



*WOOD BUFFALO*  
*ENVIRONMENTAL*  
*ASSOCIATION*

**APRIL 2015**

**MONTHLY REPORT**



CONTINUOUS MONITORING  
May 29, 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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May 29, 2015

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

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

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Enclosed is the April 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:

<b>Member</b>	<b>EPEA Approval No.</b>
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

<b>Member</b>	<b>EPEA Approval No.</b>
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.

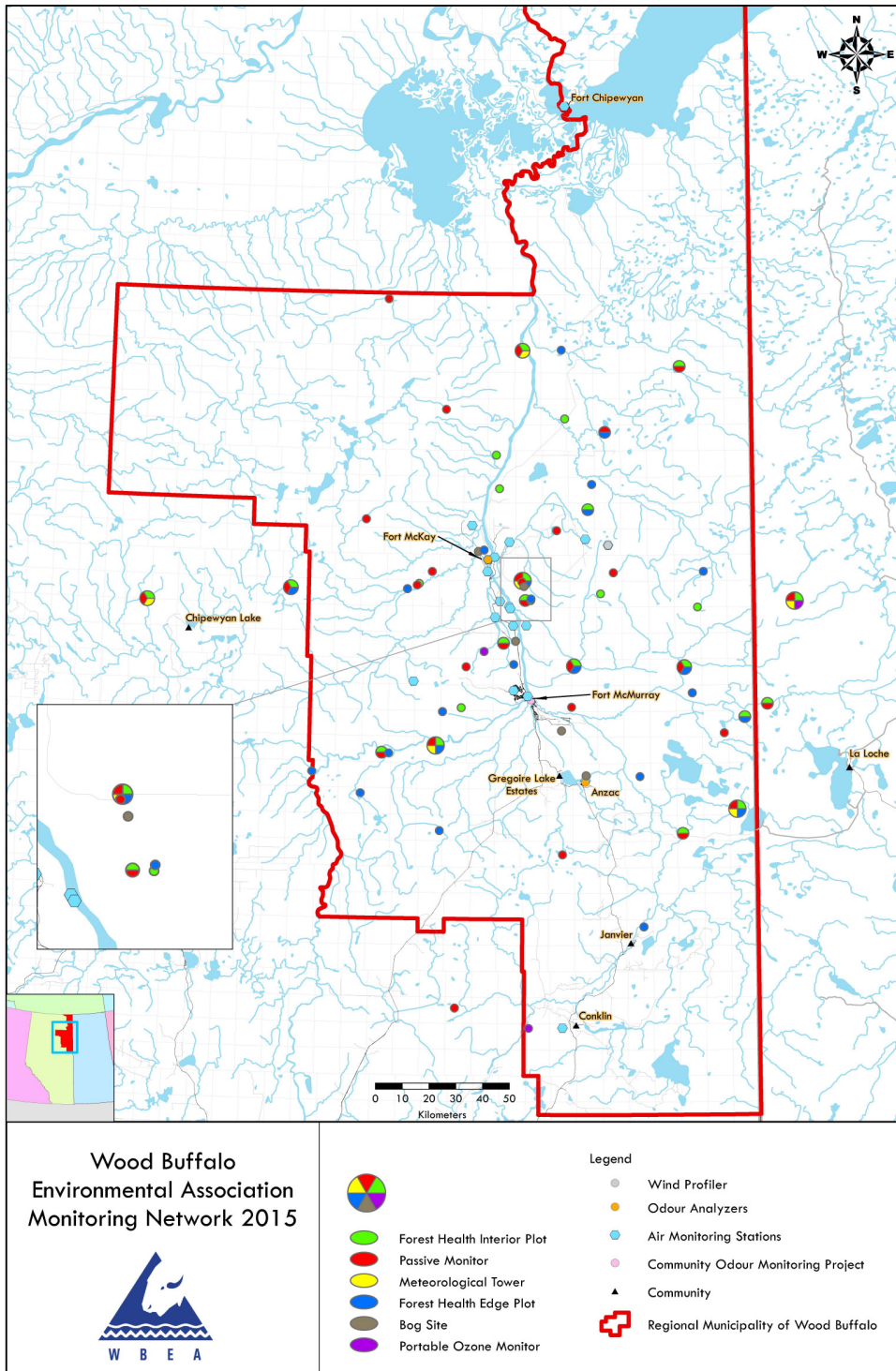


Figure 1 Map of WBEA Air Monitoring Network.

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 SO<sub>2</sub>, CO, NO<sub>2</sub>, NH<sub>3</sub>, O<sub>3</sub> and PM<sub>2.5</sub>.

There was 1 ambient ground level concentration of H<sub>2</sub>S and SO<sub>2</sub> in excess of the 1-hour H<sub>2</sub>S and SO<sub>2</sub> air quality objectives reported to Energy and Environmental Response Centre in real time.

After data processing to account for analyzer drift with baseline correction, the ambient H<sub>2</sub>S concentration was in excess of the H<sub>2</sub>S air quality objective. The ambient SO<sub>2</sub> concentration was found not to be in exceedance of the SO<sub>2</sub> objective after data processing.

Site	parameter	date/time	reference	concentration (ppb or ug/m <sup>3</sup> for PM <sub>2.5</sub> )			status*
				period	reported	final	
AMS 11 Lower Camp	H <sub>2</sub> S	27Apr15:21:00	297578	1-hour	19	19	exc
AMS 11 Lower Camp	SO <sub>2</sub>	27Apr15:21:00	297579	1-hour	172	172	nae

\*status legend:

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

## 1.1 Data Processing and Validation

Concentrations reported in near real-time were raw values. The final values were determined after processing of data for reporting. For all parameters except PM<sub>2.5</sub>, 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, NO<sub>2</sub> concentrations were re-calculated from baseline-corrected NO<sub>x</sub> and NO concentrations. Specifically, the NO concentration was subtracted from the NO<sub>x</sub> concentration to determine the NO<sub>2</sub> concentration. In cases where the NO<sub>x</sub> and/or NO values exceeded the operating range of the analyzer, values reported for NO<sub>2</sub> were determined as the largest of either the

difference between baseline-corrected NO<sub>x</sub> and NO values, or the NO<sub>2</sub> 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 April 2015, there were no incidents resulting in compliance monitoring instruments operating less than 90 % of the time.

In April 2015, there was one incident of a monitoring instrument not required for air quality compliance operating less than 90 % of the time. The normal operation of leaf wetness sensor at the Anzac air monitoring station (AMS 14) was interrupted for 220 hours due to damage by wildlife. The damaged sensor wiring was replaced on April 11 and sensor function resumed normal operation.

### **2.2 Intermittent Monitoring**

The results for passive and integrated monitoring of PAH, VOC, RSC, PM<sub>2.5</sub> and PM<sub>10</sub> 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 (NH<sub>3</sub>) 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***

A power outage at the station on April 19 affected the normal operations of all air quality analyzers for 3 hours. The NH<sub>3</sub> analyzer required an additional 2 hours for stabilization following the power outage.

Maintenance and cleaning of the sample manifold on April 14 affected the normal operations of the SO<sub>2</sub>, THC, TRS and NO<sub>2</sub> analyzers for 1 hour.

The NH<sub>3</sub> analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily spans and routine monthly multipoint calibrations. Additional

time for stabilization after exposure to high concentrations of NH<sub>3</sub> gas is an inherent behavior in the NH<sub>3</sub> analyzer operations resulting from the properties of the NH<sub>3</sub> gas. Data for 1 hour following the daily spans have been reported as invalid for a total of 30 hours this month.

Station operator activities on April 8 affected the normal operations of the SO<sub>2</sub> analyzer and solar radiation and leaf wetness sensors for 3 to 4 hours.

There were two issues associated with operation of the PM<sub>2.5</sub> analyzer resulting in 21 hours of invalid data. Maintenance to the sample inlet, flow audits and zero reference checks on April 20 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour. The PM<sub>2.5</sub> analyzer experienced six episodes of excessive baseline drifts during this reporting period, resulting in 20 hours of invalid data.

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***

Maintenance and cleaning of the sample manifold on April 2 affected the normal operations of the H<sub>2</sub>S analyzer for 1 hour.

A power spike at the station on April 7 affected the normal operations of the THC analyzer for 1 hour.

#### ***Station 3, Lower Camp B - Meteorology***

No operational issues to report.

#### ***Station 4, Buffalo Viewpoint***

No operational issues to report.

#### ***Station 5, Mannix***

Maintenance and cleaning of the sample manifold on April 7 affected the normal operations of the SO<sub>2</sub> and THC analyzers for 2 hours.

#### ***Station 6, Patricia McInnes***

Maintenance and cleaning of the sample manifold on April 10 affected the normal operations of the SO<sub>2</sub>, THC, TRS, NH<sub>3</sub> and NO<sub>2</sub> analyzers for 1 to 2 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on April 10 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.



There were two issues associated with operation of the NH<sub>3</sub> analyzer resulting in 44 hours of invalid data. The NH<sub>3</sub> analyzer required additional time to stabilize to levels below ambient concentrations following the automated daily span and routine monthly multipoint calibration periods. Additional time for stabilization after exposure to high concentrations of the NH<sub>3</sub> gas is an inherent behavior in the NH<sub>3</sub> analyzer operations resulting from the properties of the NH<sub>3</sub> gas. Data for 1 to 4 hours following the daily spans have been reported as invalid for 39 hours this month. The NH<sub>3</sub> analyzer experienced five episodes of excessive baseline drifts during this reporting period, resulting in 5 hours of invalid data.

### ***Station 7, Athabasca Valley***

Maintenance to the sample inlet, flow audits and zero reference checks on April 15 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 4 hours.

Depletion and replacement of the carrier gas cylinder at the station on April 22 affected the normal operations of the THC analyzer for 3 hours.

### ***Station 8, Fort Chipewyan***

Maintenance to the sample inlet, flow audits and zero reference checks on April 1 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

The NO<sub>2</sub> analyzer experienced a single episode of baseline drift on April 28 resulting in 1 hour of invalid data.

The solar radiation sensor experienced multiple episodes of interferences on its sensor surface which resulted in inconsistent measurements. Data for these periods were flagged, resulting in 11 hours of invalid data.

Flat-lines in the output signals of the wind sensor resulted in 14 hours of invalid data this reporting period.

### ***Station 9, Barge Landing***

Maintenance and cleaning of the sample manifold on April 9 affected the normal operations of the THC analyzer for 1 hour.

Power spikes at the station on April 19 affected the normal operations of the THC and TRS analyzers for 1 to 2 hours.

Flat-lines in the output signals of the wind sensor resulted in 12 hours of invalid data this reporting period.

### ***Station 11, Lower Camp***

Maintenance and cleaning of the sample manifold on April 14 affected the normal operations of the SO<sub>2</sub> and THC analyzers for 1 hour.

A power interruption at the station on April 22 affected the normal operations of the air quality analyzers and meteorological sensors for up to 24 hours.

The H<sub>2</sub>S analyzer experienced multiple episodes of excessive baseline drifts this month, resulting in 30 hours of invalid data. The thermal converter for the H<sub>2</sub>S analyzer was repaired on April 15 to minimize baseline drifts.

### ***Station 12, Millennium Mine***

The data acquisition system failed to record data on April 2 resulting in the absence of data for 13 hours for all parameters. The air quality analyzers required maintenance checks resulting in an additional 1 to 13 hours of invalid data.

Maintenance and cleaning of the sample manifold on April 28 affected the normal operations of the TRS analyzer for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on April 29 and 30 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

Maintenance on the daily zero and span systems and confirmation of THC analyzer responses on April 29 interrupted the normal operations of this analyzer for 4 hours.

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

### ***Station 13, Fort McKay South***

Maintenance and verification of air flow and pressure sensors in the THC analyzer on April 9 interrupted the normal operations of the analyzer for 1 hour.

The normal operations of the NO<sub>x</sub> analyzer was interrupted on April 9 for 1 hour to confirm the analyzer responses to in-situ calibrator O<sub>3</sub> concentrations. These O<sub>3</sub> concentration responses were used in subsequent calibration of the O<sub>3</sub> analyzer at the station.

Maintenance to the sample inlet, flow audits and zero reference checks on April 10 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 2 hours.

A power outage at the station on April 19 affected the normal operations of all air quality analyzers for 11 hours. The PM<sub>2.5</sub> analyzer required an additional 7 hours for stabilization following the power outage.

The PM<sub>2.5</sub> analyzer experienced a single episode of baseline drift on April 27, resulting in 1 hour of invalid data.

#### ***Station 14, Anzac***

The SO<sub>2</sub> analyzer experienced three episodes of intermittent unstable operation this month, resulting in 45 hours of invalid data.

Maintenance on the daily zero and span systems and confirmation of O<sub>3</sub> analyzer responses on April 4 interrupted the normal operations of this analyzer for 5 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on April 15 and 27 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

A power interruption at the station on April 19 affected the normal operations of the TRS, O<sub>3</sub> and PM<sub>2.5</sub> analyzers for 5 hours.

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

The normal operation of leaf wetness sensor was interrupted this reporting month for 220 hours due to damage by wildlife. The damaged sensor wiring was replaced on April 11 and sensor function resumed normal operation.

#### ***Station 15, CNRL Horizon***

Maintenance to the sample inlet, flow audits, zero reference checks and sample pump repair on April 8 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 10 hours.

Maintenance and cleaning of the sample manifold on April 22 affected the normal operations of the TRS analyzer for 2 hours.

Flat-lines in the output signals of the wind sensor resulted in 11 hours of invalid data this reporting period.

#### ***Station 16, Shell Muskeg River***

Maintenance to the sample inlet, flow audits and zero reference checks on April 10 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 2 hours.

#### ***Station 17, Wapasu***

Maintenance to the sample inlet, flow audits and zero reference checks on April 2 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.

A power outage at the station on April 8 interrupted the normal operations of all parameters for 4 hours.

The H<sub>2</sub>S analyzer experienced multiple episodes of intermittent unstable operation this reporting month resulting in 14 hours of invalid data.

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

***Station 19, Firebag***

Flat-lines in the output signals of the wind sensor resulted in 3 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 SO<sub>2</sub>, H<sub>2</sub>S, NO, NO<sub>2</sub>, NO<sub>x</sub> and meteorological sensors for ambient temperature, relative humidity, and wind speed and direction.

The SO<sub>2</sub> analyzer experienced two episodes of excessive baseline drifts resulting in 11 hours of invalid data this reporting period.

Maintenance and cleaning of the sample manifold on April 21 affected the normal operations of the H<sub>2</sub>S and NO<sub>2</sub> analyzers for 1 hour.

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

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

APRIL 2015

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	4	2015					
254465-00-00							
149968-00-01							
48522-01-00	CONTINUOUS AMBIENT MONITORING						
240008-00-03			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	SO2(ppm)	1	98.89	0.026	0	0.005	0
189942-00-02	SO2(ppm)	2	100.00	0.025	0	0.008	0
206355-00-00	SO2(ppm)	4	100.00	0.028	0	0.005	0
46586-00-00	SO2(ppm)	5	99.72	0.076	0	0.020	0
216466-00-04	SO2(ppm)	6	99.86	0.036	0	0.005	0
137467-00-00	SO2(ppm)	7	100.00	0.014	0	0.003	0
20809-01-00	SO2(ppm)	8	100.00	0.004	0	0.001	0
241311-00-00	SO2(ppm)	11	96.67	0.172	0	0.015	0
094-02-00	SO2(ppm)	12	96.39	0.009	0	0.002	0
305529-00-00	SO2(ppm)	13	98.47	0.038	0	0.005	0
026-02-00	SO2(ppm)	14	93.75	0.005	0	0.001	0
228044-00-00	SO2(ppm)	15	100.00	0.027	0	0.003	0
73203-01-00	SO2(ppm)	16	100.00	0.025	0	0.005	0
	SO2(ppm)	17	99.44	0.019	0	0.004	0
	SO2(ppm)	19	100.00	0.027	0	0.004	0
	SO2(ppm)	502	97.78	0.008	0	0.003	0
	H2S(ppm)	2	99.86	0.004	0	0.001	0
	H2S(ppm)	4	100.00	0.002	0	0.000	0
	H2S(ppm)	5	100.00	0.008	0	0.001	0
	H2S(ppm)	11	92.50	0.019	1	0.002	0
	H2S(ppm)	17	97.50	0.001	0	0.000	0
	H2S(ppm)	19	100.00	0.004	0	0.001	0
	H2S(ppm)	502	99.58	0.004	0	0.001	0
	TRS(ppm)	1	99.44	0.002	0	0.001	0
	TRS(ppm)	6	99.86	0.001	0	0.001	0
	TRS(ppm)	7	100.00	0.001	0	0.000	0
	TRS(ppm)	9	99.86	0.002	0	0.000	0
	TRS(ppm)	12	98.06	0.001	0	0.000	0
	TRS(ppm)	13	98.47	0.002	0	0.000	0
	TRS(ppm)	14	99.31	0.001	0	0.000	0
	TRS(ppm)	15	99.72	0.001	0	0.000	0
	THC(ppm)	1	99.44	3.0	-	2.1	-
	THC(ppm)	2	99.86	5.5	-	3.1	-
	THC(ppm)	4	100.00	3.5	-	2.4	-
	THC(ppm)	5	99.72	3.6	-	2.4	-
	THC(ppm)	6	99.44	2.2	-	2.0	-
	THC(ppm)	7	99.58	2.9	-	2.0	-
	THC(ppm)	9	99.58	3.3	-	2.5	-
	THC(ppm)	11	96.81	4.5	-	2.8	-
	THC(ppm)	12	95.97	4.3	-	2.4	-
	THC(ppm)	13	98.33	4.4	-	2.5	-
	THC(ppm)	14	100.00	2.4	-	2.0	-
	THC(ppm)	15	100.00	4.2	-	2.5	-
	THC(ppm)	16	100.00	4.6	-	3.1	-
	THC(ppm)	17	99.44	2.5	-	2.2	-
	THC(ppm)	19	100.00	2.6	-	2.2	-
	O3(ppm)	1	99.58	0.052	0	0.044	-
	O3(ppm)	6	100.00	0.050	0	0.041	-

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

APRIL 2015

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48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	O3(ppm)	7	7.00	0.051	0	0.042	-
206355-00-00	O3(ppm)	8	8.00	0.052	0	0.047	-
46586-00-00	O3(ppm)	13	13.00	0.048	0	0.038	-
216466-00-04	O3(ppm)	14	14.00	0.059	0	0.046	-
137467-00-00	O3(ppm)	17	17.00	0.058	0	0.048	-
20809-01-00	NO2(ppm)	1	1.00	0.030	0	0.010	-
241311-00-02	NO2(ppm)	6	6.00	0.032	0	0.007	-
094-02-00	NO2(ppm)	7	7.00	0.030	0	0.011	-
305529-00-00	NO2(ppm)	8	8.00	0.010	0	0.002	-
026-02-00	NO2(ppm)	12	12.00	0.044	0	0.017	-
228044-00-00	NO2(ppm)	13	13.00	0.028	0	0.007	-
73203-01-00	NO2(ppm)	14	14.00	0.009	0	0.002	-
	NO2(ppm)	15	15.00	0.036	0	0.008	-
	NO2(ppm)	16	16.00	0.042	0	0.018	-
	NO2(ppm)	17	17.00	0.018	0	0.007	-
	NO2(ppm)	19	19.00	0.039	0	0.008	-
	NO2(ppm)	502	502.00	0.029	0	0.006	-
	CO(ppm)	7	7.00	0.4	-	0.1	0
	NH3(ppm)	1	1.00	0	-	0	0
	NH3(ppm)	6	6.00	0	-	0	0
	PM2.5(ug/m <sup>3</sup> )	1	1.00	48.2	-	14	0
	PM2.5(ug/m <sup>3</sup> )	6	6.00	20.9	-	6.8	0
	PM2.5(ug/m <sup>3</sup> )	7	7.00	54.2	-	16.8	0
	PM2.5(ug/m <sup>3</sup> )	8	8.00	98	-	7.5	0
	PM2.5(ug/m <sup>3</sup> )	12	12.00	86.7	-	16.3	0
	PM2.5(ug/m <sup>3</sup> )	13	13.00	27.9	-	11.5	0
	PM2.5(ug/m <sup>3</sup> )	14	14.00	12.6	-	6.2	0
	PM2.5(ug/m <sup>3</sup> )	15	15.00	51	-	11.2	0
	PM2.5(ug/m <sup>3</sup> )	16	16.00	62.3	-	15.2	0
	PM2.5(ug/m <sup>3</sup> )	17	17.00	11	-	7.4	0
	WIND	1	1.00	-	-	-	-
	WIND	2	2.00	-	-	-	-
	WIND	4	4.00	-	-	-	-
	WIND	5	5.00	-	-	-	-
	WIND	6	6.00	-	-	-	-
	WIND	7	7.00	-	-	-	-
	WIND	8	8.00	-	-	-	-
	WIND	9	9.00	-	-	-	-
	WIND	11	11.00	-	-	-	-
	WIND	12	12.00	-	-	-	-
	WIND	13	13.00	-	-	-	-
	WIND	14	14.00	-	-	-	-
	WIND	15	15.00	-	-	-	-
	WIND	16	16.00	-	-	-	-
	WIND	17	17.00	-	-	-	-
	WIND	19	19.00	-	-	-	-
	WIND	502	502.00	-	-	-	-
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**  
**APRIL 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

May 29, 2015

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

APRIL 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	677	35	43	98.89	26	0	5	0
TRS(ppb) Average	682	34	38	99.44	2	0	1	0
THC(ppm) Average	681	35	39	99.44	3	-	2.1	-
NMHC(ppm) Average	681	35	39	99.44	0.101	-	0.009	-
CH4(ppm) Average	681	35	39	99.44	3	-	2.1	-
O3 (ppb) Average	683	34	37	99.58	52	0	44	-
NO2 (ppb) Average	681	35	39	99.44	30	0	10	-
NO (ppb) Average	681	35	39	99.44	25	-	3	-
NOX (ppb) Average	681	35	39	99.44	40	-	11	-
NH3 (ppb) Average	640	45	80	95.14	0	0	0	-
PM2.5 (ug/m3) Average	699	0	21	97.08	48.2	-	14.0	0
Wind Speed 10 m (km/h) Average	720	0	0	100.00	19	-	12	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	24.3	-	15.1	-
Temperature 10 m (C) Average	720	0	0	100.00	24.1	-	15.9	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	73	-
Precipitation (mm) Total	720	0	0	100.00	0.8	-	0.8	-
Surface Wetness (% of range) Average	717	0	3	99.58	35	-	7	-
Global Solar Radiation (W/m2) Average	716	0	4	99.44	790	-	280	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS 1)  
 APRIL 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	677	0.9	3	-	0	0	0	0	0	1	26
TRS (ppb) Average	682	0.5	0	-	0	0	0	0	0	1	2
THC (ppm) Average	681	1.9	0.1	-	1.8	1.8	1.8	1.9	1.9	2	3
NMHC(ppm) Average	681	0.001	0.008	-	0	0	0	0	0	0	0.101
CH4(ppm) Average	681	1.9	0.1	-	1.8	1.8	1.8	1.9	1.9	2	3
O3 (ppb) Average	683	33	10	-	4	16	27	35	41	45	52
NO2 (ppb) Average	681	4.4	5	-	0	0	1	3	6	11	30
NO (ppb) Average	681	0.9	2	-	0	0	0	0	1	2	25
NOX (ppb) Average	681	5.3	6	-	0	0	1	3	7	13	40
NH3 (ppb) Average	640	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	699	5.15	4.9	-	0.1	1.1	2.6	3.8	6.2	10	48.2
Wind Speed 10 m (km/h) Average	720	7.9	4	-	0	3	5	7	11	14	19
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	4.53	8.2	-	-16.3	-5.2	-1.6	4.2	10.9	15	24.3
Temperature 10 m (C) Average	720	5.02	7.8	-	-15.1	-5.1	-0.6	5.1	10.9	14.5	24.1
Relative Humidity (%) Average	720	47.8	21	-	13	22	31	43	64	80	98
Precipitation (mm) Total	720	-	-	1.27	0	0	0	0	0	0	0.8
Surface Wetness (% of range) Average	717	0.4	3	-	0	0	0	0	0	0	35
Global Solar Radiation (W/m2) Average	716	205.8	243	-	0	0	0	59	410	599	790

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	19 Apr 2015 15:00	19 Apr 2015 17:00	3	Station power failure
SO2	08 Apr 2015 12:00	08 Apr 2015 15:00	4	Maintenance - removed PFGC from site
SO2	14 Apr 2015 13:00	14 Apr 2015 13:00	1	Maintenance - manifold cleaning
TRS	14 Apr 2015 13:00	14 Apr 2015 13:00	1	Maintenance - manifold cleaning
NMHC, CH4, THC	14 Apr 2015 13:00	14 Apr 2015 13:00	1	Maintenance - manifold cleaning
NO2, NO, NOX	14 Apr 2015 13:00	14 Apr 2015 13:00	1	Maintenance - manifold cleaning
NH3	01 Apr 2015 06:00	30 Apr 2015 05:00	30	Stabilization after daily span
NH3	19 Apr 2015 15:00	19 Apr 2015 19:00	5	Station power failure followed by stabilization period
PM2.5	11 Apr 2015 15:00	11 Apr 2015 17:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	12 Apr 2015 14:00	12 Apr 2015 15:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	12 Apr 2015 18:00	12 Apr 2015 21:00	4	Intermittent unstable operation - excessive baseline drift
PM2.5	13 Apr 2015 14:00	13 Apr 2015 18:00	5	Intermittent unstable operation - excessive baseline drift
PM2.5	18 Apr 2015 13:00	18 Apr 2015 15:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	18 Apr 2015 17:00	18 Apr 2015 19:00	3	Intermittent unstable operation - excessive baseline drift
PM2.5	20 Apr 2015 13:00	20 Apr 2015 13:00	1	Maintenance - Flow and zero check, sample head cleaning
Surface Leaf Wetness	08 Apr 2015 12:00	08 Apr 2015 14:00	3	Maintenance - removed PFGC from site
Solar Global Radiation	08 Apr 2015 11:00	08 Apr 2015 14:00	4	Maintenance - removed PFGC from site

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Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 26 ppb on Apr 28 11:00	Maximum Daily Average: 5.0 ppb on Apr 26
Minimum Value: 0 ppb on Apr 5 19:00	Hours of Data: 677
Maximum Diurnal Average: 3.1 ppb at hour 11	Hours of Missing Data: 43
Monthly Average: 0.9 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.0 ppb on Apr 12	Percent Operational Time: 98.9
Minimum Diurnal Average: 0.1 ppb at hour 5	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 14	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Apr	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0.5	1
3-Apr	0	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0.4	1
4-Apr	0	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
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	Z	0	0	0	0	0	0	0	1	2	3	6	16	7	2	4	3	2	1	1	1	1	0	0	2.2	16
7-Apr	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
8-Apr	0	0	Z	0	0	0	0	0	0	0	0	M	M	M	M	0	0	0	0	0	0	0	0	0	0.1	0
9-Apr	0	0	0	Z	0	0	5	8	9	25	15	8	1	0	0	1	0	1	0	0	0	1	0	0	3.3	25
10-Apr	0	0	0	0	Z	1	1	2	2	1	2	2	0	0	1	1	1	2	2	1	1	2	1	2	1.2	2
11-Apr	1	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
12-Apr	Z	0	0	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-Apr	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.2	0
14-Apr	0	0	Z	0	0	0	0	0	0	0	2	2	M	11	14	7	3	2	1	3	2	0	1	1	2.3	14
15-Apr	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1
17-Apr	0	0	0	0	0	Z	1	1	1	3	7	13	1	0	0	0	1	0	0	0	0	0	0	0	1.3	13
18-Apr	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0.2	1
19-Apr	0	Z	0	0	0	0	1	1	1	1	1	1	0	1	PF	PF	PF	0	1	0	0	1	2	1	0.7	2
20-Apr	1	1	Z	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	0	0	1	0	0	0.4	1
21-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Apr	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0.4	1
26-Apr	0	0	Z	0	0	0	1	4	13	15	12	9	7	6	8	9	8	6	7	6	2	1	0	0	5.0	15
27-Apr	0	0	1	Z	0	0	0	4	11	16	14	1	1	1	0	0	0	0	0	0	0	0	0	0	2.3	16
28-Apr	1	0	0	0	Z	0	1	4	6	12	26	13	3	1	3	2	1	3	4	0	3	2	3	0	3.9	26
29-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

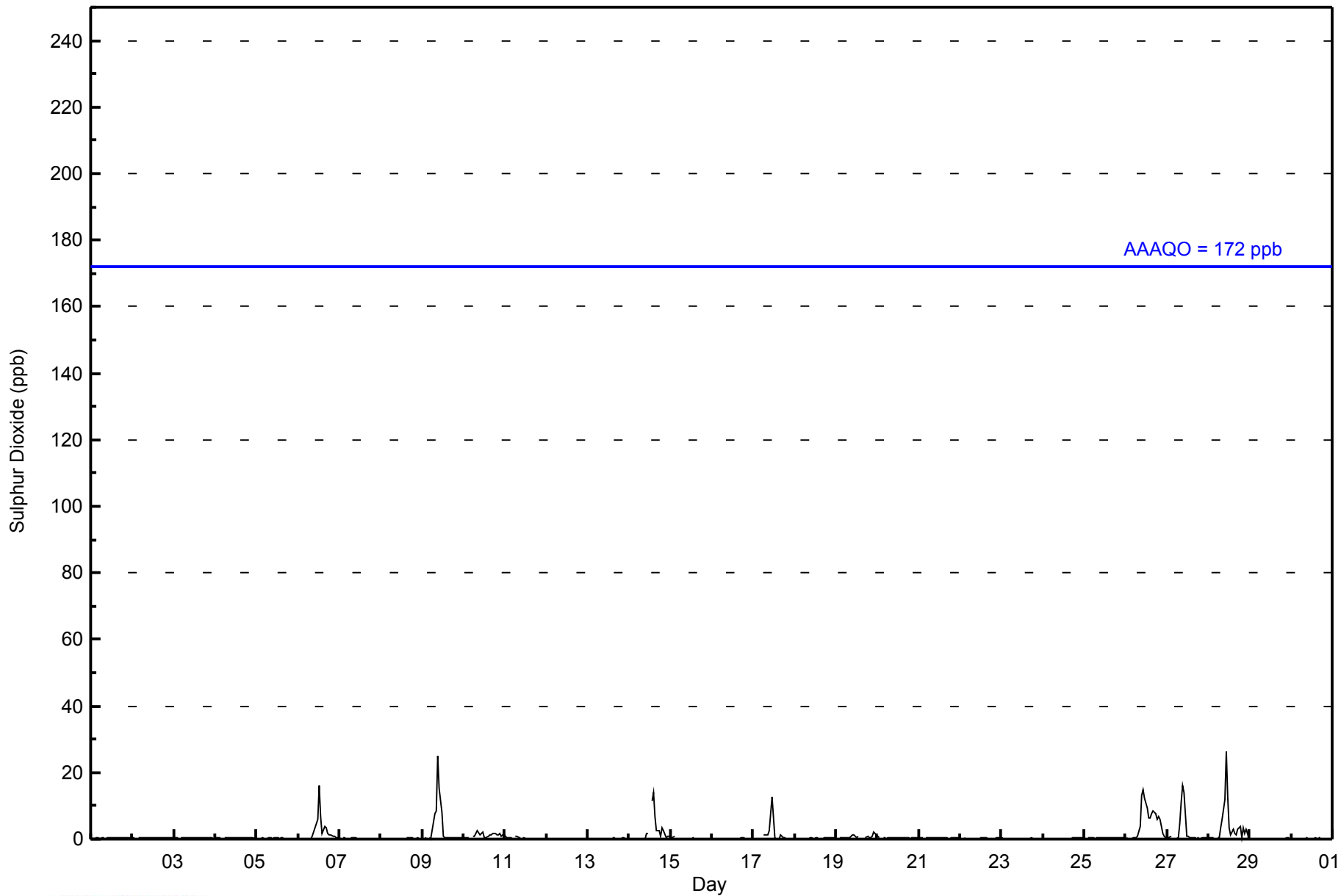
0.3	0.2	0.2	0.2	0.1	0.2	0.4	0.8	1.3	2.7	3.1	2.2	1.3	1.2	1.1	0.9	0.8	0.8	0.7	0.6	0.7	0.4	0.5	0.3	Diurnal Average	
1	1	1	0	0	1	5	8	11	25	26	13	16	11	14	8	9	8	6	7	6	2	3	2	Diurnal Maximum	

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 (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	662	97.78	97.78
11 - 20	13	1.92	99.70
21 - 60	2	0.30	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: 677

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 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	40	74	40	36	36	14	19	20	74	74	41	35	38	51	42	28	662
11 - 20	0	0	0	0	0	0	0	3	10	0	0	0	0	0	0	0	13
21 - 60	0	0	0	0	0	0	0	0	2	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
<b>Totals</b>	40	74	40	36	36	14	19	23	86	74	41	35	38	51	42	28	677

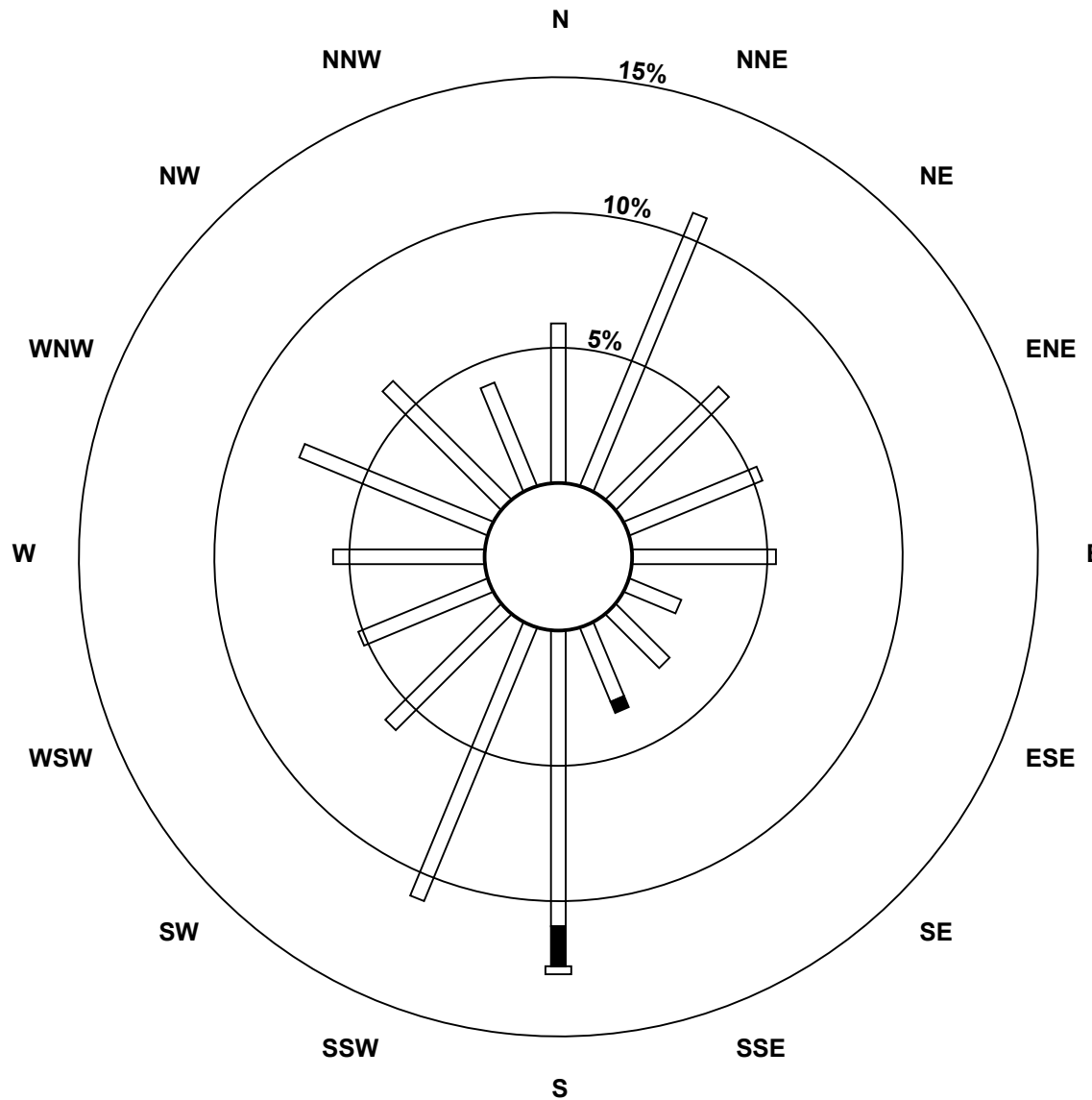
Total Number of Valid Hours: 677

Total Number of Hours: 720

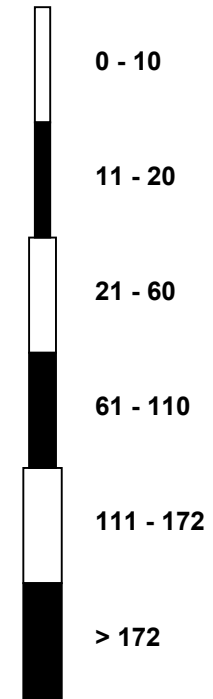


**Wood Buffalo Environmental Association  
Wind Rose Apr 2015**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)**



Classes (ppb)

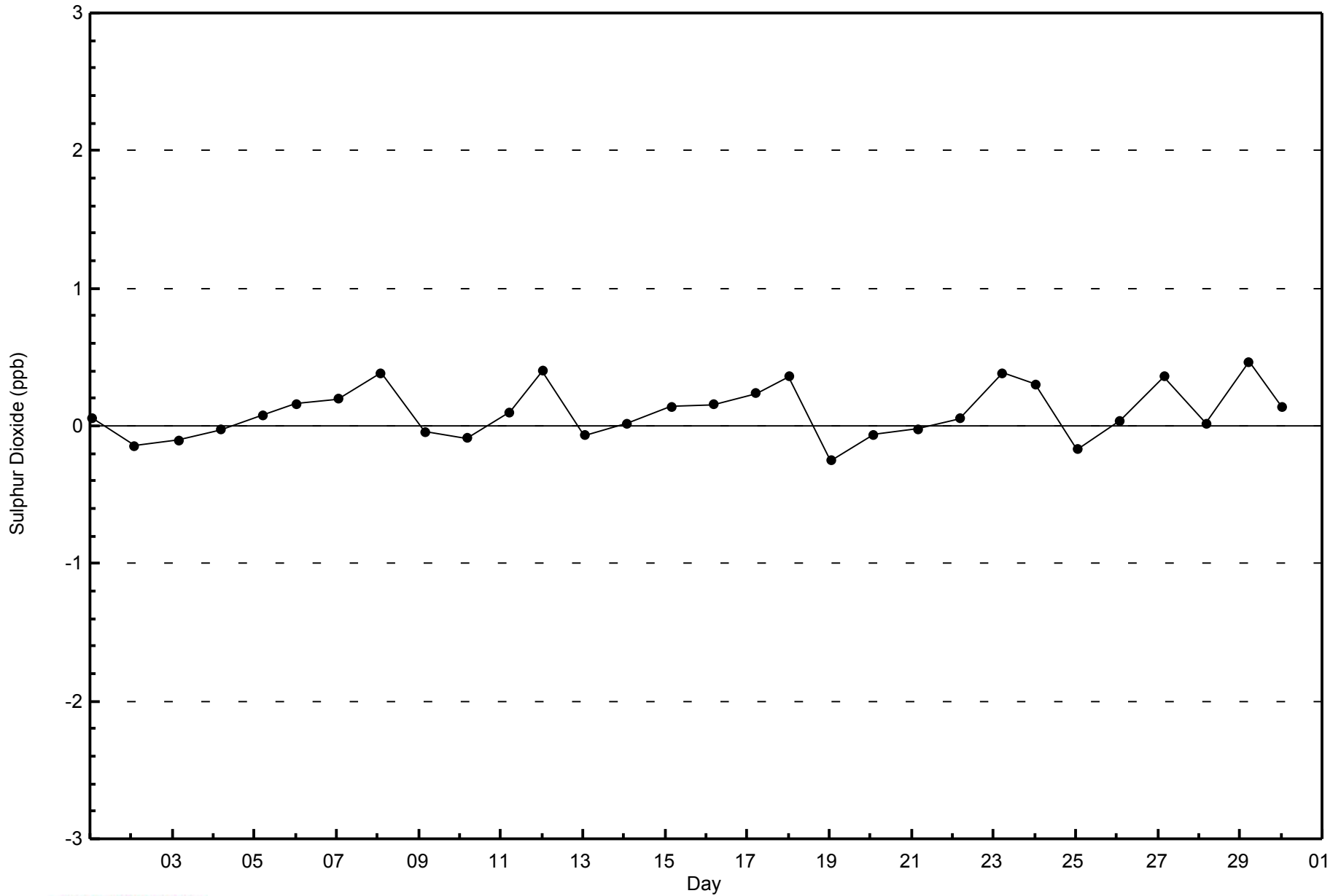


Total Number of Valid Hours: 677



WBEA  
Zero Responses

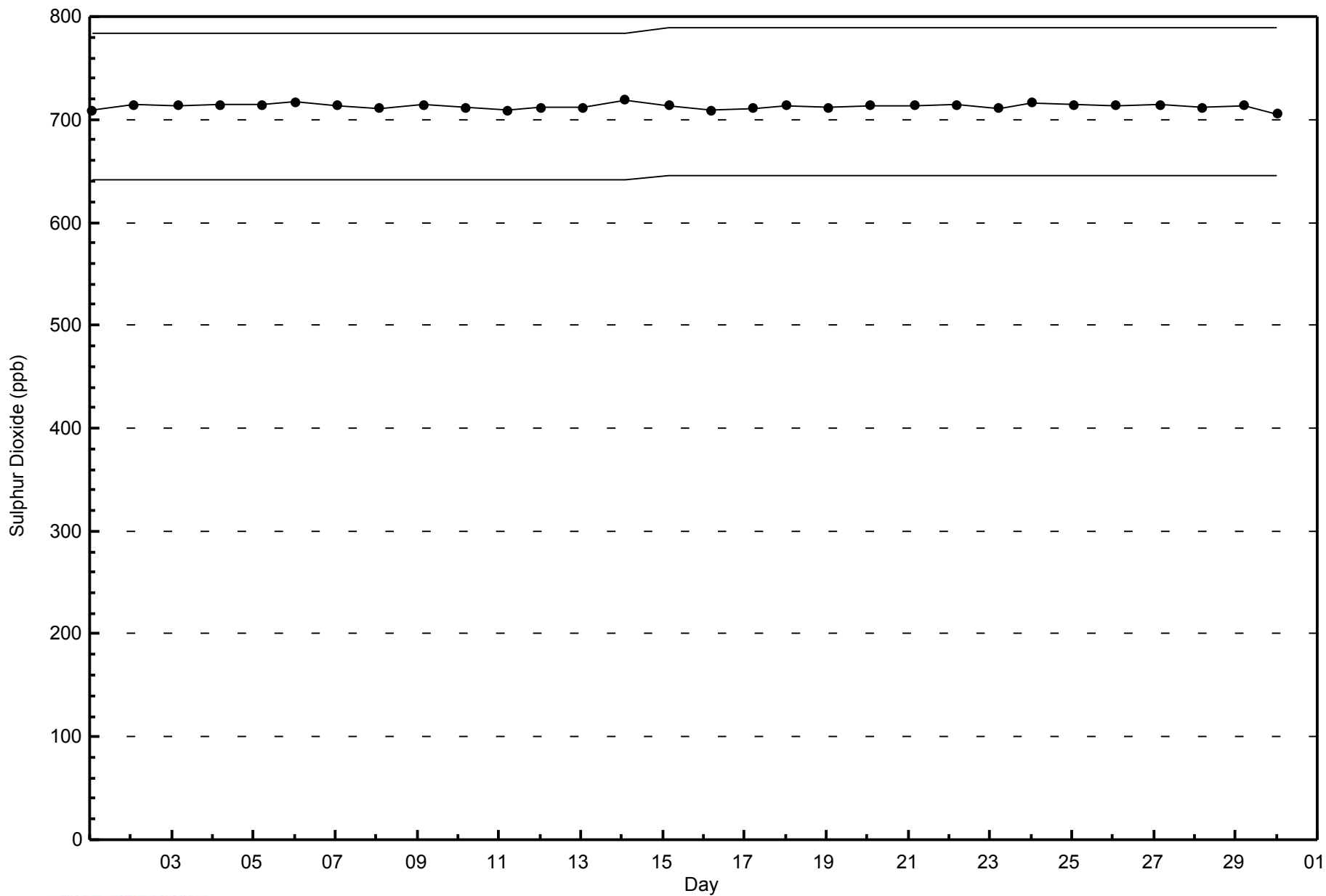
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Apr 9 10:00	Maximum Daily Average: 0.8 ppb on Apr 28		Hours of Data:	682
Minimum Value: 0 ppb on Apr 26 03:00	Minimum Daily Average: 0.4 ppb on Apr 25		Hours of Missing Data:	38
Maximum Diurnal Average: 0.7 ppb at hour 8	Minimum Diurnal Average: 0.4 ppb at hour 16		Hours of Calibration:	34
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		Percent Operational Time:	99.4

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

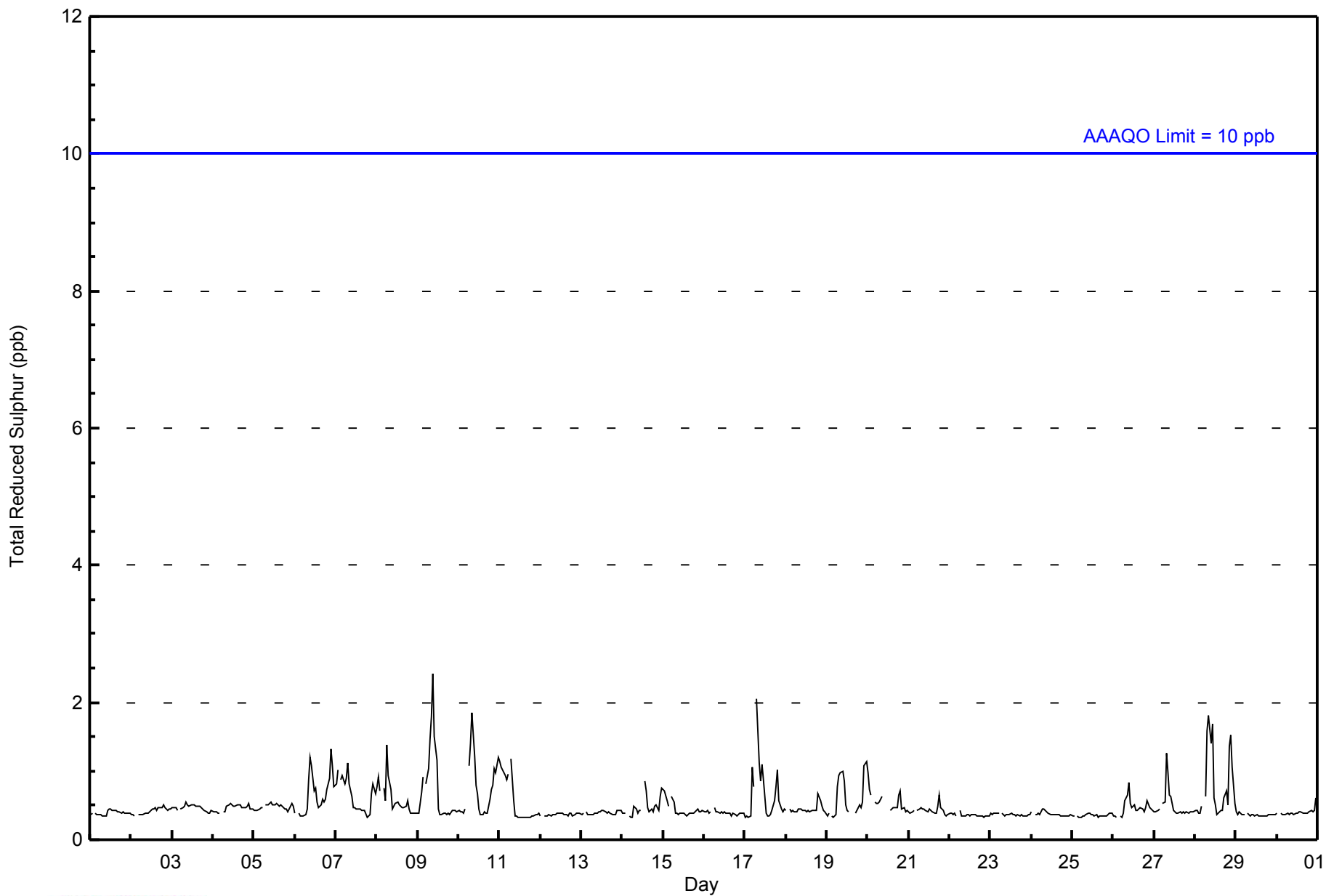
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Diurnal Average
1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	682	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: 682

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

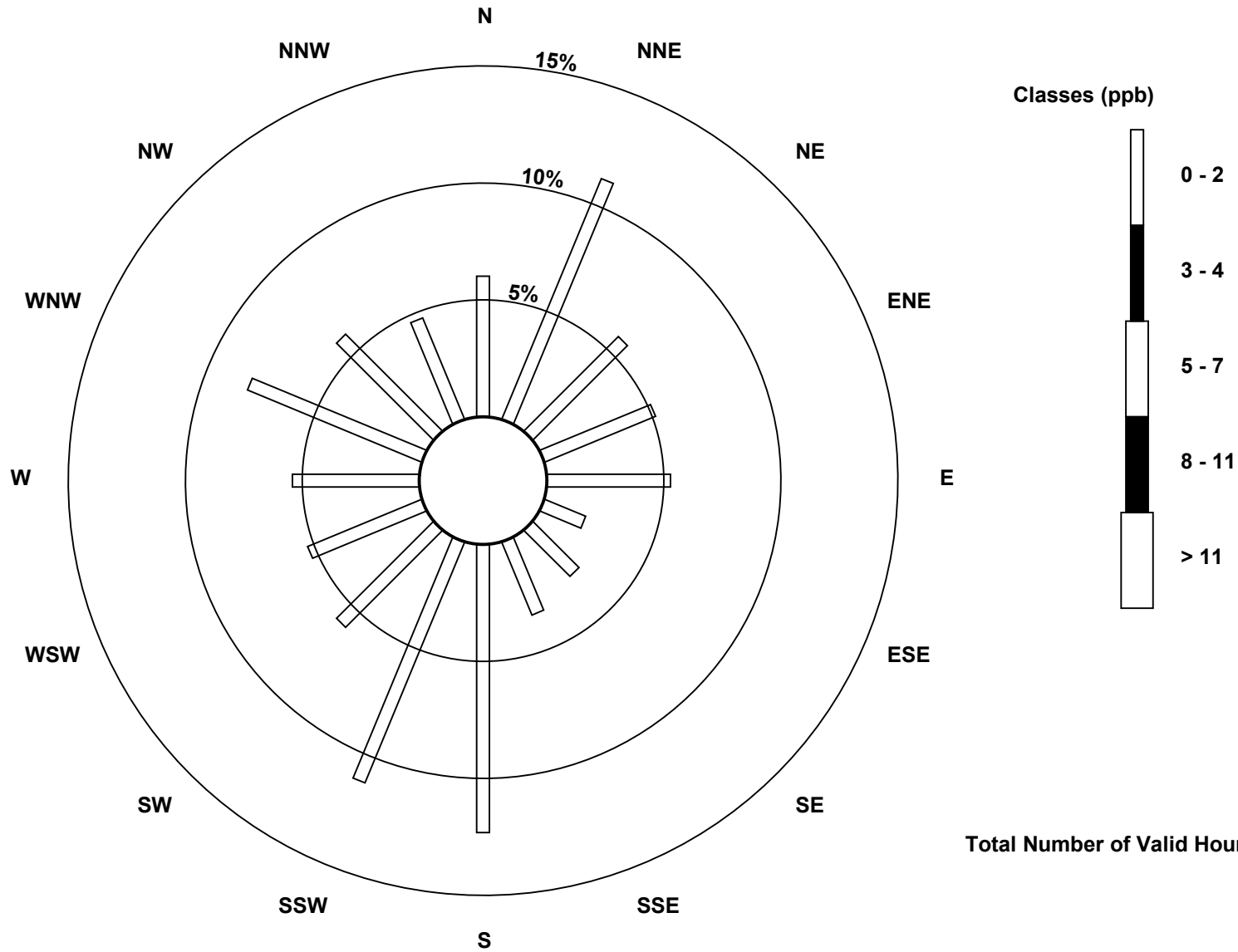
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	41	76	39	35	36	13	19	23	84	76	40	36	37	55	40	32	682
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	76	39	35	36	13	19	23	84	76	40	36	37	55	40	32	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

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



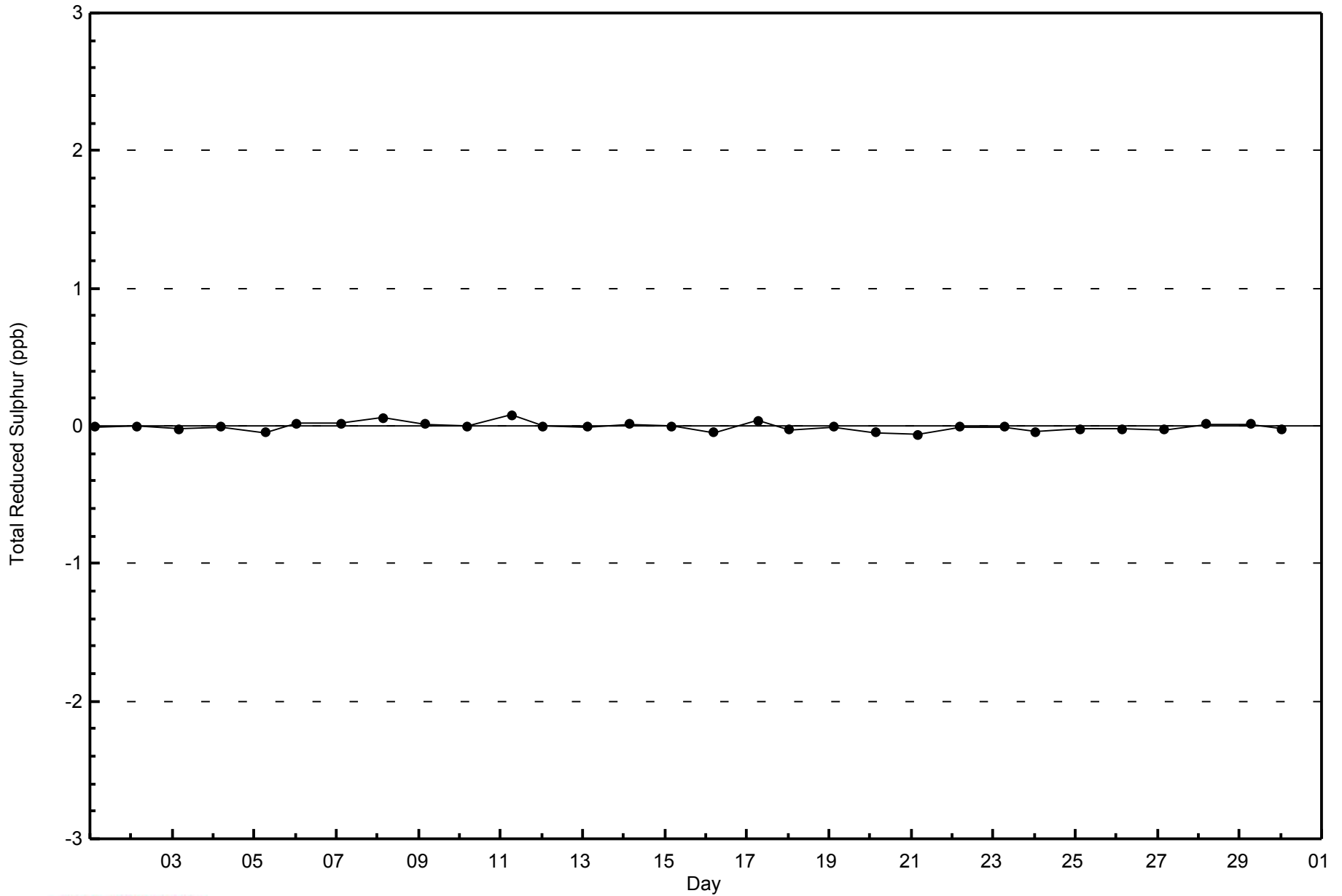
**Total Number of Valid Hours: 682**





**WBEA**  
**Zero Responses**

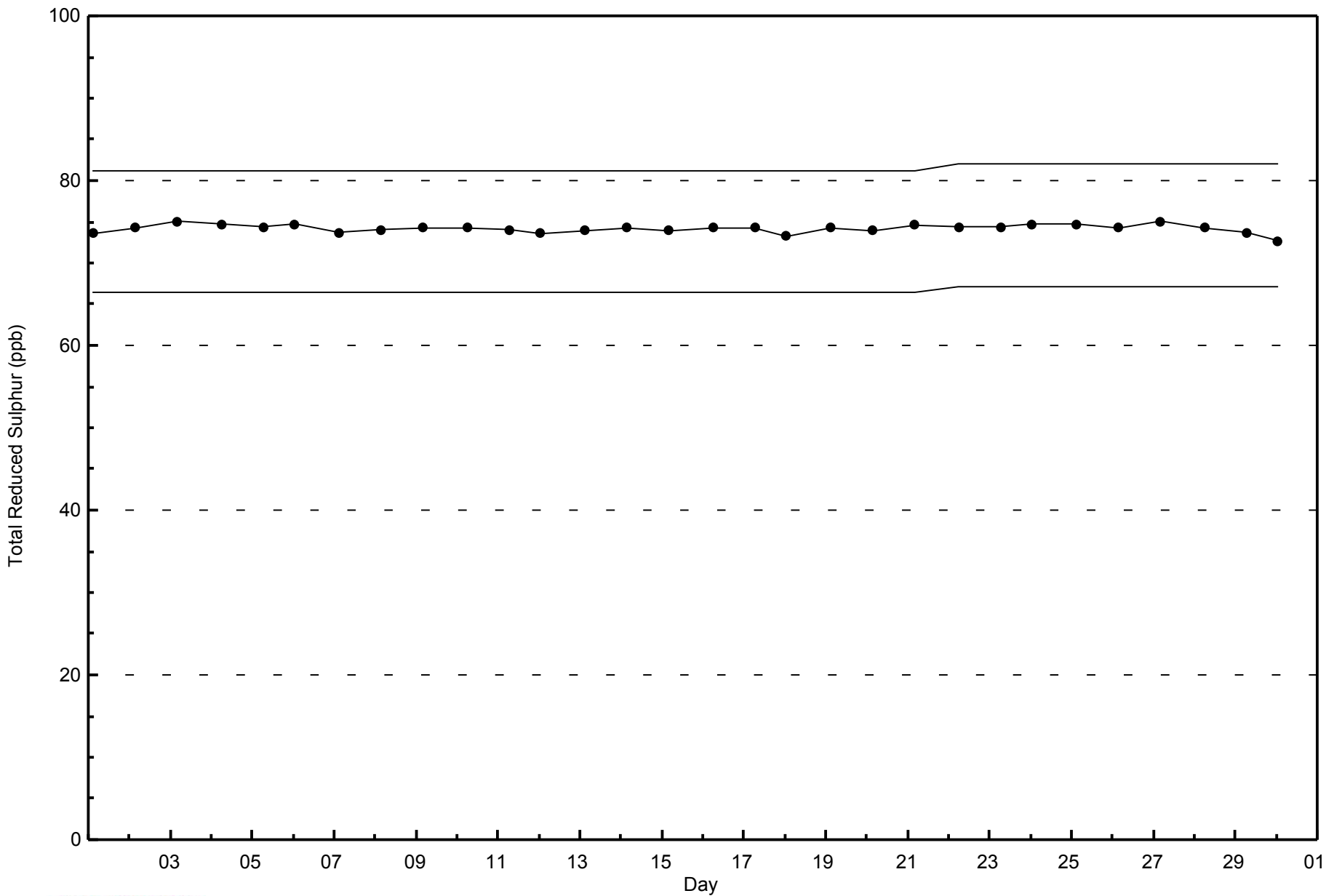
**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**





**WBEA**  
**Span Responses**

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



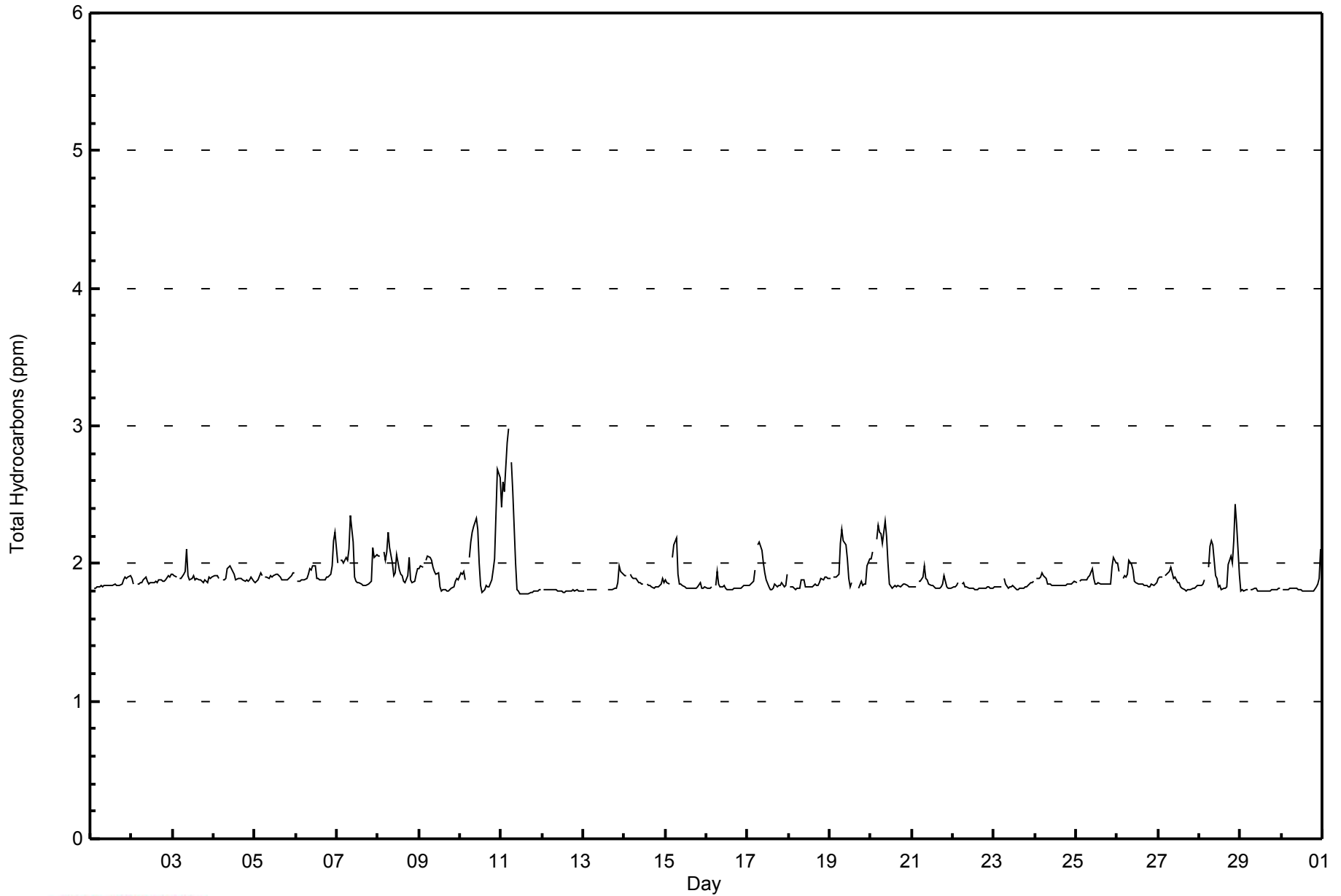


Maximum Value: 3.0 ppm on Apr 11 05:00																			Maximum Daily Average: 2.1 ppm on Apr 11						Hours in Service: 720		
Minimum Value: 1.8 ppm on Apr 11 14:00																			Minimum Daily Average: 1.8 ppm on Apr 12						Hours of Data: 681		
Maximum Diurnal Average: 2.0 ppm at hour 7																			Minimum Diurnal Average: 1.8 ppm at hour 16						Hours of Missing Data: 39		
Monthly Average: 1.90 ppm																			Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.8 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.5						Hours of Calibration: 35		
																									Percent Operational Time: 99.4		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	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	1.9	1.9	1.9	1.9	1.9	1.8	1.9	
2-Apr	1.9	1.9	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
3-Apr	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1
4-Apr	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Apr	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
6-Apr	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	2.2	1.9	2.2	
7-Apr	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.2	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.1	2.0	2.1	2.0	2.3	
8-Apr	2.1	2.1	Z	2.1	2.0	2.1	2.2	2.1	2.0	1.9	1.9	2.1	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	2.2	
9-Apr	2.0	2.0	2.0	Z	2.0	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.1	
10-Apr	1.9	1.9	1.9	1.9	Z	2.0	2.2	2.2	2.3	2.3	2.3	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.4	2.7	2.6	2.1	2.7	
11-Apr	2.4	2.6	2.5	2.9	3.0	Z	2.7	2.5	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	2.1	3.0	
12-Apr	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	
13-Apr	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	C	C	C	C	C	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.9	1.8	2.0	
14-Apr	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	M	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	
15-Apr	1.9	1.9	1.8	Z	2.0	2.1	2.2	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.2	
16-Apr	1.8	1.8	1.8	1.8	Z	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	
17-Apr	1.8	1.8	1.8	1.9	2.0	Z	2.1	2.2	2.1	2.0	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.9	1.8	1.8	1.9	2.2	
18-Apr	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
19-Apr	1.9	Z	1.9	1.9	1.9	1.9	2.2	2.2	2.2	2.1	2.0	1.9	1.8	1.9	PF	PF	PF	1.8	1.9	1.8	1.9	1.9	2.0	2.0	2.0	2.2	
20-Apr	2.0	2.1	Z	2.2	2.3	2.2	2.2	2.1	2.3	2.2	2.0	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	2.0	2.3	
21-Apr	1.8	1.8	1.8	Z	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	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.9	2.0	
22-Apr	1.8	1.8	1.8	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	
23-Apr	1.8	1.8	1.8	1.8	1.8	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	1.9	1.9	1.9	1.8	1.9	
24-Apr	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	
25-Apr	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	2.0	2.0	2.0	1.9	
26-Apr	2.0	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.9	1.9	1.9	2.0	
27-Apr	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	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	
28-Apr	1.8	1.8	1.8	1.9	Z	2.0	2.1	2.2	2.1	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.1	2.0	2.2	2.4	2.3	1.9	2.0	2.4	
29-Apr	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	1.8	1.8	1.8	1.8	
30-Apr	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	2.1	
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan      C - Calibration      M - Maintenance      PF - Power Failure																											



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	625	91.78	91.78
2.1 - 3.0	56	8.22	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

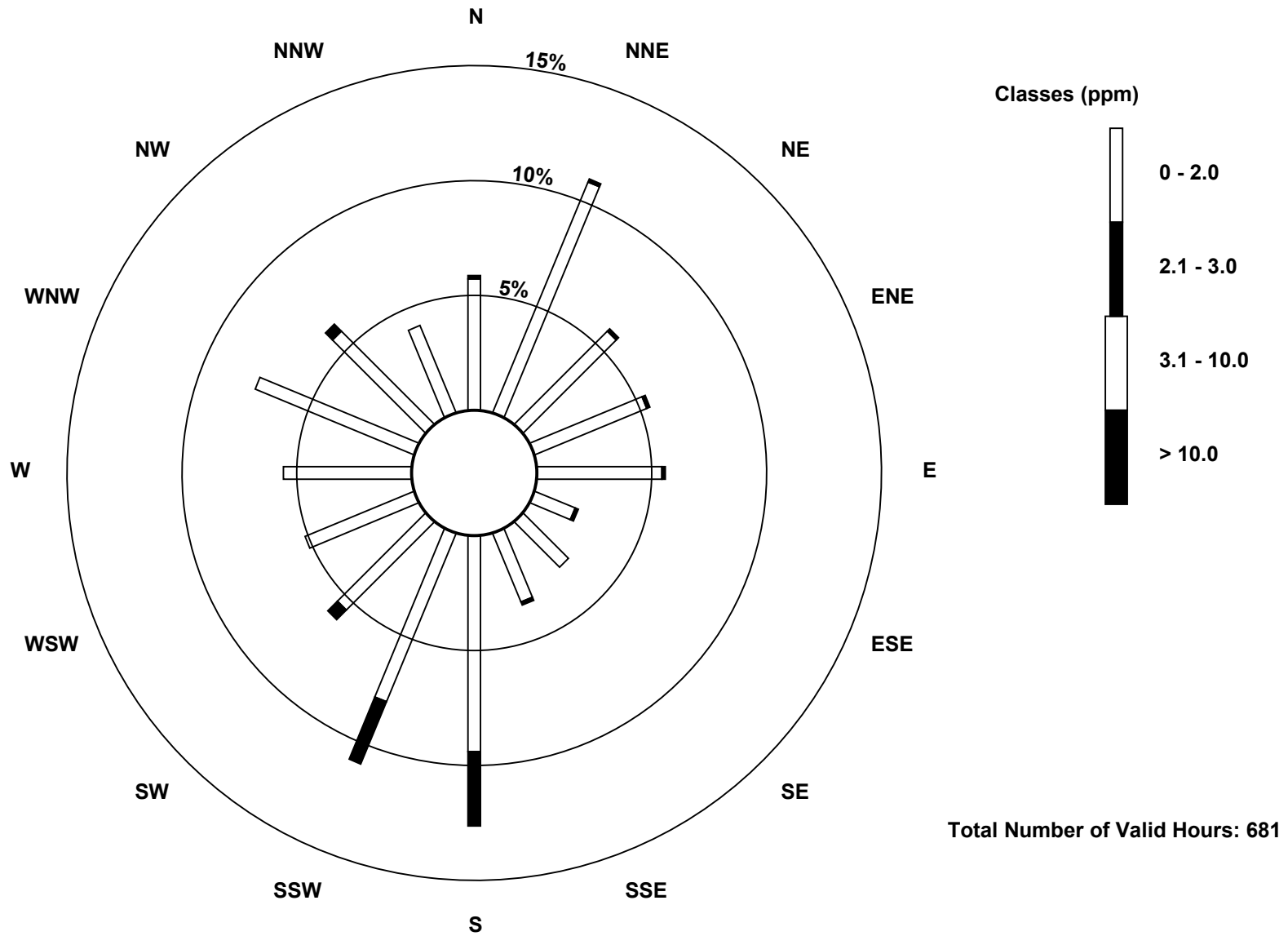
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	39	74	39	36	37	13	19	22	64	54	37	35	38	51	39	28	625
2.1 - 3.0	1	1	1	1	1	1	0	1	22	20	4	0	0	0	3	0	56
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	40	37	38	14	19	23	86	74	41	35	38	51	42	28	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

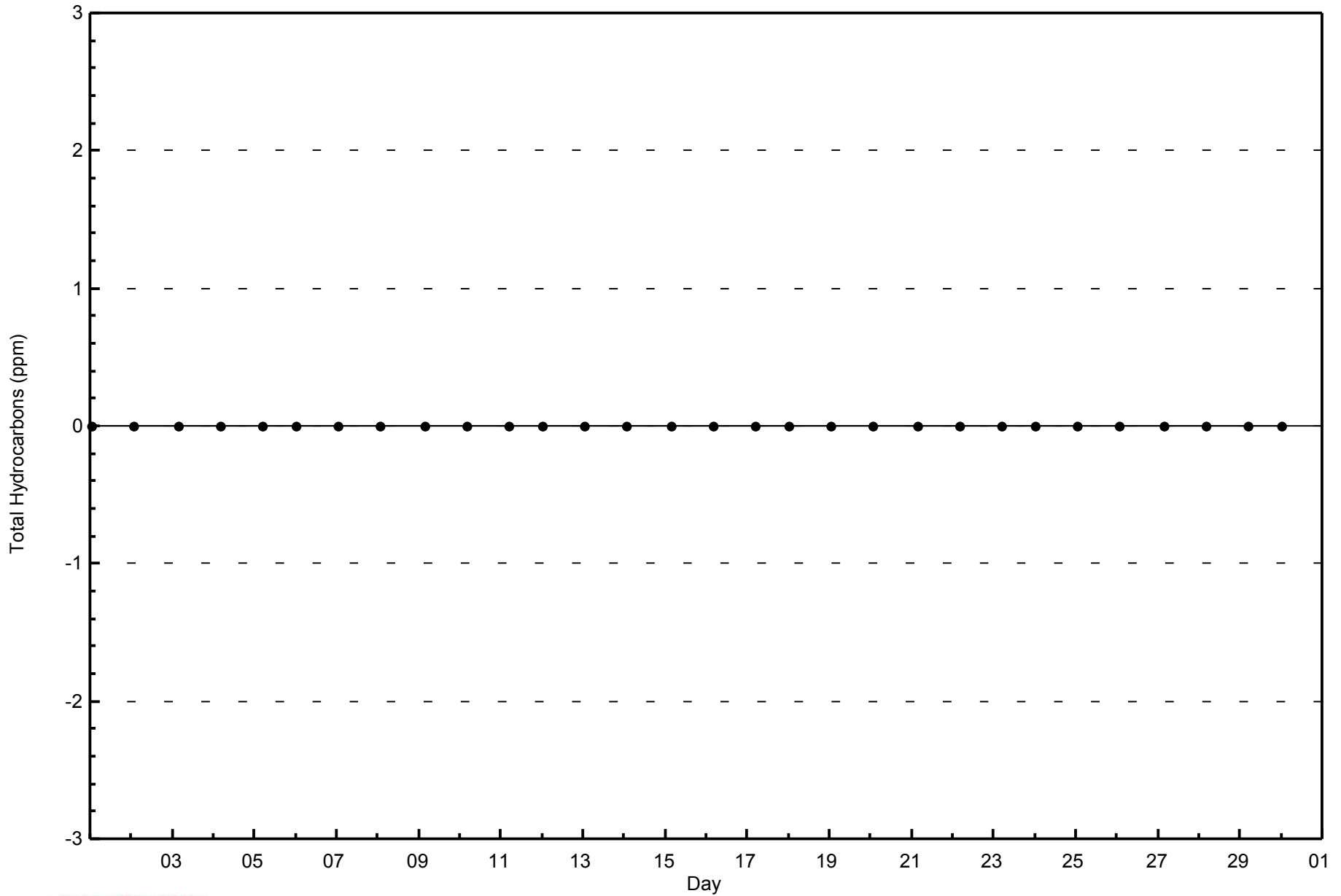
Total Hydrocarbons (THC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

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

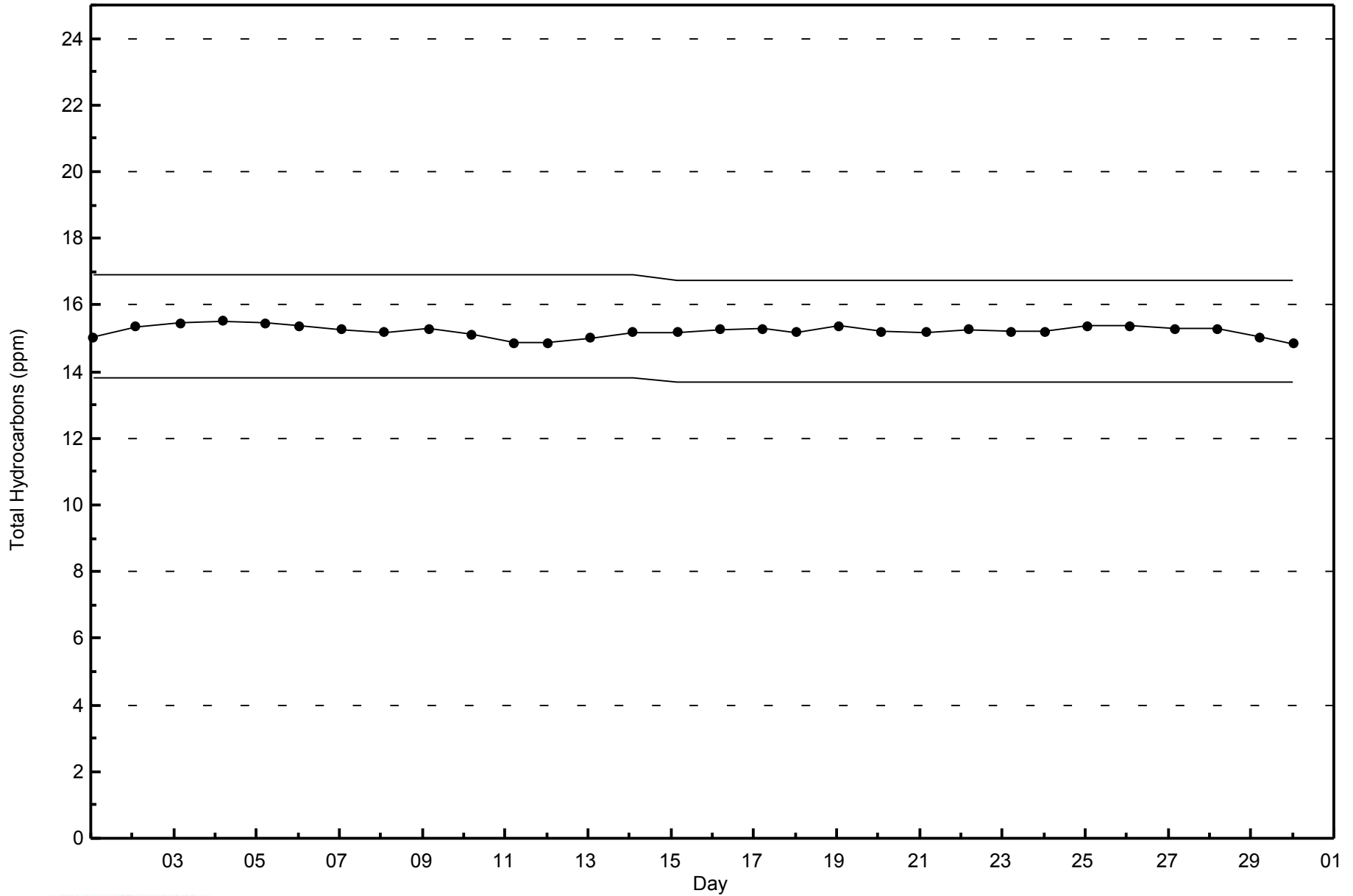






WBEA  
Span Responses

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

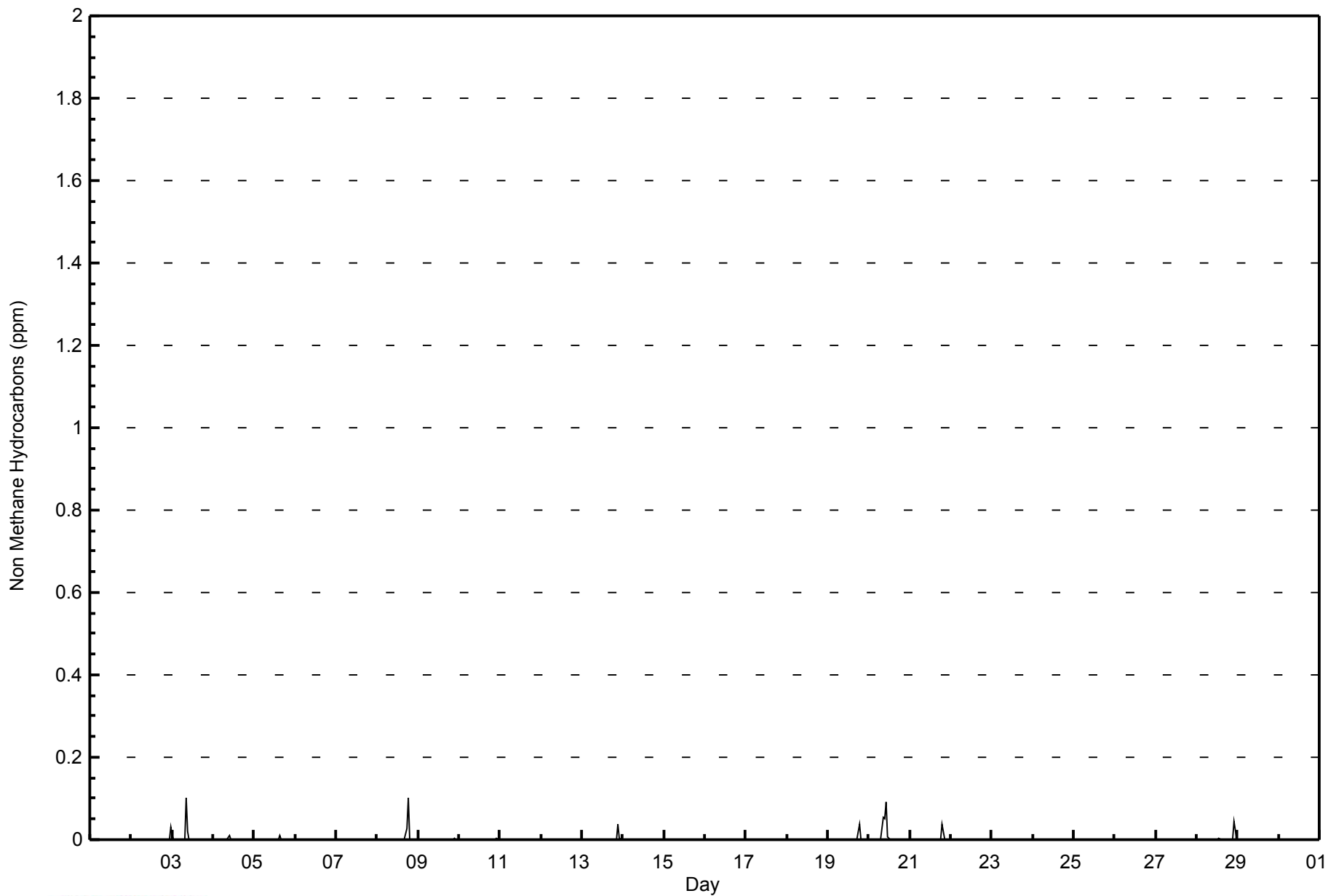






**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	665	97.65	97.65
0.006 - 0.05	12	1.76	99.41
0.06 - 0.1	4	0.59	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

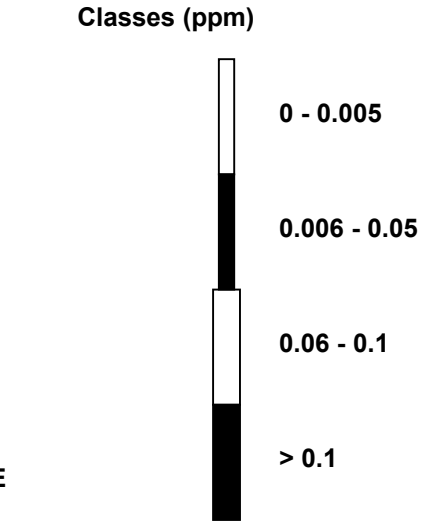
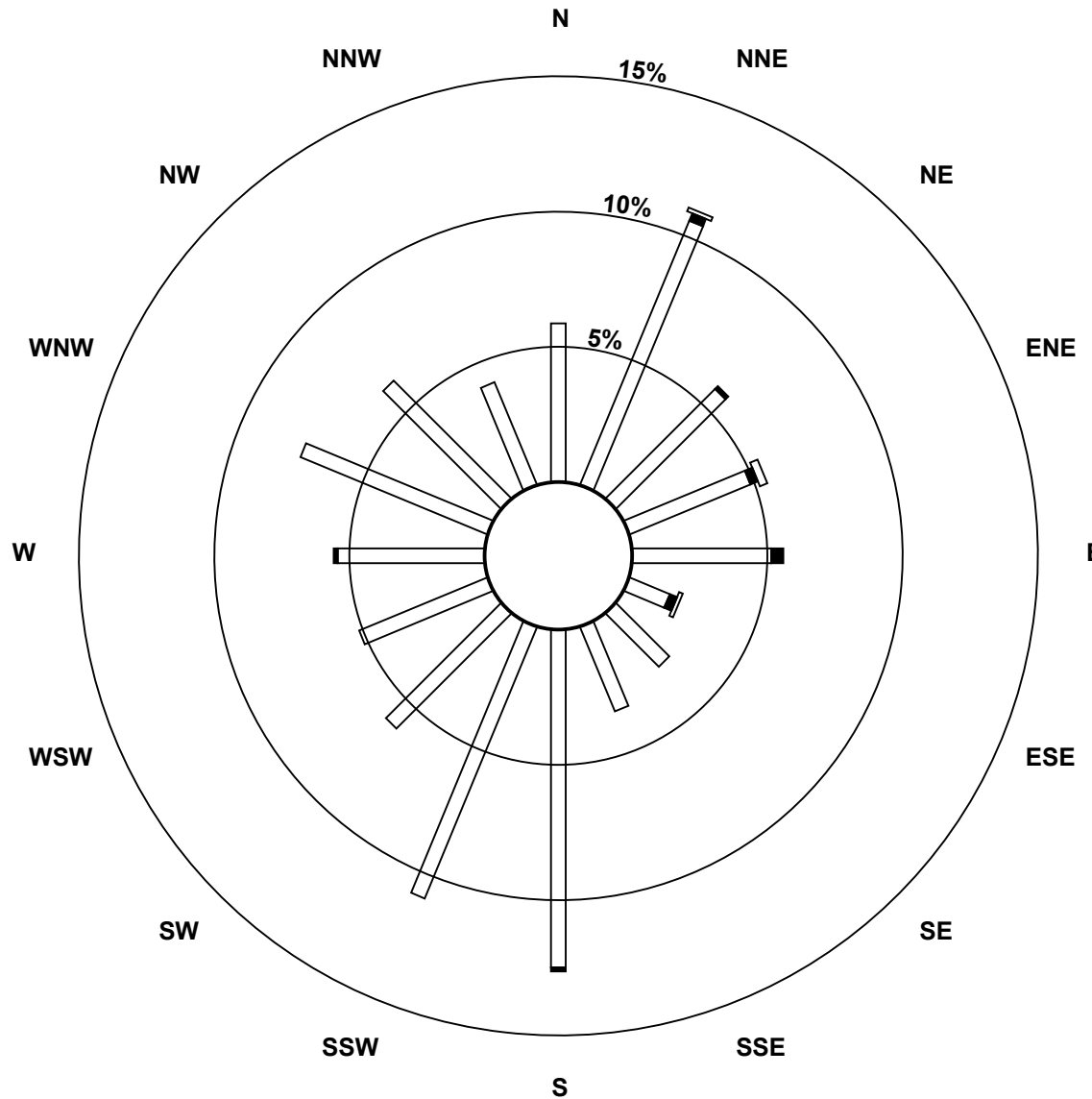
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	40	72	39	33	35	11	19	23	85	74	41	35	37	51	42	28	665
0.006 - 0.05	0	2	1	2	3	2	0	0	1	0	0	0	1	0	0	0	12
0.06 - 0.1	0	1	0	2	0	1	0	0	0	0	0	0	0	0	0	0	4
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	40	37	38	14	19	23	86	74	41	35	38	51	42	28	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

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

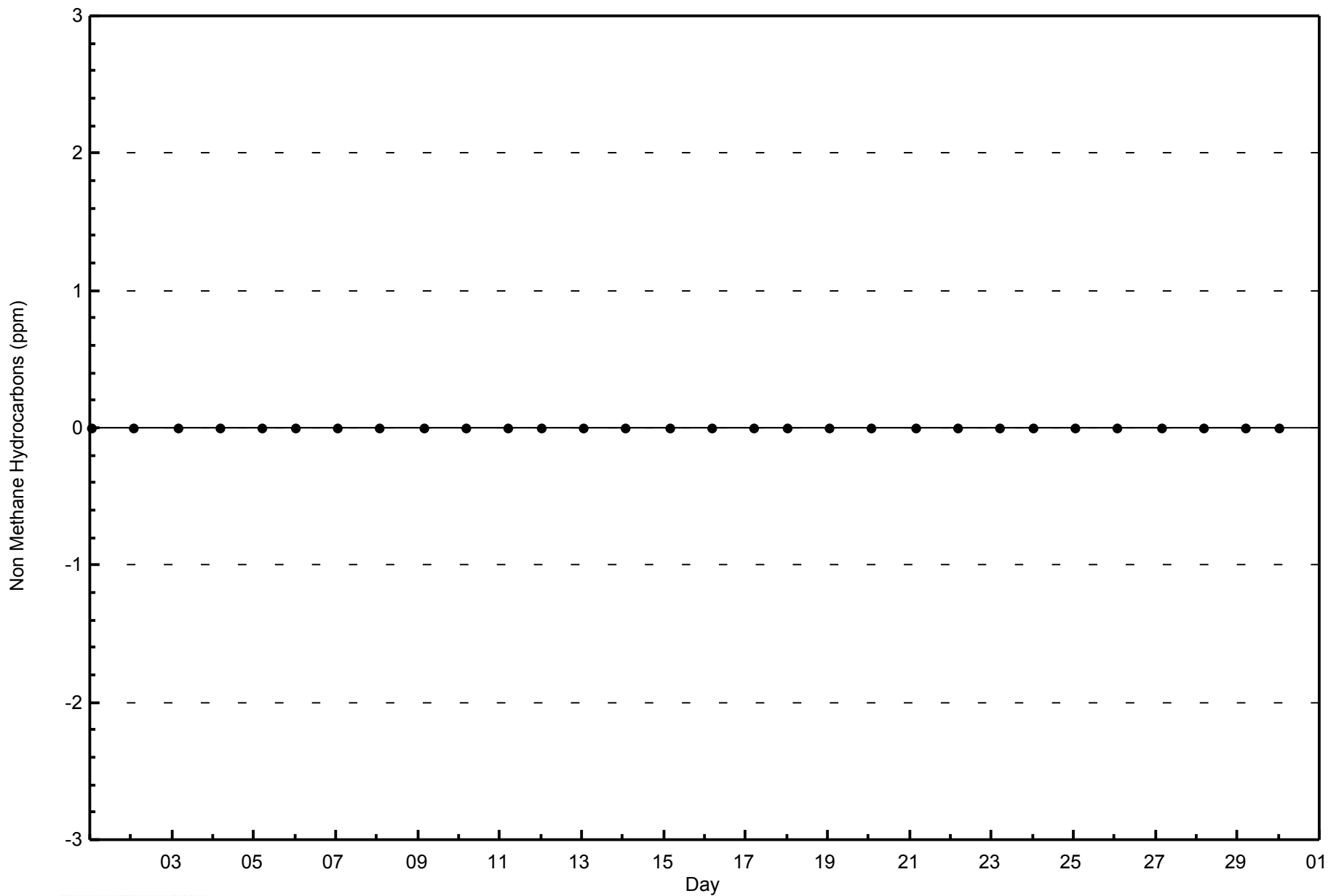


Total Number of Valid Hours: 681



WBEA  
Zero Responses

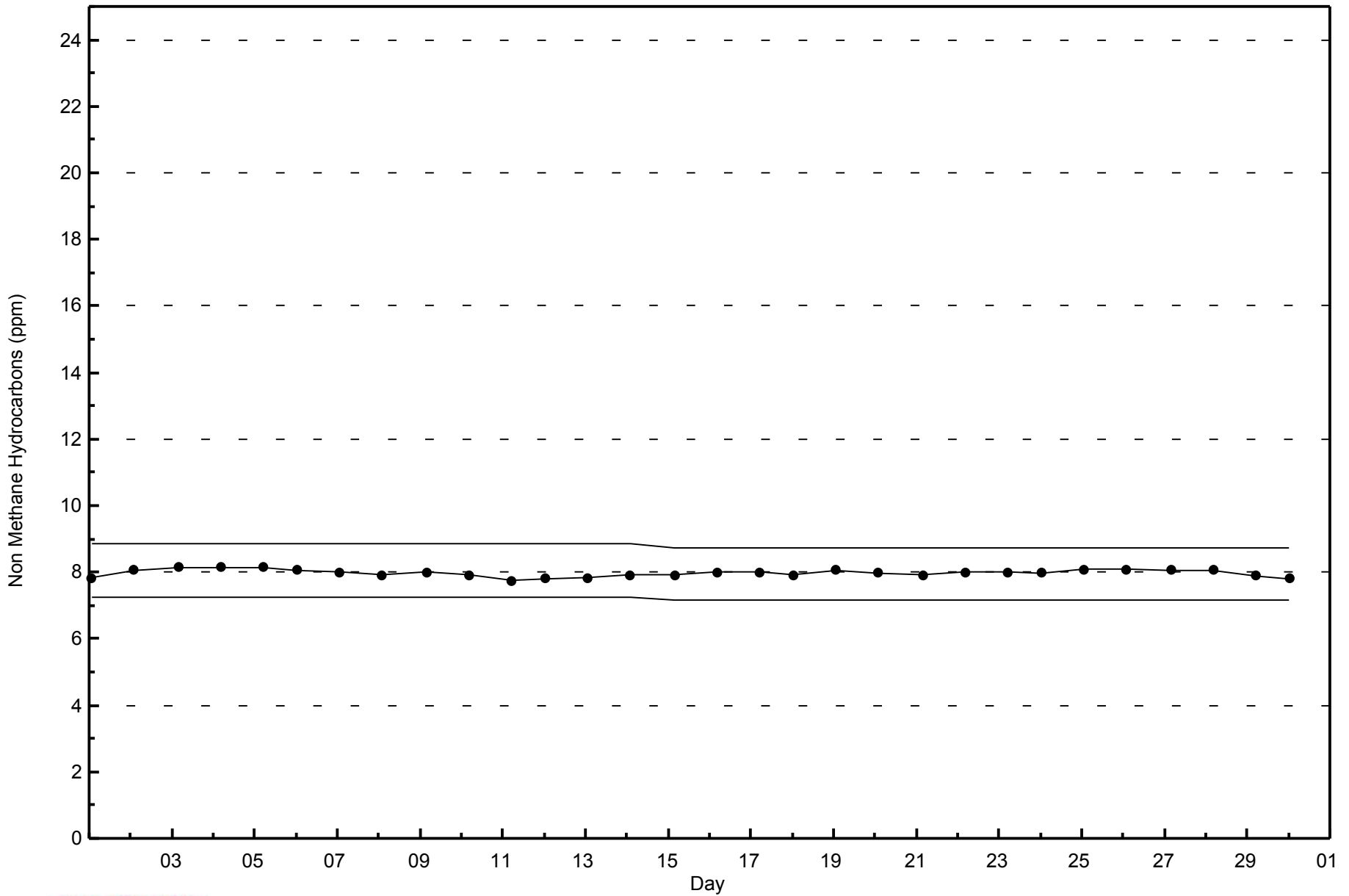
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

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







Summary of Hour Averages

Fort McKay - Bertha Ganter - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 3.0 ppm on Apr 11 05:00	Maximum Daily Average: 2.1 ppm on Apr 11		Hours of Data:	681
Minimum Value: 1.8 ppm on Apr 11 14:00	Minimum Daily Average: 1.8 ppm on Apr 12		Hours of Missing Data:	39
Maximum Diurnal Average: 2.0 ppm at hour 7	Minimum Diurnal Average: 1.8 ppm at hour 16		Hours of Calibration:	35
Monthly Average: 1.90 ppm	Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.8 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.5		Percent Operational Time:	99.4

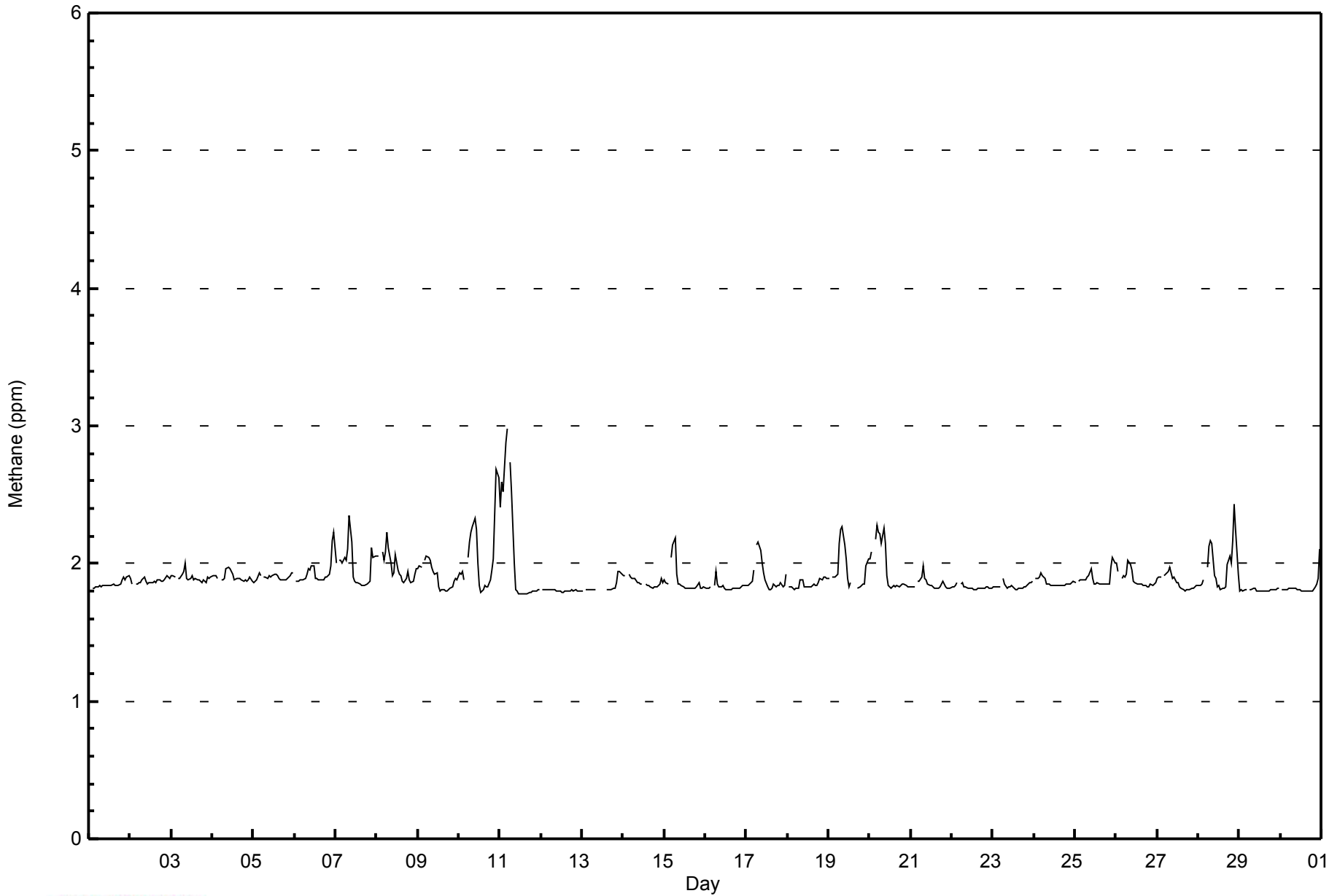
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8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

Z - zerospan      C - Calibration      M - Maintenance      PF - Power Failure



WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	626	91.92	91.92
2.1 - 3.0	55	8.08	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Fort McKay - Bertha Ganter - April 2015**

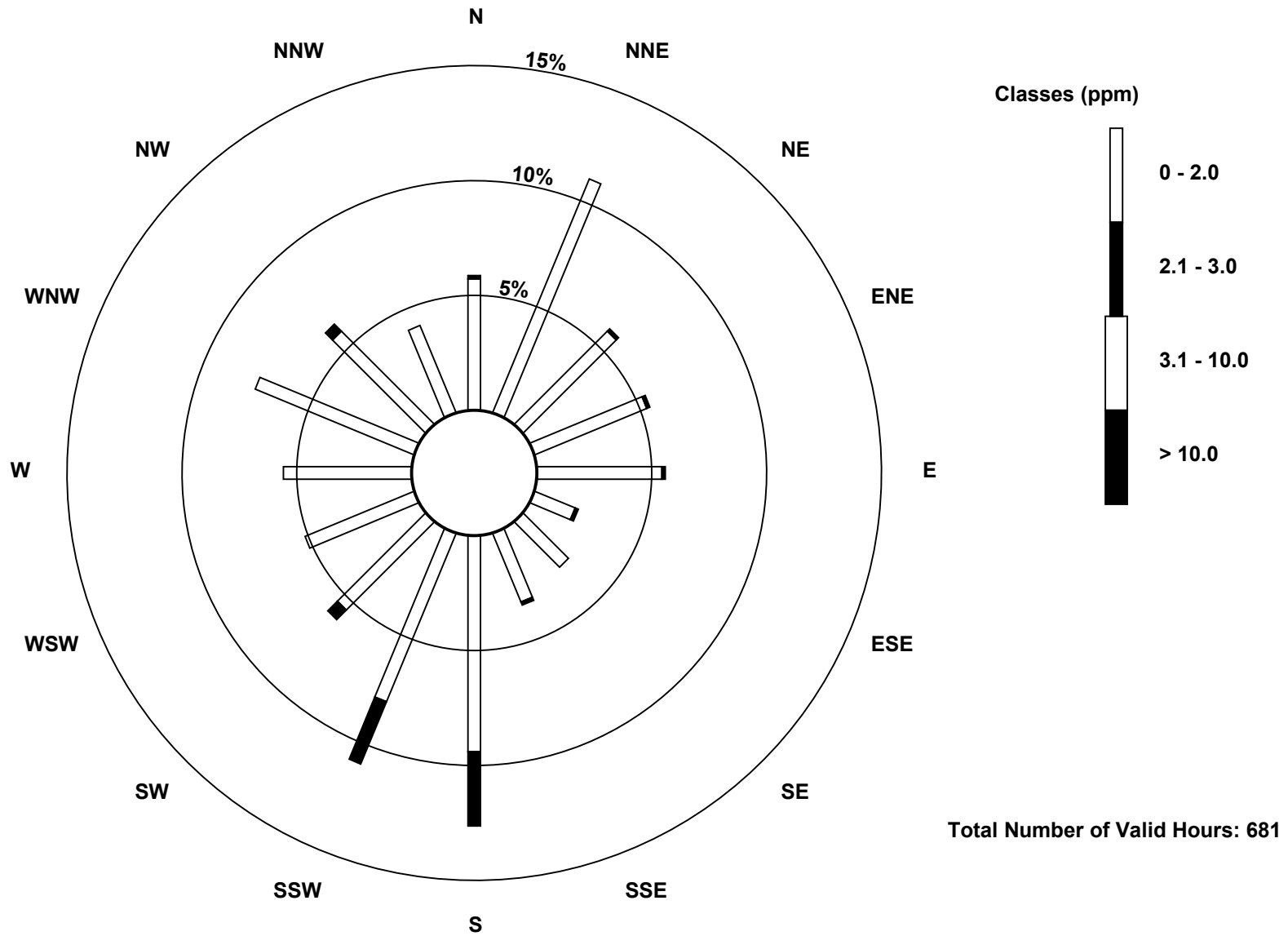
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	39	75	39	36	37	13	19	22	64	54	37	35	38	51	39	28	626
2.1 - 3.0	1	0	1	1	1	1	0	1	22	20	4	0	0	0	3	0	55
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	40	37	38	14	19	23	86	74	41	35	38	51	42	28	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

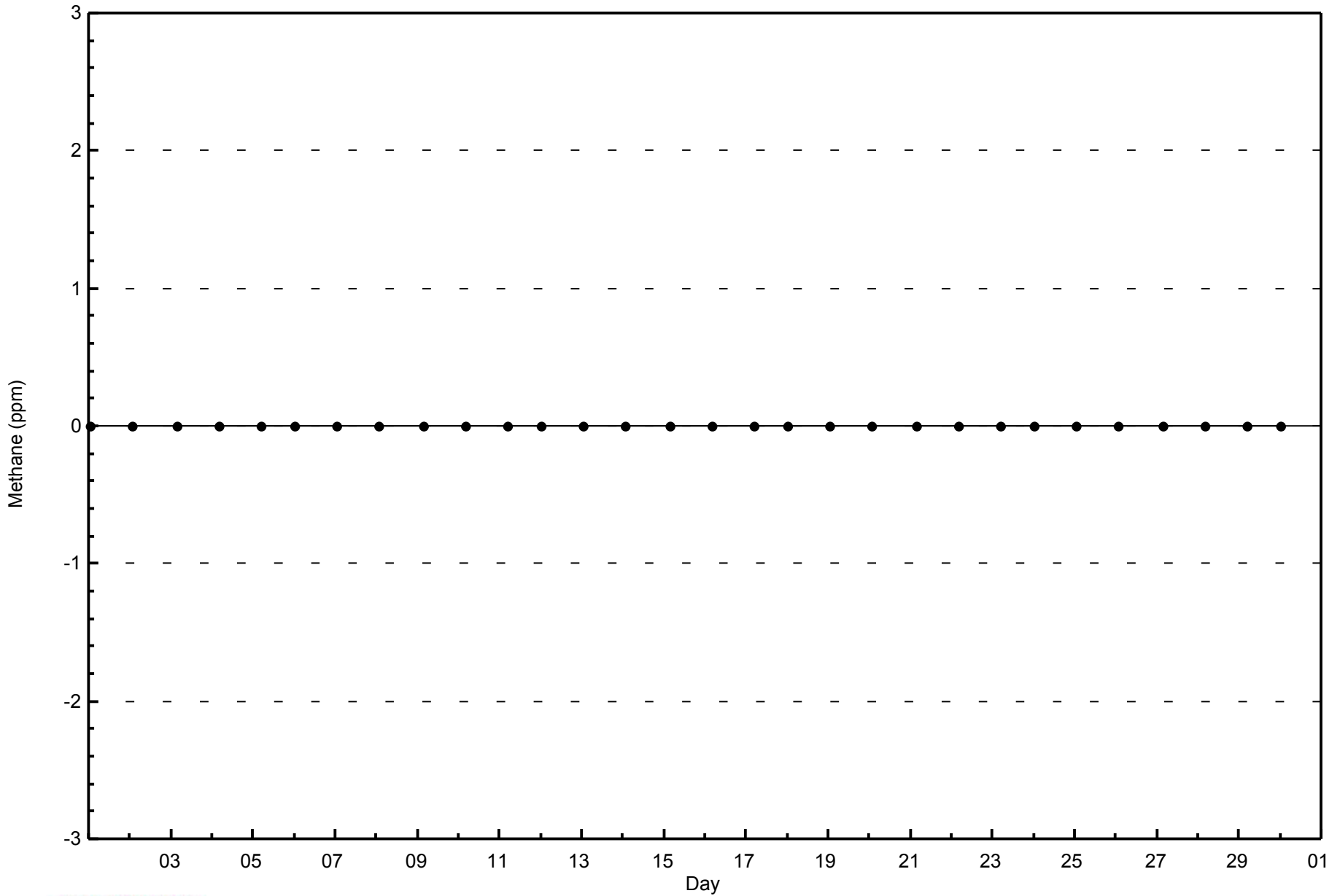
Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

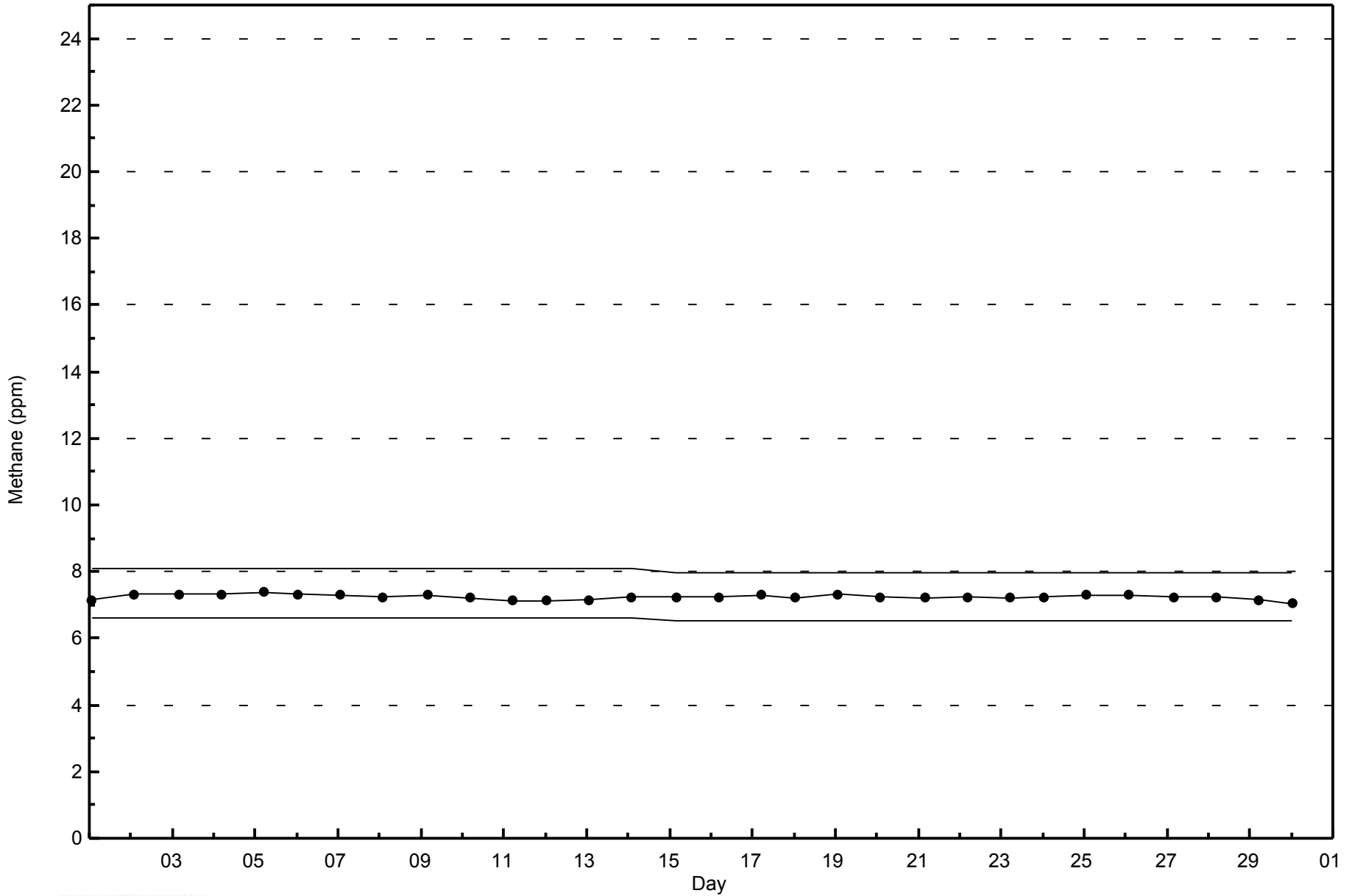
Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter - April 2015





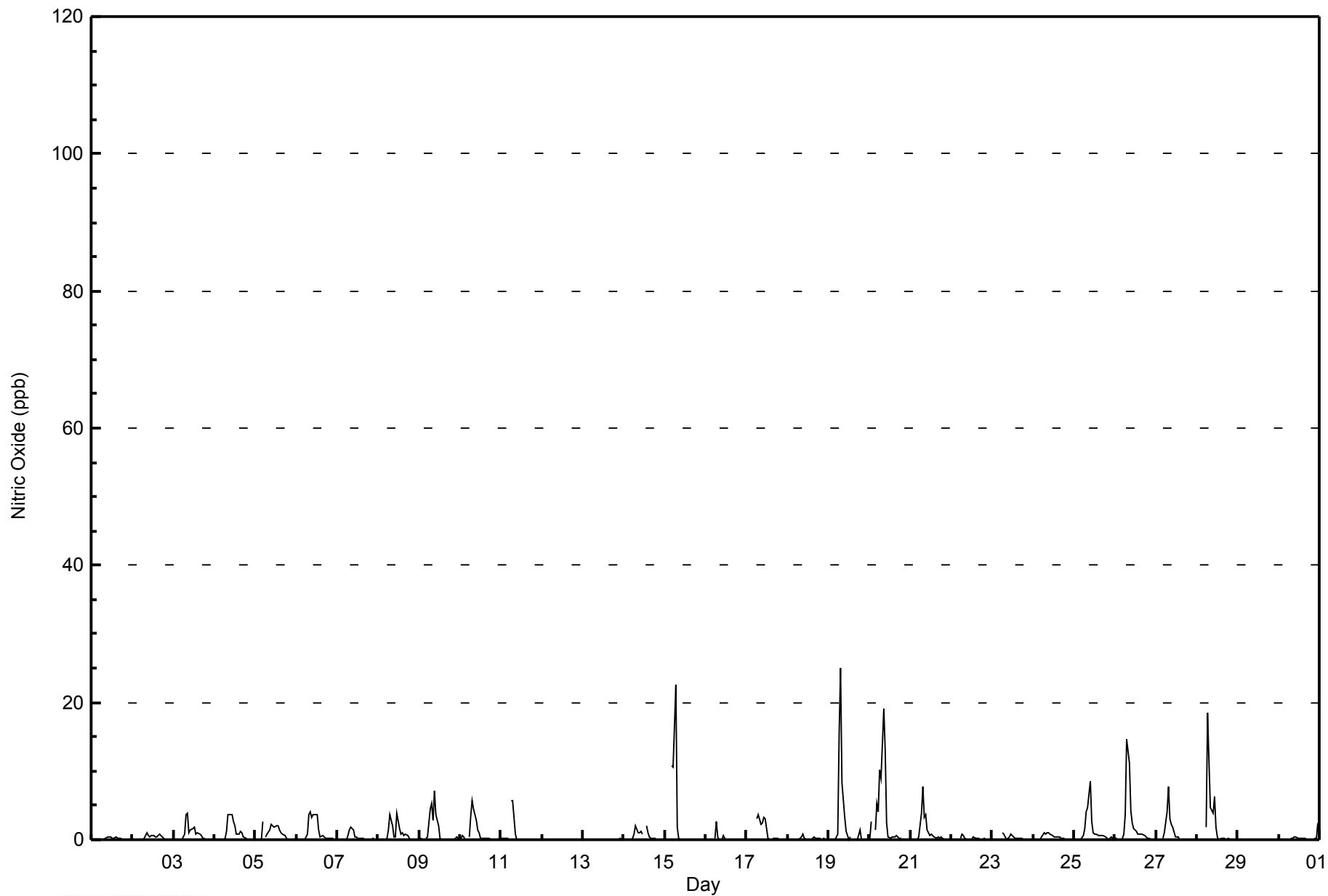
Maximum Value: 25 ppb on Apr 19 08:00														Maximum Daily Average: 3.1 ppb on Apr 20														Hours in Service: 720	
Minimum Value: 0 ppb on Apr 2 02:00														Minimum Daily Average: 0.0 ppb on Apr 12														Hours of Data: 681	
Maximum Diurnal Average: 4.1 ppb at hour 8														Minimum Diurnal Average: 0.1 ppb at hour 21														Hours of Missing Data: 39	
Monthly Average: 0.9 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 13														Hours of Calibration: 35	
																												Percent Operational Time: 99.4	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0			
2-Apr	0	0	Z	0	0	0	0	0	1	1	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0.3	1			
3-Apr	0	0	0	Z	0	0	1	4	4	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0.8	4				
4-Apr	0	0	0	0	Z	0	0	1	4	4	4	3	2	1	1	1	1	0	0	0	0	0	0	1.0	4				
5-Apr	0	0	0	0	3	Z	0	1	1	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0.8	3				
6-Apr	Z	0	0	0	0	0	1	4	4	3	4	4	4	1	0	1	0	0	0	0	0	0	0	1.2	4				
7-Apr	0	Z	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2				
8-Apr	0	0	Z	0	0	0	1	4	2	0	0	4	2	1	1	1	1	1	0	0	0	0	0	0.8	4				
9-Apr	0	0	0	Z	0	1	4	5	3	7	4	2	0	0	0	0	0	0	0	0	0	0	0	1.2	7				
10-Apr	0	1	0	0	Z	0	3	6	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	1.0	6				
11-Apr	0	0	0	0	0	Z	6	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	6				
12-Apr	Z	0	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-Apr	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0.0	0				
14-Apr	0	0	Z	0	0	0	1	2	1	1	1	1	M	2	1	0	0	0	0	0	0	0	0	0.5	2				
15-Apr	0	0	0	Z	11	11	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.0	23				
16-Apr	0	0	0	0	Z	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	3				
17-Apr	0	0	0	0	0	Z	3	4	2	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0.8	4				
18-Apr	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1				
19-Apr	0	Z	0	0	0	1	16	25	8	3	1	1	0	0	PF	PF	PF	0	1	0	0	0	0	2.9	25				
20-Apr	0	3	Z	1	5	4	10	9	19	13	2	0	0	0	0	0	1	0	0	0	0	0	0	3.1	19				
21-Apr	0	0	0	Z	0	0	4	8	3	4	1	1	1	1	0	0	0	0	0	0	0	0	0	1.1	8				
22-Apr	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1				
23-Apr	0	0	0	0	0	Z	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1				
24-Apr	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1				
25-Apr	0	Z	0	0	0	1	2	4	5	9	3	1	1	1	1	1	1	1	0	0	0	0	0	1.3	9				
26-Apr	0	0	Z	0	0	1	4	15	11	4	3	2	1	1	1	1	1	1	0	0	0	0	0	2.0	15				
27-Apr	0	0	0	Z	0	1	4	8	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.9	8				
28-Apr	0	0	0	0	Z	2	19	11	5	4	6	2	0	0	0	0	0	0	0	0	0	0	0	2.2	19				
29-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0				
30-Apr	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	2				
														0.1 0.2 0.1 0.1 0.8 0.9 3.6 4.1 2.9 2.4 1.5 1.0 0.6 0.5 0.4 0.3 0.3 0.2 0.2 0.1 0.1 0.1 0.1 0.1														Diurnal Average	
														0 3 0 1 11 11 23 25 19 13 6 4 4 2 1 1 1 1 1 1 0 0 0 0 2														Diurnal Maximum	
Z - zerspan														C - Calibration				M - Maintenance				PF - Power Failure							





WBEA  
Hourly Averages

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	679	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

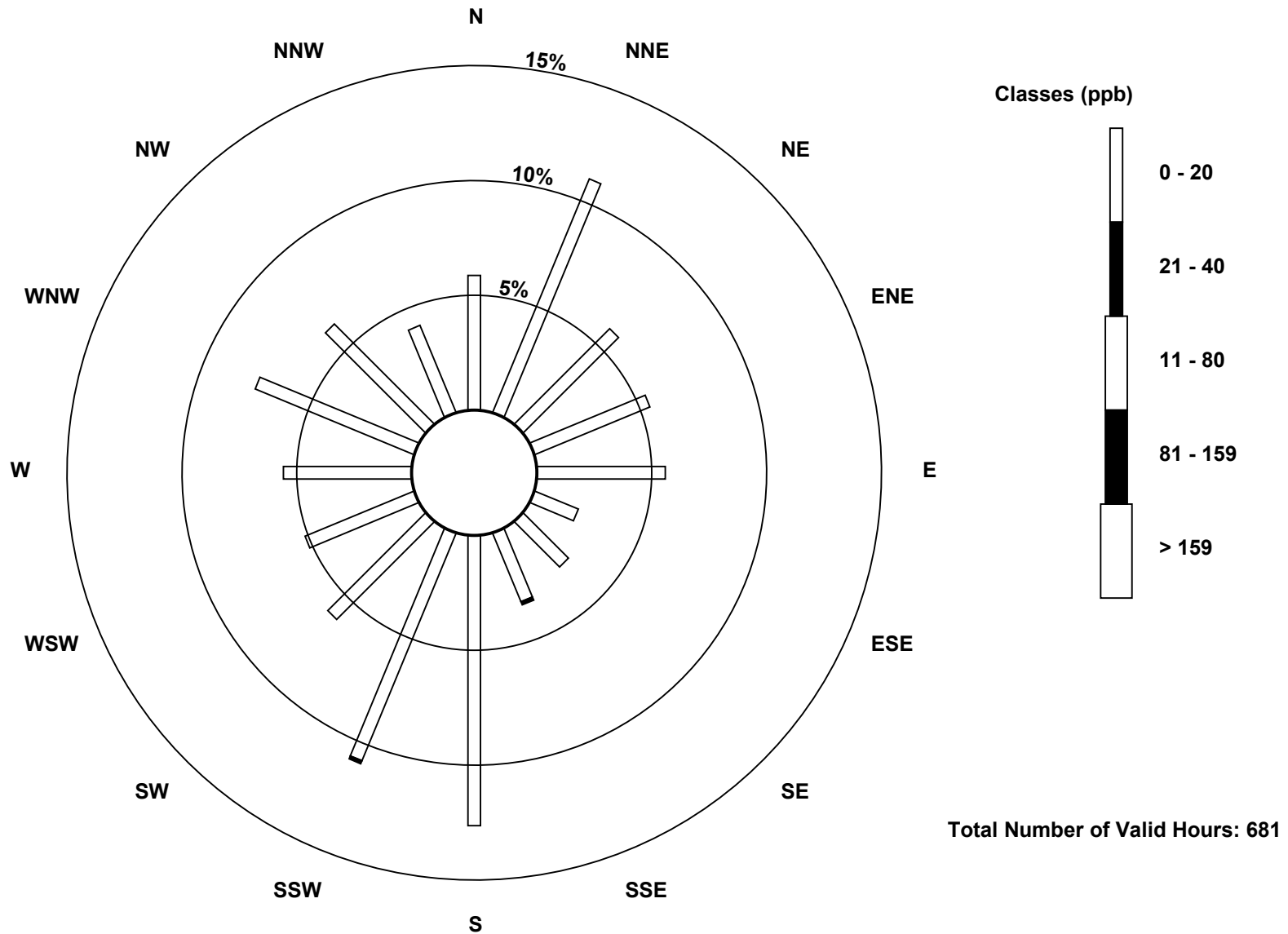
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	75	40	37	38	14	19	22	86	73	41	35	38	51	42	28	679
21 - 40	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	40	37	38	14	19	23	86	74	41	35	38	51	42	28	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

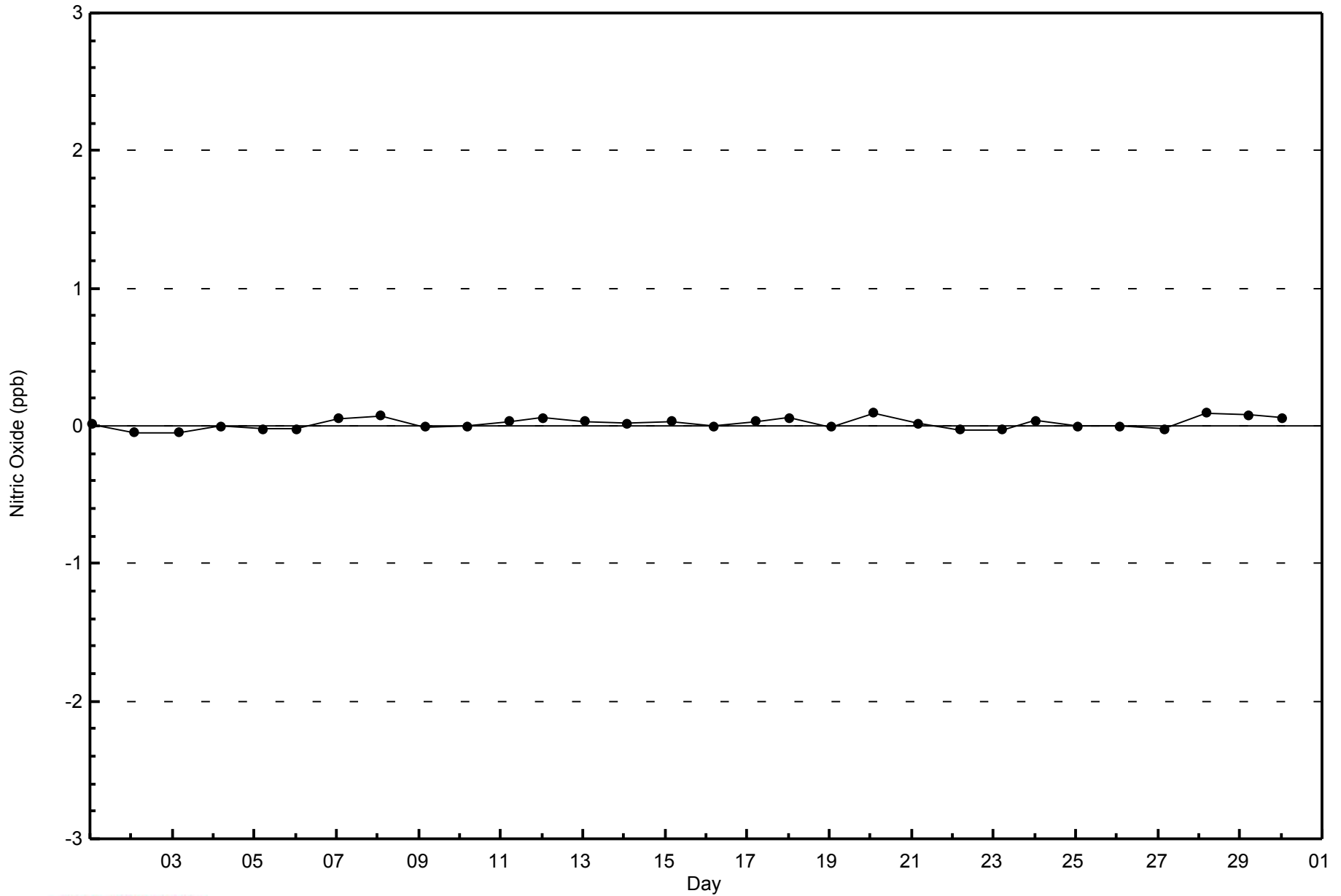
Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

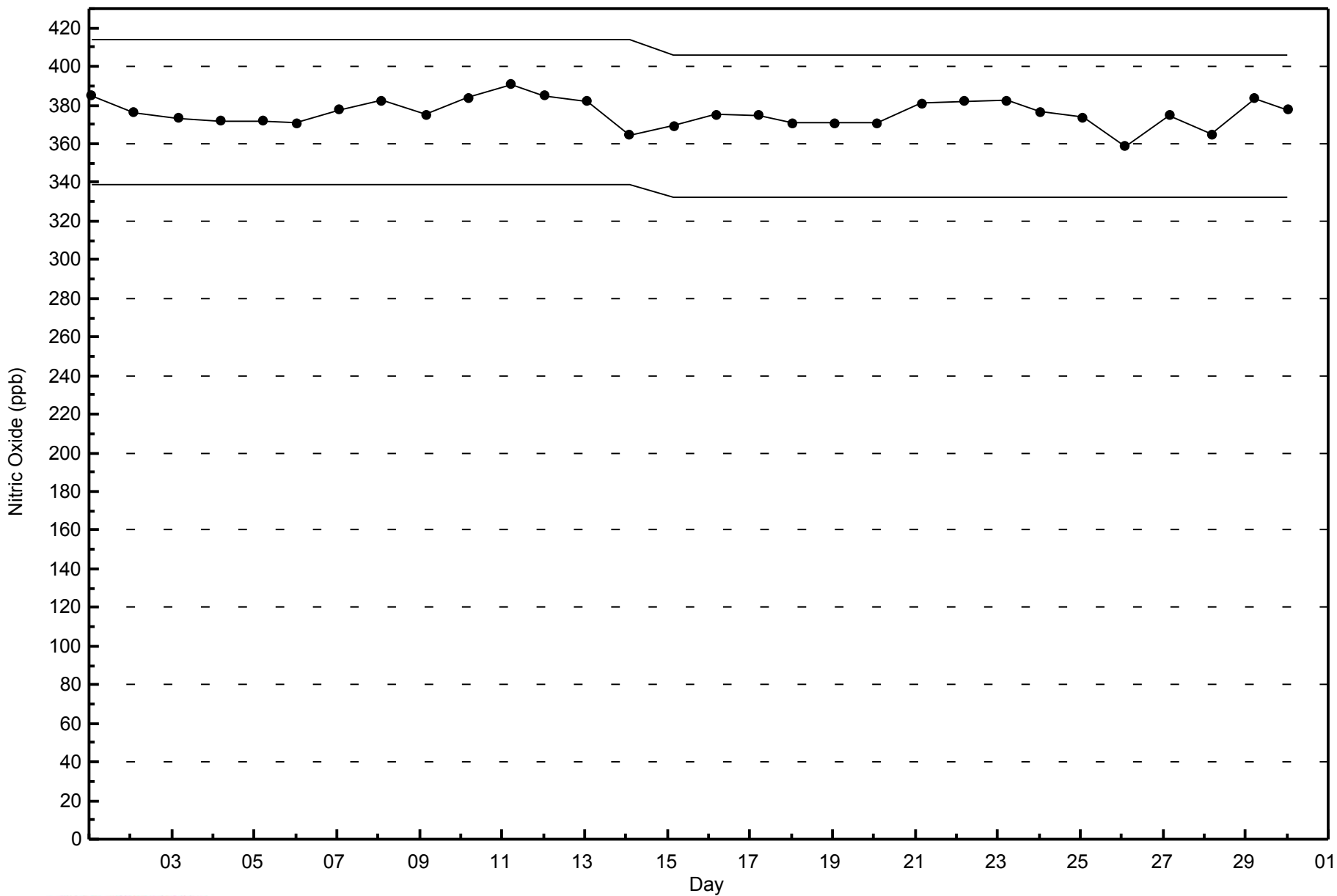
Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 30 ppb on Apr 11 01:00	Maximum Daily Average: 9.7 ppb on Apr 10
Minimum Value: 0 ppb on Apr 12 04:00	Hours of Data: 681
Maximum Diurnal Average: 7.8 ppb at hour 7	Hours of Missing Data: 39
Monthly Average: 4.4 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.2 ppb on Apr 12	Percent Operational Time: 99.4
Minimum Diurnal Average: 1.6 ppb at hour 18	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 6 P <sub>90</sub> = 11 P <sub>99</sub> = 21	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	1	Z	1	1	0	0	0	1	1	2	1	1	1	1	1	1	1	1	2	8	7	6	7	8	2.3	8
2-Apr	7	2	Z	1	1	1	3	2	6	3	2	2	2	2	2	3	4	3	5	5	4	5	6	6	3.3	7
3-Apr	8	10	9	Z	7	8	10	12	11	5	5	5	7	4	4	4	3	2	3	4	2	6	5	7	6.1	12
4-Apr	6	7	8	6	Z	6	5	5	9	10	10	8	7	3	4	5	5	3	4	4	5	7	6	3	5.9	10
5-Apr	2	2	3	7	7	Z	5	4	5	7	6	5	6	6	5	4	4	4	5	5	5	8	10	8	5.3	10
6-Apr	Z	4	6	5	5	4	5	9	10	9	10	11	11	6	3	4	4	2	4	10	14	10	8	8	7.0	14
7-Apr	5	Z	5	6	6	6	7	7	8	6	3	3	2	2	2	2	1	1	1	1	4	14	7	9	4.7	14
8-Apr	9	8	Z	9	7	10	11	11	7	3	2	11	8	5	6	4	5	5	4	4	4	4	4	6	6.3	11
9-Apr	6	8	9	Z	11	11	17	15	10	16	13	9	2	1	1	1	1	1	1	2	6	16	12	8	7.7	17
10-Apr	14	19	20	7	Z	16	20	18	16	13	9	7	3	1	2	3	3	3	3	4	7	7	9	21	9.7	21
11-Apr	30	22	22	15	15	Z	19	17	6	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	6.7	30
12-Apr	Z	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Apr	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	3	12	14	14	2.5	14
14-Apr	10	7	Z	6	4	3	3	4	4	4	5	4	M	6	5	3	3	2	2	3	4	5	10	2	4.6	10
15-Apr	1	1	2	Z	17	17	17	3	1	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	2.9	17
16-Apr	0	0	0	0	Z	3	13	2	0	0	2	0	0	0	0	0	1	1	0	0	0	1	2	2	1.3	13
17-Apr	1	0	1	2	8	Z	12	10	6	7	8	8	1	1	1	1	5	2	4	4	5	1	1	6	4.0	12
18-Apr	Z	2	1	0	0	0	1	3	2	2	0	0	0	0	0	2	1	1	4	8	5	5	4	2	1.8	8
19-Apr	3	Z	3	3	3	4	8	12	9	6	4	2	1	2	PF	PF	PF	0	2	3	4	3	5	9	4.3	12
20-Apr	11	25	Z	20	17	13	11	12	20	19	7	2	1	2	2	3	3	2	3	3	8	4	3	2	8.4	25
21-Apr	2	3	3	Z	7	7	9	15	7	8	4	2	2	2	1	1	2	2	5	4	1	1	1	1	3.8	15
22-Apr	1	0	1	2	Z	2	4	2	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0.8	4
23-Apr	0	1	1	1	1	Z	6	5	0	1	1	2	1	1	1	1	1	1	1	1	2	1	4	7	1.7	7
24-Apr	Z	9	9	10	11	10	6	3	3	3	2	2	1	1	1	1	1	1	1	1	2	2	3	6	3.8	11
25-Apr	4	Z	5	6	6	6	4	5	5	8	4	2	2	2	2	2	2	3	2	2	2	17	23	18	5.7	23
26-Apr	15	13	Z	4	6	5	6	13	13	9	6	4	3	3	3	3	3	3	4	5	7	4	3	4	6.0	15
27-Apr	6	11	13	Z	9	10	13	15	8	6	6	2	2	2	1	1	0	0	0	1	1	1	1	2	4.8	15
28-Apr	3	2	2	4	Z	10	22	19	13	12	19	8	3	1	2	2	2	2	4	2	5	5	8	4	6.6	22
29-Apr	1	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
30-Apr	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	2	10	11	25	2.6	25

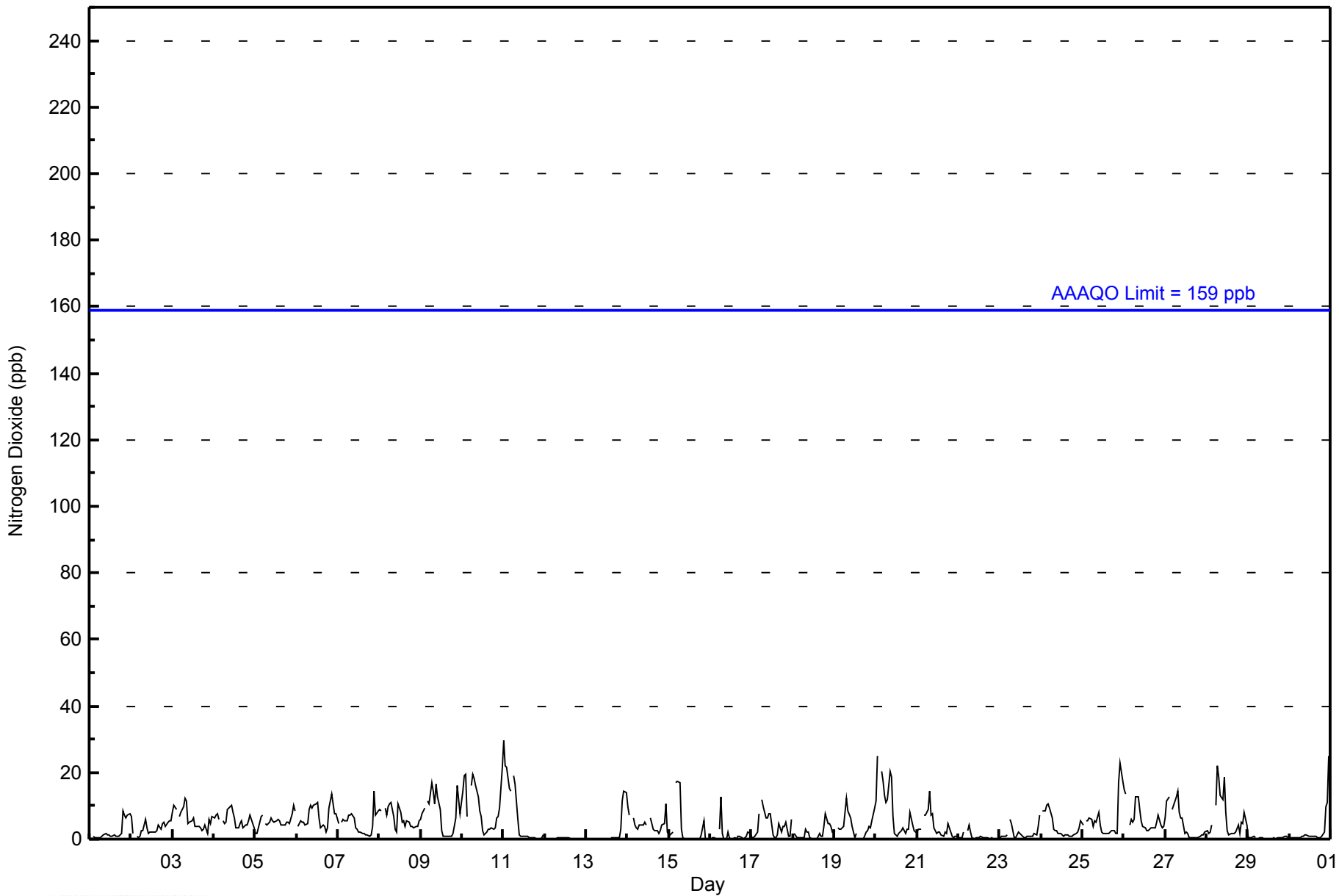
5.8	6.3	4.9	4.7	6.0	6.1	7.8	7.5	6.1	5.5	4.5	3.5	2.4	1.9	1.7	1.8	2.0	1.6	2.2	2.9	3.8	5.2	5.6	6.3	Diurnal Average		
30	25	22	20	17	17	22	19	20	19	19	11	11	6	6	5	5	5	5	5	10	14	17	23	25	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	673	98.83	98.83
21 - 40	8	1.17	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

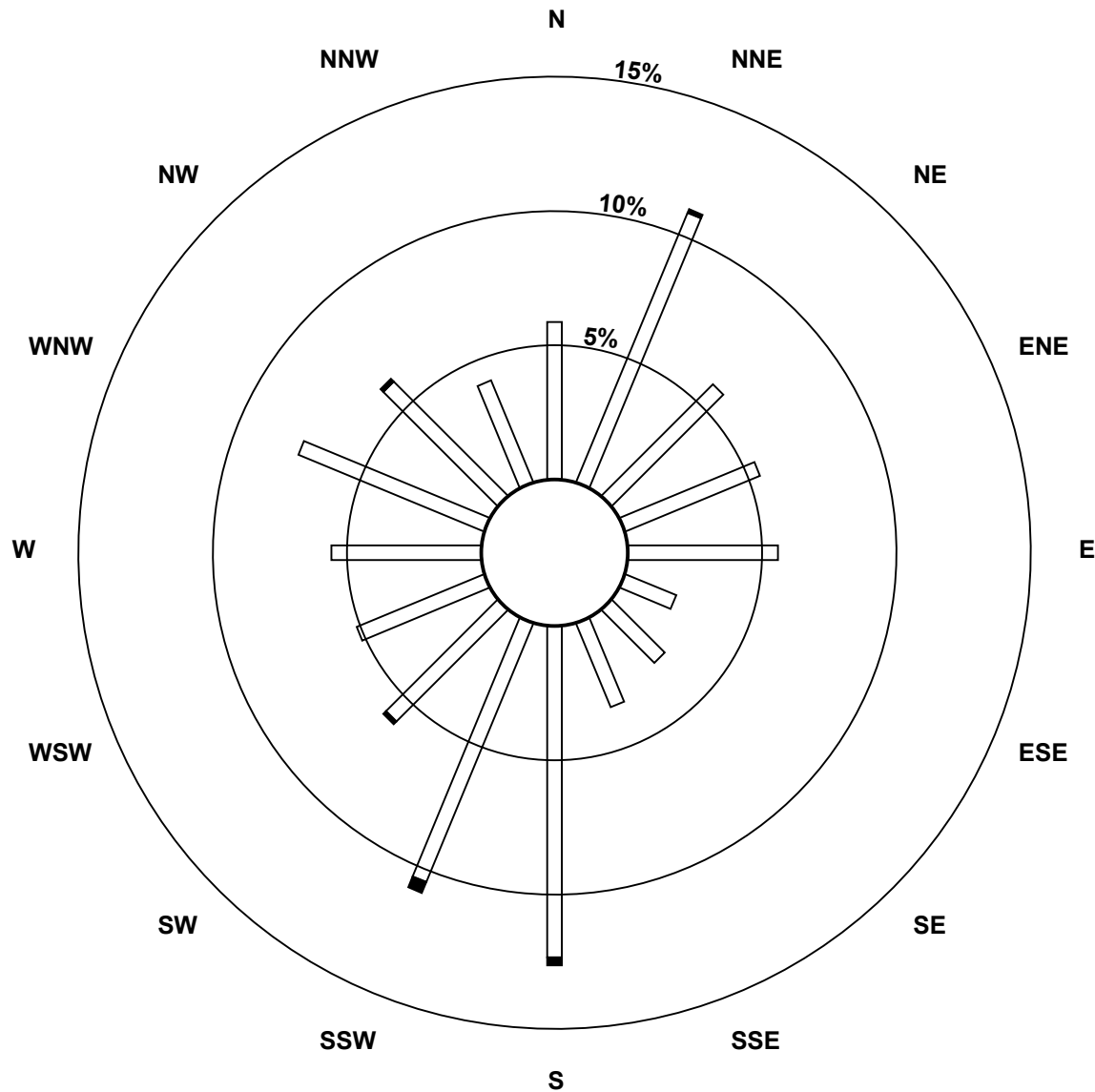
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	74	40	37	38	14	19	23	84	71	40	35	38	51	41	28	673
21 - 40	0	1	0	0	0	0	0	0	2	3	1	0	0	0	1	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	40	37	38	14	19	23	86	74	41	35	38	51	42	28	681

Total Number of Valid Hours: 681

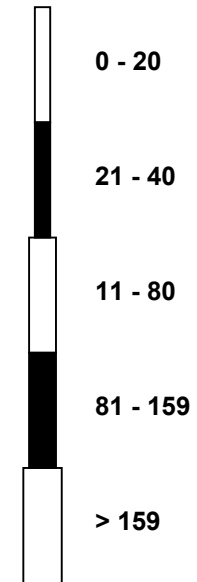
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)



Classes (ppb)

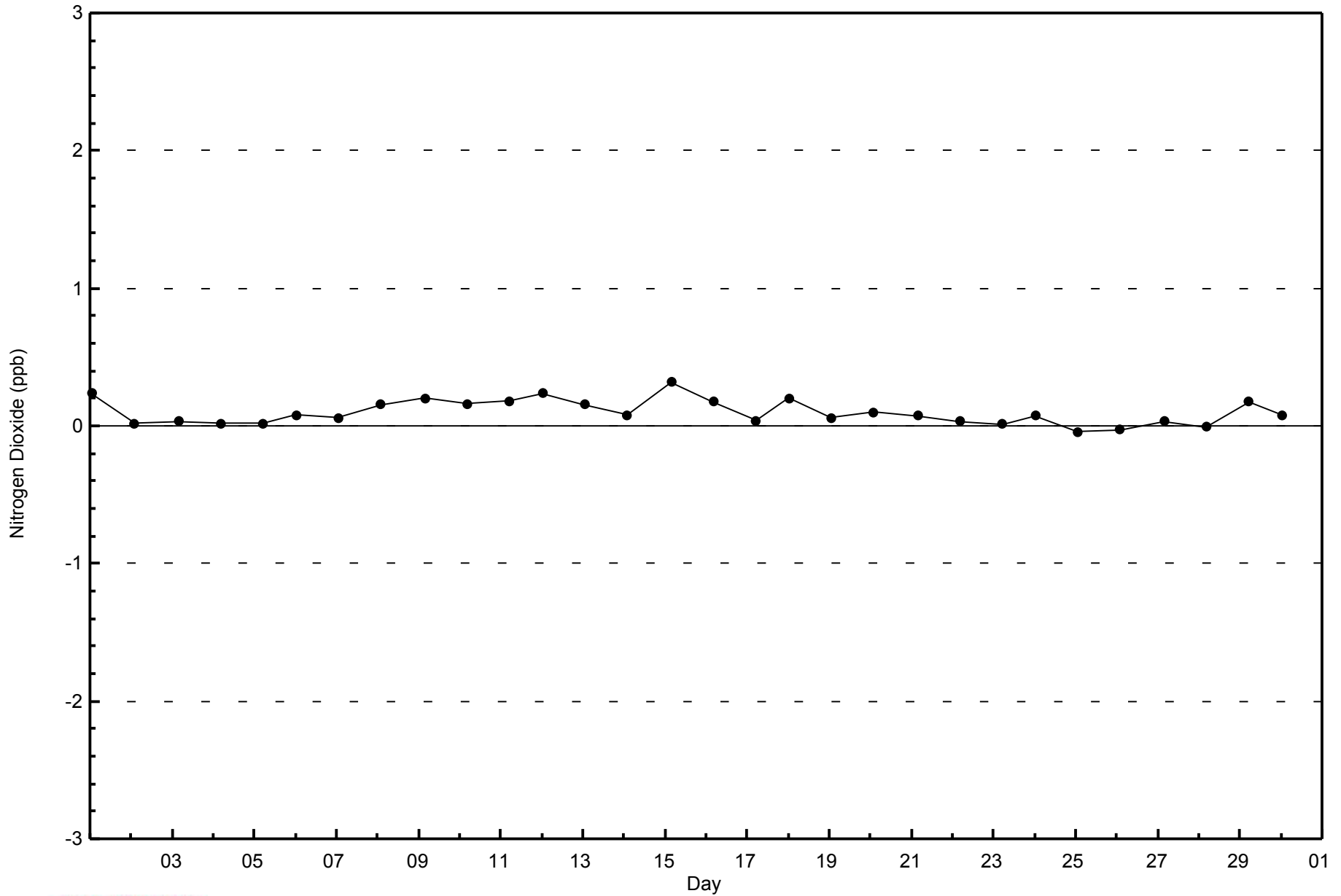


Total Number of Valid Hours: 681



WBEA  
Zero Responses

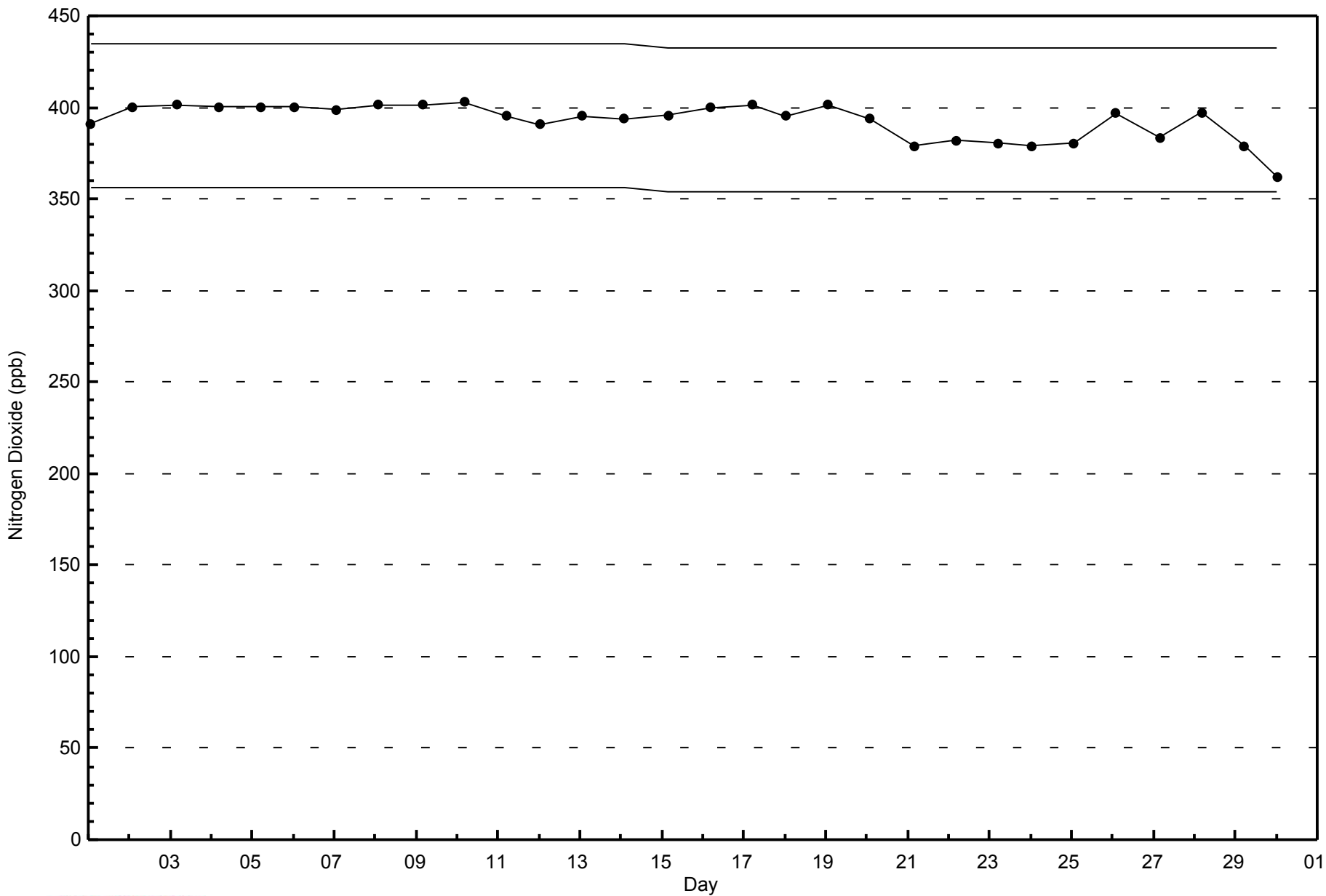
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015



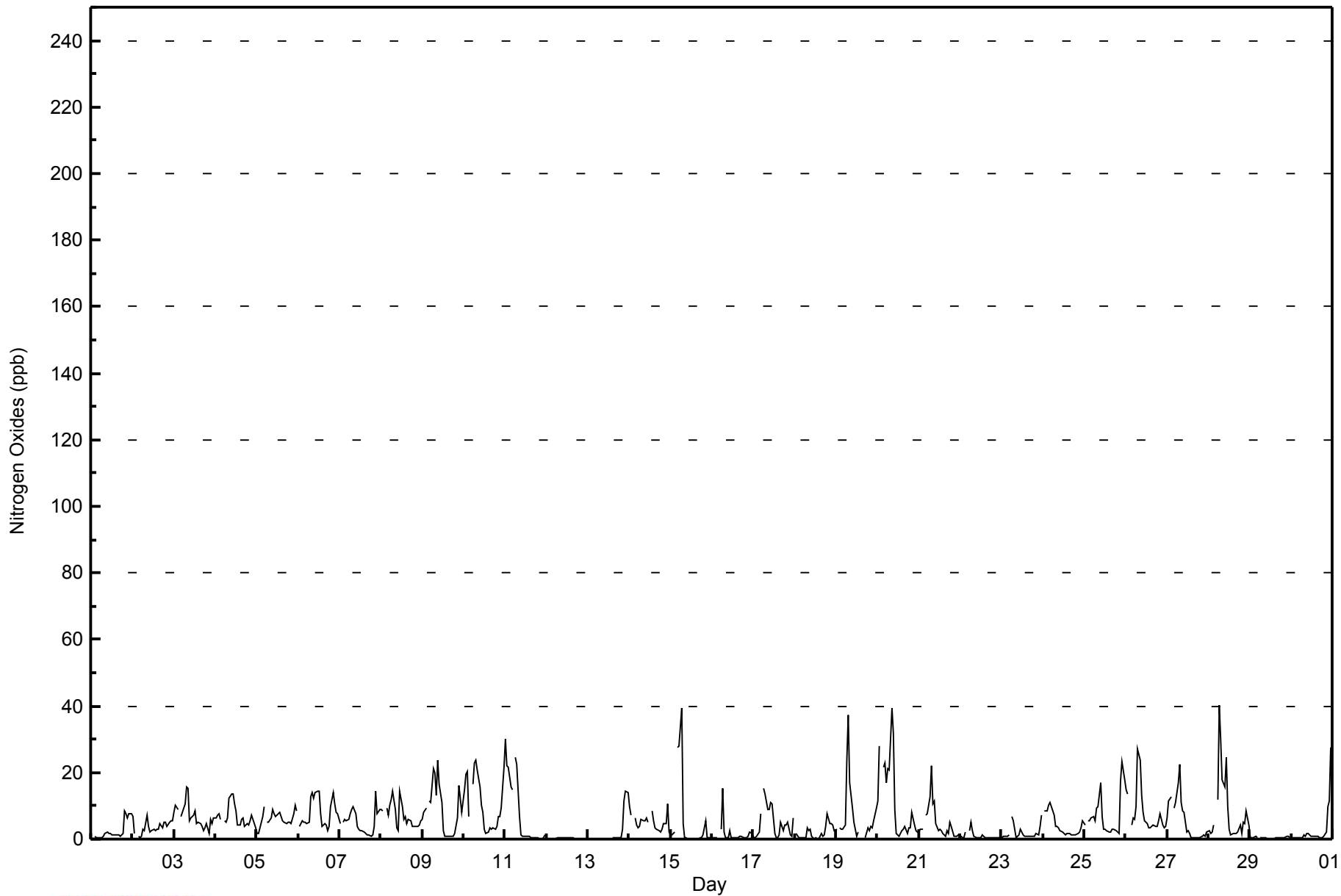


Maximum Value: 40 ppb on Apr 28 07:00																		Maximum Daily Average: 11.4 ppb on Apr 20																		Hours in Service: 720	
Minimum Value: 0 ppb on Apr 13 06:00																		Minimum Daily Average: 0.2 ppb on Apr 12																		Hours of Data: 681	
Maximum Diurnal Average: 11.5 ppb at hour 8																		Minimum Diurnal Average: 1.8 ppb at hour 18																		Hours of Missing Data: 39	
Monthly Average: 5.3 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 7 P <sub>90</sub> = 13 P <sub>99</sub> = 30																		Hours of Calibration: 35	
																																				Percent Operational Time: 99.4	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Apr	1	Z	1	1	0	0	0	1	2	2	2	2	1	1	1	1	1	1	2	8	7	6	7	7	2.5	8											
2-Apr	7	2	Z	1	1	1	3	3	7	4	2	3	3	2	3	3	5	4	5	5	4	5	6	6	3.6	7											
3-Apr	8	10	9	Z	7	8	11	16	15	6	6	7	8	4	5	5	4	3	3	4	2	6	4	7	6.9	16											
4-Apr	6	7	8	6	Z	6	5	6	12	13	14	11	9	4	4	6	6	4	5	4	5	7	6	3	6.9	14											
5-Apr	2	2	3	7	10	Z	5	5	6	9	8	7	8	8	7	5	5	5	5	5	5	8	10	8	6.2	10											
6-Apr	Z	4	5	5	5	4	5	13	14	12	14	15	15	8	4	5	4	3	4	10	14	11	8	8	8.2	15											
7-Apr	5	Z	5	6	6	6	8	9	10	8	4	3	3	2	2	2	1	1	1	1	4	14	7	9	5.0	14											
8-Apr	9	8	Z	9	7	10	12	15	9	3	2	15	10	6	7	4	6	6	4	4	4	4	4	6	7.1	15											
9-Apr	6	8	9	Z	12	11	21	20	13	24	16	11	3	1	1	1	1	1	1	2	7	16	12	8	8.9	24											
10-Apr	15	20	20	7	Z	16	23	24	21	16	10	8	3	2	2	3	3	4	3	4	7	7	9	22	10.7	24											
11-Apr	30	22	22	16	15	Z	25	22	7	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	7.3	30											
12-Apr	Z	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1											
13-Apr	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	0	0	0	0	0	3	12	14	14	2.6	14											
14-Apr	10	7	Z	6	4	4	4	6	5	5	6	5	M	8	6	3	3	3	2	3	5	5	11	2	5.1	11											
15-Apr	1	1	2	Z	27	28	39	5	1	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	5.0	39											
16-Apr	0	0	0	0	Z	3	15	2	0	0	3	0	0	0	0	0	1	1	1	0	0	1	2	2	1.5	15											
17-Apr	1	0	1	2	7	Z	15	13	9	9	11	11	2	1	1	1	5	2	4	4	5	1	1	6	4.9	15											
18-Apr	Z	2	1	0	0	0	1	3	3	3	1	0	0	0	0	2	1	1	4	8	5	5	4	2	2.0	8											
19-Apr	3	Z	3	3	3	4	24	37	17	9	5	3	1	2	PF	PF	PF	0	4	3	4	3	5	9	7.1	37											
20-Apr	12	28	Z	22	23	17	21	21	39	32	9	2	1	2	2	3	4	2	3	3	8	4	3	2	11.4	39											
21-Apr	2	3	3	Z	7	8	13	22	11	11	5	2	3	3	2	1	2	2	5	4	1	1	1	1	4.9	22											
22-Apr	1	0	1	2	Z	3	5	3	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.9	5											
23-Apr	1	1	1	1	1	Z	7	5	0	1	1	3	1	1	1	1	1	1	1	1	2	1	4	7	1.9	7											
24-Apr	Z	9	9	10	11	10	7	4	4	4	2	2	2	1	2	2	1	1	1	1	2	2	3	6	4.1	11											
25-Apr	4	Z	5	6	7	7	6	10	10	17	7	3	3	3	2	2	3	3	3	2	2	17	23	18	7.0	23											
26-Apr	15	13	Z	4	6	6	10	27	24	13	8	5	4	3	4	4	4	4	4	5	7	4	3	4	8.0	27											
27-Apr	6	11	13	Z	9	11	17	22	11	8	8	2	2	2	1	0	0	0	0	1	1	1	1	2	5.7	22											
28-Apr	3	2	2	4	Z	12	40	30	18	16	25	10	3	1	2	2	2	2	4	2	5	5	8	4	8.7	40											
29-Apr	1	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1											
30-Apr	Z	0	0	0	0	0	1	1	1	2	2	1	1	1	1	1	0	0	0	1	2	10	11	27	2.8	27											
																		Diurnal Average		Diurnal Maximum																	
																		5.8		30																	
																		6.5		28																	
																		5.0		22																	
																		4.8		22																	
																		6.8		27																	
																		7.0		28																	
																		11.4		40																	
																		11.5		37																	
																		9.0		39																	
																		7.9		32																	
																		6.0		25																	
																		4.5		15																	
																		3.1		15																	
																		2.4		8																	
																		2.1		7																	
																		2.1		6																	
																		2.3		6																	
																		1.8		6																	
																		2.3		5																	
																		2.9		10																	
																		3.8		14																	
																		5.2		17																	
																		5.7		23																	
																		6.4		27																	
Z - zerospan																		C - Calibration		M - Maintenance		PF - Power Failure															



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	649	95.30	95.30
21 - 40	32	4.70	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

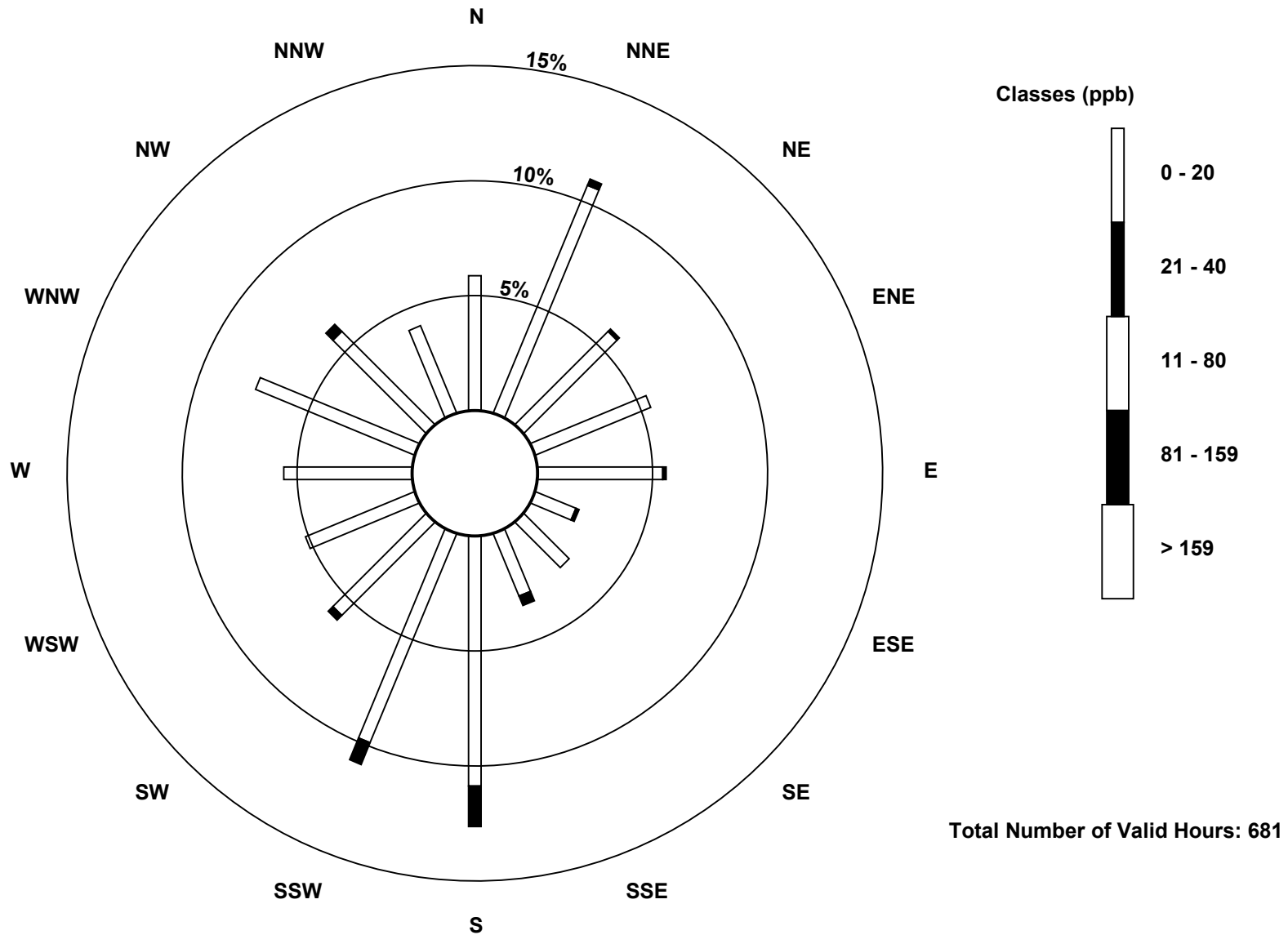
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	40	73	39	37	37	13	19	20	74	67	39	35	38	51	39	28	649
21 - 40	0	2	1	0	1	1	0	3	12	7	2	0	0	0	3	0	32
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	40	37	38	14	19	23	86	74	41	35	38	51	42	28	681

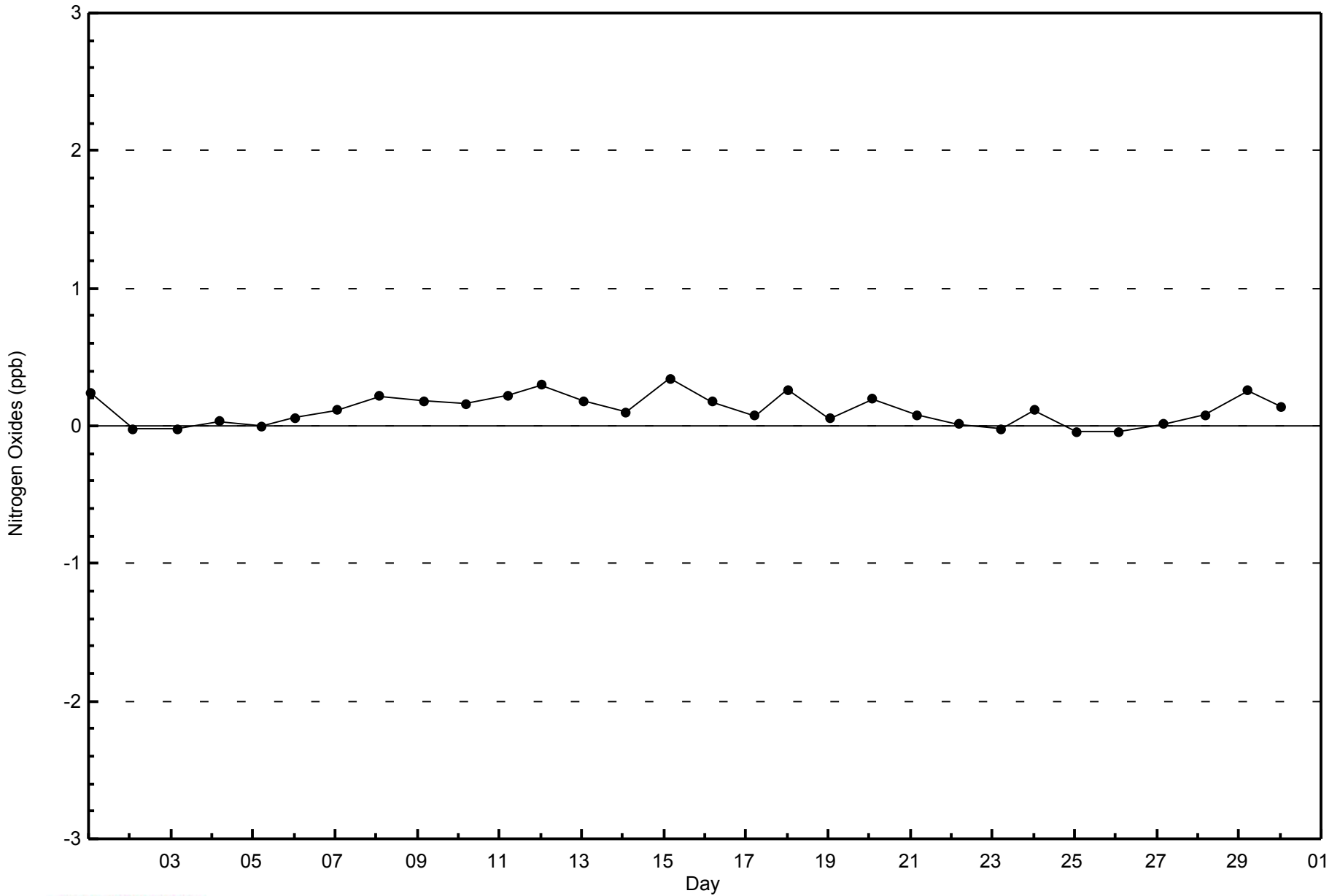
Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)

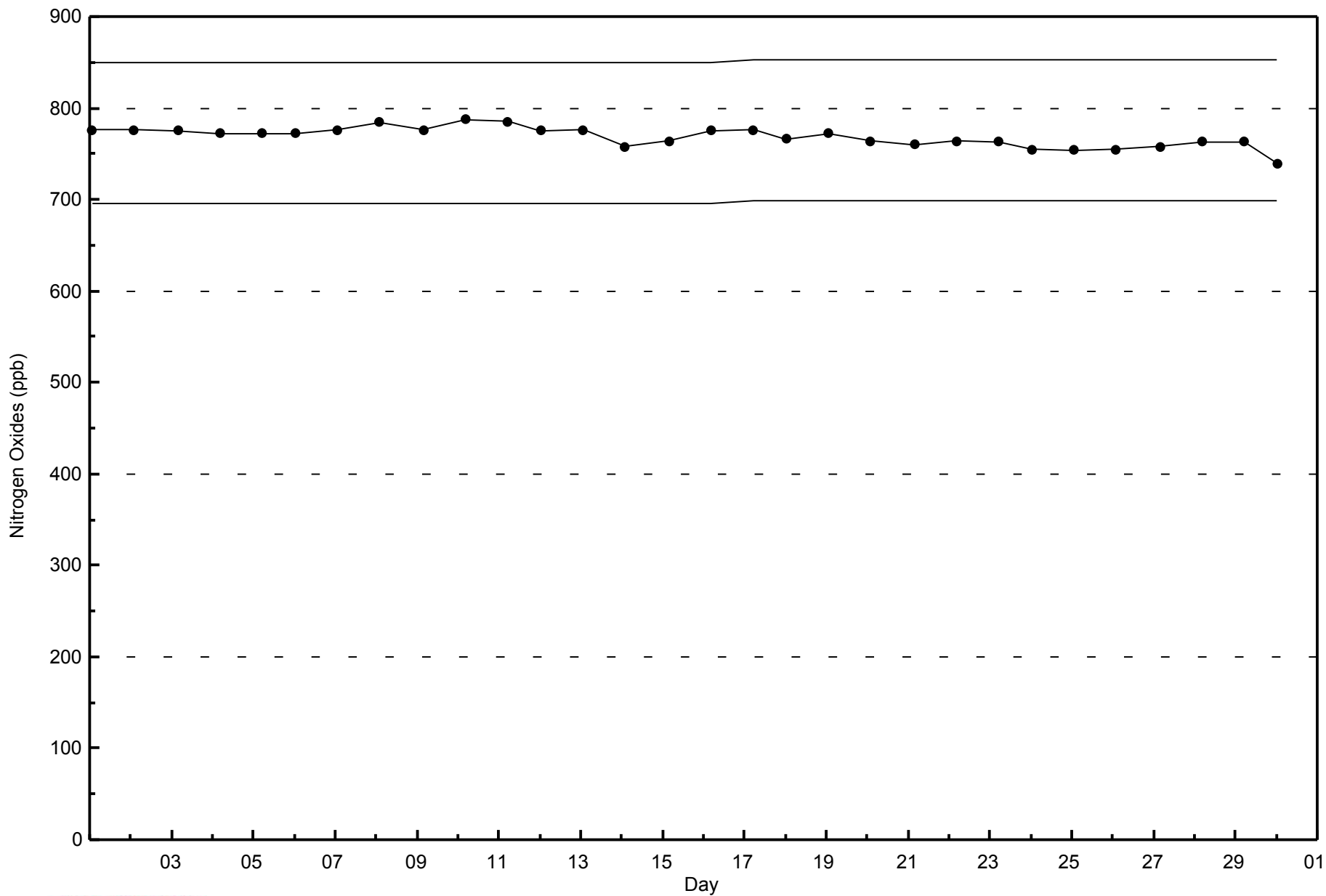






**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Fort McKay - Bertha Ganter - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 52 ppb on Apr 27 18:00	Maximum Daily Average: 43.9 ppb on Apr 29		Hours of Data:	683
Minimum Value: 4 ppb on Apr 20 02:00	Minimum Daily Average: 24.5 ppb on Apr 25		Hours of Missing Data:	37
Maximum Diurnal Average: 42.1 ppb at hour 16	Minimum Diurnal Average: 21.8 ppb at hour 7		Hours of Calibration:	34
Monthly Average: 33.0 ppb	Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 16 Q <sub>1</sub> = 27 Median = 35 Q <sub>3</sub> = 41 P <sub>90</sub> = 45 P <sub>99</sub> = 52		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-Apr	32	32	32	Z	31	31	30	30	29	29	31	33	33	33	34	34	34	34	31	25	26	25	21	24	30.2	34
2-Apr	26	30	32	34	Z	33	31	32	29	32	36	37	40	41	41	40	38	39	37	37	38	39	37	36	35.5	41
3-Apr	31	25	23	22	20	Z	18	18	26	39	40	39	38	41	40	40	39	38	35	37	32	31	26	32.0	41	
4-Apr	23	20	16	18	21	18	Z	20	23	29	31	33	34	38	38	36	36	37	34	35	34	30	29	27	28.6	38
5-Apr	30	27	24	18	16	26	29	Z	33	32	34	36	36	36	37	38	39	38	37	35	33	30	27	22	31.0	39
6-Apr	24	26	Z	20	16	14	15	20	25	30	31	33	33	39	41	41	41	42	40	32	25	27	28	28	29.3	42
7-Apr	31	31	29	Z	28	27	26	28	31	34	40	42	44	45	46	46	46	46	43	41	36	23	29	25	35.6	46
8-Apr	24	23	20	19	Z	19	17	17	25	33	33	24	29	31	32	35	34	33	37	35	33	28	19	14	26.7	37
9-Apr	13	10	11	13	11	Z	13	18	25	20	24	28	36	39	39	39	40	41	43	42	35	24	25	28	26.8	43
10-Apr	22	20	18	31	27	17	Z	17	22	27	34	38	43	45	45	45	45	46	47	46	41	36	27	17	32.8	47
11-Apr	9	9	10	13	11	11	12	Z	30	36	37	41	42	43	43	43	43	44	43	45	46	46	44	40	32.2	46
12-Apr	41	40	Z	40	39	37	37	35	35	36	36	37	38	39	40	41	41	41	42	42	41	41	41	40	39.1	42
13-Apr	41	41	41	Z	42	43	42	41	41	39	38	37	36	36	36	38	39	40	42	41	35	24	18	14	36.8	43
14-Apr	14	13	11	10	Z	10	12	13	26	C	C	C	C	36	40	43	45	44	43	42	38	35	26	34	28.1	45
15-Apr	34	32	29	20	7	Z	7	22	29	32	36	39	41	43	44	45	47	46	45	42	35	44	43	42	35.0	47
16-Apr	42	41	39	39	38	33	Z	36	38	39	39	43	44	45	47	48	47	46	47	48	44	40	34	30	41.2	48
17-Apr	30	33	31	24	19	12	18	Z	31	33	34	35	46	46	45	45	40	38	34	23	27	28	18	18	30.7	46
18-Apr	18	23	Z	34	36	36	35	32	33	34	38	40	41	41	42	40	42	41	37	30	26	22	16	16	32.7	42
19-Apr	13	10	8	Z	9	8	6	8	16	28	38	39	42	41	PF	PF	PF	44	40	35	35	32	28	19	24.9	44
20-Apr	15	4	8	5	Z	5	7	13	14	22	35	42	44	44	44	44	42	41	38	38	30	34	36	36	27.9	44
21-Apr	35	34	32	27	18	Z	15	19	27	29	36	40	39	39	42	44	41	41	38	38	39	39	38	37	34.3	44
22-Apr	38	35	29	27	23	26	Z	32	35	36	38	39	40	41	43	44	43	43	41	39	38	37	38	37	36.5	44
23-Apr	36	35	34	35	35	32	26	Z	38	38	38	38	40	41	41	41	40	41	39	36	35	36	34	29	36.4	41
24-Apr	24	29	Z	27	26	27	30	33	33	33	34	35	36	37	38	38	38	34	28	25	26	25	23	21	30.5	38
25-Apr	21	21	19	Z	15	14	16	15	17	18	28	32	34	35	37	36	35	35	34	33	33	15	9	11	24.5	37
26-Apr	11	9	13	13	Z	10	12	12	18	30	35	38	39	41	41	41	42	42	42	39	36	36	36	33	29.0	42
27-Apr	28	20	15	15	14	Z	14	18	31	35	38	44	44	45	48	50	52	52	52	51	49	47	44	40	36.8	52
28-Apr	36	33	31	25	22	16	Z	20	30	36	32	44	52	52	52	52	50	50	47	48	42	39	35	37	38.3	52
29-Apr	41	42	44	40	42	43	42	Z	40	41	41	43	46	46	47	47	47	46	45	46	46	45	44	45	43.9	47
30-Apr	46	45	Z	42	41	39	37	38	39	39	38	43	46	48	45	46	45	47	47	43	34	24	24	10	39.4	48

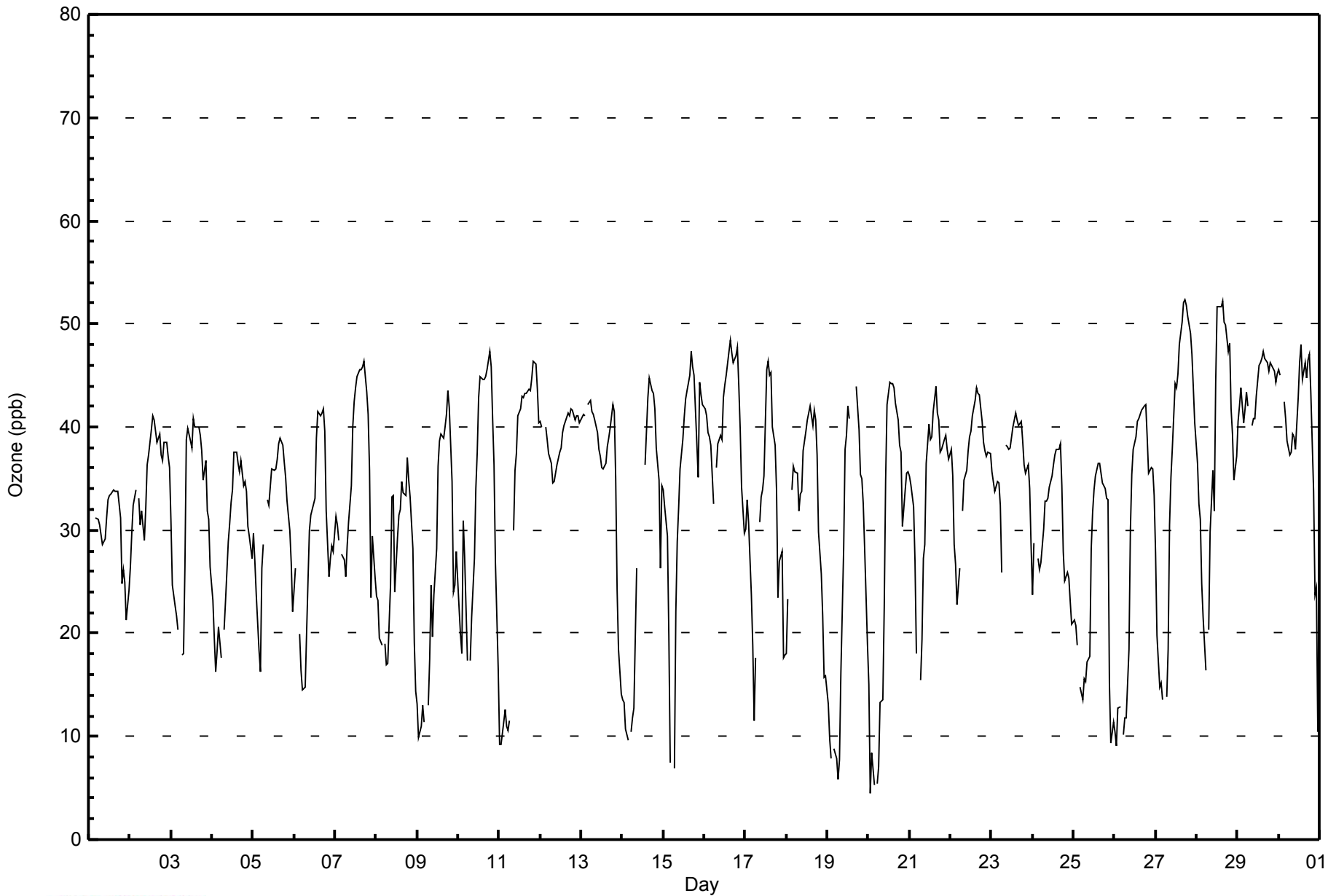
27.6	26.4	24.0	24.4	24.3	23.5	21.8	23.5	28.9	32.4	35.3	37.6	39.8	40.9	41.5	42.1	41.8	41.6	40.4	38.2	35.7	32.9	30.1	28.0	Diurnal Average		
46	45	44	42	42	43	42	41	41	41	41	44	52	52	52	52	52	52	52	52	51	49	47	44	45	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	109	15.96	15.96
21 - 50	566	82.87	98.83
51 - 82	8	1.17	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 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	11	9	2	2	0	2	1	4	13	22	10	4	6	3	8	12	109
21 - 50	28	66	38	35	38	11	18	19	62	56	30	30	30	48	35	22	566
51 - 82	0	0	0	0	0	0	0	0	4	0	0	0	3	1	0	0	8
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>39</b>	<b>75</b>	<b>40</b>	<b>37</b>	<b>38</b>	<b>13</b>	<b>19</b>	<b>23</b>	<b>79</b>	<b>78</b>	<b>40</b>	<b>34</b>	<b>39</b>	<b>52</b>	<b>43</b>	<b>34</b>	<b>683</b>

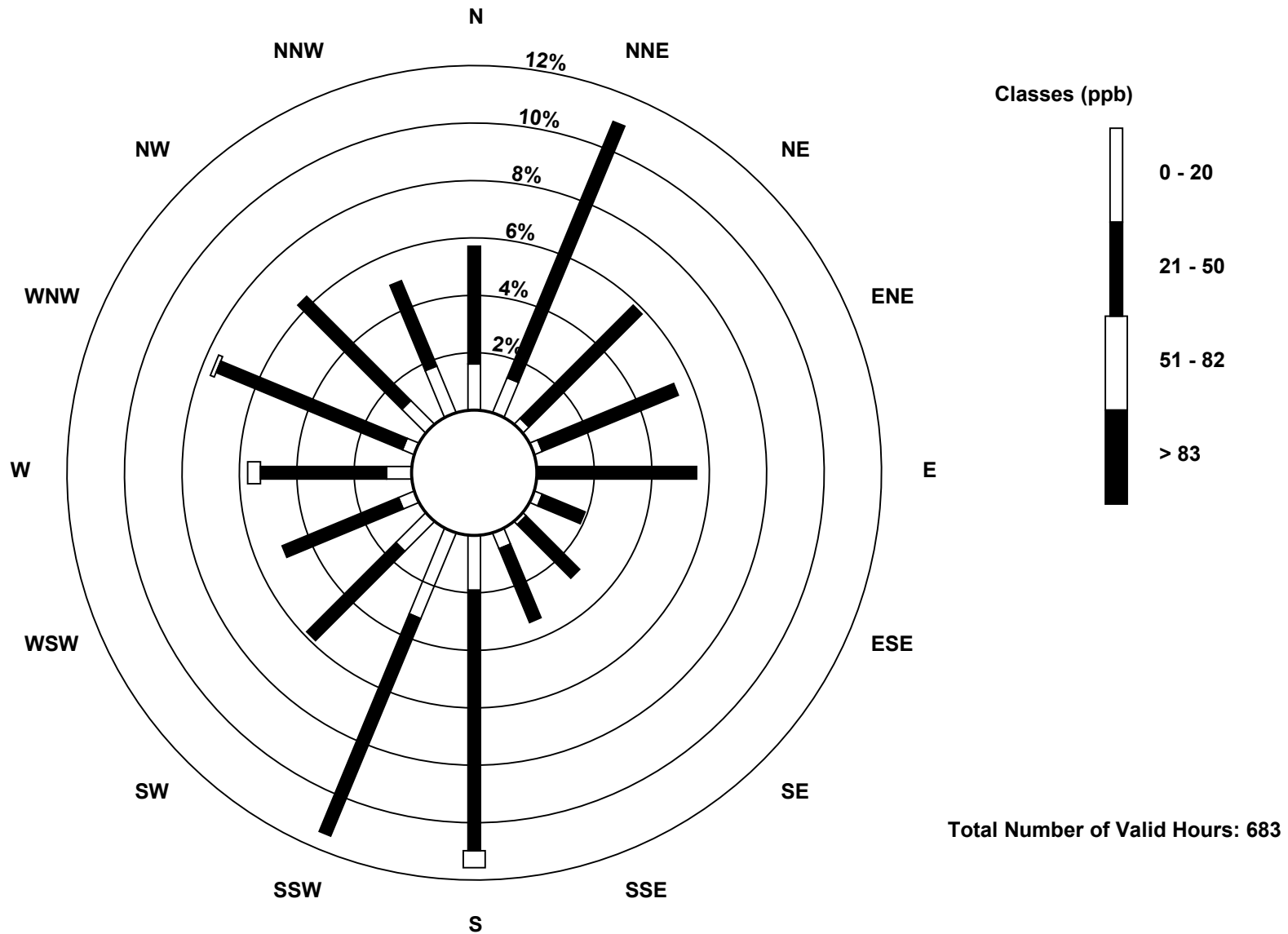
Total Number of Valid Hours: 683

Total Number of Hours: 720



Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

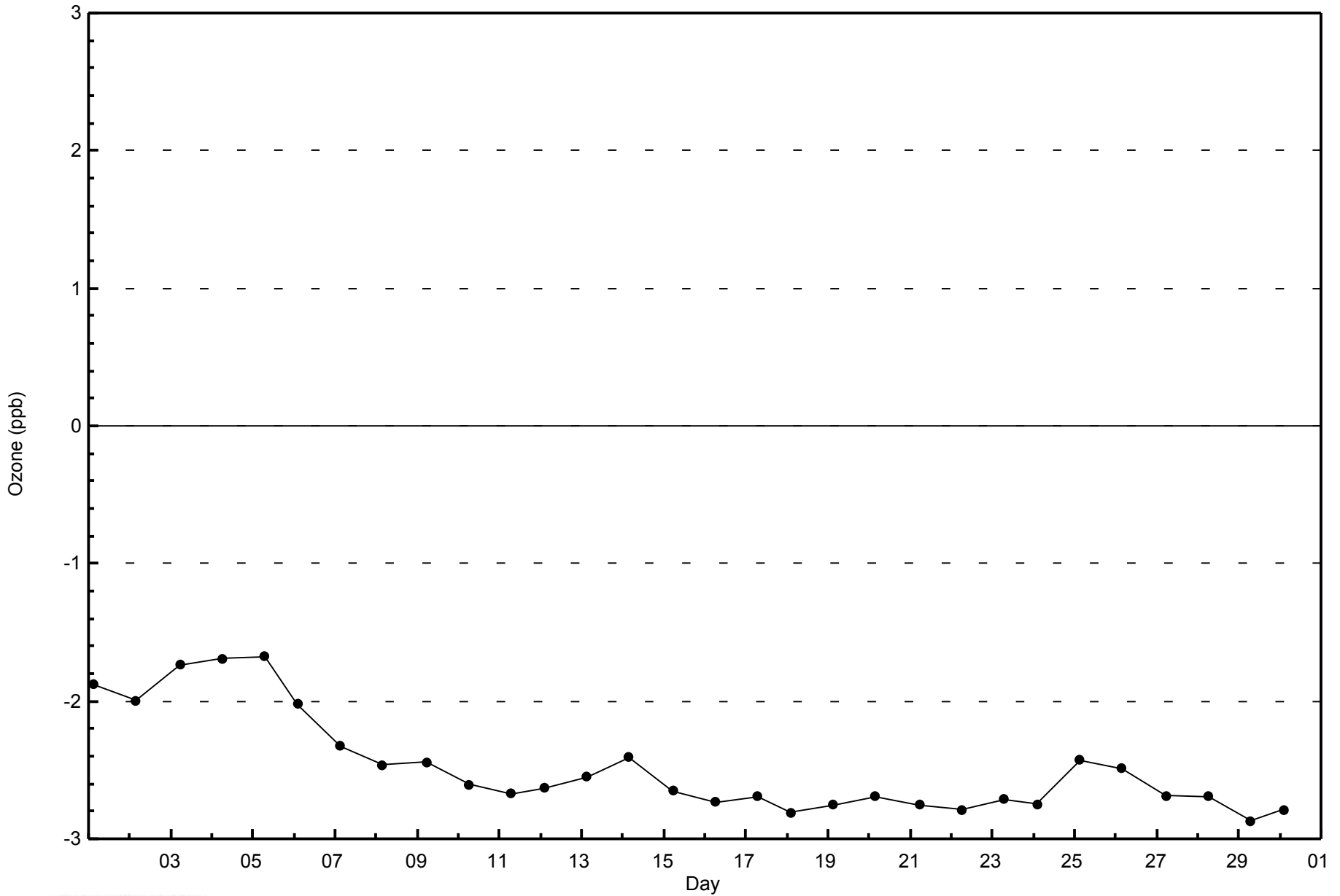
Ozone (O<sub>3</sub>) - ppb  
 Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

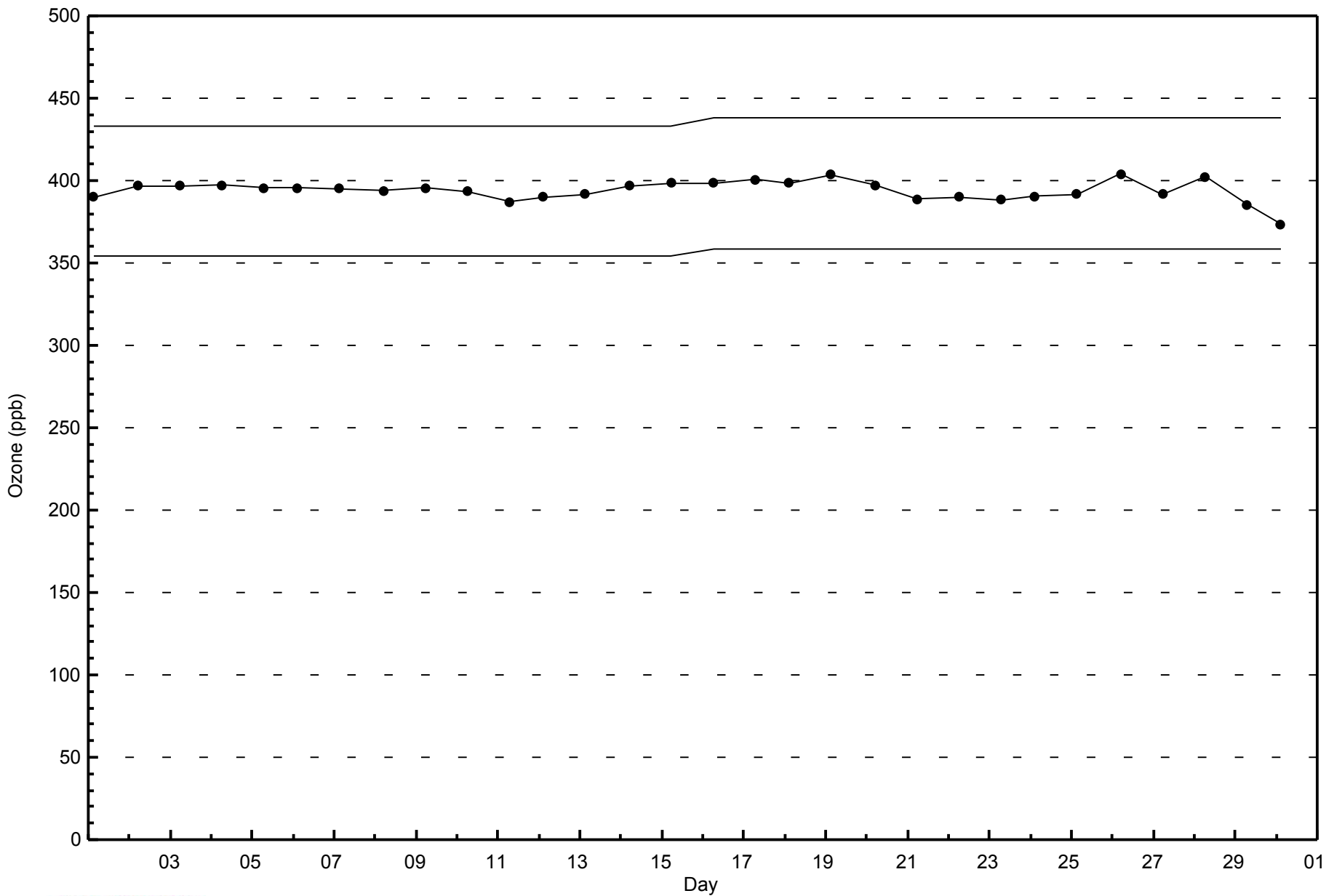
Ozone (O<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) - µg/m<sup>3</sup>

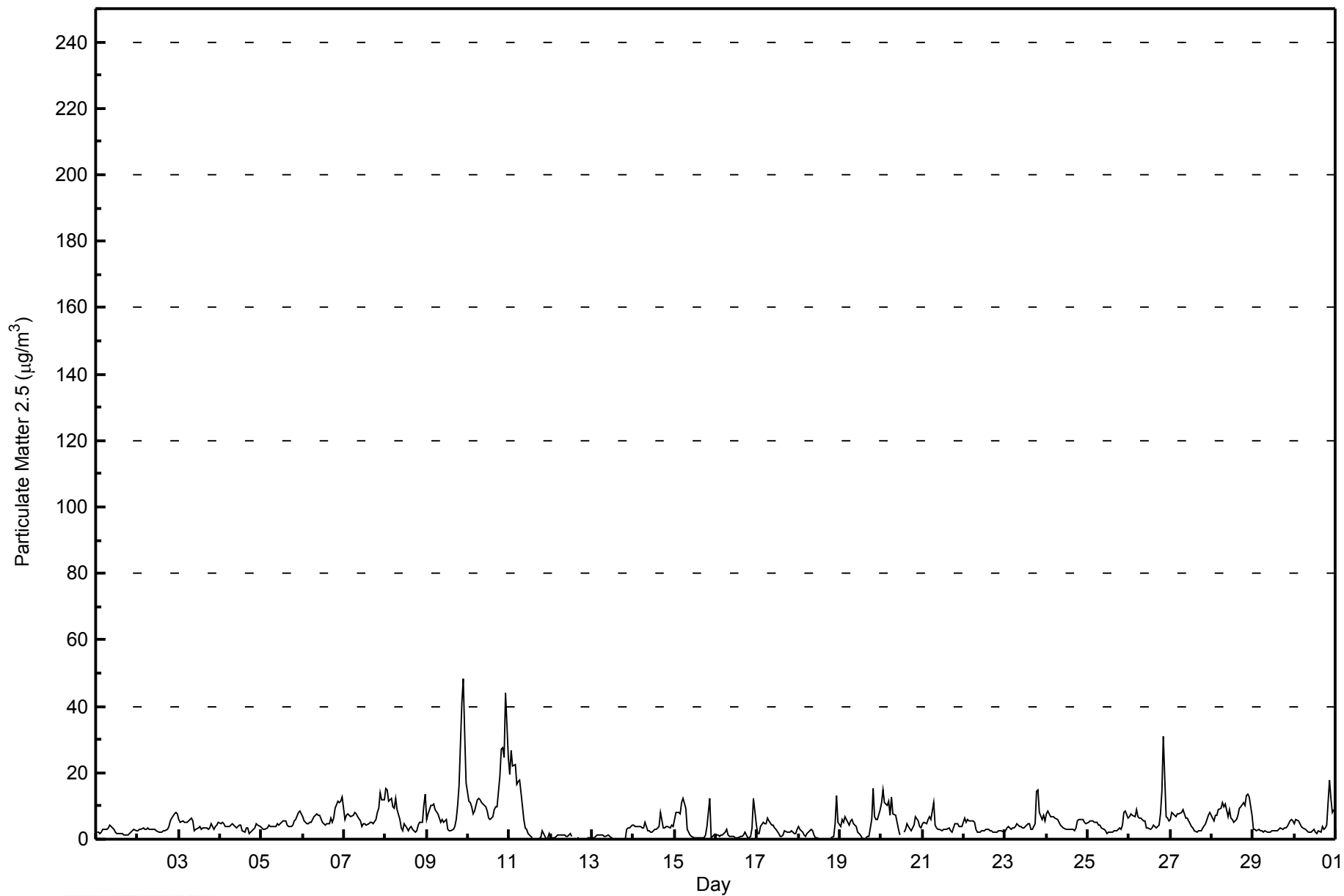
Fort McKay - Bertha Ganter - April 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 48.2 µg/m <sup>3</sup> on Apr 9 22:00 Minimum Value: 0.1 µg/m <sup>3</sup> on Apr 13 19:00 Maximum Diurnal Average: 8.6 µg/m <sup>3</sup> at hour 21 Monthly Average: 5.15 µg/m <sup>3</sup>		Maximum Daily Average: 14.0 µg/m <sup>3</sup> on Apr 10 Minimum Daily Average: 0.8 µg/m <sup>3</sup> on Apr 12 Minimum Diurnal Average: 2.7 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 1.1 Q <sub>1</sub> = 2.6 Median = 3.8 Q <sub>3</sub> = 6.2 P <sub>90</sub> = 10.0 P <sub>99</sub> = 26.7		Hours in Service: 720 Hours of Data: 699 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.1																						
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-Apr	2.1	2.1	1.8	2.1	2.9	3.1	3.1	3.6	4.1	3.5	2.9	2.1	1.6	1.7	1.7	1.6	1.2	1.2	1.3	1.8	2.0	2.4	2.9	2.6	2.3	4.1
2-Apr	2.7	2.9	3.1	3.2	3.0	3.1	3.2	3.1	3.0	3.0	2.8	2.4	2.2	1.9	2.3	2.5	2.7	3.1	3.8	5.4	6.3	7.8	8.2	7.5	3.7	8.2
3-Apr	5.8	5.1	5.4	5.0	5.1	5.3	5.8	6.5	5.6	2.7	3.0	3.4	3.8	3.2	3.4	3.5	3.5	3.0	3.3	4.6	2.9	3.6	4.3	5.1	4.3	6.5
4-Apr	4.5	5.2	4.6	4.0	3.7	3.8	4.1	4.5	4.3	3.3	3.7	4.0	4.1	2.5	2.2	3.4	3.6	1.9	2.7	2.9	3.5	4.5	4.3	3.8	3.7	5.2
5-Apr	3.2	3.1	3.0	3.4	4.1	3.9	3.9	3.9	3.9	4.6	4.3	4.5	5.4	5.4	5.4	4.2	3.7	3.9	4.2	5.7	6.1	8.2	8.6	7.6	4.8	8.6
6-Apr	6.6	5.3	4.7	4.8	5.2	5.2	6.9	7.2	7.6	7.2	7.1	5.3	4.7	4.3	4.7	4.5	6.2	5.1	6.5	9.2	11.4	11.1	11.5	12.6	6.9	12.6
7-Apr	5.8	7.2	7.4	7.0	7.0	7.3	8.2	7.6	6.7	5.5	3.7	4.5	4.5	4.4	4.7	5.0	5.1	4.6	6.1	8.2	9.5	13.9	11.7	11.9	7.0	13.9
8-Apr	15.1	14.6	11.4	12.3	9.9	9.1	12.4	8.8	5.7	3.3	2.7	4.6	3.5	2.7	3.2	3.8	2.8	1.9	2.4	4.3	4.9	5.0	10.1	13.5	7.0	15.1
9-Apr	5.9	7.6	10.2	10.2	10.8	9.1	7.7	6.3	5.0	5.9	5.3	6.0	2.8	2.6	2.6	3.1	3.8	6.1	10.4	16.0	41.3	48.2	31.7	16.9	11.5	48.2
10-Apr	11.3	10.8	9.6	7.8	8.4	11.7	12.1	11.9	11.1	10.1	9.7	8.6	6.3	5.8	6.7	8.9	9.7	9.7	19.0	27.0	27.4	24.4	44.2	24.5	14.0	44.2
11-Apr	19.4	26.6	22.0	22.4	16.4	17.5	17.9	13.8	5.9	3.2	3.1	1.6	1.0	0.5	UO	UO	UO	0.5	0.3	2.6	1.6	0.2	0.5	1.6	8.5	26.6
12-Apr	0.5	0.4	0.3	0.9	1.1	1.2	1.2	1.2	1.3	0.7	0.9	1.5	0.8	UO	UO	0.5	0.4	UO	UO	UO	UO	0.5	0.6	0.4	0.8	1.5
13-Apr	0.5	0.6	0.8	1.4	1.1	1.2	1.1	1.0	1.0	1.1	0.7	0.5	0.4	UO	UO	UO	UO	UO	0.1	0.2	2.8	3.5	3.5	4.3	1.4	4.3
14-Apr	4.2	3.7	3.8	3.8	3.8	3.5	3.4	5.0	2.6	2.4	2.2	2.3	2.9	2.8	3.4	3.7	8.1	3.3	3.2	3.9	4.0	3.3	4.2	3.8	3.6	8.1
15-Apr	6.1	8.1	7.9	7.6	10.8	12.4	9.3	3.0	2.0	1.4	0.8	0.6	0.6	0.4	0.2	0.4	0.6	0.6	1.3	3.6	12.4	0.5	1.0	1.4	3.9	12.4
16-Apr	1.2	1.2	1.0	1.1	1.2	2.0	3.1	1.3	1.0	0.8	1.0	0.6	0.4	0.3	0.7	0.7	1.3	2.3	0.4	0.3	1.0	3.3	12.4	4.5	1.8	12.4
17-Apr	1.7	1.6	3.9	5.2	4.9	4.5	6.2	5.7	4.4	4.1	3.5	3.1	1.9	0.8	0.7	1.4	2.5	2.0	2.1	2.3	2.7	1.6	1.5	2.9	3.0	6.2
18-Apr	3.7	3.1	2.2	1.2	1.0	1.6	2.5	2.8	2.6	1.1	0.5	0.3	UO	UO	UO	1.0	UO	UO	UO	0.4	0.9	4.9	13.2	5.2	2.7	13.2
19-Apr	4.0	5.9	5.2	6.8	5.9	4.4	5.7	6.1	4.5	3.6	2.3	1.6	1.1	0.6	0.2	0.3	0.7	0.7	5.9	15.2	7.0	5.9	5.7	9.0	4.5	15.2
20-Apr	11.0	14.9	11.0	10.0	11.3	7.3	12.7	7.6	7.3	4.9	2.9	1.4	M	2.1	3.0	4.6	3.8	2.7	3.3	4.4	6.8	5.4	3.9	3.6	6.3	14.9
21-Apr	4.5	5.0	4.9	5.9	6.8	6.0	11.1	4.4	3.4	2.9	3.0	2.4	2.8	2.9	3.0	3.5	2.6	2.3	3.5	4.5	4.7	3.7	3.7	3.8	4.2	11.1
22-Apr	6.4	5.1	5.9	5.7	5.5	5.3	5.0	2.9	2.1	2.0	2.4	2.4	2.4	2.8	2.8	2.7	2.6	2.3	2.2	2.2	2.7	2.7	2.5	2.3	3.4	6.4
23-Apr	2.5	3.4	3.7	3.0	3.4	3.5	3.6	4.5	3.7	3.6	3.5	3.5	4.1	4.5	4.7	2.9	3.0	4.6	14.3	14.9	8.0	5.8	7.1	5.6	5.1	14.9
24-Apr	7.4	8.4	6.8	6.7	6.9	6.3	5.8	5.2	4.3	4.0	3.2	3.1	3.1	2.8	2.9	2.8	2.5	3.3	5.4	5.9	5.8	6.1	5.0	4.8	4.9	8.4
25-Apr	5.0	5.5	5.7	5.3	5.2	5.2	4.2	4.4	3.3	2.8	2.3	1.9	2.1	2.1	2.2	2.6	2.7	2.5	3.3	3.1	4.2	8.2	8.6	6.5	4.1	8.6
26-Apr	6.9	7.7	7.0	6.8	8.8	6.7	6.5	6.2	5.6	5.3	3.4	3.2	2.8	3.4	4.1	3.7	3.6	4.2	7.5	14.4	30.9	6.8	6.5	5.4	7.0	30.9
27-Apr	6.0	7.9	7.3	6.8	7.5	7.8	7.9	9.0	7.4	6.3	6.6	4.7	4.0	3.2	2.6	2.3	2.6	2.3	2.6	3.2	4.6	5.9	7.2	7.9	5.6	9.0
28-Apr	6.2	5.5	7.4	7.2	8.8	9.3	11.0	9.6	10.6	6.9	8.8	6.5	5.8	5.1	5.9	7.3	9.2	9.9	11.1	10.3	12.9	13.6	12.9	7.3	8.7	13.6
29-Apr	2.8	3.0	2.6	3.1	2.4	2.4	2.3	2.4	2.3	2.2	2.3	2.4	2.6	2.5	2.7	2.9	3.2	3.1	3.3	3.4	3.9	5.4	5.9	5.4	3.1	5.9
30-Apr	4.8	5.8	5.4	4.7	3.9	3.5	2.9	2.6	2.1	2.2	2.1	2.8	2.0	1.8	2.7	2.1	3.7	2.9	3.5	4.3	17.8	12.5	7.9	9.1	4.7	17.8
																								Diurnal Average		
																								Diurnal Maximum		
5.6 6.2 5.9 5.8 5.9 5.8 6.4 5.4 4.5 3.7 3.3 3.1 2.9 2.7 3.0 3.1 3.5 3.3 4.7 6.3 8.6 7.6 8.4 6.7 19.4 26.6 22.0 22.4 16.4 17.5 17.9 13.8 11.1 10.1 9.7 8.6 6.3 5.8 6.7 8.9 9.7 9.9 19.0 27.0 41.3 48.2 44.2 24.5																										
M - Maintenance UO - Unstable Operation Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



**WBEA**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	419	59.94	59.94
6 - 15	201	28.76	88.70
16 - 25	12	1.72	90.41
26 - 80	8	1.14	91.56
> 81.0	0	0.00	91.56

Total Number of Valid Hours: 699

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - April 2015**

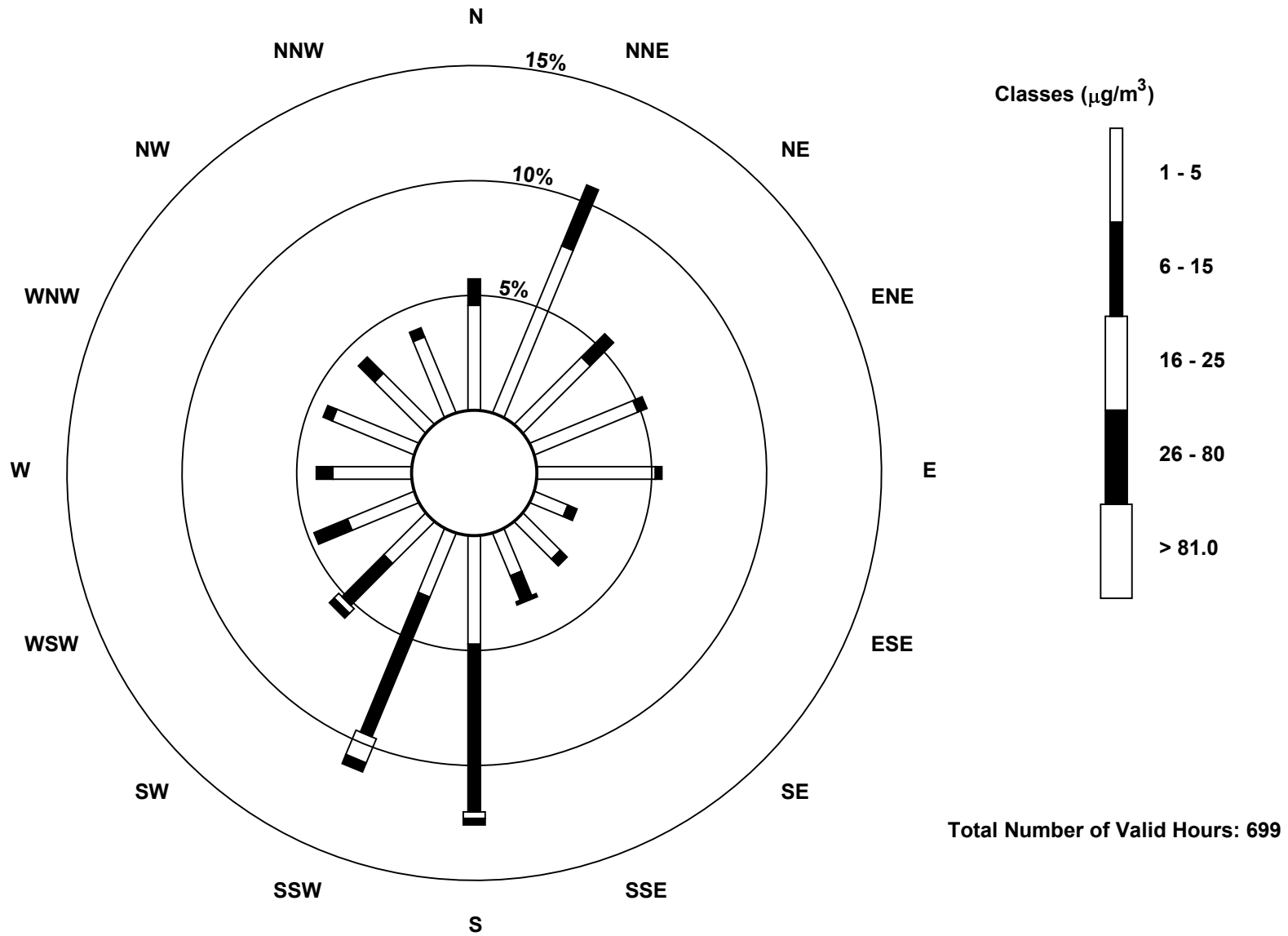
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	32	55	29	34	36	11	16	14	33	21	18	22	24	27	22	25	419
6 - 15	8	20	10	3	2	3	3	8	51	46	18	11	5	3	7	3	201
16 - 25	0	0	0	0	0	0	0	0	2	8	2	0	0	0	0	0	12
26 - 80	0	0	0	0	0	0	0	1	2	3	2	0	0	0	0	0	8
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	75	39	37	38	14	19	23	88	78	40	33	29	30	29	28	640

Total Number of Valid Hours: 699

Total Number of Hours: 720

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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
Fort McKay - Bertha Ganter (AMS 1)**







Summary of Hour Averages

Fort McKay - Bertha Ganter - April 2015

Number of Exceedences (AAAQO): 1-hr: 0	Hours in Service: 720
Maximum Value: 0 ppb on Apr 1 01:00	Maximum Daily Average: 0.0 ppb on Apr 1
Minimum Value: 0 ppb on Apr 1 01:00	Hours of Data: 640
Maximum Diurnal Average: 0.0 ppb at hour 1	Hours of Missing Data: 80
Monthly Average: 0.0 ppb	Hours of Calibration: 45
Percentiles: P <sub>1</sub> =0 P <sub>10</sub> =0 Q <sub>1</sub> =0 Median=0 Q <sub>3</sub> =0 P <sub>90</sub> =0 P <sub>99</sub> =0	Percent Operational Time: 95.1

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

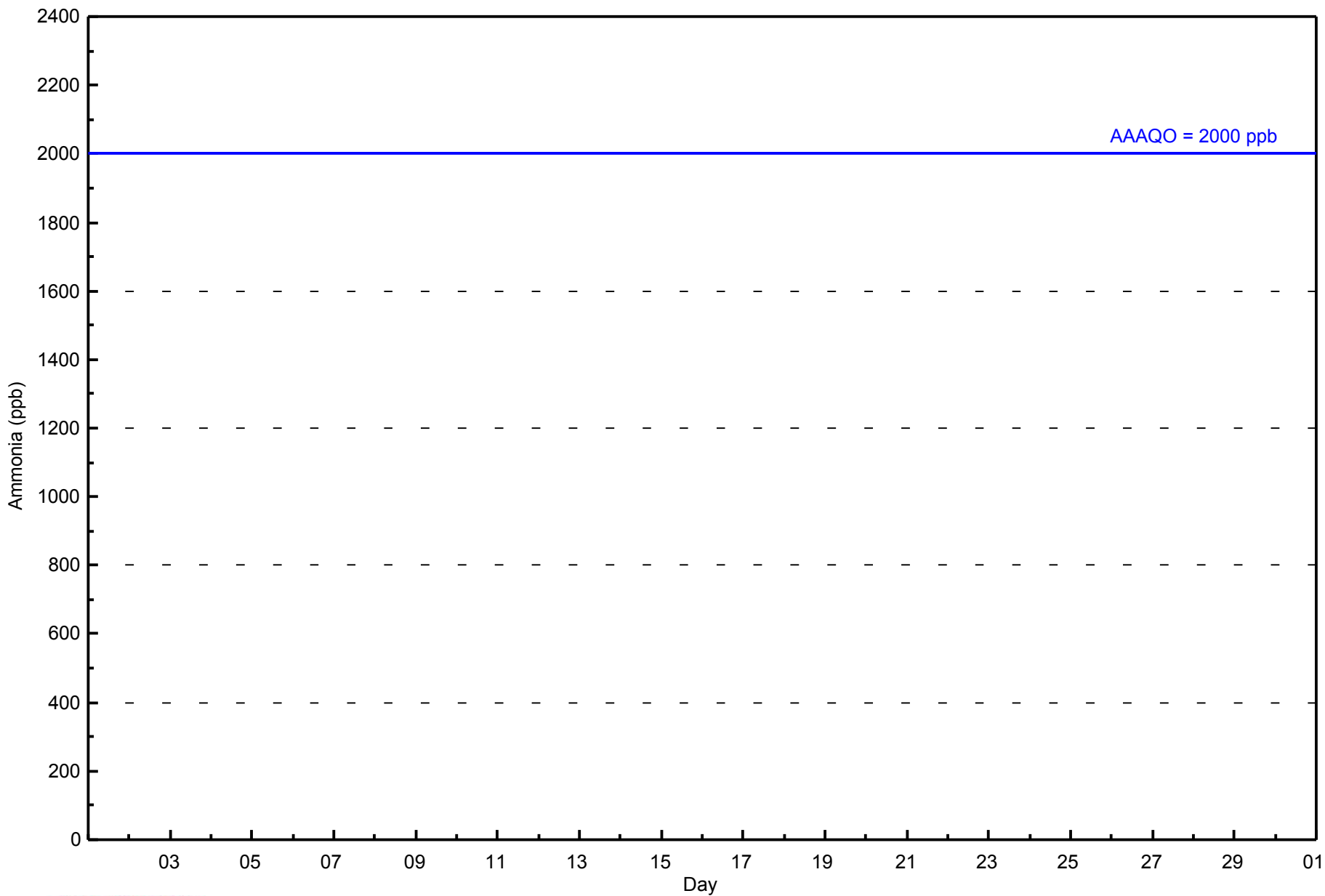
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	640	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: 640

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - April 2015**

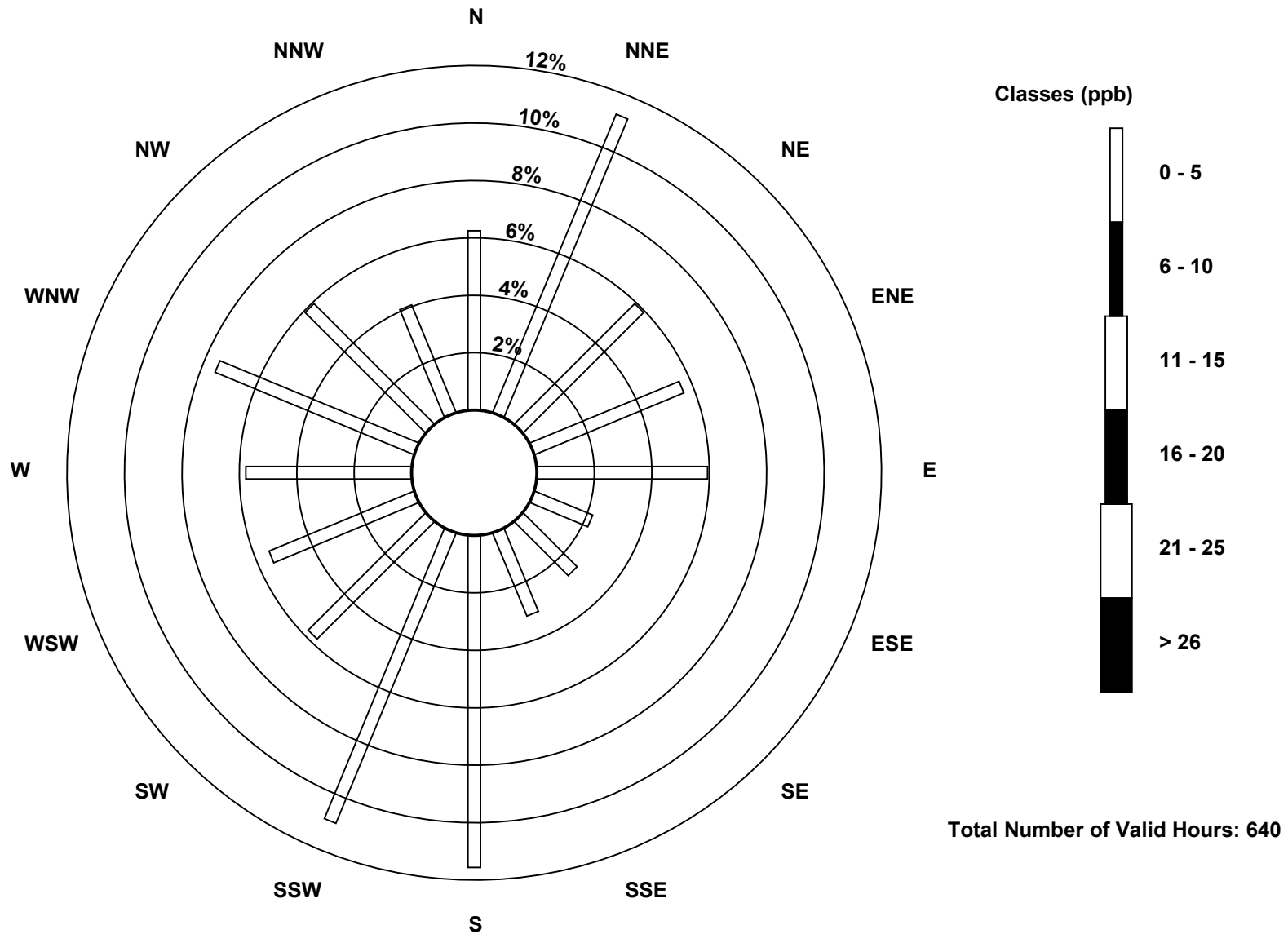
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	40	72	38	36	38	14	17	20	74	70	37	35	37	48	38	26	640
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
<b>Totals</b>	40	72	38	36	38	14	17	20	74	70	37	35	37	48	38	26	640

Total Number of Valid Hours: 640

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

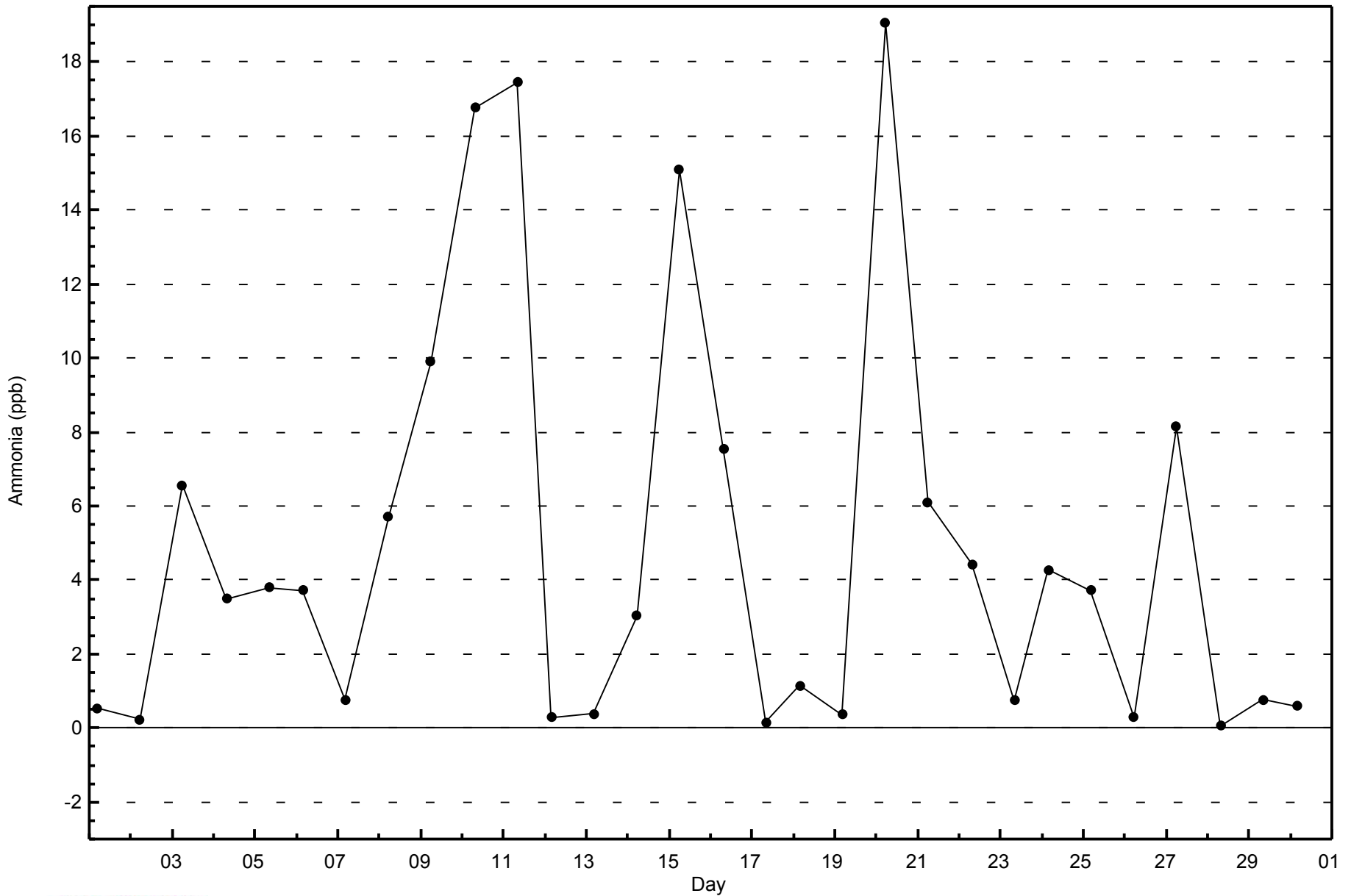
Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

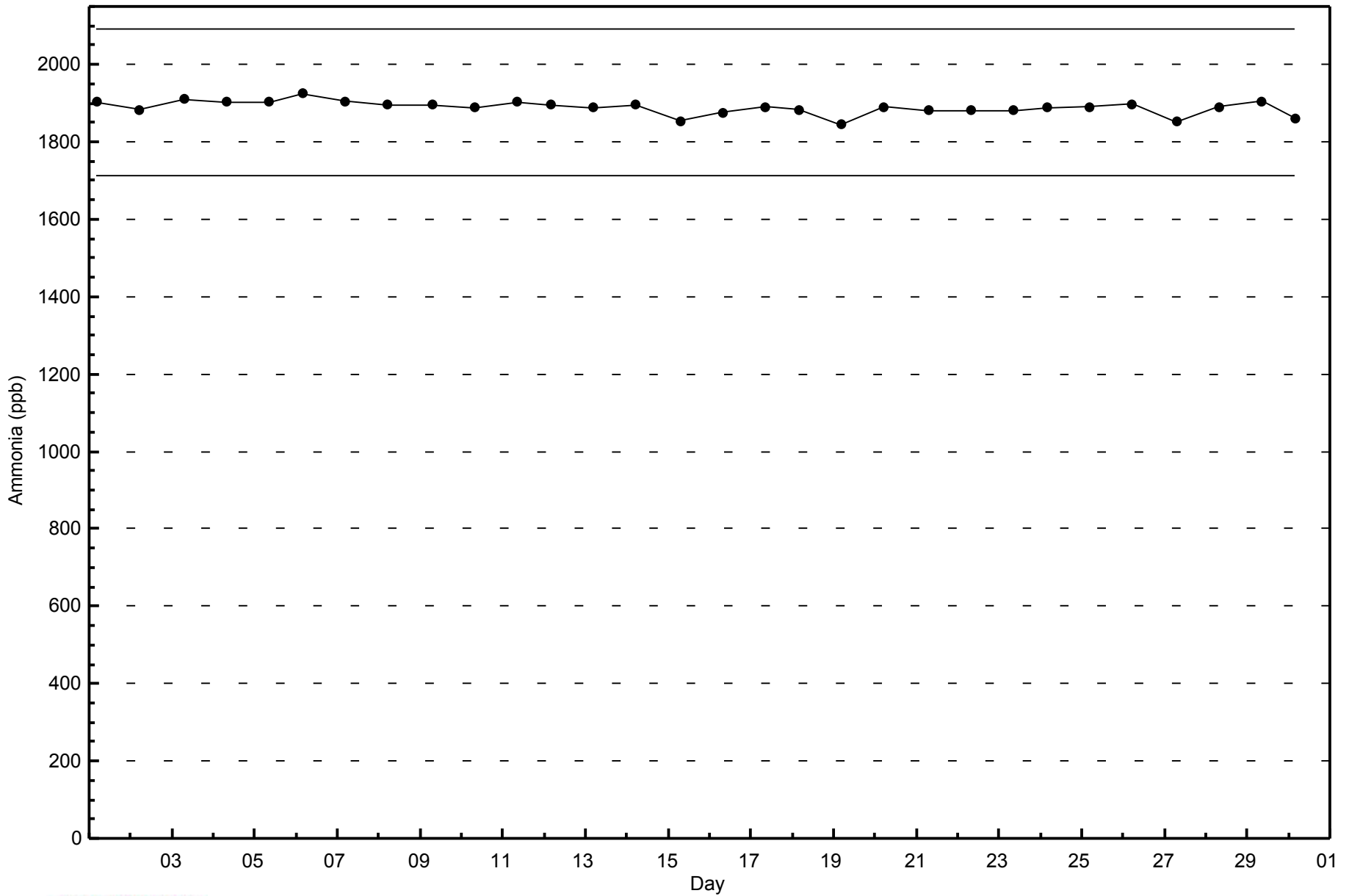
Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





WBEA  
Span Responses

Ammonia (NH<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - April 2015





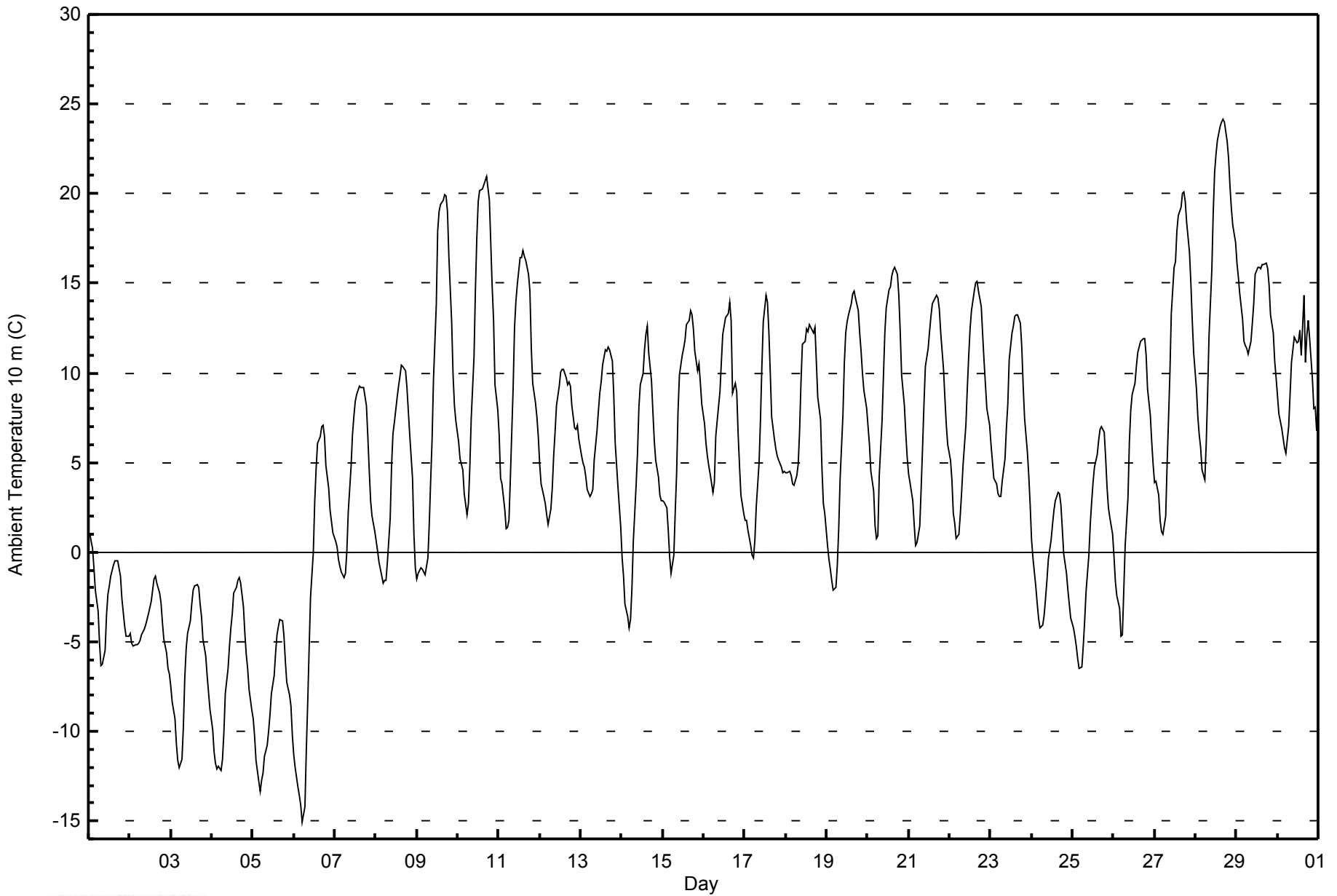
Maximum Value: 24.1 C on Apr 28 17:00																				Maximum Daily Average: 15.9 C on Apr 28					Hours in Service: 720																								
Minimum Value: -15.1 C on Apr 6 06:00																				Minimum Daily Average: -8.6 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 10.8 C at hour 16																				Minimum Diurnal Average: -1.5 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 5.02 C																				Percentiles: P <sub>1</sub> = -12.8 P <sub>10</sub> = -5.1 Q <sub>1</sub> = -0.6 Median = 5.1 Q <sub>3</sub> = 10.9 P <sub>90</sub> = 14.5 P <sub>99</sub> = 21.7					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-Apr	1.1	0.6	0.2	-0.9	-2.1	-3.3	-5.1	-6.3	-6.2	-5.5	-3.5	-2.3	-1.9	-1.3	-0.7	-0.5	-0.5	-0.5	-1.4	-2.6	-3.4	-4.2	-4.7	-4.7	-2.5	1.1																							
2-Apr	-4.6	-5.1	-5.2	-5.1	-5.2	-5.1	-4.9	-4.7	-4.3	-4.0	-3.8	-3.5	-2.7	-2.2	-1.5	-1.4	-1.7	-2.3	-2.8	-3.9	-4.8	-5.6	-6.5	-6.8	-4.1	-1.4																							
3-Apr	-7.5	-8.3	-9.3	-10.7	-11.6	-12.1	-11.6	-9.8	-7.0	-5.4	-4.5	-3.8	-2.9	-2.1	-1.9	-1.8	-2.0	-2.9	-3.6	-4.8	-5.8	-6.9	-7.8	-8.7	-6.4	-1.8																							
4-Apr	-9.9	-11.1	-11.8	-12.1	-12.0	-12.2	-11.5	-10.1	-7.9	-6.5	-5.3	-4.2	-3.5	-2.3	-1.9	-1.6	-1.4	-1.8	-3.0	-4.6	-5.7	-6.5	-7.6	-8.8	-6.8	-1.4																							
5-Apr	-9.3	-10.3	-11.7	-12.8	-13.3	-12.7	-12.3	-11.4	-10.8	-10.0	-9.1	-7.9	-6.8	-5.7	-4.7	-4.1	-3.8	-3.9	-4.7	-6.1	-7.3	-8.0	-8.6	-10.2	-8.6	-3.8																							
6-Apr	-11.3	-12.1	-13.1	-13.6	-14.1	-15.1	-14.2	-11.0	-8.4	-5.4	-2.5	0.0	2.8	4.7	6.0	6.5	7.0	7.1	6.5	4.8	3.6	2.3	1.7	1.1	-2.8	7.1																							
7-Apr	0.6	0.3	-0.4	-0.8	-1.1	-1.4	-1.2	0.1	2.2	4.7	6.6	7.5	8.4	8.8	9.3	9.2	9.2	9.2	8.2	6.4	4.6	2.9	2.0	1.2	4.0	9.3																							
8-Apr	0.6	0.1	-0.6	-1.4	-1.8	-1.6	-1.6	-0.6	1.9	4.8	6.6	7.2	8.6	9.3	9.8	10.5	10.3	10.2	9.2	7.9	6.5	4.1	1.0	-0.9	4.2	10.5																							
9-Apr	-1.5	-1.2	-0.9	-1.0	-1.1	-1.3	-0.4	1.6	4.1	6.3	9.6	13.8	17.9	19.0	19.4	19.6	20.0	19.9	19.0	16.5	12.9	9.9	8.1	7.3	9.1	20.0																							
10-Apr	6.2	5.2	4.9	4.6	3.3	2.1	2.7	4.7	7.5	10.9	14.6	17.5	19.6	20.2	20.2	20.5	20.7	20.9	19.7	17.2	14.8	13.0	9.4	7.9	12.0	20.9																							
11-Apr	6.5	4.1	3.8	2.4	1.3	1.4	1.7	4.1	9.2	12.5	14.0	15.0	16.5	16.5	16.8	16.5	16.3	15.5	14.5	11.4	9.4	8.4	7.5	6.4	9.7	16.8																							
12-Apr	4.9	3.8	3.1	2.7	2.1	1.5	2.4	3.6	5.4	6.7	8.2	9.2	10.1	10.2	10.2	9.7	9.4	9.5	9.3	8.2	7.0	6.9	7.1	6.3	6.6	10.2																							
13-Apr	5.4	5.0	4.7	4.2	3.5	3.1	3.3	3.5	5.1	6.7	7.9	8.9	9.5	10.4	11.3	11.2	11.5	11.3	10.7	8.8	6.2	4.9	3.7	1.4	6.8	11.5																							
14-Apr	-0.3	-1.3	-2.9	-3.6	-4.2	-3.8	-2.1	0.6	3.7	5.5	8.1	9.3	10.0	11.3	12.1	12.6	11.2	9.6	7.8	6.2	5.2	4.2	3.2	2.9	4.4	12.6																							
15-Apr	2.9	2.8	2.4	1.2	-0.2	-1.2	-0.2	2.3	4.5	7.8	9.9	10.9	11.4	11.8	12.7	13.0	13.5	13.2	12.5	11.2	10.1	10.5	9.4	8.3	7.5	13.5																							
16-Apr	7.2	6.1	5.4	4.8	4.3	3.3	3.9	6.4	7.3	8.9	10.6	12.2	12.6	13.1	13.3	13.9	12.9	8.9	9.5	9.0	6.6	4.8	3.2	2.1	7.9	13.9																							
17-Apr	1.8	1.8	1.2	0.4	-0.1	-0.3	0.7	2.5	4.9	7.4	10.4	12.8	14.3	13.9	12.3	10.0	7.6	6.3	5.8	5.4	5.1	4.7	4.5	4.5	5.7	14.3																							
18-Apr	4.4	4.5	4.5	4.2	3.8	3.8	4.3	4.9	6.8	9.5	11.6	11.8	12.5	12.3	12.7	12.4	12.2	12.6	10.6	8.6	7.4	4.7	2.7	2.2	7.7	12.7																							
19-Apr	0.4	-0.4	-1.0	-1.6	-2.1	-2.0	-0.7	1.3	4.1	7.6	10.5	12.3	12.9	13.2	13.8	14.4	14.5	14.2	13.5	12.3	11.2	9.9	9.1	8.0	7.3	14.5																							
20-Apr	7.0	6.0	4.5	3.4	1.4	0.8	0.9	4.3	7.3	9.8	12.2	13.7	14.6	14.8	15.5	15.7	15.9	15.5	14.3	12.3	9.9	8.2	6.6	5.3	9.2	15.9																							
21-Apr	4.4	3.8	2.9	1.5	0.4	0.5	1.5	3.6	5.8	8.2	10.3	11.3	12.3	13.1	13.8	14.2	14.3	14.2	13.5	12.2	10.2	8.5	7.1	6.0	8.1	14.3																							
22-Apr	5.1	4.0	2.2	1.7	0.7	1.0	2.1	3.4	4.9	7.1	9.1	10.9	12.5	13.5	14.5	15.0	15.1	14.6	13.7	12.2	10.7	9.3	8.0	7.0	8.3	15.1																							
23-Apr	6.0	5.0	4.1	3.8	3.3	3.1	3.1	3.9	5.2	7.0	8.2	10.7	12.2	12.6	13.1	13.2	13.3	12.8	11.4	9.3	7.5	5.6	4.3	2.6	7.6	13.3																							
24-Apr	0.7	-0.3	-1.9	-2.8	-3.7	-4.3	-4.1	-3.6	-2.6	-1.6	-0.4	0.7	1.5	2.3	2.9	3.3	3.2	2.7	1.3	-0.1	-1.2	-2.1	-2.9	-3.7	-0.7	3.3																							
25-Apr	-4.2	-4.7	-5.3	-6.0	-6.5	-6.4	-5.2	-3.8	-2.2	-0.2	1.5	2.8	3.9	4.8	5.4	6.2	6.9	7.0	6.7	5.3	3.6	2.5	1.9	1.0	0.6	7.0																							
26-Apr	-0.3	-1.6	-2.4	-3.1	-4.7	-4.7	-2.1	0.4	3.0	6.2	8.0	8.8	9.4	10.3	11.1	11.4	11.7	11.9	11.9	10.9	9.1	7.6	6.1	4.9	5.2	11.9																							
27-Apr	3.9	3.9	3.2	1.8	1.2	1.0	2.0	4.9	7.4	10.0	13.3	15.9	16.2	17.9	18.8	19.2	20.0	20.1	19.6	18.4	16.8	15.0	13.0	11.1	11.4	20.1																							
28-Apr	9.1	7.5	6.5	5.8	4.6	4.0	6.1	8.9	12.1	15.8	18.9	21.2	22.2	23.0	23.8	24.0	24.1	24.0	22.9	21.9	20.4	19.2	18.2	17.3	15.9	24.1																							
29-Apr	16.2	15.3	14.4	13.0	11.8	11.5	11.4	11.0	11.8	12.8	13.9	15.5	15.9	15.9	15.8	16.0	16.1	16.1	15.8	14.9	13.3	12.2	10.7	9.7	13.8	16.2																							
30-Apr	8.7	7.7	6.9	6.4	5.8	5.5	7.0	8.8	10.6	11.3	12.0	11.7	11.8	12.4	11.0	14.3	10.6	12.1	13.0	11.9	9.6	8.0	8.1	6.8	9.7	14.3																							
																								1.8	1.0	0.3	-0.5	-1.2	-1.5	-0.8	0.8	2.8	5.0	6.9	8.3	9.4	10.1	10.5	10.8	10.6	10.3	9.5	8.0	6.4	5.1	3.9	2.9	Diurnal Average	
																								16.2	15.3	14.4	13.0	11.8	11.5	11.4	11.0	12.1	15.8	18.9	21.2	22.2	23.0	23.8	24.0	24.1	24.0	22.9	21.9	20.4	19.2	18.2	17.3	Diurnal Maximum	





**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	197	27.36	27.36
0 - 10	318	44.17	71.53
10 - 20	188	26.11	97.64
> 20	17	2.36	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

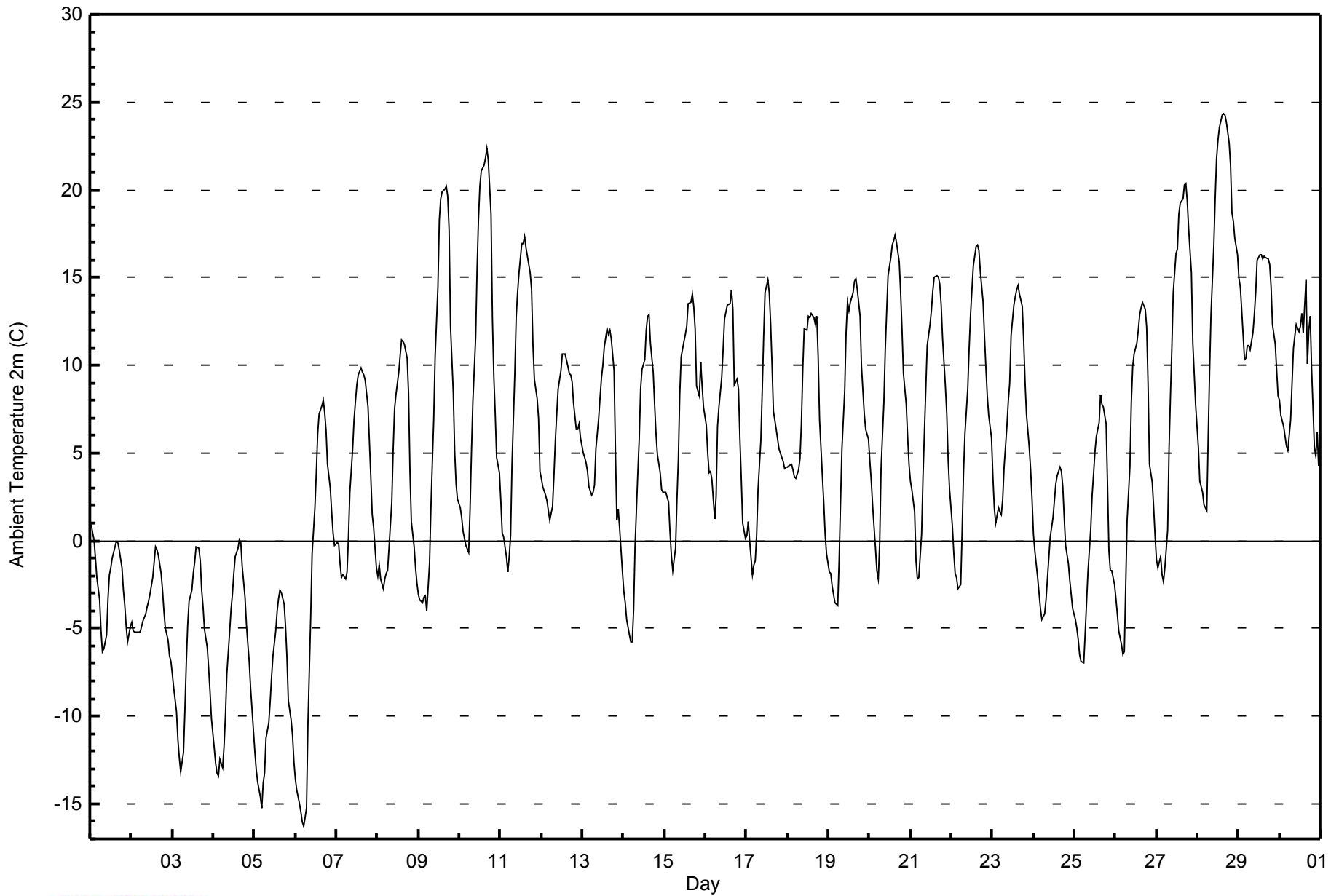


Maximum Value: 24.3 C on Apr 28 16:00																				Maximum Daily Average: 15.1 C on Apr 28					Hours in Service: 720																								
Minimum Value: -16.3 C on Apr 6 06:00																				Minimum Daily Average: -9.1 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 11.6 C at hour 16																				Minimum Diurnal Average: -2.8 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 4.53 C																				Percentiles: P <sub>1</sub> = -14.4 P <sub>10</sub> = -5.2 Q <sub>1</sub> = -1.6 Median = 4.2 Q <sub>3</sub> = 10.9 P <sub>90</sub> = 15.0 P <sub>99</sub> = 22.5					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-Apr	1.0	0.5	0.1	-1.0	-2.1	-3.4	-5.1	-6.3	-6.2	-5.3	-3.3	-2.0	-1.5	-1.0	-0.3	0.0	-0.1	-0.5	-1.6	-2.8	-3.7	-4.9	-5.8	-4.9	-2.5	1.0																							
2-Apr	-4.6	-5.1	-5.2	-5.2	-5.2	-5.2	-4.9	-4.6	-4.2	-3.8	-3.4	-3.0	-2.1	-1.2	-0.4	-0.5	-0.9	-1.8	-2.8	-4.0	-5.0	-5.7	-6.5	-6.9	-3.8	-0.4																							
3-Apr	-7.6	-8.4	-9.7	-11.3	-12.4	-13.1	-12.1	-9.7	-6.9	-4.8	-3.4	-2.9	-1.8	-1.2	-0.4	-0.5	-1.1	-2.8	-3.8	-5.1	-6.1	-7.3	-8.6	-10.2	-6.3	-0.4																							
4-Apr	-11.8	-12.7	-13.2	-13.4	-12.5	-13.0	-11.7	-10.0	-7.6	-5.2	-3.9	-3.0	-1.9	-0.9	-0.4	0.1	-0.1	-1.5	-3.2	-4.7	-5.9	-6.9	-8.4	-10.8	-6.8	0.1																							
5-Apr	-12.0	-13.0	-13.8	-14.6	-15.2	-13.8	-13.2	-11.3	-10.4	-9.2	-7.8	-6.6	-5.1	-4.0	-3.3	-2.8	-3.0	-3.6	-4.9	-6.6	-9.1	-10.2	-11.1	-12.6	-9.1	-2.8																							
6-Apr	-13.6	-14.2	-15.0	-15.5	-16.0	-16.3	-15.3	-10.5	-7.4	-4.3	-0.8	1.9	3.9	6.1	7.2	7.7	8.0	7.3	6.2	4.4	3.0	1.6	0.5	-0.3	-3.0	8.0																							
7-Apr	-0.1	-0.2	-1.3	-2.1	-2.0	-2.2	-1.8	0.2	2.8	5.2	6.9	7.9	8.9	9.4	9.8	9.6	9.4	9.2	7.6	5.6	3.6	1.5	0.7	-1.5	3.6	9.8																							
8-Apr	-2.1	-1.4	-2.2	-2.8	-2.2	-1.9	-1.7	-0.4	2.2	5.2	7.5	8.3	9.6	10.5	11.4	11.4	11.2	10.4	8.4	3.9	1.1	-0.3	-1.6	-2.4	3.4	11.4																							
9-Apr	-3.0	-3.3	-3.6	-3.2	-3.1	-4.0	-1.3	1.9	4.4	6.9	10.5	14.5	18.3	19.4	19.9	20.0	20.2	19.6	17.7	12.2	8.4	5.1	3.2	2.4	7.6	20.2																							
10-Apr	1.9	1.3	0.5	0.1	-0.3	-0.7	1.8	5.1	8.0	11.6	15.4	18.3	20.2	21.1	21.4	21.8	22.3	21.7	18.6	12.7	9.4	7.2	4.8	3.8	10.3	22.3																							
11-Apr	2.3	0.5	0.2	-0.9	-1.8	-0.9	0.3	4.3	9.5	12.7	14.1	15.2	16.9	16.9	17.3	16.7	16.2	15.2	14.3	11.2	9.2	8.1	7.0	4.0	8.7	17.3																							
12-Apr	3.6	3.1	2.6	2.3	1.7	1.2	2.0	3.7	5.7	7.2	8.7	9.7	10.6	10.7	10.6	10.0	9.5	9.5	9.1	7.9	6.4	6.4	6.7	5.9	6.4	10.7																							
13-Apr	5.0	4.7	4.4	3.9	3.1	2.6	2.7	3.2	5.2	7.0	8.2	9.3	10.0	11.0	12.1	11.7	12.0	11.5	9.7	5.1	1.1	1.8	0.7	-1.8	6.0	12.1																							
14-Apr	-2.9	-3.5	-4.5	-5.3	-5.8	-5.8	-4.0	-0.3	3.9	5.8	8.7	9.8	10.3	12.0	12.8	12.9	11.3	9.6	7.7	6.1	4.9	3.8	2.9	2.8	3.9	12.9																							
15-Apr	2.8	2.7	2.2	0.5	-0.8	-1.7	-0.4	2.4	4.7	8.3	10.5	11.4	11.8	12.3	13.5	13.6	14.1	13.3	12.1	8.8	8.3	10.2	8.8	7.6	7.4	14.1																							
16-Apr	6.6	5.0	3.9	4.0	3.5	1.2	2.5	6.5	7.6	9.3	10.9	12.7	13.1	13.5	13.5	14.3	13.2	8.9	9.2	8.7	5.9	3.5	1.0	0.1	7.4	14.3																							
17-Apr	0.3	1.1	0.0	-2.0	-1.4	-1.1	0.4	2.9	5.7	8.5	11.6	14.2	14.9	14.1	12.4	10.0	7.4	6.3	5.7	5.2	5.0	4.5	4.1	4.2	5.6	14.9																							
18-Apr	4.2	4.2	4.3	4.1	3.6	3.6	4.0	4.6	6.7	9.8	12.0	12.0	12.8	12.7	13.0	12.7	12.3	12.8	10.5	6.9	3.7	2.2	0.4	-0.8	7.2	13.0																							
19-Apr	-1.8	-1.9	-2.6	-3.0	-3.5	-3.7	-1.1	2.1	5.2	8.6	12.0	13.6	13.1	13.6	14.2	14.8	15.0	14.3	12.8	10.0	8.6	7.2	6.3	5.7	6.6	15.0																							
20-Apr	4.5	3.4	2.0	-0.4	-1.7	-2.2	-0.2	4.1	7.9	10.9	13.0	15.1	16.1	16.9	17.1	17.4	17.0	15.9	14.1	12.0	9.5	7.7	5.9	4.4	8.8	17.4																							
21-Apr	3.4	3.0	1.7	-1.2	-2.2	-2.1	0.3	3.7	6.2	8.6	11.1	12.4	13.1	14.2	15.0	15.1	15.1	14.7	13.4	11.5	8.8	7.2	4.6	2.9	7.5	15.1																							
22-Apr	0.9	-0.7	-1.9	-2.1	-2.7	-2.5	0.6	4.0	6.1	8.7	11.0	12.9	14.3	15.6	16.8	16.9	16.6	15.3	13.6	11.6	9.8	8.3	7.1	5.8	7.7	16.9																							
23-Apr	3.6	1.9	1.0	1.9	1.6	1.5	2.4	4.2	6.5	8.0	9.0	11.7	13.4	13.9	14.3	14.5	14.1	13.3	11.5	9.1	7.2	5.3	4.0	2.4	7.3	14.5																							
24-Apr	0.4	-0.6	-2.1	-3.0	-3.9	-4.5	-4.2	-3.4	-2.2	-1.0	0.2	1.4	2.3	3.2	3.7	4.2	3.9	3.1	1.4	-0.3	-1.3	-2.2	-3.1	-3.9	-0.5	4.2																							
25-Apr	-4.5	-4.9	-5.6	-6.5	-6.9	-6.9	-5.3	-3.6	-1.7	0.7	2.6	3.8	5.0	6.0	6.7	8.3	7.8	7.6	6.6	3.1	-0.6	-1.7	-1.7	-2.5	0.2	8.3																							
26-Apr	-3.3	-4.2	-5.1	-5.9	-6.5	-6.3	-2.6	1.2	4.2	7.9	10.0	10.7	11.3	12.0	12.9	13.3	13.6	13.2	12.1	8.9	4.4	3.3	1.9	0.3	4.5	13.6																							
27-Apr	-1.0	-1.5	-0.9	-1.9	-2.3	-1.5	0.6	5.2	8.2	10.9	14.1	16.4	16.6	18.6	19.2	19.5	20.3	20.3	19.4	17.8	15.3	11.3	9.5	7.8	10.1	20.3																							
28-Apr	5.3	3.4	3.1	2.8	2.1	1.7	5.9	9.6	12.9	16.7	19.5	21.8	22.8	23.6	24.3	24.3	24.3	23.8	22.7	21.4	18.7	18.2	17.3	16.3	15.1	24.3																							
29-Apr	14.9	14.4	13.1	10.3	10.4	11.2	11.1	10.9	11.9	12.9	14.2	16.0	16.3	16.3	16.1	16.3	16.2	16.1	15.7	14.5	12.3	11.2	9.7	8.2	13.3	16.3																							
30-Apr	8.0	7.1	6.5	5.9	5.4	5.1	6.9	8.9	11.0	11.7	12.3	11.9	12.3	12.9	11.8	14.9	10.1	12.0	12.8	9.7	5.3	4.8	6.2	4.3	9.1	14.9																							
																								0.0	-0.7	-1.4	-2.2	-2.6	-2.8	-1.4	1.0	3.3	5.7	7.7	9.2	10.2	10.9	11.4	11.6	11.2	10.5	9.2	6.8	4.6	3.4	2.2	1.0	Diurnal Average	
																								14.9	14.4	13.1	10.3	10.4	11.2	11.1	10.9	12.9	16.7	19.5	21.8	22.8	23.6	24.3	24.3	24.3	23.8	22.7	21.4	18.7	18.2	17.3	16.3	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	235	32.64	32.64
0 - 10	286	39.72	72.36
10 - 20	180	25.00	97.36
> 20	19	2.64	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

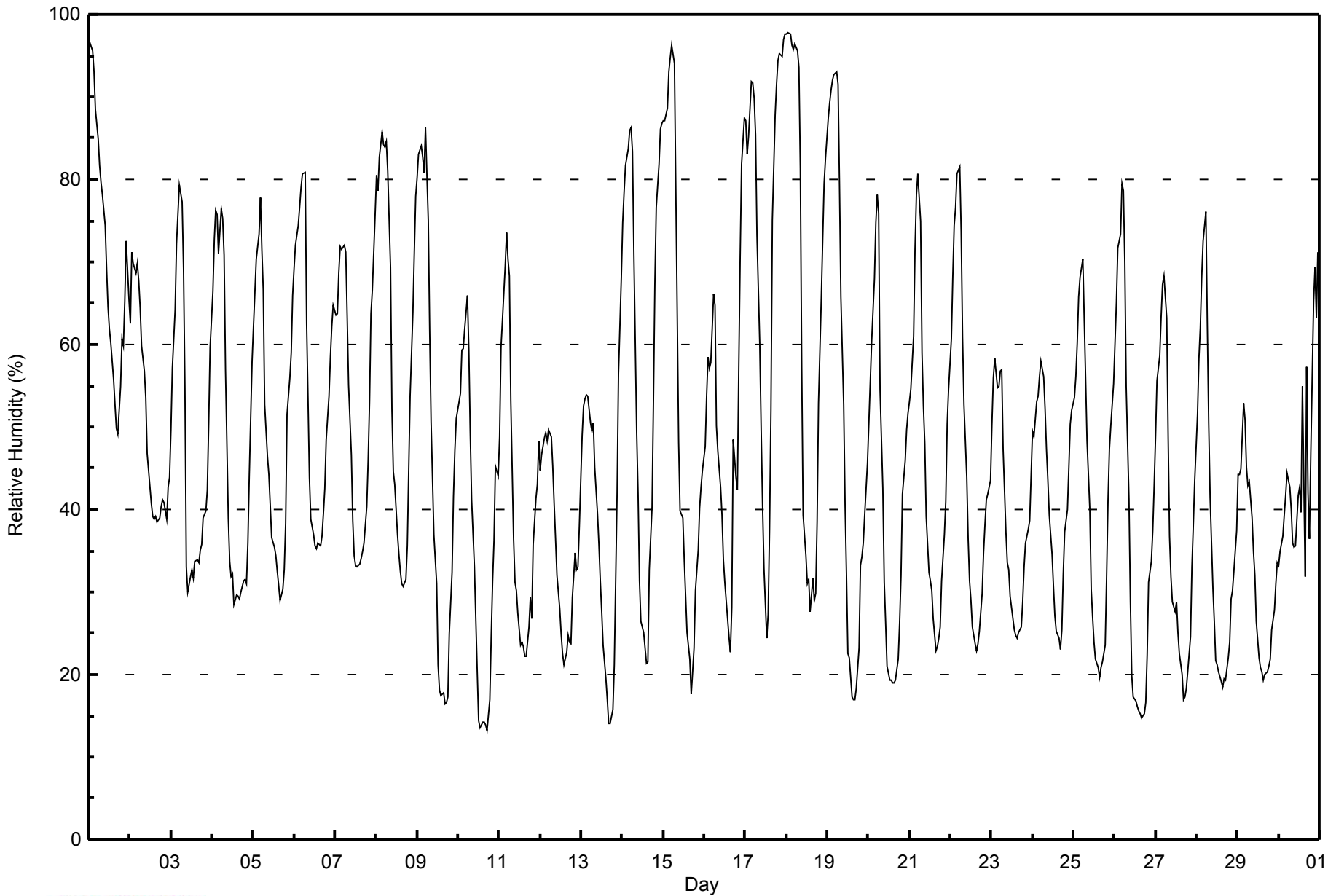


Maximum Value: 98 % on Apr 18 02:00																			Maximum Daily Average: 72.7 % on Apr 17						Hours in Service: 720			
Minimum Value: 13 % on Apr 10 18:00																			Minimum Daily Average: 32.7 % on Apr 29						Hours of Data: 720			
Maximum Diurnal Average: 73.5 % at hour 6																			Minimum Diurnal Average: 26.2 % at hour 16						Hours of Missing Data: 0			
Monthly Average: 47.8 %																			Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 22 Q <sub>1</sub> = 31 Median = 43 Q <sub>3</sub> = 64 P <sub>90</sub> = 80 P <sub>99</sub> = 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-Apr	97	96	96	93	89	85	82	80	78	74	69	65	62	60	56	53	50	49	55	61	60	65	73	65	71.3	97		
2-Apr	62	71	70	69	70	68	64	60	57	54	47	45	41	39	39	39	38	39	40	41	41	39	43	44	50.8	71		
3-Apr	50	57	64	72	76	79	77	69	55	33	30	32	33	32	34	34	34	35	36	39	40	42	51	60	48.4	79		
4-Apr	66	73	76	76	71	76	75	71	57	39	34	32	32	28	30	30	29	30	31	32	31	36	44	58	48.2	76		
5-Apr	62	66	70	73	78	72	67	53	46	44	41	37	35	34	33	31	29	30	33	38	52	56	59	66	50.2	78		
6-Apr	69	72	74	77	79	81	81	63	53	44	39	37	36	35	36	36	37	40	43	48	54	58	62	65	54.9	81		
7-Apr	64	64	69	72	72	72	71	63	55	47	39	34	33	33	33	34	35	36	40	46	53	64	67	76	53.0	76		
8-Apr	81	79	83	86	84	84	85	81	69	52	45	43	37	35	32	31	31	31	36	45	54	64	71	78	59.0	86		
9-Apr	80	83	84	83	81	86	75	62	51	44	37	31	21	18	18	18	16	17	17	25	32	41	47	51	46.6	86		
10-Apr	53	54	59	59	62	66	59	49	41	33	27	20	14	14	14	14	14	13	17	25	31	36	45	44	36.0	66		
11-Apr	49	60	63	69	73	70	68	53	37	31	30	27	24	24	23	22	22	26	29	27	36	41	43	48	41.5	73		
12-Apr	45	47	49	49	48	50	49	45	41	36	32	28	25	23	21	23	25	24	24	29	35	33	33	38	35.4	50		
13-Apr	49	52	53	54	54	50	50	50	45	40	36	31	28	24	19	17	14	14	16	21	32	42	56	68	38.1	68		
14-Apr	75	78	82	84	86	86	83	71	49	42	31	26	25	23	21	22	33	40	53	67	77	82	86	87	58.8	87		
15-Apr	87	87	89	93	95	96	94	79	64	48	40	39	34	29	25	22	18	20	23	30	35	40	43	45	53.1	96		
16-Apr	48	54	58	57	58	66	65	50	47	43	39	34	31	29	25	23	28	48	44	42	57	71	82	87	49.4	87		
17-Apr	87	83	85	92	92	90	85	73	60	50	41	33	24	27	38	52	75	88	91	94	95	95	97	98	72.7	98		
18-Apr	98	98	98	96	96	97	96	93	81	57	39	34	31	31	28	32	29	30	38	53	66	73	79	82	64.8	98		
19-Apr	87	89	91	92	93	93	92	80	66	53	41	32	23	22	17	17	17	18	23	33	34	36	39	46	51.4	93		
20-Apr	51	55	60	68	75	78	76	55	43	31	26	21	19	19	19	19	19	22	26	32	42	46	50	52	41.8	78		
21-Apr	53	55	61	71	78	81	75	59	53	48	39	32	31	30	27	23	23	24	26	31	37	41	50	55	46.0	81		
22-Apr	61	68	74	77	81	82	74	61	53	44	36	31	29	26	24	23	24	25	30	35	38	41	42	44	46.7	82		
23-Apr	50	56	58	55	55	57	57	47	37	33	33	30	27	25	25	24	25	26	29	33	36	38	39	44	39.1	58		
24-Apr	49	49	53	54	56	58	56	52	47	44	39	35	31	27	25	24	23	25	32	37	40	45	50	52	41.9	58		
25-Apr	54	56	60	66	68	70	63	56	48	40	30	27	24	22	21	20	21	22	24	32	41	47	50	55	42.4	70		
26-Apr	60	65	72	73	79	79	70	55	41	29	20	17	17	16	16	15	15	15	17	22	31	34	37	43	39.1	79		
27-Apr	49	56	59	63	67	68	63	49	37	32	29	28	29	25	22	20	17	17	18	20	25	33	38	44	37.8	68		
28-Apr	52	58	62	68	73	76	62	50	41	30	26	22	21	20	19	19	19	19	22	24	29	30	33	37	38.1	76		
29-Apr	44	44	45	53	51	45	43	43	39	35	32	26	22	21	20	19	20	20	21	22	25	28	31	34	32.7	53		
30-Apr	33	35	37	39	42	44	43	40	36	35	36	42	43	40	55	32	57	42	36	47	65	69	63	71	45.1	71		
	62.1	65.4	68.5	71.1	72.6	73.5	70.0	60.4	50.9	42.2	36.0	32.4	29.4	27.7	27.1	26.2	27.9	29.6	32.4	37.8	44.1	48.9	53.5	57.8	Diurnal Average			
	98	98	98	96	96	97	96	93	81	74	69	65	62	60	56	53	75	88	91	94	95	95	97	98	Diurnal Maximum			



**WBEA**  
**Hourly Averages**

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





Maximum Value: 0.8 mm on Apr 30 16:00	Maximum Daily Total: 0.8 mm on Apr 30	Hours in Service: 720
Minimum Value: 0.0 mm on Apr 1 01:00	Minimum Daily Total: 0.0 mm on Apr 1	Hours of Data: 720
Maximum Diurnal Total: 0.8 mm at hour 16	Minimum Diurnal Total: 0.0 mm at hour 1	Hours of Missing Data: 0
Monthly Total: 1.27 mm	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0	Hours of Calibration: 0
		Percent Operational Time: 100.0

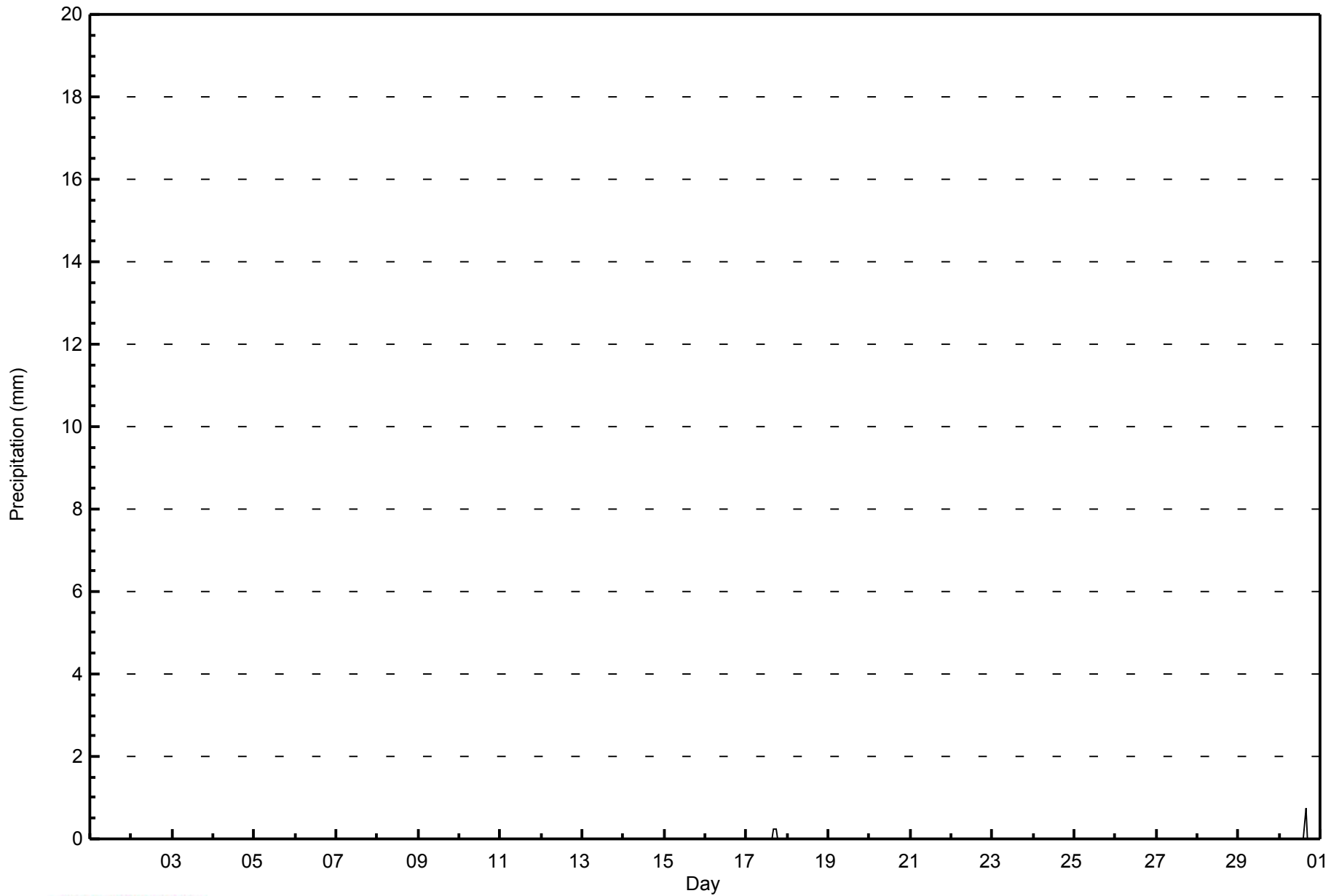
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Maximum





Wood Buffalo Environmental Association  
Hourly Averages

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





**WBEA**  
**Cumulative Frequency Distribution**

**Precipitation (PC) - mm**  
**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	719	99.86	99.86
0.4 - 0.5	0	0.00	99.86
0.6 - 0.7	0	0.00	99.86
0.8 - 1.4	1	0.14	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

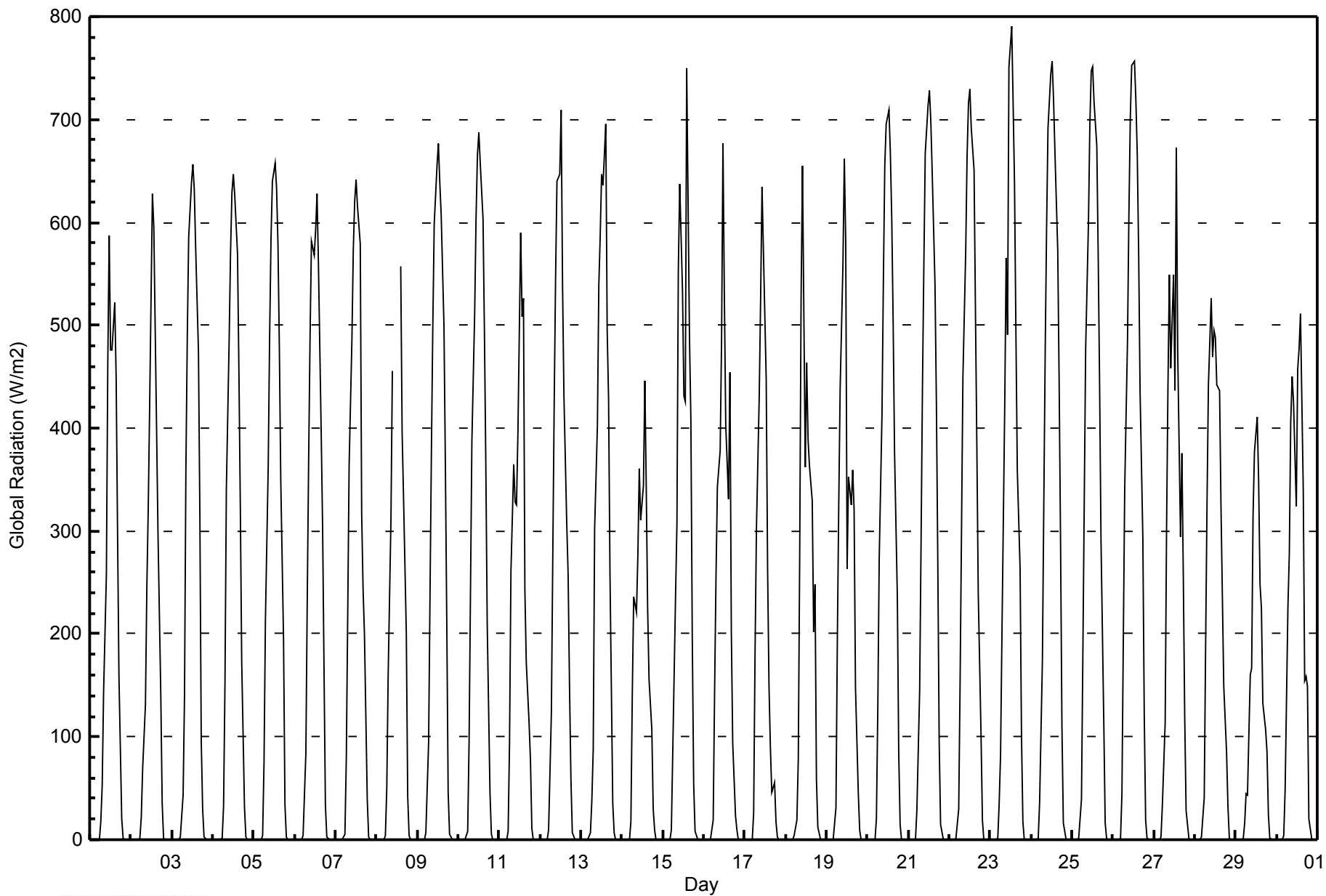


Maximum Value: 790 W/m2 on Apr 23 13:00		Maximum Daily Average: 279.7 W/m2 on Apr 26		Hours in Service: 720																																													
Minimum Value: 0 W/m2 on Apr 1 01:00		Minimum Daily Average: 112.9 W/m2 on Apr 29		Hours of Data: 716																																													
Maximum Diurnal Average: 589.7 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 2		Hours of Missing Data: 4																																													
Monthly Average: 205.8 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 59 Q <sub>3</sub> = 410 P <sub>90</sub> = 599 P <sub>99</sub> = 750		Hours of Calibration: 0																																													
				Percent Operational Time: 99.4																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	0	0	0	0	0	1	18	53	144	257	463	587	476	476	521	448	300	158	20	1	0	0	0	0	163.5	587																							
2-Apr	0	0	0	0	0	1	22	69	132	246	321	420	628	595	496	397	297	140	35	1	0	0	0	0	158.3	628																							
3-Apr	0	0	0	0	0	2	44	139	361	489	585	639	656	633	575	474	317	96	30	2	0	0	0	0	210.1	656																							
4-Apr	0	0	0	0	0	2	32	151	340	485	571	629	647	627	570	456	326	174	31	2	0	0	0	0	210.1	647																							
5-Apr	0	0	0	0	0	3	75	213	362	487	584	641	657	633	579	477	350	194	34	3	0	0	0	0	220.5	657																							
6-Apr	0	0	0	0	0	4	84	235	370	489	582	568	593	628	560	394	303	167	35	3	0	0	0	0	208.9	628																							
7-Apr	0	0	0	0	0	5	80	219	364	486	573	621	641	616	579	317	244	199	39	3	0	0	0	0	207.8	641																							
8-Apr	0	0	0	0	0	4	50	160	312	455	UO	UO	UO	UO	557	396	333	200	42	4	0	0	0	0	125.7	557																							
9-Apr	0	0	0	0	0	7	94	239	378	499	597	655	676	639	607	498	365	213	46	6	0	0	0	0	229.9	676																							
10-Apr	0	0	0	0	0	8	96	240	387	512	605	665	687	657	604	494	365	210	45	6	0	0	0	0	232.5	687																							
11-Apr	0	0	0	0	0	8	95	260	365	329	325	395	590	509	526	243	172	113	78	11	0	0	0	0	167.4	590																							
12-Apr	0	0	0	0	0	10	124	275	422	545	640	646	709	539	431	308	258	149	59	7	0	0	0	0	213.4	709																							
13-Apr	0	0	0	0	0	6	38	88	302	403	538	588	647	635	696	495	428	259	35	7	0	0	0	0	215.2	696																							
14-Apr	0	0	0	0	0	18	141	236	221	277	360	310	345	446	343	225	157	107	30	9	0	0	0	0	134.4	446																							
15-Apr	0	0	0	0	0	10	161	236	307	553	637	533	431	426	750	488	408	197	55	7	0	0	0	0	216.6	750																							
16-Apr	0	0	0	0	0	18	143	255	343	378	486	677	527	402	331	454	202	94	23	10	0	0	0	0	181.0	677																							
17-Apr	0	0	0	0	0	26	181	303	431	526	634	573	448	263	149	89	46	56	17	3	0	0	0	0	156.0	634																							
18-Apr	0	0	0	0	0	4	19	79	276	525	655	362	463	389	363	330	202	248	60	12	0	0	0	0	166.1	655																							
19-Apr	0	0	0	0	0	31	195	326	438	559	662	581	263	352	326	359	321	148	46	9	0	0	0	0	192.4	662																							
20-Apr	0	0	0	0	0	20	127	272	414	543	654	695	710	668	603	502	377	237	84	16	0	0	0	0	246.8	710																							
21-Apr	0	0	0	0	1	29	145	288	437	558	667	713	728	699	648	539	424	271	95	15	0	0	0	0	260.7	728																							
22-Apr	0	0	0	0	1	30	155	300	449	572	664	716	730	692	650	514	382	240	101	20	0	0	0	0	259.0	730																							
23-Apr	0	0	0	0	1	35	83	201	424	566	491	751	790	716	638	493	359	263	101	18	0	0	0	0	247.1	790																							
24-Apr	0	0	0	0	1	36	174	327	475	596	691	745	757	718	668	572	443	290	110	17	1	0	0	0	275.9	757																							
25-Apr	0	0	0	0	2	40	180	330	478	600	695	747	751	718	673	567	442	292	114	17	1	0	0	0	276.9	751																							
26-Apr	0	0	0	0	2	44	195	342	486	607	700	752	757	718	666	570	437	293	122	19	1	0	0	0	279.7	757																							
27-Apr	0	0	0	0	3	34	114	302	440	550	458	549	437	673	473	294	375	257	121	29	2	0	0	0	213.0	673																							
28-Apr	0	0	0	0	2	41	189	327	442	526	470	495	489	442	436	326	238	149	86	33	1	0	0	0	195.4	526																							
29-Apr	0	0	0	0	1	16	45	44	160	167	314	377	411	348	249	225	133	108	86	25	1	0	0	0	112.9	411																							
30-Apr	0	0	0	0	3	49	226	277	405	450	426	324	457	478	511	340	154	159	150	21	1	0	0	0	184.7	511																							
																								0.0	0.0	0.0	0.0	0.6	18.1	110.8	226.1	362.1	474.5	553.5	584.6	589.7	563.3	526.0	409.6	305.3	189.4	64.3	11.1	0.3	0.0	0.0	0.0	Diurnal Average	
																								0	0	0	0	3	49	226	342	486	607	700	752	790	718	750	572	443	293	150	33	2	0	0	0	Diurnal Maximum	
UO - Unstable Operation																																																	



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**Fort McKay - Bertha Ganter - April 2015**





**WBEA**

**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2**

**Fort McKay - Bertha Ganter - April 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	319	44.55	44.55
21 - 100	59	8.24	52.79
101 - 300	95	13.27	66.06
301 - 600	172	24.02	90.08
601 - 900	71	9.92	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 716

Total Number of Hours: 720



Maximum Speed: 19 km/h on Apr 13 04:00	Maximum Daily Speed Average: 11.8 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 4 09:00	Minimum Daily Speed Average: 2.1 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 2.6 km/h at hour 4	Minimum Diurnal Speed Average: 0.1 km/h at hour 21	Hours of Missing Data: 0
Monthly Average Velocity: 0.6 km/h 257.6 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 7 Q <sub>3</sub> = 11 P <sub>90</sub> = 14 P <sub>99</sub> = 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-Apr	N12	N13	NNE12	NNE16	NNE16	NNE15	NNE16	NNE15	NNE14	NNE15	NNE16	NNE15	NNE16	NNE13	NNE14	NNE14	NNE12	NNE11	NNE7	NE4	NNE5	NNE4	N4	N5	NNE11.8	NNE16
2-Apr	N5	NNW5	NW4	NW4	NNW4	NNW4	N5	NE5	NE5	NNE9	NNE9	NNE9	NE8	ENE8	ENE7	ENE7	E9	ENE8	ENE6	NE7	NE5	NE6	ENE5	NE4	NE5.1	NNE9
3-Apr	NNE4	NNE3	N4	NNW4	NNW3	NW3	NW1	N3	NNE3	E5	E8	ENE9	ENE8	ENE8	E11	E10	E10	NE7	NE7	NNE6	ENE6	NE5	NNE4	NNE5	NE4.6	E11
4-Apr	N3	W2	WSW2	NW4	NNW2	N1	N2	NNW1	NW0	ESE7	ESE9	E9	ESE10	ENE8	E10	E10	E9	ENE8	NE7	NE8	NE8	NNE6	N5	NNW5	ENE3.8	E10
5-Apr	NNW4	NW4	NW4	NW3	NNW2	N5	N6	NNE6	NE7	ENE8	E9	E9	E10	E10	E10	ENE8	ENE8	ENE7	NE6	NNE5	NNE4	NNE4	NNE3	NW3	NE4.2	E10
6-Apr	NNW3	NW2	N3	NW3	W2	W3	WSW2	S3	S7	S9	SSE10	SSE9	S10	S13	SSW10	S9	S10	S10	S9	SSW8	SSW7	S7	S7	S6	S5.6	S13
7-Apr	S7	SSW7	SW6	SW6	SSW7	SSW7	SSW6	SSW8	S11	SSW13	SSW15	SW15	SW14	SSW16	SSW15	SSW13	SW11	SW10	WSW8	SW6	SSW5	SSW7	SSW7	SW5	SSW9.1	SSW16
8-Apr	SSW6	SSW7	S6	SSW5	SSW7	SSW8	SSW7	S8	SSW6	NW1	E7	ENE6	NNE7	E9	E11	ENE8	E8	ENE6	ENE4	NE2	NNE3	NW2	W2	W2	SE2.1	E11
9-Apr	W2	WSW3	SW4	SW5	SW4	SW4	SSW7	S8	S13	S14	S13	S14	SW13	WSW12	WSW13	WSW11	WSW12	WSW9	WSW6	SW5	SSW4	SSW3	SW3	SSW5	SW6.7	S14
10-Apr	SSW4	SSW5	SSW5	SSW6	SSW6	SSW6	SSW7	S7	S10	S12	S12	S12	SW8	SSW10	S13	S11	SSE8	S4	S6	S4	S5	SSW5	SSW5	S4	S7.1	S13
11-Apr	SSW3	SW3	SSW4	SSW4	SSW4	SSW4	SSW6	S7	SW5	SW5	WSW9	WNW8	WNW8	WNW11	WNW9	NW8	NW12	WNW10	WNW12	WNW15	WNW16	NW16	NW6	WSW4	W6.1	WNW16
12-Apr	W5	W6	WNW7	WNW8	W9	W9	W10	W9	W10	W10	WSW12	W13	W14	WNW15	W13	WNW16	WNW13	WNW14	WNW13	NW14	NW7	WNW11	WNW13	NW12	WNW10.5	WNW16
13-Apr	NW15	WNW17	NW18	NW19	NW13	NW9	NW6	NW9	NW12	NNW16	NNW19	NNW18	NW19	NW16	NW14	NW14	NW14	NW9	NW7	NNW5	N3	NNE6	NNE4	NNE5	NW11.6	NW19
14-Apr	NNE4	NNW3	NNW3	NNW4	N3	NNW3	NNW3	ENE2	SSW5	S4	S8	S10	S14	S12	S11	SSW9	S18	S18	S16	S11	S10	S9	S12	S6.7	S18	
15-Apr	SSW9	SSW8	SSW6	SW5	S6	S5	SSW8	SSW6	SW5	WSW7	W7	WNW10	WNW11	WNW11	WNW11	W10	W11	WNW10	WSW6	SSW4	WSW6	W8	WSW5	W6	WSW6.0	WNW11
16-Apr	WSW6	SW5	W5	W5	WSW5	S3	S4	WSW6	SW8	SSW10	SSW13	SW13	WSW13	WNW11	WNW13	WNW14	NW14	N14	NW12	WNW11	NW4	SW3	SSW4	SSW5	W6.0	WNW14
17-Apr	WNW6	WNW6	SW3	SSW4	SSW7	SSW6	S7	S9	S11	SSE11	S10	S12	SSW14	SSW15	SW14	SW17	SSW10	SSE6	SSE7	SE2	SSE5	ESE1	N4	NNW4	SSW6.3	SSW17
18-Apr	NNW6	NNW6	NNW8	NNW10	NNW11	N11	N9	NW9	NNW11	NNW14	N14	N14	N14	NNE12	NNE9	NE10	N9	NNW13	NNE8	NNW3	WNW4	SW2	WSW2	W2	N8.0	N14
19-Apr	SW3	SSW2	SW3	WSW3	SW2	SW3	S4	SSE6	S8	S10	SSE11	S12	WNW6	NNW3	NW7	WNW9	WNW10	WNW6	W1	SSE3	S4	SSW4	SSW4	ESE1	SW2.7	S12
20-Apr	NNE1	NW2	NW3	NW4	NW1	N2	SW2	NE4	ESE4	E7	ENE5	ESE6	E7	SE8	ESE7	E8	ENE7	NE8	NNE7	NNE9	NNE9	NNE9	N8	N6	NE3.6	NNE9
21-Apr	N6	N6	NNE3	N3	NW2	N2	NE1	NNE5	NNE8	NE7	ENE9	ENE11	NE9	ENE10	ENE10	NE10	NE9	NE9	NE8	E7	E8	SE7	SE5	SSE4	NE5.3	ENE11
22-Apr	SE1	N3	NE3	ENE3	NNE3	ENE4	E5	SE9	SSE11	SE11	SE14	SE17	SSE15	SE18	SE16	SE17	SE17	SE17	ESE15	ESE13	SE11	SE9	SE9	SE8	SE9.6	SE18
23-Apr	E5	ENE5	E6	E7	ESE7	E4	E4	ESE7	SE12	E9	ENE10	ENE11	ENE14	E15	E14	E14	E12	E15	E14	E14	ENE12	NE9	NE9	NE9	E9.3	E15
24-Apr	NNE8	NE9	NNE9	NNE9	NNE8	NNE10	NNE11	NE11	NE11	NE11	NE12	NNE13	NE12	NNE13	NE12	NNE13	NNE13	NNE13	NNE15	NNE13	NNE12	NNE11	NNE9	NNE8	NNE10.9	NNE15
25-Apr	NNE8	NNE7	NNE6	N6	N6	N5	N7	NNE7	NNE6	ENE7	ENE8	ENE7	NE7	NE7	NE5	E6	NNE5	N7	N6	N5	N4	N5	NNE5	N5	NNE5.5	ENE8
26-Apr	NNW3	WNW2	WNW3	NW3	WSW3	SW2	SSE2	SSE4	SSE6	SSE8	SSE10	SSE10	SSE11	SSW4	S8	S10	S10	S9	SSE7	SE6	SSE3	S5	S4	S3	S4.7	SSE11
27-Apr	ESE1	SSW4	SE1	N3	N2	SW1	SSW2	S8	S12	S13	S10	SW14	SSW13	SW17	WSW13	W12	W13	WNW11	W10	W6	WSW5	SW5	SW5	SW3	SW5.9	SW17
28-Apr	SSW2	SW2	SSW5	S5	SSW4	SSW3	S5	S8	S6	S10	S10	S15	S16	S15	S16	S16	S14	SSW17	S12	S9	SSW6	SSW9	S8	WNW7	S8.7	SSW17
29-Apr	WNW4	WNW6	NW2	WSW4	WNW6	WNW9	NW7	WNW7	WNW5	WNW8	WNW7	WNW8	WNW10	WNW10	WNW9	WNW7	WSW6	W7	SW7	WSW6	W5	WSW6	WSW6	W6	W6.2	WNW10
30-Apr	WNW7	W7	W8	WNW10	WNW9	WNW9	W8	W9	W9	WSW12	WSW12	WSW13	W12	W12	SW7	WSW10	NNW11	NW9	W4	SSW2	SW3	WSW3	SSW6	SSW5	W7.2	WSW13

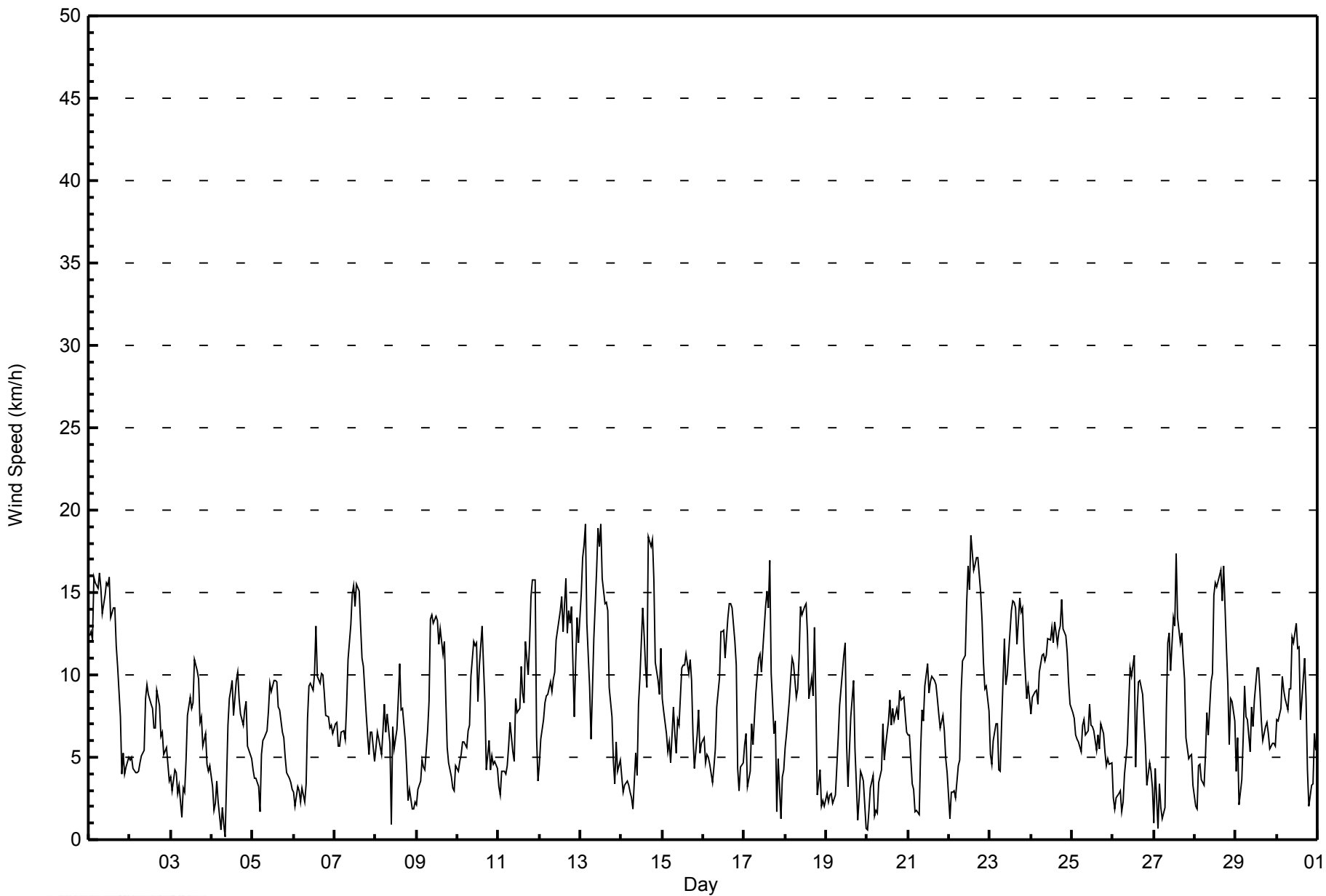
NW1.9	WNW2.3	NW2.2	NW2.6	NNW2.0	NNW1.7	W0.7	SSW0.8	S2.0	SSE2.1	SSE2.4	S1.9	SW1.3	SSW1.1	SSW1.2	SSW1.0	W0.4	NNW0.9	N0.5	N0.4	N0.1	WNW0.7	WSW0.6	NNW1.0	Diurnal Average
NNW15	WNW17	NW18	NW19	NNE16	NNE15	NNE16	NNE15	NNE14	NNW16	NNW19	NNW18	NW19	SE18	SE16	SSW17	S18	S18	S18	S16	WNW16	NW16	WNW13	NW12	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	233	32.36	32.36
6 - 11	340	47.22	79.58
12 - 19	147	20.42	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

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

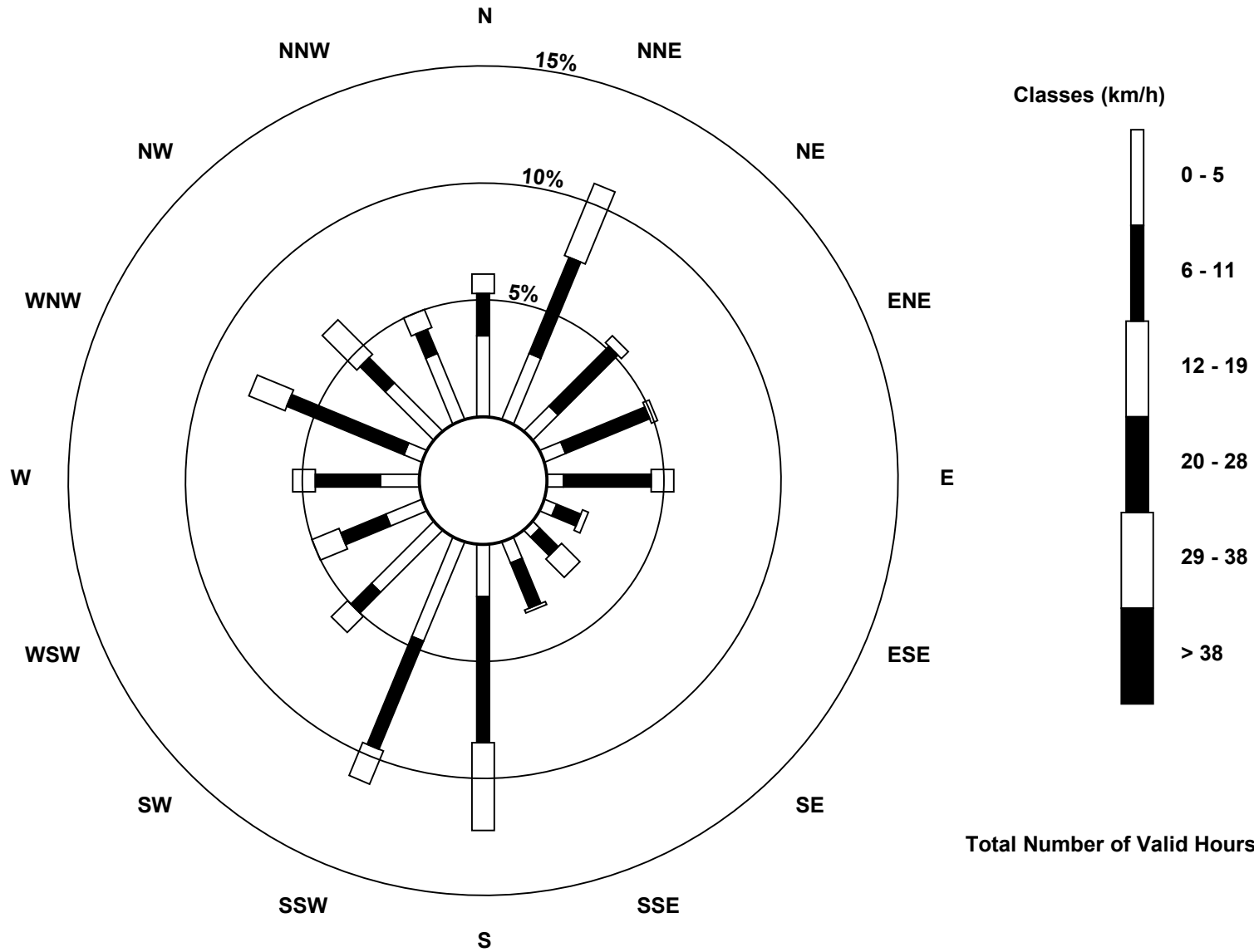
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	25	22	11	7	5	4	3	7	16	33	27	12	12	6	21	22	233
6 - 11	13	32	26	28	27	8	8	15	45	36	9	15	20	39	11	8	340
12 - 19	6	24	3	2	7	2	8	1	27	11	7	9	7	12	15	6	147
20 - 28	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	44	78	40	37	39	14	19	23	88	80	43	36	39	57	47	36	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

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





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



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Fort McKay - Bertha Ganter - April 2015

Direction of Maximum Speed: 314 deg on Apr 13 04:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 20.9 deg on Apr 1		Hours of Data: 720
Direction of Minimum Speed: 324 deg on Apr 4 09:00	Direction of Minimum Daily Speed Average: 2.1 deg on Apr 8	Hours of Missing Data: 0
Monthly Average Direction: 260.8 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-Apr	11	11	13	16	21	22	28	29	28	24	24	17	26	32	24	15	23	21	26	35	14	13	1	2	20.9
2-Apr	351	330	326	316	329	343	11	34	38	20	15	28	39	58	67	66	82	78	64	35	46	36	77	45	34.8
3-Apr	14	13	351	331	334	319	321	359	29	87	83	66	68	59	92	86	83	52	42	33	70	35	26	17	52.0
4-Apr	359	270	257	307	328	11	5	336	324	111	103	92	104	77	94	95	94	60	36	36	37	22	8	340	63.7
5-Apr	333	306	307	313	346	351	3	32	51	78	98	90	100	97	87	76	57	57	40	16	12	28	20	311	51.5
6-Apr	335	315	349	310	281	271	237	170	170	171	155	158	180	172	195	176	176	179	185	193	193	184	179	171	182.1
7-Apr	188	196	216	215	205	209	202	192	178	194	213	216	219	206	212	207	219	222	240	231	204	198	200	220	208.5
8-Apr	209	196	191	197	199	200	199	190	210	313	93	64	17	87	97	75	84	74	76	54	25	307	275	263	134.1
9-Apr	278	251	226	218	216	220	195	181	183	182	178	183	225	249	253	248	251	257	237	222	200	206	214	207	216.6
10-Apr	200	196	198	209	207	207	205	181	181	175	176	182	217	200	178	174	164	184	190	180	191	204	201	189	188.6
11-Apr	199	230	202	210	208	207	201	190	235	235	251	292	287	292	297	310	312	297	292	287	289	315	323	257	277.7
12-Apr	273	279	286	284	280	280	277	277	276	265	248	260	267	293	281	290	290	294	303	315	305	294	294	311	285.2
13-Apr	312	302	306	314	324	323	312	309	320	329	328	328	325	326	322	313	319	313	340	350	16	28	20	20	322.3
14-Apr	15	333	347	347	353	338	334	63	198	176	179	188	190	183	185	193	186	176	173	184	182	180	186	187	184.8
15-Apr	193	192	200	227	190	186	198	210	223	250	263	295	287	284	299	264	266	282	256	202	244	281	250	260	249.6
16-Apr	248	231	274	263	255	184	180	244	223	213	212	230	255	290	284	287	319	354	316	302	318	230	203	213	266.1
17-Apr	288	295	224	198	200	203	187	180	179	167	173	173	201	213	217	214	205	165	160	139	168	105	359	344	196.9
18-Apr	339	340	343	346	348	353	359	326	329	337	357	355	353	15	25	47	4	347	15	327	282	235	254	273	350.9
19-Apr	226	208	228	238	219	214	176	162	170	173	164	180	298	334	309	297	302	298	279	161	181	192	196	118	214.4
20-Apr	24	320	325	319	307	349	222	35	115	95	77	110	93	130	106	91	77	55	33	22	17	13	6	7	53.8
21-Apr	11	7	32	352	326	0	54	16	14	35	66	71	56	69	63	52	48	50	48	82	97	132	146	153	55.5
22-Apr	143	4	37	65	22	76	95	133	153	130	145	143	151	142	141	145	141	137	119	123	126	126	129	124	132.8
23-Apr	89	74	85	97	104	81	81	115	132	97	71	72	77	84	84	90	83	86	86	81	76	34	46	38	82.3
24-Apr	27	35	20	20	17	26	33	40	40	41	40	37	31	45	22	30	30	20	14	18	21	21	18	16	27.7
25-Apr	19	16	12	8	10	5	8	13	32	75	72	64	34	46	53	97	22	353	9	349	2	6	15	7	25.7
26-Apr	337	301	294	308	238	234	161	159	148	153	155	166	167	196	174	176	170	176	157	138	167	173	187	179	171.1
27-Apr	114	205	125	7	358	221	205	186	177	177	186	221	204	216	245	267	268	286	274	261	241	234	236	220	227.5
28-Apr	197	226	200	189	208	199	188	171	177	181	184	183	179	178	186	182	186	196	186	187	199	197	187	292	188.3
29-Apr	293	301	309	247	289	298	306	292	289	292	296	287	294	296	287	286	237	259	226	241	263	237	245	275	279.2
30-Apr	285	278	281	287	287	283	273	267	271	253	250	248	276	274	216	255	336	316	281	211	234	246	211	198	268.1

318.2 303.1 306.2 307.0 299.5 303.3 273.7 192.1 182.6 163.6 155.4 175.2 228.8 198.6 195.3 201.8 268.8 343.3 359.5 351.8 351.5 296.2 243.2 287.5

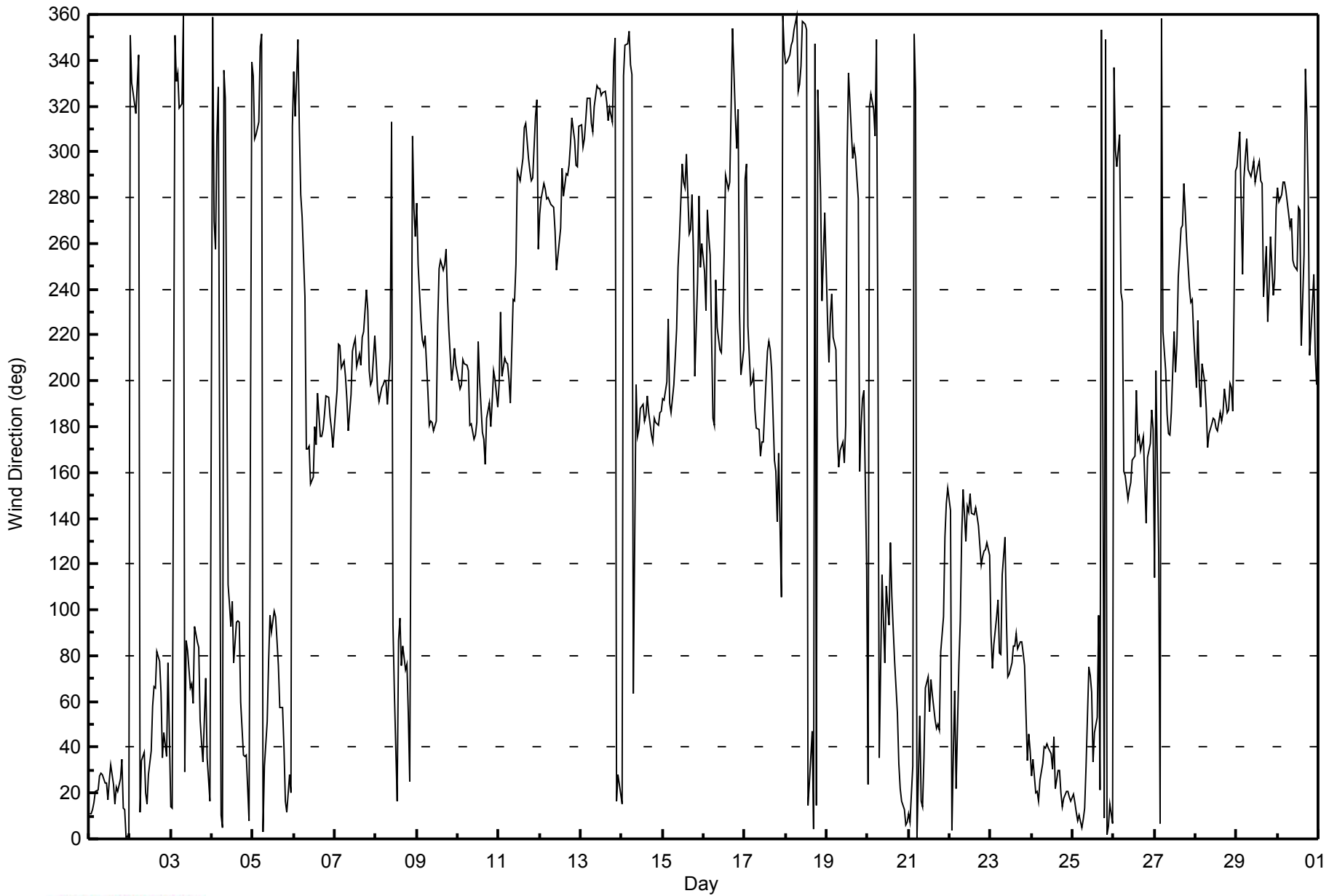
Diurnal Average

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



**WBEA**  
**Hourly Averages**

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 107 deg on Apr 4 09:00	Hours of Data: 720
Minimum Value: 8 deg on Apr 10 04:00	Hours of Missing Data: 0
	Hours of Calibration: 0
	Percent Operational Time: 100.0
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 15 Q <sub>1</sub> = 20 Median = 31 Q <sub>3</sub> = 42 P <sub>90</sub> = 48 P <sub>99</sub> = 83	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	28	31	31	29	31	35	34	36	37	36	34	33	36	40	41	33	36	38	38	58	25	25	20	19	58
2-Apr	21	19	20	18	19	19	36	44	57	39	38	39	45	49	55	49	31	39	43	47	46	37	48	50	57
3-Apr	23	38	17	15	18	20	62	40	76	58	46	46	48	48	31	35	34	47	44	38	49	49	40	18	76
4-Apr	42	61	33	24	23	100	35	86	107	30	29	39	30	48	32	26	31	44	40	42	38	38	21	10	107
5-Apr	17	29	20	15	84	35	21	42	48	48	29	44	33	29	33	47	40	48	47	24	19	20	32	26	84
6-Apr	21	23	24	23	14	11	33	33	19	19	15	16	19	21	32	20	17	15	14	13	14	14	13	10	33
7-Apr	14	17	15	15	13	13	15	17	13	23	26	26	29	21	25	24	29	28	30	18	27	14	10	17	30
8-Apr	11	12	11	13	12	13	26	14	40	98	38	52	42	45	25	42	34	45	35	23	33	33	38	29	98
9-Apr	27	19	18	14	12	21	16	16	13	13	15	16	32	43	37	42	36	42	29	14	22	18	23	15	43
10-Apr	12	17	14	8	9	11	11	16	13	11	14	19	56	33	20	23	19	25	24	18	14	19	19	19	56
11-Apr	31	34	16	16	23	39	25	16	41	51	39	42	51	36	42	40	24	42	34	37	38	24	61	40	61
12-Apr	41	40	39	42	42	40	46	44	44	42	46	44	46	36	44	38	35	36	27	21	32	34	37	29	46
13-Apr	27	29	26	19	21	21	24	24	26	23	24	24	22	26	31	28	25	31	20	10	40	18	27	15	40
14-Apr	16	42	44	28	31	37	44	55	42	57	21	19	17	18	33	18	17	15	15	15	15	15	15	16	57
15-Apr	19	16	16	15	18	24	12	29	52	46	47	41	42	44	46	45	45	39	42	18	42	46	38	43	52
16-Apr	31	24	38	45	44	47	25	47	31	24	28	35	40	39	41	42	39	29	28	26	58	58	21	27	58
17-Apr	30	31	35	32	12	14	18	16	14	16	18	16	30	28	30	24	25	16	16	68	27	76	17	21	76
18-Apr	21	21	22	22	22	25	29	19	21	23	31	30	28	37	40	44	39	27	48	41	13	58	45	42	58
19-Apr	22	42	46	21	23	16	14	11	19	15	16	31	61	83	40	39	29	43	73	25	16	17	14	81	83
20-Apr	99	75	47	13	91	37	34	47	44	31	68	70	45	44	48	42	42	43	42	31	28	25	22	26	99
21-Apr	39	29	50	20	63	55	81	27	28	49	45	43	48	45	45	42	45	44	41	36	20	26	23	33	81
22-Apr	72	17	43	52	47	23	21	22	24	25	22	19	26	22	22	23	21	21	18	16	15	16	17	18	72
23-Apr	21	23	21	18	18	37	35	25	21	40	42	41	40	33	34	31	36	28	30	31	37	46	45	41	46
24-Apr	38	42	30	31	34	34	38	43	43	43	41	44	42	44	35	42	39	38	31	30	30	30	31	28	44
25-Apr	29	32	26	19	21	21	31	36	50	54	52	61	60	70	65	59	61	47	29	12	11	13	18	18	70
26-Apr	62	35	19	14	33	34	50	24	23	22	22	30	27	78	55	39	24	22	24	13	16	17	15	21	78
27-Apr	93	16	82	54	72	42	43	22	18	16	24	29	27	31	43	44	42	39	44	36	24	12	19	33	93
28-Apr	35	51	24	18	26	20	20	14	23	19	18	17	18	17	21	18	17	16	15	13	14	16	15	43	51
29-Apr	57	39	69	30	28	25	24	31	38	34	40	42	38	38	42	46	39	41	31	33	34	20	26	34	69
30-Apr	35	38	42	38	38	43	46	46	48	40	39	42	43	46	49	42	33	29	44	61	47	42	22	19	61

99	75	82	54	91	100	81	86	107	98	68	70	61	83	65	59	61	48	73	68	58	76	61	81	
Diurnal Maximum																								



# Wood Buffalo Environmental Association

## SO2 Calibration Report

### Station Information

Calibration Date	April 13, 2015	Last Calibration	March 10, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:45
Gas Cert Reference	SA140071A	Station temp.	21 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
ZAG Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-689	-689
Analyzer IP address	192.168.1.43		Lamp voltage	739	738
Calculated slope	0.982822	0.978800	Chamber temp	43.0	43.3
Calculated intercept	0.675988	0.782398	Pressure	715.7	717.3
Analyzer Background	42.8	42.8	Flow	0.500	0.501
Analyzer Coefficient	0.802	0.802	Intensity	356xx	35600
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	0.3	----
as found span	5500	78.1	710.0	721.0	0.985
calibrator zero	5500	0.0	0.0	0.3	----
high point	5500	78.1	710.0	725.4	0.979
second point	5500	43.8	398.2	405.0	0.983
third point	5500	21.9	199.1	201.7	0.987
as left zero	5500	0.0	0.0	0.1	----
as left span	5500	78.1	710.0	724.3	0.980
Average Correction Factor					0.983

Corrected As found	720.7	Previous response	721.7	% change	0.1%
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**Notes:**

changed inlet filter after as founds.

Calibration Performed By:

Michael Martineau



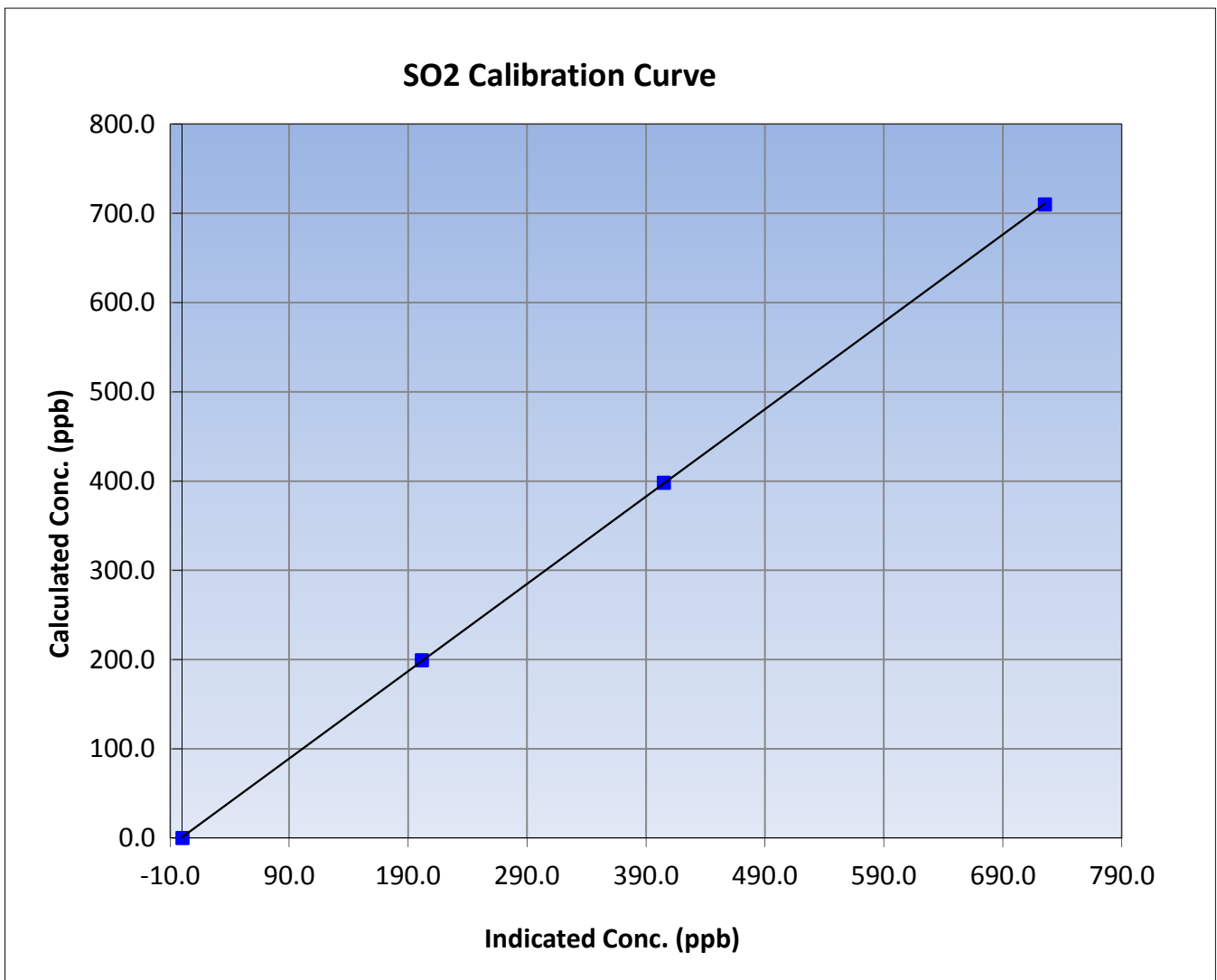
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 10, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 43C	Analyzer serial #	509110888

## Calibration Data

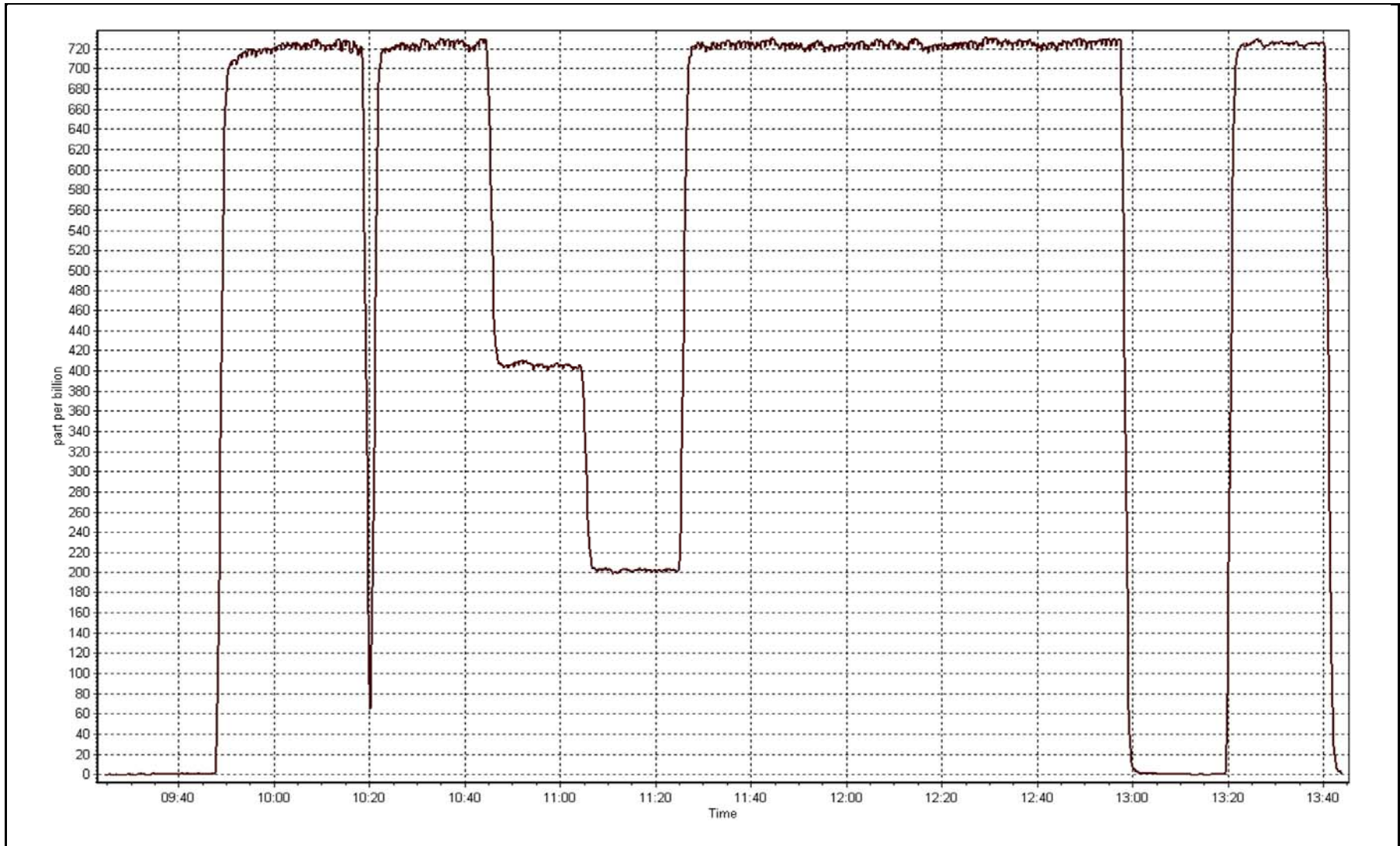
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999987
710.0	725.4	0.9788		
398.2	405.0	0.9832	Slope	0.978800
199.1	201.7	0.9872		
			Intercept	0.782398





SO2 Calibration Plot

Date: April 13, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

### Station Information

Calibration Date	April 20, 2015	Last Calibration	January 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	12:10
Gas Cert Reference	LL27480	Station temp.	21 Deg C
Cal Gas Concentration	10.6 ppm	Cal Gas Exp Date	12/21/2012
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Dil air Make/Model	API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
SO2 gas concentration	50 ppm	SO2 gas cert/exp	SA140071A 26-Sep-17

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-859	-859
Analyzer IP address	192.168.1.42		Lamp voltage	1172	1167
Calculated slope	1.013130	1.006947	Chamber temp	45	45
Calculated intercept	-0.101624	0.009589	Pressure	671.5	666.9
Analyzer Background	1.63	1.63	Flow	0.412	0.410
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	0.0	-0.1	----
as found span	6500	46.0	75.0	74.5	1.007
SO2 scrubber check	5500	21.9	199.1	0.8	----
calibrator zero	6500	0.0	0.0	-0.1	----
high point	6500	46.0	75.0	74.5	1.007
second point	6500	24.6	40.1	39.8	1.007
third point	6500	12.3	20.1	20.0	1.004
as left zero	6500	0.0	0.0	0.1	----
as left span	6500	46.0	75.0	74.8	1.003
Average Correction Factor					1.006

Corrected As found	74.5	Previous response	74.1	% change	-0.5%
--------------------	------	-------------------	------	----------	-------

**Notes:**

inlet filter changed and scrubber check performed after as founds. As found span used as high point.

Calibration Performed By:

Michael Martineau



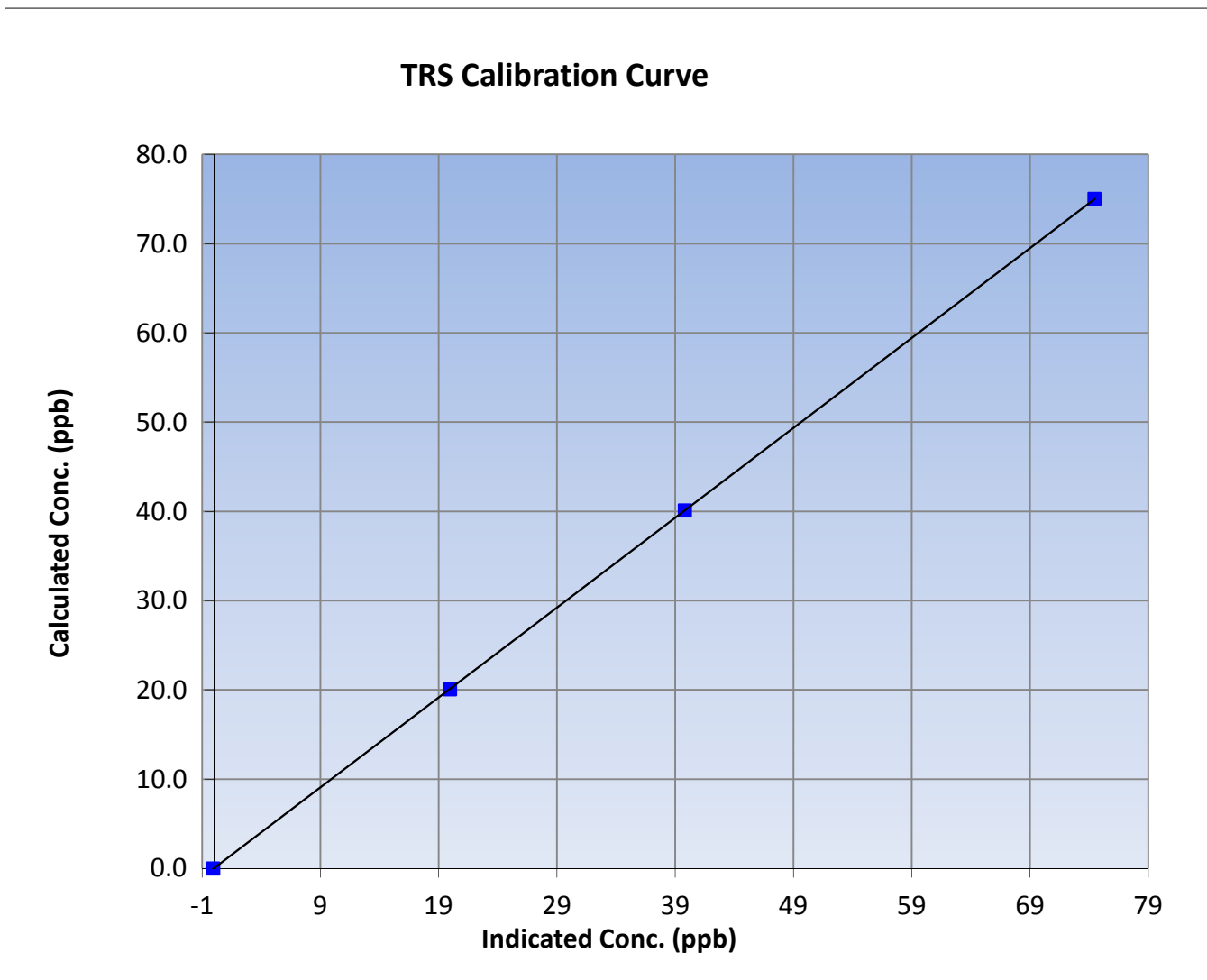
# Wood Buffalo Environmental Association TRS Calibration Report

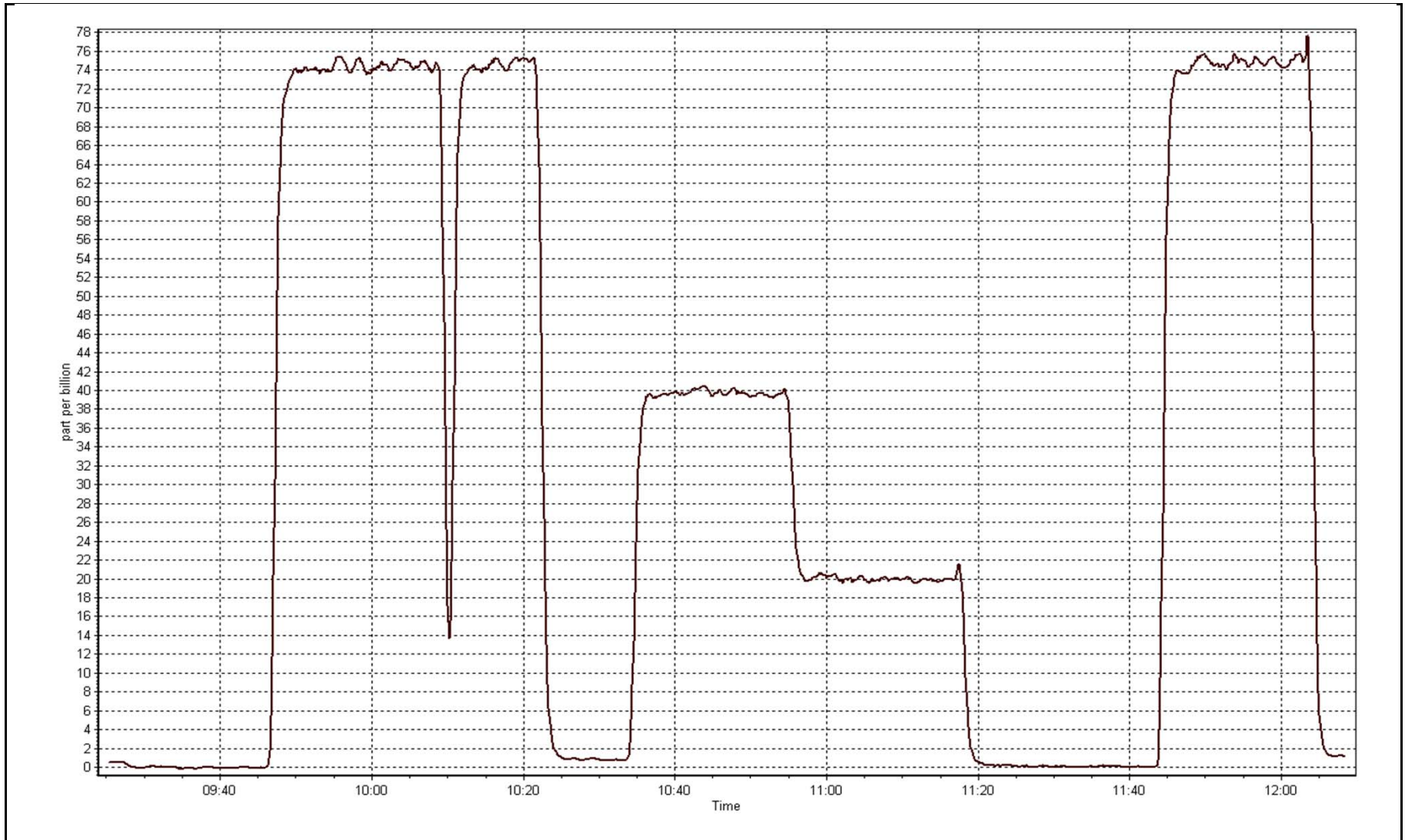
## Station Information

Calibration Date	April 20, 2015	Previous Calibration	January 9, 2015
Station Name	AMS 1	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	12:10
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	----	Correlation Coefficient	0.999997
75.0	74.5	1.0073		
40.1	39.8	1.0072	Slope	1.006947
20.1	20.0	1.0039		
			Intercept	0.009589







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

## Station Information

Calibration Date	Monday, April 13, 2015	Last Calibration	Tuesday, March 10, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:45
Gas Cert Reference	SA140071A	Cal Gas Expiry Date	Tuesday, September 26, 2017
CH4 Cal Gas Conc.	499.0 ppm	CH4 Equiv Conc.	1054.5 ppm
C3H8 Cal Gas Conc.	202.0 ppm	Station temp.	Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
ZAG make/model	Teledyne API 701	Serial Number	587
DACS make/model	Campbell Scientific CR3000	Serial Number	2582

## Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	74.8
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.986999	0.995876	Carrier Pressure	40.4	40.4
THC Calc intercept	0.025551	0.026031	Fuel Pressure	42.2	42.2
NMHC Calc slope	0.986010	1.006363	Air Pressure	32.2	32.2
NMHC Calc intercept	0.012292	0.000497			

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	----
as found span	5500	78.1	14.97	15.05	0.995
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	14.97	15.03	0.996
second point	5500	43.8	8.40	8.38	1.002
third point	5500	21.9	4.20	4.17	1.007
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	14.97	15.05	0.995
Average Correction Factor					1.002

Corrected As found 15.05 Previous response 15.15 % change 0.6%

**Notes:**

inlet filter changed after as founds.

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	----
as found span	5500	78.1	7.89	7.85	1.005
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.89	7.84	1.006
second point	5500	43.8	4.42	4.39	1.008
third point	5500	21.9	2.21	2.20	1.005
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.89	7.86	1.004
Average Correction Factor					1.006

Corrected As found      7.85      Previous response      7.99      % change      1.8%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	----
as found span	5500	78.1	7.09	7.20	0.984
calibrator zero	5500	0.0	0.00	0.00	----
high point	5500	78.1	7.09	7.19	0.986
second point	5500	43.8	3.97	3.99	0.996
third point	5500	21.9	1.99	1.97	1.009
as left zero	5500	0.0	0.00	0.00	----
as left span	5500	78.1	7.09	7.19	0.986
Average Correction Factor					0.997

Corrected As found      7.20      Previous response      7.16      % change      -0.6%



# Wood Buffalo Environmental Association

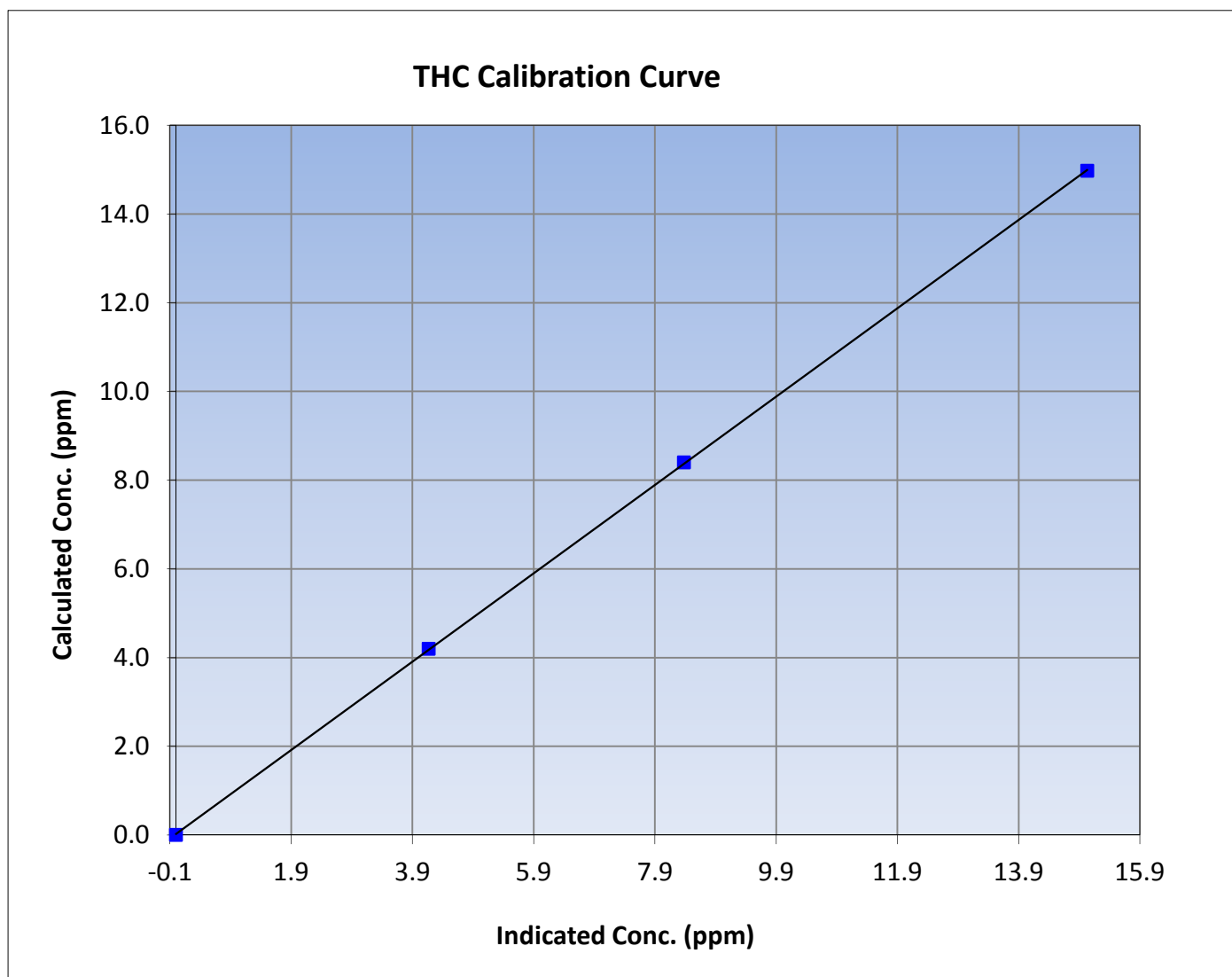
## THC Calibration Summary

### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 10, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
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	----	Correlation Coefficient	0.999982
14.97	15.03	0.9963		
8.40	8.38	1.0021	Slope	0.995876
4.20	4.17	1.0069		
			Intercept	0.026031





# Wood Buffalo Environmental Association

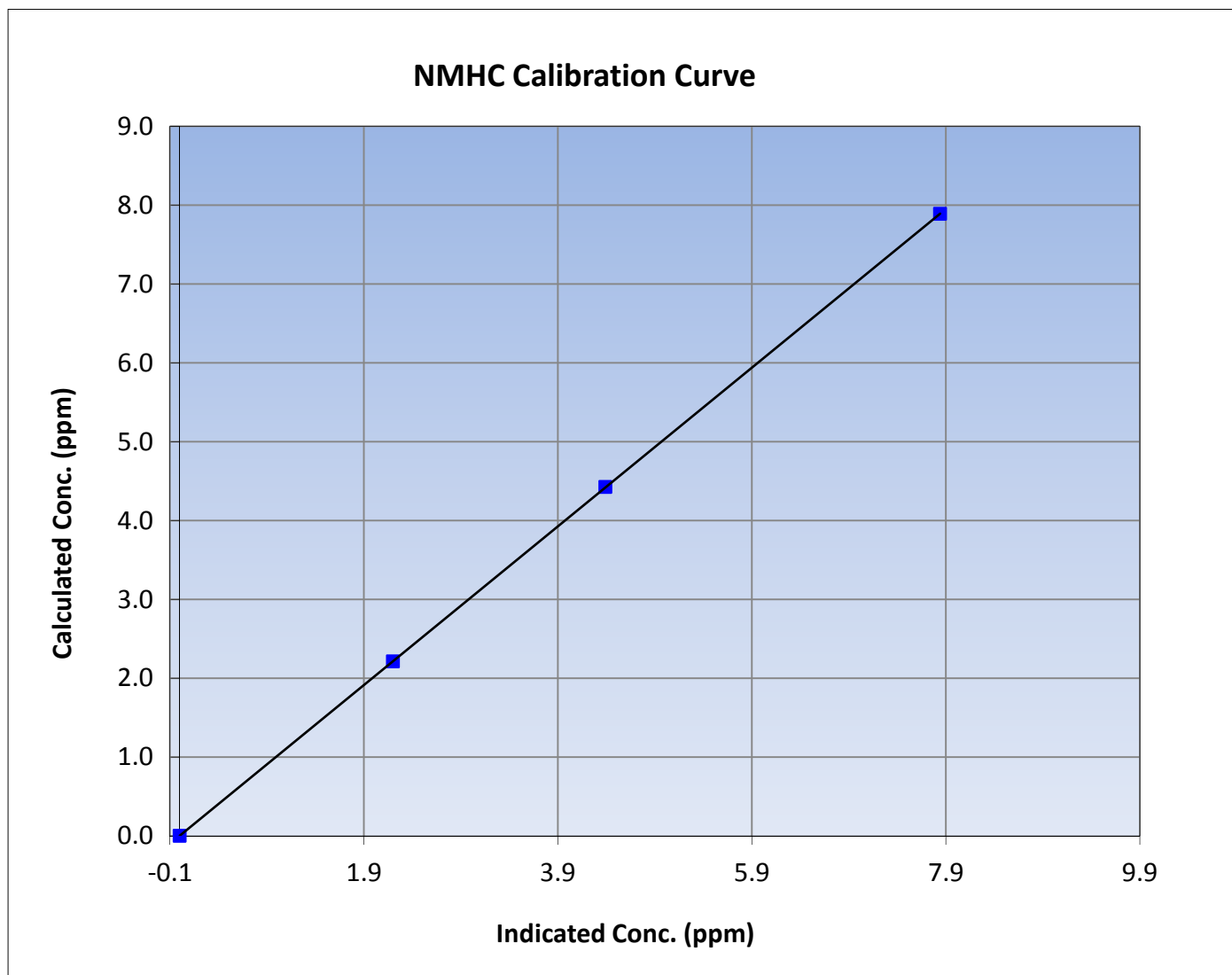
## NMHC Calibration Summary

### Station Information

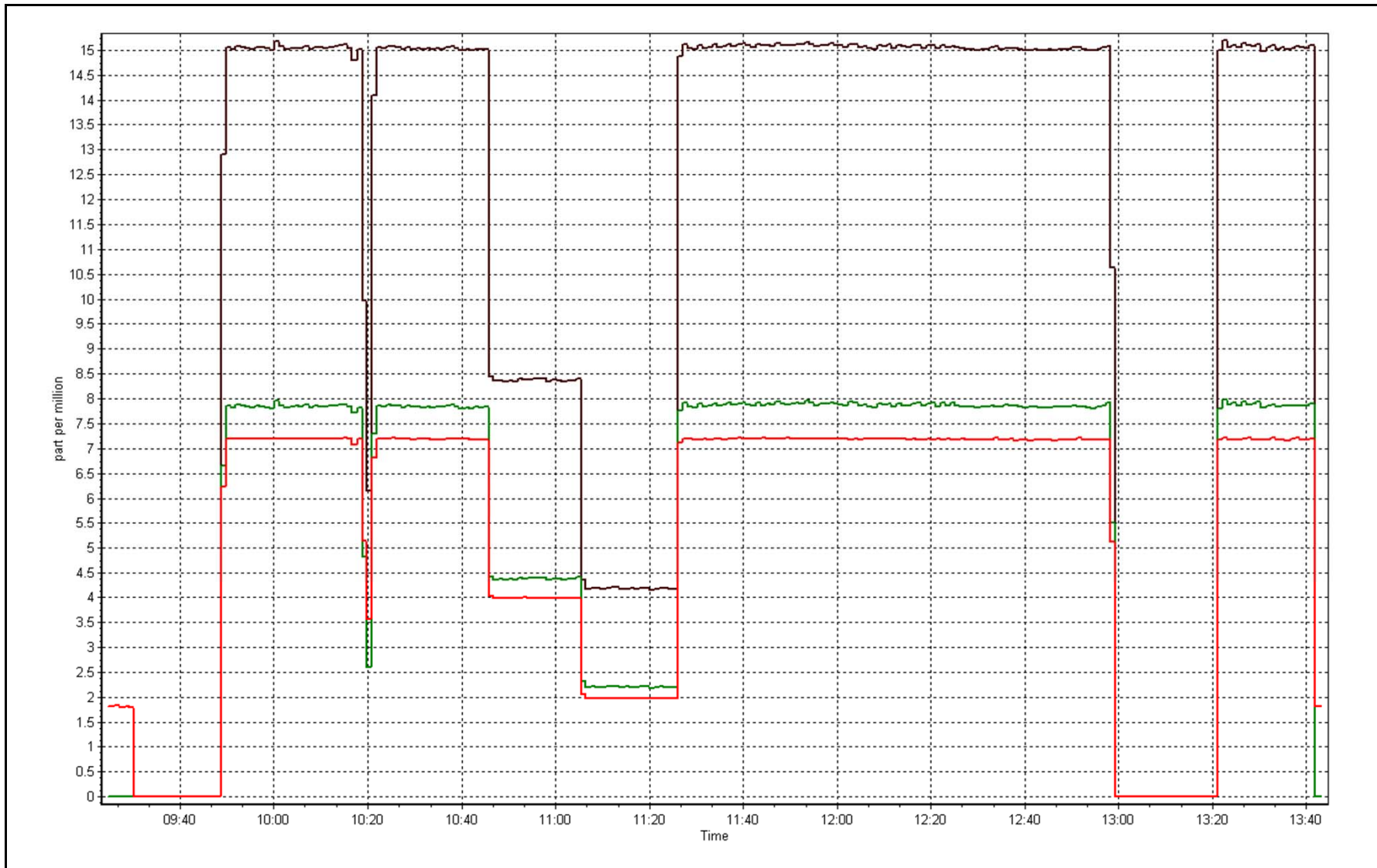
Calibration Date	April 13, 2015	Previous Calibration	March 10, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999999
7.89	7.84	1.0061		
4.42	4.39	1.0077	Slope	1.006363
2.21	2.20	1.0054		
			Intercept	0.000497









# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 24, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	11:50
NO2 GPT Ref date	Monday, April 13, 2015	Transfer Standard	NOX GPT
Calibrator Make/Model	SABIO 4010	Station temp.	21 Deg C
ZAG make/model	Teledyne API 701	Serial Number	1730512
DACS make/model	Campbell Scientific CR3000	Serial Number	587
		Serial Number	2582

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	25.1	27.2
Analyzer IP address	192.168.1.48		Lamp temp.	53.6	53.5
Calculated slope	0.999514	0.990955	Pressure	668.4	697.6
Calculated intercept	-0.316016	-0.460525	Flow cell A	0.715	0.597
Analyzer Background	-0.3	-0.3	Flow cell B	0.717	0.591
Analyzer Coefficient	0.958	0.958	Cell A Intensity	79700	79000
			Cell B Intensity	74400	73600

Analyzer make	Thermo 49i	Analyzer serial #	1300156233
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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	5500	0.00	0.0	-1.4	----
as found span	5000	0.98	389.3	395.6	0.984
calibrator zero	5500	0.00	0.0	-1.4	----
high point	5000	0.98	389.3	391.7	0.994
second point	5000	0.56	198.4	203.4	0.975
third point	5000	0.34	102.6	104.7	0.980
as left zero	5500	0.00	0.0	-0.4	----
as left span	5000	0.98	389.3	393.6	0.989
Average Correction Factor					0.983

Corrected As found	397.0	Previous response	389.8	% change	-1.8%
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**Notes:**

Changed inlet filter after as founds.

Calibration Performed By:

Michael Martineau



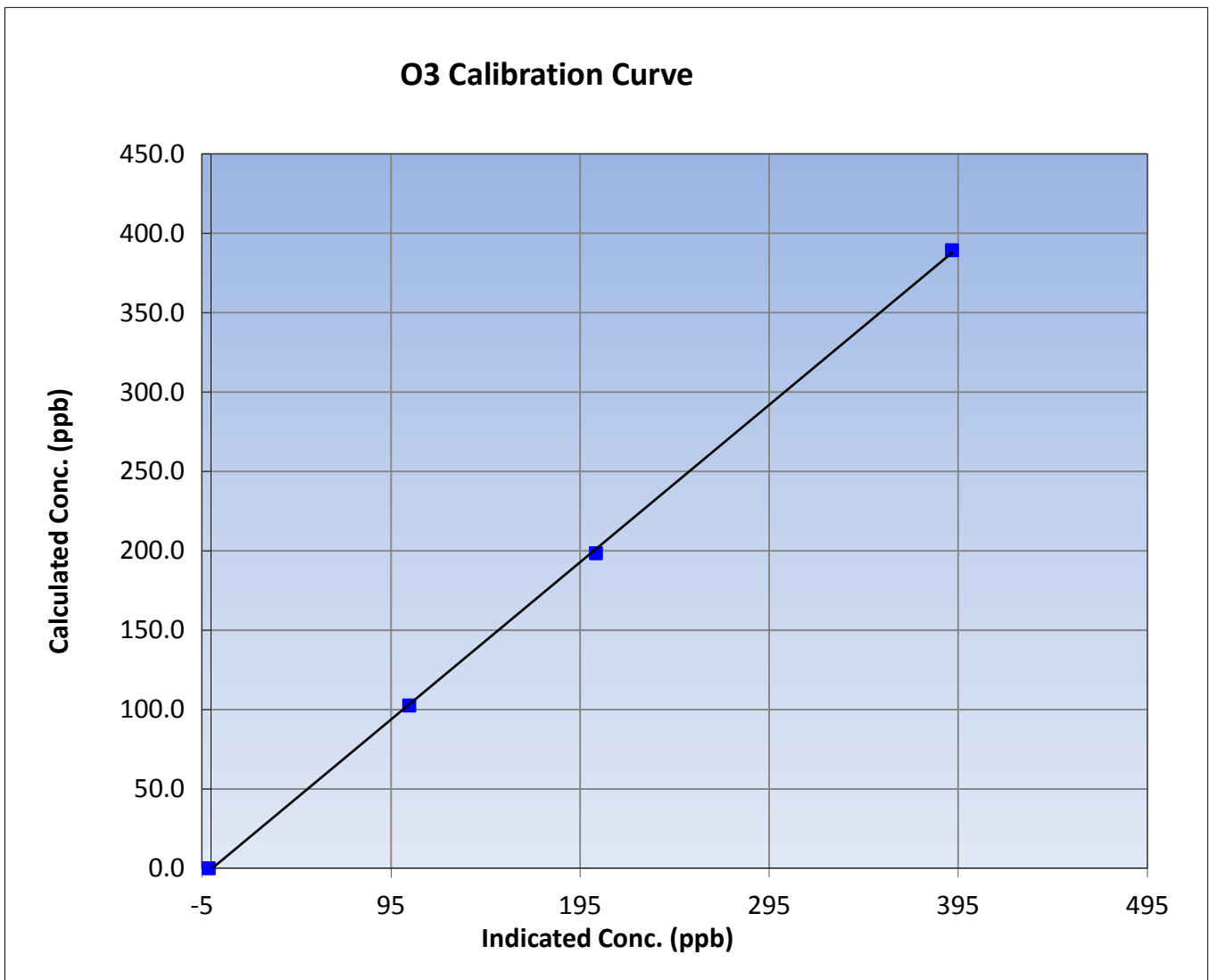
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	Tuesday, April 14, 2015	Previous Calibration	March 24, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:00	End Time (MST)	11:50
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

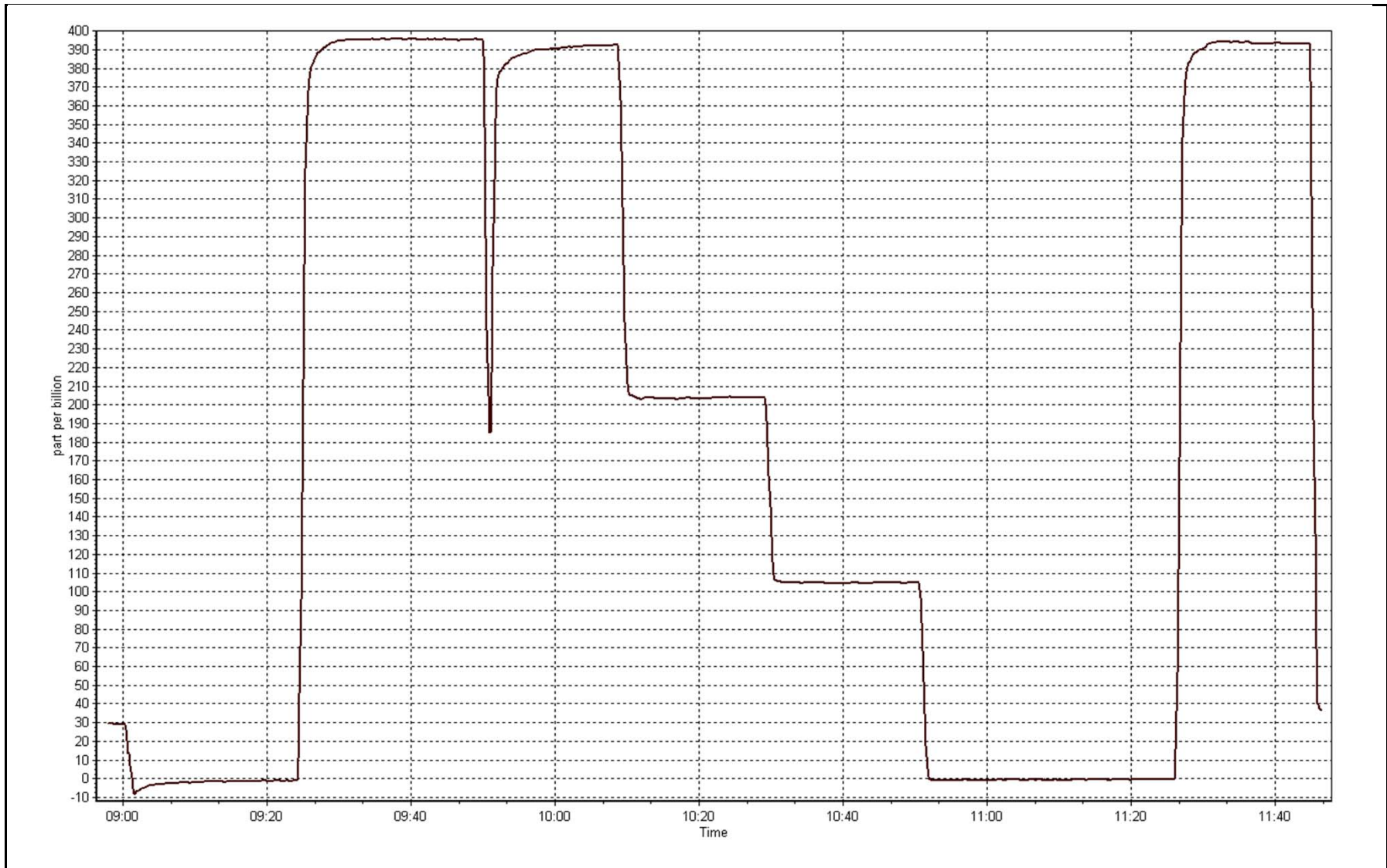
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.4	----	Correlation Coefficient	0.999833
389.3	391.7	0.9939		
198.4	203.4	0.9753	Slope	0.990955
102.6	104.7	0.9799		
			Intercept	-0.460525



O3 Calibration Plot

Date: April 14, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:45
NO Cal Gas Conc	52.8 ppm	Gas Cert Reference	SA140071A
NOx Cal Gas Conc	52.8 ppm	Cal Gas Expiry Date	September 26, 2017
Calibrator	Sabio 4010	Serial Number	1730512
Zero air Generator	Teledyne API T701	Serial Number	587

## DACS Information

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

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998435	0.998115	1.002853
	Data Offset	0.832293	1.206945	0.228046
Current Calibration	Data Slope	1.000077	0.997480	1.007800
	Data Offset	1.203457	1.191311	1.231383

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153357
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.849		0.839	
NOX coefficient	0.998		0.995	
NO2 coefficient	1.000		1.000	
NO bkgrnd	6.1		6.0	
NOX bkgrnd	6.2		6.1	
Chamber Temp	50.4	Deg C	50.3	Deg C
Moly Temp	328	Deg C	325	Deg C
PMT voltage	n/a	V	-849.5	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	207.5	mmHg	206.1	mmHg
R Cell Press Nox	n/a	mmHg	206.1	mmHg
NO sample flow	472	lpm	0.476	lpm
Nox sample Flow	n/a	lpm	0.473	lpm

**Notes:**

Changed inlet filter and adjusted span after as founds.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 13, 2015

Station Number:

AMS 1

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
as found span	5500	78.1	749.8	749.8	0.0	725.6	723.8	1.8	1.0333	1.0359
calibrator zero	5500	0.0	0.0	0.0	0.0	0.0	0.0	0.1	----	----
high point	5500	78.1	749.8	749.8	0.0	749.3	751.1	-1.9	1.0007	0.9982
second point	5500	43.8	420.5	420.5	0.0	418.5	419.8	-1.3	1.0047	1.0016
third point	5500	21.9	210.2	210.2	0.0	207.8	208.3	-0.5	1.0119	1.0093
as left zero	5500	0.0	0.0	0.0	0.0	0.4	0.1	0.3	----	----
as left span	5500	78.1	749.8	361.2	388.6	755.9	367.0	388.9	0.9918	0.9842
Average Correction Factor									1.0058	1.0030

Corrected As found

NO<sub>x</sub>= 725.6

NO= 723.8

Percent Change

NO<sub>x</sub>= 3.4%

NO= 3.6%

Previous Response

NO<sub>x</sub>= 750.1

NO= 750.0

### 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 NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.1			N/A	
1st NO2 (300)	----	361.2	389.3	746.9	361.2	385.7	0.9898	1.0000	1.0094	99.1%
2nd NO2 (200)	----	552.2	198.4	747.2	552.2	195.1	0.9893	1.0000	1.0168	98.3%
3rd NO2 (100)	----	647.9	102.6	747.1	647.9	99.2	0.9895	1.0000	1.0341	96.7%
4th NO2 (0)	750.5	----	-2.8	747.7	750.5	-2.8	0.9887	1.0000	N/A	----
Average Correction Factor							0.9893	1.0000	1.0201	98.0%

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

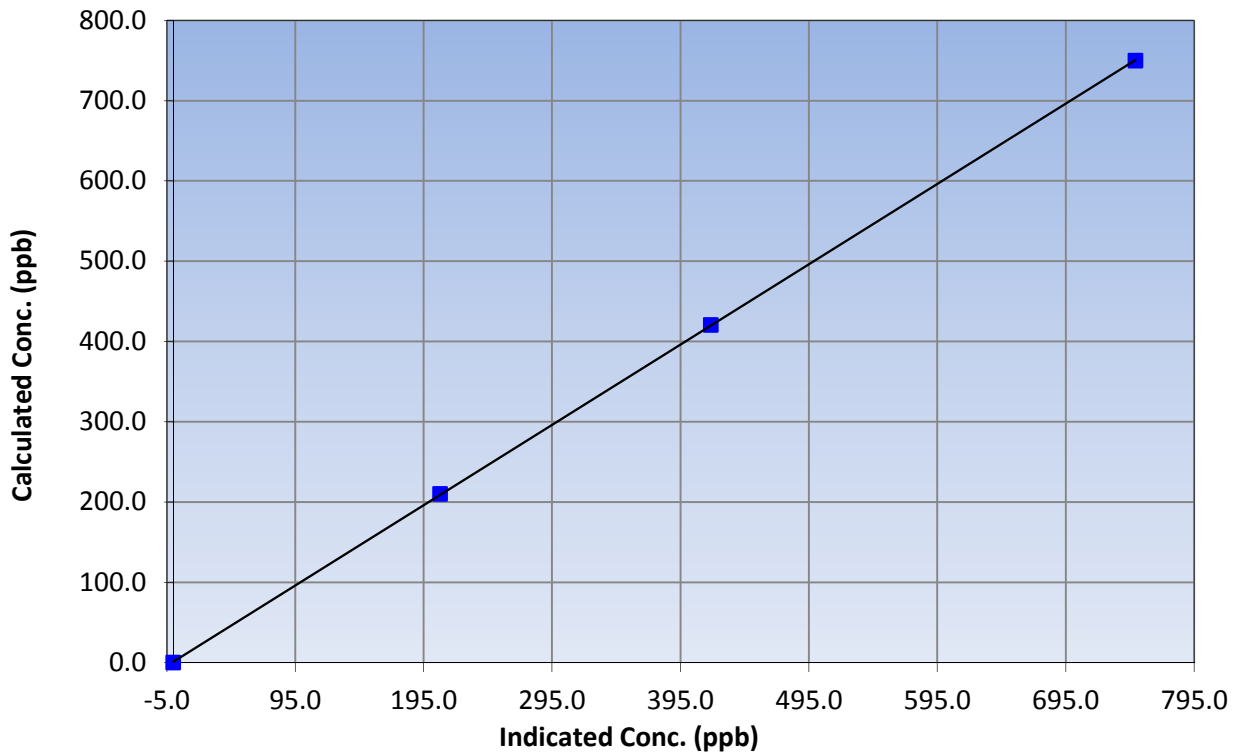
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999986
749.8	749.3	1.0007		
420.5	418.5	1.0047	Slope	1.000077
210.2	207.8	1.0119		
			Intercept	1.203457

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

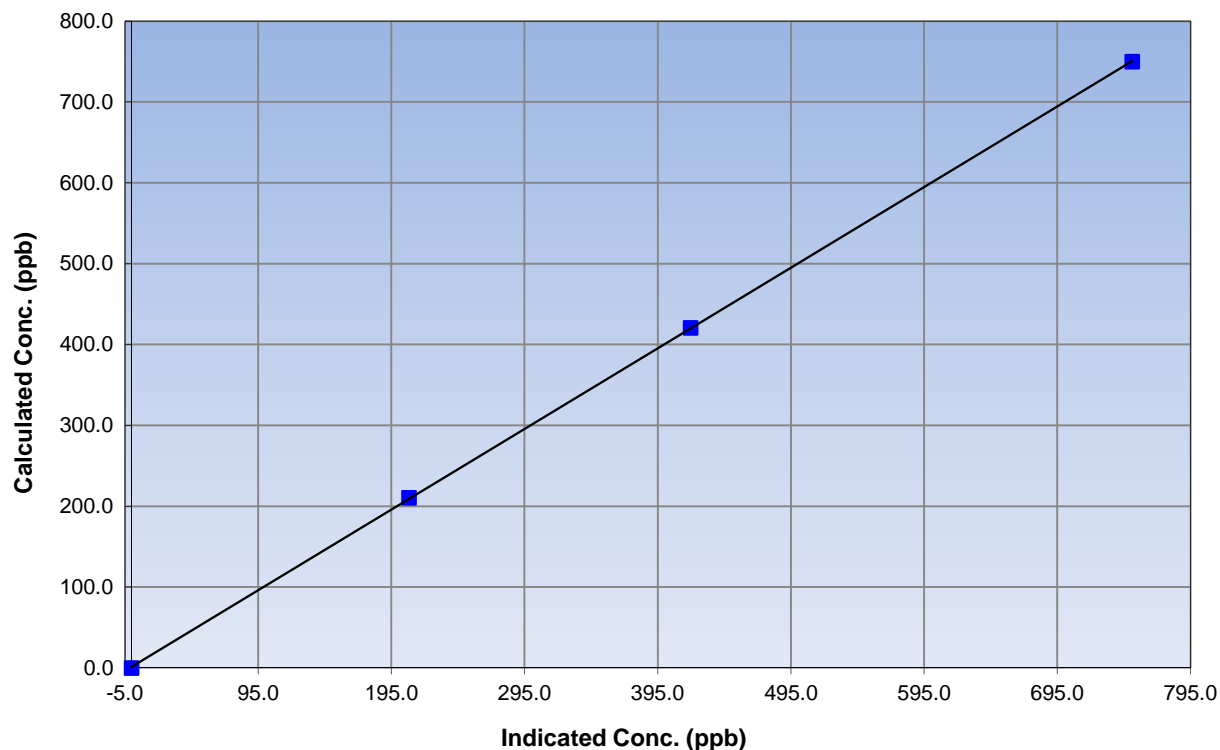
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999988
749.8	751.1	0.9982		
420.5	419.8	1.0016	Slope	0.997480
210.2	208.3	1.0093		
			Intercept	1.191311

### NO Calibration Curve







# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

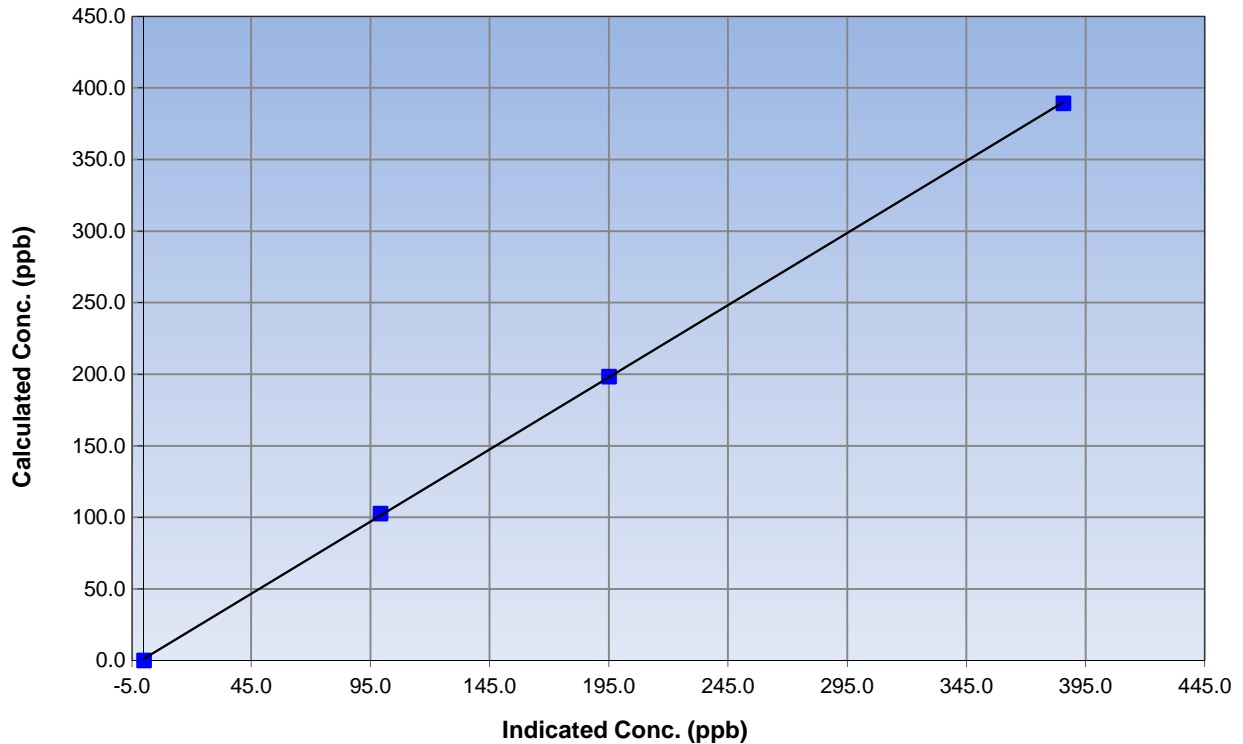
### Station Information

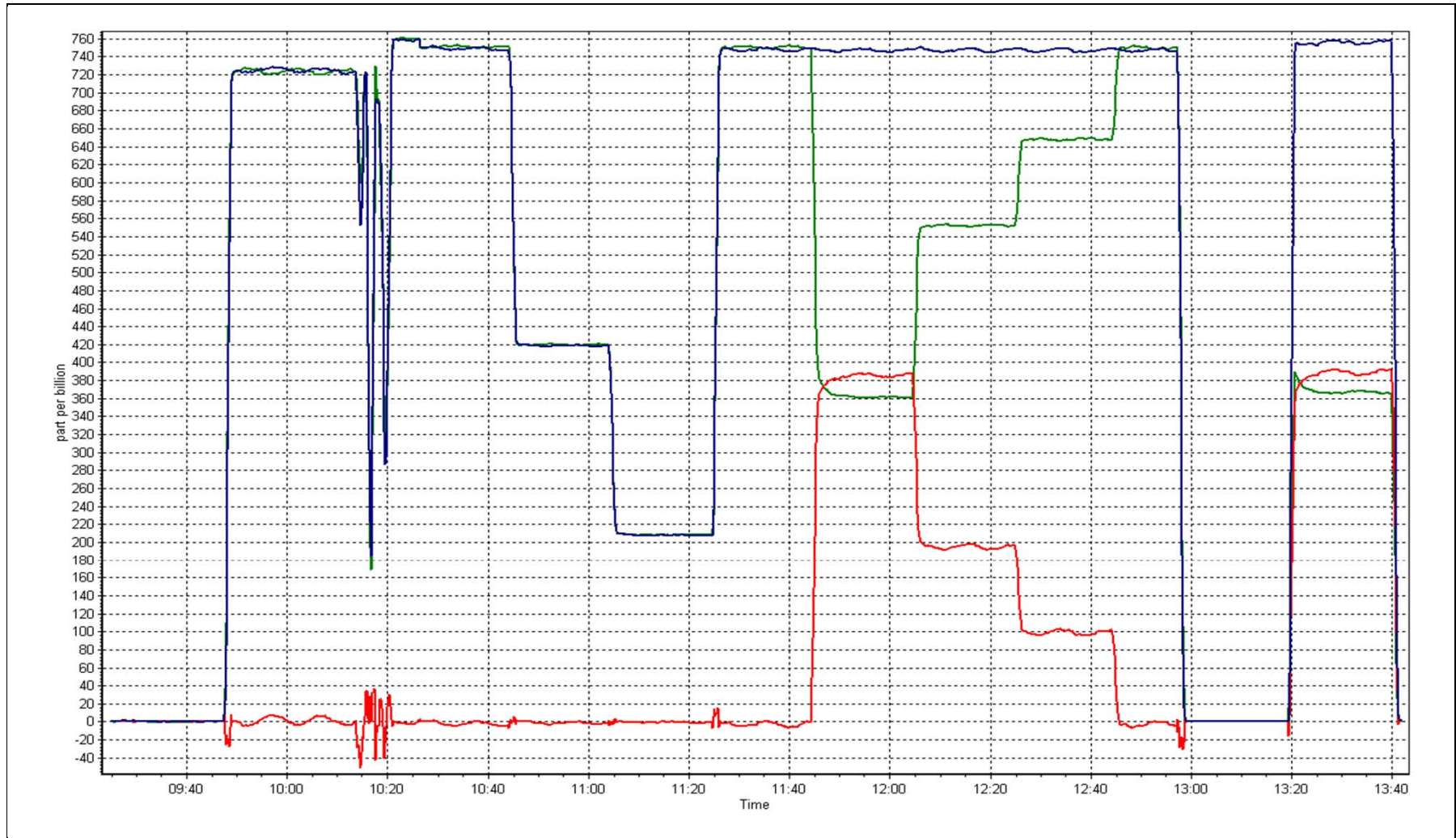
Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	13:45
Analyzer make	Thermo 42i	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999949
389.3	385.7	1.0094		
198.4	195.1	1.0168	Slope	1.007800
102.6	99.2	1.0341		
			Intercept	1.231383

### NO<sub>2</sub> Calibration Curve







# Wood Buffalo Environmental Association

## N<sub>t</sub>-NO<sub>x</sub>-NH<sub>3</sub> Calibration Report

### Station Information

Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
NOX Calibration Date	April 13, 2015	NOX Previous Cal Date	March 23, 2015
NH3 Calibration Date	April 14, 2015	NH3 Previous Cal Date	March 23, 2015
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:30
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010		
NH3 Cal Gas Conc	192 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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	1.002647	0.994785	0.997654	0.996512	1.002049
	Data Offset	-6.699135	-6.404847	1.201157	1.811754	-2.139571
Cal Stats After	Data Slope	1.001248	0.993969	0.994293	0.997856	1.011102
	Data Offset	-11.177751	-12.057179	0.721904	-0.280430	1.298297
IP address		192.168.1.17				

### Analyzer Information

Analyzer make/model	<u>API T201</u>	Analyzer serial #	<u>152</u>	
Converter	API 501 NH#	Converter serial #	<u>147</u>	
Test Point	before		after	
NH3 Conc range	0-2500	ppb	2500	ppb
NOx Conc range	0-1000	ppb	1000	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	1.109		1.109	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	1.190		1.190	
NH3 coefficient	0.890		0.880	
Nt coefficient	1.189		1.189	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	315.7	Deg C	315.4	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	85.0	ccm	84.0	ccm
R Cell Press	4.5	mmHg	4.5	mmHg
PMT Voltage	645.0	v	645.0	v
Sample Flow 1 NO	519.0	ccm	507.0	ccm
Sample Flow 2 Nox	523.0	ccm	502.0	ccm
Sample Flow 3 Nt	554.0	ccm	536.0	ccm

Notes:

Changed inlet filter after as founds (Nox cal).



# Wood Buffalo Environmental Association

## Nt-NO<sub>x</sub>-NH<sub>3</sub> Calibration Report

### Station Information

Calibration Date:

April 14, 2015

Station Number:

AMS 1

### NH<sub>3</sub> Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NOx conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NOx conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	-0.3	0.3	-0.6	----	----
as found NO	5500	78.1	749.8	749.8	----	750.3	751.9	-1.6	0.999	----
calibrator zero	5500	0.0	0.0	0.0	0.0	1.2	0.9	0.3	----	----
high NO point	5500	78.1	749.8	749.8	----	753.3	754.1	-0.8	0.995	----
NO/O <sub>3</sub> point	5500	78.1	749.8	749.8	----	759.0	759.1	0.0	0.988	----
as found NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2016.2	15.4	2000.9	0.992	0.999
first NH <sub>3</sub>	6500	67.7	1999.8	NA	1999.8	2016.2	15.4	2000.9	0.992	0.999
second NH <sub>3</sub>	6500	33.9	1001.4	NA	1001.4	1031.1	8.9	1022.2	0.971	0.980
third NH <sub>3</sub>	6500	17.0	502.2	NA	502.2	524.5	4.3	520.2	0.957	0.965
Average Correction Factor									0.9916	0.9815

NH<sub>3</sub> Corrected As Found  
 Nt Corrected As Found  
 NOx Corrected As Found

NH<sub>3</sub> = 2001.5 ppb  
 Nt = 750.6 ppb  
 NOx = 751.6 ppb

Previous Response  
 Previous Response  
 Previous Response

NH<sub>3</sub> = 2001.2 ppb  
 Nt = 760.1 ppb  
 NOx = 750.3 ppb

NH<sub>3</sub> percent change 0.0%  
 Nt percent change 1.3%  
 NOx percent change -0.2%



# Wood Buffalo Environmental Association

## NO<sub>x</sub>(NH<sub>3</sub>) Calibration Report

### Station Information

Calibration Date:

April 13, 2015

Station Number:

AMS 1

### NO<sub>x</sub> / NO / Nt Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NO conc (ppb)	Calculated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated Nt conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor
as found zero	5500	0.0	0.0	0.0	0.0	0.9	0.8	1.2	----	----
as found span	5500	78.1	749.8	749.8	749.8	752.0	755.2	746.7	0.9970	0.9928
calibrator zero	5500	0.0	0.0	0.0	0.0	0.9	0.8	1.2	----	----
high point	5500	78.1	749.8	749.8	749.8	754.1	751.6	753.3	0.9942	0.9975
second point	5500	43.8	420.5	420.5	420.5	421.7	422.3	421.2	0.9971	0.9958
third point	5500	21.9	210.2	210.2	210.2	208.8	209.8	207.5	1.0071	1.0020
as left zero	5500	0.0	0.0	0.0	0.0	1.6	1.6	3.7	----	----
as left span	5500	78.1	749.8	366.2	749.8	751.6	365.7	754.9	0.9975	1.0012
Average Correction Factor									0.9995	0.9984

	Nt	NO <sub>x</sub>	NO	NO <sub>2</sub>
Corrected As found	745.6	751.1	754.3	388.0
Previous Response	760.1	750.3	756.0	394.5
Percent Change	1.9%	-0.1%	0.2%	1.7%

### GPT Calibration Data

Total Flow		5500		ccm	Source Gas Flow		78.10		ccm	
O <sub>3</sub> Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <sub>2</sub> conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NO conc (ppb)	Indicated NO <sub>2</sub> conc (ppb)	NO <sub>x</sub> Correction factor	NO Correction factor	NO <sub>2</sub> Correction factor	Converter Efficiency
Cal zero			0.0			0.0			----	
1st NO <sub>2</sub> (300)	----	366.2	393.2	754.2	366.2	388.0	0.9942	1.0000	1.0133	98.7%
2nd NO <sub>2</sub> (200)	----	559.8	199.5	755.8	559.8	196.0	0.9920	1.0000	1.0179	98.2%
3rd NO <sub>2</sub> (100)	----	655.8	103.5	755.1	655.8	99.4	0.9929	1.0000	1.0415	96.0%
4th NO <sub>2</sub> (0)	759.3	----	-0.2	759.1	759.3	0.0	0.9877	1.0000	----	----
Average Correction Factor							0.9917	1.0000	1.0242	97.6%

Calibration Performed By: Michael Martineau



## Wood Buffalo Environmental Association NH3 Calibration Summary

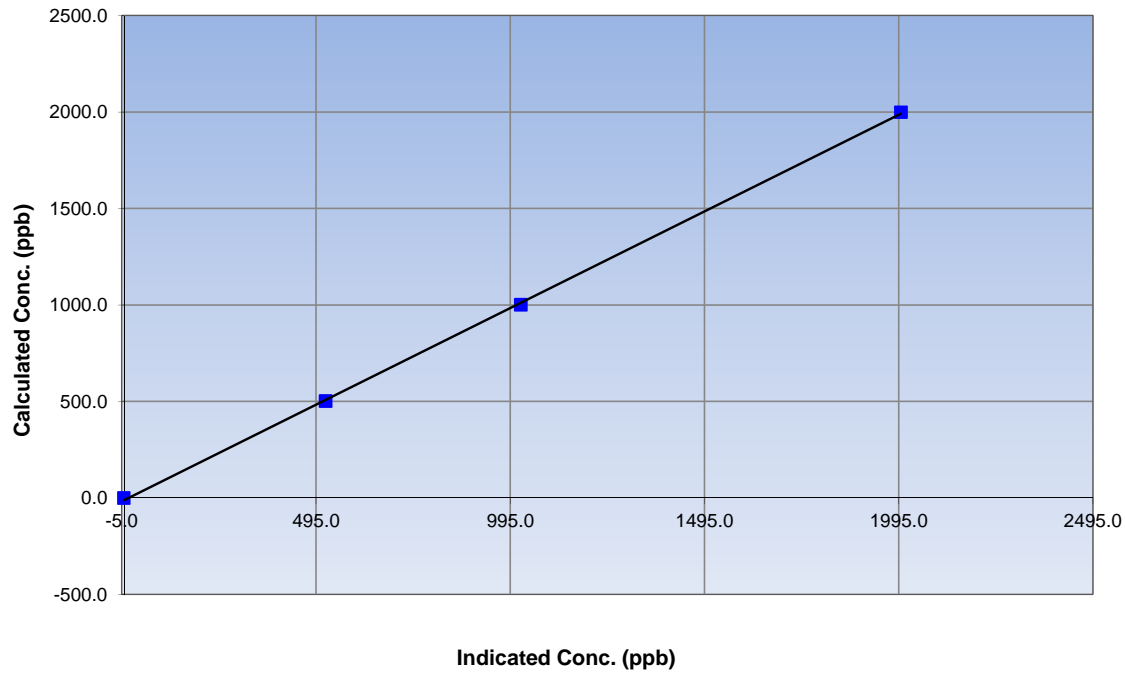
### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 23, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:30
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	0.3	----	Correlation Coefficient	0.999839
1999.8	2000.9	0.9994		
1001.4	1022.2	0.9796	Slope	1.001248
502.2	520.2	0.9653		
			Intercept	-11.177751

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

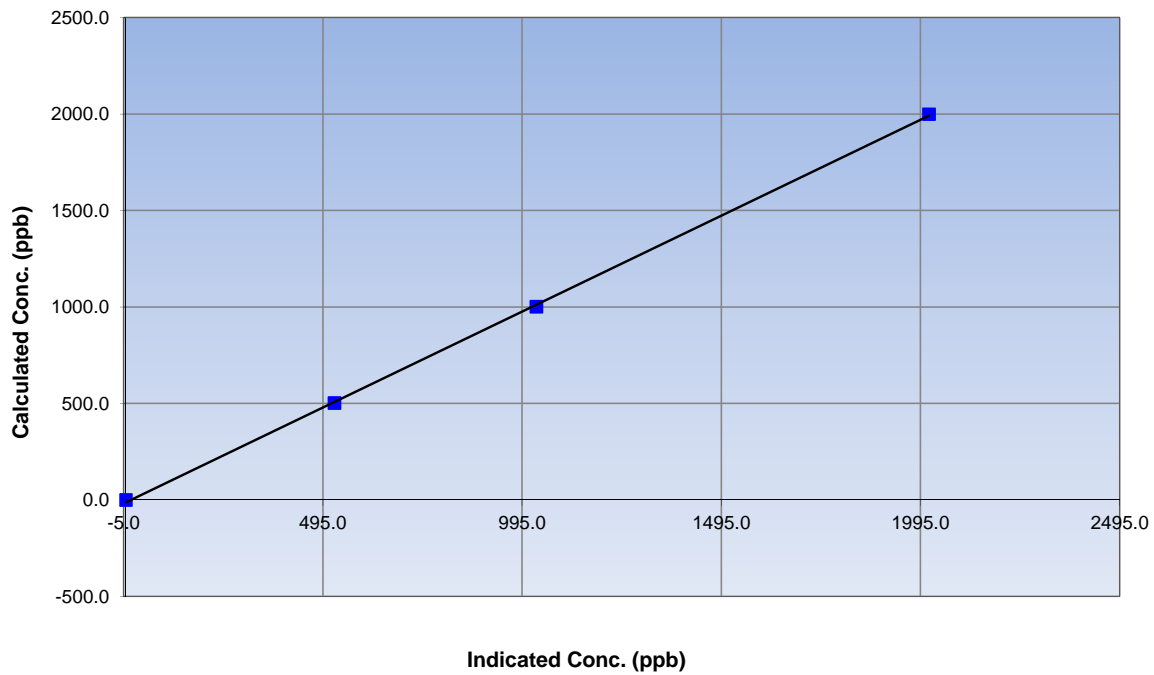
### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 23, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

### Nt (NH<sub>3</sub>) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	1.2	----	Correlation Coefficient	0.999834
1999.8	2016.2	0.9918		
1001.4	1031.1	0.9711	Slope	0.993969
502.2	524.5	0.9573		
			Intercept	-12.057179

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

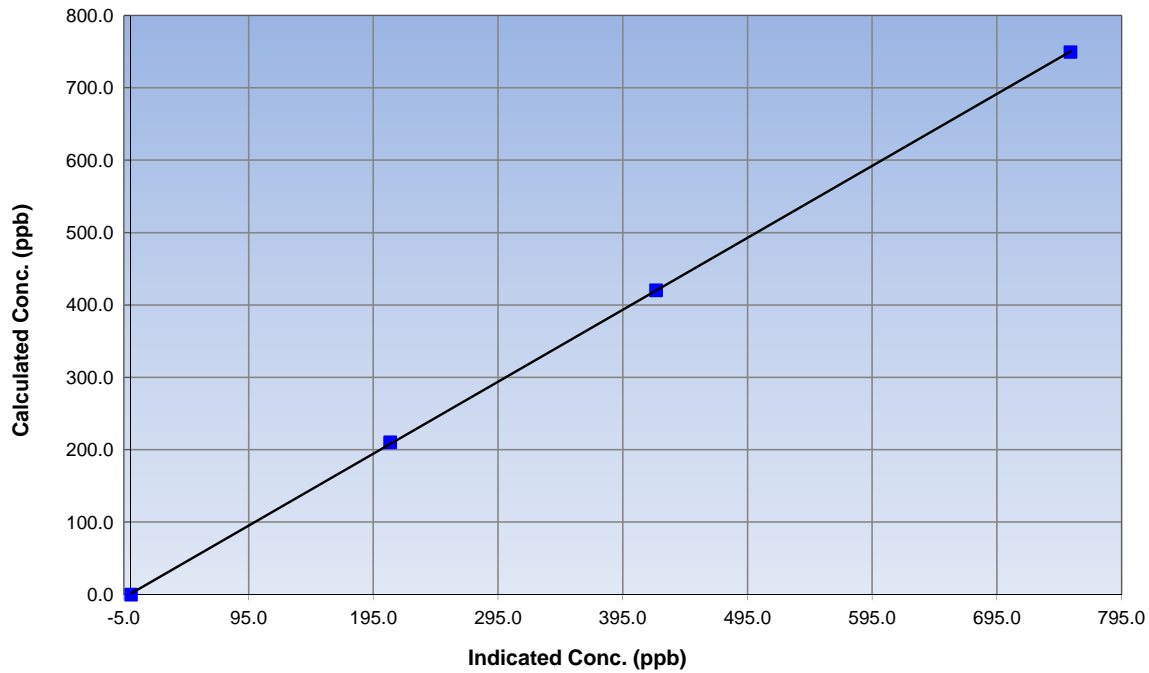
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

### NO<sub>x</sub> Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.9	----	Correlation Coefficient	0.999976
749.8	754.1	0.9942		
420.5	421.7	0.9971	Slope	0.994293
210.2	208.8	1.0071		
			Intercept	0.721904

### NOx Calibration Curve







# Wood Buffalo Environmental Association

## NO Calibration Summary

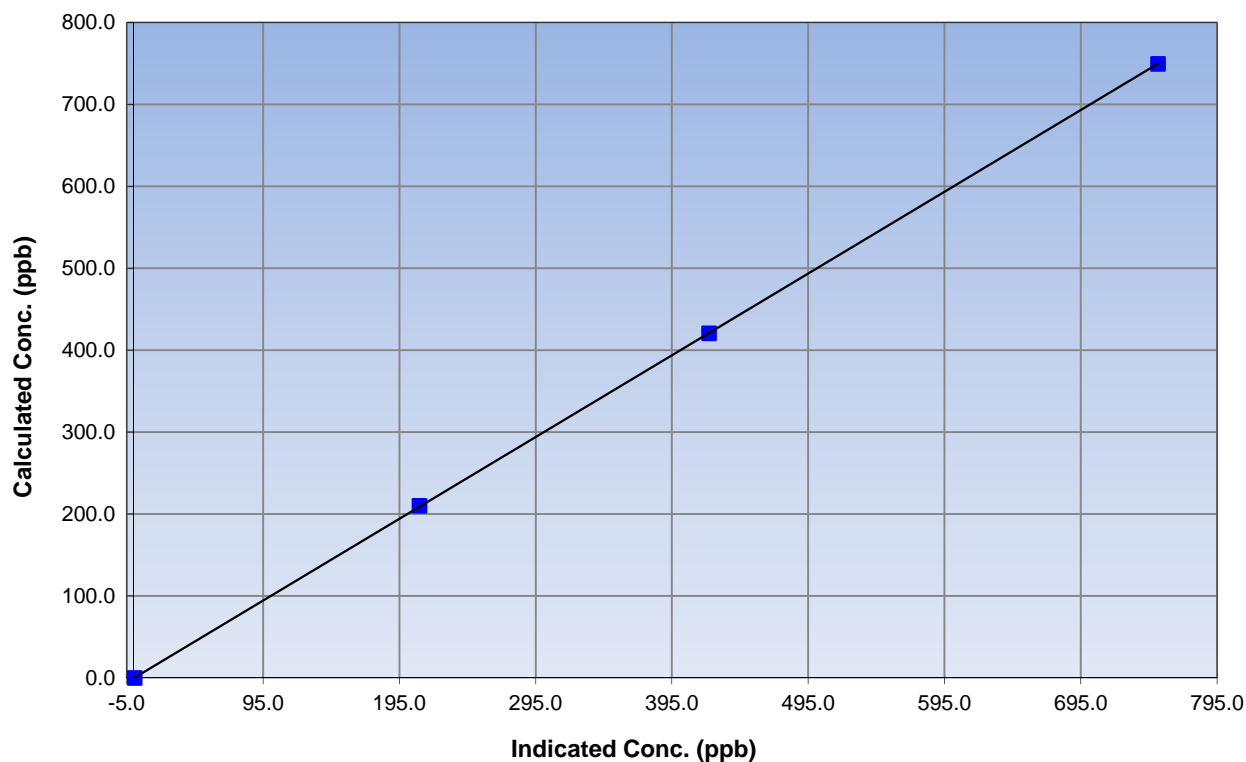
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.8	----	Correlation Coefficient	0.999994
749.8	751.6	0.9975		
420.5	422.3	0.9958	Slope	0.997856
210.2	209.8	1.0020		
			Intercept	-0.280430

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

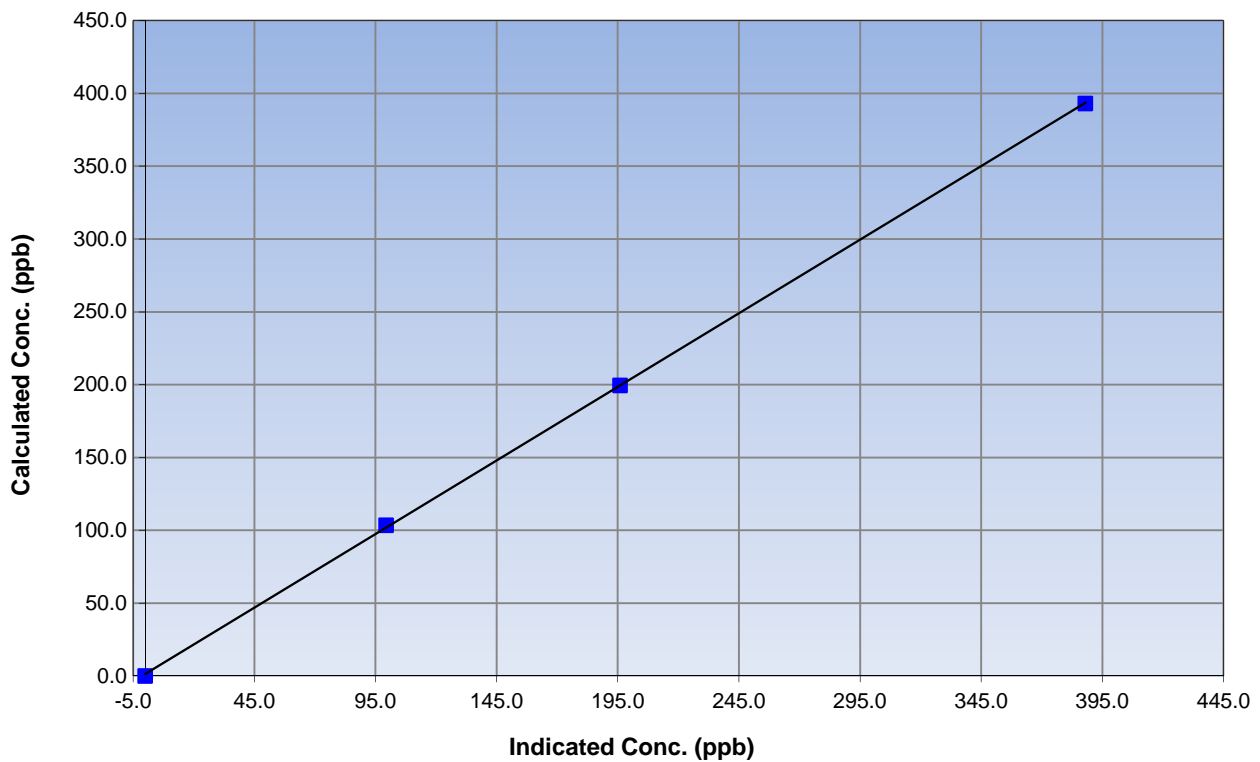
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 23, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:25	End Time (MST)	14:30
Analyzer make	API T201	Analyzer serial #	152

### Calibration Information

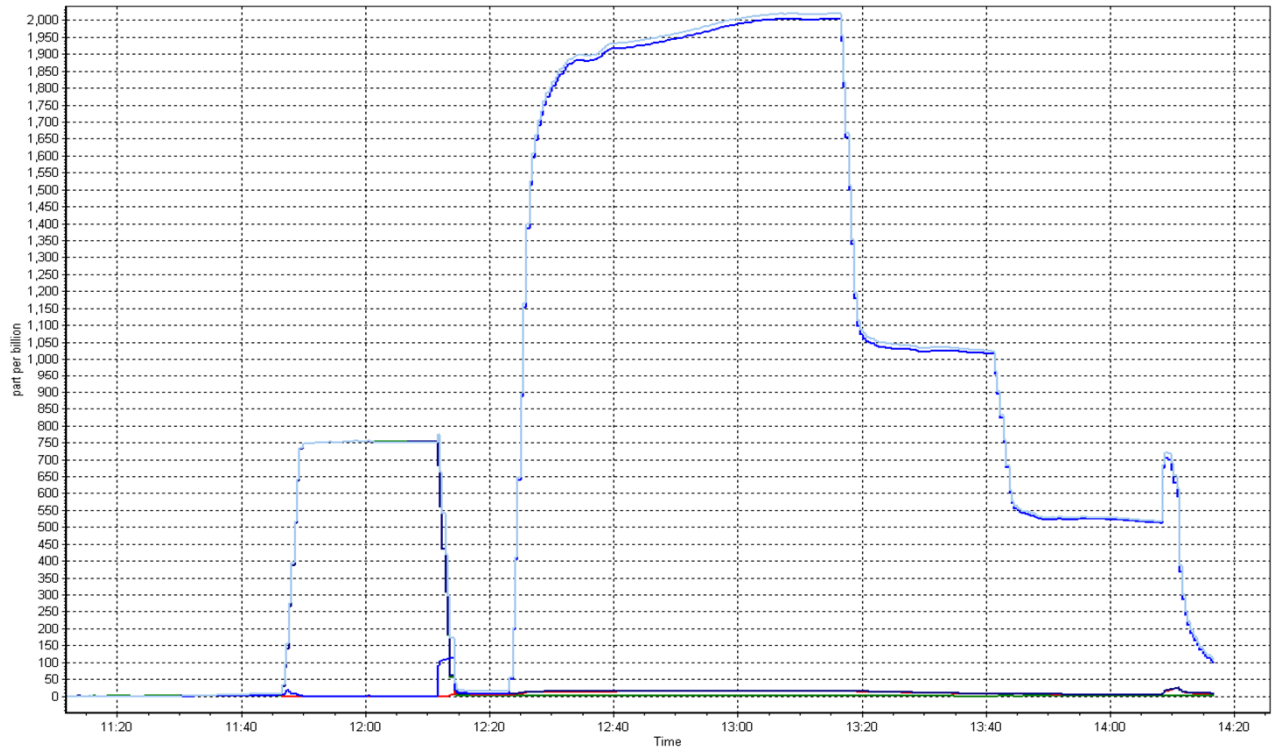
Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999942
393.2	388.0	1.0133		
199.5	196.0	1.0179	Slope	1.011102
103.5	99.4	1.0415	Intercept	1.298297

### NO<sub>2</sub> Calibration Curve



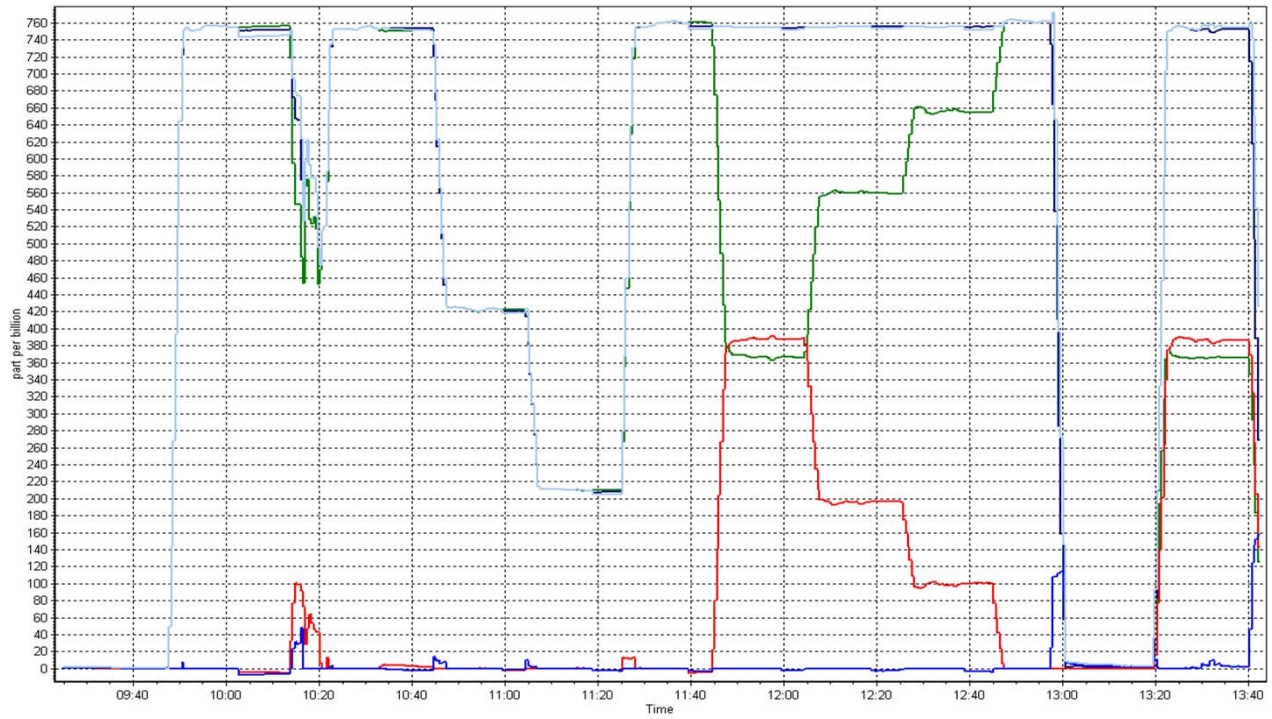
NH<sub>3</sub> Calibration Plot

Date: April 14, 2015



NO<sub>x</sub> Calibration Plot

Date: April 13, 2015



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 2  
MILDRED LAKE  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)

APRIL 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	25	0	8	0
H2S (ppb) Average	684	35	36	99.86	4	0	1	0
THC (ppm) Average	682	37	38	99.86	5.5	-	3.1	-
Temperature (C) Average	720	0	0	100.00	23.7	-	16	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	74	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	29	-	18	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	2.1	3	-	0	0	0	1	1	6	25
H2S (ppb) Average	684	0.5	0	-	0	0	0	0	0	1	4
THC (ppm) Average	682	2.3	0.4	-	2	2.1	2.1	2.2	2.3	2.7	5.5
Temperature 2 m (C) Average	720	4.93	7.7	-	-13	-5.3	-0.2	5.1	10.7	14.3	23.7
Relative Humidity (%) Average	720	46.7	20	-	14	25	31	43	58	74	100
Wind Speed 10 m (km/h) Average	720	11.2	5	-	1	5	8	10	14	18	29
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-



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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	02 Apr 2015 14:00	02 Apr 2015 14:00	1	Maintenance - manifold cleaning
THC	07 Apr 2015 09:00	07 Apr 2015 09:00	1	Power spike

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Summary of Hour Averages

Mildred Lake - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 25 ppb on Apr 14 05:00	Maximum Daily Average: 8.5 ppb on Apr 14		Hours of Data:	683
Minimum Value: 0 ppb on Apr 3 20:00	Minimum Daily Average: 0.2 ppb on Apr 5		Hours of Missing Data:	37
Maximum Diurnal Average: 3.0 ppb at hour 14	Minimum Diurnal Average: 0.8 ppb at hour 22		Hours of Calibration:	37
Monthly Average: 2.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 6 P <sub>99</sub> = 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-Apr	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	1	0	0	1	0	1	0.5	1
2-Apr	1	1	Z	1	1	1	1	1	1	1	C	C	C	C	C	C	1	0	1	1	1	0	0	0	--	1
3-Apr	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Apr	0	0	0	0	Z	0	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	1	0	0.4	1
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	Z	0	0	0	1	1	2	3	1	1	5	5	1	1	1	2	2	1	7	3	1	1	1	1	1.8	7
7-Apr	1	Z	1	1	1	0	1	1	1	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0.5	1
8-Apr	1	10	Z	1	0	0	0	0	0	1	0	1	1	0	0	1	0	0	1	1	1	1	1	0	1.0	10
9-Apr	2	2	1	Z	6	4	10	2	8	11	12	4	1	1	1	2	4	0	0	0	0	0	0	0	3.2	12
10-Apr	0	0	0	0	Z	2	1	15	6	5	6	3	1	2	4	1	1	2	1	1	1	1	1	3	2.5	15
11-Apr	1	1	1	1	0	Z	1	0	1	1	1	1	1	2	2	1	0	0	1	6	5	0	0	1	1.3	6
12-Apr	Z	4	6	9	13	11	6	6	5	2	1	2	15	7	9	1	6	4	4	0	0	1	1	0	4.9	15
13-Apr	1	Z	1	1	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0.5	1
14-Apr	10	21	Z	20	25	13	8	11	17	14	9	6	2	1	1	1	1	5	2	5	6	7	8	1	8.5	25
15-Apr	1	0	0	Z	0	0	1	1	2	3	10	1	7	1	1	1	12	6	2	1	0	1	2	1	2.6	12
16-Apr	2	1	6	4	Z	1	8	3	3	1	1	1	4	11	5	2	14	1	1	1	1	1	1	1	3.0	14
17-Apr	2	3	2	1	1	Z	4	1	3	14	14	3	1	1	1	1	1	1	2	2	1	1	0	0	2.5	14
18-Apr	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0.9	1
19-Apr	1	Z	1	1	1	1	0	1	4	2	2	1	1	0	2	2	2	0	1	5	4	1	0	1	1.4	5
20-Apr	1	1	Z	1	0	0	1	0	1	1	1	4	13	18	11	5	1	1	0	0	0	0	0	0	2.7	18
21-Apr	0	1	1	Z	1	1	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	3	0.6	3
22-Apr	1	1	1	1	Z	1	1	1	1	1	1	1	1	3	1	7	1	1	0	0	1	1	1	1	1.2	7
23-Apr	1	1	1	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0.7	1
24-Apr	Z	0	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
25-Apr	0	Z	0	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0.4	1
26-Apr	0	0	Z	0	1	1	1	3	3	2	1	6	6	10	15	11	8	9	2	1	1	2	8	10	4.4	15
27-Apr	9	15	9	Z	9	4	6	5	1	1	1	1	1	1	0	0	6	1	2	5	0	0	0	0	3.4	15
28-Apr	1	1	7	9	Z	2	14	10	3	1	5	2	1	1	1	1	0	0	1	1	1	1	0	2	2.7	14
29-Apr	0	1	0	1	1	Z	1	1	1	2	1	3	11	6	1	1	1	1	0	1	1	1	1	2	1.6	11
30-Apr	Z	9	15	11	10	11	8	12	9	7	1	1	13	14	5	19	2	1	1	1	1	1	1	1	6.6	19

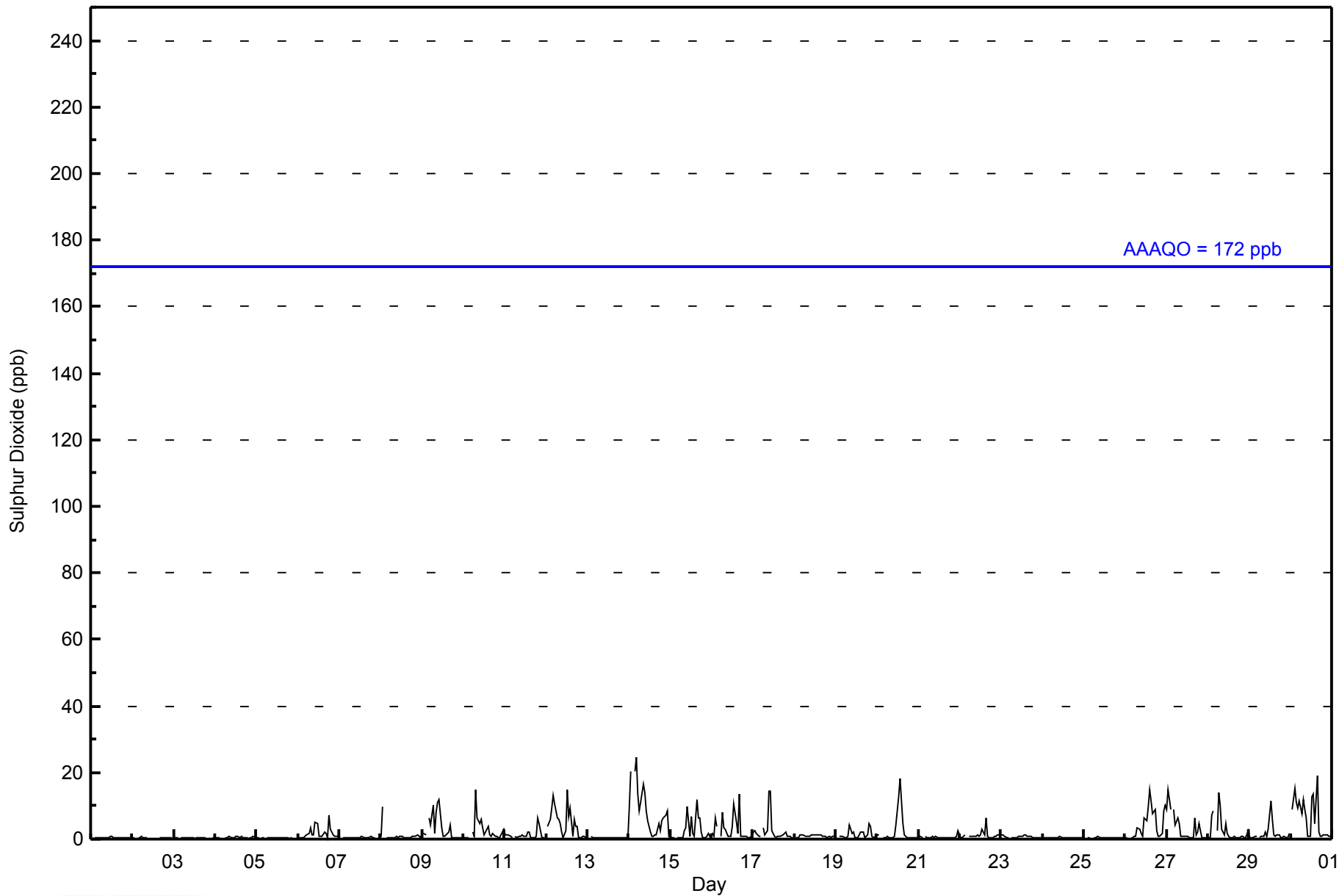
1.5	2.9	2.2	2.6	2.9	2.4	2.6	2.7	2.5	2.6	2.7	1.7	2.9	3.0	2.3	2.6	2.1	1.3	1.2	1.3	1.0	0.8	1.1	1.1	Diurnal Average	
10	21	15	20	25	13	14	15	17	14	14	6	15	18	15	19	14	9	7	6	6	7	8	10	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - April 2015



AAAQO = 172 ppb



**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	650	95.17	95.17
11 - 20	31	4.54	99.71
21 - 60	2	0.29	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mildred Lake - April 2015**

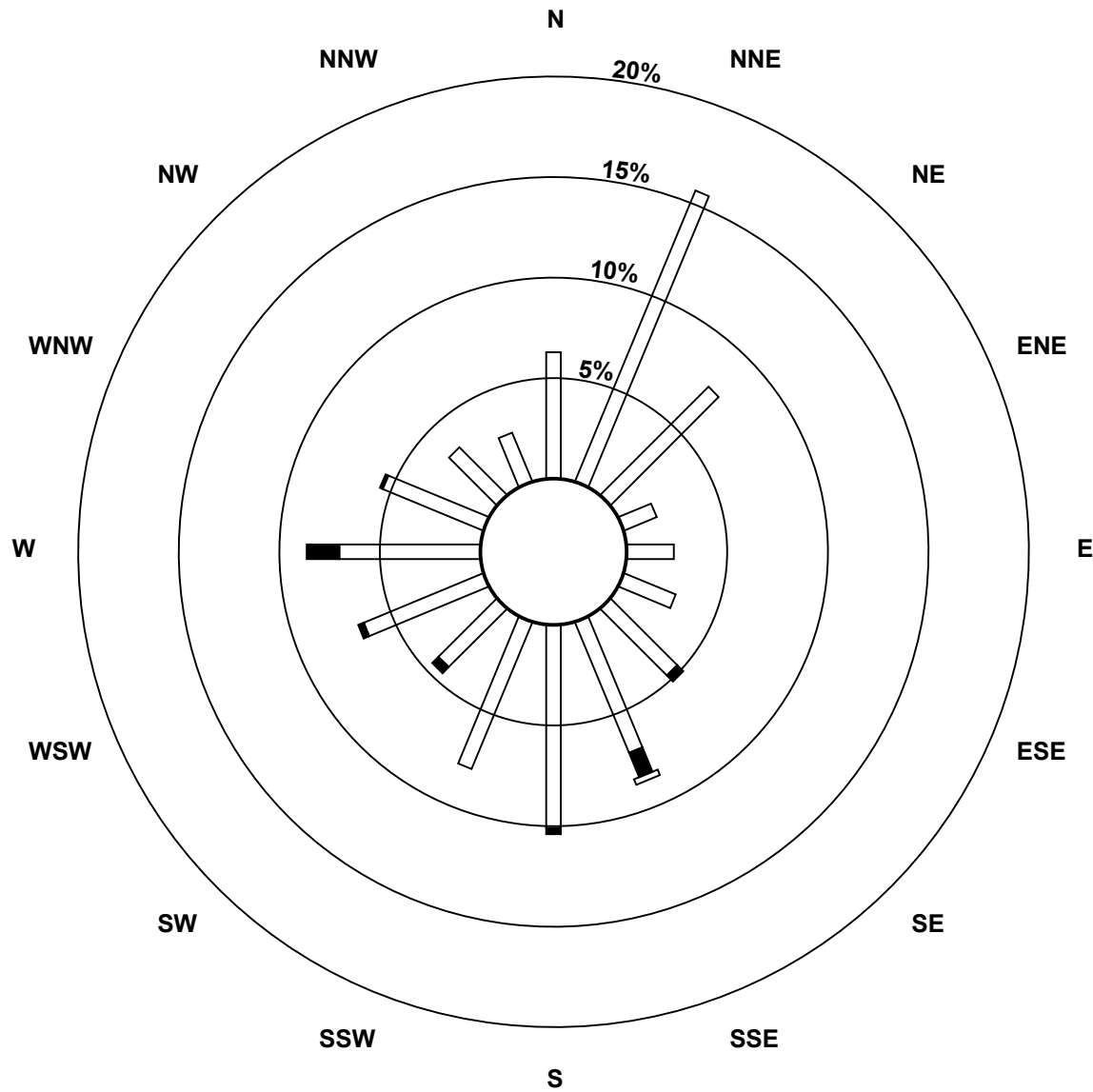
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	43	107	52	12	16	19	32	48	69	54	28	44	48	37	23	18	650
11 - 20	0	0	0	0	0	0	3	9	2	0	3	2	11	1	0	0	31
21 - 60	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	43	107	52	12	16	19	35	59	71	54	31	46	59	38	23	18	683

Total Number of Valid Hours: 683

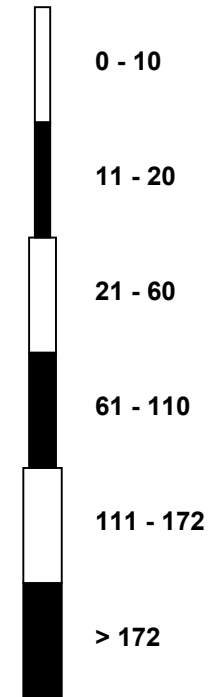
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake (AMS 2)**



Classes (ppb)

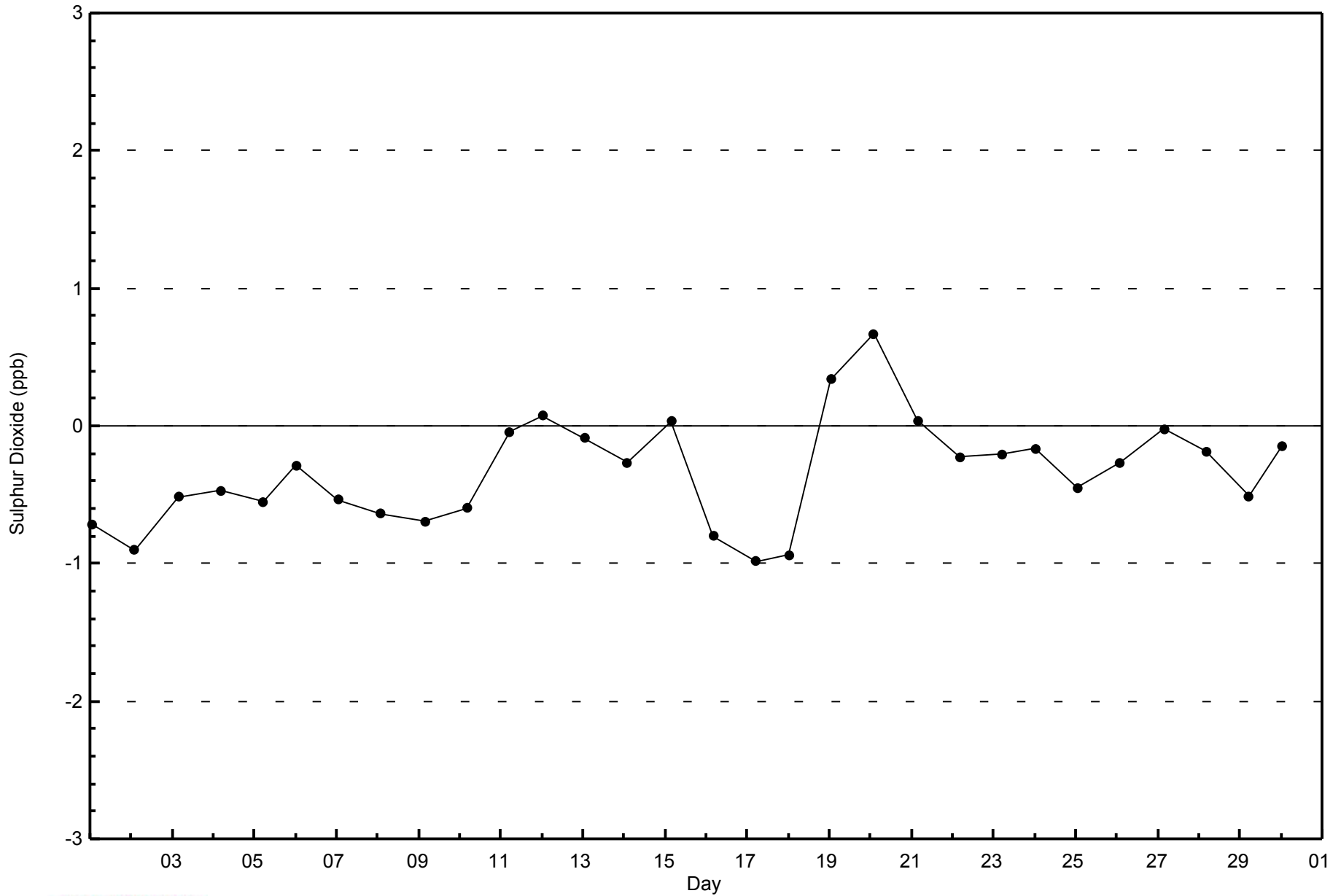


Total Number of Valid Hours: 683



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - April 2015

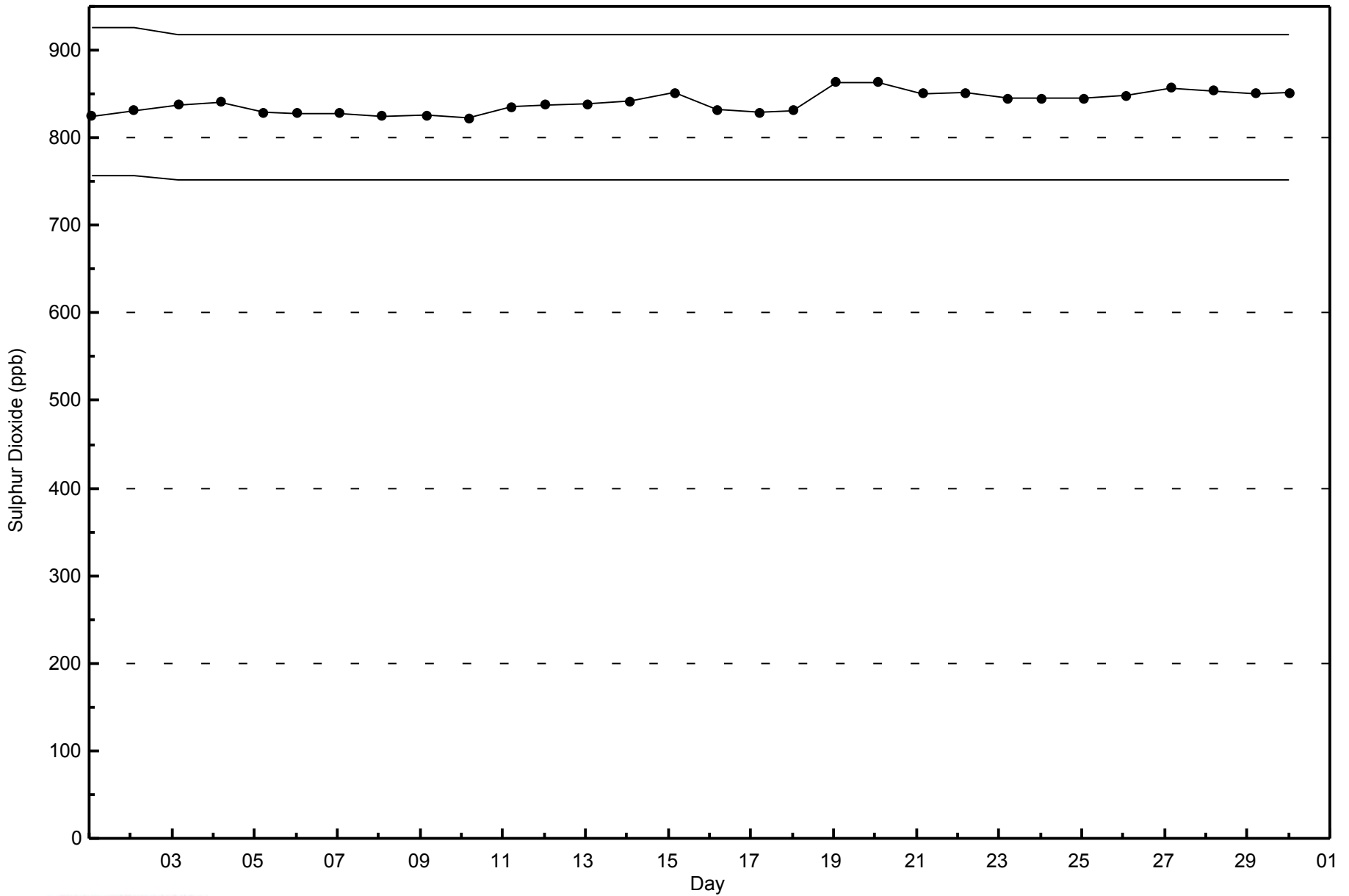






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - April 2015





Summary of Hour Averages

Mildred Lake - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Apr 11 08:00	Maximum Daily Average: 0.9 ppb on Apr 28		Hours of Data:	684
Minimum Value: 0 ppb on Apr 21 17:00	Minimum Daily Average: 0.1 ppb on Apr 21		Hours of Missing Data:	36
Maximum Diurnal Average: 0.9 ppb at hour 8	Minimum Diurnal Average: 0.3 ppb at hour 16		Hours of Calibration:	35
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
2-Apr	0	0	0	Z	0	0	0	1	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Apr	0	1	1	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Apr	0	1	1	1	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.4	1
5-Apr	0	0	0	0	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Apr	0	Z	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0.6	1
7-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Apr	0	3	1	Z	1	1	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	1	0	0.6	3
9-Apr	1	1	1	1	Z	1	2	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	2
10-Apr	0	0	0	0	0	Z	1	4	2	2	1	1	0	0	0	0	0	0	1	1	0	0	1	2	0.9	4
11-Apr	1	1	1	0	1	0	Z	4	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.7	4
12-Apr	0	Z	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
13-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Apr	1	2	2	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	2	2	0	0.9	2
15-Apr	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Apr	1	0	1	1	1	Z	1	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0.5	1
17-Apr	1	1	1	0	1	1	Z	1	1	2	1	1	0	0	0	0	1	1	1	1	1	0	0	0	0.7	2
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
19-Apr	1	0	Z	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0	1	0.5	1
20-Apr	1	1	1	Z	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Apr	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
26-Apr	0	0	0	Z	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.5	1
27-Apr	1	2	2	2	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
28-Apr	0	0	2	4	2	Z	2	2	1	1	1	0	0	0	0	0	0	0	0	1	2	1	0	1	0.9	4
29-Apr	1	1	1	1	1	1	Z	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.7	2
30-Apr	2	Z	3	2	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	3

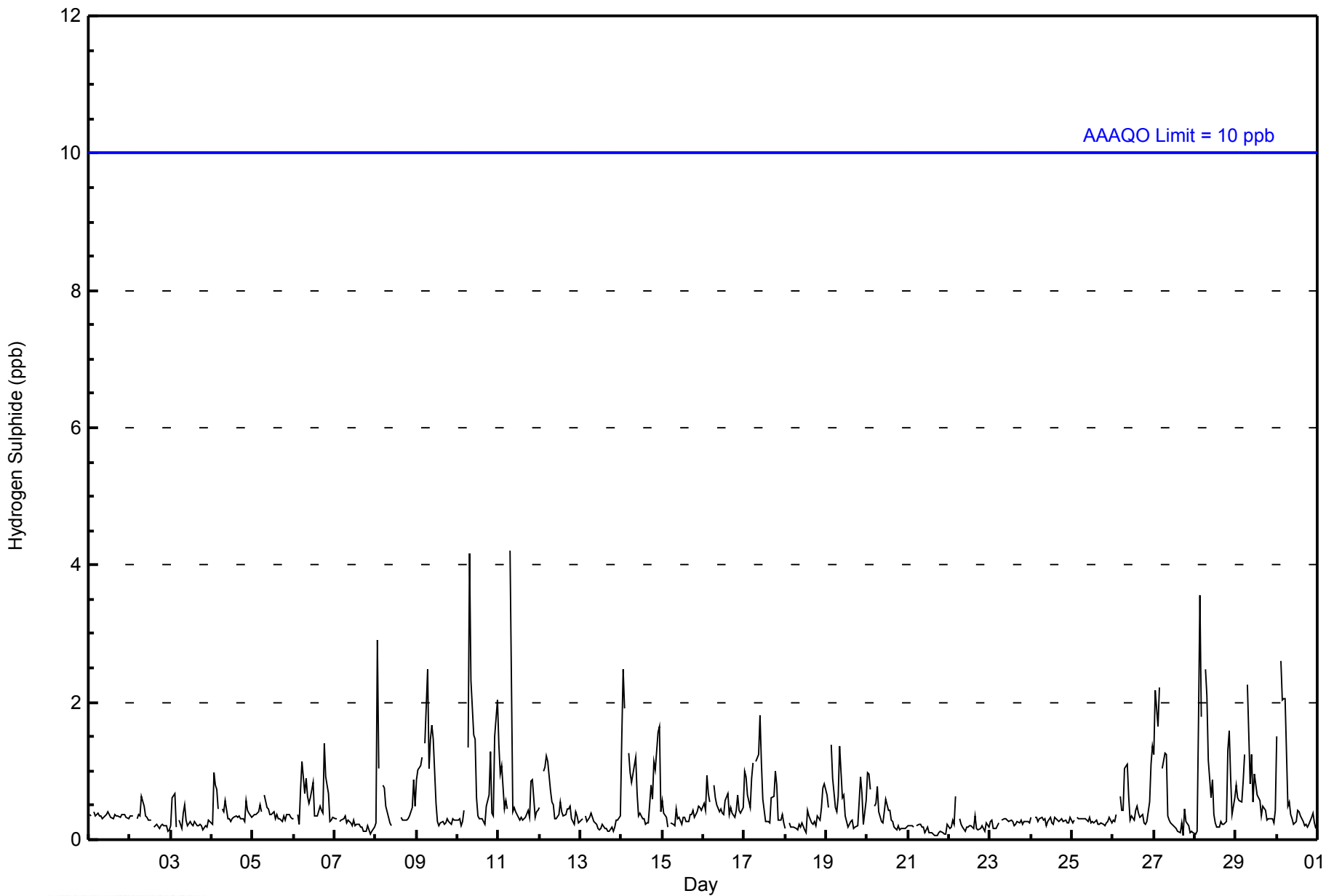
0.5	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.9	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average
2	3	3	4	2	2	2	2	4	2	2	1	1	1	1	1	0	1	1	1	1	1	2	2	2	2	Diurnal Maximum

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



WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mildred Lake - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	679	99.27	99.27
3 - 4	5	0.73	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mildred Lake - April 2015**

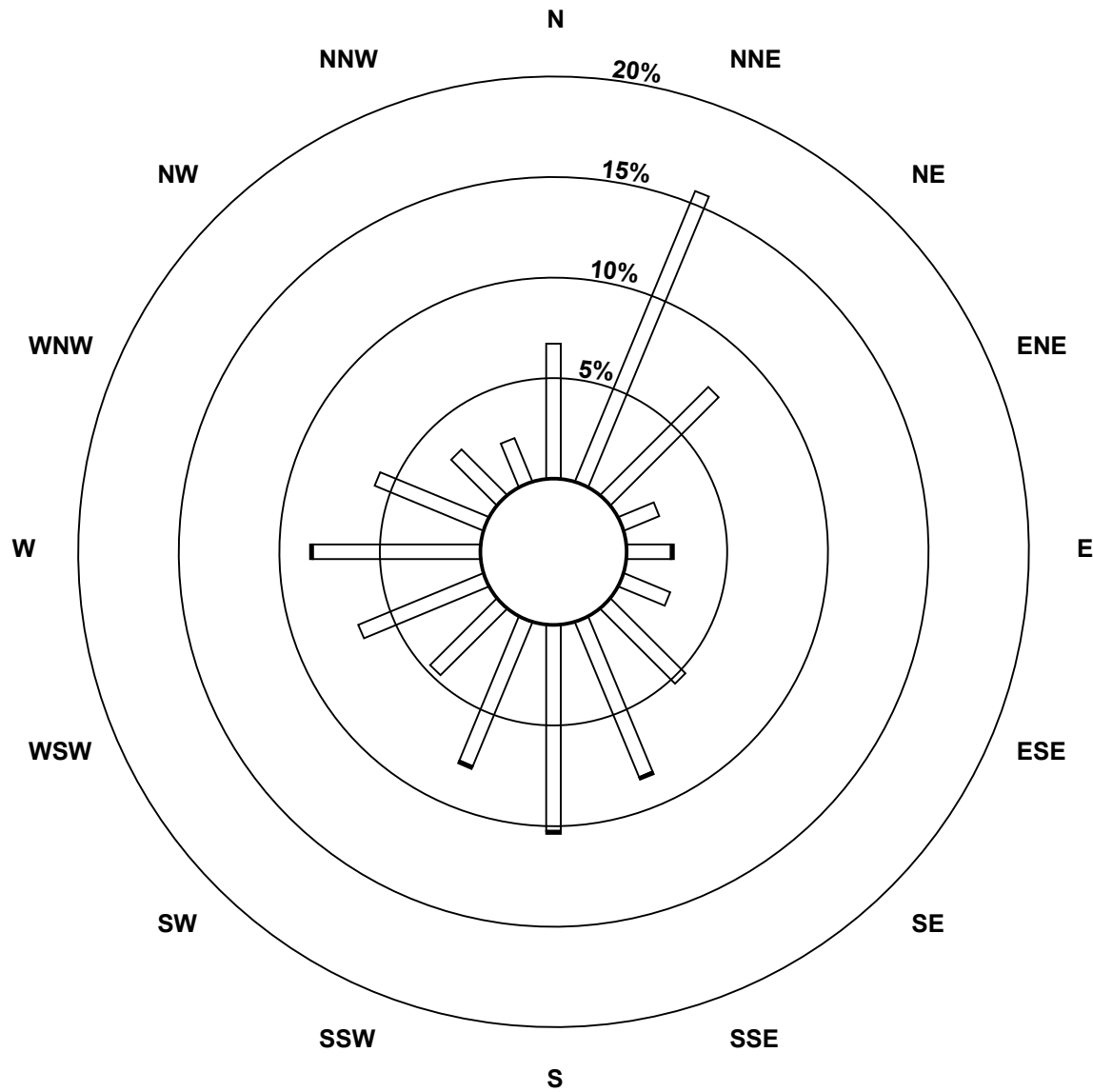
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	46	107	52	13	15	17	36	57	70	53	32	46	57	40	22	16	679
3 - 4	0	0	0	0	1	0	0	1	1	1	0	0	1	0	0	0	5
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	46	107	52	13	16	17	36	58	71	54	32	46	58	40	22	16	684

Total Number of Valid Hours: 684

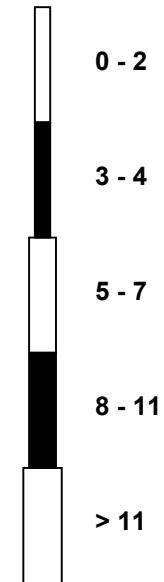
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake (AMS 2)



Classes (ppb)

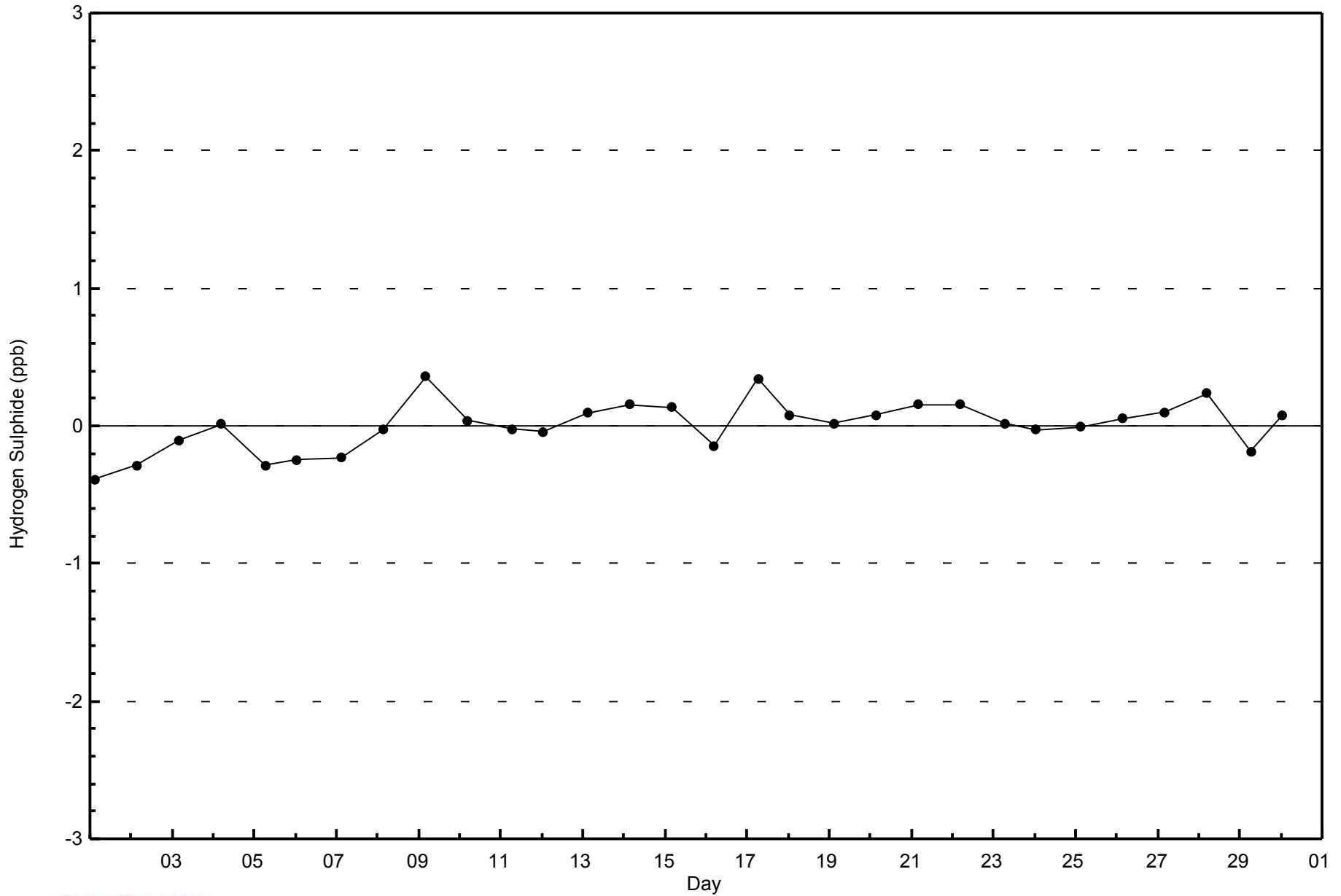


Total Number of Valid Hours: 684



WBEA  
Zero Responses

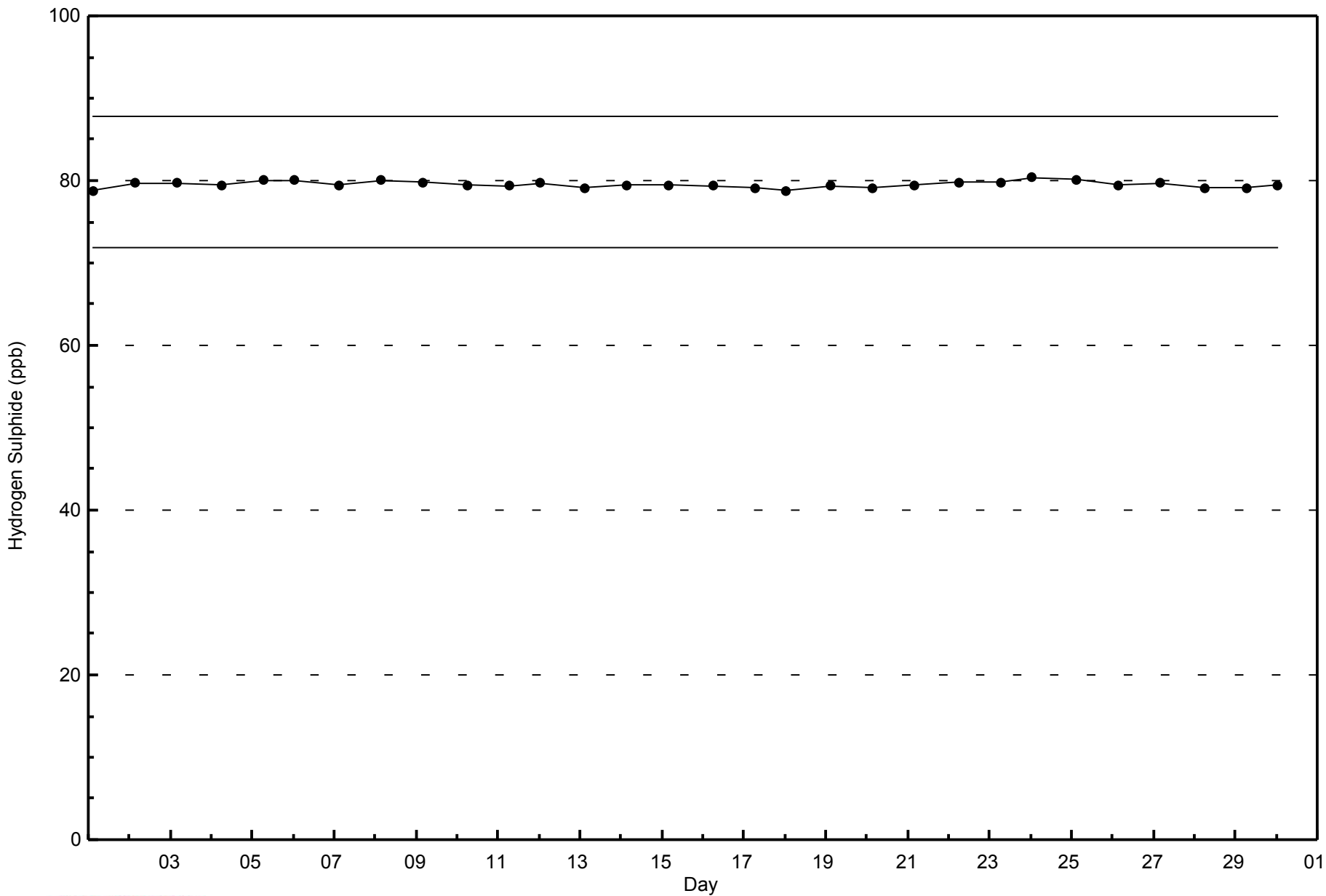
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - April 2015





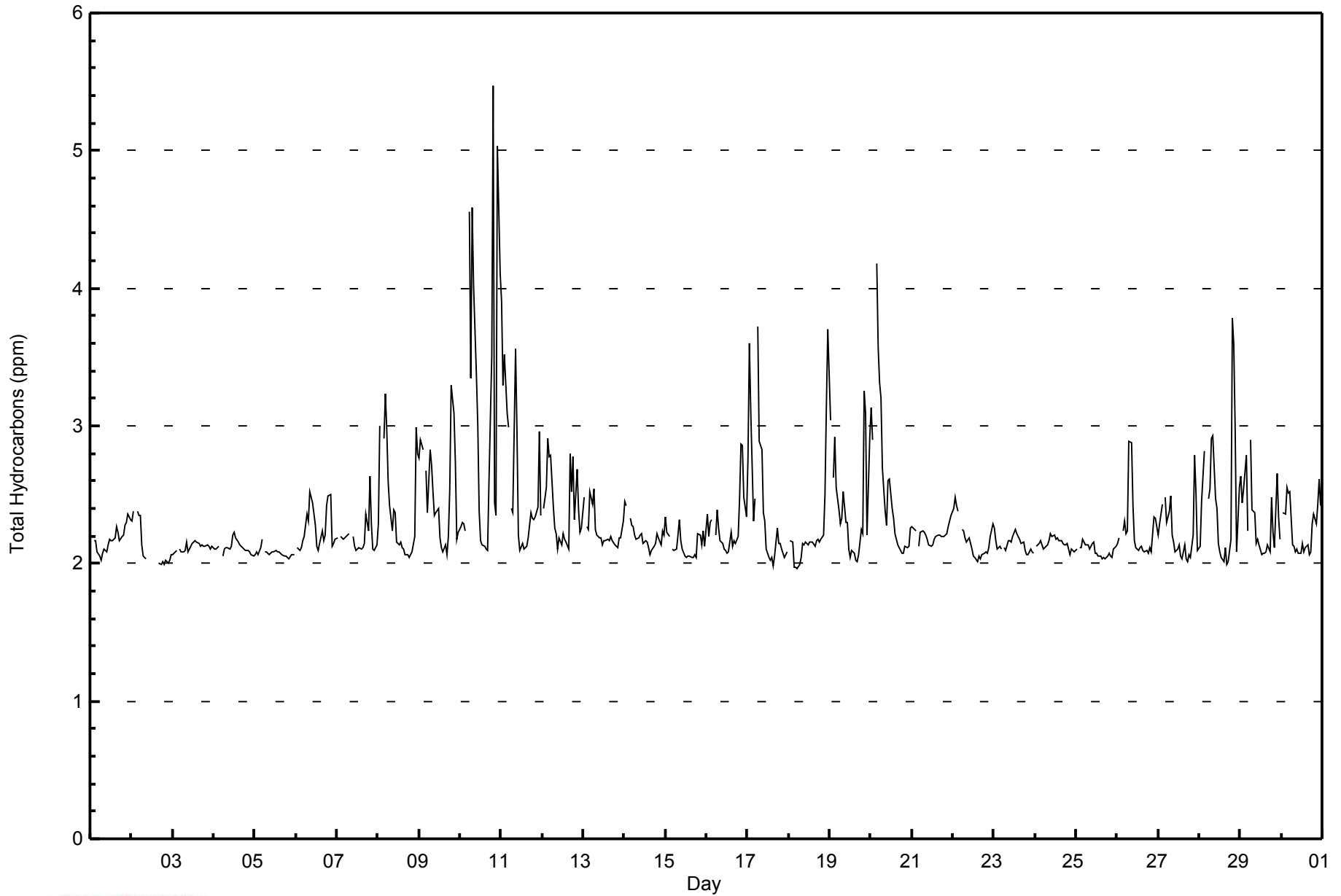


Maximum Value: 5.5 ppm on Apr 10 20:00		Maximum Daily Average: 3.1 ppm on Apr 10		Hours in Service: 720																							
Minimum Value: 2.0 ppm on Apr 18 06:00		Minimum Daily Average: 2.1 ppm on Apr 5		Hours of Data: 682																							
Maximum Diurnal Average: 2.5 ppm at hour 4		Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Missing Data: 38																							
Monthly Average: 2.30 ppm		Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.7 P <sub>99</sub> = 4.0		Hours of Calibration: 37																							
				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-Apr	2.2	Z	2.2	2.2	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.3	2.2	2.4	
2-Apr	2.3	2.4	Z	2.4	2.4	2.4	2.1	2.1	2.0	C	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	--	2.4	
3-Apr	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
4-Apr	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
5-Apr	2.1	2.1	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.2	
6-Apr	Z	2.1	2.1	2.1	2.2	2.2	2.4	2.3	2.5	2.5	2.4	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.5	2.5	2.1	2.1	2.2	2.3	2.5	
7-Apr	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	PF	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	2.2	2.6	2.3	2.1	2.1	2.1	2.2	2.6
8-Apr	2.3	3.0	Z	2.9	3.2	3.0	2.6	2.4	2.2	2.4	2.4	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2	3.0	2.8	2.4	3.2
9-Apr	2.8	2.9	2.8	Z	2.7	2.4	2.8	2.7	2.5	2.3	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.5	3.3	3.1	2.7	2.2	2.2	2.5	3.3
10-Apr	2.3	2.3	2.3	2.2	Z	4.6	3.4	4.6	4.0	3.4	3.0	2.4	2.2	2.1	2.1	2.1	2.1	2.6	3.5	5.5	2.4	2.4	5.0	4.1	3.1	5.5	
11-Apr	3.9	3.3	3.5	3.1	3.0	Z	2.4	2.4	3.6	3.0	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.4	2.3	2.3	2.3	2.4	3.0	2.4	2.6	3.9	
12-Apr	Z	2.4	2.6	2.9	2.8	2.8	2.4	2.3	2.2	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.8	2.5	2.8	2.3	2.7	2.4	2.2	2.3	2.4	2.9	
13-Apr	2.5	Z	2.3	2.2	2.5	2.4	2.5	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.5	
14-Apr	2.5	2.4	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.5
15-Apr	2.3	2.2	2.2	Z	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.2	2.2	2.1	2.2	2.1	2.1	2.3
16-Apr	2.4	2.2	2.3	2.3	Z	2.2	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.2	2.5	2.9	2.9	2.5	2.3	2.3	2.3	2.9
17-Apr	2.8	3.6	3.1	2.3	2.5	Z	3.7	2.9	2.8	2.4	2.3	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.1	2.1	2.0	2.1	2.1	2.4	3.7	
18-Apr	Z	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.5	3.1	3.7	2.2	3.7	
19-Apr	3.0	Z	2.6	2.9	2.5	2.4	2.3	2.3	2.5	2.3	2.3	2.1	2.0	2.1	2.1	2.0	2.0	2.1	2.2	2.2	3.3	3.1	2.2	2.9	2.4	3.3	
20-Apr	3.1	2.9	Z	4.2	3.6	3.3	3.2	2.7	2.4	2.3	2.6	2.6	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.6	4.2
21-Apr	2.3	2.3	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3
22-Apr	2.4	2.5	2.4	2.4	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.5
23-Apr	2.3	2.2	2.1	2.1	2.1	Z	2.1	2.1	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	2.1	2.1	2.3
24-Apr	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
25-Apr	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	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2
26-Apr	2.2	2.2	Z	2.2	2.3	2.2	2.2	2.9	2.9	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.3	2.3	2.2	2.2	2.9
27-Apr	2.2	2.3	2.4	Z	2.5	2.3	2.4	2.5	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.2	2.8	2.5	2.1	2.2	2.2	2.8
28-Apr	2.1	2.4	2.6	2.8	Z	2.5	2.5	2.9	2.9	2.5	2.4	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.2	3.8	3.6	3.0	2.1	2.6	2.5	3.8	
29-Apr	2.6	2.4	2.5	2.8	2.2	Z	2.9	2.4	2.4	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.2	2.1	2.7	2.3	2.2	2.3	2.9
30-Apr	Z	2.4	2.4	2.6	2.5	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.4	2.3	2.4	2.6	2.4	2.3	2.6
																								Diurnal Average			
																								Diurnal Maximum			
Z - zerospan      C - Calibration      PF - Power Failure																											



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	49	7.18	7.18
2.1 - 3.0	602	88.27	95.45
3.1 - 10.0	31	4.55	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mildred Lake - April 2015**

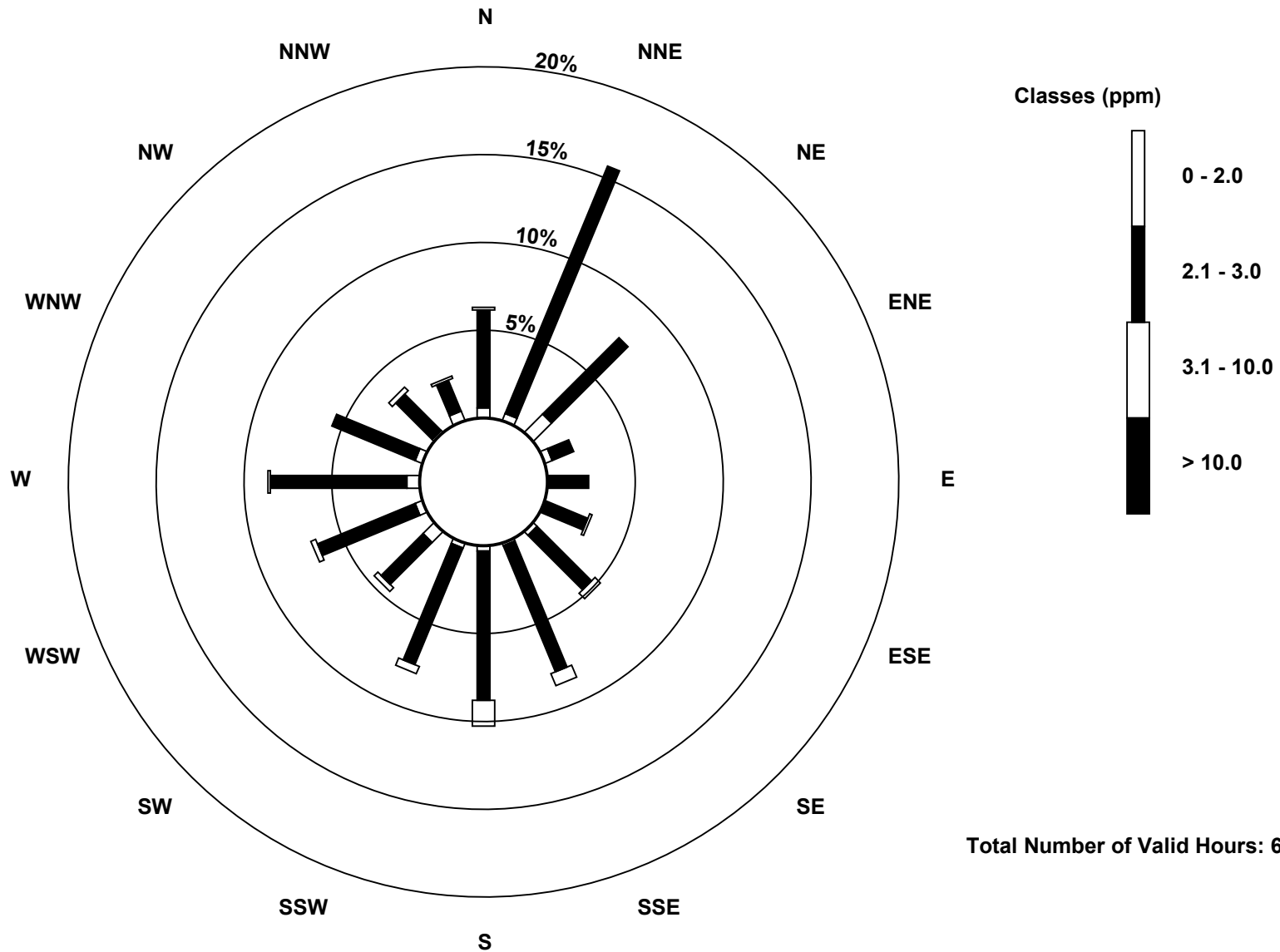
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	4	3	10	3	0	0	2	1	2	2	6	3	5	3	1	4	49
2.1 - 3.0	38	104	42	9	16	18	30	53	58	49	23	41	53	35	20	13	602
3.1 - 10.0	1	0	0	0	0	1	3	5	10	3	2	2	1	0	2	1	31
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>43</b>	<b>107</b>	<b>52</b>	<b>12</b>	<b>16</b>	<b>19</b>	<b>35</b>	<b>59</b>	<b>70</b>	<b>54</b>	<b>31</b>	<b>46</b>	<b>59</b>	<b>38</b>	<b>23</b>	<b>18</b>	<b>682</b>

Total Number of Valid Hours: 682

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

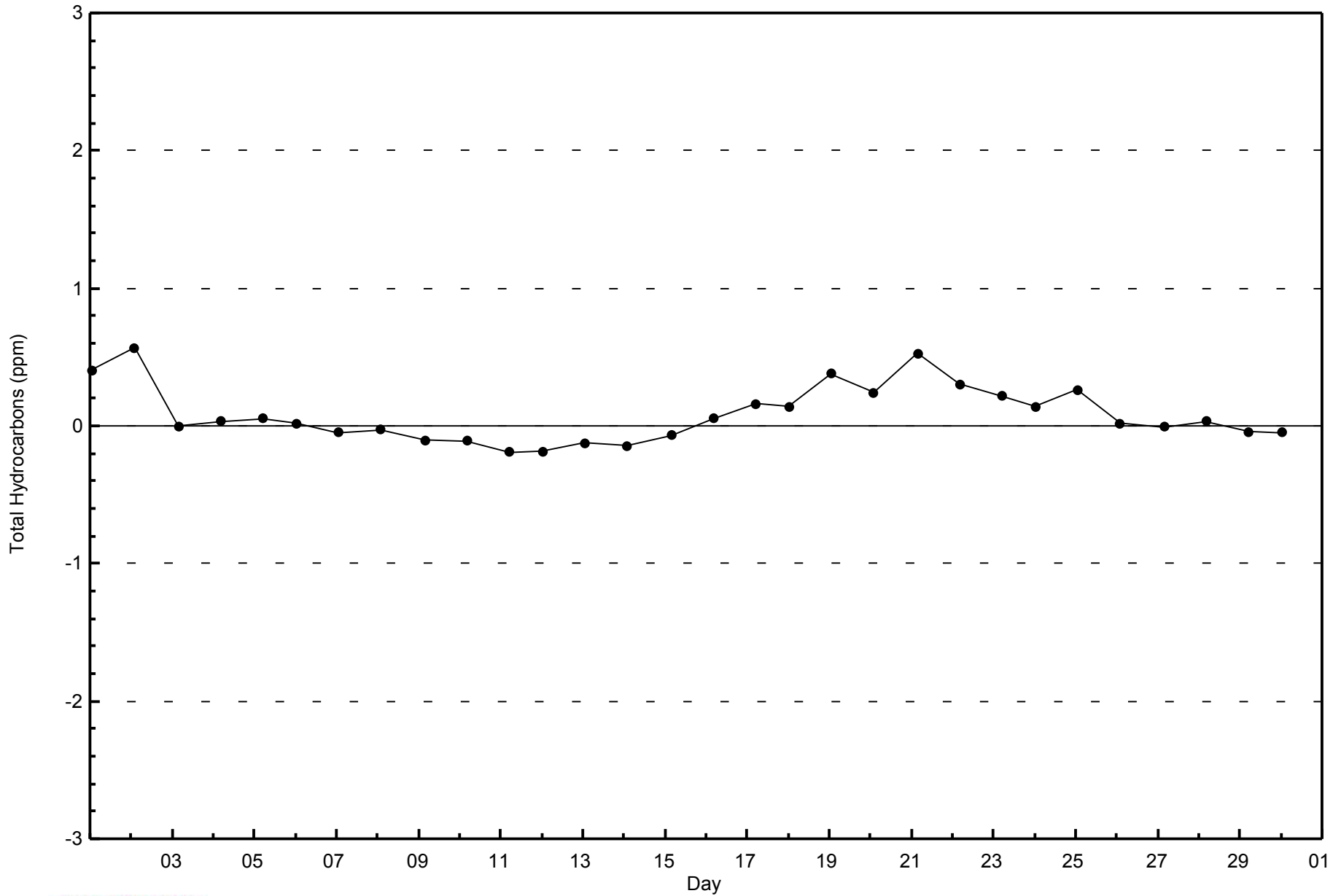
Total Hydrocarbons (THC) - ppm  
Mildred Lake (AMS 2)





WBEA  
Zero Responses

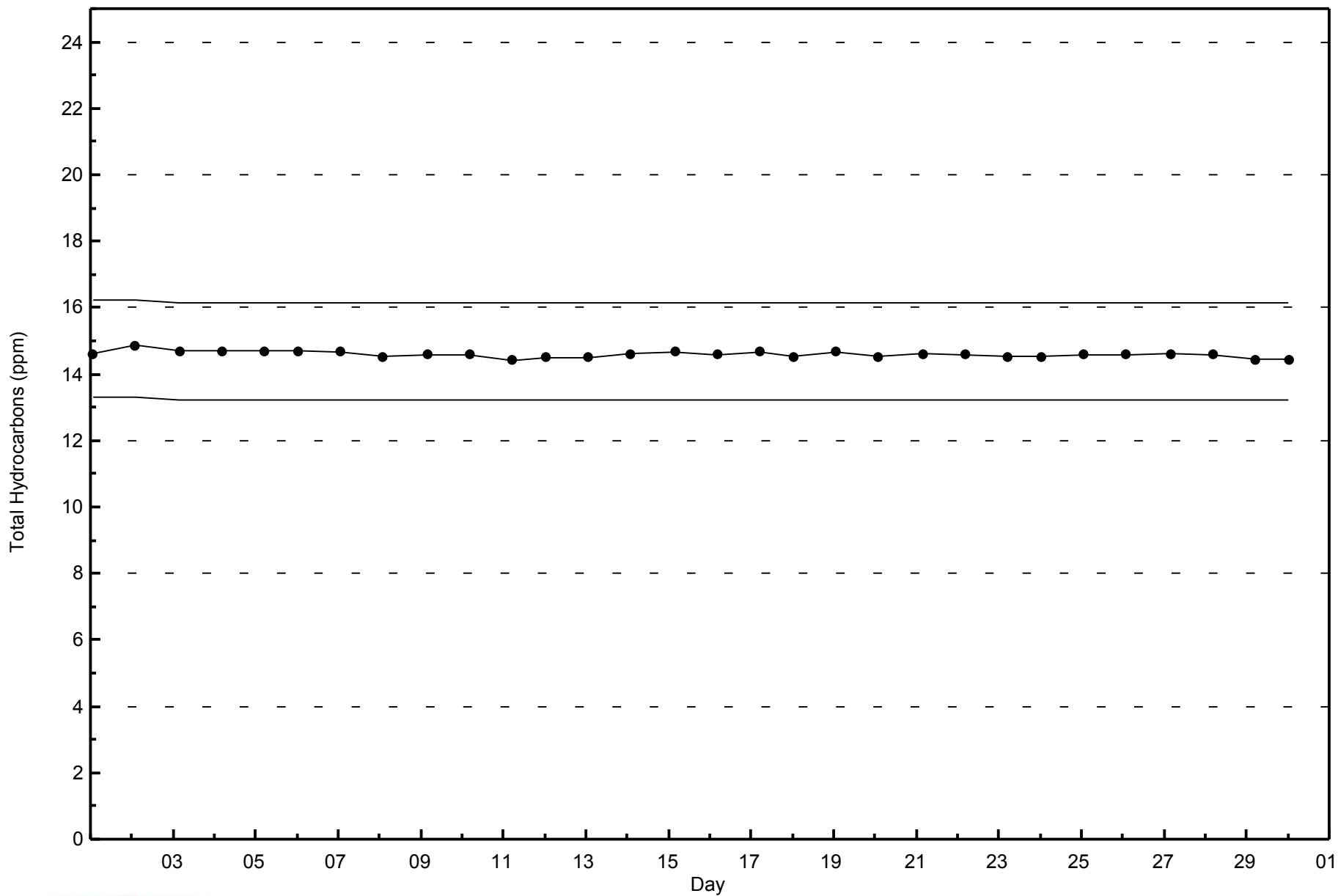
Total Hydrocarbons (THC) - ppm  
Mildred Lake - April 2015





WBEA  
Span Responses

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





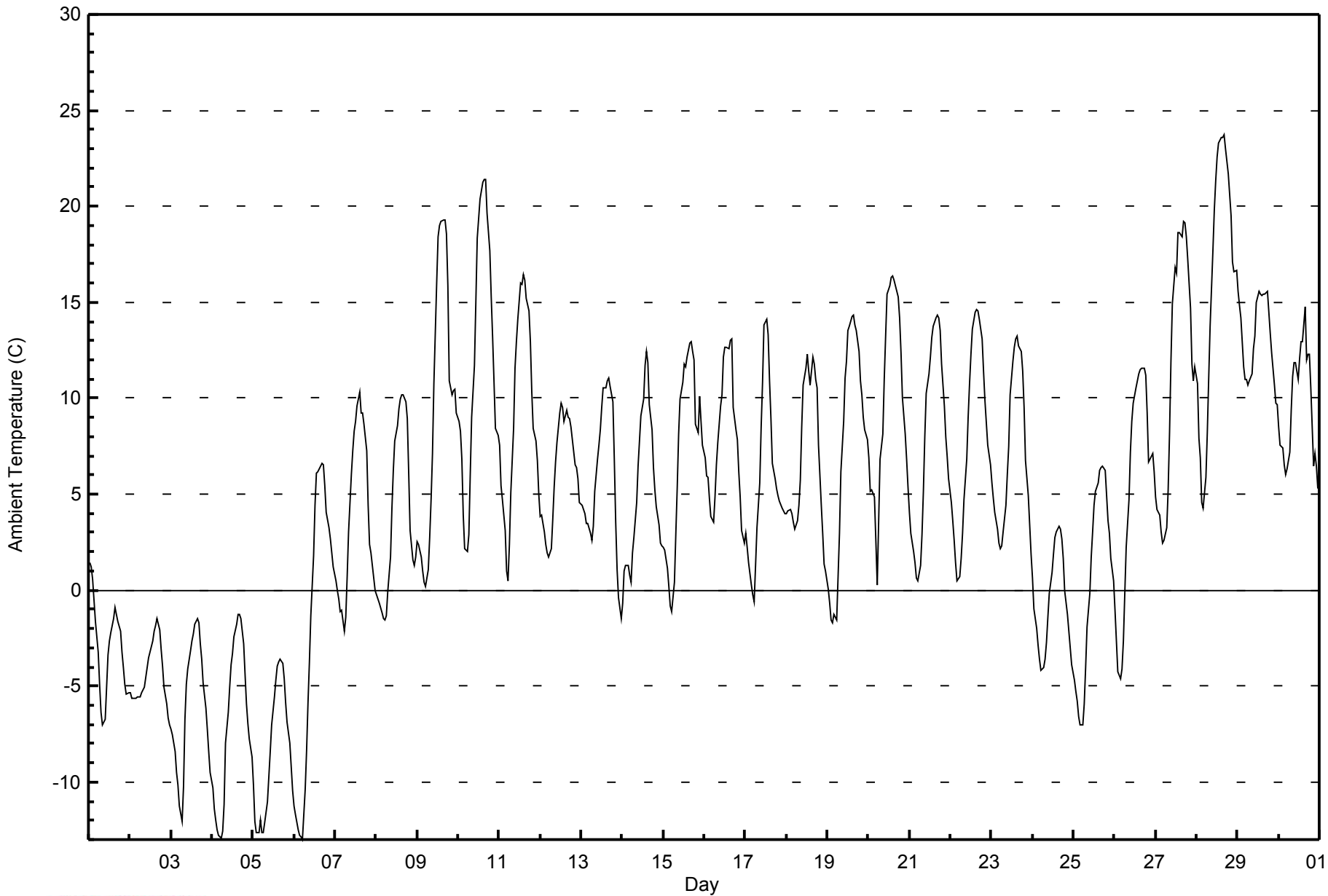
Maximum Value: 23.7 C on Apr 28 17:00																				Maximum Daily Average: 16.0 C on Apr 28					Hours in Service: 720	
Minimum Value: -13.0 C on Apr 6 06:00																				Minimum Daily Average: -8.5 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 10.6 C at hour 16																				Minimum Diurnal Average: -1.2 C at hour 6					Hours of Missing Data: 0	
Monthly Average: 4.93 C																				Percentiles: P <sub>1</sub> = -12.6 P <sub>10</sub> = -5.3 Q <sub>1</sub> = -0.2 Median = 5.1 Q <sub>3</sub> = 10.7 P <sub>90</sub> = 14.3 P <sub>99</sub> = 21.1					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-Apr	1.5	1.2	0.6	-0.5	-1.7	-3.2	-4.9	-6.4	-7.0	-6.7	-5.1	-3.4	-2.7	-2.2	-1.5	-0.9	-1.2	-1.7	-2.2	-3.2	-4.0	-4.9	-5.4	-5.3	-3.0	1.5
2-Apr	-5.3	-5.6	-5.7	-5.6	-5.6	-5.6	-5.6	-5.3	-5.0	-4.6	-4.1	-3.5	-3.0	-2.6	-2.1	-1.8	-1.5	-2.1	-3.1	-4.0	-5.0	-5.9	-6.7	-7.1	-4.4	-1.5
3-Apr	-7.3	-7.5	-8.4	-9.5	-10.2	-11.2	-12.1	-10.3	-6.7	-4.9	-4.1	-3.2	-2.6	-2.3	-1.7	-1.4	-1.7	-2.8	-3.6	-4.9	-6.2	-7.3	-8.4	-9.5	-6.2	-1.4
4-Apr	-10.3	-11.4	-12.0	-12.5	-12.8	-13.0	-12.6	-11.2	-8.0	-6.4	-5.1	-3.9	-3.3	-2.5	-1.8	-1.3	-1.3	-1.5	-2.8	-4.4	-5.9	-6.9	-7.8	-8.7	-7.0	-1.3
5-Apr	-10.1	-12.1	-12.6	-12.6	-12.0	-12.6	-12.6	-12.1	-11.1	-9.7	-8.4	-7.0	-5.5	-4.7	-3.9	-3.7	-3.6	-3.8	-4.6	-5.9	-6.9	-7.9	-9.2	-10.4	-8.5	-3.6
6-Apr	-11.2	-11.7	-12.5	-12.8	-12.9	-13.0	-10.4	-8.3	-5.9	-3.8	-1.3	1.8	4.4	6.1	6.2	6.5	6.6	6.5	5.4	4.1	3.3	2.7	1.9	1.2	-2.0	6.6
7-Apr	0.5	0.0	-0.4	-1.1	-1.1	-2.1	-1.4	0.7	3.0	6.0	7.3	8.3	8.8	9.6	10.3	9.2	9.2	8.6	7.3	4.4	2.4	1.9	1.3	-0.1	3.9	10.3
8-Apr	-0.3	-0.5	-0.7	-1.2	-1.5	-1.6	-1.3	-0.1	1.7	4.2	6.2	7.8	8.6	9.4	9.9	10.2	10.2	9.8	8.9	6.1	3.1	1.6	1.3	1.7	3.9	10.2
9-Apr	2.6	2.3	1.7	1.0	0.4	0.2	1.1	2.7	4.7	7.1	10.8	16.0	18.4	19.0	19.2	19.3	19.3	18.6	15.8	10.9	10.2	10.4	10.5	9.2	9.6	19.3
10-Apr	8.8	8.3	6.8	3.9	2.1	2.0	2.9	6.0	9.0	11.7	15.0	18.4	19.4	20.4	21.3	21.4	21.4	19.7	17.7	15.3	13.2	10.9	8.4	8.1	12.2	21.4
11-Apr	7.5	5.5	4.7	3.1	1.0	0.5	2.4	5.1	8.4	11.6	13.0	14.1	16.0	15.9	16.5	16.2	15.2	14.6	13.0	10.3	8.5	7.8	6.8	5.0	9.3	16.5
12-Apr	3.9	3.9	3.0	2.4	2.0	1.7	2.1	3.7	5.4	6.7	7.7	9.2	9.7	9.6	8.8	9.4	9.0	8.9	8.5	7.8	6.5	6.4	5.8	4.6	6.1	9.7
13-Apr	4.4	4.2	4.0	3.5	3.5	3.0	2.6	3.4	5.1	6.8	7.6	8.3	9.5	10.6	10.6	10.9	11.1	10.6	9.8	6.9	3.5	1.0	-0.4	-1.5	5.8	11.1
14-Apr	-0.7	1.0	1.3	1.3	0.8	0.4	1.9	2.7	4.6	6.5	7.8	9.1	9.9	11.7	12.4	11.8	9.7	8.4	6.4	5.2	4.3	3.4	2.4	2.3	5.2	12.4
15-Apr	2.3	2.1	1.1	0.2	-0.8	-1.1	0.4	3.0	5.3	8.1	10.0	10.8	11.8	11.6	12.2	12.9	12.9	12.4	12.0	8.6	8.2	10.1	8.8	7.5	7.1	12.9
16-Apr	6.9	5.9	5.8	4.8	3.9	3.6	4.9	6.5	7.7	9.6	10.2	12.2	12.6	12.7	12.6	13.0	13.1	9.5	8.3	7.8	6.2	4.8	3.1	2.5	7.8	13.1
17-Apr	2.9	2.2	1.4	0.3	-0.3	-0.6	1.3	3.3	5.6	8.5	10.9	13.8	14.1	13.3	10.9	8.9	6.6	5.8	5.3	5.0	4.7	4.3	4.1	4.0	5.7	14.1
18-Apr	4.0	4.1	4.2	4.0	3.5	3.2	3.6	4.4	5.7	8.5	10.7	11.5	12.3	11.4	10.7	12.1	11.8	11.0	10.6	7.6	4.4	3.0	1.4	1.0	6.9	12.3
19-Apr	0.0	-0.7	-1.6	-1.7	-1.3	-1.6	0.7	3.0	6.2	8.8	11.1	12.0	13.5	13.8	14.2	14.3	13.9	13.5	12.4	10.9	10.1	9.0	8.4	7.9	7.4	14.3
20-Apr	6.9	5.2	5.2	4.9	2.6	0.3	3.6	6.8	8.1	11.0	13.2	15.4	15.8	16.3	16.4	16.2	15.9	15.3	14.2	12.4	10.0	8.1	6.9	5.4	9.8	16.4
21-Apr	4.1	3.0	2.0	1.4	0.6	0.5	1.3	2.9	5.1	8.0	10.3	11.2	12.2	13.2	13.7	14.2	14.4	14.2	13.6	11.8	9.6	8.0	6.9	5.8	7.8	14.4
22-Apr	4.6	3.6	2.6	1.5	0.5	0.7	1.7	3.0	4.7	6.9	9.0	10.8	12.3	13.6	14.5	14.6	14.5	14.1	13.1	11.4	9.9	8.8	7.6	6.5	7.9	14.6
23-Apr	5.6	4.8	4.1	3.2	2.5	2.1	2.3	3.1	4.5	6.0	7.5	10.1	11.9	12.6	13.1	13.3	12.8	12.4	11.4	9.5	6.8	4.9	3.4	1.9	7.1	13.3
24-Apr	0.6	-1.0	-2.0	-2.8	-3.6	-4.2	-4.0	-3.6	-2.7	-1.4	-0.2	0.9	1.8	2.7	3.0	3.3	3.2	2.7	1.6	0.0	-1.3	-2.1	-3.0	-3.9	-0.7	3.3
25-Apr	-4.7	-5.3	-5.8	-6.6	-7.0	-7.0	-5.9	-4.1	-1.9	-0.1	1.7	3.1	4.4	5.2	5.5	6.2	6.4	6.5	6.3	4.9	3.6	2.9	1.7	0.5	0.4	6.5
26-Apr	-1.1	-2.6	-4.3	-4.6	-4.1	-2.6	-0.1	2.2	4.7	7.2	8.8	9.7	10.5	10.9	11.3	11.5	11.6	11.6	11.2	9.2	6.7	7.0	7.1	6.2	5.3	11.6
27-Apr	4.8	4.2	3.9	3.0	2.4	2.6	3.3	5.3	8.2	11.9	14.9	16.8	16.5	18.6	18.7	18.4	19.2	19.2	18.4	17.3	14.7	11.8	10.9	11.6	11.5	19.2
28-Apr	10.8	8.0	6.9	4.6	4.3	5.9	8.2	11.1	13.7	17.7	19.8	21.3	22.5	23.3	23.6	23.6	23.7	23.0	21.7	20.6	19.5	17.1	16.6	16.7	16.0	23.7
29-Apr	15.6	14.8	14.2	11.6	11.0	11.0	10.7	10.9	11.3	12.6	13.2	15.0	15.6	15.4	15.4	15.4	15.4	15.6	14.5	13.4	12.3	10.7	9.7	9.6	13.1	15.6
30-Apr	8.5	7.5	7.4	6.6	6.0	6.3	7.2	9.4	11.1	11.9	11.9	11.0	12.1	12.9	12.9	14.8	12.0	12.3	12.3	10.5	6.5	7.1	6.4	5.3	9.6	14.8
																								Diurnal Average		
																								Diurnal Maximum		





**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	187	25.97	25.97
0 - 10	331	45.97	71.94
10 - 20	189	26.25	98.19
> 20	13	1.81	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association

Summary of Hour Averages

Relative Humidity (RH) - %

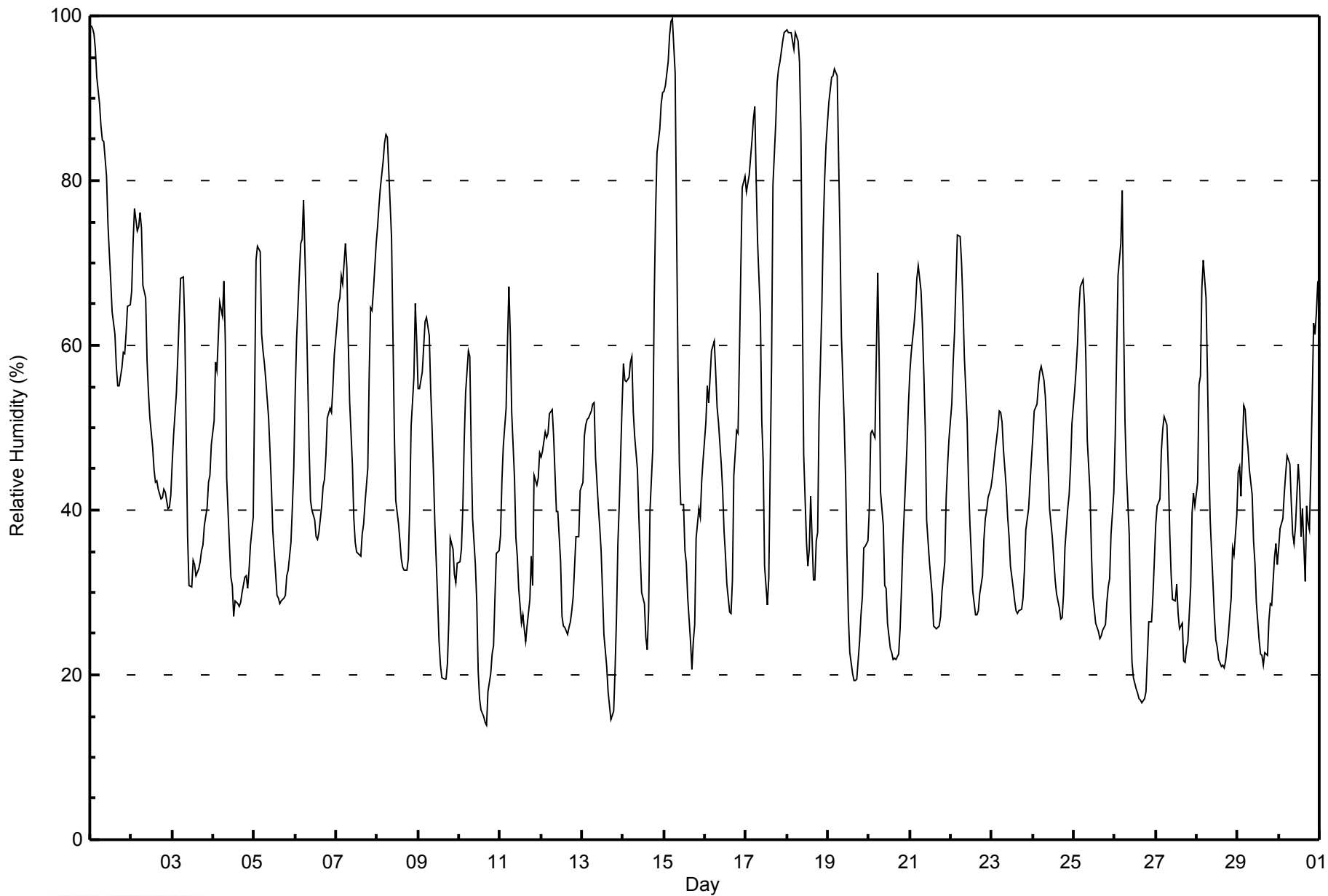
Mildred Lake - April 2015

Maximum Value: 100 % on Apr 15 06:00																			Maximum Daily Average: 74.3 % on Apr 1						Hours in Service: 720																								
Minimum Value: 14 % on Apr 10 17:00																			Minimum Daily Average: 31.6 % on Apr 10						Hours of Data: 720																								
Maximum Diurnal Average: 68.3 % at hour 6																			Minimum Diurnal Average: 28.7 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 46.7 %																			Percentiles: P <sub>1</sub> = 17 P <sub>10</sub> = 25 Q <sub>1</sub> = 31 Median = 43 Q <sub>3</sub> = 58 P <sub>90</sub> = 74 P <sub>99</sub> = 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-Apr	99	99	98	96	92	89	87	85	85	81	75	71	68	64	61	57	55	55	57	59	59	62	65	65	74.3	99																							
2-Apr	67	73	77	74	74	76	74	67	66	58	54	51	48	45	43	44	42	41	41	43	42	40	40	42	55.1	77																							
3-Apr	46	49	54	59	64	68	68	62	49	37	31	31	34	33	32	33	34	35	36	38	40	43	44	48	44.5	68																							
4-Apr	51	58	57	61	65	64	68	60	44	36	32	31	27	29	29	28	29	30	32	32	31	33	36	39	41.7	68																							
5-Apr	54	70	72	71	61	59	58	56	51	47	43	38	32	30	29	29	29	29	30	32	33	36	40	45	44.8	72																							
6-Apr	54	61	69	72	73	78	64	56	47	41	40	39	37	37	37	41	43	44	47	51	52	52	55	59	52.0	78																							
7-Apr	63	65	66	68	67	72	69	60	53	45	39	36	35	35	34	37	38	41	45	56	65	64	67	72	54.0	72																							
8-Apr	74	77	79	82	85	86	85	81	73	61	49	41	38	36	34	33	33	33	34	40	50	56	65	60	57.8	86																							
9-Apr	55	55	57	60	63	63	61	55	50	45	38	29	24	21	20	19	19	21	27	37	35	32	31	34	39.6	63																							
10-Apr	34	35	40	48	54	59	59	48	39	33	29	20	17	16	15	14	14	18	20	23	24	29	35	35	31.6	59																							
11-Apr	37	44	48	52	61	67	61	52	44	37	34	31	26	27	26	24	26	29	34	31	44	43	44	47	40.4	67																							
12-Apr	47	47	49	49	49	52	52	49	44	40	40	34	27	26	26	25	26	26	28	30	37	37	37	42	38.2	52																							
13-Apr	43	49	50	51	51	52	53	53	46	41	38	35	30	25	21	18	16	15	16	21	27	36	41	53	36.7	53																							
14-Apr	58	56	56	56	58	59	52	49	45	39	35	30	29	25	23	28	40	47	65	76	83	86	89	91	53.1	91																							
15-Apr	91	92	94	98	99	100	93	74	58	46	41	41	35	34	29	24	21	24	26	37	40	39	44	46	55.2	100																							
16-Apr	51	55	53	56	59	61	57	53	51	46	42	38	35	31	28	27	31	44	50	49	59	69	79	81	50.1	81																							
17-Apr	79	80	81	85	87	89	80	73	64	51	46	33	29	32	45	58	79	87	92	93	94	97	98	98	72.8	98																							
18-Apr	98	98	98	97	96	98	97	94	86	66	47	36	33	35	42	32	32	36	37	51	65	74	80	84	67.2	98																							
19-Apr	90	91	92	93	94	93	83	73	61	51	44	35	27	23	20	19	19	19	24	27	29	35	36	36	50.6	94																							
20-Apr	40	49	50	49	59	69	58	42	38	31	30	26	23	23	22	22	22	22	26	30	36	44	48	53	38.0	69																							
21-Apr	57	59	63	65	68	70	67	62	57	50	39	34	32	30	26	26	26	26	27	30	34	41	45	49	45.0	70																							
22-Apr	53	58	62	68	73	73	70	65	59	51	43	38	34	30	27	27	28	30	32	36	39	40	42	43	46.7	73																							
23-Apr	44	45	47	50	52	52	51	47	43	39	37	33	30	29	28	27	28	28	29	33	38	40	43	46	39.2	52																							
24-Apr	49	52	53	55	57	57	56	54	50	45	40	37	34	32	30	28	27	27	30	35	40	42	45	50	42.7	57																							
25-Apr	55	57	60	64	67	68	65	58	49	42	35	30	28	26	25	24	25	25	26	29	31	32	37	42	41.6	68																							
26-Apr	49	59	69	72	79	63	51	45	37	28	22	20	18	18	17	17	17	17	18	22	26	27	30	34	35.5	79																							
27-Apr	38	41	41	47	50	51	50	45	37	32	29	29	31	27	26	26	22	21	23	24	31	40	42	41	35.2	51																							
28-Apr	43	55	56	67	70	66	57	46	39	31	27	24	23	22	21	21	21	22	25	27	29	35	35	39	37.6	70																							
29-Apr	45	45	42	53	52	49	48	45	42	36	33	29	24	23	22	21	23	22	27	29	29	34	36	33	35.1	53																							
30-Apr	35	38	39	42	44	47	46	41	37	36	38	46	43	37	40	31	41	39	38	45	63	61	64	68	44.0	68																							
																								56.5	60.4	62.4	65.4	67.5	68.3	64.6	58.4	51.5	44.0	39.0	34.8	31.7	29.9	29.3	28.7	30.1	31.9	34.7	38.9	43.5	46.7	49.7	52.5	Diurnal Average	
																								99	99	98	98	99	100	97	94	86	81	75	71	68	64	61	58	79	87	92	93	94	97	98	98	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Mildred Lake - April 2015**





Maximum Speed: 29 km/h on Apr 11 20:00	Maximum Daily Speed Average: 17.8 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 20 07:00	Minimum Daily Speed Average: 2.6 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 3.7 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 0.7 km/h 292.8 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 10 Q <sub>3</sub> = 14 P <sub>90</sub> = 18 P <sub>99</sub> = 24	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NNE16	NNE18	NNE19	NNE21	NNE22	NNE24	NNE25	NNE24	NNE24	NNE24	NNE22	NNE21	NNE22	NNE23	NNE21	NNE21	NNE21	NNE17	NNE13	NNE10	NE7	NNE5	N5	NNE5	NNE17.8	NNE25
2-Apr	N6	NNE5	NNW6	NNW5	N5	N6	N5	NE5	NNE8	NNE11	N13	NNE10	N11	NNE10	N11	NNE9	NE10	ENE11	ENE10	NE9	NE10	NE11	NE9	NE6	NNE7.7	N13
3-Apr	NE5	NNE5	NNE7	N7	NNE7	N9	NNE8	NNE6	ENE3	N4	NE7	NE8	N12	N13	NNE8	NNE9	NE11	NE12	NE11	NE11	NE10	NE9	ENE7	NE5	NNE7.8	N13
4-Apr	NNE6	NNE7	NNE8	NNE7	NE6	NNE5	N7	NE5	NE6	ENE7	NNE6	NNW9	NNW12	N10	N7	N4	NE6	NNE10	NE12	NE14	NE14	NE11	NNE10	NNE6	NNE7.7	NE14
5-Apr	NNE4	N5	N5	N6	N9	NNE11	NE10	NNE10	NNE11	NNE10	NNE9	NE9	NNE8	NE9	NE10	NE9	NE8	NE11	NE11	NE9	NE10	NE9	NNE7	NNE7	NNE8.4	NNE11
6-Apr	N6	N4	NE3	NNE2	ENE2	SSW4	S7	SSW7	S10	S9	SSE8	SSE11	S14	SSW10	S8	SSE10	S10	S13	SSE14	SSE13	S12	SSW16	SSW17	SSW13	S7.8	SSW17
7-Apr	SSW11	S10	S11	S9	SSW10	S6	SSE8	S11	S11	SSW12	SSW16	SSW17	SSW18	SSW15	SSW12	SSW11	SW9	WSW10	WSW10	SW8	SW6	SSW9	S9	S7	SSW10.1	SSW18
8-Apr	SSE10	SSE10	S11	SSE10	SSE11	S10	S10	SSW7	SSW9	SW5	NNW5	NNE11	NNE14	N14	N12	NNE11	ENE9	ENE9	ENE6	E6	E6	SSE4	SSW6	S7	ESE2.6	N14
9-Apr	S9	SSE11	SSE8	SSE9	SSE10	SSE12	SSE15	SSE16	SSE13	SSE15	SSE13	SSW9	WSW12	WSW15	WSW17	WSW17	WSW16	WSW12	SW8	SW4	W3	W7	WSW9	WSW9	SSW8.1	WSW17
10-Apr	WSW9	WSW10	SW7	SSW8	S5	S8	S8	S8	S9	S10	SSE9	S9	S9	S6	WSW5	SW5	S4	S10	SSE10	S10	S8	S6	SE6	SE7	S6.9	S10
11-Apr	S5	S6	SSW6	SSW6	S5	SSW6	SSW7	SSW10	WSW7	W6	W12	NNW12	NNW12	W14	NNW13	NNW14	NNW13	NNW16	NNW20	W29	W23	NNW14	NNW7	W7	W9.2	W29
12-Apr	W10	W15	W13	W13	W14	W15	W17	W14	W11	WSW15	SW16	WSW17	W22	W21	W19	NNW24	W21	W25	NNW22	NNW16	NNW10	NNW11	W11	WSW11	W15.3	W25
13-Apr	NNW11	NNW9	W13	NNW14	NNW19	NNW13	NNW12	NNW14	NNW16	NNW26	NNW24	NNW21	NNW21	NNW22	NNW22	NNW20	NNW16	NNW16	NNW12	N5	N3	ESE1	E4	SSW2	NW13.1	NW26
14-Apr	SSE6	SSE13	SSE14	SSE15	SSE13	SSE11	SSE15	SE15	SSE15	SSE14	SE13	SSE14	SSE13	S11	S9	SSW15	S18	SSE21	SSE18	SSE15	SSE15	SSE20	SSE17	S15	SSE14.0	SSE21
15-Apr	S12	S10	S8	SSW9	S6	SSW8	SSW9	SSW7	W8	WSW10	W10	NNW15	W14	NNW15	W14	W16	W15	W9	SSW4	SW6	NNW17	W11	W11	WSW8.3	NNW17	
16-Apr	W13	W13	W17	W12	W11	WSW12	W10	W9	SW9	SW8	WSW12	WSW15	WSW14	W14	W20	NNW21	W18	N24	NNW15	NNW17	NNW12	NNW11	WSW5	WSW4	W11.1	N24
17-Apr	W11	WSW7	SW7	SSW7	SSW8	S7	S7	S9	SSE10	SSE10	SSE11	S10	SW13	SW15	SW17	SW20	S10	SSE12	SSE11	SE8	E3	NE4	N5	N9	SSW6.6	SW20
18-Apr	N9	NNW11	NNW15	NNW17	NNW21	N17	N20	NNW16	NNW15	NNW21	N20	N25	N24	NNE14	NNE9	NNE15	NNE15	NNW14	NNE12	NE6	NNW3	WSW3	NNW2	SSW2	N12.6	N25
19-Apr	SW4	SW4	SE4	SSW3	SW4	SSW5	SSW7	S6	SSW7	SSE8	S8	S8	SW9	SW10	W11	NNW12	NNW7	NNW5	S2	S6	SSE6	S6	SSE5	SSE6	SSW4.5	NNW12
20-Apr	ESE2	S2	NNW5	NNW7	NNW5	N3	SE1	N6	NE5	NE6	SW7	SW9	SW8	SW9	SW8	SSW8	NNW2	NNE10	NE12	NNE11	NNE11	NNE14	NNE14	N2.7	NNE14	
21-Apr	NNE13	NNE9	NNE7	NNE8	NNE7	NNE6	NNE8	NNE11	N12	NNE13	NE14	NNE17	NE15	NE13	NNE13	NNE13	NE14	NNE14	ENE12	E12	E10	ESE16	SE15	SE12	NE9.3	NNE17
22-Apr	SE11	SE11	SE9	SE8	SE8	ESE13	ESE15	SE17	SE15	SE14	SSE18	SE19	SE19	SE21	SE21	SE20	SE20	SE20	SE17	ESE17	SE18	SE18	SE20	SE19	SE15.9	SE21
23-Apr	ESE15	ESE13	ESE13	E8	E10	E11	E12	ESE16	ESE15	E13	E12	ESE14	ESE18	ESE20	ESE18	E17	E19	ESE14	E16	ENE18	ENE15	NE9	NE11	NNE9	E13.2	ESE20
24-Apr	NNE11	NNE12	NNE12	NNE12	NE13	NE14	NE15	NE17	NNE18	NNE17	NNE19	NNE18	NNE17	NNE18	NNE18	NNE21	NNE20	NNE20	NNE20	NNE19	NNE17	NNE17	NNE16	NNE14	NNE16.3	NNE21
25-Apr	NNE14	NNE15	NNE13	N10	NNE11	NNE10	N12	NNE9	NNE7	N9	NNE10	NNE7	N7	N10	NNW12	N11	NNW15	N15	N12	N8	NE9	NE10	NNE8	NNE8	N10.2	N15
26-Apr	NNE6	N4	ENE2	SW2	SSW6	SSW8	SW5	SSW6	S8	S8	S7	SSW7	SW6	S7	S6	SE6	ESE8	SE8	SE8	E8	ESE9	SE10	SE11	SE11	SSE4.8	SE11
27-Apr	SE8	SE9	SSE13	SSE11	SSE8	SSW8	S10	S13	S13	S14	S16	SW14	SW10	SW17	WSW15	WSW15	WSW17	WSW17	W13	W10	W6	WSW3	WSW6	WSW10	SSW8.8	SW17
28-Apr	WSW7	SSW6	SSE6	E2	SE5	ESE3	SSE5	SSE9	S11	S11	SSE13	SSE15	S16	S17	S19	S18	SSW20	SSW20	S14	SSE15	SSE14	S9	SSW11	NNW13	S10.3	SSW20
29-Apr	NW8	NW9	NNW8	WSW5	W7	NNW12	NNW9	NNW12	NNW9	W10	NNW9	NNW9	W14	NNW14	NNW14	NNW10	W8	W10	SW9	WSW8	WSW9	WSW7	W9	W12	W9.2	W14
30-Apr	W10	W12	W14	W11	W12	W12	WSW15	WSW13	WSW11	WSW16	WSW21	WSW20	WSW18	W16	NNW8	NNW11	NNW18	NNW14	NW7	WSW2	SSE4	SSW3	SSW5	SSW6	W9.9	WSW21
NW0.7 W0.7 W0.9 NNW0.8 NW0.9 NNW0.3 SSE0.4 S1.1 S1.1 SW0.6 SW0.7 W1.3 W3.1 W2.8 NNW3.7 NNW3.4 NW2.2 NNW2.2 NNE1.7 ENE1.8 ENE1.6 E0.9 SSE1.3 SSW1.2																								Diurnal Average		
NNE16 NNE18 NNE19 NNE21 NNE22 NNE24 NNE25 NNE24 NNE24 NNW26 NNW24 N25 N24 NNE23 NNW22 NNW24 W21 W25 NNW22 W29 W23 SSE20 SE20 SE19																								Diurnal Maximum		

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

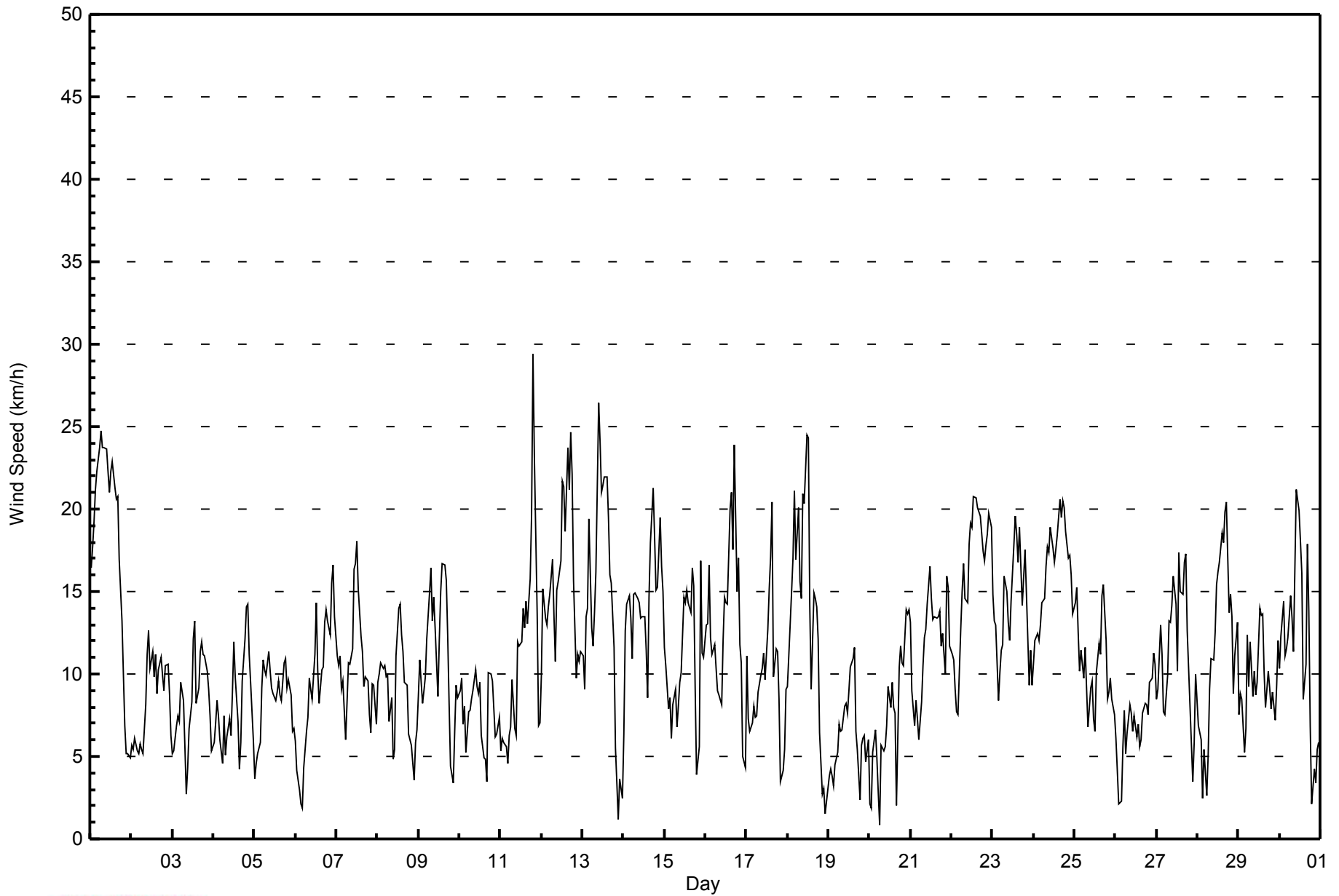
**Wind Speed (WS) - km/h**  
**Mildred Lake - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Apr 13 05:00 Minimum Value: 0 km/h on Apr 20 06:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7																		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	4	4	5	5	6	6	6	6	6	6	5	6	6	6	6	5	5	4	4	3	2	1	1	1	6
2-Apr	1	1	1	2	1	1	1	2	2	3	3	4	4	3	4	3	3	3	2	2	2	3	3	1	4
3-Apr	1	1	1	1	1	1	2	1	1	3	3	4	5	4	4	4	3	3	3	3	3	2	2	2	5
4-Apr	1	2	1	1	1	2	1	1	2	2	3	4	4	4	3	3	3	3	3	4	4	3	2	1	4
5-Apr	1	1	1	2	2	3	2	3	3	3	3	4	4	4	3	3	3	3	2	2	2	2	1	1	4
6-Apr	2	1	1	1	1	2	1	1	2	2	2	3	3	3	2	3	3	3	2	2	2	2	2	2	3
7-Apr	2	2	2	2	2	1	2	3	2	3	4	4	4	4	3	3	3	3	3	2	2	2	3	1	4
8-Apr	1	1	1	1	2	2	2	2	2	2	2	4	4	4	4	4	3	2	2	1	1	1	1	1	4
9-Apr	3	2	2	1	1	2	2	3	3	3	3	2	4	5	5	5	5	4	2	2	1	2	3	3	5
10-Apr	3	3	2	1	2	1	1	1	1	1	1	2	3	3	2	2	1	4	2	2	1	3	1	1	4
11-Apr	2	1	1	2	1	1	2	2	2	2	4	4	5	4	4	5	4	4	6	9	7	5	3	3	9
12-Apr	3	5	4	4	4	5	6	7	4	5	5	6	7	7	7	7	7	8	7	5	3	4	3	3	8
13-Apr	3	3	6	4	10	4	3	4	6	7	8	6	6	6	7	6	5	5	3	2	1	1	1	1	10
14-Apr	3	3	3	3	3	3	4	3	3	3	3	3	3	3	2	9	6	5	4	3	4	4	4	3	9
15-Apr	3	3	2	2	1	2	2	1	3	3	4	4	4	5	5	5	5	5	6	1	3	5	5	3	6
16-Apr	4	4	5	4	3	3	4	4	3	2	4	5	5	5	7	7	6	7	5	6	3	3	2	2	7
17-Apr	4	3	2	1	1	1	1	2	2	2	2	3	4	5	6	5	3	2	3	2	2	1	1	3	6
18-Apr	2	2	3	3	4	3	5	3	3	5	5	5	6	7	7	5	5	3	5	3	1	1	1	1	7
19-Apr	1	1	1	1	2	2	2	1	1	1	2	2	3	3	4	4	3	2	2	1	1	1	1	1	4
20-Apr	2	1	3	1	2	0	1	3	2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	2	3
21-Apr	2	3	2	2	2	1	3	2	3	3	4	4	4	4	4	4	4	4	3	3	2	4	4	3	4
22-Apr	3	3	2	2	2	3	3	4	4	4	4	4	5	5	5	5	5	4	4	4	4	5	5	4	5
23-Apr	3	3	3	3	2	2	2	4	4	3	3	4	5	5	5	4	4	4	4	4	4	3	3	2	5
24-Apr	2	3	3	3	3	4	4	4	4	4	5	5	6	5	6	5	5	5	5	4	4	4	4	3	6
25-Apr	3	3	3	2	2	2	3	3	2	3	4	4	4	5	5	5	4	3	3	2	2	2	1	2	5
26-Apr	1	1	1	2	1	1	1	1	2	2	2	3	2	4	3	3	3	3	2	1	2	2	2	2	4
27-Apr	1	1	2	3	2	2	3	3	3	3	4	4	3	6	6	6	6	5	5	4	2	2	2	4	6
28-Apr	2	1	2	1	2	1	2	3	2	2	3	3	4	4	4	4	5	5	4	3	3	2	3	4	5
29-Apr	2	3	2	2	2	4	3	4	3	4	3	4	4	4	4	4	4	4	3	2	3	2	2	3	4
30-Apr	4	4	5	3	3	4	4	4	4	5	7	6	6	6	5	6	7	4	5	1	1	2	2	1	7
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	81	11.25	11.25
6 - 11	338	46.94	58.19
12 - 19	244	33.89	92.08
20 - 28	56	7.78	99.86
29 - 38	1	0.14	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

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

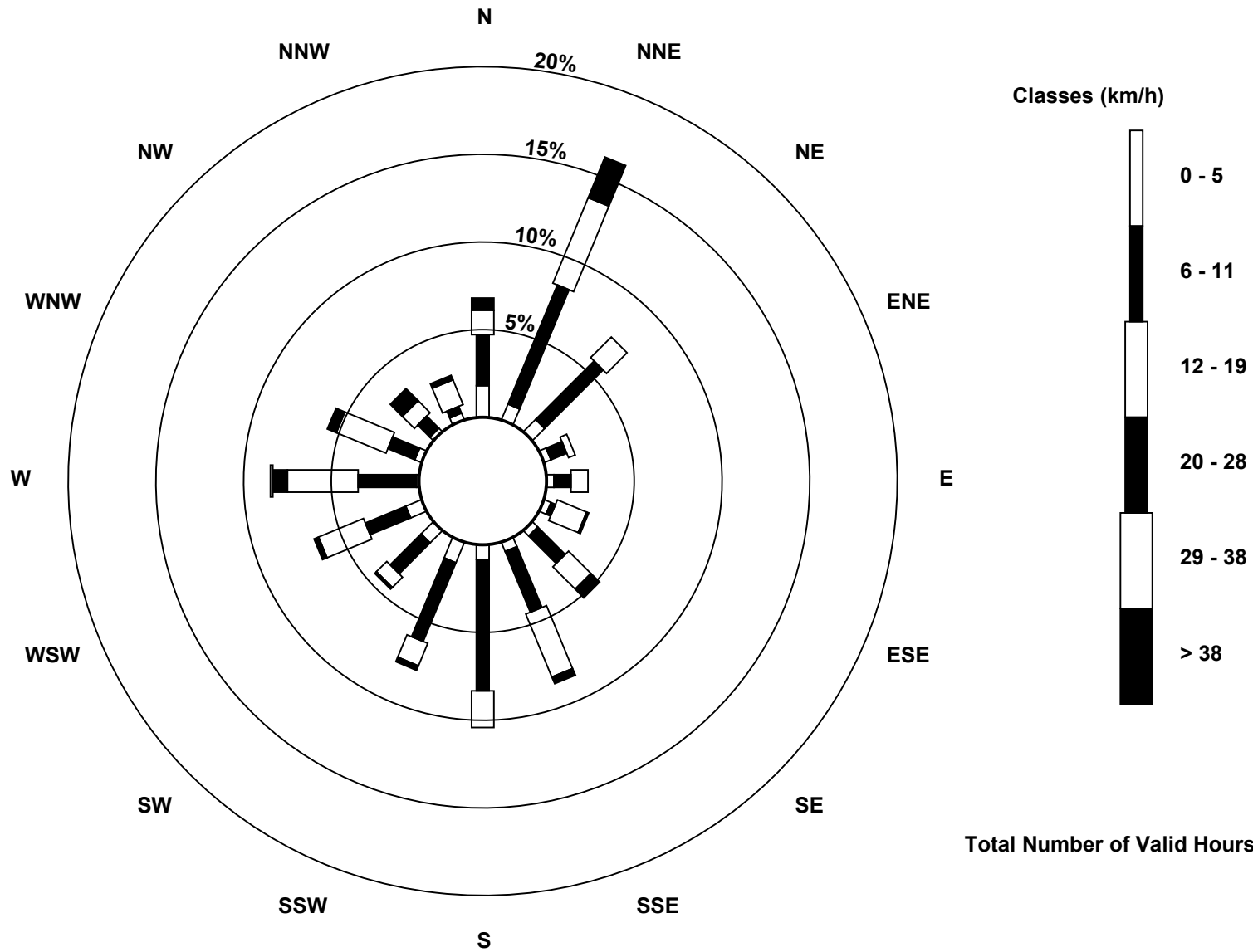
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	7	7	3	3	3	3	4	6	9	7	7	1	3	2	3	81
6 - 11	21	53	34	7	7	2	16	27	54	35	18	18	24	12	7	3	338
12 - 19	10	38	12	3	7	13	13	28	15	10	6	20	29	22	7	11	244
20 - 28	5	18	0	0	0	1	5	3	0	2	1	2	6	4	7	2	56
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	49	116	53	13	17	19	37	62	75	56	32	47	61	41	23	19	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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



**Total Number of Valid Hours: 720**



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Mildred Lake - April 2015**

Direction of Maximum Speed: 279 deg on Apr 11 20:00		Hours in Service: 720
Direction of Maximum Daily Speed Average: 21.5 deg on Apr 1		Hours of Data: 720
Direction of Minimum Speed: 144 deg on Apr 20 07:00		Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.6 deg on Apr 8		Percent Operational Time: 100.0
Monthly Average Direction: 243.7 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-Apr	15	14	15	16	20	19	20	22	21	23	22	19	20	27	28	26	22	25	30	32	34	24	7	13	21.5	
2-Apr	10	16	335	333	357	357	8	34	22	21	10	20	356	21	355	15	35	66	58	46	45	49	55	44	23.8	
3-Apr	41	30	12	10	15	10	19	12	62	352	50	47	5	6	29	18	48	51	45	47	47	48	59	56	31.3	
4-Apr	27	18	23	24	35	16	9	39	51	60	16	347	344	4	3	1	34	28	46	39	34	43	30	22	24.4	
5-Apr	12	0	9	8	8	25	36	33	22	27	19	34	32	37	36	35	42	48	45	40	41	38	32	17	30.3	
6-Apr	9	8	50	21	69	193	190	199	191	178	151	154	172	194	173	160	177	174	161	162	186	194	193	198	176.6	
7-Apr	196	185	190	187	197	175	158	188	173	195	204	206	198	205	213	212	226	241	247	227	217	195	191	175	200.6	
8-Apr	165	165	169	164	168	174	174	193	207	230	343	33	12	10	9	24	61	76	76	84	101	165	205	183	118.2	
9-Apr	173	168	166	160	154	153	163	168	155	154	154	211	239	243	248	256	255	245	233	232	277	267	255	241	204.1	
10-Apr	240	244	232	195	174	184	189	172	174	169	162	184	174	183	242	234	191	170	168	174	182	184	144	145	185.3	
11-Apr	181	184	199	195	183	198	202	204	251	269	263	287	285	281	290	290	290	293	285	279	279	311	288	260	270.1	
12-Apr	261	274	270	270	273	267	268	272	266	244	233	252	276	271	275	284	277	281	286	303	312	285	270	254	272.3	
13-Apr	313	295	278	287	311	301	297	291	307	314	317	325	320	315	323	320	301	320	338	354	360	108	92	206	312.2	
14-Apr	147	162	154	158	159	151	158	145	157	158	135	151	164	170	190	198	171	158	162	158	151	162	163	173	160.4	
15-Apr	174	178	185	202	189	194	205	200	266	249	267	293	277	288	297	274	268	275	275	196	233	287	263	260	253.9	
16-Apr	264	259	274	264	259	251	268	264	220	218	245	237	244	274	276	282	266	352	334	308	309	302	250	241	274.2	
17-Apr	273	249	220	199	194	183	175	174	164	159	151	187	221	222	231	220	185	166	159	134	92	50	8	351	195.3	
18-Apr	353	341	342	346	347	353	358	341	324	338	351	353	350	26	13	22	23	329	21	34	296	239	345	202	352.6	
19-Apr	217	225	136	202	217	193	194	181	192	165	176	189	214	232	266	285	306	315	174	172	160	171	163	160	205.5	
20-Apr	102	187	298	316	320	6	144	350	34	38	226	214	227	217	228	206	301	33	42	31	17	15	15	12	355.8	
21-Apr	14	16	24	16	15	25	19	15	8	13	34	27	35	37	32	26	37	30	59	95	96	118	129	135	42.6	
22-Apr	134	132	130	133	135	119	122	127	138	142	147	140	139	139	146	140	134	133	124	115	126	131	128	129	133.1	
23-Apr	121	121	114	99	85	97	98	108	111	100	100	110	111	107	117	99	93	113	90	74	74	55	53	31	97.7	
24-Apr	31	26	26	26	35	39	39	34	26	31	27	32	26	28	29	21	25	22	17	21	16	23	24	20	26.4	
25-Apr	16	18	24	11	13	15	11	25	15	5	19	20	350	11	342	352	346	351	355	9	35	37	19	28	10.0	
26-Apr	21	3	76	214	209	205	217	197	184	180	187	193	214	180	177	139	104	135	124	97	116	131	146	136	156.1	
27-Apr	126	133	163	151	164	198	174	177	173	178	190	218	222	219	237	237	250	251	266	266	262	252	252	246	210.2	
28-Apr	248	198	164	89	127	113	152	164	171	173	165	167	180	183	179	174	195	194	184	166	167	187	198	282	180.7	
29-Apr	307	308	295	250	273	293	296	288	291	277	292	285	279	282	286	287	270	266	236	242	258	252	260	262	277.7	
30-Apr	265	268	275	261	260	260	252	257	248	255	249	244	254	268	295	283	333	345	307	242	155	201	209	210	264.6	
322.9	272.1	276.8	285.8	325.1	298.9	166.1	174.0	176.2	215.0	229.6	266.0	280.0	281.2	291.6	293.9	315.9	342.4	28.3	59.6	72.1	94.1	147.0	206.3			
Diurnal Average																										

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

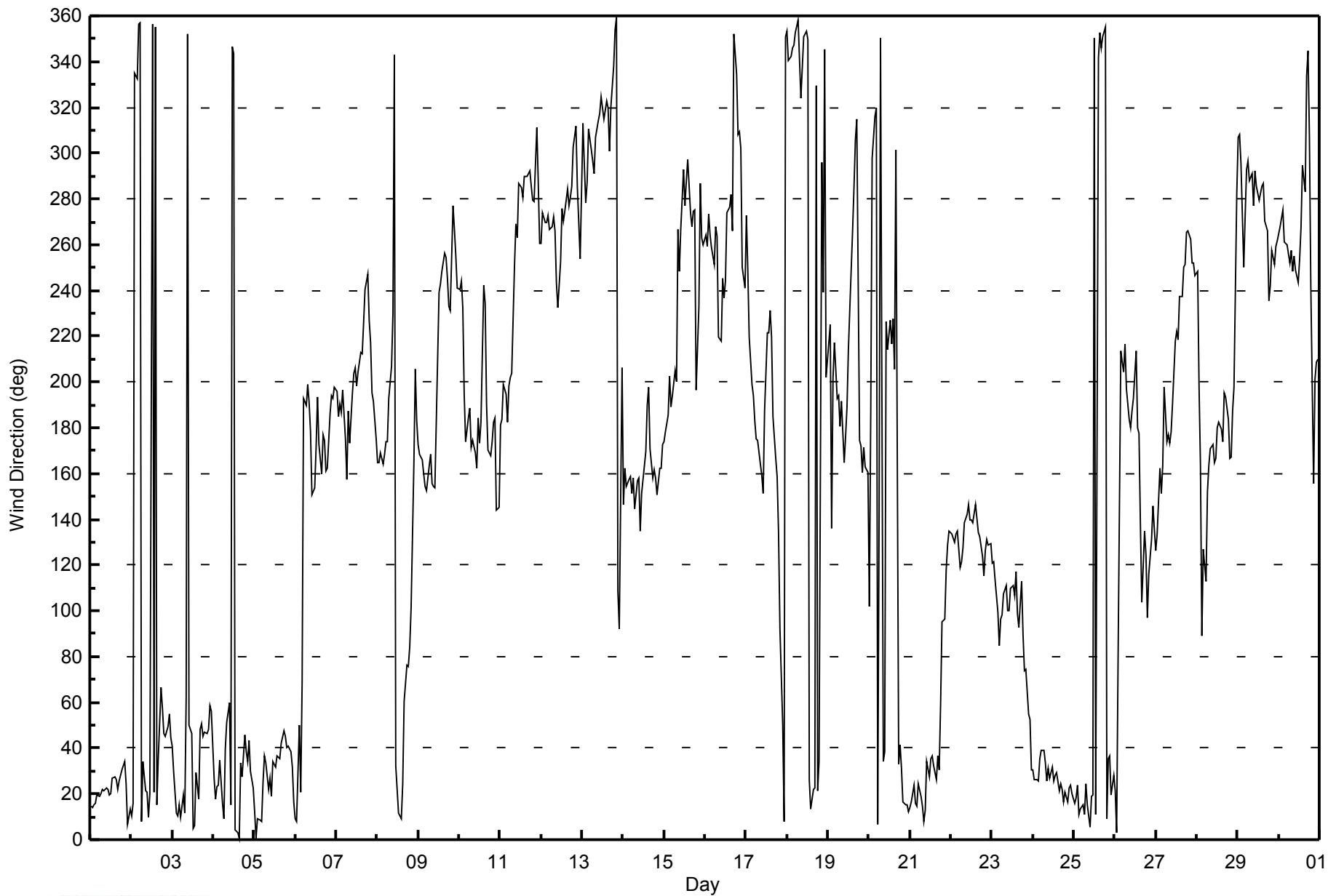


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 83 deg on Apr 25 13:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 6 deg on Apr 8 21:00																									
Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 20 Q <sub>3</sub> = 25 P <sub>90</sub> = 37 P <sub>99</sub> = 72																									
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-Apr	15	15	16	17	17	17	17	17	16	16	17	18	17	18	20	19	18	18	18	18	20	20	16	19	20
2-Apr	21	18	12	19	26	16	13	25	23	22	20	33	24	31	28	37	32	20	19	15	16	16	18	18	37
3-Apr	19	16	12	9	11	10	16	18	67	72	51	44	33	27	39	67	25	18	18	16	16	17	17	20	72
4-Apr	13	14	16	16	17	19	13	25	26	32	51	34	27	40	55	71	50	29	16	16	16	15	14	15	71
5-Apr	16	11	13	9	14	15	18	23	26	26	31	35	48	38	39	40	37	22	14	15	15	15	11	11	48
6-Apr	13	13	31	30	43	18	14	19	18	24	25	22	17	28	29	20	22	18	13	12	15	11	11	12	43
7-Apr	12	13	12	15	15	16	11	18	15	19	14	15	15	17	21	18	26	24	22	20	22	13	13	10	26
8-Apr	10	13	10	10	10	12	12	28	16	44	59	25	27	21	26	27	26	22	18	15	6	44	11	14	59
9-Apr	14	11	20	12	13	13	10	11	15	15	17	33	26	23	23	22	21	21	21	47	22	23	25	26	47
10-Apr	21	20	33	9	19	11	11	9	13	13	15	19	26	48	47	48	46	24	10	13	13	18	15	12	48
11-Apr	29	14	19	15	24	17	27	13	39	30	23	20	23	23	26	21	18	17	20	17	19	18	27	22	39
12-Apr	20	19	20	21	18	21	21	30	29	24	24	29	22	23	27	19	22	19	21	19	15	20	24	21	30
13-Apr	20	33	27	20	16	18	16	17	19	17	18	18	20	21	17	20	21	22	17	9	8	73	46	45	73
14-Apr	22	10	13	12	11	18	18	18	17	17	18	20	16	20	23	22	22	15	13	15	16	12	13	13	23
15-Apr	15	16	18	16	19	12	15	17	29	27	31	21	27	25	22	28	24	21	32	22	44	18	28	21	44
16-Apr	20	20	19	19	21	22	27	32	33	22	23	24	27	23	21	21	26	27	29	20	23	16	37	54	54
17-Apr	22	31	22	13	11	14	14	15	16	20	21	38	21	21	27	17	20	13	18	23	66	35	10	9	66
18-Apr	10	11	10	11	11	12	15	11	15	15	16	15	16	35	55	25	23	17	24	18	40	32	77	67	77
19-Apr	33	7	35	23	22	20	16	16	20	21	20	24	37	25	34	26	47	30	77	9	13	11	21	12	77
20-Apr	66	52	41	11	11	24	72	53	39	48	49	18	30	30	28	37	77	22	17	17	14	14	13	12	77
21-Apr	13	16	14	12	12	15	16	21	19	19	25	24	27	25	32	25	23	19	33	13	13	12	17	17	33
22-Apr	17	14	14	16	17	12	15	19	20	23	19	20	21	20	19	20	19	16	16	14	15	16	16	14	23
23-Apr	14	14	12	20	13	12	12	16	22	21	20	28	22	20	23	23	20	22	25	16	17	24	17	16	28
24-Apr	18	16	15	15	17	17	17	19	20	22	22	24	26	25	21	21	20	20	16	17	17	15	16	15	26
25-Apr	14	14	15	13	12	12	13	23	31	28	45	66	83	50	34	48	22	17	15	15	13	12	14	14	83
26-Apr	14	14	50	40	14	11	20	22	21	28	43	48	56	65	65	54	43	30	22	9	10	12	15	16	65
27-Apr	13	12	9	17	21	22	18	16	18	18	19	23	21	22	25	24	24	22	25	21	21	37	20	22	37
28-Apr	28	19	14	43	12	33	22	19	15	18	16	15	17	19	18	16	14	13	16	11	12	18	15	31	43
29-Apr	21	21	19	27	24	18	16	18	19	24	21	27	22	22	20	30	28	24	22	23	21	23	21	20	30
30-Apr	21	20	19	21	21	22	21	22	26	22	21	23	27	28	46	45	30	22	46	57	31	60	29	26	60
	66	52	50	43	43	33	72	53	67	72	59	66	83	65	65	71	77	30	77	57	66	73	77	67	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Mildred Lake - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 2, 2015	Last Calibration	March 10, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	15:20
Gas Cert Reference	CC307191	Station temp.	22 Deg C
Cal Gas Concentration	59.4 ppm	Cal Gas Exp Date	3/26/2012
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
ZAG Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8346

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-652	-652
Analyzer IP address	192.168.1.43		Lamp voltage	777	777
Calculated slope	1.000062	0.999876	Chamber temp	45.1	45.0
Calculated intercept	0.014808	1.632533	Pressure	708.3	701.2
Analyzer Background	25.2	25.4	Flow	0.500	0.495
Analyzer Coefficient	1.119	1.119	Intensity	90	90
Analyzer make	TEI 43i		Analyzer serial #	JC1404901075	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.8	----
as found span	5000	69.9	830.4	831.4	0.999
calibrator zero	5000	0.0	0.0	-0.9	----
high point	5000	69.9	830.4	829.4	1.001
second point	5000	35.4	420.6	418.1	1.006
third point	5000	17.7	210.3	208.3	1.009
as left zero	5000	0.0	0.0	-0.5	----
as left span	5000	69.9	830.4	828.3	1.003
Average Correction Factor					1.006

Corrected As found	832.2	Previous response	830.3	% change	-0.2%
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**Notes:**

Sample inlet filter changed after as founds. No adjustments made. Performed as lefts at 14:38 MST.

Calibration Performed By:

Asad Hidayat



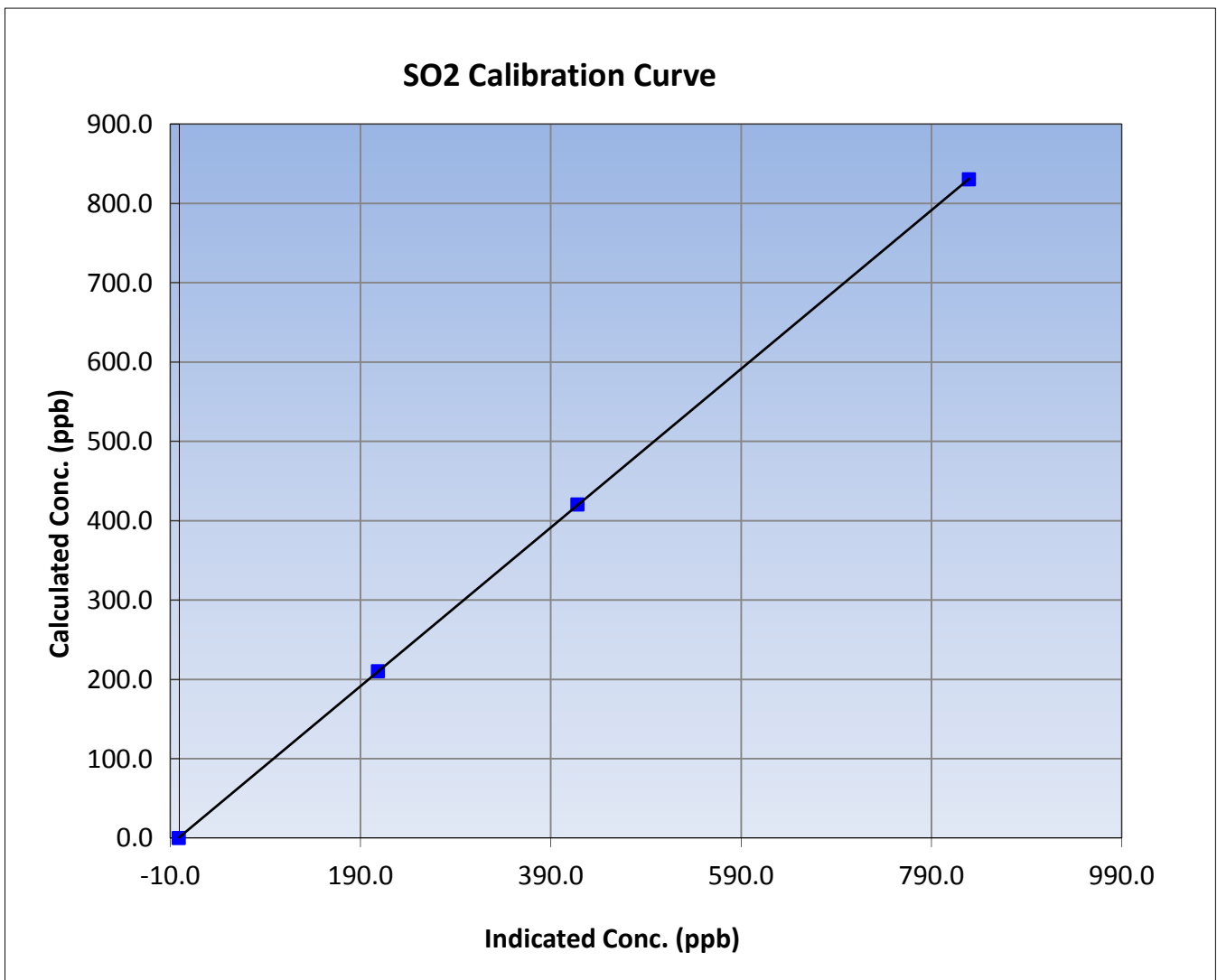
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

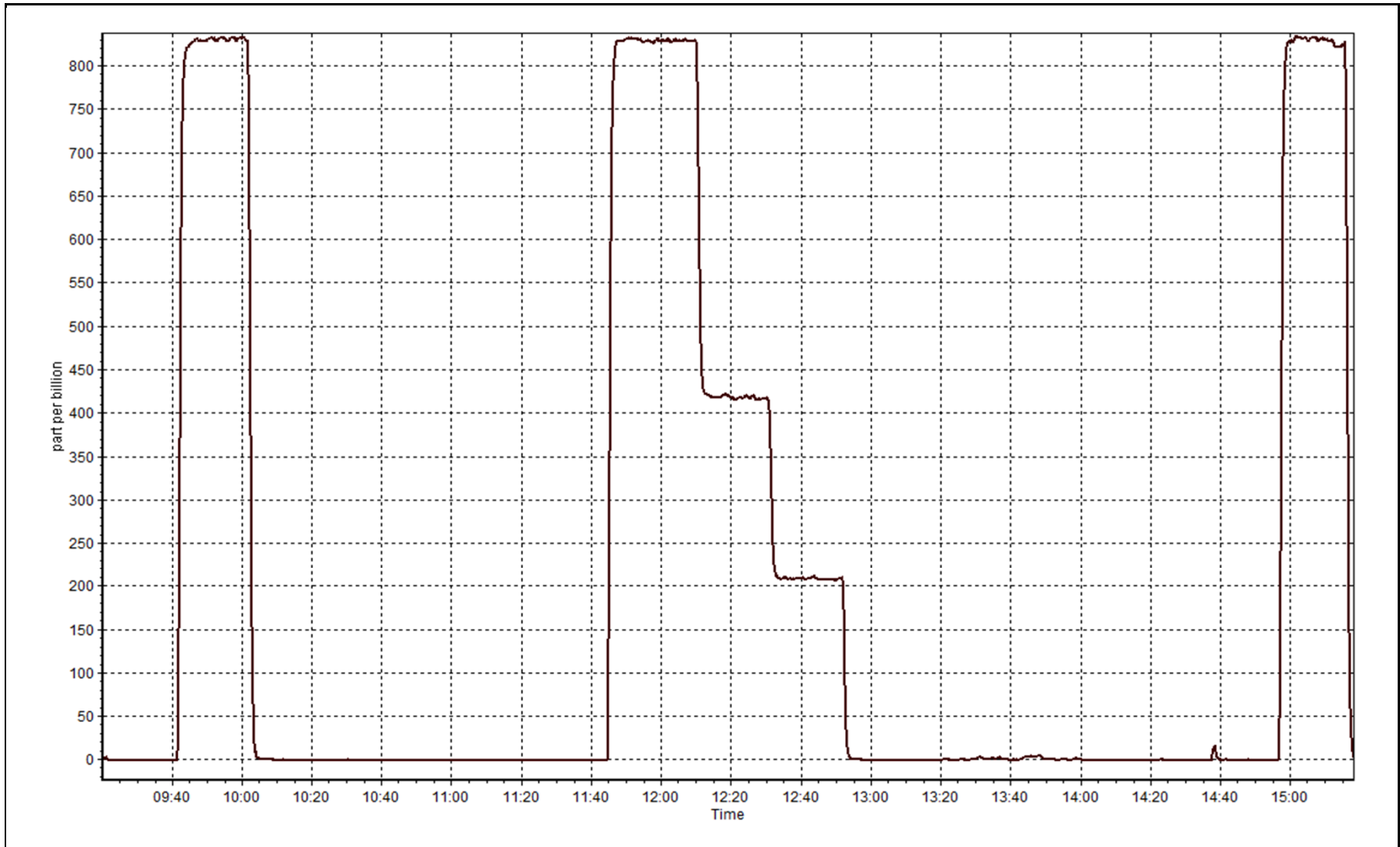
Calibration Date	April 2, 2015	Previous Calibration	March 10, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:15	End Time (MST)	15:20
Analyzer make	TEI 43i	Analyzer serial #	JC1404901075

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.9	----	Correlation Coefficient	0.999995
830.4	829.4	1.0012		
420.6	418.1	1.0060	Slope	0.999876
210.3	208.3	1.0095		
			Intercept	1.632533









# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	April 8, 2015	Last Calibration	March 10, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:43	End Time (MST)	14:00
Gas Cert Reference	ALM028262	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	9/9/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
ZAG air Make/Model	API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346
SO2 gas concentration	59.4 ppm	SO2 gas cert/exp	CC307191 3/26/2012

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-601	-601
Analyzer IP address	192.168.1.42		Lamp voltage	778	779
Calculated slope	0.992198	0.992013	Chamber temp	45	45
Calculated intercept	0.283702	-0.071896	Pressure	550.0	546.9
Analyzer Background	14.4	14.2	Flow	1.010	0.990
Analyzer Coefficient	0.918	0.914	Intensity	87	87
			Converter temp.	324	325
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	4000	0.0	0.0	-0.3	----
as found span	4000	63.5	80.0	79.9	1.002
SO2 scrubber check	5000	17.7	210.3	0.1	----
calibrator zero	4000	0.0	0.0	0.1	----
high point	4000	63.5	80.0	80.7	0.991
second point	4000	31.8	40.1	40.5	0.988
third point	4000	15.9	20.0	20.2	0.991
as left zero	5000	0.0	0.0	0.0	----
as left span	4000	63.5	80.0	80.3	0.996
Average Correction Factor					0.990

Corrected As found	80.2	Previous response	80.4	% change	0.2%
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**Notes:**

Sample inlet filter changed after as founds. Slightly adjusted both zero and span.

Calibration Performed By: Asad Hidayat



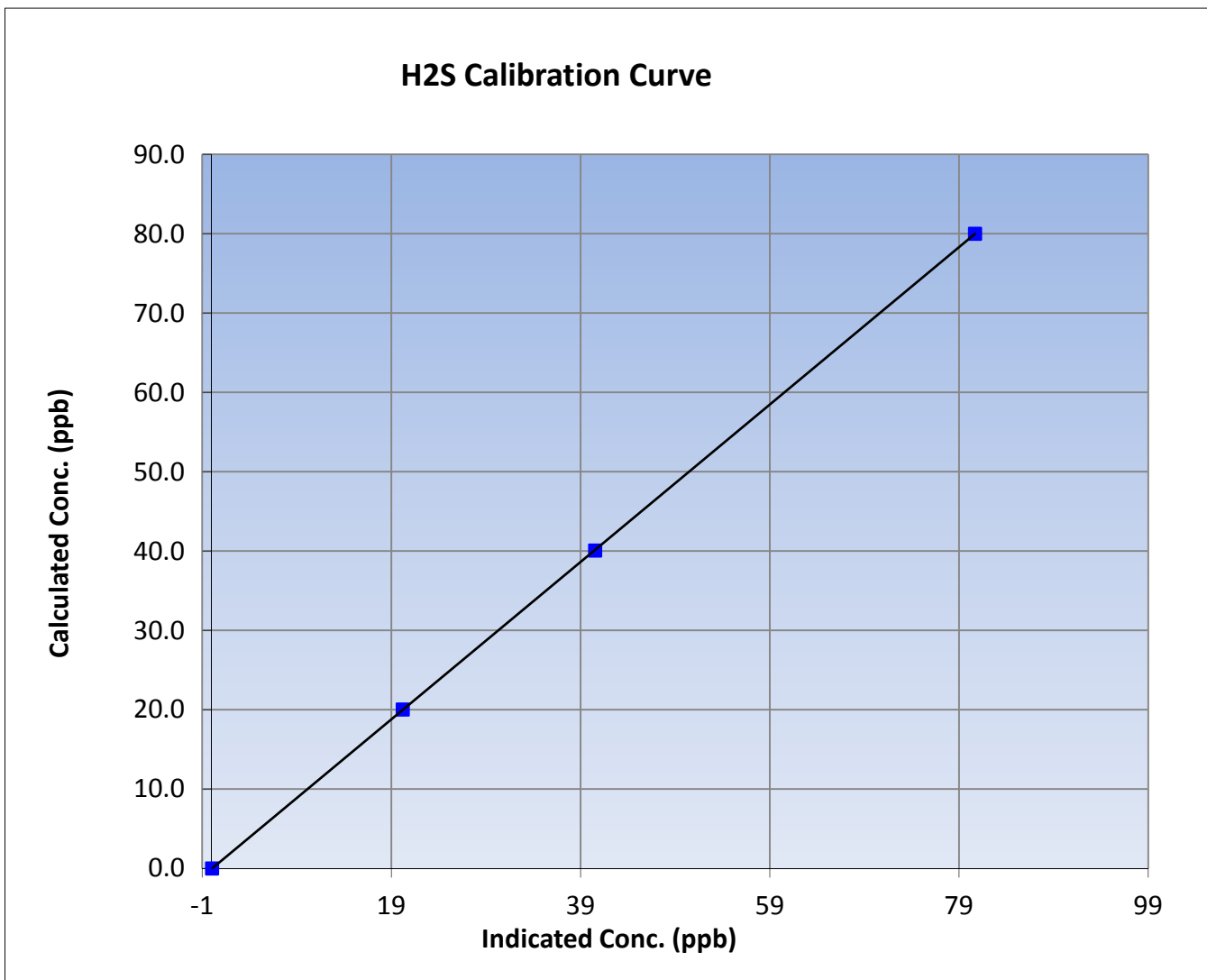
# Wood Buffalo Environmental Association H2S Calibration Report

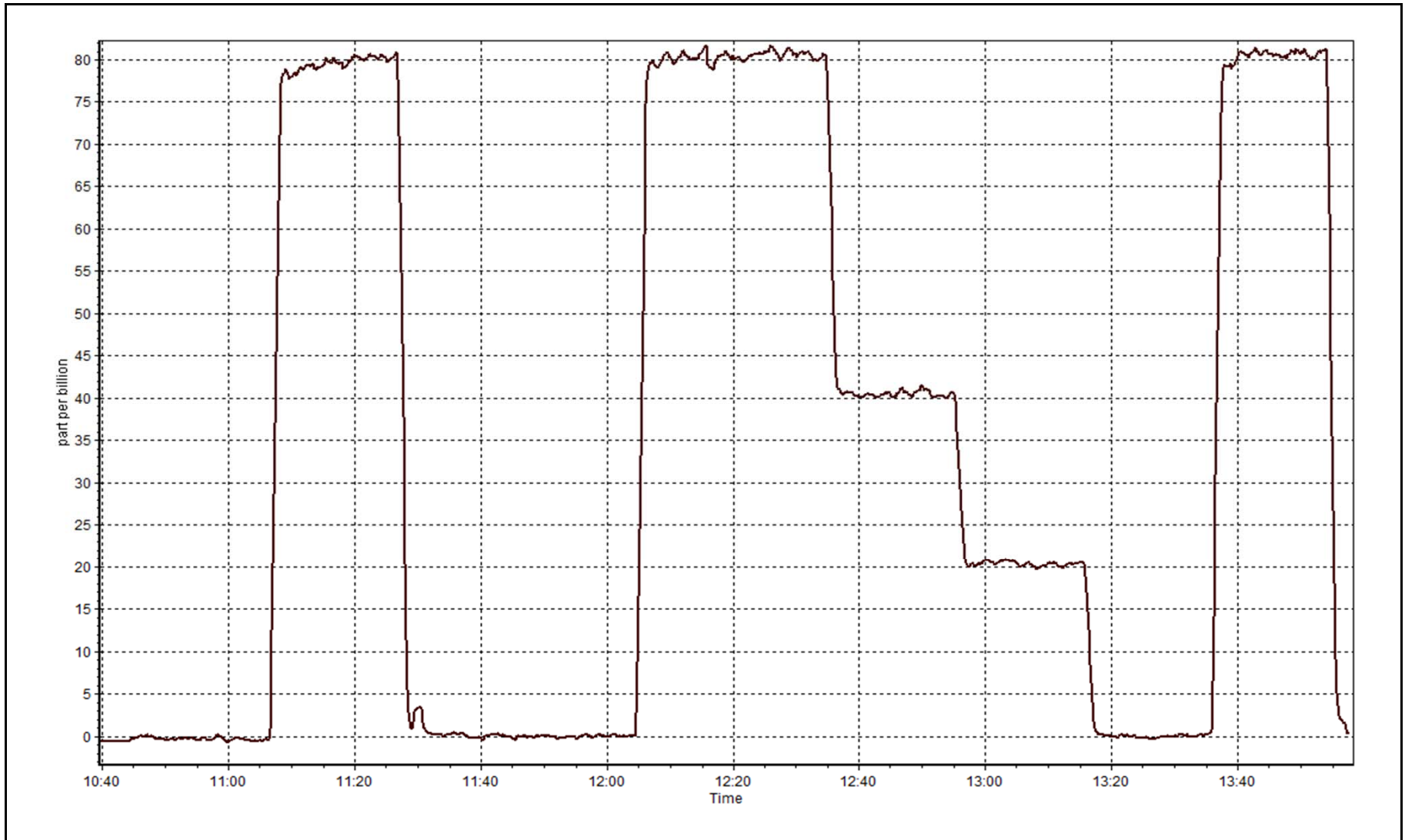
## Station Information

Calibration Date	April 8, 2015	Previous Calibration	March 10, 2015
Station Name	AMS 2	Station Number	AMS 2
Start Time (MST)	10:43	End Time (MST)	14:00
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	0.1	----	Correlation Coefficient	0.999997
80.0	80.7	0.9914		
40.1	40.5	0.9884	Slope	0.992013
20.0	20.2	0.9908		
			Intercept	-0.071896







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Thursday, April 02, 2015	Last Calibration	Thursday, March 12, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	15:20
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	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
ZAG make/model	Teledyne API 701	Serial Number	825
DACS make/model	Campbell Scientific CR3000	Serial Number	8346

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.8	42.3
Calculated slope	1.001927	0.999605	Fuel Pressure	25.7	20.2
Calculated intercept	-0.018005	0.012147	Analyzer Coeff	4.9	4.6
			Analyzer BKG	2.480	2.440

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

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.08	----
as found span	5000	69.9	14.83	14.84	0.999
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	69.9	14.83	14.83	1.000
second point	5000	35.4	7.51	7.49	1.002
third point	5000	17.7	3.75	3.72	1.009
as left zero	5000	0.0	0.00	-0.01	----
as left span	5000	69.9	14.83	14.72	1.007
Average Correction Factor					1.004

Corrected As found	14.76	Previous response	14.82	% change	0.4%
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**Notes:**

THC pump and sample inlet filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association THC Calibration Report

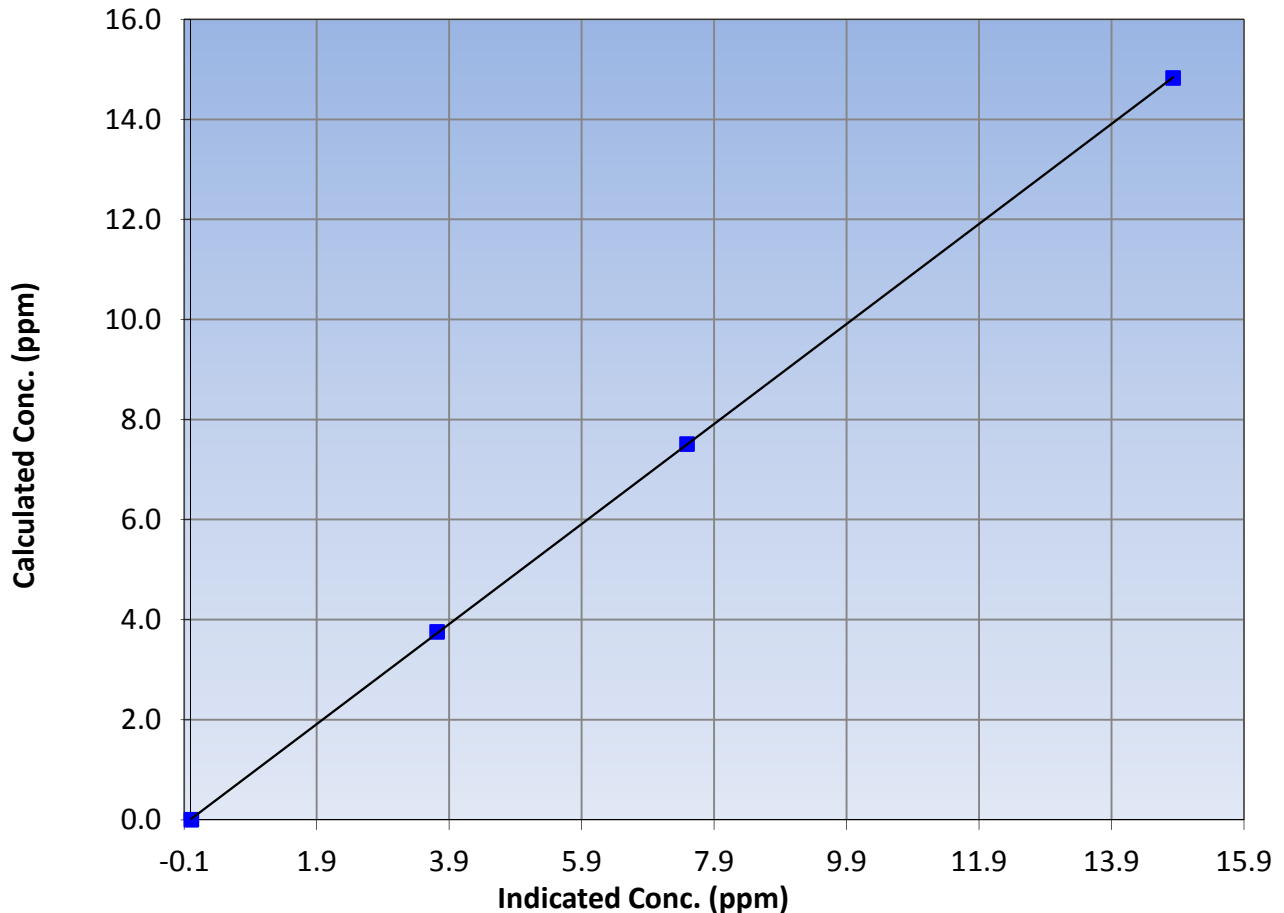
## Station Information

Calibration Date	April 2, 2015	Previous Calibration	March 12, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:15	End Time (MST)	15:20
Analyzer make	51i-LT	Analyzer serial #	1300156231

## Calibration Data

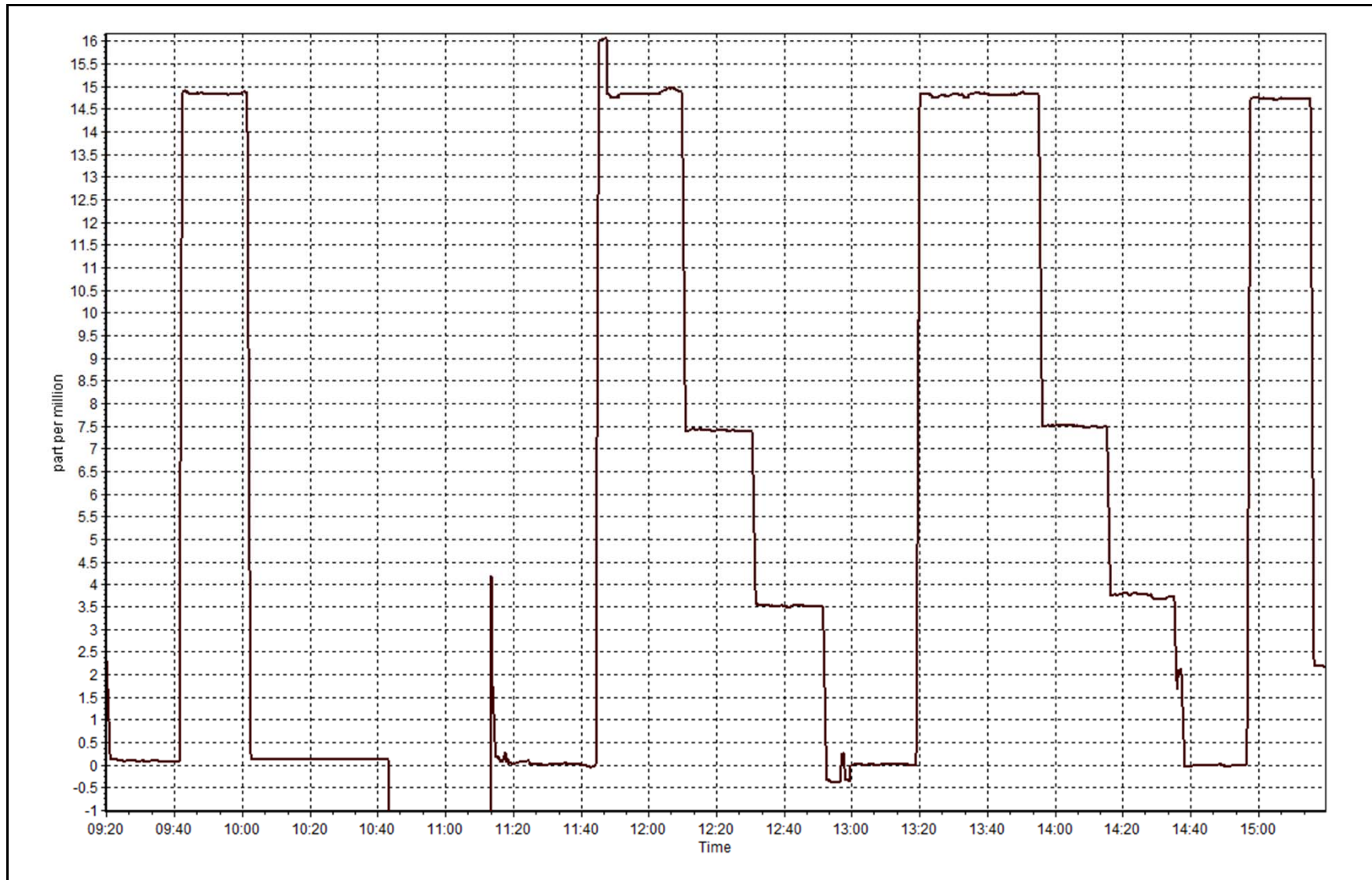
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999990
14.83	14.83	0.9997		
7.51	7.49	1.0024	Slope	0.999605
3.75	3.72	1.0092		
			Intercept	0.012147

### THC Calibration Curve



THC Calibration Plot

Date: April 2, 2015



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 3  
LOWER CAMP METEOROLOGY  
APRIL 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

May 29, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
Temperature 20 m (C) Average	720	0	0	100.00	24.5	-	16.6	-
Temperature 45 m (C) Average	720	0	0	100.00	24.5	-	16.7	-
Temperature 100 m (C) Average	720	0	0	100.00	23.9	-	17.1	-
Temperature 167 m (C) Average	720	0	0	100.00	23.3	-	17.2	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	98	-	72.0	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	97	-	71.0	-
Relative Humidity 100 m (%) Average	720	0	0	100.00	97	-	73.0	-
Relative Humidity 167 m (%) Average	720	0	0	100.00	98	-	74.0	-
Wind Speed 20 m (km/h) Average	720	0	0	100.00	28	-	17.0	-
Wind Speed 45 m (km/h) Average	720	0	0	100.00	37	-	23.0	-
Wind Speed 100 m (km/h) Average	720	0	0	100.00	53	-	31.0	-
Wind Speed 167 m (km/h) Average	720	0	0	100.00	60	-	39.0	-
Wind Direction 20 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 167 m (deg) Average	720	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0	0	100.00	0.7	-	0.1	-
Vertical Wind Speed 45 m (km/h) Average	720	0	0	100.00	1.7	-	0.8	-
Vertical Wind Speed 100 m (km/h) Average	720	0	0	100.00	3.5	-	1.8	-
Vertical Wind Speed 167 m (km/h) Average	720	0	0	100.00	4.1	-	2.1	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
Temperature 20 m (C) Average	720	5.2	7.6	-	-13.9	-5.2	-0.2	5.6	10.8	14.4	24.5
Temperature 45 m (C) Average	720	5.16	7.6	-	-13.6	-5.2	0	5.6	10.7	14.2	24.5
Temperature 100 m (C) Average	720	5.13	7.6	-	-13.5	-5.8	0.8	5.6	10.4	13.8	23.9
Temperature 167 m (C) Average	720	5	7.4	-	-13.5	-6.2	0.7	5.7	10.1	13.8	23.3
Relative Humidity 20 m (%) Average	720	46.5	20	-	13	24	31	43	59	77	98
Relative Humidity 45 m (%) Average	720	45.1	19	-	13	23	30	42	57	75	97
Relative Humidity 100 m (%) Average	720	43.1	19	-	12	22	29	40	54	70	97
Relative Humidity 167 m (%) Average	720	42.1	18	-	12	21	29	39	50	69	98
Wind Speed 20 m (km/h) Average	720	10	5	-	0	3	6	10	14	17	28
Wind Speed 45 m (km/h) Average	720	13.2	7	-	0	4	8	13	18	22	37
Wind Speed 100 m (km/h) Average	720	18.2	9	-	0	6	11	17	25	31	53
Wind Speed 167 m (km/h) Average	720	21.2	11	-	1	8	12	21	29	35	60
Wind Direction 20 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	-0.13	0.2	-	-1	-0.5	-0.3	-0.1	0	0.1	0.7
Vertical Wind Speed 45 m (km/h) Average	720	0.01	0.6	-	-1.9	-0.7	-0.3	0	0.4	0.8	1.7
Vertical Wind Speed 100 m (km/h) Average	720	0.3	0.7	-	-2.2	-0.4	-0.1	0.2	0.6	1.1	3.5
Vertical Wind Speed 167 m (km/h) Average	720	0.68	0.9	-	-1.8	-0.2	0.1	0.5	1.1	1.8	4.1

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

OPERATIONAL NOTES

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

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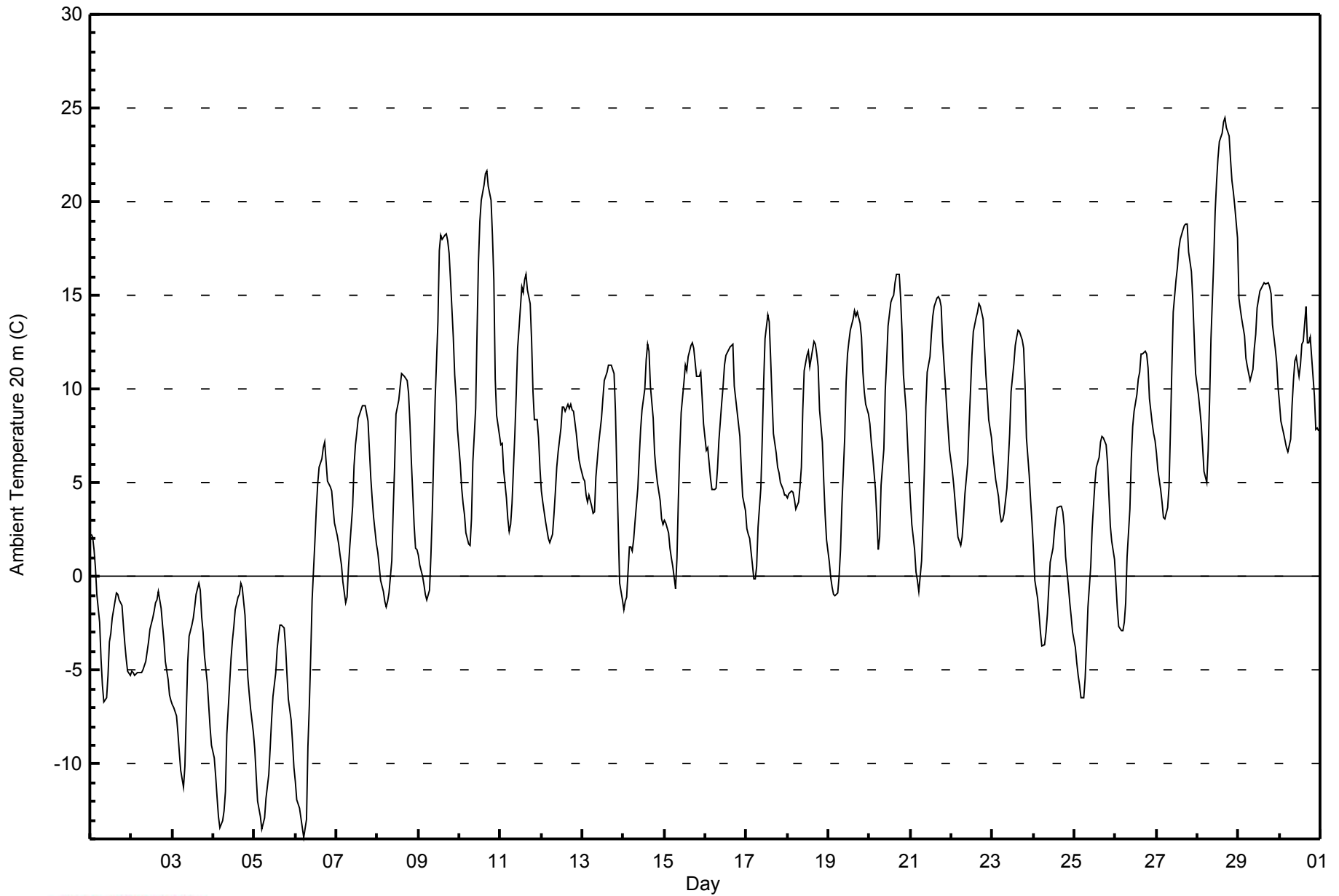


Maximum Value: 24.5 C on Apr 28 17:00																				Maximum Daily Average: 16.6 C on Apr 28					Hours in Service: 720																								
Minimum Value: -13.9 C on Apr 6 06:00																				Minimum Daily Average: -8.0 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 10.8 C at hour 16																				Minimum Diurnal Average: -0.8 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 5.20 C																				Percentiles: P <sub>1</sub> = -12.9 P <sub>10</sub> = -5.2 Q <sub>1</sub> = -0.2 Median = 5.6 Q <sub>3</sub> = 10.8 P <sub>90</sub> = 14.4 P <sub>99</sub> = 21.7					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-Apr	2.3	2.1	1.4	0.4	-0.9	-2.4	-4.4	-5.8	-6.7	-6.5	-5.3	-3.5	-3.0	-2.2	-1.3	-0.9	-1.0	-1.2	-1.6	-2.6	-3.5	-4.4	-5.0	-5.3	-2.6	2.3																							
2-Apr	-5.0	-5.2	-5.2	-5.1	-5.1	-5.2	-5.1	-5.0	-4.5	-4.0	-3.5	-2.8	-2.2	-1.9	-1.4	-1.2	-0.8	-1.7	-2.6	-3.4	-4.5	-5.5	-6.3	-6.6	-3.9	-0.8																							
3-Apr	-6.8	-7.0	-7.5	-8.4	-9.4	-10.3	-11.2	-10.1	-7.3	-4.6	-3.2	-2.6	-2.2	-1.7	-0.9	-0.3	-0.7	-2.1	-2.9	-4.2	-5.6	-6.8	-8.1	-9.0	-5.5	-0.3																							
4-Apr	-9.7	-10.7	-11.7	-12.8	-13.4	-13.0	-12.5	-11.5	-8.4	-5.7	-4.3	-3.4	-2.7	-1.8	-1.1	-1.0	-0.4	-0.6	-2.1	-3.7	-5.3	-6.2	-7.1	-8.4	-6.6	-0.4																							
5-Apr	-9.3	-10.7	-12.0	-12.8	-13.5	-13.2	-12.9	-11.9	-10.6	-9.2	-7.7	-6.4	-5.1	-3.8	-3.2	-2.6	-2.6	-2.7	-3.7	-5.2	-6.6	-7.6	-8.8	-10.2	-8.0	-2.6																							
6-Apr	-10.9	-11.9	-12.4	-12.9	-13.4	-13.9	-13.0	-9.1	-6.9	-4.2	-1.3	1.9	3.6	5.0	5.8	6.3	6.9	7.2	6.2	5.1	4.8	4.6	3.7	2.9	-1.9	7.2																							
7-Apr	2.1	1.7	1.1	0.6	-0.3	-1.4	-1.1	0.4	1.7	3.7	5.9	7.0	7.7	8.4	8.9	9.1	9.1	9.2	8.3	6.8	5.2	4.1	3.1	1.7	4.3	9.2																							
8-Apr	1.3	0.6	-0.2	-0.8	-1.3	-1.6	-1.3	-0.9	0.9	3.5	5.9	8.7	9.4	10.2	10.8	10.8	10.7	10.5	9.8	8.1	6.2	2.7	1.5	1.4	4.4	10.8																							
9-Apr	1.1	0.6	0.1	-0.4	-1.0	-1.2	-0.7	1.1	3.5	6.5	9.4	13.6	17.4	18.2	18.0	18.3	18.3	17.9	17.2	15.8	12.8	10.7	9.6	7.9	8.9	18.3																							
10-Apr	6.0	4.8	3.9	3.3	2.3	1.8	1.7	3.1	6.2	9.0	13.1	16.8	19.0	20.1	20.9	21.5	21.6	20.8	20.1	18.2	15.9	10.5	8.6	7.5	11.5	21.6																							
11-Apr	7.0	7.1	5.7	4.2	3.1	2.4	2.8	3.9	7.6	9.7	12.2	13.2	15.5	15.1	15.9	16.1	15.3	14.6	12.7	9.9	8.4	8.4	7.4	5.8	9.3	16.1																							
12-Apr	4.6	4.0	2.9	2.5	2.1	1.8	2.2	3.3	4.5	5.8	6.7	7.9	9.0	9.0	8.8	9.2	9.0	9.2	8.9	8.8	7.6	6.9	6.2	5.8	6.1	9.2																							
13-Apr	5.3	5.1	4.4	4.0	4.3	3.7	3.4	3.4	5.3	7.1	7.8	8.5	9.5	10.4	10.9	11.3	11.3	11.3	10.8	8.8	5.5	2.7	-0.4	-1.3	6.4	11.3																							
14-Apr	-1.7	-1.3	-1.1	1.6	1.6	1.4	2.0	3.0	4.7	6.4	7.8	8.9	10.0	11.6	12.4	12.0	10.2	8.5	6.6	5.7	5.0	4.0	3.1	2.8	5.2	12.4																							
15-Apr	3.0	2.8	2.3	1.5	1.0	0.6	-0.7	1.0	4.1	6.7	8.7	10.4	11.3	11.0	11.7	12.3	12.5	12.2	11.4	10.7	10.7	10.9	9.5	8.1	7.2	12.5																							
16-Apr	6.7	6.9	6.0	5.2	4.6	4.7	4.7	5.7	7.2	9.2	10.2	11.3	11.8	12.0	12.2	12.3	12.4	10.2	8.8	8.1	7.5	5.7	4.3	3.5	8.0	12.4																							
17-Apr	2.6	2.3	2.0	0.6	-0.1	-0.1	0.6	2.6	4.7	7.3	10.3	12.7	14.0	13.6	11.7	9.6	7.6	6.6	5.8	5.6	5.0	4.6	4.4	4.3	5.8	14.0																							
18-Apr	4.2	4.4	4.6	4.5	4.1	3.6	4.0	4.8	5.8	8.9	11.0	11.8	12.0	11.2	11.7	12.5	12.4	11.9	11.2	8.9	7.2	5.1	3.3	2.0	7.5	12.5																							
19-Apr	0.7	-0.1	-0.6	-0.9	-1.0	-0.9	0.0	1.5	3.9	7.4	10.4	11.9	12.5	13.2	13.7	14.2	13.9	14.1	13.5	12.7	10.9	9.9	9.2	8.7	7.5	14.2																							
20-Apr	8.2	7.2	6.4	4.6	3.1	1.4	2.1	4.8	6.8	10.0	11.5	13.3	14.7	14.9	15.0	15.6	16.1	16.1	14.8	13.0	10.8	8.8	7.1	5.4	9.7	16.1																							
21-Apr	4.0	2.8	1.5	0.2	-0.2	-0.8	0.9	3.1	5.8	9.0	10.9	11.7	12.9	13.9	14.4	14.8	15.0	14.8	14.4	12.6	10.2	9.0	7.8	6.7	8.1	15.0																							
22-Apr	5.6	4.9	4.0	3.0	2.1	1.6	2.1	3.2	4.4	6.0	8.1	10.0	11.8	13.1	13.8	14.1	14.6	14.4	13.7	12.3	10.8	9.6	8.4	7.4	8.3	14.6																							
23-Apr	6.5	5.8	5.1	4.3	3.3	3.0	3.0	3.4	4.8	6.1	7.6	9.9	11.3	12.3	12.8	13.1	13.1	12.7	12.1	10.3	7.4	5.4	4.0	2.8	7.5	13.1																							
24-Apr	1.4	-0.2	-1.2	-2.0	-3.0	-3.7	-3.6	-2.9	-2.0	-0.6	0.8	1.5	2.4	3.1	3.6	3.7	3.8	3.4	2.7	1.1	-0.5	-1.4	-2.2	-3.0	0.1	3.8																							
25-Apr	-3.8	-4.6	-5.3	-5.8	-6.5	-6.4	-5.4	-3.6	-1.6	0.6	2.5	3.8	5.0	5.8	6.4	7.2	7.5	7.4	7.0	6.1	4.4	2.7	1.9	1.0	1.1	7.5																							
26-Apr	-0.4	-1.7	-2.6	-2.9	-2.9	-2.5	-1.4	1.1	3.6	6.3	8.0	8.8	9.7	10.5	10.9	11.9	11.9	12.0	11.9	11.1	9.5	8.1	7.7	7.3	5.7	12.0																							
27-Apr	6.6	5.7	4.6	4.0	3.2	3.1	3.7	4.8	7.8	11.1	14.1	15.8	16.5	17.5	18.0	18.5	18.7	18.8	18.8	17.3	16.3	14.8	12.8	10.9	11.8	18.8																							
28-Apr	9.7	9.0	8.2	6.9	5.6	5.0	6.8	9.4	12.7	16.9	19.5	21.1	22.3	23.2	23.7	24.2	24.5	24.0	23.5	22.3	21.2	20.6	19.8	18.1	16.6	24.5																							
29-Apr	14.9	14.2	13.8	12.8	11.6	11.2	10.8	10.4	11.0	12.2	12.9	14.3	15.2	15.4	15.6	15.7	15.6	15.7	15.5	15.1	13.4	12.2	11.4	10.1	13.4	15.7																							
30-Apr	9.3	8.3	7.6	7.3	6.8	6.7	7.4	9.1	10.4	11.5	11.7	10.7	11.2	12.4	12.6	14.4	12.5	12.5	12.8	11.7	9.7	7.9	7.9	7.8	10.0	14.4																							
																								2.2	1.6	0.9	0.2	-0.4	-0.8	-0.5	0.7	2.6	4.9	6.7	8.2	9.4	10.0	10.4	10.8	10.6	10.2	9.5	8.2	6.7	5.3	4.2	3.2	Diurnal Average	
																								14.9	14.2	13.8	12.8	11.6	11.2	10.8	10.4	12.7	16.9	19.5	21.1	22.3	23.2	23.7	24.2	24.5	24.0	23.5	22.3	21.2	20.6	19.8	18.1	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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







**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	184	25.56	25.56
0 - 10	332	46.11	71.67
10 - 20	187	25.97	97.64
> 20	17	2.36	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

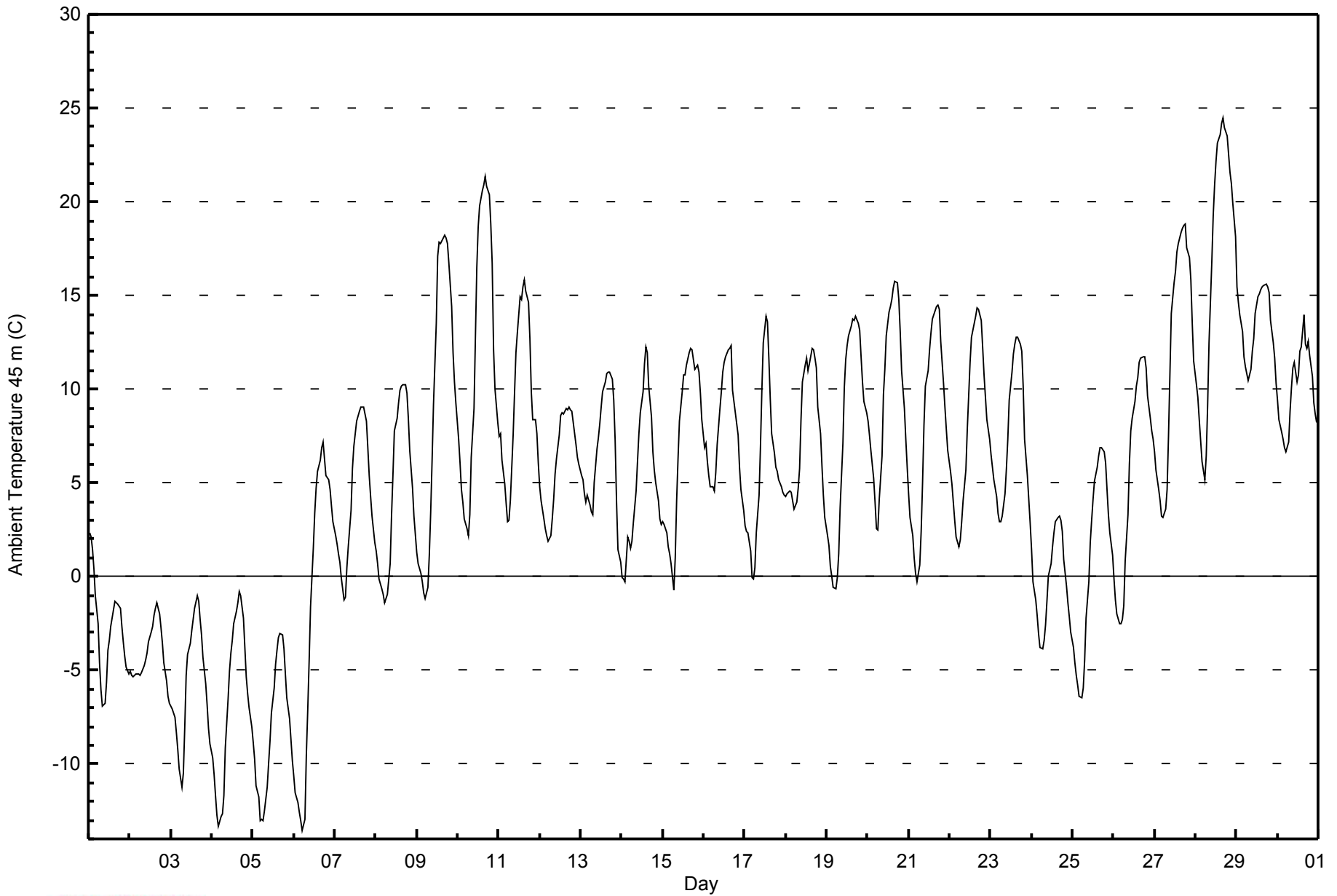


Maximum Value: 24.5 C on Apr 28 17:00																				Maximum Daily Average: 16.7 C on Apr 28					Hours in Service: 720																								
Minimum Value: -13.6 C on Apr 6 06:00																				Minimum Daily Average: -8.2 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 10.4 C at hour 16																				Minimum Diurnal Average: -0.7 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 5.16 C																				Percentiles: P <sub>1</sub> = -12.8 P <sub>10</sub> = -5.2 Q <sub>1</sub> = 0.0 Median = 5.6 Q <sub>3</sub> = 10.7 P <sub>90</sub> = 14.2 P <sub>99</sub> = 22.1					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-Apr	2.3	2.1	1.4	0.4	-1.0	-2.6	-4.6	-6.0	-6.9	-6.8	-5.6	-3.9	-3.4	-2.7	-1.8	-1.3	-1.4	-1.5	-1.7	-2.6	-3.5	-4.2	-4.8	-5.2	-2.7	2.3																							
2-Apr	-5.0	-5.3	-5.3	-5.2	-5.2	-5.2	-5.3	-5.1	-4.8	-4.4	-4.0	-3.5	-2.9	-2.6	-2.1	-1.7	-1.4	-2.0	-2.7	-3.5	-4.6	-5.6	-6.4	-6.8	-4.2	-1.4																							
3-Apr	-7.0	-7.1	-7.5	-8.3	-9.2	-10.3	-11.3	-10.5	-8.0	-5.2	-4.1	-3.6	-2.9	-2.3	-1.7	-1.0	-1.3	-2.3	-3.1	-4.3	-5.7	-6.8	-8.1	-8.9	-5.9	-1.0																							
4-Apr	-9.7	-10.6	-11.7	-12.7	-13.3	-12.8	-12.6	-11.7	-9.1	-6.6	-5.1	-4.1	-3.4	-2.5	-1.9	-1.4	-0.8	-1.0	-2.2	-3.8	-5.4	-6.2	-7.0	-8.1	-6.8	-0.8																							
5-Apr	-8.8	-9.8	-11.2	-11.8	-13.1	-13.0	-13.0	-12.5	-11.2	-10.0	-8.8	-7.3	-6.0	-4.7	-4.0	-3.2	-3.0	-3.1	-3.9	-5.2	-6.5	-7.6	-8.7	-9.8	-8.2	-3.0																							
6-Apr	-10.6	-11.5	-12.0	-12.6	-13.1	-13.6	-13.0	-9.5	-7.2	-4.5	-1.6	1.5	3.4	4.7	5.6	6.2	6.9	7.2	6.3	5.4	5.2	4.7	3.7	2.9	-1.9	7.2																							
7-Apr	2.2	1.8	1.2	0.8	-0.1	-1.3	-1.1	0.5	1.6	3.5	5.8	7.0	7.6	8.3	8.8	9.0	9.1	9.1	8.3	6.8	5.4	4.2	3.2	1.8	4.3	9.1																							
8-Apr	1.4	0.7	-0.1	-0.6	-1.0	-1.4	-1.1	-0.9	0.7	3.3	5.5	7.8	8.5	9.3	10.0	10.2	10.3	10.2	9.8	8.4	6.7	4.7	3.2	2.3	4.5	10.3																							
9-Apr	1.3	0.7	0.2	-0.3	-0.9	-1.2	-0.6	1.2	3.4	6.2	9.2	13.5	17.1	17.9	17.8	18.0	18.2	18.1	17.8	16.8	14.4	11.9	10.4	9.3	9.2	18.2																							
10-Apr	7.3	6.1	4.7	4.0	3.1	2.5	2.2	3.3	6.4	9.0	12.8	16.5	18.7	19.8	20.6	20.9	21.3	20.8	20.4	18.8	16.7	12.1	10.0	8.2	11.9	21.3																							
11-Apr	7.5	7.6	6.2	5.0	3.9	3.0	3.0	4.1	7.6	9.8	12.0	13.0	15.0	14.8	15.5	15.9	15.3	14.6	12.7	9.9	8.4	8.4	7.6	6.1	9.4	15.9																							
12-Apr	4.8	4.1	3.0	2.6	2.2	1.9	2.2	3.1	4.1	5.4	6.3	7.5	8.6	8.7	8.7	9.0	8.9	9.1	8.9	8.8	7.6	7.0	6.4	6.0	6.0	9.1																							
13-Apr	5.4	5.2	4.4	4.0	4.4	3.8	3.4	3.3	5.0	6.8	7.4	8.1	9.1	9.9	10.4	10.8	10.9	10.9	10.5	9.5	7.3	4.0	1.4	0.8	6.5	10.9																							
14-Apr	-0.1	-0.1	-0.2	2.1	1.9	1.5	1.9	2.9	4.6	6.2	7.6	8.7	9.8	11.4	12.3	12.0	10.2	8.5	6.6	5.7	5.0	4.1	3.1	2.8	5.3	12.3																							
15-Apr	2.9	2.8	2.3	1.6	1.2	0.7	-0.7	1.0	4.0	6.3	8.3	9.9	10.7	10.7	11.3	11.9	12.2	12.1	11.6	11.0	11.3	10.9	9.8	8.4	7.2	12.2																							
16-Apr	6.9	7.1	6.2	5.4	4.8	4.8	4.6	5.6	7.0	9.0	9.9	10.9	11.4	11.8	12.1	12.2	12.3	10.0	8.8	8.2	7.5	5.8	4.6	3.6	7.9	12.3																							
17-Apr	2.7	2.4	2.3	1.4	-0.1	-0.1	0.5	2.3	4.3	7.0	10.0	12.5	13.9	13.6	11.6	9.5	7.7	6.6	5.8	5.6	5.1	4.8	4.5	4.4	5.8	13.9																							
18-Apr	4.2	4.4	4.6	4.5	4.1	3.6	4.0	4.7	5.7	8.4	10.3	11.3	11.7	11.0	11.3	12.2	12.1	11.7	11.1	9.1	7.6	5.9	4.3	3.1	7.5	12.2																							
19-Apr	2.2	1.6	0.5	0.0	-0.6	-0.6	0.0	1.2	3.7	7.1	10.1	11.6	12.3	12.8	13.4	13.8	13.7	13.9	13.5	13.2	11.7	10.4	9.3	8.8	7.6	13.9																							
20-Apr	8.3	7.6	6.8	5.2	4.0	2.5	2.5	4.2	6.4	9.7	11.1	12.9	14.1	14.4	14.8	15.4	15.7	15.7	14.8	13.1	10.9	9.0	7.4	5.8	9.7	15.7																							
21-Apr	4.4	3.1	2.2	1.0	0.2	-0.3	0.6	2.4	5.0	8.1	10.1	11.0	12.1	13.0	13.7	14.2	14.4	14.5	14.3	12.6	10.3	9.0	7.8	6.8	7.9	14.5																							
22-Apr	5.6	4.9	4.0	3.0	2.1	1.6	2.0	2.9	4.1	5.7	7.8	9.6	11.5	12.7	13.5	13.9	14.3	14.2	13.6	12.2	10.7	9.6	8.4	7.4	8.1	14.3																							
23-Apr	6.5	5.8	5.1	4.3	3.4	2.9	2.9	3.2	4.5	5.8	7.3	9.4	10.9	11.9	12.4	12.8	12.8	12.4	12.0	10.2	7.3	5.4	4.1	2.8	7.3	12.8																							
24-Apr	1.4	-0.2	-1.2	-2.0	-3.0	-3.8	-3.9	-3.4	-2.6	-1.3	0.0	0.7	1.6	2.3	2.9	3.1	3.2	3.0	2.4	0.9	-0.5	-1.4	-2.2	-3.0	-0.3	3.2																							
25-Apr	-3.8	-4.6	-5.3	-5.8	-6.4	-6.5	-5.9	-4.5	-2.2	-0.3	1.8	3.0	4.1	5.1	5.8	6.5	6.9	6.9	6.7	6.1	4.6	3.3	2.3	1.2	0.8	6.9																							
26-Apr	-0.1	-1.2	-2.0	-2.5	-2.5	-2.3	-1.6	0.8	3.3	6.0	7.8	8.5	9.3	10.1	10.6	11.4	11.6	11.7	11.7	11.2	9.6	8.5	7.8	7.4	5.6	11.7																							
27-Apr	6.6	5.7	4.6	4.0	3.2	3.1	3.6	4.6	7.5	10.8	14.0	15.7	16.3	17.3	17.8	18.4	18.6	18.7	18.8	17.6	17.0	15.8	13.6	11.5	11.9	18.8																							
28-Apr	10.2	9.5	8.4	7.2	6.2	5.2	6.4	9.1	12.5	16.8	19.2	20.9	22.2	23.1	23.6	24.2	24.5	24.0	23.5	22.5	21.6	20.9	20.0	18.2	16.7	24.5																							
29-Apr	15.5	14.6	14.0	13.1	11.7	11.2	10.8	10.4	11.0	12.1	12.7	14.0	15.0	15.1	15.3	15.5	15.5	15.6	15.5	15.2	13.6	12.4	11.7	10.3	13.4	15.6																							
30-Apr	9.4	8.4	7.7	7.3	6.9	6.7	7.2	8.8	10.1	11.2	11.4	10.4	10.8	12.0	12.3	14.0	12.4	12.1	12.6	11.8	10.7	9.2	8.6	8.2	10.0	14.0																							
																								2.5	1.9	1.1	0.5	-0.2	-0.7	-0.6	0.5	2.3	4.5	6.3	7.8	8.9	9.6	10.0	10.4	10.4	10.1	9.5	8.4	7.0	5.7	4.5	3.5	Diurnal Average	
																								15.5	14.6	14.0	13.1	11.7	11.2	10.8	10.4	12.5	16.8	19.2	20.9	22.2	23.1	23.6	24.2	24.5	24.0	23.5	22.5	21.6	20.9	20.0	18.2	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	181	25.14	25.14
0 - 10	337	46.81	71.94
10 - 20	186	25.83	97.78
> 20	16	2.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

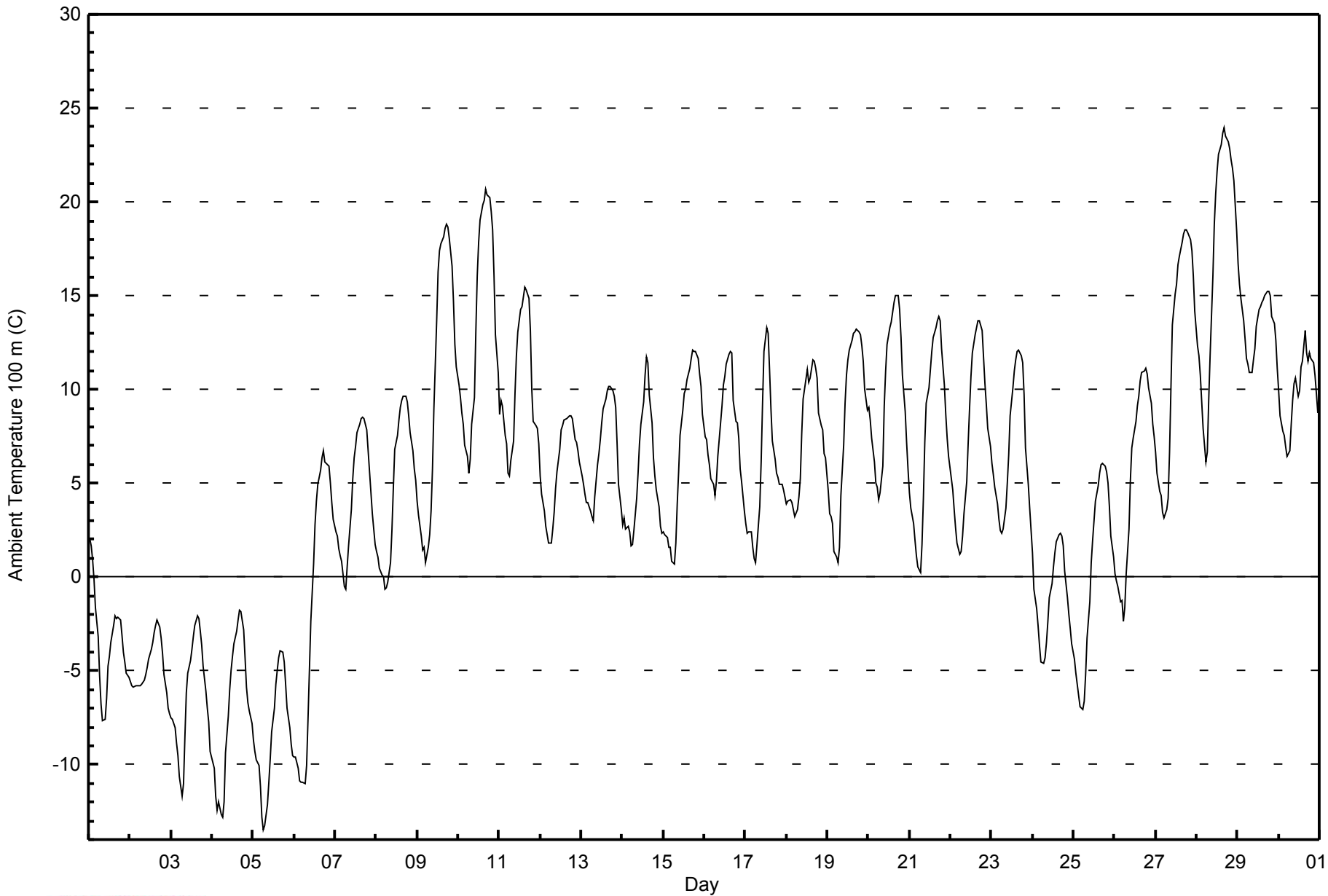


Maximum Value: 23.9 C on Apr 28 17:00																				Maximum Daily Average: 17.1 C on Apr 28					Hours in Service: 720	
Minimum Value: -13.5 C on Apr 5 07:00																				Minimum Daily Average: -8.5 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 9.8 C at hour 17																				Minimum Diurnal Average: -0.3 C at hour 7					Hours of Missing Data: 0	
Monthly Average: 5.13 C																				Percentiles: P <sub>1</sub> = -12.0 P <sub>10</sub> = -5.8 Q <sub>1</sub> = 0.8 Median = 5.6 Q <sub>3</sub> = 10.4 P <sub>90</sub> = 13.8 P <sub>99</sub> = 22.3					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-Apr	2.0	1.7	0.9	-0.1	-1.6	-3.2	-5.3	-6.7	-7.7	-7.6	-6.4	-4.8	-4.2	-3.5	-2.6	-2.1	-2.2	-2.2	-2.3	-3.1	-4.0	-4.6	-5.1	-5.4	-3.3	2.0
2-Apr	-5.6	-5.8	-5.9	-5.8	-5.8	-5.8	-5.8	-5.7	-5.5	-5.2	-4.8	-4.4	-3.9	-3.5	-3.0	-2.6	-2.3	-2.7	-3.3	-4.1	-5.2	-6.2	-7.0	-7.3	-4.9	-2.3
3-Apr	-7.5	-7.6	-8.1	-8.8	-9.5	-10.6	-11.7	-11.0	-8.5	-6.2	-5.1	-4.5	-3.8	-3.2	-2.6	-2.1	-2.2	-2.9	-3.7	-4.8	-6.1	-7.0	-7.7	-9.3	-6.4	-2.1
4-Apr	-9.9	-10.2	-11.7	-12.4	-12.0	-12.6	-12.8	-12.0	-9.4	-7.4	-6.1	-5.0	-4.2	-3.5	-2.9	-2.3	-1.8	-1.8	-2.8	-4.3	-5.9	-6.7	-7.2	-7.8	-7.2	-1.8
5-Apr	-8.7	-9.3	-9.7	-10.0	-11.1	-12.8	-13.5	-13.2	-12.1	-11.0	-9.7	-8.3	-7.0	-5.7	-5.0	-4.3	-3.9	-4.0	-4.5	-5.7	-7.0	-8.0	-8.9	-9.5	-8.5	-3.9
6-Apr	-9.6	-9.6	-10.2	-10.9	-11.0	-10.9	-11.0	-10.1	-7.6	-5.0	-2.3	0.7	2.8	4.0	4.9	5.7	6.3	6.7	6.2	6.0	5.9	5.0	4.0	3.1	-1.5	6.7
7-Apr	2.4	2.2	1.5	1.2	0.8	-0.5	-0.7	0.5	1.6	3.6	5.3	6.3	7.0	7.7	8.2	8.4	8.5	8.5	7.8	6.7	5.6	4.5	3.4	1.7	4.3	8.5
8-Apr	1.4	1.0	0.5	0.1	0.0	-0.6	-0.6	-0.3	0.8	2.5	4.7	6.8	7.5	8.3	9.0	9.4	9.6	9.7	9.3	8.6	7.7	6.8	5.8	5.2	4.7	9.7
9-Apr	4.0	3.3	2.2	1.4	1.6	0.8	1.6	2.3	3.5	5.7	9.0	13.7	16.3	17.4	17.8	18.1	18.6	18.8	18.7	18.1	16.6	14.7	12.4	11.2	10.3	18.8
10-Apr	10.3	9.6	8.7	8.1	7.0	6.4	5.5	6.3	8.1	9.5	13.1	16.0	17.8	19.0	19.9	20.1	20.7	20.4	20.2	19.5	18.5	16.0	12.9	10.9	13.5	20.7
11-Apr	8.7	9.4	9.1	7.6	7.1	5.5	5.4	6.2	7.3	9.8	11.8	13.0	14.2	14.4	14.9	15.4	15.3	14.8	13.2	10.0	8.3	8.1	8.0	7.1	10.2	15.4
12-Apr	5.4	4.4	3.5	2.7	2.3	1.8	1.8	2.5	3.5	4.7	5.6	6.8	7.8	8.1	8.3	8.4	8.5	8.6	8.6	8.5	7.3	7.2	6.7	6.1	5.8	8.6
13-Apr	5.4	4.9	4.4	4.0	4.0	3.5	3.2	3.0	4.3	6.0	6.6	7.3	8.2	9.0	9.5	9.9	10.1	10.2	10.0	9.6	9.0	7.1	4.9	3.6	6.6	10.2
14-Apr	2.8	3.1	2.6	2.7	2.4	1.6	1.7	2.5	4.2	5.6	7.1	8.2	9.4	10.7	11.7	11.4	9.7	8.3	6.4	5.4	4.7	3.8	2.7	2.3	5.5	11.7
15-Apr	2.4	2.2	2.1	1.6	1.6	0.8	0.7	1.8	3.9	5.6	7.5	8.9	9.8	10.0	10.5	11.2	11.7	12.1	12.0	12.0	11.7	10.8	10.1	8.7	7.1	12.1
16-Apr	7.5	7.3	6.5	6.0	5.2	4.9	4.4	5.1	6.4	8.3	9.2	10.2	10.7	11.4	11.9	12.0	11.9	9.4	8.3	8.2	7.4	5.8	5.1	3.5	7.8	12.0
17-Apr	2.8	2.3	2.4	2.4	1.6	1.0	0.8	1.8	3.7	6.1	9.2	12.1	13.3	13.0	11.1	8.9	7.3	6.3	5.6	5.3	5.0	4.9	4.6	4.3	5.7	13.3
18-Apr	3.9	4.1	4.1	4.0	3.6	3.3	3.6	4.3	5.3	7.7	9.5	10.5	11.0	10.4	10.6	11.5	11.5	11.1	10.6	8.7	8.1	7.9	6.6	6.3	7.4	11.5
19-Apr	4.6	3.3	3.3	2.9	1.3	1.0	0.8	1.6	4.4	7.0	9.3	10.7	11.6	12.1	12.6	13.0	13.1	13.2	13.0	12.9	12.3	11.5	10.0	8.9	8.1	13.2
20-Apr	9.0	8.4	7.4	6.1	5.0	4.8	4.1	4.5	5.9	9.1	11.0	12.4	13.3	13.6	14.1	14.7	15.0	15.0	14.3	12.8	10.8	8.8	7.2	5.7	9.7	15.0
21-Apr	4.5	3.7	2.9	2.0	1.2	0.5	0.3	1.8	4.2	7.1	9.2	10.1	11.1	12.0	12.8	13.3	13.7	13.9	13.7	12.2	10.3	8.6	7.4	6.4	7.6	13.9
22-Apr	5.3	4.7	3.6	2.6	1.8	1.2	1.3	2.2	3.4	5.1	7.1	8.9	10.7	12.0	12.9	13.3	13.6	13.7	13.1	11.8	10.3	9.2	7.9	6.9	7.6	13.7
23-Apr	6.1	5.5	4.8	3.9	3.1	2.5	2.4	2.6	3.7	5.0	6.5	8.6	10.1	11.0	11.6	12.0	12.1	11.8	11.5	9.7	6.9	4.9	3.6	2.4	6.8	12.1
24-Apr	1.3	-0.6	-1.7	-2.6	-3.6	-4.5	-4.6	-4.3	-3.5	-2.4	-1.1	-0.3	0.6	1.3	1.9	2.2	2.4	2.2	1.6	0.3	-1.1	-2.0	-2.7	-3.5	-1.0	2.4
25-Apr	-4.3	-5.1	-5.8	-6.3	-6.9	-7.1	-6.6	-5.2	-3.3	-1.3	0.8	1.9	3.0	4.1	4.9	5.5	6.0	6.1	5.9	5.6	5.0	3.7	2.2	1.1	0.2	6.1
26-Apr	0.2	-0.2	-0.5	-1.4	-1.2	-2.3	-1.6	0.2	2.5	5.2	6.8	7.4	8.3	9.1	9.6	10.5	10.9	11.0	11.1	10.8	10.1	9.3	8.1	7.5	5.5	11.1
27-Apr	6.6	5.5	4.5	4.4	3.5	3.1	3.6	4.2	6.7	10.1	13.4	15.1	15.6	16.6	17.1	17.8	18.3	18.5	18.5	18.4	18.0	17.4	16.0	14.2	12.0	18.5
28-Apr	12.3	11.8	10.8	9.3	7.9	6.1	6.7	9.4	11.8	16.0	18.8	20.4	21.7	22.5	23.1	23.7	23.9	23.5	23.2	22.8	22.2	21.8	21.1	18.4	17.1	23.9
29-Apr	16.8	15.6	14.8	13.7	12.7	11.7	11.4	10.9	10.9	11.6	12.2	13.4	14.2	14.4	14.6	14.8	15.0	15.3	15.2	15.0	13.9	13.5	12.6	11.1	13.6	16.8
30-Apr	9.9	8.6	7.8	7.5	7.0	6.4	6.7	8.1	9.4	10.3	10.6	9.6	10.0	11.2	11.5	13.2	12.0	11.5	12.0	11.7	11.4	10.7	9.8	8.7	9.8	13.2
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	165	22.92	22.92
0 - 10	361	50.14	73.06
10 - 20	178	24.72	97.78
> 20	16	2.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



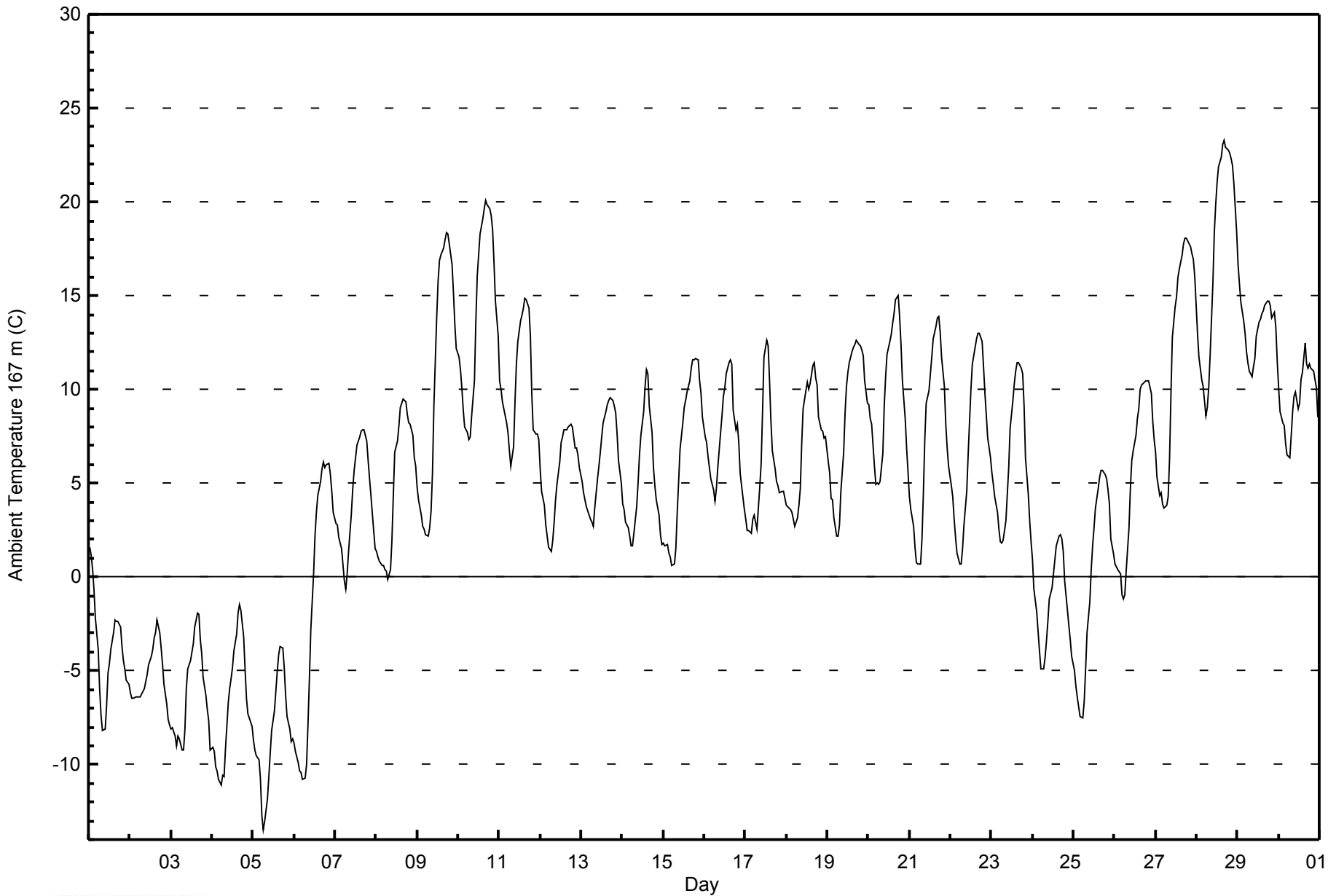
Maximum Value: 23.3 C on Apr 28 17:00																				Maximum Daily Average: 17.2 C on Apr 28					Hours in Service: 720	
Minimum Value: -13.5 C on Apr 5 07:00																				Minimum Daily Average: -8.4 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 9.4 C at hour 17																				Minimum Diurnal Average: 0.2 C at hour 7					Hours of Missing Data: 0	
Monthly Average: 5.00 C																				Percentiles: P <sub>1</sub> = -10.8 P <sub>10</sub> = -6.2 Q <sub>1</sub> = 0.7 Median = 5.7 Q <sub>3</sub> = 10.1 P <sub>90</sub> = 13.8 P <sub>99</sub> = 22.2					Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	1.6	1.2	0.4	-0.7	-2.2	-3.8	-5.9	-7.3	-8.2	-8.1	-6.8	-5.1	-4.6	-3.9	-2.9	-2.3	-2.3	-2.4	-2.7	-3.7	-4.5	-4.9	-5.5	-5.8	-3.8	1.6
2-Apr	-6.2	-6.4	-6.5	-6.4	-6.4	-6.4	-6.4	-6.2	-5.9	-5.6	-5.2	-4.7	-4.2	-3.9	-3.3	-3.0	-2.3	-3.0	-3.8	-4.6	-5.7	-6.7	-7.6	-7.9	-5.3	-2.3
3-Apr	-8.1	-8.0	-8.4	-9.0	-8.4	-8.6	-9.2	-9.2	-8.1	-5.9	-4.9	-4.4	-4.0	-3.6	-2.7	-1.9	-2.0	-3.3	-4.1	-5.3	-6.3	-7.1	-7.6	-9.2	-6.2	-1.9
4-Apr	-9.1	-9.3	-10.1	-10.4	-10.8	-11.1	-10.6	-10.7	-9.1	-6.7	-6.0	-5.4	-4.8	-4.0	-3.1	-1.9	-1.4	-1.8	-3.2	-4.9	-6.5	-7.3	-7.5	-8.0	-6.8	-1.4
5-Apr	-8.7	-9.3	-9.5	-9.8	-10.8	-12.7	-13.5	-13.0	-11.9	-10.6	-9.4	-8.2	-7.1	-6.1	-5.1	-4.1	-3.7	-3.8	-4.8	-6.3	-7.5	-8.1	-8.8	-8.7	-8.4	-3.7
6-Apr	-8.8	-9.3	-9.9	-10.4	-10.4	-10.8	-10.7	-10.0	-7.8	-5.4	-2.8	0.2	2.2	3.4	4.4	5.1	5.7	6.1	5.8	6.0	6.1	5.5	4.5	3.4	-1.6	6.1
7-Apr	2.9	2.7	2.1	1.8	1.5	-0.2	-0.6	0.2	1.3	3.4	4.7	5.7	6.4	7.0	7.5	7.8	7.9	7.9	7.3	6.2	5.2	4.4	3.4	1.5	4.1	7.9
8-Apr	1.4	1.1	0.9	0.6	0.6	0.4	0.3	-0.1	0.4	1.9	4.3	6.6	7.3	8.1	9.0	9.3	9.5	9.3	8.7	8.3	8.1	7.6	6.4	5.9	4.8	9.5
9-Apr	4.8	4.1	3.3	2.7	2.5	2.2	2.2	2.6	3.5	5.6	9.1	13.8	15.8	16.9	17.2	17.5	18.0	18.3	18.3	17.8	16.7	15.1	13.4	12.2	10.6	18.3
10-Apr	11.7	11.1	10.1	8.9	8.0	7.7	7.3	7.5	8.6	10.4	13.6	16.0	17.2	18.3	19.1	19.6	20.1	19.8	19.7	19.2	18.5	16.7	14.7	12.8	14.0	20.1
11-Apr	10.5	10.0	9.3	8.6	8.2	7.7	6.7	5.9	6.9	9.3	11.4	12.6	13.7	14.0	14.4	14.8	14.8	14.4	12.8	9.8	7.9	7.6	7.6	7.3	10.3	14.8
12-Apr	5.8	4.5	3.8	2.8	2.2	1.6	1.4	2.0	3.0	4.1	4.9	6.1	7.2	7.5	7.8	7.8	8.0	8.1	8.1	8.0	6.9	6.9	6.5	5.8	5.4	8.1
13-Apr	5.1	4.5	4.1	3.7	3.5	3.1	2.9	2.7	3.6	5.3	5.9	6.6	7.5	8.2	8.8	9.2	9.4	9.5	9.4	9.1	8.7	7.6	6.2	5.0	6.3	9.5
14-Apr	3.9	3.6	3.0	2.6	2.2	1.7	1.7	2.3	3.8	5.0	6.5	7.6	8.8	10.1	11.1	10.8	9.1	7.7	5.9	4.9	4.1	3.3	2.2	1.8	5.2	11.1
15-Apr	1.8	1.7	1.7	1.3	1.1	0.6	0.7	1.5	3.4	5.1	6.8	8.2	9.1	9.4	9.9	10.5	11.1	11.6	11.6	11.6	11.6	10.5	9.8	8.5	6.6	11.6
16-Apr	7.5	7.2	6.4	5.8	5.2	4.7	4.1	4.7	5.9	7.7	8.6	9.6	10.1	10.9	11.4	11.6	11.4	8.9	7.8	8.1	7.2	5.6	4.9	3.6	7.4	11.6
17-Apr	3.1	2.4	2.5	2.3	3.1	3.3	2.9	2.5	4.8	6.1	8.9	11.7	12.7	12.4	10.5	8.3	6.7	5.8	5.1	4.8	4.5	4.6	4.5	4.2	5.7	12.7
18-Apr	3.8	3.7	3.6	3.4	3.0	2.7	3.1	3.8	4.7	7.1	9.0	9.9	10.4	10.0	10.3	11.3	11.4	10.6	10.2	8.5	7.8	7.8	7.4	7.5	7.1	11.4
19-Apr	6.1	5.5	4.2	4.1	3.1	2.2	2.2	2.7	4.5	6.7	8.8	10.2	10.9	11.5	12.0	12.3	12.4	12.6	12.4	12.4	12.1	11.8	10.5	9.3	8.4	12.6
20-Apr	9.2	8.4	8.2	5.9	5.0	5.0	4.9	5.1	6.6	9.1	10.7	11.9	12.6	12.9	13.5	14.0	14.8	15.0	13.9	12.4	10.5	8.4	6.9	5.6	9.6	15.0
21-Apr	4.3	3.6	2.7	1.6	0.7	0.7	0.7	2.0	4.5	7.3	9.3	9.9	10.8	11.7	12.7	13.4	13.8	13.9	13.1	11.7	10.1	8.1	6.9	5.9	7.5	13.9
22-Apr	4.9	4.3	3.1	2.1	1.3	0.7	0.7	1.5	2.8	4.6	6.5	8.3	10.0	11.3	12.3	12.7	13.0	13.0	12.5	11.2	9.8	8.6	7.4	6.4	7.0	13.0
23-Apr	5.6	4.9	4.2	3.4	2.6	1.9	1.8	1.9	3.0	4.4	5.8	8.0	9.5	10.3	11.0	11.4	11.4	11.2	10.8	9.1	6.4	4.4	3.0	1.9	6.2	11.4
24-Apr	0.9	-0.7	-1.9	-2.9	-3.9	-4.9	-4.9	-4.3	-3.4	-2.3	-1.2	-0.6	0.2	0.9	1.7	2.2	2.3	2.0	1.4	-0.2	-1.8	-2.6	-3.4	-4.2	-1.3	2.3
25-Apr	-5.0	-5.8	-6.4	-6.9	-7.4	-7.5	-6.6	-4.9	-3.0	-1.3	0.4	1.7	2.7	3.7	4.7	5.3	5.7	5.7	5.4	5.2	4.6	3.9	2.1	1.2	-0.1	5.7
26-Apr	0.7	0.5	0.4	0.2	-0.9	-1.2	-0.9	0.3	2.6	4.7	6.2	6.7	7.6	8.4	8.9	10.0	10.2	10.4	10.5	10.5	10.5	9.8	8.3	7.4	5.5	10.5
27-Apr	6.6	5.3	4.4	4.5	3.9	3.7	3.8	4.3	6.3	9.7	12.8	14.4	15.0	16.0	16.5	17.2	17.8	18.1	18.0	18.0	17.6	17.2	16.9	16.1	11.8	18.1
28-Apr	13.0	11.7	11.1	10.5	10.2	8.6	9.0	10.1	11.8	15.7	18.4	19.9	21.1	21.9	22.4	23.1	23.3	22.9	22.7	22.6	22.3	22.0	21.0	18.4	17.2	23.3
29-Apr	16.7	15.6	14.6	13.7	13.0	12.1	11.4	11.0	10.7	11.2	11.7	12.8	13.6	13.7	14.0	14.2	14.5	14.7	14.7	14.5	13.8	14.1	13.3	11.5	13.4	16.7
30-Apr	10.1	8.8	8.2	8.1	7.1	6.5	6.4	7.5	8.8	9.6	9.9	8.9	9.2	10.5	10.9	12.5	11.4	11.1	11.4	11.2	11.0	10.6	10.1	8.6	9.5	12.5
																								Diurnal Average		
																								Diurnal Maximum		





**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	160	22.22	22.22
0 - 10	370	51.39	73.61
10 - 20	178	24.72	98.33
> 20	12	1.67	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

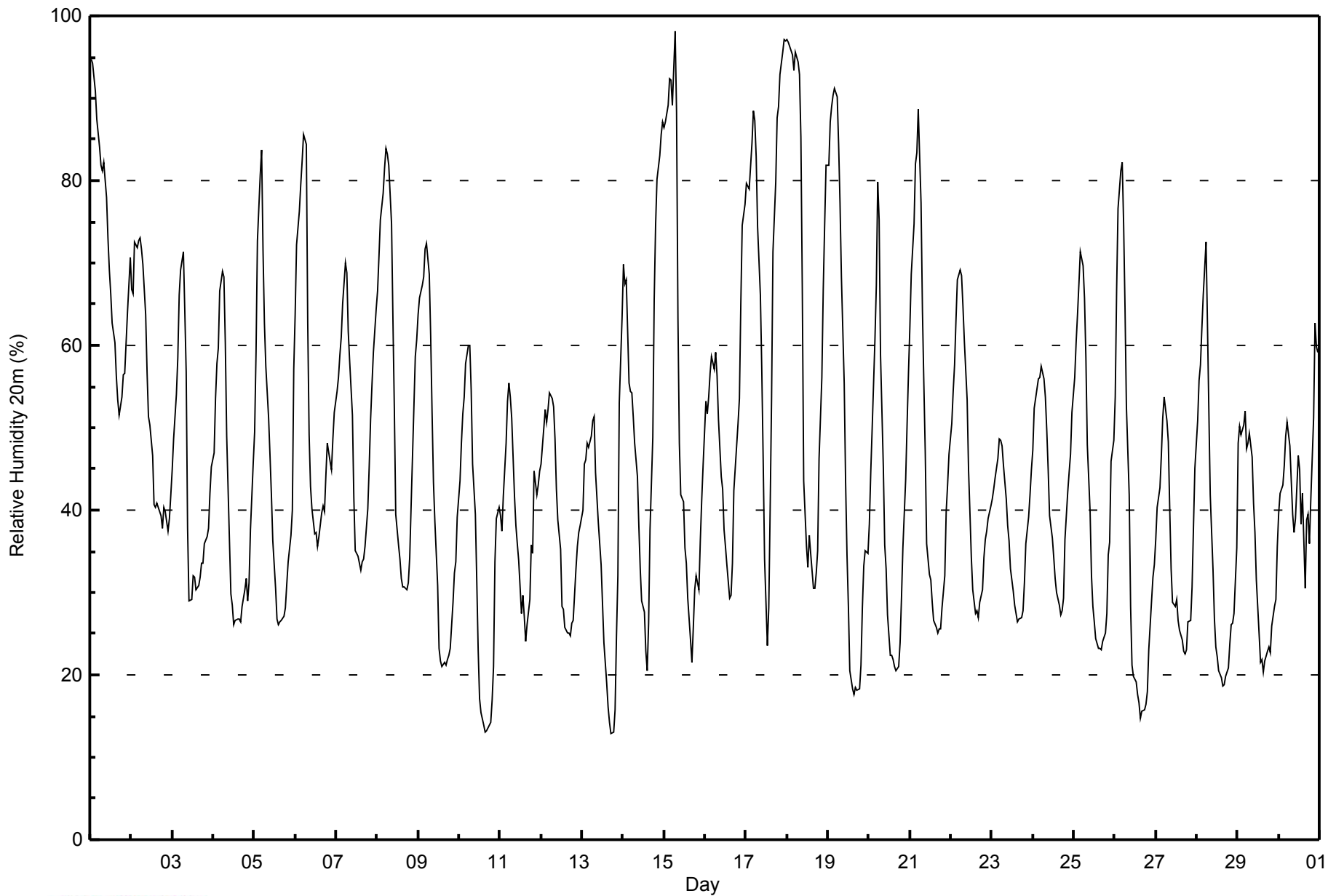


Maximum Value: 98 % on Apr 15 07:00														Maximum Daily Average: 71.7 % on Apr 1														Hours in Service: 720																					
Minimum Value: 13 % on Apr 13 18:00														Minimum Daily Average: 34.2 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 69.5 % at hour 6														Minimum Diurnal Average: 27.6 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 46.5 %														Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 24 Q <sub>1</sub> = 31 Median = 43 Q <sub>3</sub> = 59 P <sub>90</sub> = 77 P <sub>99</sub> = 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-Apr	95	94	92	91	87	84	82	81	82	78	73	69	66	63	60	56	53	52	54	56	57	60	64	71	71.7	95																							
2-Apr	67	66	73	72	73	73	72	70	64	57	51	50	47	41	40	41	40	39	38	40	40	38	39	42	53.0	73																							
3-Apr	45	49	54	58	66	69	71	64	57	38	29	29	32	32	30	31	32	34	34	36	37	38	42	45	43.8	71																							
4-Apr	47	54	58	60	67	69	68	60	49	36	30	28	26	27	27	27	26	28	30	32	29	31	38	46	41.3	69																							
5-Apr	49	59	73	81	84	71	63	57	51	47	42	36	30	27	26	26	27	27	28	31	34	37	40	57	46.0	84																							
6-Apr	64	72	76	79	82	86	84	63	49	43	40	37	37	36	37	40	41	40	44	48	46	45	49	52	53.7	86																							
7-Apr	54	56	59	61	65	70	69	62	58	52	42	35	35	34	33	34	34	36	40	45	51	55	59	64	50.1	70																							
8-Apr	67	71	75	79	82	84	83	82	75	63	52	39	36	34	32	31	31	30	31	34	40	52	59	61	55.1	84																							
9-Apr	64	66	67	68	72	72	69	61	52	43	39	31	23	22	21	22	21	22	22	23	29	32	34	39	42.2	72																							
10-Apr	44	48	52	54	58	60	60	55	46	40	31	23	17	15	14	13	13	13	14	17	21	34	39	40	34.2	60																							
11-Apr	39	37	42	48	53	55	54	51	42	38	36	34	27	30	27	24	26	29	36	35	45	42	43	45	39.1	55																							
12-Apr	46	48	52	51	52	54	54	53	49	43	39	35	28	28	26	25	25	25	26	27	33	36	37	38	38.7	54																							
13-Apr	40	46	46	48	48	49	51	51	45	39	36	33	29	24	19	16	14	13	13	16	25	32	53	63	35.3	63																							
14-Apr	70	67	68	55	54	54	51	48	44	38	33	29	28	23	21	26	38	49	66	75	80	83	86	87	53.1	87																							
15-Apr	86	87	89	92	92	89	98	88	63	48	42	41	35	34	29	24	22	26	30	32	30	36	41	45	54.3	98																							
16-Apr	53	52	54	57	59	57	59	56	51	44	43	38	36	33	29	30	34	42	48	50	54	65	75	77	49.8	77																							
17-Apr	80	79	79	85	89	87	83	74	66	57	46	34	24	28	40	53	71	80	88	89	93	96	97	97	71.5	97																							
18-Apr	97	97	96	95	93	96	94	93	85	67	43	36	33	37	35	30	31	32	35	46	56	67	75	82	64.6	97																							
19-Apr	82	87	89	90	91	90	84	77	68	55	43	35	28	20	18	18	18	18	18	21	28	33	35	35	49.4	91																							
20-Apr	38	45	50	61	67	80	75	59	45	36	33	27	22	22	22	21	21	21	24	29	35	44	50	57	41.0	80																							
21-Apr	62	69	75	82	83	89	77	64	55	47	36	32	31	29	27	26	25	26	26	28	32	40	43	47	47.9	89																							
22-Apr	50	54	58	63	68	69	69	65	60	53	45	40	34	30	27	28	27	29	30	34	37	38	39	40	45.3	69																							
23-Apr	41	43	44	46	49	48	48	45	41	38	36	33	30	28	27	26	27	27	28	31	36	39	42	45	37.5	49																							
24-Apr	47	52	55	56	56	58	56	54	50	45	39	37	34	32	30	28	27	28	29	37	42	45	47	52	43.1	58																							
25-Apr	56	60	64	67	71	70	66	58	48	40	32	28	26	24	23	23	23	24	25	27	35	36	46	49	42.6	71																							
26-Apr	54	67	77	81	82	75	65	53	42	28	21	20	19	18	17	15	16	16	16	18	23	29	32	33	38.1	82																							
27-Apr	37	40	43	47	51	54	51	48	40	33	29	28	29	27	25	24	23	23	23	26	27	31	38	45	35.1	54																							
28-Apr	51	56	58	62	66	72	63	52	42	33	27	23	22	21	20	19	19	20	21	24	26	26	27	35	36.9	72																							
29-Apr	48	50	49	50	52	48	48	49	46	41	37	32	25	22	22	20	22	23	23	23	26	28	29	36	35.4	52																							
30-Apr	40	42	43	45	49	51	48	44	39	37	39	47	45	38	42	31	39	39	36	41	51	63	60	59	44.5	63																							
																								57.1	60.4	63.6	66.2	68.7	69.5	67.1	61.3	53.5	45.2	38.8	34.7	31.2	29.2	28.2	27.6	28.8	30.3	32.6	35.8	39.9	44.3	48.6	52.8	Diurnal Average	
																								97	97	96	95	93	96	98	93	85	78	73	69	66	63	60	56	71	80	88	89	93	96	97	97	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	32	4.44	4.44
20 - 40	292	40.56	45.00
40 - 60	227	31.53	76.53
60 - 80	107	14.86	91.39
80 - 100	62	8.61	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

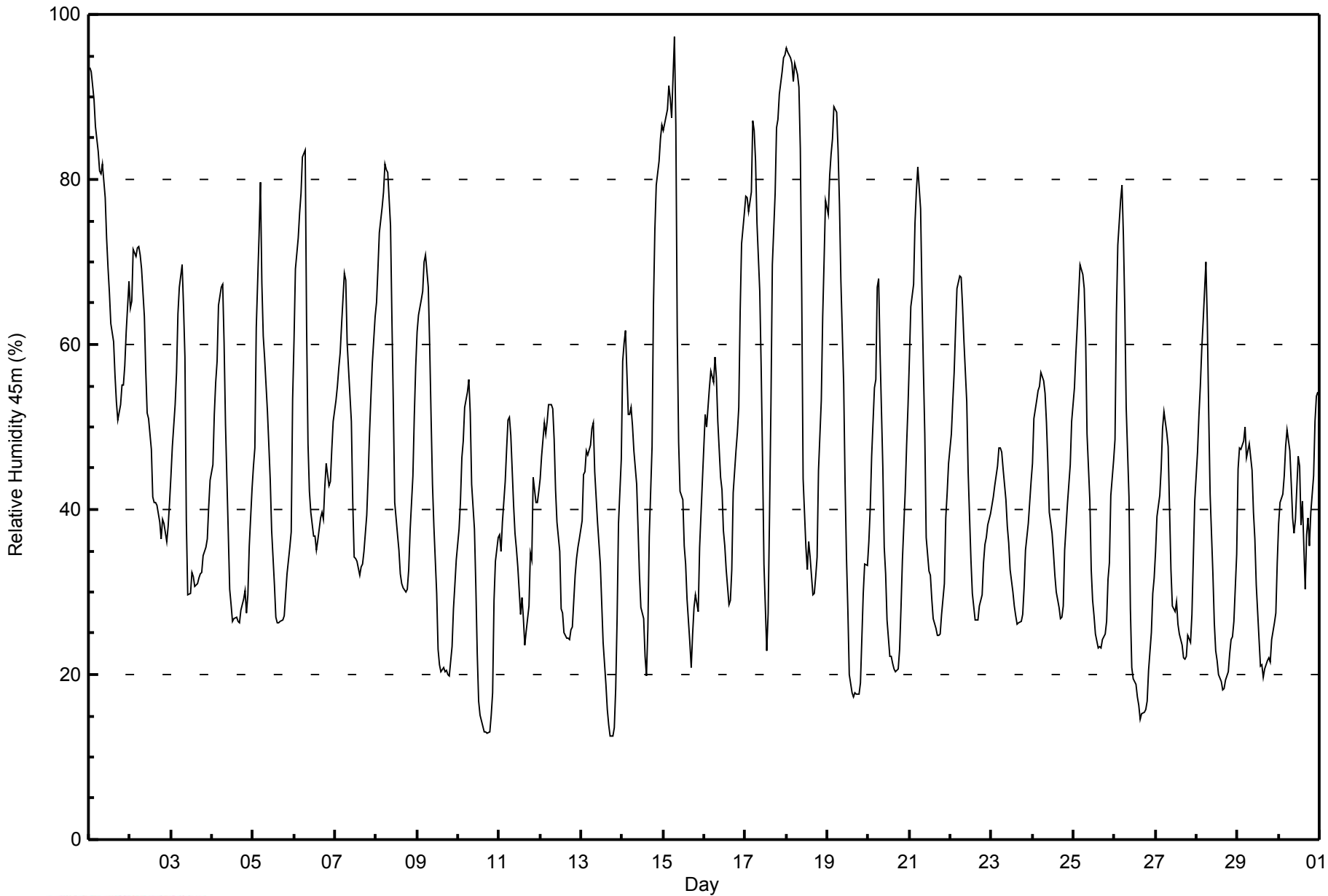


Maximum Value: 97 % on Apr 15 07:00														Maximum Daily Average: 70.8 % on Apr 1														Hours in Service: 720																					
Minimum Value: 13 % on Apr 13 18:00														Minimum Daily Average: 31.3 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 67.0 % at hour 6														Minimum Diurnal Average: 27.2 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 45.1 %														Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 23 Q <sub>1</sub> = 30 Median = 42 Q <sub>3</sub> = 57 P <sub>90</sub> = 75 P <sub>99</sub> = 94														Hours of Calibration: 0																					
																												Percent Operational Time: 100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	94	93	91	90	86	83	81	81	82	78	73	69	66	63	60	56	53	51	53	55	55	57	61	68	70.8	94																							
2-Apr	64	65	72	71	72	72	71	69	63	57	52	51	47	41	41	41	40	39	37	39	38	36	38	41	52.4	72																							
3-Apr	44	48	53	57	64	67	70	65	59	39	30	30	32	32	31	31	32	32	32	34	35	36	40	44	43.1	70																							
4-Apr	45	52	55	58	65	67	67	60	50	37	30	28	26	27	27	26	26	28	29	30	27	30	36	42	40.5	67																							
5-Apr	45	47	62	73	80	68	61	58	52	48	44	37	31	27	26	26	26	27	27	30	32	35	37	53	43.9	80																							
6-Apr	61	69	73	76	78	83	84	62	48	42	40	37	37	35	36	39	40	39	43	46	43	43	47	51	52.1	84																							
7-Apr	53	55	57	59	62	69	68	60	57	51	41	34	34	34	32	33	33	35	39	44	49	54	58	63	48.9	69																							
8-Apr	65	69	74	77	78	82	81	81	74	63	53	41	37	35	32	31	31	30	30	33	37	44	51	57	53.6	82																							
9-Apr	62	64	65	66	70	71	67	60	51	43	38	30	23	21	20	21	20	21	20	20	23	28	31	34	40.4	71																							
10-Apr	38	41	46	48	52	54	56	52	43	38	31	23	17	15	14	13	13	13	13	15	18	29	34	37	31.3	56																							
11-Apr	37	35	38	43	47	51	51	49	41	37	35	33	27	29	27	24	25	28	35	34	44	41	41	42	37.3	51																							
12-Apr	44	46	50	49	51	53	53	52	49	42	38	35	28	27	25	24	24	24	25	26	32	34	35	36	37.7	53																							
13-Apr	39	44	45	47	47	48	50	51	45	39	36	33	29	24	19	16	14	13	13	14	18	27	38	46	33.0	51																							
14-Apr	58	60	62	51	52	52	50	47	43	38	32	28	27	22	20	26	37	48	65	74	79	82	85	87	51.0	87																							
15-Apr	86	87	88	91	90	87	97	87	62	48	42	41	36	33	29	24	21	25	28	30	28	35	40	44	53.3	97																							
16-Apr	51	50	52	55	57	55	59	56	51	44	42	37	36	33	29	29	33	42	47	49	52	64	72	76	48.8	76																							
17-Apr	78	78	76	79	87	86	82	75	67	57	46	33	23	28	39	53	70	78	86	87	90	93	95	95	70.0	95																							
18-Apr	96	95	95	94	92	94	93	91	84	66	44	35	33	36	34	30	30	32	34	45	53	63	70	77	63.2	96																							
19-Apr	76	81	83	85	89	88	84	77	68	55	43	34	28	20	18	17	18	18	18	19	24	30	33	33	47.4	89																							
20-Apr	36	40	47	55	56	67	68	59	45	35	32	27	22	22	21	21	20	21	23	28	34	42	48	53	38.4	68																							
21-Apr	58	65	67	75	79	81	76	66	57	49	37	33	32	29	27	26	25	25	25	27	31	39	42	46	46.5	81																							
22-Apr	49	53	57	62	67	68	68	65	60	53	45	39	34	30	27	27	27	28	30	33	36	37	38	39	44.6	68																							
23-Apr	41	42	43	45	47	48	47	45	41	38	36	33	30	28	27	26	26	26	27	30	35	38	41	43	36.8	48																							
24-Apr	46	51	53	54	55	57	56	54	50	46	40	37	35	32	30	28	27	27	28	35	41	43	45	51	42.5	57																							
25-Apr	55	59	62	66	70	68	67	61	49	41	33	29	27	25	23	23	23	24	25	26	32	33	42	46	42.1	70																							
26-Apr	48	64	72	78	79	73	64	52	42	28	21	20	19	17	16	15	15	15	16	17	21	25	30	32	36.6	79																							
27-Apr	35	39	42	45	50	52	49	48	40	33	28	28	29	26	25	24	22	22	22	25	24	27	34	41	33.7	52																							
28-Apr	47	51	55	59	63	70	63	52	42	32	26	23	22	20	19	18	18	19	20	23	24	25	26	35	35.5	70																							
29-Apr	45	48	47	48	50	46	47	48	45	40	36	31	24	21	21	20	21	22	22	22	24	26	27	34	34.0	50																							
30-Apr	38	41	42	44	48	50	47	43	39	37	39	46	45	38	41	30	37	39	36	40	44	51	54	54	42.6	54																							
																								54.4	57.7	60.8	63.3	66.0	67.0	65.9	60.8	53.2	45.1	38.7	34.5	31.2	29.0	27.9	27.2	28.2	29.6	31.6	34.3	37.5	41.7	45.7	50.0	Diurnal Average	
																								96	95	95	94	92	94	97	91	84	78	73	69	66	63	60	56	70	78	86	87	90	93	95	95	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	39	5.42	5.42
20 - 40	299	41.53	46.94
40 - 60	224	31.11	78.06
60 - 80	108	15.00	93.06
80 - 100	50	6.94	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



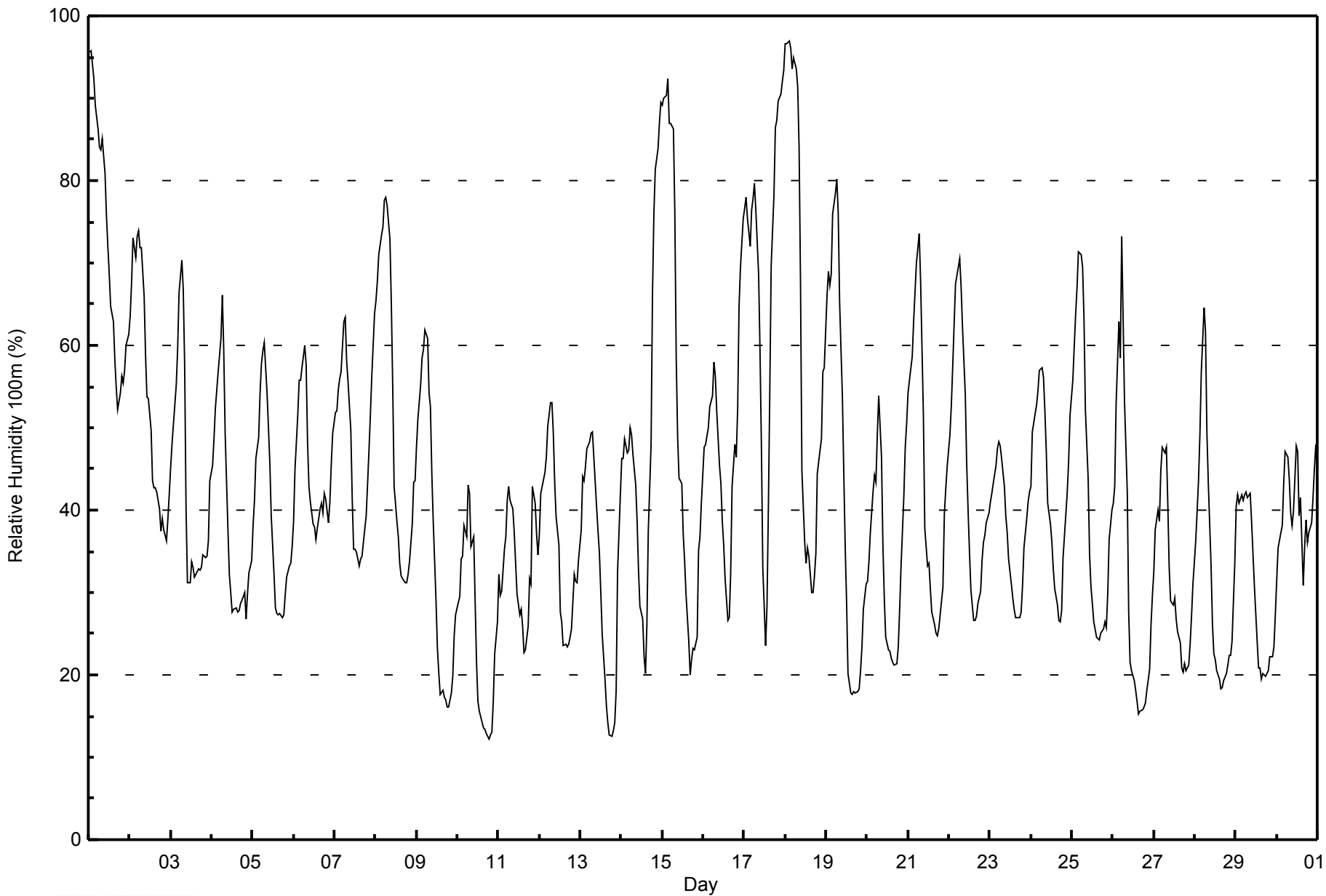


Maximum Value: 97 % on Apr 18 03:00														Maximum Daily Average: 72.5 % on Apr 1														Hours in Service: 720																					
Minimum Value: 12 % on Apr 10 19:00														Minimum Daily Average: 25.0 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 62.6 % at hour 7														Minimum Diurnal Average: 27.7 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 43.1 %														Percentiles: P <sub>1</sub> = 13 P <sub>10</sub> = 22 Q <sub>1</sub> = 29 Median = 40 Q <sub>3</sub> = 54 P <sub>90</sub> = 70 P <sub>99</sub> = 94														Hours of Calibration: 0																					
																												Percent Operational Time: 100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	96	96	94	92	89	86	84	84	85	81	76	72	69	65	63	58	55	52	54	56	55	57	60	61	72.5	96																							
2-Apr	64	68	73	71	73	74	72	72	66	59	54	54	50	44	43	43	42	40	38	39	38	36	39	42	53.8	74																							
3-Apr	45	48	53	55	60	66	70	67	58	40	31	31	34	33	32	33	33	33	33	35	34	34	36	44	43.2	70																							
4-Apr	45	49	52	55	57	61	66	59	49	38	32	30	28	28	28	28	29	30	30	27	30	32	34	34	39.3	66																							
5-Apr	38	41	46	49	54	58	59	60	54	50	46	39	32	28	27	27	27	27	27	30	32	33	34	36	39.8	60																							
6-Apr	39	45	52	56	56	57	60	58	48	43	41	38	38	37	38	40	41	40	42	41	38	41	46	49	45.1	60																							
7-Apr	52	52	55	56	57	63	63	58	56	50	41	35	35	35	33	34	34	36	39	43	47	51	56	64	47.8	64																							
8-Apr	65	68	71	73	74	78	78	77	73	65	55	43	39	37	34	32	32	31	31	32	34	38	43	44	51.9	78																							
9-Apr	48	51	55	59	60	62	61	54	53	44	39	29	23	20	18	18	17	17	16	16	18	20	25	27	35.4	62																							
10-Apr	29	30	34	34	38	37	43	42	36	37	29	22	17	16	14	14	13	13	12	13	13	17	23	26	25.0	43																							
11-Apr	32	30	30	35	37	41	43	41	40	37	34	30	27	28	26	23	23	26	32	31	43	41	37	35	33.4	43																							
12-Apr	37	42	44	45	46	50	53	53	49	43	39	36	28	26	24	24	23	24	25	26	32	31	31	34	36.0	53																							
13-Apr	38	44	44	45	47	48	49	50	46	40	37	35	30	25	20	16	14	13	13	13	14	18	33	42	32.2	50																							
14-Apr	46	46	49	47	47	50	49	47	43	39	33	28	27	22	20	26	38	48	66	76	81	84	87	90	49.5	90																							
15-Apr	89	90	90	92	87	87	86	76	59	49	44	43	37	34	30	24	20	22	23	23	25	35	37	41	51.8	92																							
16-Apr	48	48	49	50	53	54	58	56	52	45	43	39	36	32	27	27	32	43	48	46	52	65	70	75	47.8	75																							
17-Apr	77	78	75	72	76	78	80	76	69	59	48	33	23	28	40	54	70	78	86	87	90	91	92	93	68.9	93																							
18-Apr	97	97	97	96	94	95	94	91	84	68	45	36	34	36	34	30	30	32	35	44	47	49	57	57	61.5	97																							
19-Apr	66	69	67	69	76	78	80	76	65	54	44	36	29	20	18	18	18	18	18	18	20	23	28	31	43.3	80																							
20-Apr	31	34	37	42	44	43	49	54	46	36	29	25	23	23	22	21	21	21	23	28	33	42	48	51	34.5	54																							
21-Apr	54	56	59	63	66	70	74	68	60	51	38	33	33	30	28	26	25	25	26	27	31	40	42	45	44.6	74																							
22-Apr	49	53	57	63	67	70	70	67	62	54	46	40	35	30	27	27	27	29	30	34	36	37	39	40	45.3	70																							
23-Apr	41	42	43	45	47	48	48	46	43	39	37	34	31	29	28	27	27	27	28	31	35	39	41	42	37.5	48																							
24-Apr	43	49	52	53	54	57	57	56	52	47	41	38	36	33	31	29	27	26	28	34	40	42	46	52	42.6	57																							
25-Apr	56	60	64	67	71	71	70	63	52	44	35	31	29	26	25	24	24	25	26	26	26	30	36	40	42.5	71																							
26-Apr	41	43	53	63	59	73	63	53	42	28	22	20	19	18	17	15	16	16	16	17	18	21	26	30	32.8	73																							
27-Apr	33	38	40	39	45	48	47	48	41	33	29	28	29	27	25	24	21	20	21	20	21	24	27	31	31.6	48																							
28-Apr	36	40	44	49	57	65	62	49	43	33	26	23	22	20	19	18	18	19	20	21	22	22	24	34	32.9	65																							
29-Apr	41	42	41	42	41	42	42	41	42	39	35	31	24	21	21	20	20	20	20	20	22	22	23	27	30.8	42																							
30-Apr	32	35	37	38	43	47	46	44	40	38	40	48	47	39	42	31	36	39	36	37	38	42	45	48	40.3	48																							
																								50.2	52.7	55.2	57.2	59.2	61.9	62.6	59.6	53.6	46.1	39.6	35.3	32.1	29.7	28.4	27.7	28.4	29.6	31.4	33.2	35.5	38.5	42.1	45.5	Diurnal Average	
																								97	97	97	96	94	95	94	91	85	81	76	72	69	65	63	58	70	78	86	87	90	91	92	93	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	48	6.67	6.67
20 - 40	312	43.33	50.00
40 - 60	238	33.06	83.06
60 - 80	85	11.81	94.86
80 - 100	37	5.14	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

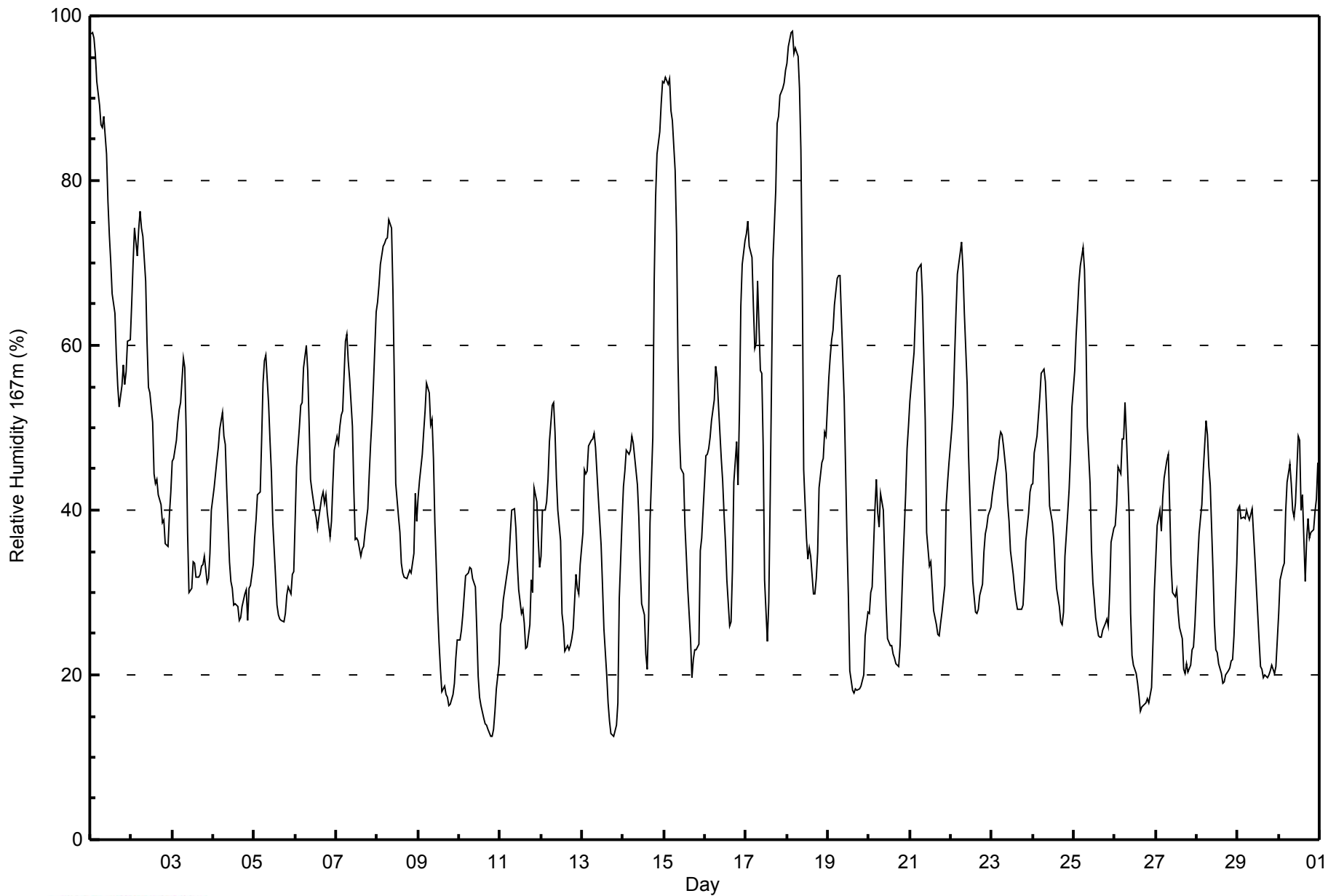


Maximum Value: 98 % on Apr 18 04:00																		Maximum Daily Average: 74.1 % on Apr 1																		Hours in Service: 720	
Minimum Value: 12 % on Apr 10 19:00																		Minimum Daily Average: 22.0 % on Apr 10																		Hours of Data: 720	
Maximum Diurnal Average: 58.2 % at hour 7																		Minimum Diurnal Average: 28.0 % at hour 16																		Hours of Missing Data: 0	
Monthly Average: 42.1 %																		Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 21 Q <sub>1</sub> = 29 Median = 39 Q <sub>3</sub> = 50 P <sub>90</sub> = 69 P <sub>99</sub> = 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-Apr	98	98	97	95	92	89	87	86	88	83	78	73	70	66	64	59	55	53	55	58	55	57	60	61	74.1	98											
2-Apr	65	70	74	71	74	76	74	73	68	60	55	54	51	44	43	44	42	41	38	39	36	36	39	42	54.6	76											
3-Apr	46	46	48	51	52	53	58	57	50	37	30	31	34	34	32	32	32	33	33	34	31	32	35	40	40.1	58											
4-Apr	43	44	46	48	50	52	49	48	43	34	31	31	28	29	28	27	27	28	30	30	27	30	31	33	36.1	52											
5-Apr	37	39	42	42	48	55	58	59	53	48	45	39	32	28	27	27	27	26	27	30	31	30	32	33	38.1	59											
6-Apr	39	45	50	53	53	57	60	57	51	44	42	40	39	38	39	41	42	41	42	40	37	39	43	47	44.9	60											
7-Apr	49	48	50	52	52	61	61	58	56	50	43	36	37	36	34	35	36	37	40	44	48	51	55	64	47.3	64											
8-Apr	65	67	70	72	72	73	73	75	74	67	56	43	39	37	34	32	32	32	32	33	32	35	42	39	51.1	75											
9-Apr	42	44	47	49	52	55	54	50	51	46	39	28	24	21	18	19	18	17	16	16	18	19	22	24	32.9	55											
10-Apr	24	25	27	30	32	32	33	33	32	31	26	20	17	16	15	14	14	13	12	13	13	16	18	21	22.0	33											
11-Apr	26	27	29	32	33	34	37	40	40	38	34	30	27	28	26	23	23	26	32	30	43	41	36	33	32.0	43											
12-Apr	34	40	40	41	44	48	53	53	50	44	40	36	27	26	23	24	23	24	24	26	32	31	30	33	35.2	53											
13-Apr	37	45	44	45	48	48	49	49	48	42	39	36	31	26	20	17	14	13	12	13	14	17	29	39	32.2	49											
14-Apr	43	45	47	47	47	49	48	46	43	39	33	29	27	23	21	27	38	49	68	78	83	86	89	92	49.9	92											
15-Apr	92	93	92	92	89	87	81	74	58	49	45	44	38	34	31	24	20	22	23	23	24	35	37	40	52.0	93											
16-Apr	47	47	47	49	51	53	57	56	53	46	44	39	36	31	26	27	33	43	48	43	52	65	70	73	47.3	73											
17-Apr	74	75	72	71	65	60	60	68	57	57	48	32	24	29	41	56	70	79	87	88	90	91	92	93	65.7	93											
18-Apr	94	96	98	98	95	96	95	91	84	68	45	37	34	35	34	30	30	32	35	43	46	46	50	49	60.9	98											
19-Apr	56	59	61	62	65	68	69	68	63	53	45	36	30	20	18	18	18	18	18	19	19	20	25	28	39.8	69											
20-Apr	27	30	31	40	44	40	38	42	40	34	28	24	24	23	23	22	21	21	24	28	33	42	47	50	32.4	50											
21-Apr	53	55	59	64	69	69	70	66	59	51	37	33	34	31	28	26	25	25	26	28	31	41	43	46	44.5	70											
22-Apr	50	53	59	64	69	71	73	69	64	55	47	41	36	31	28	27	28	30	31	35	37	38	39	40	46.5	73											
23-Apr	42	43	44	46	48	49	49	48	44	41	39	35	32	30	29	28	28	28	29	32	36	40	42	43	38.6	49											
24-Apr	43	47	49	51	54	57	57	56	52	47	41	39	36	33	31	28	26	26	28	34	40	43	47	53	42.3	57											
25-Apr	57	61	64	68	70	72	69	61	50	43	35	31	29	27	25	25	25	25	26	27	26	30	36	38	42.5	72											
26-Apr	38	41	45	44	49	49	53	49	39	27	22	21	20	19	17	16	16	16	17	17	17	19	24	30	29.4	53											
27-Apr	34	38	40	37	42	44	46	47	40	33	30	30	30	28	26	24	21	20	21	20	21	23	23	26	31.1	47											
28-Apr	34	37	39	41	45	51	49	45	43	33	26	23	23	21	20	19	19	20	21	21	22	22	25	33	30.4	51											
29-Apr	40	41	39	39	39	40	39	39	40	37	34	31	24	21	21	20	20	20	20	20	21	20	21	24	29.6	41											
30-Apr	28	32	33	34	40	43	46	43	40	39	41	49	48	40	42	31	36	39	37	37	38	40	41	46	39.3	49											
																		48.5 51.0 52.8 54.2 56.0 57.8 58.2 56.9 52.4 45.9 39.8 35.7 32.8 30.2 28.8 28.0 28.6 29.9 31.8 33.3 35.1 37.7 40.8 43.8																		Diurnal Average	
																		98 98 98 98 95 96 95 91 88 83 78 73 70 66 64 59 70 79 87 88 90 91 92 93																		Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	52	7.22	7.22
20 - 40	325	45.14	52.36
40 - 60	236	32.78	85.14
60 - 80	71	9.86	95.00
80 - 100	36	5.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

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

Maximum Speed: 28 km/h on Apr 11 20:00	Maximum Daily Speed Average: 16.4 km/h on Apr 12	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 21 05:00	Minimum Daily Speed Average: 2.7 km/h on Apr 20	Hours of Data: 720
Maximum Diurnal Speed Average: 4.7 km/h at hour 15	Minimum Diurnal Speed Average: 0.4 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 232.9 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 14 P <sub>90</sub> = 17 P <sub>99</sub> = 23	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	N10	NNE12	NNE14	NNE13	NNE16	NNE17	NNE18	N17	N19	N17	N17	N16	N18	NNE16	NNE14	N17	N16	NNE14	NNE10	NNE7	NNE4	NNE2	NNW3	N2	NNE12.9	N19	
2-Apr	N4	NNW4	NW4	NW4	NNW4	NNW4	NNE3	ENE2	N5	N7	N9	N8	N9	NNW9	NNW7	NNW7	NNE7	NE8	NE8	NNE8	NE5	NNE5	NNE3	ENE2	N5.0	N9	
3-Apr	NE2	NNE4	N4	N3	NNW3	NNW4	NNW3	N3	N3	NNW3	N6	N9	N8	N8	N9	NNE6	NNE9	NNE9	NNE10	NNE8	NE8	NE7	NE5	NNE1	NNE5.4	NNE10	
4-Apr	NNE4	NNE4	NNE4	NNE3	NNE2	NNW2	N3	NNE3	NNW3	N4	NNW5	NNW7	NNW9	N8	N6	NE5	N4	NNE6	NNE9	NNE9	NNE7	NNE6	N6	NNW3	N4.8	NNE9	
5-Apr	NNW2	ENE1	NW1	N2	NNW3	N5	NNE4	N6	N8	N9	N8	N7	N8	N8	N8	NNE6	NNE7	NNE7	NNE8	NNE6	N5	NNE5	NNE4	N3	N5.2	N9	
6-Apr	N3	NNW2	NNW4	NNW4	NNW3	NW2	NW1	SE1	SSE9	SSE10	SSE9	SSE12	S11	S10	SSE11	SSE11	S11	SSE16	SSE17	SSE16	SSE15	S16	S16	S15	SSE7.8	SSE17	
7-Apr	S14	SSE17	SSE11	SSE8	SSE11	ESE3	SSE6	SSE12	SSE13	SSE14	SSE15	SSW15	SSW15	SSW14	SSW14	SSW11	SSW11	SW13	SW13	SSW9	S12	S13	SSE12	E5	S10.4	SSE17	
8-Apr	SSE12	SSE16	SSE17	SSE16	SSE16	SSE10	SSE13	SE9	SSE9	SW4	W3	N7	N10	N9	N8	N9	NNE5	NE5	ENE4	E2	WSW1	NNW1	SSW1	SE5	SE3.6	SSE17	
9-Apr	SE8	SE7	SE7	SSE7	SE6	SE7	SE12	SSE13	SSE19	SE15	SSE17	SSE12	WSW10	W14	W19	W16	W16	W14	WSW11	WSW9	WSW8	W5	SSW1	S5	SSW6.0	SSE19	
10-Apr	SSE8	SSE13	SSE14	SSE14	SSE12	SSE14	SSE14	SSE10	SSE12	SSE13	SSE10	SSE8	SSE5	SSE3	SSW2	NNW4	S4	S17	S10	S11	SSE12	SE5	SE7	SE6	SSE9.0	S17	
11-Apr	SE3	SSE4	SSE7	SSE9	SSE10	SSE10	SE9	SSE13	SSE5	SSE6	W15	W12	W9	W14	W14	W14	W14	W17	W22	W28	W27	NW9	W8	WSW12	WSW7.7	W28	
12-Apr	W14	W17	W15	W15	W15	W17	W11	W10	WSW14	WSW18	WSW23	WSW22	W23	W21	W21	W21	W23	W23	NNW22	NNW16	NW10	W8	W11	WSW14	W16.4	W23	
13-Apr	NNW11	NW8	WSW13	W14	NW16	NW10	NNW12	W14	NNW16	NW25	NW24	NW17	NW17	NW18	NW16	NW15	NNW18	NW14	NNW8	NNW4	SW1	N1	NNW2	NNW2	NW11.7	NW25	
14-Apr	N3	N1	E2	SE12	SE14	SE18	SE18	SE18	SE15	SE14	SE14	SE13	SSE11	SSE10	SSE10	S18	S20	SSE21	SSE18	SE15	SE15	SSE14	SSE16	SSE15	SSE12.9	SSE21	
15-Apr	S14	S12	S8	SW5	SSW3	S5	SE10	SSE11	SW9	WSW13	WSW12	W15	W14	W15	W16	W15	W16	W15	W15	W9	WSW3	SW8	W20	W12	W10	WSW8.7	NNW20
16-Apr	W11	WSW13	W15	W16	W16	W11	W7	WSW8	WSW10	WSW6	W9	WSW16	W16	W15	W20	W22	WSW22	NNW20	NNW12	NNW17	NW11	NNW7	WSW9	SSW1	W11.8	W22	
17-Apr	SW3	SW3	SSE6	SE10	SSE8	SSE10	SSE9	SE5	SSE8	SSE9	SSE11	SSE12	SW15	SW18	SW23	SW20	S12	S12	SSE11	SE7	NNW2	NNW2	N3	NNW5	S6.9	SW23	
18-Apr	N5	NNW6	NNW9	NNW11	NNW13	NNW11	NNW11	NNW10	NNW8	NNW9	NNW14	NNW15	NNW16	NNE10	N6	NNE12	N11	NW12	NNE11	NNE4	W3	ENE0	NW2	SE1	NNW8.1	NNW16	
19-Apr	SSE1	SSE3	SE4	SSE2	SSE5	SE6	SE7	SSE8	SSE10	SSE8	SSE7	SSE6	SW4	WSW10	WSW15	W11	WSW9	WNW5	SSW3	S3	SE7	SE6	SE2	SE5	S3.8	WSW15	
20-Apr	SSE8	SE1	NNW3	NNW4	NNW3	NW2	N1	N3	NNW1	WSW6	W11	W11	W9	W12	SW9	SW7	NNW3	NNE7	NE11	NNE9	N8	N9	N6	N6	NW2.7	W12	
21-Apr	N4	N3	NNW2	NNW1	NW0	NW1	NNW3	NNW6	NNW7	N8	N12	N14	NNE10	N10	NNE11	N11	NNE10	NNE10	E10	E10	E6	SE11	SE14	SE16	NE4.5	SE16	
22-Apr	SE15	SE13	SE10	SE8	SE9	SE11	SE12	SE13	SSE16	SSE18	SSE20	SSE19	SSE17	SSE19	SSE23	SSE22	SE18	SE18	SE17	SE14	SE14	SE16	SE19	SE15	SE15.6	SSE23	
23-Apr	SE12	SE11	SE9	ESE5	ENE5	E6	ESE8	ESE12	ESE11	SE12	SE10	SE15	SE17	ESE14	SE15	SE16	E12	SE12	ESE11	ENE14	ENE14	ENE7	NNE6	NNE8	ESE9.7	SE17	
24-Apr	NNE8	NNE9	NNE10	NNE9	NNE11	NNE10	NNE9	NNE10	N13	N12	NNE13	NNE13	N14	NNE14	N14	NNE16	NNE16	NNE15	NNE14	N13	N13	N11	N11	N10	NNE12.0	NNE16	
25-Apr	N10	N8	N7	N6	N5	N6	N7	NNW6	N5	N6	N6	N7	N8	N6	NNE4	NNW8	NNW8	NNW11	NNW10	N8	N5	NNW4	N3	N3	N6.3	NNW11	
26-Apr	NNE2	NW1	NW1	N1	N1	ESE3	SE4	SE3	SSE7	SE8	SE6	SE8	SE7	SSE5	SE7	ENE1	SSE5	SE6	ESE5	E4	SSE4	SSE7	SSE8	SE15	SE4.4	SE15	
27-Apr	SE18	SE11	SE7	SSE6	SSE4	S7	SSE10	SSE6	ESE4	SSE10	S15	SSW14	WSW12	SW19	WSW20	WSW22	W18	W19	WSW15	WSW12	WSW10	WSW8	WSW10	W7	SW8.6	WSW22	
28-Apr	SW2	SSE8	SE8	SE3	SE4	ENE1	ESE2	SE7	SE4	SSE2	SSE10	SSE14	S16	S19	S19	S20	S21	S18	S16	SSE19	SSE17	SSE17	S16	W12	S10.5	S21	
29-Apr	W11	W8	W7	W11	W14	W18	W11	W15	WSW4	WSW12	W9	WSW9	W16	W16	W14	W12	WSW8	WSW11	WSW11	SW11	WSW9	WSW10	WSW13	W9	W11.0	W18	
30-Apr	W14	W15	W16	W17	W16	W16	WSW16	W16	WSW15	W18	W22	WSW25	WSW19	W17	NNW8	W14	NW10	N9	NW4	WSW4	SE3	WSW1	SE2	S6	W11.5	WSW25	

S1.3	S1.6	SSW1.4	SW1.3	SW0.8	SSW0.8	SE1.7	SSE2.1	S2.0	SSW1.0	WSW2.3	WSW2.9	W4.3	W4.6	W4.7	W4.6	W3.0	NNW2.3	W0.7	SSW0.4	SSW1.1	S1.2	SSW2.1	S1.9	Diurnal Average
SE18	SSE17	SSE17	W17	NNE16	SE18	NNE18	SE18	N19	NW25	NW24	WSW25	W23	W21	SSE23	W22	W23	NNW23	NNW22	W28	W27	NNW20	SE19	SE16	Diurnal Maximum

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

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

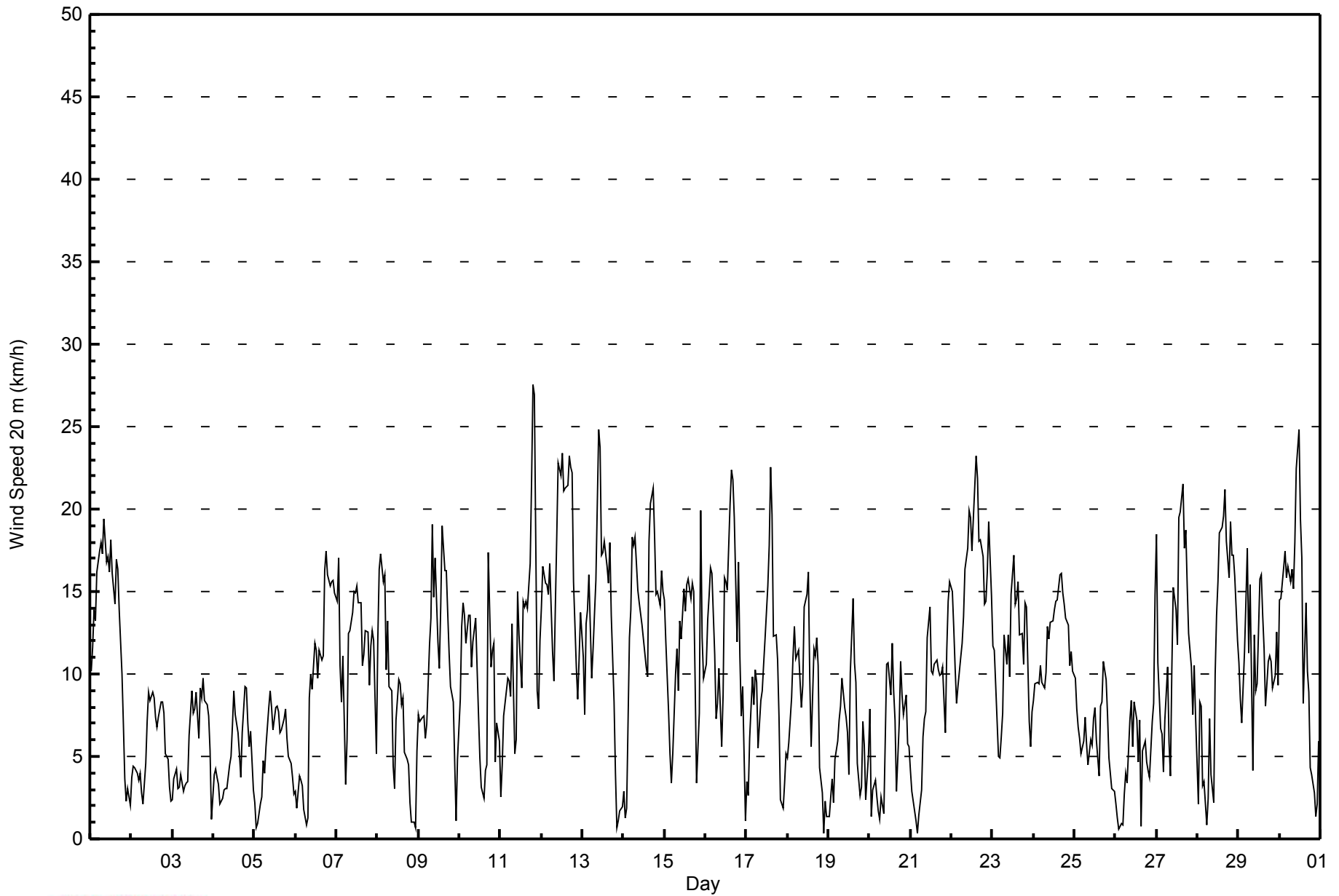
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Apr 13 05:00 Minimum Value: 0 km/h on Apr 26 03:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 8																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	3	5	6	6	7	7	7	7	7	7	6	6	7	7	6	6	6	6	4	3	2	1	1	1	7
2-Apr	1	2	1	2	1	2	1	1	3	3	3	3	4	4	4	4	3	3	3	3	3	3	2	1	4
3-Apr	1	1	2	1	1	2	1	1	1	2	3	3	4	4	4	3	3	4	4	3	3	3	4	1	4
4-Apr	1	1	1	1	1	1	2	1	1	2	3	4	4	4	4	3	3	3	4	4	3	2	3	1	4
5-Apr	1	1	1	1	1	2	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	3
6-Apr	2	1	1	1	1	1	1	2	2	2	3	4	4	4	4	3	4	3	3	2	3	3	3	3	4
7-Apr	3	3	4	5	5	2	5	4	4	4	4	5	6	5	5	4	4	5	4	3	3	3	3	2	6
8-Apr	3	3	3	3	3	4	3	4	3	3	2	4	4	4	3	3	3	2	2	1	1	1	1	2	4
9-Apr	3	3	3	3	2	2	3	4	4	6	5	5	5	5	6	5	4	3	3	2	2	2	1	2	6
10-Apr	3	2	3	3	2	2	2	3	3	3	4	3	2	2	2	3	6	5	2	3	3	2	2	2	6
11-Apr	3	2	3	2	2	2	2	3	3	3	5	5	5	5	5	5	5	6	8	8	10	4	2	4	10
12-Apr	4	5	4	4	4	5	5	4	5	6	7	7	8	7	8	8	9	8	8	6	4	3	3	4	9
13-Apr	4	3	4	5	11	4	4	5	6	10	8	7	7	7	7	6	6	6	3	1	1	2	1	1	11
14-Apr	1	1	2	4	5	5	5	5	5	5	5	4	4	4	4	9	6	6	5	5	5	4	5	4	9
15-Apr	4	3	3	2	2	3	3	3	4	5	5	5	5	5	6	6	6	5	3	2	6	8	3	3	8
16-Apr	3	5	5	4	4	4	3	3	4	3	4	6	6	5	7	7	6	8	6	8	5	5	4	1	8
17-Apr	3	3	3	3	2	3	3	3	3	3	4	4	6	7	7	7	3	3	4	4	2	1	2	3	7
18-Apr	2	2	3	4	4	4	4	4	3	5	6	6	6	9	8	5	5	5	6	3	2	1	2	1	9
19-Apr	1	2	2	1	2	2	2	2	3	2	2	2	3	4	4	4	4	3	1	1	2	3	2	3	4
20-Apr	3	1	2	1	1	1	1	2	2	3	3	3	3	4	4	3	3	4	4	3	2	3	2	2	4
21-Apr	2	2	1	1	1	1	2	3	3	3	5	5	5	4	5	4	4	4	5	4	3	5	5	4	5
22-Apr	5	5	4	3	3	4	4	5	4	4	6	6	7	7	7	7	7	6	6	5	5	6	6	5	7
23-Apr	4	5	4	3	3	3	4	5	4	5	4	6	6	7	6	6	6	5	5	6	6	5	2	3	7
24-Apr	3	4	4	3	4	4	4	5	5	5	5	6	6	6	6	6	7	6	6	5	5	4	4	3	7
25-Apr	3	3	3	2	2	2	3	2	2	3	3	4	4	4	3	4	5	4	4	2	2	1	1	2	5
26-Apr	1	1	0	1	1	1	1	2	2	3	3	4	4	3	3	3	3	3	2	3	2	3	3	5	5
27-Apr	6	5	3	3	2	3	3	3	3	5	5	6	5	8	7	7	5	6	5	3	2	3	2	3	8
28-Apr	2	2	3	2	2	1	2	2	2	2	3	4	5	5	5	5	5	5	4	4	3	4	4	5	5
29-Apr	3	3	3	3	4	6	4	6	3	4	3	4	5	5	5	4	3	3	3	4	2	2	3	3	6
30-Apr	4	4	5	5	5	5	5	6	5	6	8	7	8	6	8	6	7	3	4	2	2	1	2	2	8
Diurnal Maximum																									





**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

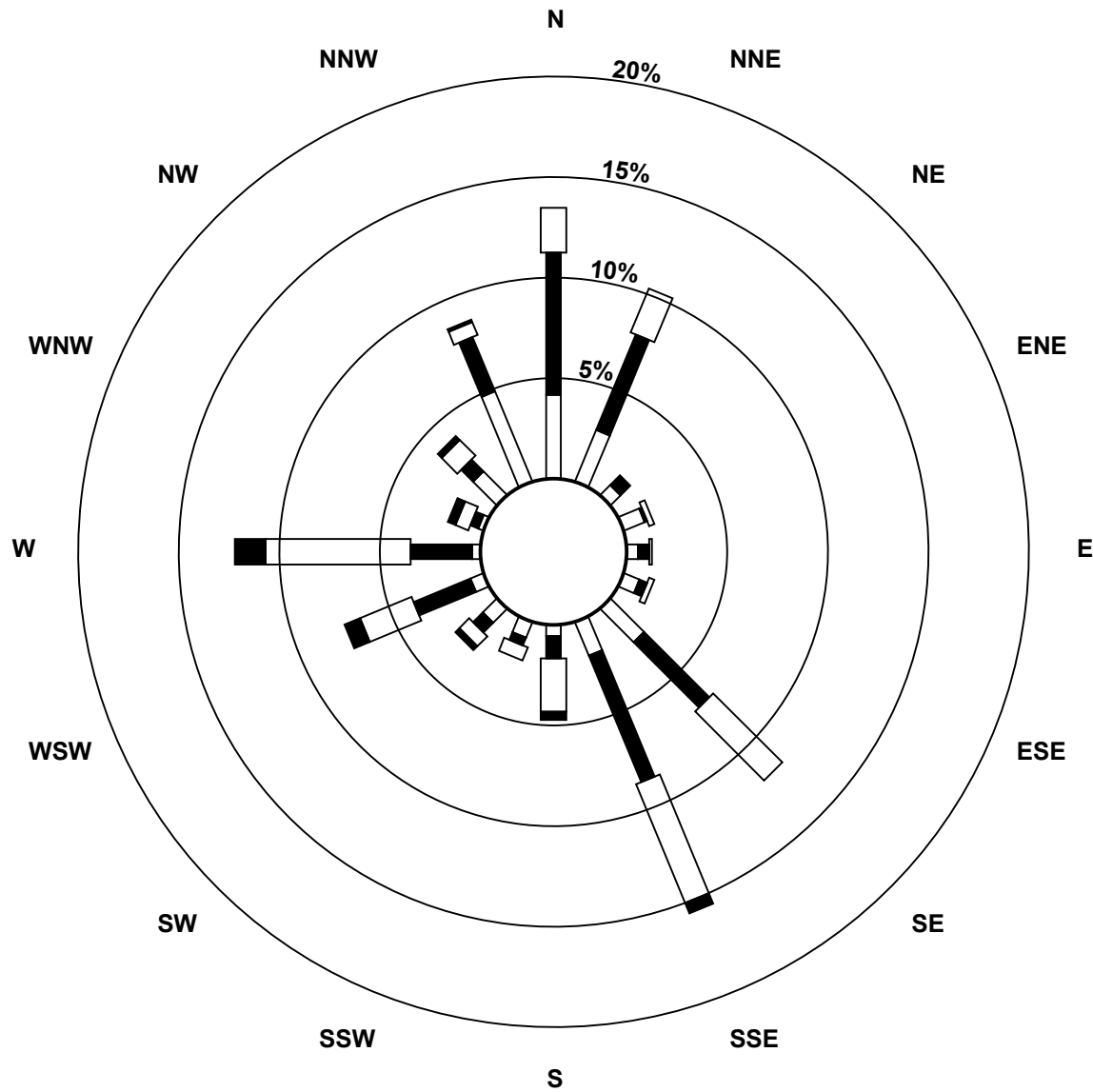
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	177	24.58	24.58
6 - 11	273	37.92	62.50
12 - 19	238	33.06	95.56
20 - 28	32	4.44	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

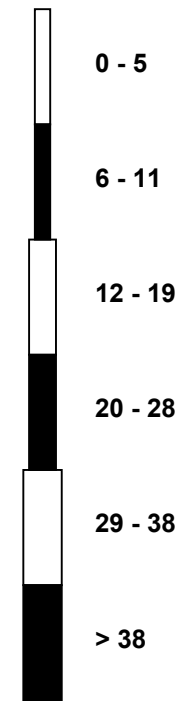
Total Number of Hours: 720

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

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



**Classes (km/h)**



**Total Number of Valid Hours: 720**



Maximum Speed: 37 km/h on Apr 11 20:00	Maximum Daily Speed Average: 22.1 km/h on Apr 12	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 26 04:00	Minimum Daily Speed Average: 3.7 km/h on Apr 20	Hours of Data: 720
Maximum Diurnal Speed Average: 5.8 km/h at hour 14	Minimum Diurnal Speed Average: 0.3 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 245.2 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 8 Median = 13 Q <sub>3</sub> = 18 P <sub>90</sub> = 22 P <sub>99</sub> = 30	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	N16	NNE19	NNE22	NNE21	NNE25	NNE27	NNE27	N25	N27	N25	N24	N23	N26	NNE25	NNE22	N25	N25	NNE21	NNE15	NNE11	NNE6	NNE4	NNW4	N4	NNE19.3	N27
2-Apr	N6	NNW6	NW5	NW5	NNW5	NNW5	NNE4	ENE3	N6	N9	N12	N11	N11	NNW11	NNW10	NNW8	NNE10	NE13	NE13	NNE12	NE8	NNE7	NNE4	ENE3	N6.9	NE13
3-Apr	NE3	NNE5	N6	N5	NNW5	NNW6	NNW4	N4	N3	NNW4	N8	N11	N10	N11	N12	NNE8	NNE13	NNE13	NNE15	NNE13	NE12	NE11	NE9	NNE1	NNE7.4	NNE15
4-Apr	NNE5	NNE6	NNE6	NNE5	NNE3	NNW3	N4	NNE3	NNW3	N5	NNW6	NNW8	NNW11	N9	N8	NE6	N5	NNE9	NNE15	NNE14	NNE11	NNE9	N10	NNW5	N6.6	NNE15
5-Apr	NNW4	ENE2	NW1	N4	NNW5	N8	NNE6	N8	N10	N12	N10	N8	N10	N10	N10	NNE8	NNE9	NNE10	NNE12	NNE9	N7	NNE7	NNE6	N4	N7.2	NNE12
6-Apr	N5	NNW3	NNW6	NNW5	NNW5	NW2	NW1	SE2	SSE10	SSE11	SSE10	SSE14	S12	S11	SSE13	SSE12	S12	SSE17	SSE20	SSE18	SSE17	S17	S17	S16	SSE8.4	SSE20
7-Apr	S16	SSE18	SSE12	SSE11	SSE14	ESE6	SSE9	SSE14	SSE16	SSE18	SSE17	SSW17	SSW18	SSW17	SSW16	SSW13	SSW14	SW15	SW15	SSW13	S13	S14	SSE13	E7	S12.3	SSE18
8-Apr	SSE14	SSE20	SSE21	SSE20	SSE21	SSE15	SSE18	SE13	SSE11	SW5	W3	N9	N13	N12	N12	N12	NNE8	NE7	ENE7	E5	WSW2	NNW1	SSW2	SE10	SE4.7	SSE21
9-Apr	SE12	SE11	SE10	SSE10	SE9	SE9	SE14	SSE17	SSE23	SE20	SSE24	SSE15	WSW13	W18	W25	W22	W22	W19	WSW16	WSW13	WSW12	W8	SSW3	S4	SSW8.0	W25
10-Apr	SSE10	SSE17	SSE19	SSE18	SSE13	SSE17	SSE16	SSE14	SSE16	SSE17	SSE14	SSE9	SSE5	SSE3	SSW2	NNW5	S5	S18	S12	S14	SSE14	SE9	SE11	SE9	SSE11.3	SSE19
11-Apr	SE3	SSE7	SSE11	SSE11	SSE13	SSE12	SE11	SSE15	SSE5	SSE5	W21	W17	W12	W19	W19	W18	W19	W23	W29	W37	W36	NW12	W11	WSW18	WSW10.5	W37
12-Apr	W19	W22	W21	W21	W20	W23	W17	W12	WSW19	WSW25	WSW30	WSW29	W31	W29	W28	W29	W31	W30	NNW30	NNW20	NW13	W12	W15	WSW19	W22.1	W31
13-Apr	NNW14	NW10	WSW18	W19	NW20	NW12	NNW15	W18	NNW19	NW30	NNW29	NW21	NW21	NW22	NW20	NW19	NNW22	NW17	NNW11	NNW7	SW1	N1	NNW3	NNW2	NW14.8	NW30
14-Apr	N2	N3	E6	SE20	SE21	SE24	SE23	SE24	SE20	SE18	SE18	SE18	SSE14	SSE13	SSE12	S20	S23	SSE29	SSE24	SE21	SE20	SSE20	SSE20	SSE17	SSE17.0	SSE29
15-Apr	S16	S13	S9	SW6	SSW5	S7	SE12	SSE11	SW12	WSW18	WSW15	W19	W18	W20	W20	W19	W21	W20	W14	WSW5	SW11	W27	W17	W14	WSW11.4	NNW27
16-Apr	W15	WSW19	W21	W22	W22	W17	W10	WSW10	WSW13	WSW7	W11	WSW20	W21	W20	W27	W30	WSW30	NNW26	NNW16	NNW23	NW15	NNW10	WSW13	SSW2	W16.0	WSW30
17-Apr	SW7	SW4	SSE6	SE10	SSE11	SSE14	SSE13	SE7	SSE11	SSE11	SSE13	SSE15	SW19	SW22	SW27	SW23	S13	S14	SSE14	SE11	NNW3	NNW2	N5	NNW8	S8.3	SW27
18-Apr	N7	NNW8	NNW12	NNW15	NNW17	NNW15	NNW16	NNW13	NNW10	NNW12	NNW19	NNW20	NNW22	NNE14	N9	NNE17	N17	NW15	NNE16	NNE7	W4	ENE1	NW3	SE1	NNW11.3	NNW22
19-Apr	SSE3	SSE3	SE8	SSE6	SSE8	SE9	SE9	SSE10	SSE11	SSE9	SSE8	SSE7	SW4	WSW12	WSW18	W13	WSW12	WNW6	SSW3	S4	SE9	SE9	SE5	SE7	S5.0	WSW18
20-Apr	SSE10	SE3	NNW5	NNW5	NNW5	NW3	N1	N3	NNW2	WSW6	W13	W13	W11	W14	SW10	SW8	NNW4	NNE10	NE16	NNE14	N11	N13	N9	N9	NW3.7	NE16
21-Apr	N7	N6	NNW4	NNW4	NW2	NW3	NNW4	NNW8	NNW9	N9	N17	N19	NNE14	N14	NNE14	N15	NNE15	NNE15	E14	E15	E10	SE15	SE18	SE20	NNE6.6	SE20
22-Apr	SE21	SE18	SE14	SE11	SE12	SE14	SE15	SE17	SSE21	SSE21	SSE24	SSE24	SSE22	SSE25	SSE29	SSE29	SE23	SE23	SE22	SE18	SE18	SE20	SE24	SE19	SE19.9	SSE29
23-Apr	SE15	SE15	SE13	ESE8	ENE7	E8	ESE11	ESE16	ESE13	SE15	SE12	SE18	SE21	ESE19	SE18	SE20	E17	SE16	ESE15	ENE21	ENE21	ENE11	NNE8	NNE12	ESE12.8	SE21
24-Apr	NNE14	NNE15	NNE15	NNE15	NNE16	NNE14	NNE13	NNE14	N17	N17	NNE18	NNE18	N19	NNE20	N20	NNE24	NNE24	NNE22	NNE22	N21	N19	N15	N15	N14	NNE17.5	NNE24
25-Apr	N13	N11	N9	N9	N8	N9	N10	NNW7	N5	N7	N7	N9	N10	N8	NNE5	NNW10	NNW14	NNW12	N11	N9	NNW7	N6	N5	N8.6	NNW14	
26-Apr	NNE4	NW2	NW0	N0	N1	ESE2	SE5	SE4	SSE8	SE9	SE6	SE10	SE9	SSE6	SE8	ENE1	SSE6	SE7	ESE7	E7	SSE5	SSE10	SSE11	SE20	SE5.4	SE20
27-Apr	SE25	SE14	SE9	SSE9	SSE6	S9	SSE12	SSE7	ESE4	SSE12	S17	SSW17	WSW15	SW24	WSW25	WSW26	W24	W25	WSW20	WSW18	WSW15	WSW11	WSW16	W13	SW11.2	WSW26
28-Apr	SW4	SSE12	SE12	SE6	SE7	ENE2	ESE3	SE9	SE4	SSE2	SSE12	SSE16	S17	S19	S20	S21	S23	S19	S17	SSE22	SSE19	SSE18	S17	W16	S11.9	S23
29-Apr	W15	W11	W10	W17	W20	W23	W16	W21	WSW6	WSW17	W12	WSW12	W21	W21	W18	W15	WSW10	WSW15	WSW15	SW14	WSW13	WSW14	WSW18	W13	W15.0	W23
30-Apr	W20	W20	W22	W24	W21	W22	WSW22	W22	WSW21	W23	W30	WSW34	WSW25	W23	WNW11	W18	NW13	N12	NW6	WSW4	SE5	WSW2	SE2	S8	W15.3	WSW34
S1.2 S1.5SSW1.5 SW1.6 SW0.9 SW0.8 SE1.9 SSE2.3 S2.3SSW1.8WSW2.9WSW3.7 W5.6 W5.8 W5.8 W5.7 W4.7NNW3.3 NW1.1 N0.3SSW0.8SSW1.1SSW2.4SSW2.2																								Diurnal Average		
SE25 W22 NNE22 W24 NNE25 NNE27 NNE27 N25 N27 NW30WSW30WSW34 W31 W29 SSE29 W30 W31WNW30WNW30 W37 W36WNW27 SE24 SE20																								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: 13 km/h on Apr 18 14:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 1 km/h on Apr 26 03:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 9	

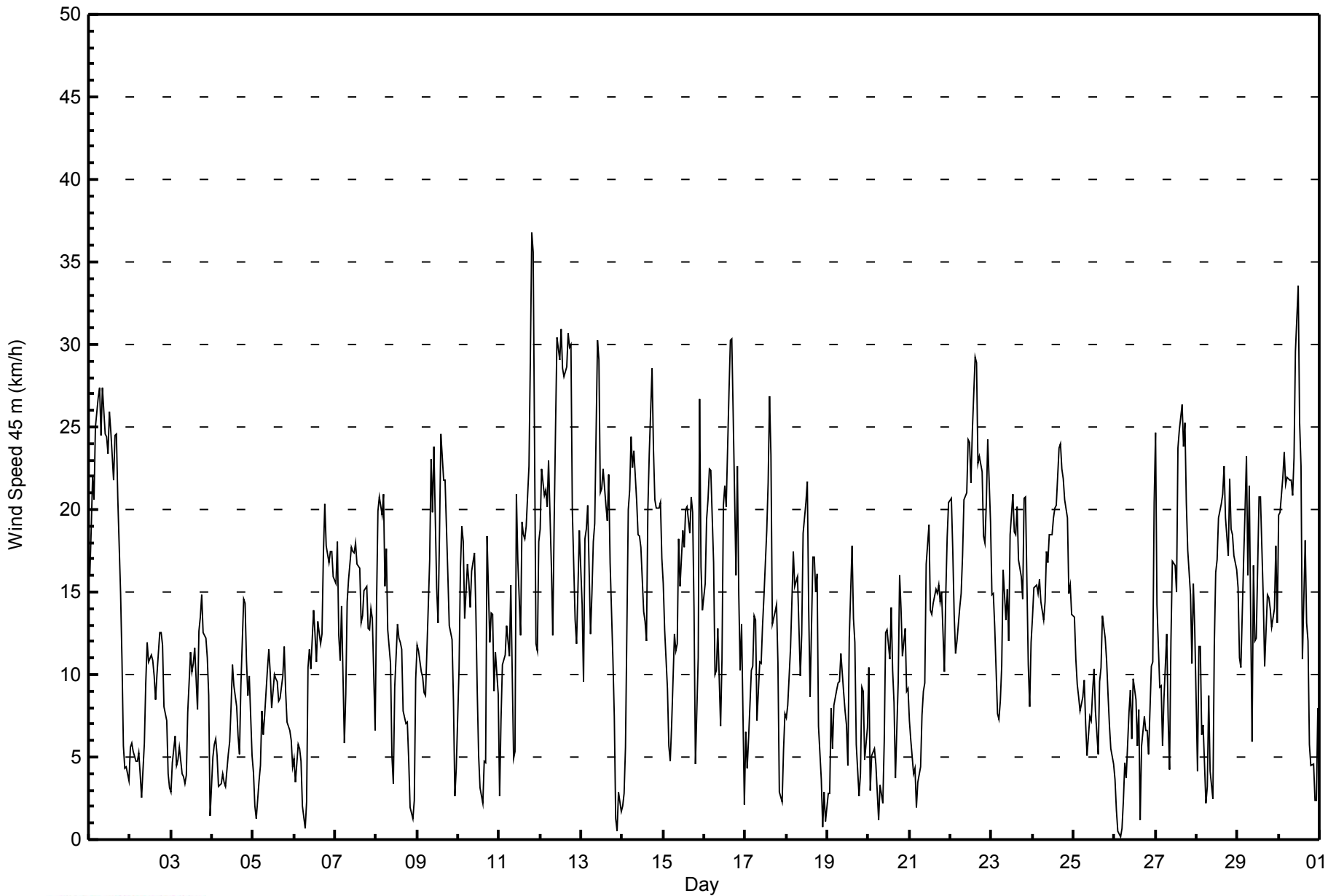
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	4	5	6	6	7	8	8	8	8	7	7	7	8	7	7	7	7	6	4	3	2	1	1	1	8
2-Apr	2	2	1	2	1	2	2	1	3	3	3	3	4	4	4	4	3	3	4	3	3	3	2	1	4
3-Apr	1	2	1	1	2	2	2	1	1	2	3	4	5	4	4	4	4	3	4	3	4	3	5	2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

Diurnal Maximum



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

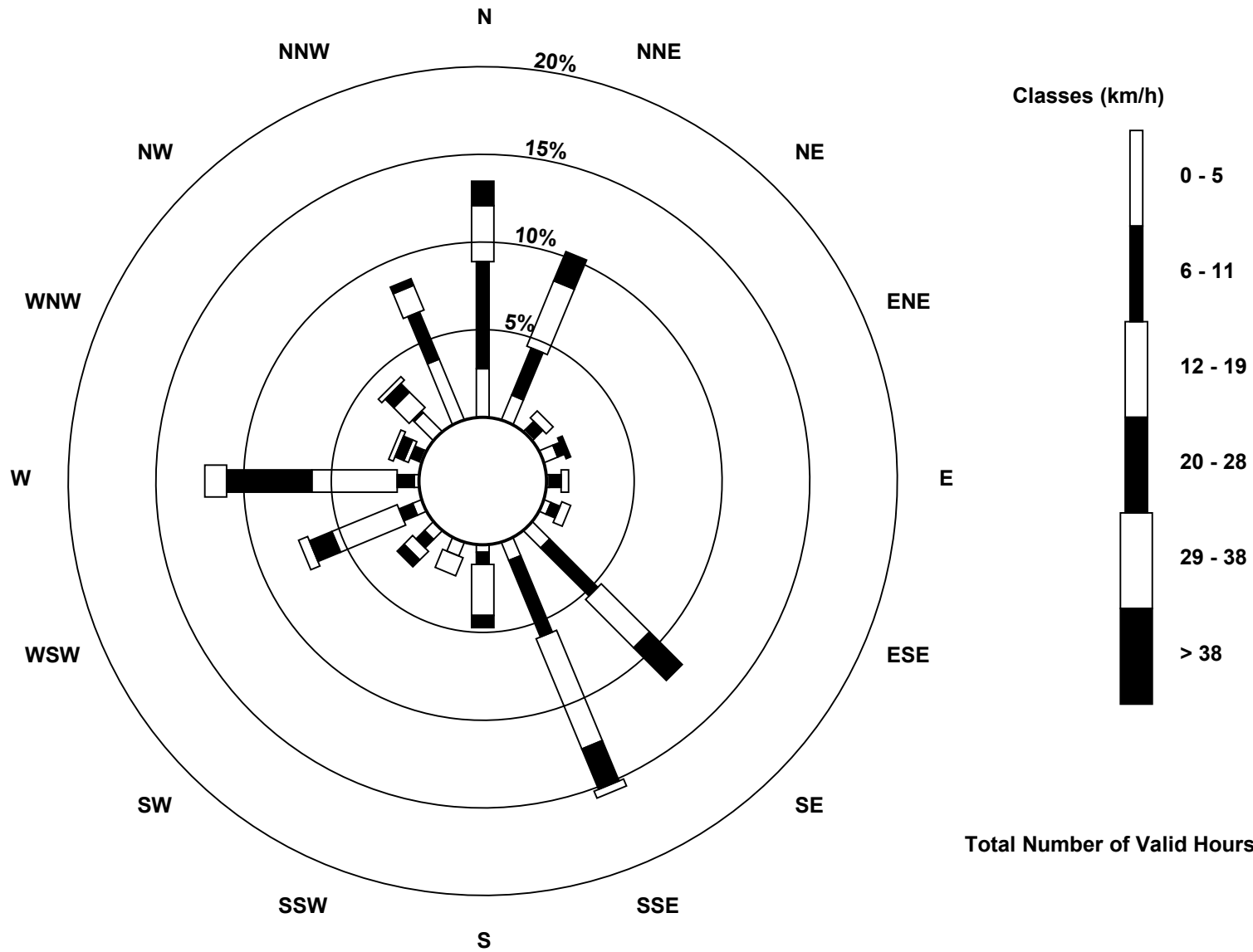
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	119	16.53	16.53
6 - 11	193	26.81	43.33
12 - 19	260	36.11	79.44
20 - 28	128	17.78	97.22
29 - 38	20	2.78	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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







Maximum Speed: 53 km/h on Apr 11 20:00	Maximum Daily Speed Average: 30.6 km/h on Apr 12	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 26 02:00	Minimum Daily Speed Average: 4.9 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 6.7 km/h at hour 16	Minimum Diurnal Speed Average: 0.7 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 2.7 km/h 227.7 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 11 Median = 17 Q <sub>3</sub> = 25 P <sub>90</sub> = 31 P <sub>99</sub> = 41	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NNE24	NNE28	NNE31	NNE30	NNE35	N37	NNE38	N34	N35	N33	N33	N32	N34	N33	NNE30	N32	N33	N29	NNE21	NNE16	NNE10	NNE9	N7	N7	N27.0	NNE38
2-Apr	NNW8	NNW7	NW7	NW7	NNW6	NNW7	NNE5	NNE3	N8	N12	NNW15	N14	NNW13	NNW13	NNW12	NNW11	N13	NE14	NE16	NNE17	NE15	NE12	NNE7	ENE4	N9.1	NNE17
3-Apr	NE3	NNE5	N7	NNE5	NNE5	N7	N7	NNW4	NW2	NNW4	N9	N13	N13	N14	N14	NNE11	N17	NNE17	NNE19	NNE18	NE21	NE21	ENE20	ENE5	NNE10.0	NE21
4-Apr	ENE5	NE3	N9	NNW6	NNE5	N3	N6	N3	N2	N6	NNW8	NW9	NW12	N12	N10	NNE7	N7	N12	NNE19	NNE21	NNE17	NNE13	NNE16	N15	N8.7	NNE21
5-Apr	N11	N7	N5	N6	N13	N15	NNE13	N10	N14	N14	N12	N9	N12	NNW12	N12	N10	NNE10	NNE14	NNE15	NNE13	NNE11	NNE10	NE7	NE5	N10.5	N15
6-Apr	NE2	ESE4	ESE3	ESE2	ESE3	SE5	SE9	SSE11	SSE12	SSE11	SE11	SSE17	S14	SSE12	SSE15	SSE13	SSE14	SSE20	SSE24	SSE25	S28	S27	S27	S28	SSE13.3	S28
7-Apr	S26	S28	S20	S19	S20	SSE15	SSE18	S15	SSE15	SSE16	SSE18	S19	SSW20	SSW18	S18	SSW15	SSW15	SW17	SW21	SSW20	S17	S23	S18	SE10	S17.5	S28
8-Apr	SSE15	SSE18	SSE18	SSE20	SSE22	SSE19	SSE16	SSE9	S6	WSW8	NW5	NNW12	N17	N16	N16	N15	NNE11	NE9	ENE11	E14	ESE11	SE11	SSE12	SSE15	SE4.9	SSE22
9-Apr	SSE20	SSE20	SSE19	SSE17	SSE19	SE21	SSE20	SSE22	SSE25	SE29	SE29	S16	SW17	WSW22	WSW33	WSW29	WSW30	WSW25	WSW24	SW25	SW25	SW22	WSW11	SSW4	SSW14.9	WSW33
10-Apr	SW7	SSW8	S8	S9	SSE12	SSE16	SSE17	SSE16	SSE11	SSE17	SSE13	SE9	SE5	ESE4	S1	NW5	S6	SSE22	S17	S17	S21	S16	SSE18	SE19	SSE11.4	SSE22
11-Apr	SE10	SSE14	SSE15	SSE8	SSE9	SSE11	S9	SSW8	SW10	SW6	WSW26	W24	W17	WSW24	WSW24	W26	W30	W35	W42	W53	W51	WNW19	W17	W25	WSW17.4	W53
12-Apr	WSW33	W37	WSW34	WSW33	WSW31	WSW32	WSW24	WSW18	WSW21	WSW27	WSW32	WSW31	WSW39	WSW39	W38	W38	W43	W42	W42	WNW28	WNW22	W20	WSW25	WSW27	WSW30.6	W43
13-Apr	WNW23	WNW15	WSW26	W30	WNW29	WNW19	W23	W27	WNW25	WNW39	NW37	NW28	NW27	WNW29	NW27	NW25	WNW27	NW21	NW17	NNW14	N7	ESE3	SE15	SE16	WNW18.9	WNW39
14-Apr	SE20	SE28	SE29	SE36	SE36	SE35	SE34	SE29	SE23	SE23	SE24	SE21	SE19	SE16	SSE24	SSE29	SE37	SE33	SE31	SE31	SE31	SE31	SE29	SSE21	SE27.8	SE37
15-Apr	SSE18	SSE15	SSE11	S8	SSW10	SSW9	SSW8	SSW8	WSW17	WSW19	WSW16	W24	W21	W25	W24	WSW22	WSW26	WSW28	WSW20	SW11	SW20	W39	WSW26	WSW23	WSW16.1	W39
16-Apr	WSW26	WSW29	WSW35	WSW36	WSW34	WSW26	WSW19	WSW16	SW14	SW8	WSW15	WSW22	WSW27	WSW25	W39	WSW41	WSW34	NNW36	NW24	WNW34	WNW23	WNW21	W16	WSW11	W22.9	WSW41
17-Apr	WSW18	WSW13	SW13	SSW8	SSE12	SSE14	SSE16	SE12	SE13	SE14	SE16	SSE17	SW21	SW25	SW33	SSW28	S16	SSE19	SE23	SE17	ESE2	ESE4	N4	NNW11	S10.8	SW33
18-Apr	NNW15	NNW16	NNW20	NNW23	NNW26	NNW25	NNW26	NNW23	NW17	NNW18	NNW26	NNW28	NNW29	N20	N14	NNE23	N23	NW22	NNE23	NE12	WNW2	WSW3	WNW4	NW2	NNW16.9	NNW29
19-Apr	SSW3	SW4	SSE5	SSW2	S3	S5	SSE7	SE8	SSE8	SE9	SE8	SSE7	SW6	WSW14	WSW18	W16	WSW13	WNW8	SW2	S4	SSE11	SSE15	SE13	SE12	S5.5	WSW18
20-Apr	SSE12	S5	W15	NW10	NW9	NW6	WNW2	NW3	NW4	WNW5	W9	WSW9	WSW11	WSW14	SW10	SW8	NNW5	NNE12	NNE21	NNE22	NNE19	N20	N16	N17	NNW5.1	NNE22
21-Apr	N14	N13	N11	N11	N10	N10	N9	NNW10	NNW11	N12	N21	N23	N17	NNE18	NNE18	N20	NNE19	NNE20	E20	E24	E22	SE23	SE26	SE29	NE10.6	SE29
22-Apr	SE30	SE26	SE21	SE18	SE19	SE23	SE21	SE23	SE24	SE24	SE28	SE29	SE28	SE31	SE36	SE36	SE31	SE31	SE30	ESE26	SE27	SE29	SE32	SE30	SE27.1	SE36
23-Apr	SE23	SE22	SE22	ESE15	ESE12	ESE15	ESE16	ESE21	ESE16	ESE19	ESE16	ESE23	ESE27	ESE25	ESE24	ESE26	E23	ESE21	E20	ENE30	ENE31	ENE20	NNE11	NNE16	ESE18.7	ENE31
24-Apr	NE21	NNE22	NNE22	NNE21	NNE22	NNE20	NNE17	NNE20	N22	N23	NNE26	N24	N26	N26	N28	NNE30	NNE32	N32	NNE30	N29	N29	N23	N21	N19	NNE24.1	NNE32
25-Apr	N19	N15	N14	N12	N13	N11	N11	N8	N6	N9	N9	N11	NNW13	N10	N8	NNW11	NNW12	NNW17	NNW17	N16	NNE21	N15	N10	NE8	N11.9	NNE21
26-Apr	E4	SSW0	SE4	SE8	SSE6	SSE4	SE7	SE6	SE9	SE9	SE7	SE12	SE10	SE7	SE9	E2	SE6	ESE8	E9	E12	ESE17	SE22	SE23	SE34	SE9.5	SE34
27-Apr	SE37	SE25	SE20	SE24	SE18	SE18	SE20	SE13	SE8	SSE15	S18	SSW19	SW17	SW27	SW29	SW30	WSW31	WSW32	WSW26	WSW26	WSW20	SW22	WSW24	WSW22	SSW15.7	SE37
28-Apr	SSW11	SSE11	SSE12	SSE15	SE15	SE12	SE11	SE13	SE8	SE5	SE17	SE21	S19	S22	SSE23	S25	S27	S24	S23	SSE28	SSE30	SSE29	S30	W28	SSE17.2	SSE30
29-Apr	WNW14	W18	W15	W25	W30	W34	W24	W30	W11	WSW21	W16	WSW13	WSW26	WSW26	W21	W19	WSW12	WSW19	SW19	SW20	WSW20	SW26	SW31	WSW24	WSW20.6	W34
30-Apr	WSW32	WSW32	WSW34	WSW36	WSW33	WSW32	WSW28	WSW27	WSW22	WSW27	WSW33	WSW35	WSW27	WSW25	W14	WSW22	NW19	NNW17	NW9	SW6	S7	S5	S8	S10	WSW20.0	WSW36
S3.2 SSW3.6 SSW3.7 SW3.6 SW2.6 SSW2.3 S2.4 S2.7 SSW2.1 SSW1.7 WSW2.3 WSW3.3 W6.0 W6.2 W6.6 W6.7 W5.3 WNW4.1 NW0.8 ESE0.7 SSE2.1 S3.6 S5.3 S4.7																								Diurnal Average		
SE37 W37 WSW35 WSW36 SE36 N37 NNE38 SE34 N35 WNW39 WNW37 WSW35 WSW39 WSW39 W39 WSW41 W43 W42 W42 W53 W51 W39 SE32 SE34																								Diurnal Maximum		

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

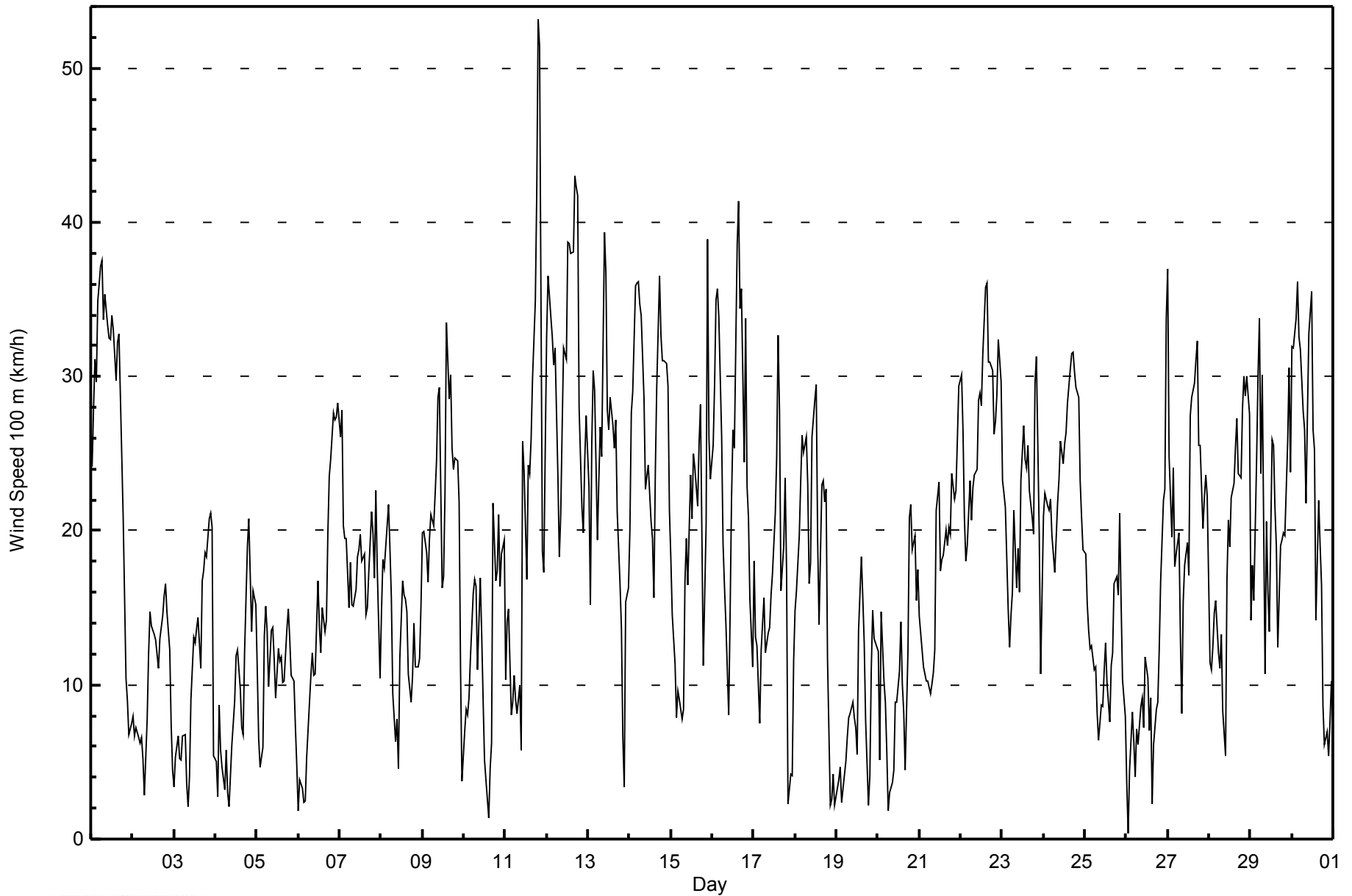
**Wind Speed 100 m (WS100m) - km/h**  
**Lower Camp Met Tower - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 15 km/h on Apr 18 14:00 Minimum Value: 1 km/h on Apr 5 03:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 10																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	3	4	5	5	6	6	6	6	5	5	5	5	5	4	4	5	4	4	3	4	2	2	1	6	
2-Apr	1	2	1	2	1	2	1	1	3	2	2	3	3	4	4	4	3	2	3	3	4	4	3	2	4
3-Apr	1	1	1	1	1	2	2	1	1	2	3	3	5	4	4	4	3	3	3	3	4	3	6	3	6
4-Apr	3	1	2	2	2	1	1	2	2	2	3	3	4	3	4	3	3	4	4	3	3	3	2	4	4
5-Apr	3	1	1	1	3	3	3	3	3	2	2	3	3	3	3	4	3	3	3	3	3	3	1	3	4
6-Apr	1	2	2	1	1	1	2	2	2	2	2	3	4	4	4	3	4	4	4	5	4	4	5	3	5
7-Apr	3	3	5	6	5	3	3	4	4	3	4	5	6	6	5	4	5	5	4	4	4	3	5	2	6
8-Apr	4	3	3	3	3	4	3	2	3	4	2	5	3	3	3	4	3	3	3	2	3	1	2	5	5
9-Apr	2	2	2	2	3	4	3	4	3	3	4	5	4	6	3	2	2	3	2	2	2	2	4	2	6
10-Apr	3	3	2	2	3	3	2	2	3	2	4	3	2	3	3	3	7	4	3	4	3	4	2	2	7
11-Apr	6	3	5	3	2	3	3	2	3	4	3	5	6	4	5	6	4	6	8	6	10	6	3	5	10
12-Apr	4	2	2	3	3	3	5	4	3	3	4	5	7	5	9	7	9	8	8	7	5	6	4	3	9
13-Apr	5	4	4	4	15	5	4	5	6	8	8	7	7	7	7	6	5	5	3	2	2	3	3	2	15
14-Apr	4	3	5	2	3	2	3	4	4	4	3	4	5	4	5	9	8	4	4	4	5	3	5	5	9
15-Apr	4	3	3	2	3	4	3	4	3	4	4	4	4	4	5	6	5	4	5	2	10	9	4	3	10
16-Apr	2	3	3	2	3	3	4	3	5	3	5	5	4	5	6	5	4	10	9	10	5	8	2	4	10
17-Apr	5	6	4	3	3	3	2	1	1	2	3	4	6	7	7	9	5	4	4	4	5	2	2	6	9
18-Apr	3	2	3	4	5	4	5	6	3	6	7	7	6	15	13	5	8	5	8	9	2	1	2	1	15
19-Apr	1	2	2	1	1	2	2	2	2	1	2	2	4	3	3	4	4	3	1	1	3	3	3	2	4
20-Apr	2	2	4	1	1	2	1	2	2	2	2	2	3	3	4	2	4	4	4	3	3	3	2	2	4
21-Apr	2	2	1	1	1	1	2	2	2	3	4	3	5	4	4	4	3	4	5	4	4	6	5	4	6
22-Apr	3	4	4	3	2	4	4	4	3	3	4	5	5	6	5	5	6	7	6	6	6	7	5	5	7
23-Apr	5	4	4	5	4	4	4	5	5	4	4	6	6	6	6	5	6	4	6	6	5	9	3	3	9
24-Apr	2	2	2	2	2	2	3	3	3	4	4	5	5	5	5	5	5	5	5	4	3	3	2	2	5
25-Apr	2	3	2	2	2	2	2	2	2	3	4	4	4	4	5	4	5	3	3	3	2	3	2	2	5
26-Apr	2	1	2	1	3	1	1	2	1	2	4	3	4	4	4	3	3	3	3	3	5	4	5	5	5
27-Apr	3	6	4	4	5	3	3	5	4	4	5	7	4	10	6	8	5	5	4	3	1	2	1	2	10
28-Apr	5	3	2	2	2	2	4	3	3	3	4	4	5	6	6	7	6	6	4	6	6	5	6	7	7
29-Apr	5	4	4	3	3	4	4	6	7	3	4	4	4	5	4	6	4	3	2	3	2	3	3	4	7
30-Apr	3	3	3	3	3	4	3	4	2	5	8	5	6	5	12	6	9	4	6	2	2	3	4	3	12
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

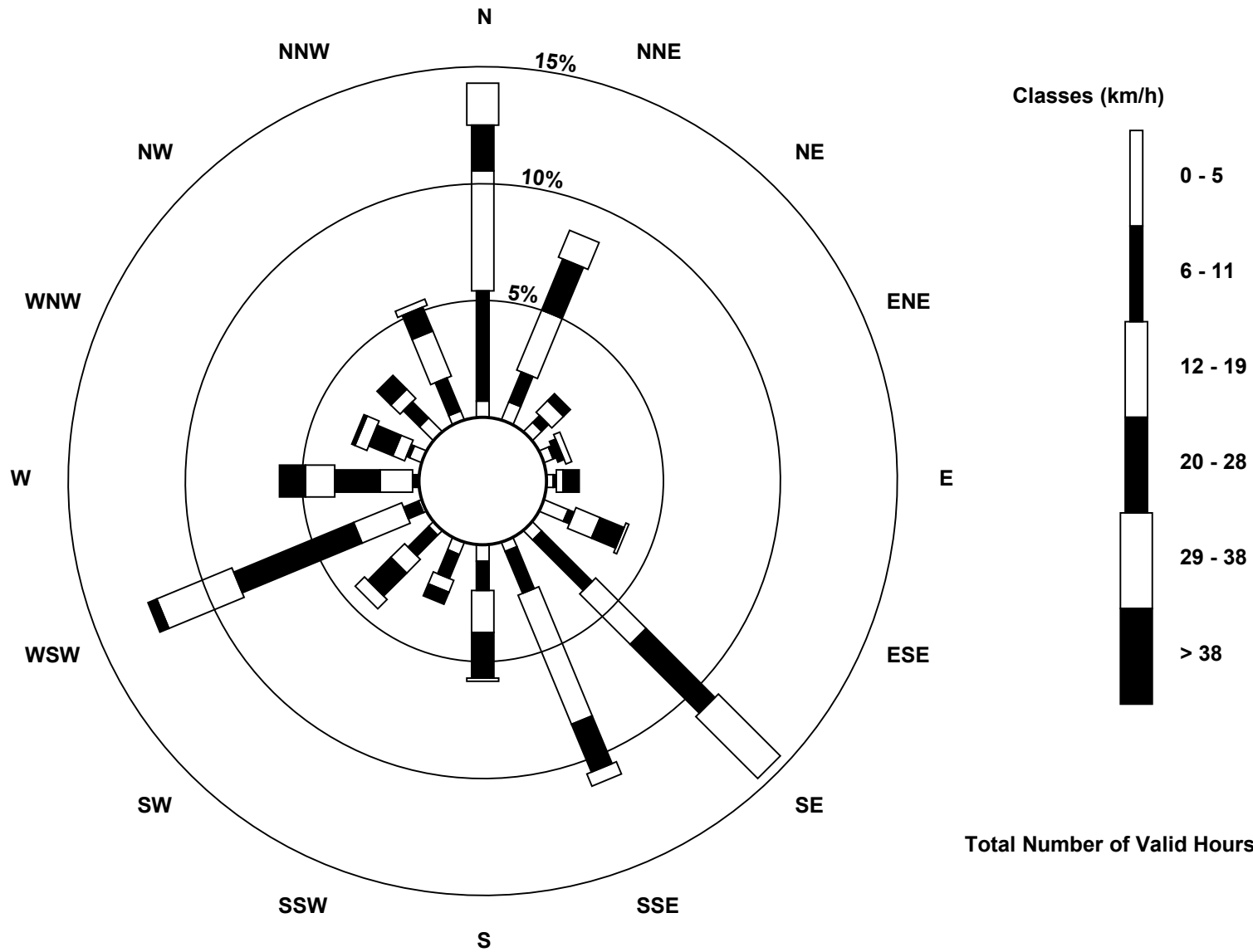
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	60	8.33	8.33
6 - 11	139	19.31	27.64
12 - 19	209	29.03	56.67
20 - 28	199	27.64	84.31
29 - 38	101	14.03	98.33
> 38	12	1.67	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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



**Total Number of Valid Hours: 720**



Maximum Speed: 60 km/h on Apr 11 20:00	Maximum Daily Speed Average: 37.7 km/h on Apr 12	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 18 21:00	Minimum Daily Speed Average: 2.8 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 7.7 km/h at hour 15	Minimum Diurnal Speed Average: 0.8 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 4.1 km/h 239.3 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 8 Q <sub>1</sub> = 12 Median = 21 Q <sub>3</sub> = 29 P <sub>90</sub> = 35 P <sub>99</sub> = 46	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NNE31	NNE33	NNE36	NNE33	NNE38	NNE40	NNE40	N33	N34	N34	N32	N32	N33	NNE33	NNE31	N32	N34	NNE30	NNE23	NNE19	NNE17	NNE15	NNE11	NE9	NNE29.0	NNE40
2-Apr	N8	N8	NNW8	NW7	NNW7	NNW8	N6	N3	N8	N12	N15	N14	NNW13	NNW13	NNW13	NNW12	N13	NE14	NE17	NE21	NE22	NE19	NE10	ENE6	N10.1	NE22
3-Apr	NE4	E6	ENE7	E7	ESE8	ESE5	ESE6	ESE6	ESE3	NNW4	N9	N13	N13	N14	N14	NNE12	NNE17	NNE19	NNE20	NE24	NE29	NE26	ENE21	E14	NE10.4	NE29
4-Apr	ESE14	ESE11	NNE2	N3	ESE6	ESE7	ENE3	ENE6	NE5	N6	NNW7	NW9	NW12	N13	NNW10	N8	N7	NNE12	NNE20	NNE25	NNE23	NNE18	NNE21	N20	NNE8.8	NNE25
5-Apr	NNE16	NNE10	N11	N12	N17	NNE22	NNE21	N11	N14	N13	N11	N10	N13	N12	N12	NNE10	NNE10	NNE13	NNE16	NE18	NE17	ENE17	E9	ESE10	NNE12.2	NNE22
6-Apr	SE9	SE11	SE11	SE11	SE10	SSE9	SSE11	SSE13	SSE9	SSE10	SSE10	SSE16	S14	S13	SSE14	SSE14	S15	SSE21	SSE24	S27	SSW31	SSW33	SSW34	SSW31	S15.8	SSW34
7-Apr	SSW29	SSW31	SSW31	SSW28	SSW26	S17	S19	S20	S15	S15	S19	S22	SSW21	SSW20	SSW21	SSW17	SSW17	SW19	SW23	SW25	SSW22	SSW25	SSW26	S10	SSW21.3	SSW31
8-Apr	S14	S16	SSW16	SSW15	S13	S13	S12	SSW9	SW9	WSW11	NW7	NNW12	N17	N16	N16	N15	NNE11	NE9	ENE11	E16	ESE15	SE16	SSE13	S23	SSE2.8	S23
9-Apr	S25	S25	S21	S21	SSE19	SSE20	SSE23	S24	SSE22	SSE24	SSE23	SSW17	SW19	WSW25	WSW36	WSW31	WSW33	WSW31	WSW30	SW30	WSW33	WSW33	WSW28	WSW19	SSW20.0	WSW36
10-Apr	WSW23	WSW21	SW16	SW17	SW12	SSW12	SSW11	SSW9	SSW9	S10	S10	SSE5	SSE5	SE4	SSW2	WNW5	S9	S25	S20	S22	SSW25	SSW21	S22	S27	SSW12.5	S27
11-Apr	S22	S22	S16	SSW10	SSW8	SSW10	SW13	SW14	WSW16	WSW11	WSW31	W25	W20	W28	W27	W28	W32	W38	W47	W60	W58	WNW24	W21	W25	WSW21.8	W60
12-Apr	W41	W46	W46	W44	WSW41	WSW42	WSW34	WSW26	WSW26	WSW31	WSW36	WSW36	WSW44	W44	W44	W43	W49	W47	W47	WNW33	WNW28	W26	W32	WSW36	W37.7	W49
13-Apr	WNW29	WNW20	W31	W38	WNW36	WNW26	WNW29	W32	WNW28	WNW42	NW39	NW30	NW29	NW30	NW29	NW27	WNW29	NW23	NW19	NNW16	N10	E6	SE21	SE25	WNW21.5	WNW42
14-Apr	SE32	SSE35	SSE36	SE40	SE40	SE40	SE41	SE39	SE32	SE24	SE25	SE26	SSE21	SE20	SSE16	SSE26	SSE32	SSE36	SSE32	SE34	SE36	SE33	SSE29	SSE22	SSE30.9	SE41
15-Apr	SSE20	S17	SSE13	SSW9	SSW9	SW14	SW15	SW14	WSW19	WSW22	WSW19	W26	W23	W28	W26	WSW25	WSW30	W32	W23	SW15	SW29	W45	WSW33	WSW34	WSW20.0	W45
16-Apr	WSW38	WSW42	W45	W43	W44	WSW37	WSW29	WSW24	SW17	SW10	WSW18	WSW25	WSW32	WSW30	W44	WSW46	WSW40	NNW40	NW30	WNW39	WNW29	WNW28	W17	W21	W28.9	WSW46
17-Apr	W30	WSW23	WSW20	SW16	SSW9	SSW10	S10	S10	SSE9	SE14	SSE15	S17	SW23	SW28	SW35	SSW31	S20	SSE22	SE27	SE21	SE6	SE8	SSE1	NW9	SSW12.8	SW35
18-Apr	N18	NNW19	NNW25	NNW28	NNW33	NNW30	N32	NNW31	NW22	NNW22	NNW30	NNW31	NNW34	N23	N18	NNE25	NNE24	NW25	NNE26	ENE17	E1	SSW2	WNW5	NW7	NNW20.2	NNW34
19-Apr	W4	WNW8	WSW5	WNW2	SW8	SW11	SSW12	SSW8	S7	S7	SSE7	SSE7	SW6	WSW16	WSW20	W18	WSW14	WNW8	WSW2	S4	S11	S19	S14	S12	SW7.5	WSW20
20-Apr	S8	WSW8	WNW12	NW13	NW10	NNW10	NNW8	NW8	NNW7	NNW6	WNW8	W7	W11	WSW14	SW11	SW9	N5	NNE13	NNE23	NE29	NNE28	NNE26	NNE21	NNE24	NNW7.6	NE29
21-Apr	NNE20	NNE18	NNE16	NNE15	NNE10	NNE18	NNE17	N13	N12	N13	NNE21	N23	NNE18	NNE19	NNE18	NNE21	NNE20	NNE20	E22	E30	ESE32	SE28	SE30	SE33	NE13.9	SE33
22-Apr	SE34	SE29	SE24	SE22	SE21	SE27	SE24	SE24	SE23	SE23	SE28	SE29	SE29	SE32	SE36	SE36	SE32	SE32	SE34	ESE29	SE32	SE34	SE37	SE34	SE29.3	SE37
23-Apr	SE28	SE26	SE26	ESE21	ESE17	ESE19	ESE19	ESE23	ESE17	ESE19	ESE17	ESE23	ESE27	ESE25	ESE25	ESE26	E24	ESE21	E22	ENE35	E39	E29	NE12	NE17	ESE21.5	E39
24-Apr	NE23	NE27	NE27	NE27	NE28	NNE25	NNE19	NNE19	NNE21	NNE23	NNE25	NNE25	N25	NNE27	N29	NNE31	NNE32	NNE32	NNE31	NNE31	NNE33	NNE27	NNE23	NNE21	NNE25.7	NNE33
25-Apr	NNE20	N16	NNE16	NNE15	NNE19	NNE14	N11	N9	N7	NNW9	N9	N10	NNW13	N10	N9	NNW11	NNW12	NNW18	NNW18	N17	NNE23	NNE23	NE16	ENE15	N13.3	NNE23
26-Apr	SE10	SSE8	S10	S10	S10	S9	SSE8	SSE8	S7	SSE8	SE6	SE11	SE11	SE7	SE9	E3	SE5	ESE8	E9	E15	ESE24	SE30	SE31	SSE36	SE11.4	SSE36
27-Apr	SSE34	SSE27	SE23	SE28	SE24	SE23	SSE21	SSE16	SSE13	SSE15	S20	SSW22	SW19	SW30	SW31	SW34	WSW36	WSW38	WSW31	WSW31	WSW26	WSW25	WSW30	WSW33	SSW18.5	WSW38
28-Apr	WSW18	SSW9	SSW10	S7	SSE13	SSE15	SSE16	SSE12	SSE10	SSE9	SSE17	SSE21	S20	S26	S26	S29	S32	S28	S30	SSE33	SSE36	S37	SSW31	W38	S19.1	W38
29-Apr	WNW18	WNW23	WNW18	W23	WNW24	WNW33	WNW29	W33	WNW16	WSW24	W18	W16	W29	W28	W25	W21	WSW16	WSW22	WSW22	SW23	WSW29	WSW36	WSW42	WSW38	W24.0	WSW42
30-Apr	WSW43	WSW43	W45	W48	WSW45	W44	WSW37	WSW34	WSW27	WSW31	WSW38	WSW40	WSW31	WSW30	W18	WSW25	NW22	NNW18	NW10	SW5	S6	S7	SSW15	SSW13	WSW25.8	W48
SSW5.0 SW5.6 SW5.7WSW5.5WSW4.1 SW3.6 SW3.4 SW4.1 SW3.3WSW3.1WSW3.5WSW4.4 W6.8 W7.2 W7.7 W7.6 W6.3WNW4.9WNW1.5 E0.8 SSE1.9 S4.1SSW6.8SSW6.9																								Diurnal Average		
WSW43 W46 W46 W48WSW45 W44 SE41 SE39 N34WNW42 NW39WSW40WSW44 W44 W44WSW46 W49 W47 W47 W60 W58 W45WSW42 W38																								Diurnal Maximum		

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



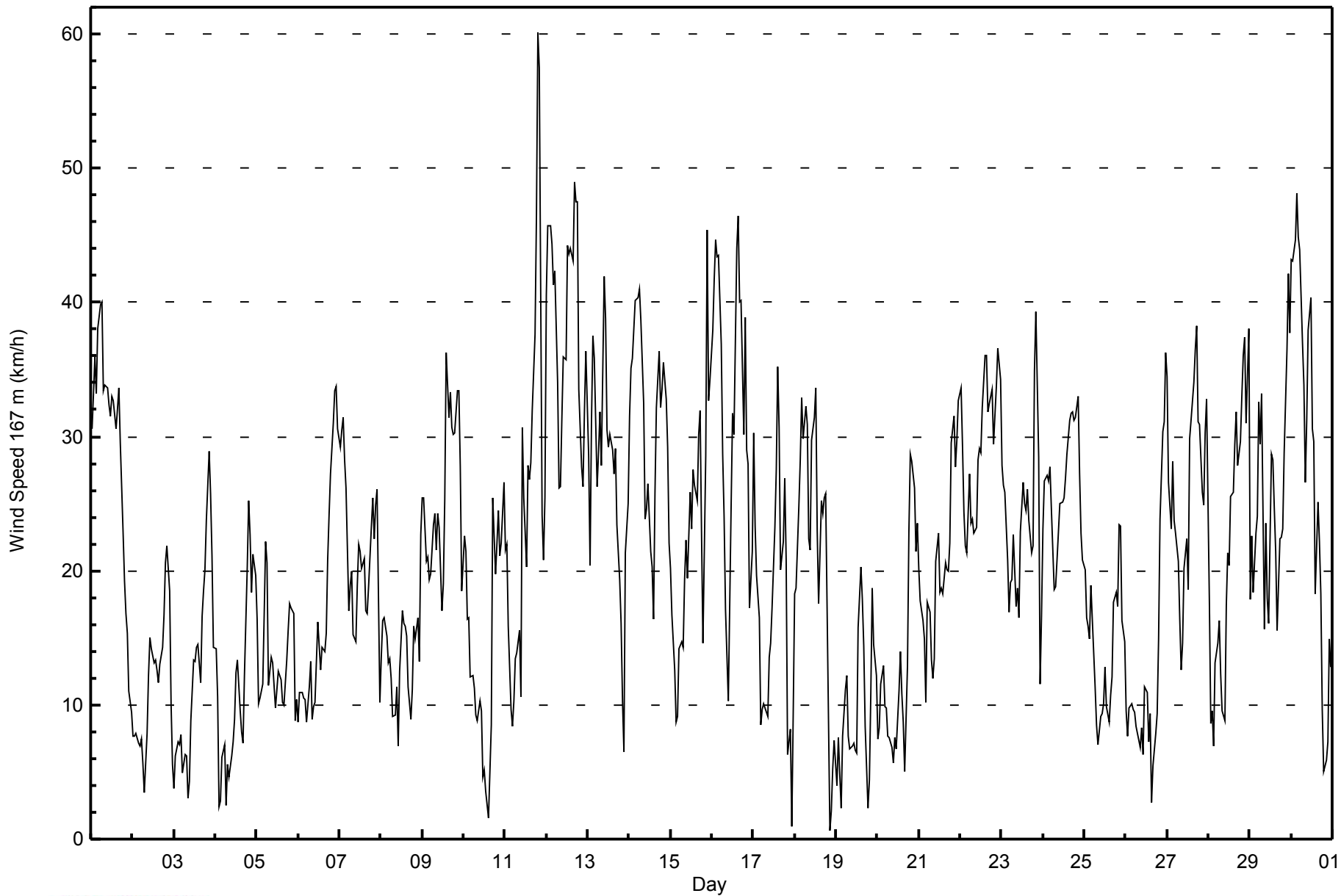
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 17 km/h on Apr 13 05:00	Hours of Data: 720
Minimum Value: 1 km/h on Apr 20 06:00	Hours of Missing Data: 0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 10	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-Apr	4	4	5	6	6	7	7	6	5	6	5	5	6	5	4	4	4	4	4	3	4	3	2	1	7
2-Apr	1	2	1	2	1	2	1	1	3	2	2	2	3	4	3	4	3	3	2	3	3	5	3	3	5
3-Apr	1	1	1	1	1	2	2	1	1	2	3	3	4	4	3	4	3	3	3	3	2	2	3	4	4
4-Apr	2	2	2	2	3	1	1	1	1	2	3	4	4	4	3	2	3	3	3	3	4	4	3	2	4
5-Apr	2	1	1	1	4	3	3	4	3	2	2	3	2	3	3	3	3	3	3	2	4	3	2	2	4
6-Apr	2	2	2	2	2	2	2	3	2	2	2	4	4	4	3	3	3	3	4	2	2	2	2	2	4
7-Apr	2	2	3	4	5	3	3	3	3	3	4	4	5	5	4	4	4	4	4	2	4	3	5	2	5
8-Apr	3	2	2	2	2	2	2	3	2	3	3	5	3	3	3	4	3	3	2	1	1	2	3	3	5
9-Apr	3	3	2	2	3	2	3	4	3	4	4	4	4	7	3	2	2	3	3	2	2	2	4	4	7
10-Apr	4	3	2	1	2	2	2	2	2	2	2	2	2	3	3	3	9	4	3	5	2	2	2	2	9
11-Apr	4	3	4	2	2	3	3	2	3	7	3	5	5	4	5	5	4	7	9	5	10	7	3	6	10
12-Apr	3	2	2	3	3	3	5	4	3	3	4	5	5	4	8	6	8	7	7	7	4	6	4	3	8
13-Apr	6	4	5	3	17	6	4	3	6	8	9	6	7	7	6	5	5	5	3	2	2	3	4	2	17
14-Apr	4	3	4	2	2	3	3	3	4	3	3	4	6	4	6	9	8	5	5	3	3	3	6	5	9
15-Apr	4	3	3	2	2	3	3	3	3	3	4	4	4	3	5	6	6	4	5	2	10	8	4	3	10
16-Apr	2	3	3	2	2	4	3	3	6	3	4	5	4	5	4	3	10	8	10	5	6	4	3	10	
17-Apr	3	4	2	4	2	1	2	2	2	2	3	5	5	6	7	8	4	4	5	4	7	2	2	6	8
18-Apr	1	1	3	3	4	4	6	7	3	5	7	6	6	16	12	5	8	4	8	9	2	1	2	2	16
19-Apr	2	2	1	1	5	2	2	2	1	2	2	3	4	3	3	4	4	3	1	1	4	3	4	2	5
20-Apr	3	3	2	1	1	1	1	2	1	2	2	3	3	3	3	2	4	4	4	3	3	4	3	2	4
21-Apr	2	2	3	2	2	4	2	3	2	3	4	4	5	4	4	4	4	5	5	5	3	6	5	3	6
22-Apr	3	4	4	3	2	3	4	4	3	4	4	4	5	6	5	5	6	7	6	6	6	7	5	5	7
23-Apr	5	4	4	5	4	5	4	4	5	4	3	6	5	6	5	5	6	4	7	5	5	12	4	3	12
24-Apr	2	3	1	1	1	2	3	3	3	4	4	5	5	5	4	5	5	5	5	4	4	5	3	3	5
25-Apr	3	3	2	2	2	3	2	2	1	3	4	4	4	4	4	4	5	4	3	2	1	2	3	3	5
26-Apr	3	2	2	2	2	2	1	2	1	2	4	3	4	4	4	3	3	3	3	3	3	3	4	5	5
27-Apr	4	4	4	2	3	2	3	4	5	4	5	6	4	9	6	9	5	6	5	3	1	3	1	3	9
28-Apr	8	2	2	2	2	2	3	4	2	4	4	4	5	6	5	6	5	5	3	4	4	3	4	6	8
29-Apr	5	5	5	2	3	4	4	5	7	3	4	4	3	3	3	5	4	3	3	3	5	4	3	3	7
30-Apr	2	2	3	2	3	4	2	4	2	3	8	4	6	4	13	7	10	4	5	2	1	2	6	4	13
	8	5	5	6	17	7	7	7	7	8	9	6	7	16	13	9	10	10	9	10	10	12	6	6	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

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







**WBEA**  
**Cumulative Frequency Distribution**

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

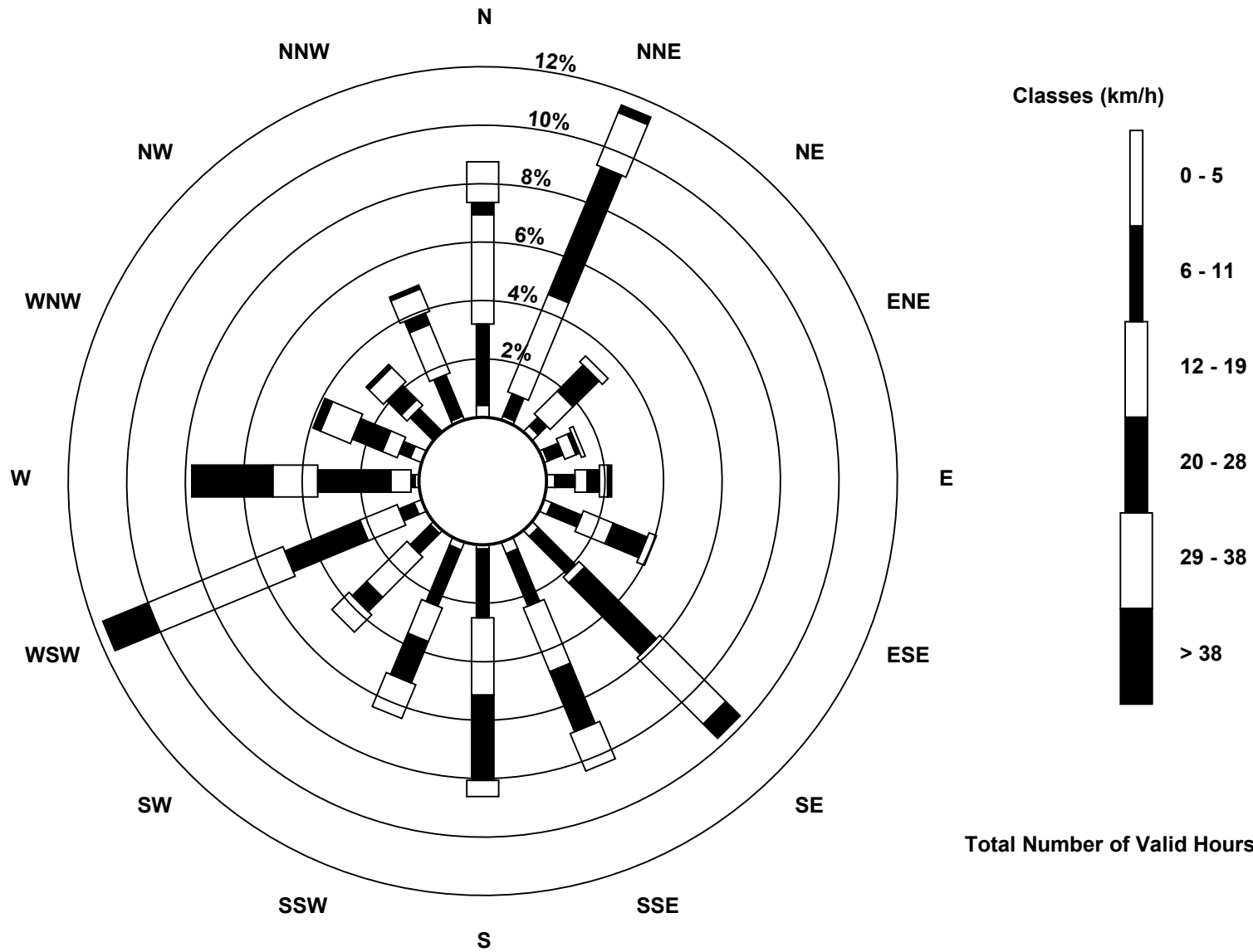
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	27	3.75	3.75
6 - 11	139	19.31	23.06
12 - 19	170	23.61	46.67
20 - 28	191	26.53	73.19
29 - 38	149	20.69	93.89
> 38	44	6.11	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

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



Total Number of Valid Hours: 720



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

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

Direction of Maximum Speed: 271 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 269.3 deg on Apr 12	Hours of Data: 720
Direction of Minimum Speed: 325 deg on Apr 21 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.7 deg on Apr 20	Percent Operational Time: 100.0
Monthly Average Direction: 274.9 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	8	15	16	20	19	14	16	6	3	9	6	8	7	17	19	8	9	12	21	26	17	16	329	3	11.7
2-Apr	349	343	310	310	334	331	25	73	9	360	349	355	356	347	346	340	14	45	42	30	37	21	14	70	3.6
3-Apr	44	19	6	0	345	340	343	352	355	347	357	9	10	5	12	13	26	31	30	38	50	55	12	14.8	
4-Apr	33	14	23	25	23	344	11	28	345	356	345	330	327	351	356	36	9	12	30	23	22	33	10	347	7.5
5-Apr	332	63	326	350	336	11	20	7	9	3	352	356	359	352	1	19	27	15	23	13	360	14	30	352	6.2
6-Apr	355	341	345	336	332	314	317	129	154	156	153	155	182	170	160	166	172	168	159	158	168	180	179	174	167.2
7-Apr	171	167	167	161	156	104	148	159	158	148	166	196	208	207	198	206	213	222	233	211	177	178	168	101	181.2
8-Apr	147	154	154	154	151	152	154	144	149	228	280	352	353	2	9	359	24	45	66	92	240	341	200	142	133.0
9-Apr	140	140	141	151	145	144	140	152	156	145	150	164	248	260	271	268	267	263	257	237	257	278	199	174	201.4
10-Apr	167	152	152	150	153	149	150	157	150	150	150	147	149	156	212	331	185	175	182	177	168	145	144	141	157.8
11-Apr	142	154	153	156	152	148	141	147	166	154	259	263	265	266	264	272	276	278	268	271	273	314	280	258	250.2
12-Apr	269	275	270	268	269	264	260	261	252	254	251	254	265	271	271	276	277	281	283	297	319	269	265	253	269.3
13-Apr	307	304	258	277	311	306	285	278	300	313	313	315	314	311	317	317	300	311	331	347	233	2	333	345	305.8
14-Apr	2	359	83	134	136	141	138	139	140	130	130	141	161	154	157	176	171	155	157	146	142	148	161	168	148.7
15-Apr	174	177	188	228	209	191	142	154	228	254	258	272	270	270	268	262	264	269	254	238	228	281	261	262	245.4
16-Apr	271	257	273	270	265	262	274	253	249	249	264	252	261	260	269	267	256	341	327	294	305	303	257	197	272.5
17-Apr	233	229	165	143	147	153	158	143	147	150	150	167	223	223	230	214	183	169	157	132	344	348	352	335	182.5
18-Apr	350	334	333	334	336	337	347	337	327	347	342	343	342	15	353	21	11	321	19	20	279	59	315	138	346.4
19-Apr	149	151	145	151	154	146	145	147	152	151	150	154	222	251	253	267	251	295	205	173	142	132	143	139	182.1
20-Apr	154	128	290	329	343	320	2	2	332	247	259	259	260	259	222	235	331	12	36	27	2	356	351	355	305.3
21-Apr	359	357	336	347	325	316	344	337	345	351	8	1	15	10	14	7	19	22	90	89	98	138	140	138	35.6
22-Apr	134	133	136	134	137	129	133	139	155	157	156	150	147	147	153	150	136	141	128	125	138	141	139	137	141.9
23-Apr	130	133	126	105	77	97	102	109	118	131	129	132	134	120	127	127	96	125	103	71	75	66	17	27	110.4
24-Apr	33	26	20	22	30	26	24	15	5	9	14	12	7	12	10	17	15	15	16	11	9	6	1	0	14.2
25-Apr	1	354	5	2	354	353	357	344	6	356	5	352	351	358	29	333	336	339	332	352	8	342	7	353	352.5
26-Apr	23	319	325	11	10	112	124	132	148	145	141	139	139	148	136	70	168	126	106	92	155	149	153	141	137.0
27-Apr	141	144	146	158	157	171	165	162	122	149	187	207	238	226	243	242	260	259	250	257	245	241	255	266	217.2
28-Apr	217	152	145	144	124	68	112	143	134	165	155	164	179	179	178	180	184	187	179	164	164	168	174	268	172.8
29-Apr	268	260	269	262	265	273	273	268	257	250	265	251	269	267	268	274	249	256	244	234	246	248	249	277	261.0
30-Apr	273	276	272	269	270	265	258	263	254	265	262	256	255	260	283	265	314	357	313	242	143	252	124	174	266.1
	180.4	182.3	203.6	220.6	224.1	205.5	145.8	160.9	172.3	200.0	236.6	244.2	267.8	263.8	259.0	265.5	269.1	281.7	267.0	213.0	191.6	188.4	192.9	190.1	

Diurnal Average

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

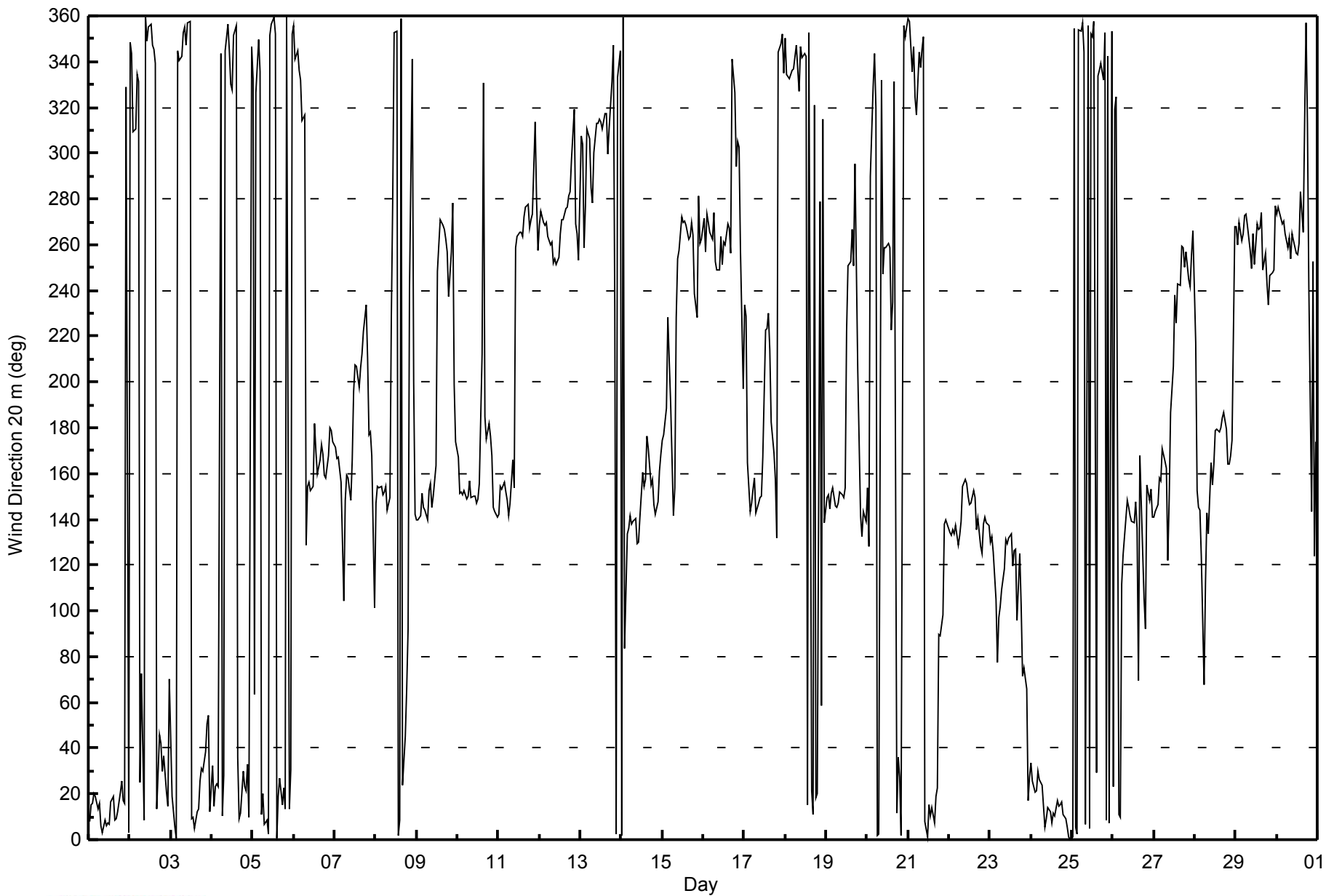
**Wind Direction 20 m (WD20m) - deg**  
**Lower Camp Met Tower - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 105 deg on Apr 26 16:00 Minimum Value: 5 deg on Apr 10 06:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 12 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 30 P <sub>90</sub> = 48 P <sub>99</sub> = 84																			Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																			
1-Apr	20	22	21	22	21	21	21	20	19	21	20	23	20	22	23	22	20	22	24	22	29	37	29	36	37																		
2-Apr	19	23	18	20	26	23	31	43	33	27	21	26	28	31	35	36	30	25	20	22	36	38	49	42	49																		
3-Apr	36	22	19	23	16	23	27	36	31	44	34	27	39	31	30	43	27	23	20	21	20	71	83	83																			
4-Apr	20	21	22	23	43	27	32	34	39	36	55	44	32	36	42	40	63	31	21	23	24	20	19	23	63																		
5-Apr	25	81	33	11	24	23	30	29	26	23	25	35	30	29	37	38	33	25	24	22	26	23	20	35	81																		
6-Apr	28	46	16	15	17	71	74	77	14	12	20	18	19	20	18	14	21	11	9	7	9	10	10	9	77																		
7-Apr	9	7	18	32	20	50	61	15	14	13	21	16	19	20	20	17	17	14	17	14	12	10	14	25	61																		
8-Apr	14	7	6	8	8	16	10	23	12	45	64	37	22	22	24	26	42	36	22	46	72	67	67	15	72																		
9-Apr	17	24	18	19	18	14	9	12	10	18	16	37	30	20	15	15	14	11	10	14	11	23	73	30	73																		
10-Apr	13	7	8	11	7	5	8	12	12	11	16	16	35	55	65	60	84	11	11	15	18	31	15	14	84																		
11-Apr	87	34	20	8	8	11	10	9	37	31	15	16	25	18	20	17	15	16	16	15	16	25	19	13	87																		
12-Apr	13	13	13	13	13	14	22	25	15	15	14	15	18	19	20	20	20	19	18	20	15	23	16	14	25																		
13-Apr	20	37	16	18	20	22	18	18	22	18	19	20	26	23	24	23	20	22	19	19	95	85	46	54	95																		
14-Apr	28	81	85	18	16	12	12	14	16	16	16	18	20	20	28	20	19	13	12	17	15	15	14	13	85																		
15-Apr	13	12	18	21	24	38	12	11	39	17	20	20	21	18	20	19	19	14	12	29	31	17	18	15	39																		
16-Apr	14	16	16	13	12	18	25	20	18	39	25	19	19	17	16	16	13	29	27	19	21	42	23	84	84																		
17-Apr	65	86	26	10	11	12	16	29	17	16	17	29	16	17	14	11	18	12	20	28	70	77	19	17	86																		
18-Apr	17	16	15	15	16	15	18	17	19	27	21	20	18	46	88	26	25	19	28	46	39	95	71	72	95																		
19-Apr	58	49	69	35	18	14	15	14	12	12	18	37	62	20	16	22	19	32	21	30	12	25	76	32	76																		
20-Apr	12	63	65	27	29	43	34	35	76	30	14	18	26	22	23	31	74	31	20	19	18	14	15	17	76																		
21-Apr	18	30	79	53	99	43	38	21	26	22	23	20	30	30	26	26	26	25	28	18	26	19	15	14	99																		
22-Apr	16	16	15	17	15	16	17	17	12	10	12	17	21	20	15	16	20	16	18	19	17	18	14	17	21																		
23-Apr	19	17	21	35	30	33	23	22	25	22	22	21	18	30	28	23	30	24	31	19	20	62	38	19	62																		
24-Apr	17	18	19	18	18	19	23	26	22	25	24	25	28	25	26	25	24	24	22	21	19	19	17	17	28																		
25-Apr	19	24	21	20	23	21	20	26	35	31	55	47	38	65	70	48	42	23	20	15	20	14	28	40	70																		
26-Apr	42	53	59	78	76	14	23	33	15	19	44	29	44	73	33	105	34	31	43	54	28	24	14	15	105																		
27-Apr	15	22	23	23	47	14	11	50	70	20	19	17	20	17	20	15	17	16	14	11	7	12	11	32	70																		
28-Apr	68	12	12	18	30	77	49	17	34	53	17	14	18	14	14	15	11	10	11	9	8	9	10	34	77																		
29-Apr	13	21	19	12	11	14	18	18	75	17	19	17	19	18	19	21	13	15	18	16	10	11	13	22	75																		
30-Apr	14	14	13	14	14	13	17	16	14	17	15	14	19	18	76	22	50	22	58	31	59	62	77	23	77																		
																			87	86	85	78	99	77	74	77	76	53	64	47	62	73	88	105	84	36	58	54	95	95	77	84	
Diurnal Maximum																																											



**WBEA**  
**Hourly Averages**

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





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

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

Direction of Maximum Speed: 261 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 259.5 deg on Apr 12	Hours of Data: 720
Direction of Minimum Speed: 124 deg on Apr 26 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 3.6 deg on Apr 20	Percent Operational Time: 100.0
Monthly Average Direction: 277.3 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-Apr	5	11	12	14	13	9	12	4	359	4	2	4	2	9	13	4	5	8	14	20	14	7	335	355	7.2
2-Apr	343	338	303	303	329	329	21	57	3	354	344	350	349	342	338	332	6	37	36	22	31	22	12	54	359.2
3-Apr	33	14	357	353	343	340	344	345	346	340	352	353	4	2	356	7	8	20	25	23	30	46	50	23	10.3
4-Apr	26	5	11	7	1	337	359	15	336	349	340	322	321	346	351	23	1	5	23	19	15	22	1	345	1.1
5-Apr	338	11	283	329	340	359	9	2	3	359	347	352	353	345	354	12	18	7	18	9	355	9	17	346	359.8
6-Apr	350	344	348	346	344	343	344	121	144	146	141	145	172	161	151	158	164	161	150	152	164	173	172	168	157.0
7-Apr	165	162	164	159	151	123	141	154	146	140	157	185	198	197	187	194	202	213	224	203	174	173	162	107	173.4
8-Apr	138	144	144	145	143	141	144	137	141	226	284	345	350	356	360	354	16	39	61	82	147	146	159	136	119.8
9-Apr	136	138	135	138	137	135	134	143	145	137	139	154	242	250	261	259	258	251	242	219	228	242	255	176	192.3
10-Apr	159	141	141	138	136	137	135	141	137	139	142	137	140	138	206	323	175	166	171	168	165	146	139	136	146.5
11-Apr	111	138	141	142	138	136	132	137	175	155	250	255	258	257	257	266	269	268	258	261	264	306	268	247	243.4
12-Apr	257	264	259	257	258	253	250	253	245	245	242	246	256	260	262	266	267	272	273	287	311	260	255	244	259.5
13-Apr	298	295	250	267	302	296	278	269	289	303	304	306	305	302	308	309	290	302	325	337	242	30	351	352	296.6
14-Apr	29	125	113	132	133	135	132	131	133	123	123	133	146	140	144	165	159	143	144	138	133	139	148	157	138.7
15-Apr	165	167	175	210	198	187	136	147	226	245	250	264	262	261	261	254	254	260	255	217	213	272	250	249	238.1
16-Apr	257	246	262	260	255	251	265	247	241	241	256	243	251	251	260	258	248	334	320	285	296	292	249	218	263.1
17-Apr	235	228	175	137	138	142	143	131	136	139	139	158	214	214	221	206	173	158	143	124	340	13	341	329	173.0
18-Apr	338	329	327	329	330	332	341	329	318	335	337	337	336	12	355	15	8	314	12	24	275	256	303	215	341.1
19-Apr	161	152	144	150	146	139	138	138	139	139	138	146	213	245	245	259	243	287	200	173	138	130	133	128	171.5
20-Apr	142	153	270	319	345	315	322	358	333	247	254	254	252	251	214	226	329	6	28	21	359	350	343	343	309.4
21-Apr	346	357	338	357	346	338	341	334	341	346	4	357	8	6	7	3	13	16	83	86	93	129	132	131	28.5
22-Apr	127	127	129	129	132	121	126	131	143	145	144	139	136	136	141	140	127	131	120	117	130	132	130	129	132.5
23-Apr	123	124	120	102	77	95	98	103	110	121	120	122	124	111	117	118	91	116	93	67	71	63	14	20	101.6
24-Apr	24	18	13	14	21	19	17	10	1	5	9	7	1	5	6	12	10	10	12	7	6	3	358	357	9.1
25-Apr	358	353	1	357	351	348	354	341	359	353	359	349	345	351	18	331	330	335	327	346	8	339	352	1	348.7
26-Apr	29	333	316	124	134	121	120	124	137	135	131	132	129	133	128	66	155	116	96	84	134	133	142	134	126.4
27-Apr	133	133	134	141	146	153	151	148	112	140	177	197	230	218	234	234	250	250	240	248	230	218	236	248	207.7
28-Apr	200	143	138	140	129	110	113	134	125	147	145	150	168	169	167	170	174	176	169	156	159	163	170	261	163.1
29-Apr	262	257	260	252	256	264	263	260	258	242	257	245	259	258	259	265	240	247	235	225	237	234	235	261	252.0
30-Apr	263	266	260	259	260	256	250	253	246	256	253	248	247	251	270	256	308	351	306	229	138	204	159	162	256.4

175.4 169.3 193.7 208.0 207.1 188.7 132.5 148.5 160.5 193.5 233.1 240.8 265.6 261.0 256.9 263.2 271.0 290.7 318.6 82.7 173.7 171.9 188.2 187.4

Diurnal Average

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction 45 m (WD45m) - deg

Lower Camp Met Tower - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 102 deg on Apr 26 04:00	Hours of Data: 720
Minimum Value: 2 deg on Apr 10 06:00	Hours of Missing Data: 0
Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 8 Q <sub>1</sub> = 11 Median = 16 Q <sub>3</sub> = 23 P <sub>90</sub> = 38 P <sub>99</sub> = 84	Hours of Calibration: 0
	Percent Operational Time: 100.0

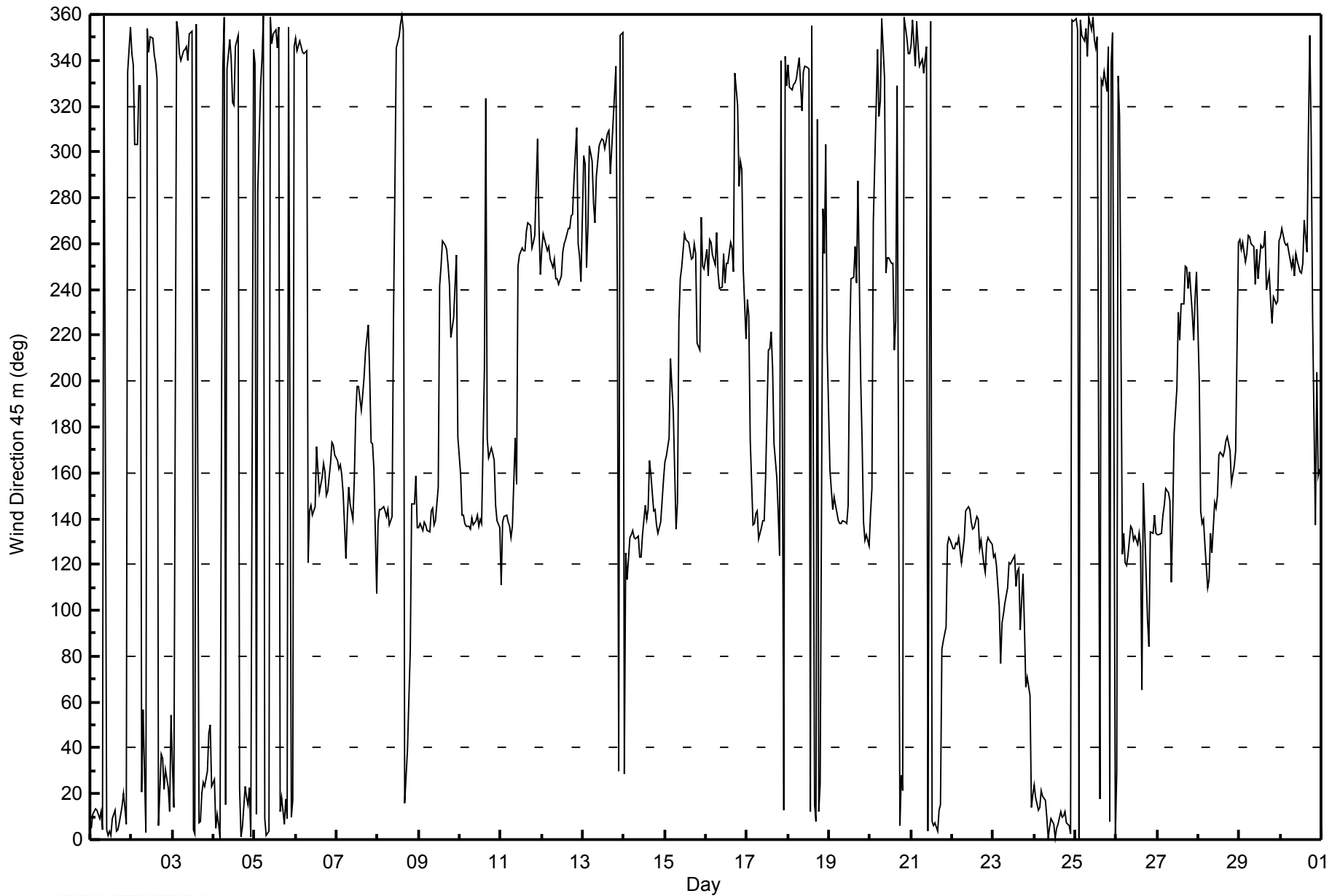
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	14	14	14	15	14	15	16	16	14	15	14	16	14	16	17	16	16	16	18	15	20	28	22	24	28
2-Apr	14	16	14	18	19	18	27	37	29	22	16	21	25	23	27	31	25	19	16	14	23	29	43	30	43
3-Apr	34	17	15	20	14	17	22	26	29	38	27	21	31	25	23	37	21	15	13	15	14	16	72	85	85
4-Apr	19	14	18	19	30	17	26	25	29	29	48	39	28	32	37	32	52	24	15	15	16	17	13	14	52
5-Apr	15	45	33	8	15	16	20	19	19	18	18	28	24	24	33	34	28	18	17	17	21	17	15	12	45
6-Apr	12	18	10	9	10	53	76	53	9	9	14	15	17	17	14	12	19	9	8	8	8	7	7	7	76
7-Apr	7	7	13	20	15	35	35	14	12	8	18	15	19	20	18	16	17	15	15	14	8	6	13	21	35
8-Apr	11	4	3	4	3	8	6	16	8	47	60	31	17	17	15	20	37	26	17	30	38	63	29	5	63
9-Apr	10	15	12	15	11	9	7	8	7	12	10	38	26	15	10	9	8	6	8	7	6	11	52	38	52
10-Apr	13	4	5	5	4	2	3	6	6	6	10	12	33	58	74	49	87	8	6	13	14	11	10	10	87
11-Apr	87	17	11	6	5	8	8	6	39	34	9	10	18	13	15	11	11	10	12	9	11	23	18	7	87
12-Apr	10	9	9	9	8	8	13	17	8	8	9	11	12	12	16	16	16	14	13	18	12	21	13	11	21
13-Apr	20	37	13	14	17	20	15	13	20	16	17	18	22	19	21	20	17	18	16	10	83	99	33	60	99
14-Apr	57	53	47	9	8	7	8	9	10	11	10	12	17	16	25	19	18	10	10	11	11	10	11	11	57
15-Apr	10	9	13	19	20	36	8	16	34	9	12	14	15	11	14	14	13	9	7	27	26	12	16	10	36
16-Apr	9	10	11	8	7	11	18	16	13	36	21	14	11	12	11	10	8	28	25	15	18	35	11	67	67
17-Apr	55	70	29	11	7	8	12	22	11	12	12	29	16	17	12	12	16	11	16	19	68	62	11	12	70
18-Apr	13	14	12	12	12	12	15	13	16	21	19	16	15	42	64	21	19	17	23	40	36	80	65	55	80
19-Apr	30	56	20	16	8	8	9	10	7	9	14	36	58	15	13	17	15	27	23	21	8	12	38	24	58
20-Apr	9	28	38	30	17	31	53	26	71	39	9	13	19	15	22	29	68	28	15	13	14	12	12	11	71
21-Apr	10	10	51	12	45	19	27	18	22	18	17	14	23	24	21	20	20	17	25	12	18	13	12	9	51
22-Apr	10	11	11	11	11	12	13	13	9	7	9	14	18	16	11	12	16	12	13	15	15	13	10	13	18
23-Apr	14	12	16	26	25	23	17	15	20	17	18	17	15	26	23	18	25	19	27	14	14	53	36	14	53
24-Apr	11	11	12	12	12	13	16	19	16	19	18	20	23	18	21	19	18	18	15	14	14	16	14	14	23
25-Apr	15	17	17	16	17	16	15	20	29	25	50	43	32	52	63	43	36	18	18	12	15	11	16	28	63
26-Apr	25	23	72	102	80	20	21	29	12	15	37	21	35	51	32	98	27	24	38	46	22	17	12	9	102
27-Apr	10	16	16	18	31	12	9	43	68	16	16	17	16	16	16	11	11	11	10	7	7	10	6	14	68
28-Apr	49	8	7	10	13	48	40	12	33	55	14	13	16	11	11	12	8	7	7	9	8	8	7	32	55
29-Apr	8	17	15	6	7	9	12	12	78	12	12	10	13	12	15	18	9	11	15	14	7	9	8	19	78
30-Apr	10	9	9	9	9	9	9	10	7	11	10	8	14	12	68	16	48	19	47	46	28	54	97	21	97
	87	70	72	102	80	53	76	53	78	55	60	43	58	58	74	98	87	28	47	46	83	99	97	85	

Diurnal Maximum



**WBEA**  
**Hourly Averages**

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







Direction of Maximum Speed: 259 deg on Apr 11 20:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 258.7 deg on Apr 12		Hours of Data:	720
Direction of Minimum Speed: 198 deg on Apr 26 02:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 4.9 deg on Apr 8		Percent Operational Time:	100.0
Monthly Average Direction: 252.5 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-Apr	16	17	15	16	16	11	12	5	2	4	3	4	4	10	13	4	5	9	15	22	23	21	356	2	9.6
2-Apr	348	345	318	310	328	336	20	29	2	356	347	352	346	340	344	337	8	36	37	33	42	39	30	57	4.4
3-Apr	34	32	11	21	17	355	0	337	324	341	353	355	4	4	3	13	11	23	28	32	36	50	67	68	21.5
4-Apr	69	52	0	342	15	352	349	353	358	360	345	322	321	349	351	14	2	10	28	25	22	26	15	6	7.0
5-Apr	8	351	353	4	356	10	15	6	4	2	354	357	355	348	360	11	20	14	25	23	16	25	36	37	8.4
6-Apr	51	106	103	102	110	137	145	153	148	151	139	148	176	164	155	160	168	163	153	161	178	182	182	178	162.4
7-Apr	178	179	181	178	174	158	159	172	165	158	164	187	199	200	190	197	203	215	222	212	186	182	180	144	183.7
8-Apr	153	160	162	160	159	160	163	164	179	240	305	345	351	354	358	354	20	47	66	86	108	136	154	160	130.6
9-Apr	156	152	148	149	147	144	150	157	149	140	146	173	235	243	256	255	256	246	239	227	231	233	242	199	197.2
10-Apr	229	211	176	174	161	160	157	149	158	148	150	135	141	121	180	306	173	167	172	180	183	175	151	143	164.2
11-Apr	135	156	162	165	165	168	182	192	229	223	247	261	262	256	258	266	267	267	260	259	261	301	271	260	250.3
12-Apr	257	260	256	255	255	252	248	252	246	243	238	243	256	258	261	265	265	269	271	287	303	264	257	244	258.7
13-Apr	294	291	255	267	300	293	277	268	290	302	304	306	306	303	309	309	292	304	324	341	355	106	133	132	295.3
14-Apr	136	142	139	139	140	139	139	137	137	128	128	134	143	140	145	164	160	145	146	140	138	141	147	154	141.7
15-Apr	163	168	168	184	207	209	192	202	238	245	248	264	260	260	259	253	250	258	258	219	218	269	252	246	240.9
16-Apr	249	243	257	257	253	246	257	251	234	223	247	237	248	251	260	256	245	333	321	290	296	291	264	249	262.1
17-Apr	249	246	227	207	157	155	150	136	132	134	139	162	214	215	220	207	174	155	141	128	109	123	6	335	180.0
18-Apr	340	329	328	331	332	339	346	330	314	328	339	337	336	10	3	15	10	318	18	49	300	238	299	314	342.5
19-Apr	209	232	155	209	184	174	162	143	154	139	139	147	215	243	244	259	242	299	217	178	152	158	142	137	187.4
20-Apr	148	191	260	306	313	326	287	310	318	283	281	257	255	251	218	224	346	13	31	29	19	9	358	353	330.0
21-Apr	353	355	1	359	352	1	354	347	345	350	8	1	11	13	14	8	18	21	87	92	98	127	132	134	33.9
22-Apr	130	132	133	136	138	128	130	132	141	141	142	135	135	136	139	139	129	131	124	120	129	131	132	132	133.1
23-Apr	128	129	125	118	102	112	108	107	112	119	117	119	121	111	117	118	94	118	97	72	76	73	30	29	104.7
24-Apr	36	27	23	24	27	23	18	12	7	11	12	9	3	8	8	12	12	11	13	10	8	8	7	6	13.5
25-Apr	5	0	7	5	5	3	359	350	357	351	2	353	345	358	11	339	333	336	330	354	14	10	360	43	357.2
26-Apr	83	198	139	139	157	150	145	139	129	135	131	130	130	129	127	90	140	116	98	93	112	129	142	141	129.5
27-Apr	141	138	136	140	141	141	139	143	145	149	179	201	228	219	231	231	248	247	237	253	240	234	240	237	201.1
28-Apr	206	159	156	148	145	141	145	145	136	139	145	146	169	169	166	169	176	178	172	160	160	168	182	268	166.8
29-Apr	284	278	278	263	265	270	278	268	272	244	262	250	257	258	260	264	238	249	236	229	242	235	233	246	256.3
30-Apr	254	255	256	255	254	254	247	252	247	255	250	245	243	248	270	257	314	347	304	223	169	169	186	175	253.1

186.9	196.4	212.7	219.1	220.5	197.0	169.1	186.7	191.6	211.8	240.5	248.8	268.1	263.8	261.4	265.4	273.2	292.2	304.6	114.9	152.4	171.6	179.1	184.7
Diurnal Average																							

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

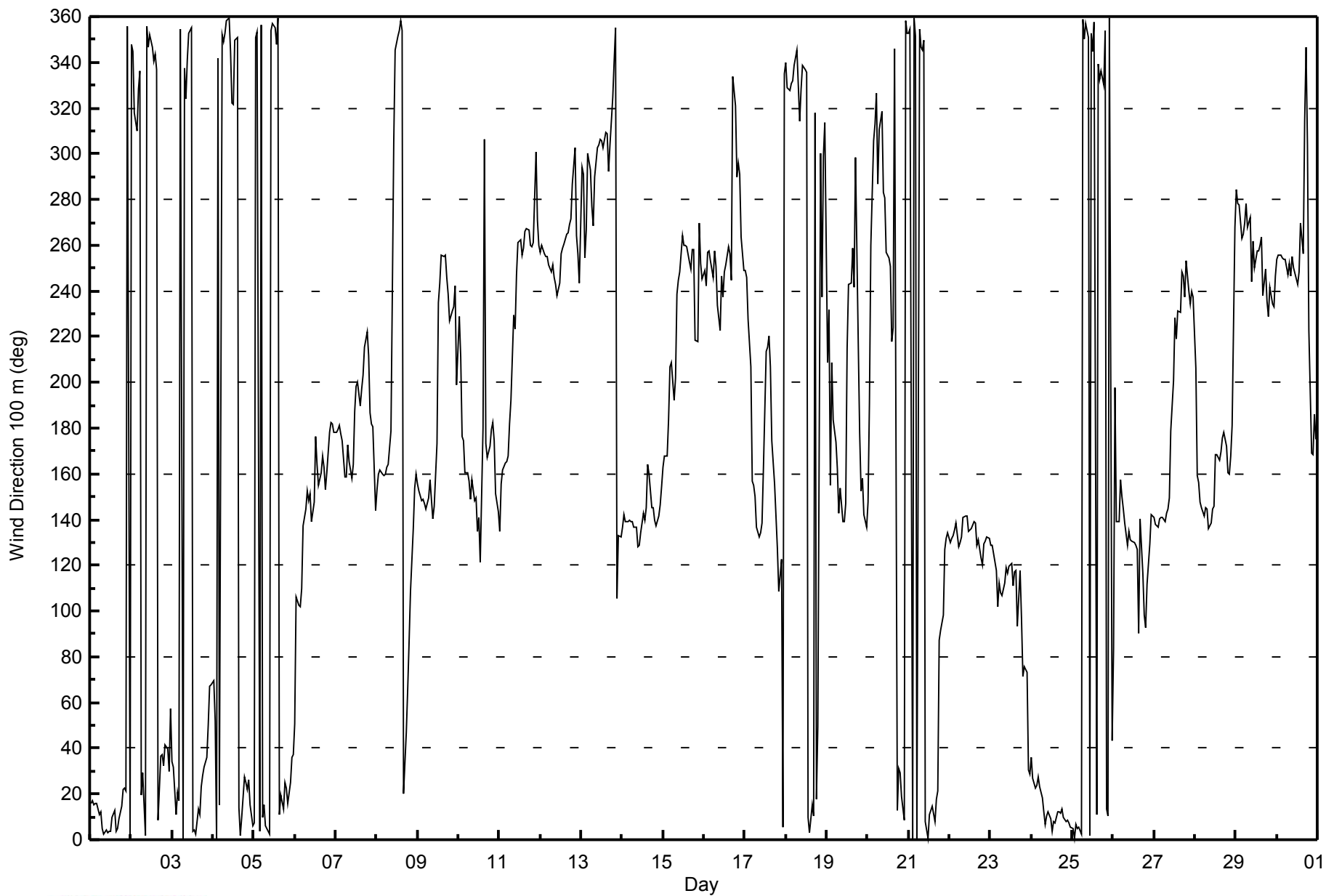


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 720																	
Maximum Value: 98 deg on Apr 26 02:00										Hours of Data: 720																	
Minimum Value: 2 deg on Apr 29 23:00										Hours of Missing Data: 0																	
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 16 P <sub>90</sub> = 27 P <sub>99</sub> = 67										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-Apr	8	7	8	8	9	9	8	9	7	9	7	8	7	9	11	10	8	9	11	10	11	14	14	10	14		
2-Apr	8	15	8	12	15	12	18	33	18	15	10	13	18	20	22	23	22	14	9	8	13	18	26	25	33		
3-Apr	26	17	12	17	10	8	11	25	43	40	22	15	22	21	18	23	16	9	9	9	8	8	20	37	43		
4-Apr	26	40	8	18	38	18	9	36	66	18	27	33	20	22	30	23	31	21	9	9	11	12	9	6	66		
5-Apr	5	8	7	5	7	9	9	11	11	11	11	22	14	20	26	26	24	13	11	10	18	14	14	41	41		
6-Apr	60	33	34	40	26	13	6	7	6	9	8	13	16	16	12	9	15	6	7	5	6	5	6	3	60		
7-Apr	3	3	8	9	8	10	10	12	12	12	15	15	17	18	17	16	14	13	9	7	9	5	11	12	18		
8-Apr	10	7	6	4	4	5	6	15	20	25	51	24	11	10	10	16	28	28	12	15	9	7	7	7	51		
9-Apr	4	6	5	7	5	5	4	6	6	4	6	34	16	13	4	5	5	6	5	5	3	3	9	37	37		
10-Apr	18	18	11	12	8	4	4	5	12	4	11	11	25	54	88	62	73	6	6	13	7	7	7	8	88		
11-Apr	31	9	6	13	9	10	21	20	15	36	7	6	12	12	13	8	5	5	8	5	6	18	18	8	36		
12-Apr	3	3	3	4	3	4	8	10	7	5	6	9	9	7	14	13	12	9	10	15	8	14	9	7	15		
13-Apr	19	30	10	9	13	18	13	8	16	11	11	14	18	15	17	14	13	15	13	4	11	69	9	5	69		
14-Apr	5	4	3	2	2	3	4	4	5	6	6	6	13	9	24	18	16	5	5	5	4	7	9	9	24		
15-Apr	9	8	9	10	17	29	20	22	9	7	11	9	12	8	12	10	10	6	6	17	17	9	12	7	29		
16-Apr	4	5	6	3	2	5	10	11	9	27	18	11	7	9	8	6	6	26	22	10	13	14	9	16	27		
17-Apr	12	21	14	24	8	7	7	6	4	5	8	29	13	13	9	10	14	11	8	12	94	21	35	10	94		
18-Apr	6	8	7	8	8	7	11	8	10	14	13	12	12	35	43	19	13	15	20	20	71	27	40	56	71		
19-Apr	38	37	20	36	20	19	16	14	14	11	14	31	52	11	13	14	17	20	31	13	11	9	13	9	52		
20-Apr	9	32	11	11	5	10	30	26	44	38	19	21	16	14	19	24	68	26	9	7	10	8	8	6	68		
21-Apr	5	5	7	8	5	11	11	15	13	12	12	10	18	16	16	15	14	14	19	7	11	9	8	5	19		
22-Apr	5	4	6	6	5	6	8	7	5	5	6	10	11	10	6	8	8	9	8	9	9	9	6	7	11		
23-Apr	8	7	8	15	16	14	10	10	13	12	13	11	10	18	16	15	19	15	24	9	8	33	32	12	33		
24-Apr	8	7	5	5	6	6	9	10	11	11	11	15	16	13	13	13	11	12	9	7	7	9	8	7	16		
25-Apr	7	10	9	8	9	11	9	15	18	19	44	31	24	34	48	35	30	16	13	8	5	12	17	18	48		
26-Apr	29	98	14	7	14	10	11	15	7	11	27	15	23	38	22	90	28	20	26	19	9	9	5	4	98		
27-Apr	4	6	6	4	7	4	4	18	36	13	15	17	12	11	12	9	9	8	6	4	4	4	2	5	36		
28-Apr	31	10	7	5	6	5	8	6	11	32	8	10	16	11	10	13	7	8	7	6	5	7	8	27	32		
29-Apr	14	11	12	3	3	5	7	7	41	10	7	10	9	8	13	13	8	9	12	10	5	5	2	7	41		
30-Apr	3	3	3	3	4	5	5	6	5	6	7	6	11	10	68	12	45	14	31	10	29	26	39	23	68		
	60	98	34	40	38	29	30	36	66	40	51	34	52	54	88	90	73	28	31	20	94	69	40	56			
Diurnal Maximum																											



**WBEA**  
**Hourly Averages**

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





Maximum Value: 0.7 km/h on Apr 28 23:00																				Maximum Daily Average: 0.1 km/h on Apr 28					Hours in Service: 720	
Minimum Value: -1.0 km/h on Apr 11 21:00																				Minimum Daily Average: -0.5 km/h on Apr 12					Hours of Data: 720	
Maximum Diurnal Average: 0.0 km/h at hour 22																				Minimum Diurnal Average: -0.2 km/h at hour 15					Hours of Missing Data: 0	
Monthly Average: -0.13 km/h																				Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = -0.5 Q <sub>1</sub> = -0.3 Median = -0.1 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.1 P <sub>99</sub> = 0.5					Hours of Calibration: 0	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0.0	0.0	-0.2	-0.1	-0.2	-0.1	-0.1	-0.3	-0.5	-0.4	-0.5	-0.1	-0.6	-0.1	0.1	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	0.1
2-Apr	0.1	-0.2	-0.1	0.0	0.0	0.0	0.1	0.0	-0.1	-0.2	-0.1	-0.1	0.0	-0.3	-0.1	0.1	0.0	-0.3	-0.2	-0.1	0.1	0.1	-0.3	0.1	-0.1	0.1
3-Apr	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.1	-0.1	-0.4	0.2	-0.1	-0.5	-0.2	-0.1	-0.2	0.3	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	0.0	-0.1	0.3
4-Apr	-0.2	-0.2	-0.1	-0.2	-0.1	-0.1	0.1	-0.2	-0.1	-0.2	-0.1	-0.1	-0.2	0.0	0.1	-0.1	0.3	0.0	0.0	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	0.3
5-Apr	0.0	0.1	0.0	0.0	0.0	-0.2	0.1	-0.2	-0.2	-0.3	-0.4	-0.3	-0.1	0.0	-0.1	0.1	-0.3	0.1	0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	0.1
6-Apr	0.0	0.1	0.0	-0.1	0.0	-0.1	-0.1	0.1	-0.1	0.0	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	-0.2	0.3	0.5	0.5	0.5	0.5	0.1	0.5
7-Apr	0.4	0.4	0.6	0.6	0.2	0.1	-0.3	-0.2	-0.6	-0.1	-0.2	0.1	-0.2	-0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	0.4	0.5	0.3	-0.3	0.0	0.6
8-Apr	-0.1	-0.2	-0.2	-0.2	-0.1	-0.3	-0.4	-0.3	-0.1	-0.1	-0.2	-0.1	-0.1	-0.2	0.2	-0.2	-0.1	-0.1	-0.1	0.0	0.1	0.1	0.1	0.0	-0.1	0.2
9-Apr	0.0	0.0	-0.1	0.1	-0.1	0.0	-0.3	-0.1	-0.3	-0.2	0.0	-0.1	-0.1	-0.6	-0.9	-0.7	-0.6	-0.5	-0.4	-0.2	-0.1	0.0	0.1	0.2	-0.2	0.2
10-Apr	0.2	0.2	0.1	0.2	0.0	0.1	0.0	-0.1	-0.1	-0.3	0.4	0.3	0.4	0.1	-0.1	0.0	0.1	0.4	0.2	0.2	0.3	0.0	-0.1	-0.1	0.1	0.4
11-Apr	0.0	0.1	0.3	0.1	0.1	0.1	0.2	0.1	0.2	0.3	-0.4	-0.3	0.0	-0.4	-0.5	-0.6	-0.4	-0.5	-0.6	-1.0	-1.0	-0.1	-0.2	-0.2	-0.2	0.3
12-Apr	-0.6	-0.6	-0.6	-0.4	-0.6	-0.5	-0.4	-0.5	-0.1	-0.4	-0.4	-0.5	-0.8	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.6	-0.3	-0.1	-0.4	-0.3	-0.5	-0.1
13-Apr	-0.4	-0.2	-0.2	-0.4	-0.4	-0.2	-0.4	-0.3	-0.5	-0.6	-0.8	-0.4	-0.4	-0.2	-0.3	-0.3	-0.7	-0.4	-0.2	-0.1	0.1	0.0	0.0	0.0	-0.3	0.1
14-Apr	0.1	0.1	0.1	0.0	-0.2	-0.2	-0.5	-0.6	-0.3	-0.4	-0.4	-0.1	0.3	0.2	0.1	0.1	0.1	-0.2	-0.2	0.1	-0.2	-0.1	-0.1	-0.1	-0.1	0.3
15-Apr	0.3	0.1	0.3	-0.1	0.1	0.1	0.2	0.1	0.0	-0.2	-0.4	-0.7	-0.5	-0.7	-0.6	-0.4	-0.3	-0.7	-0.2	0.0	0.1	-0.7	-0.3	-0.3	-0.2	0.3
16-Apr	-0.4	-0.2	-0.4	-0.6	-0.5	-0.1	-0.2	-0.2	-0.3	-0.1	-0.2	-0.4	-0.2	-0.4	-0.7	-0.7	-0.5	-0.7	-0.2	-0.4	-0.3	-0.2	-0.3	0.0	-0.3	0.0
17-Apr	0.0	0.1	0.3	0.3	0.1	-0.1	-0.5	0.1	0.1	0.5	0.1	0.0	-0.1	-0.4	-0.5	-0.4	0.2	0.2	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.5
18-Apr	0.1	0.0	0.0	-0.1	-0.1	0.0	-0.1	-0.1	-0.3	0.0	-0.1	-0.2	-0.2	0.0	-0.1	-0.2	-0.2	-0.4	0.0	-0.1	0.0	0.1	0.0	0.1	-0.1	0.1
19-Apr	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.3	0.2	0.2	-0.2	-0.2	-0.5	-0.2	-0.2	0.1	0.1	0.1	0.2	0.3	0.2	-0.1	0.0	0.3
20-Apr	0.0	0.1	-0.1	-0.2	-0.1	0.0	0.1	-0.1	0.1	0.0	-0.5	-0.4	-0.1	-0.5	-0.1	-0.2	-0.5	-0.1	-0.4	-0.1	-0.3	-0.1	0.0	0.0	-0.1	0.1
21-Apr	-0.2	-0.1	0.0	0.0	0.1	0.0	-0.1	-0.1	-0.3	-0.1	-0.4	-0.6	-0.3	0.0	-0.3	-0.1	-0.2	0.0	-0.2	-0.4	-0.2	-0.1	-0.3	-0.3	-0.2	0.1
22-Apr	-0.1	-0.3	-0.1	-0.1	0.0	-0.4	-0.3	0.0	-0.3	-0.5	-0.3	-0.5	-0.2	-0.1	-0.2	-0.2	-0.2	-0.1	-0.6	-0.4	-0.2	-0.1	-0.6	-0.2	-0.3	0.0
23-Apr	-0.4	-0.3	0.1	0.0	-0.2	-0.2	-0.3	-0.5	-0.4	-0.3	0.1	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	-0.3	-0.3	-0.2	-0.3	-0.2	-0.2	-0.2	0.1
24-Apr	0.1	0.0	0.0	0.0	-0.2	-0.1	-0.1	0.0	-0.6	0.0	0.0	-0.2	-0.1	-0.3	-0.1	-0.2	-0.2	0.0	0.0	0.1	-0.1	0.0	-0.3	-0.1	-0.1	0.1
25-Apr	0.0	-0.2	-0.1	-0.1	0.1	0.0	-0.3	-0.3	0.1	0.0	0.0	-0.1	0.0	-0.1	-0.2	-0.3	-0.1	-0.4	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.1
26-Apr	-0.1	0.0	0.0	0.0	0.1	-0.1	0.0	0.0	0.1	-0.1	0.1	-0.1	0.1	0.2	0.1	0.1	0.3	-0.1	-0.1	-0.2	0.1	0.0	0.1	-0.1	0.0	0.3
27-Apr	-0.4	-0.4	-0.1	0.1	0.0	0.2	-0.1	0.1	0.1	0.0	0.3	0.1	0.0	-0.3	-0.6	-0.5	-0.5	-0.5	-0.3	-0.3	-0.3	0.1	-0.2	-0.1	-0.1	0.3
28-Apr	0.0	0.1	0.1	0.1	0.1	0.1	-0.2	-0.1	0.0	-0.1	0.0	0.0	0.1	0.3	0.3	0.2	0.1	0.2	0.3	0.1	0.4	0.6	0.7	-0.1	0.1	0.7
29-Apr	-0.4	-0.3	-0.3	-0.2	-0.4	-0.6	-0.2	-0.5	-0.1	-0.1	-0.2	-0.2	-0.7	-0.5	-0.4	-0.4	-0.1	-0.2	-0.1	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3	-0.1
30-Apr	-0.5	-0.6	-0.6	-0.6	-0.5	-0.5	-0.3	-0.5	-0.2	-0.6	-0.6	-0.6	-0.2	-0.4	-0.3	-0.4	-0.2	-0.3	-0.1	0.0	0.1	0.1	0.1	0.2	-0.3	0.2
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.6 km/h on Apr 11 21:00 Minimum Value: 0.1 km/h on Apr 5 03:00 Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.2 Median = 1.9 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 3.2 P <sub>99</sub> = 4.1																								Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	2.4	3.0	3.4	3.4	4.1	4.2	4.5	4.1	4.0	4.1	4.0	3.9	4.1	4.0	3.8	3.9	3.9	3.5	2.5	1.7	0.9	0.5	0.4	0.4	4.5
2-Apr	0.8	1.0	0.8	0.7	0.7	0.9	0.9	0.9	1.4	1.8	2.1	2.2	2.3	2.2	2.2	1.8	2.2	2.0	1.9	1.9	1.5	1.6	1.2	0.8	2.3
3-Apr	0.7	0.9	0.9	0.7	0.6	0.8	0.7	1.0	1.2	1.6	2.0	2.3	2.2	2.4	2.4	2.1	2.3	2.1	2.2	2.1	1.9	1.7	1.6	0.7	2.4
4-Apr	0.7	0.6	0.8	0.6	0.5	0.4	0.8	1.1	1.3	1.6	1.9	2.1	2.2	2.3	2.2	1.8	1.7	1.7	2.3	2.4	1.8	1.3	1.2	0.6	2.4
5-Apr	0.4	0.2	0.1	0.1	0.5	0.9	1.2	1.6	2.1	2.2	2.0	2.1	2.4	2.4	2.3	2.1	1.9	2.0	2.0	1.5	1.2	1.1	0.7	0.4	2.4
6-Apr	0.5	0.4	0.6	0.5	0.4	0.2	0.2	0.9	1.6	1.8	2.0	2.3	1.9	1.9	1.9	1.5	1.4	1.7	1.7	1.3	1.4	1.6	1.6	1.6	2.3
7-Apr	1.6	1.7	1.6	1.6	1.8	1.3	1.9	2.1	2.3	2.4	2.1	2.0	2.0	1.8	1.9	1.5	1.5	1.6	1.5	1.2	1.2	1.3	1.5	1.0	2.4
8-Apr	1.3	1.5	1.6	1.6	1.7	1.7	1.8	1.7	1.6	1.6	1.5	2.2	2.3	2.3	2.4	2.1	1.7	1.4	1.0	0.6	0.3	0.2	0.2	0.5	2.4
9-Apr	1.4	1.7	1.5	1.3	1.1	0.9	1.3	1.7	2.3	3.0	3.2	2.4	2.0	2.4	3.0	2.6	2.4	1.8	1.2	0.7	0.7	0.7	0.4	0.4	3.2
10-Apr	0.7	1.0	1.4	1.5	1.1	1.0	1.5	1.4	1.8	2.0	2.2	1.9	1.7	1.6	1.6	1.6	1.4	1.9	1.1	1.0	0.9	0.6	0.8	0.8	2.2
11-Apr	0.7	0.6	1.0	0.7	0.8	0.7	0.8	1.6	1.3	1.2	2.5	2.1	2.2	2.4	2.5	2.5	2.4	3.0	3.4	4.4	4.6	1.9	1.1	1.5	4.6
12-Apr	2.0	2.6	2.1	2.3	2.2	2.5	2.2	2.1	2.3	2.8	3.2	3.2	3.8	3.7	3.8	3.8	4.0	4.0	4.1	2.9	1.9	1.3	1.5	1.8	4.1
13-Apr	1.9	1.5	2.0	2.5	3.3	1.9	1.9	2.5	3.0	4.5	4.2	3.3	3.4	3.5	3.4	3.1	3.2	2.5	1.7	0.5	0.1	0.4	0.3	0.3	4.5
14-Apr	0.4	0.5	0.9	2.6	2.4	2.6	2.7	3.0	2.6	2.6	2.6	2.1	2.1	1.9	2.3	2.8	3.4	2.9	2.9	2.9	2.6	2.6	2.1	2.1	3.4
15-Apr	1.7	1.4	1.0	0.6	0.5	0.7	1.5	1.5	1.7	2.3	2.2	2.9	2.6	2.7	2.8	2.4	2.6	2.3	1.2	0.4	1.5	3.9	1.8	1.5	3.9
16-Apr	1.6	2.1	2.5	2.3	2.3	1.9	1.7	1.7	1.6	1.7	2.0	2.5	2.8	2.3	3.3	3.7	3.1	4.0	2.6	3.3	2.1	1.7	1.0	0.7	4.0
17-Apr	1.2	1.0	1.0	1.0	1.0	1.5	2.1	1.7	1.9	2.1	2.2	2.1	1.8	2.0	2.5	2.1	1.5	1.7	2.0	1.4	0.7	0.4	0.5	0.9	2.5
18-Apr	1.0	1.1	1.7	2.1	2.6	2.2	2.3	2.1	1.7	2.4	3.1	3.1	3.3	3.0	2.5	2.9	2.9	2.2	2.7	1.3	0.3	0.2	0.4	0.2	3.3
19-Apr	0.2	0.3	0.4	0.3	0.5	0.7	1.2	1.6	1.7	1.7	1.9	1.8	1.5	1.8	2.1	2.2	1.5	1.1	0.3	0.3	0.5	1.0	1.0	0.8	2.2
20-Apr	0.9	0.2	0.7	0.3	0.2	0.1	0.2	1.0	1.3	1.4	1.7	2.0	2.0	2.1	1.5	1.6	1.7	1.9	2.4	2.1	1.3	1.6	1.0	1.0	2.4
21-Apr	0.7	0.6	0.3	0.3	0.2	0.3	0.8	1.3	1.8	1.9	3.0	3.0	2.8	2.9	2.8	2.8	2.7	2.5	2.4	2.2	1.6	2.1	2.6	2.6	3.0
22-Apr	2.6	2.4	1.9	1.5	1.6	2.0	2.2	2.7	2.7	2.5	3.0	3.2	3.5	3.7	3.7	3.8	3.8	3.4	3.3	2.9	2.8	3.2	3.2	2.8	3.8
23-Apr	2.3	2.2	2.1	1.4	1.3	1.6	1.8	2.6	2.4	2.6	2.3	3.1	3.2	3.4	3.2	3.4	3.1	2.6	2.5	3.1	3.4	2.4	1.3	1.6	3.4
24-Apr	1.8	2.2	2.4	2.4	2.3	2.3	2.4	2.7	2.9	3.2	3.6	3.4	3.6	3.5	3.8	3.9	4.1	3.8	3.6	3.3	3.1	2.4	2.4	2.1	4.1
25-Apr	2.2	1.9	1.5	1.4	1.3	1.3	1.6	1.4	1.6	2.0	2.1	2.3	2.5	2.3	2.2	2.4	2.1	2.3	1.8	1.4	1.0	0.5	0.5	0.6	2.5
26-Apr	0.4	0.1	0.1	0.2	0.2	0.5	0.9	1.1	1.7	1.9	1.9	2.2	2.2	1.9	2.0	1.9	1.5	1.4	1.3	1.0	0.6	1.2	1.2	2.6	2.6
27-Apr	3.4	2.3	1.5	1.6	1.1	1.0	1.4	1.4	1.6	2.3	2.1	1.8	1.9	2.4	2.6	2.7	2.8	2.9	2.1	1.5	0.8	0.8	1.2	1.3	3.4
28-Apr	0.6	0.8	1.1	0.6	0.5	0.5	0.8	1.4	1.4	1.2	1.8	2.3	1.9	2.2	2.3	2.3	2.2	1.9	1.8	1.9	1.7	1.5	1.7	2.3	2.3
29-Apr	1.2	1.0	1.1	1.6	2.0	2.7	2.0	2.5	1.2	1.9	1.7	1.7	2.7	2.7	2.3	2.1	1.2	1.6	1.4	1.1	1.0	1.2	1.8	1.5	2.7
30-Apr	2.3	2.4	2.5	2.7	2.4	2.4	2.6	2.7	2.5	3.0	3.5	3.5	3.2	2.9	2.5	2.7	2.5	2.0	1.3	0.3	0.3	0.3	0.6	0.8	3.5
Diurnal Maximum																									
3.4 3.0 3.4 3.4 4.1 4.2 4.5 4.1 4.0 4.5 4.2 3.9 4.1 4.0 3.8 3.9 4.1 4.0 4.1 4.4 4.6 3.9 3.2 2.8																									



Maximum Value: 1.7 km/h on Apr 10 04:00		Maximum Daily Average: 0.8 km/h on Apr 22		Hours in Service: 720																						
Minimum Value: -1.9 km/h on Apr 13 11:00		Minimum Daily Average: -0.9 km/h on Apr 12		Hours of Data: 720																						
Maximum Diurnal Average: 0.1 km/h at hour 4		Minimum Diurnal Average: -0.2 km/h at hour 16		Hours of Missing Data: 0																						
Monthly Average: 0.01 km/h		Percentiles: P <sub>1</sub> = -1.5 P <sub>10</sub> = -0.7 Q <sub>1</sub> = -0.3 Median = 0.0 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.8 P <sub>99</sub> = 1.2		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	-0.2	0.0	-0.3	0.1	-0.1	-0.3	-0.3	-0.4	-0.6	-0.3	-0.4	-0.2	-0.4	-0.2	0.1	-0.3	-0.2	-0.1	0.1	-0.1	0.0	0.0	-0.2	0.0	-0.2	0.1
2-Apr	-0.1	-0.3	-0.3	-0.1	-0.1	0.0	0.1	0.1	-0.1	-0.2	-0.5	-0.1	-0.1	-0.4	-0.4	0.1	0.1	-0.1	0.1	0.0	0.3	0.2	-0.3	0.3	-0.1	0.3
3-Apr	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.3	0.0	-0.2	0.3	-0.2	-0.7	-0.3	-0.1	-0.3	0.2	0.0	0.0	-0.1	0.1	0.2	0.2	0.3	0.1	0.0	0.3
4-Apr	-0.2	-0.3	-0.1	-0.2	-0.1	-0.1	0.1	-0.1	-0.2	-0.2	0.0	0.1	-0.5	0.2	0.0	0.0	0.3	0.1	0.2	-0.1	-0.2	0.0	-0.1	-0.2	-0.1	0.3
5-Apr	-0.2	0.1	0.0	-0.1	-0.1	-0.1	0.1	-0.3	-0.3	-0.3	-0.6	-0.4	-0.4	0.0	-0.2	0.3	-0.2	0.2	0.0	-0.1	-0.3	-0.2	-0.1	-0.2	-0.1	0.3
6-Apr	-0.2	0.0	-0.1	-0.2	-0.1	0.0	0.0	0.3	0.5	0.6	0.6	0.8	0.6	0.3	0.6	0.4	0.4	0.6	0.8	1.2	0.6	0.0	0.1	0.4	0.3	1.2
7-Apr	0.6	0.9	1.0	1.2	1.0	0.2	-0.1	0.6	0.1	0.8	0.4	0.1	-0.5	-0.1	-0.4	-0.1	-0.2	-0.1	-0.1	-0.3	0.1	0.2	0.5	0.0	0.2	1.2
8-Apr	0.6	1.0	1.0	0.9	1.3	0.5	0.6	0.4	0.4	-0.4	-0.2	-0.3	-0.3	-0.4	-0.2	-0.3	0.1	0.2	0.3	0.2	0.1	0.1	0.1	0.6	0.3	1.3
9-Apr	0.6	0.6	0.4	0.6	0.4	0.5	0.3	0.7	1.0	0.7	1.1	0.6	-0.3	-0.6	-1.3	-1.1	-1.0	-0.8	-0.5	-0.2	-0.2	-0.1	0.0	0.2	0.1	1.1
10-Apr	0.4	1.6	1.5	1.7	1.0	1.1	0.9	0.7	0.9	0.7	1.1	0.7	0.7	0.4	0.3	0.0	0.1	0.4	0.1	0.2	0.6	0.6	0.7	0.5	0.7	1.7
11-Apr	0.2	0.4	1.1	0.8	1.1	0.8	0.9	1.2	0.4	0.5	-0.7	-0.5	-0.2	-0.7	-0.7	-0.7	-1.0	-1.1	-1.0	-1.8	-1.7	-0.5	-0.4	-0.3	-0.2	1.2
12-Apr	-0.9	-1.1	-0.9	-0.9	-0.8	-0.8	-0.3	-0.7	-0.4	-0.4	-0.4	-0.6	-1.2	-1.3	-1.1	-1.6	-1.2	-1.5	-1.6	-1.1	-0.8	-0.4	-0.6	-0.4	-0.9	-0.3
13-Apr	-0.9	-0.6	-0.3	-0.8	-1.1	-0.5	-0.7	-1.0	-1.3	-1.4	-1.9	-1.2	-1.0	-0.9	-0.6	-0.7	-1.6	-0.8	-0.4	-0.3	0.0	0.1	0.0	0.1	-0.8	0.1
14-Apr	0.2	0.2	0.4	1.1	1.0	1.0	0.7	0.9	0.9	0.7	0.8	0.8	0.8	0.7	0.4	0.2	0.6	1.4	1.2	1.1	0.8	1.0	1.1	0.7	0.8	1.4
15-Apr	0.6	0.1	0.2	-0.1	0.0	0.3	1.1	0.8	0.5	-0.4	-0.5	-1.1	-0.8	-1.0	-0.9	-0.7	-0.6	-0.9	-0.4	0.0	0.0	-1.6	-0.5	-0.4	-0.3	1.1
16-Apr	-0.7	-0.5	-1.0	-1.1	-0.7	-0.3	-0.3	-0.3	-0.4	-0.2	-0.2	-0.3	-0.3	-0.7	-1.2	-1.3	-0.8	-1.0	-0.7	-1.1	-0.7	-0.5	-0.4	0.1	-0.6	0.1
17-Apr	0.3	0.2	0.4	0.8	0.7	0.6	-0.1	0.5	0.6	0.9	0.8	0.5	-0.1	-0.4	-0.6	-0.4	0.4	0.5	0.7	0.5	0.0	-0.1	-0.2	-0.2	0.2	0.9
18-Apr	-0.1	-0.3	-0.4	-0.6	-0.8	-0.4	-0.4	-0.4	-0.6	-0.3	-0.4	-0.7	-0.7	0.0	-0.1	0.0	-0.1	-0.8	0.0	0.0	-0.1	0.0	-0.1	0.0	-0.3	0.0
19-Apr	0.1	0.2	0.6	0.3	0.5	0.7	0.6	0.6	0.8	0.7	0.6	0.5	-0.1	-0.2	-0.6	-0.5	0.0	0.1	0.0	0.0	0.8	1.1	0.3	0.2	0.3	1.1
20-Apr	0.6	0.2	-0.4	-0.3	-0.1	0.0	0.0	-0.1	0.1	0.1	-0.6	-0.6	-0.1	-0.6	0.0	-0.1	-0.6	0.0	0.1	0.0	-0.2	-0.2	-0.1	-0.1	-0.1	0.6
21-Apr	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	-0.1	-0.3	-0.1	-0.5	-0.6	-0.4	-0.2	-0.3	0.0	-0.1	0.1	0.7	0.4	0.2	0.8	0.7	0.8	0.0	0.8
22-Apr	0.8	0.8	0.6	0.5	0.4	0.4	0.4	0.6	0.8	0.7	0.9	0.9	1.0	1.0	1.3	1.2	1.1	1.0	0.8	0.6	0.8	0.8	0.6	0.7	0.8	1.3
23-Apr	0.6	0.5	0.6	0.2	0.1	0.4	0.3	0.3	0.3	0.5	0.6	0.7	0.8	0.9	0.8	0.7	0.5	0.7	0.5	0.3	0.8	0.2	-0.1	-0.2	0.5	0.9
24-Apr	0.2	0.0	-0.2	0.0	0.0	0.0	-0.1	0.1	-0.6	0.0	0.0	-0.3	0.0	-0.2	0.0	-0.2	-0.2	0.1	0.2	-0.1	-0.2	0.1	-0.1	-0.2	-0.1	0.2
25-Apr	-0.1	-0.2	0.0	0.0	0.2	-0.1	-0.3	-0.4	0.1	-0.1	0.1	-0.3	-0.1	-0.1	-0.1	-0.3	-0.3	-0.5	-0.4	-0.2	0.0	-0.4	-0.2	-0.2	-0.2	0.2
26-Apr	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.4	0.4	0.6	0.4	0.5	0.5	0.5	0.2	0.6	0.2	0.3	0.1	0.3	0.6	0.5	1.0	0.3	1.0
27-Apr	1.0	0.6	0.4	0.7	0.4	0.6	0.5	0.4	0.3	0.5	0.3	-0.3	0.4	-0.1	-0.5	-0.4	-0.6	-0.6	-0.2	-0.5	-0.3	0.2	-0.2	0.0	0.1	1.0
28-Apr	0.1	0.9	0.7	0.4	0.6	0.3	0.0	0.4	0.2	0.0	0.5	0.7	0.3	0.4	0.5	0.3	-0.4	-0.4	0.1	0.8	1.0	0.8	0.5	-0.3	0.3	1.0
29-Apr	-0.6	-0.5	-0.5	-0.3	-0.5	-1.0	-0.4	-0.9	0.0	0.1	-0.4	-0.3	-0.9	-0.9	-0.6	-0.9	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.6	-0.4	0.1
30-Apr	-1.1	-1.2	-1.0	-0.9	-1.0	-0.8	-0.5	-0.4	-0.9	-1.1	-0.8	-0.3	-0.6	-0.5	-0.5	-0.4	-0.4	-0.3	0.0	0.4	0.1	0.2	0.4	-0.5	-0.4	0.4
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5.1 km/h on Apr 13 10:00 Minimum Value: 0.1 km/h on Apr 13 21:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.2 Median = 1.9 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 3.1 P <sub>99</sub> = 4.5																								Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	2.5	3.1	3.5	3.5	4.3	4.3	4.5	4.1	4.2	4.0	3.8	4.0	4.0	4.1	3.6	3.9	3.9	3.5	2.6	1.7	1.1	0.6	0.5	0.5	4.5
2-Apr	0.9	1.0	0.9	0.8	0.8	1.0	0.9	1.0	1.5	1.8	2.0	2.3	2.4	2.4	2.3	2.1	2.2	1.9	1.8	1.9	1.7	1.9	1.5	0.9	2.4
3-Apr	0.8	0.9	0.9	0.8	0.7	0.9	0.9	1.1	1.3	1.8	2.2	2.1	2.3	2.5	2.2	2.3	2.0	2.0	1.9	2.1	1.8	1.6	0.9	2.5	
4-Apr	0.8	0.5	0.7	0.6	0.4	0.5	0.9	1.1	1.3	1.8	2.1	2.3	2.7	2.5	2.3	1.9	1.6	1.9	2.2	2.4	2.0	1.4	1.3	0.8	2.7
5-Apr	0.5	0.2	0.1	0.2	0.6	1.1	1.3	1.6	2.0	2.3	2.1	2.2	2.4	2.6	2.4	2.2	2.0	2.2	1.9	1.6	1.4	1.2	0.6	0.5	2.6
6-Apr	0.6	0.5	0.7	0.6	0.5	0.3	0.2	1.0	1.4	1.6	1.9	2.3	2.2	2.2	1.9	1.5	1.6	1.8	1.6	1.4	1.7	1.8	1.9	1.7	2.3
7-Apr	1.7	1.8	1.8	1.8	1.8	1.6	2.0	2.2	2.2	2.0	2.2	2.7	2.4	2.5	2.4	1.9	1.8	1.8	1.8	1.4	1.2	1.5	1.6	1.3	2.7
8-Apr	1.2	1.1	1.2	1.1	1.1	1.6	1.5	1.5	1.3	1.6	1.7	2.2	2.3	2.4	2.3	2.1	1.9	1.4	1.0	0.7	0.4	0.3	0.3	0.6	2.4
9-Apr	1.4	1.7	1.4	1.2	1.0	0.9	1.2	1.6	2.0	3.0	2.9	2.2	2.3	2.5	3.0	2.6	2.2	1.5	1.0	0.9	0.7	0.8	0.5	0.5	3.0
10-Apr	1.0	0.9	1.1	1.1	0.6	0.5	0.9	1.1	1.3	1.3	1.8	1.6	1.7	1.8	1.8	1.9	1.7	2.0	1.1	1.2	1.3	0.9	0.9	0.8	2.0
11-Apr	0.8	0.7	1.0	0.6	0.6	0.7	0.7	1.0	1.3	1.2	2.1	2.0	2.2	2.3	2.5	2.7	2.6	3.2	3.4	4.5	4.9	2.2	1.1	1.3	4.9
12-Apr	2.1	2.8	2.4	2.3	2.2	2.5	2.4	2.4	2.1	2.5	2.9	3.0	4.1	4.0	4.0	4.2	4.5	4.6	4.4	3.0	2.3	1.5	1.5	1.8	4.6
13-Apr	2.1	1.6	2.1	2.7	3.9	2.5	2.2	2.8	3.3	5.1	4.5	3.7	3.6	4.1	3.8	3.6	3.4	2.8	2.0	0.7	0.1	0.4	0.5	0.4	5.1
14-Apr	0.7	0.9	1.2	2.1	2.0	2.0	2.4	2.6	2.3	2.1	2.2	2.3	2.2	2.1	1.9	2.8	3.0	3.1	2.8	2.7	2.5	2.5	2.7	2.2	3.1
15-Apr	1.9	1.6	1.2	0.7	0.7	0.7	1.2	1.4	1.7	1.9	2.2	3.1	2.8	2.6	2.7	2.4	2.5	2.3	1.0	0.5	1.8	4.0	1.8	1.6	4.0
16-Apr	1.7	2.1	2.8	2.3	2.1	2.0	2.0	1.8	1.7	1.8	2.1	2.5	2.9	2.3	3.6	3.8	2.7	4.2	2.8	3.4	2.1	1.9	0.8	1.0	4.2
17-Apr	1.6	1.4	1.2	1.0	0.9	1.3	1.9	1.9	1.7	1.9	2.0	2.0	2.2	2.6	3.1	2.8	1.9	1.9	2.0	1.3	0.8	0.5	0.5	1.1	3.1
18-Apr	1.2	1.3	2.0	2.4	3.0	2.6	2.8	2.4	2.0	2.8	3.5	3.5	3.8	3.1	2.7	2.8	2.9	2.4	2.7	1.4	0.3	0.2	0.5	0.2	3.8
19-Apr	0.3	0.3	0.6	0.5	0.6	0.8	1.0	1.4	1.2	1.3	1.8	1.9	1.7	1.8	2.0	2.2	1.5	1.3	0.3	0.4	0.7	1.3	1.1	0.9	2.2
20-Apr	0.7	0.4	1.0	0.3	0.2	0.1	0.2	0.8	1.3	1.5	1.5	1.7	2.2	2.1	1.8	1.9	1.8	1.8	2.4	2.1	1.5	1.7	1.2	1.3	2.4
21-Apr	0.8	0.6	0.4	0.3	0.4	0.4	0.9	1.5	1.9	2.1	3.0	3.0	2.7	2.7	3.0	2.8	2.4	2.6	2.5	2.2	1.6	2.2	2.4	2.5	3.0
22-Apr	2.4	2.3	1.8	1.5	1.5	2.0	2.0	2.5	2.3	2.0	2.6	3.0	3.2	3.3	3.3	3.4	3.5	3.2	3.3	3.1	2.8	3.2	3.1	2.7	3.5
23-Apr	2.4	2.1	2.3	1.8	1.4	1.8	1.8	2.5	2.4	2.3	2.3	2.9	3.1	3.1	3.1	3.1	3.1	2.6	2.6	3.2	3.5	2.7	1.5	1.5	3.5
24-Apr	1.7	2.1	2.2	2.2	2.2	2.2	2.4	2.7	2.9	3.3	3.6	3.3	3.8	3.7	3.9	3.8	4.1	3.9	3.7	3.5	3.3	2.8	2.5	2.1	4.1
25-Apr	2.2	2.1	1.7	1.6	1.6	1.6	1.6	1.6	1.8	2.2	2.4	2.6	2.7	2.6	2.3	2.7	2.5	2.6	2.2	1.6	1.2	0.6	0.7	0.7	2.7
26-Apr	0.5	0.2	0.1	0.2	0.2	0.4	0.9	1.1	1.6	1.8	2.2	2.2	2.3	2.2	2.1	2.1	1.6	1.4	1.3	0.9	0.8	1.2	1.3	2.5	2.5
27-Apr	3.1	2.3	1.6	1.8	1.4	1.2	1.5	1.4	1.7	2.2	2.6	2.3	2.1	2.9	2.9	2.7	2.9	2.8	1.9	1.4	0.6	1.0	1.0	1.2	3.1
28-Apr	0.9	0.8	1.1	0.8	0.6	0.6	0.8	1.4	1.3	1.4	1.8	2.3	2.3	2.7	2.7	2.8	2.7	2.4	2.0	2.1	2.0	1.6	1.7	2.8	2.8
29-Apr	1.0	0.9	1.1	1.3	1.7	2.8	2.1	2.5	1.2	1.8	1.7	1.6	2.8	2.7	2.5	2.2	1.1	1.5	1.4	1.4	1.0	1.2	1.8	1.5	2.8
30-Apr	2.5	2.5	2.6	2.8	2.6	2.7	2.5	2.7	2.0	3.0	3.3	3.1	3.0	2.9	2.8	2.8	2.8	2.2	1.4	0.4	0.4	0.4	0.8	1.1	3.3
Diurnal Maximum																									
3.1 3.1 3.5 3.5 4.3 4.3 4.5 4.1 4.2 5.1 4.5 4.0 4.1 4.1 4.0 4.2 4.5 4.6 4.4 4.5 4.9 4.0 3.1 2.8																									



Maximum Value: 3.5 km/h on Apr 14 23:00		Maximum Daily Average: 1.8 km/h on Apr 14		Hours in Service: 720																						
Minimum Value: -2.2 km/h on Apr 13 11:00		Minimum Daily Average: -0.5 km/h on Apr 13		Hours of Data: 720																						
Maximum Diurnal Average: 0.5 km/h at hour 23		Minimum Diurnal Average: 0.0 km/h at hour 16		Hours of Missing Data: 0																						
Monthly Average: 0.30 km/h		Percentiles: P <sub>1</sub> = -1.2 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.1 Median = 0.2 Q <sub>3</sub> = 0.6 P <sub>90</sub> = 1.1 P <sub>99</sub> = 2.7		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0.8	0.6	0.3	0.8	0.3	0.3	0.1	1.0	0.8	0.5	0.2	1.2	0.5	0.8	1.1	0.6	0.2	0.2	0.6	0.1	0.3	0.2	-0.1	0.0	0.5	1.2
2-Apr	0.0	-0.4	-0.3	0.2	-0.1	0.0	0.1	0.1	0.3	-0.3	-0.4	-0.2	0.7	-0.3	-0.5	0.3	0.6	-0.6	-0.1	0.3	0.7	0.4	-0.2	0.4	0.0	0.7
3-Apr	0.1	0.0	-0.2	0.1	0.0	0.0	0.3	0.1	-0.1	0.2	-0.2	-0.8	-0.2	0.2	-0.5	0.6	0.3	0.2	-0.1	0.0	0.1	0.1	1.2	0.1	0.1	1.2
4-Apr	-0.2	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	-0.2	-0.4	0.2	1.2	-0.2	0.2	-0.4	-0.4	0.2	0.5	0.1	0.4	0.3	-0.1	0.1	-0.1	0.0	1.2
5-Apr	-0.1	0.0	0.0	0.1	-0.1	0.0	-0.1	-0.2	-0.2	0.1	-0.8	-0.8	-0.6	-0.1	-0.1	0.4	0.5	0.7	0.6	-0.1	-0.2	-0.1	-0.2	0.1	-0.1	0.7
6-Apr	0.1	0.2	0.0	0.0	0.0	0.2	0.4	0.7	0.6	0.1	0.2	1.0	0.7	0.1	0.2	0.3	0.3	-0.1	1.2	1.0	-0.6	-0.7	-0.7	-0.6	0.2	1.2
7-Apr	-0.2	-0.4	0.6	1.1	1.0	2.1	2.2	1.5	1.6	0.3	0.1	-0.2	-0.3	0.4	-0.6	-0.1	0.0	0.6	0.6	0.3	0.0	-0.4	0.5	0.2	0.4	2.2
8-Apr	0.1	0.1	-0.1	0.4	0.7	1.0	0.5	0.4	0.1	-0.3	-0.5	-0.2	-0.1	-0.8	-0.7	-0.2	0.4	0.6	0.5	0.4	0.3	0.7	0.7	0.6	0.2	1.0
9-Apr	1.7	2.4	2.2	1.3	0.8	0.3	-0.4	0.6	1.1	1.7	2.2	1.0	0.5	0.3	-0.2	-0.2	-0.2	0.0	0.0	0.6	0.7	0.6	0.1	0.1	0.7	2.4
10-Apr	0.0	0.0	-0.1	0.1	0.2	0.8	0.7	1.2	0.3	0.7	0.9	0.4	0.4	0.9	0.7	-0.2	-0.1	-0.2	-0.2	0.4	0.2	0.2	1.3	1.5	0.4	1.5
11-Apr	0.7	0.3	0.6	0.2	0.2	0.0	0.1	0.1	0.5	0.1	0.3	-0.2	-0.4	0.0	-0.2	-0.4	-0.5	-0.4	-0.1	-0.1	-0.4	-0.5	-0.1	0.0	0.0	0.7
12-Apr	-0.3	-0.3	-0.2	-0.1	-0.1	0.4	0.7	0.1	-0.1	0.0	0.6	0.1	0.0	-0.3	-0.1	-0.7	-0.9	-1.0	-1.2	-0.8	-1.1	0.0	0.0	0.0	-0.2	0.7
13-Apr	-0.9	-0.5	0.2	-0.6	-0.7	-0.4	-0.6	-0.5	-1.0	-1.3	-2.2	-0.5	-0.4	-0.5	-0.6	-1.1	-1.4	-0.7	-0.2	-0.1	0.1	0.3	0.8	1.1	-0.5	1.1
14-Apr	1.7	2.4	2.8	3.1	2.4	1.2	0.8	1.2	0.9	0.5	0.7	1.0	2.4	1.6	0.8	0.6	1.0	2.7	3.5	2.5	2.1	2.0	3.5	1.8	1.8	3.5
15-Apr	0.2	-0.5	0.4	-0.1	0.1	0.1	0.0	0.3	1.5	0.1	-0.3	-0.8	-0.4	-0.4	-0.5	-0.2	0.3	-0.1	0.1	0.3	0.3	-1.2	0.1	0.2	0.0	1.5
16-Apr	0.2	0.3	-0.1	-0.4	0.1	0.6	-0.5	-0.2	-0.3	0.0	0.5	0.7	0.0	0.0	0.0	0.0	0.2	-0.6	-0.6	-0.8	-0.4	-0.1	-0.4	0.8	0.0	0.8
17-Apr	1.7	1.1	1.2	0.0	0.5	1.0	1.1	0.9	0.5	0.7	0.7	0.3	0.5	0.4	0.5	-0.1	0.3	1.6	2.4	0.9	0.3	0.2	0.0	-0.1	0.7	2.4
18-Apr	-0.1	-0.2	-0.6	-0.6	-0.7	-0.5	-0.1	-0.7	-0.1	-0.2	-0.1	-0.6	-0.8	0.2	0.8	0.2	-0.2	-0.7	0.3	0.3	0.0	0.1	-0.1	0.0	-0.2	0.8
19-Apr	0.1	0.0	0.2	0.0	0.0	0.2	0.3	0.5	0.2	0.1	0.1	0.4	0.4	-0.3	-0.3	-0.4	0.4	0.3	-0.1	-0.1	0.6	0.9	0.9	-0.1	0.2	0.9
20-Apr	0.6	0.1	-0.3	-0.4	-0.3	0.0	0.0	0.0	0.2	0.8	-0.3	-0.3	0.3	-0.5	0.3	-0.2	-1.1	-0.1	0.0	0.2	0.4	0.3	0.1	0.1	0.0	0.8
21-Apr	0.0	-0.1	0.1	0.1	0.1	0.0	-0.1	0.2	0.1	0.1	-0.2	-0.3	-0.3	-0.1	-0.2	0.2	-0.1	0.5	0.8	0.4	0.9	1.1	0.9	1.3	0.2	1.3
22-Apr	1.1	1.3	0.5	0.5	0.8	0.9	0.8	0.5	1.2	1.0	1.3	1.7	1.5	1.5	1.3	1.9	1.9	1.6	1.0	1.3	1.2	1.0	0.7	1.1	1.2	1.9
23-Apr	0.9	1.0	0.9	0.6	0.3	0.3	0.4	0.0	0.7	0.3	0.8	1.0	0.9	2.2	1.9	0.3	0.9	1.2	1.3	-0.1	0.5	0.6	0.0	0.2	0.7	2.2
24-Apr	0.3	0.2	0.0	0.2	0.1	0.0	-0.1	0.7	0.1	0.3	0.4	-0.6	0.7	0.2	0.5	0.2	0.4	1.0	0.3	0.8	0.6	0.6	1.0	1.0	0.4	1.0
25-Apr	0.5	0.3	0.8	0.6	1.1	0.6	0.0	-0.4	-0.7	-0.3	0.6	0.0	-0.1	0.0	-0.2	0.6	0.4	-0.1	0.0	0.1	0.4	0.0	-0.2	-0.2	0.2	1.1
26-Apr	0.1	0.0	0.3	0.4	0.1	0.2	0.4	0.5	0.2	0.3	0.4	0.2	1.1	0.7	0.4	-0.3	0.4	-0.4	0.2	0.2	0.9	1.4	0.9	2.5	0.5	2.5
27-Apr	3.0	2.9	1.3	2.8	1.9	1.4	1.5	0.7	-0.1	0.8	0.4	-0.1	1.2	1.0	0.8	0.4	0.3	0.5	0.5	0.0	0.1	1.1	0.5	1.5	1.0	3.0
28-Apr	0.8	0.6	0.5	1.3	1.2	1.6	0.6	0.2	0.1	0.0	0.6	2.3	0.8	0.4	0.9	0.1	-0.6	-0.5	-0.5	0.8	0.8	0.3	0.0	0.0	0.5	2.3
29-Apr	-0.4	-0.5	-0.1	0.3	0.3	-0.2	0.2	0.1	0.6	1.0	0.0	0.0	-0.2	-0.4	-0.1	-0.6	0.0	0.0	0.5	0.2	0.2	0.7	1.9	0.2	0.2	1.9
30-Apr	-0.2	-0.7	-0.3	-0.1	0.0	0.1	0.6	0.4	0.0	-0.4	0.1	0.0	0.6	0.0	0.4	0.1	-0.3	0.0	-0.2	0.2	0.2	0.1	0.5	-0.1	0.1	0.6
																								Diurnal Average		
																								Diurnal Maximum		





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 5.2 km/h on Apr 13 10:00	Hours of Data: 720
Minimum Value: 0.1 km/h on Apr 20 06:00	Hours of Missing Data: 0
Percentiles: $P_1 = 0.2$ $P_{10} = 0.7$ $Q_1 = 1.2$ Median = 1.9 $Q_3 = 2.6$ $P_{90} = 3.3$ $P_{99} = 4.3$	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-Apr	2.6	3.1	3.7	3.7	4.4	4.3	4.6	3.9	3.3	3.3	3.1	3.1	3.3	3.6	3.7	3.4	3.2	3.2	2.9	1.9	1.4	0.8	0.7	0.5	4.6
2-Apr	0.7	1.0	0.7	1.0	0.8	1.2	1.0	1.2	1.8	1.8	2.1	2.6	3.3	3.0	2.7	2.7	2.5	2.1	1.9	1.9	2.3	2.5	2.1	1.4	3.3
3-Apr	1.0	0.9	1.0	1.0	0.6	0.6	1.0	0.8	0.9	1.9	2.4	2.6	2.7	2.8	2.9	2.7	2.7	2.1	2.2	2.0	2.1	1.6	1.4	1.7	2.9
4-Apr	1.2	0.4	0.6	0.6	0.4	0.3	0.5	0.6	0.9	2.0	2.7	3.4	3.4	3.0	2.5	2.1	2.1	2.3	2.1	2.5	2.4	2.0	1.3	0.6	3.4
5-Apr	0.5	0.2	0.1	0.2	0.5	1.2	1.3	1.8	2.1	2.0	2.3	2.5	2.7	2.9	2.8	2.6	2.5	2.2	2.1	1.6	2.1	1.7	0.8	0.8	2.9
6-Apr	0.7	0.9	0.8	0.7	0.4	0.4	0.5	0.9	1.0	1.2	1.4	2.5	2.9	2.6	2.1	1.9	1.7	1.7	2.0	1.8	1.6	1.8	1.8	1.4	2.9
7-Apr	1.3	1.5	1.9	1.9	1.6	1.7	2.0	2.3	2.2	2.1	2.6	3.0	2.9	3.2	2.8	2.3	1.9	2.2	1.9	1.2	1.4	1.4	1.6	1.5	3.2
8-Apr	1.5	1.4	1.2	1.1	1.2	1.4	1.3	1.2	1.2	1.5	1.8	2.5	2.3	2.3	2.2	2.4	2.4	2.3	1.3	0.5	0.6	0.5	0.7	1.2	2.5
9-Apr	1.4	1.4	1.2	1.4	1.2	1.6	1.3	1.9	2.0	2.4	2.4	2.3	2.4	2.4	1.4	1.1	1.0	1.1	1.1	0.9	0.7	0.8	0.9	0.9	2.4
10-Apr	1.3	1.2	1.0	1.3	0.9	1.0	0.9	1.2	1.2	0.8	1.3	0.9	1.5	2.2	2.2	2.1	2.0	1.8	1.1	1.5	1.3	1.2	1.4	1.5	2.2
11-Apr	1.8	1.6	1.2	0.7	0.8	0.9	1.0	1.1	1.9	1.4	1.5	1.0	1.9	1.8	2.3	1.8	1.6	2.1	2.3	3.0	3.4	2.4	1.3	0.9	3.4
12-Apr	1.1	1.1	1.3	1.7	1.5	1.8	2.5	2.5	2.1	2.1	2.9	3.3	3.2	2.8	3.3	3.3	3.9	4.0	3.8	3.1	2.0	2.1	1.6	1.8	4.0
13-Apr	1.8	2.0	2.2	2.4	4.3	2.9	2.1	2.5	3.4	5.2	4.5	4.2	4.1	4.2	4.7	3.7	3.3	2.8	1.8	0.6	0.2	0.6	0.7	0.7	5.2
14-Apr	1.2	1.5	1.1	1.1	1.3	1.3	1.9	2.1	1.9	2.1	2.0	2.1	2.2	2.1	2.4	3.2	3.3	3.0	2.5	2.0	2.1	1.6	2.4	2.6	3.3
15-Apr	2.5	1.6	1.5	0.9	0.9	1.1	1.1	1.5	1.9	1.9	2.4	2.5	2.7	2.1	2.4	2.2	2.4	1.5	0.7	0.7	2.1	3.6	1.7	1.9	3.6
16-Apr	1.3	2.0	1.8	1.1	1.4	2.0	2.0	2.0	2.0	1.9	2.2	3.3	2.4	2.1	2.7	2.3	2.3	3.8	2.5	2.4	2.0	1.6	0.9	1.7	3.8
17-Apr	2.4	1.9	1.7	1.4	0.8	1.0	1.1	0.9	0.9	1.2	1.7	2.2	2.9	2.9	4.0	2.8	2.1	2.2	2.1	1.4	1.6	0.8	0.2	0.6	4.0
18-Apr	0.9	1.0	2.0	2.5	3.2	2.3	2.6	2.5	2.1	3.2	4.1	4.0	4.0	3.3	3.5	3.1	2.7	2.3	3.0	1.7	0.3	0.3	0.5	0.2	4.1
19-Apr	0.4	0.5	0.6	0.3	0.5	0.7	0.7	0.8	0.7	0.8	1.4	1.8	2.3	2.1	2.4	2.4	2.2	1.7	0.6	0.5	1.1	2.0	1.8	1.0	2.4
20-Apr	0.9	0.7	1.0	0.5	0.3	0.1	0.2	0.4	1.2	1.7	1.6	1.7	2.9	2.7	2.9	2.4	2.4	2.3	2.2	2.1	2.0	1.8	1.3	1.1	2.9
21-Apr	0.8	0.4	0.7	0.7	0.5	0.8	0.8	1.7	1.9	2.4	2.9	2.8	3.2	3.0	3.3	3.2	2.8	2.8	2.7	2.1	1.9	2.9	3.0	2.3	3.3
22-Apr	2.0	1.8	1.7	1.5	1.3	1.8	2.4	2.6	2.0	2.0	2.6	3.5	3.3	3.5	3.0	3.0	3.5	3.2	3.2	3.3	3.5	3.8	3.2	3.1	3.8
23-Apr	2.6	2.1	2.3	2.5	2.2	2.2	2.2	2.7	3.2	2.4	2.6	3.1	3.7	4.1	3.9	3.8	3.7	3.1	3.1	3.1	3.6	3.5	2.1	1.7	4.1
24-Apr	1.3	1.3	1.3	1.4	1.8	2.0	2.7	2.9	2.7	3.3	3.7	3.5	3.9	3.9	4.0	4.5	4.3	3.8	3.5	3.2	2.8	2.9	2.5	2.3	4.5
25-Apr	2.1	2.0	2.1	1.7	1.9	1.9	1.8	1.9	1.9	2.4	3.1	3.4	3.5	3.5	3.2	3.2	3.3	2.9	2.3	1.2	0.9	1.1	1.2	1.3	3.5
26-Apr	0.7	0.4	0.4	0.4	0.5	0.4	1.0	0.9	0.8	1.2	2.5	2.5	2.6	2.7	2.7	2.1	2.2	1.7	1.6	1.0	1.1	1.3	1.6	2.1	2.7
27-Apr	2.4	1.9	1.5	1.2	1.9	1.3	1.5	1.7	2.1	2.3	3.2	2.7	2.9	3.9	3.5	3.4	2.6	2.5	2.0	0.9	0.6	0.8	0.7	0.9	3.9
28-Apr	1.3	1.1	0.8	0.8	0.8	0.9	0.8	1.2	1.1	1.6	2.2	2.6	3.0	3.2	3.2	3.0	2.6	2.3	1.7	2.6	2.4	1.5	1.4	3.1	3.2
29-Apr	0.9	1.4	1.2	0.8	0.6	1.3	1.5	1.3	1.3	1.7	1.3	1.7	2.3	2.2	2.2	2.1	1.4	1.2	1.2	1.6	1.0	0.9	1.3	1.6	2.3
30-Apr	1.5	1.3	1.5	1.6	1.9	2.2	2.0	2.6	1.8	2.5	3.0	2.7	3.7	3.2	2.8	2.8	2.6	2.0	1.7	0.6	0.6	0.7	1.3	1.5	3.7

2.6	3.1	3.7	3.7	4.4	4.3	4.6	3.9	3.4	5.2	4.5	4.2	4.1	4.2	4.7	4.5	4.3	4.0	3.8	3.3	3.6	3.8	3.2	3.1	
Diurnal Maximum																								



Maximum Value: 4.1 km/h on Apr 7 03:00		Maximum Daily Average: 2.1 km/h on Apr 14		Hours in Service: 720																						
Minimum Value: -1.8 km/h on Apr 13 11:00		Minimum Daily Average: -0.1 km/h on Apr 13		Hours of Data: 720																						
Maximum Diurnal Average: 1.1 km/h at hour 21		Minimum Diurnal Average: 0.2 km/h at hour 11		Hours of Missing Data: 0																						
Monthly Average: 0.68 km/h		Percentiles: $P_1 = -1.1$ $P_{10} = -0.2$ $Q_1 = 0.1$ Median = 0.5 $Q_3 = 1.1$ $P_{90} = 1.8$ $P_{99} = 3.6$		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	1.0	1.1	0.7	1.2	1.2	0.9	0.5	1.6	1.6	1.3	0.4	2.1	0.5	1.4	1.9	0.9	0.2	-0.1	0.6	0.4	0.8	0.5	0.3	0.2	0.9	2.1
2-Apr	0.0	-0.1	0.0	0.3	-0.1	0.1	0.3	0.1	0.3	-0.5	-0.5	-0.1	1.1	-0.2	-0.2	0.4	0.8	-0.7	-0.3	0.6	1.5	1.4	-0.1	0.2	0.2	1.5
3-Apr	0.0	0.2	0.0	0.4	0.4	0.3	0.2	0.2	0.2	-0.2	-0.3	-1.0	-0.3	0.4	-0.6	0.6	0.4	0.1	-0.2	0.2	0.5	0.8	2.1	1.2	0.2	2.1
4-Apr	0.6	0.6	0.2	0.1	0.4	0.4	0.1	0.2	0.2	-0.7	0.4	1.4	0.1	0.4	-0.5	-0.8	0.1	0.6	0.1	0.7	0.9	0.0	0.1	0.0	0.2	1.4
5-Apr	0.3	0.1	0.0	0.2	0.0	0.1	-0.2	-0.3	-0.4	0.2	-1.2	-0.8	-0.3	0.0	0.5	0.7	0.6	0.4	0.1	0.7	-0.2	0.3	0.2	0.7	0.0	0.7
6-Apr	0.4	0.5	0.7	0.6	0.4	0.4	0.6	1.1	0.4	-0.1	0.0	0.8	1.0	0.2	-0.1	0.4	-0.2	1.6	0.9	1.8	2.6	2.7	2.3	0.8	2.7	
7-Apr	2.4	3.1	4.1	3.3	2.7	1.8	1.8	1.9	1.3	0.4	0.2	0.8	1.1	1.7	0.6	0.9	0.9	2.0	2.0	1.9	2.4	2.8	3.3	0.5	1.8	4.1
8-Apr	0.2	0.5	1.3	1.6	0.7	0.8	0.8	0.8	0.7	0.1	-1.1	0.0	-0.6	-1.0	-1.2	-0.2	0.6	0.5	0.7	0.9	0.9	1.1	0.6	0.4	0.4	1.6
9-Apr	1.2	1.3	0.6	0.6	0.6	0.6	-0.6	0.2	0.0	1.2	1.2	1.4	1.7	1.4	0.5	0.5	0.5	0.9	1.1	1.8	2.0	1.8	1.2	0.6	0.9	2.0
10-Apr	0.9	0.7	0.8	1.0	0.5	0.8	0.8	0.4	0.5	0.5	0.7	0.3	0.0	0.3	0.7	-0.4	-0.1	0.0	-0.2	1.1	2.1	1.5	0.2	0.5	0.6	2.1
11-Apr	0.5	-0.1	0.7	0.8	0.6	0.6	0.7	0.9	1.2	0.5	1.1	0.2	0.0	0.7	0.5	-0.1	-0.1	0.3	0.7	1.7	1.1	-0.2	0.1	0.1	0.5	1.7
12-Apr	-0.1	0.1	0.5	0.9	0.8	1.3	2.1	1.3	0.3	0.8	1.5	1.1	0.9	0.8	1.0	0.6	0.4	0.2	-0.2	-0.3	-1.2	0.3	0.4	0.9	0.6	2.1
13-Apr	-0.6	-0.5	0.8	-0.2	-0.3	-0.1	-0.1	0.1	-0.5	-1.0	-1.8	-0.7	0.3	-0.2	-0.2	-1.1	-0.6	-0.3	-0.2	-0.1	0.2	0.7	1.4	1.8	-0.1	1.8
14-Apr	2.9	2.8	3.4	3.6	2.7	1.2	0.7	1.7	1.0	0.4	0.8	1.0	3.2	1.9	1.3	1.0	1.0	2.8	3.8	3.2	3.0	2.2	3.8	1.9	2.1	3.8
15-Apr	0.2	-0.4	0.7	0.5	0.6	0.8	0.7	0.9	1.9	0.7	0.1	-0.4	0.1	0.1	0.2	0.5	1.2	0.7	0.6	1.2	2.4	-0.2	0.8	1.1	0.6	2.4
16-Apr	0.9	1.5	0.9	0.4	1.0	1.5	0.5	0.5	0.2	0.6	1.2	1.7	0.7	0.8	1.0	1.3	1.3	-0.6	-0.3	-0.4	0.0	0.6	-0.3	2.2	0.7	2.2
17-Apr	3.7	2.7	2.5	1.0	0.5	0.7	0.8	0.8	0.5	0.6	0.4	0.7	1.8	1.9	2.1	2.1	0.3	2.2	3.6	1.4	1.1	0.7	0.2	0.0	1.3	3.7
18-Apr	0.1	-0.1	-0.5	-0.5	-0.6	0.1	0.4	-0.5	0.0	0.1	-0.4	-0.3	-0.7	0.3	0.8	0.4	-0.1	-0.4	0.3	0.7	0.1	0.2	0.2	-0.1	0.0	0.8
19-Apr	0.1	0.0	0.2	0.0	0.5	0.8	0.9	0.7	0.4	0.1	-0.1	0.3	0.6	-0.2	0.5	-0.2	0.4	0.7	-0.1	0.3	0.4	0.0	0.7	-0.2	0.3	0.9
20-Apr	0.4	0.3	0.0	-0.2	-0.2	0.0	0.0	0.0	0.1	0.7	-0.2	-0.1	1.0	-0.3	0.7	0.1	-1.2	-0.1	0.0	0.7	0.9	0.6	0.3	0.2	0.2	1.0
21-Apr	0.2	0.2	0.3	0.4	0.2	0.2	0.2	0.6	0.3	0.1	-0.1	-0.2	-0.3	-0.4	-0.5	0.5	0.2	0.7	1.3	1.5	2.2	1.2	1.0	1.7	0.5	2.2
22-Apr	1.8	1.8	0.7	0.7	1.0	1.4	1.0	0.7	0.9	0.6	1.1	1.8	1.3	1.7	1.2	2.0	2.6	2.0	1.7	1.6	1.7	1.5	1.5	1.9	1.4	2.6
23-Apr	1.6	1.6	1.6	1.0	0.7	1.0	1.3	0.4	1.2	0.1	0.6	1.0	0.5	2.8	2.5	0.5	1.7	1.4	1.8	0.8	1.6	1.8	0.1	0.2	1.2	2.8
24-Apr	0.4	0.4	0.2	0.3	0.3	-0.2	-0.2	0.7	0.2	0.3	0.5	-0.3	1.1	0.3	1.1	0.4	0.6	1.7	0.5	0.8	0.8	0.6	0.9	0.9	0.5	1.7
25-Apr	0.6	0.7	0.6	0.8	1.4	0.6	-0.1	-0.1	-1.0	-0.5	0.8	0.2	0.1	0.5	-0.1	1.4	0.7	0.3	0.4	0.9	0.4	-0.1	0.2	0.4	0.4	1.4
26-Apr	0.6	0.2	0.3	0.3	0.0	0.2	0.2	0.2	0.3	0.2	-0.3	-0.2	1.2	1.0	-0.4	-0.5	-0.1	-0.7	0.6	0.9	2.2	2.5	1.2	2.5	0.5	2.5
27-Apr	2.8	3.6	2.0	3.3	2.5	1.7	1.5	0.8	0.2	0.7	0.9	1.4	1.9	2.5	2.1	1.6	1.2	1.4	1.5	0.6	0.6	1.4	1.0	2.3	1.6	3.6
28-Apr	1.7	0.6	0.7	0.3	0.8	1.2	0.8	-0.1	0.1	0.4	0.5	3.2	1.1	0.4	0.8	-0.2	-0.6	0.0	-0.4	0.7	0.9	-0.1	2.6	0.8	0.7	3.2
29-Apr	0.0	-0.3	0.1	0.2	0.0	0.0	0.6	0.4	1.1	1.5	0.3	0.3	0.6	0.2	0.3	-0.4	0.5	0.4	1.1	1.1	0.9	1.9	2.8	0.9	0.6	2.8
30-Apr	0.9	0.2	0.5	0.7	0.9	1.2	1.7	1.0	0.4	0.2	1.0	1.3	1.5	1.0	0.6	0.7	0.0	-0.1	0.1	0.5	0.5	0.4	1.6	0.3	0.7	1.7
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6.0 km/h on Apr 13 10:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 0.1 km/h on Apr 20 07:00																									
Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.1 Median = 1.8 Q <sub>3</sub> = 2.6 P <sub>90</sub> = 3.4 P <sub>99</sub> = 4.8																									
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-Apr	2.8	2.8	3.5	3.9	4.8	4.4	4.6	4.2	3.8	3.7	3.5	3.8	3.6	4.0	4.3	3.9	3.6	3.4	2.8	1.9	1.2	0.8	0.7	0.5	4.8
2-Apr	0.7	1.1	0.7	1.1	0.8	1.0	0.9	1.0	1.8	2.0	2.2	2.9	3.8	3.3	2.9	2.9	2.8	2.4	1.6	1.2	1.9	2.4	2.4	1.5	3.8
3-Apr	0.9	0.7	0.6	1.1	0.5	0.3	0.3	0.4	0.5	1.9	2.7	2.9	2.9	3.0	3.0	3.1	3.2	2.1	2.0	1.5	1.3	0.6	1.5	1.9	3.2
4-Apr	1.2	0.7	0.5	0.5	0.7	0.4	0.2	0.3	0.6	1.9	2.8	3.6	3.9	3.6	2.9	2.2	2.3	2.5	1.9	2.0	2.5	2.2	1.2	0.4	3.9
5-Apr	0.4	0.5	0.2	0.2	0.5	1.2	1.1	1.6	2.0	2.1	2.3	2.7	3.1	3.1	3.2	2.9	3.0	2.4	2.0	1.4	2.3	1.6	1.1	1.1	3.2
6-Apr	1.0	1.5	1.4	1.2	0.6	0.5	0.6	0.8	0.7	1.0	1.7	2.4	2.4	2.2	2.0	1.4	1.4	1.4	1.8	1.4	1.3	1.0	1.0	1.0	2.4
7-Apr	1.0	0.9	1.2	1.2	1.1	1.3	1.4	1.4	1.4	1.4	2.1	2.4	2.9	2.9	2.5	2.2	1.8	2.2	1.9	1.0	0.9	0.8	1.1	1.1	2.9
8-Apr	1.0	1.1	1.0	0.8	0.9	0.9	0.9	1.4	1.4	1.4	1.7	2.8	2.5	2.6	2.6	3.1	2.7	2.8	1.3	0.4	0.3	0.4	0.8	0.8	3.1
9-Apr	1.1	1.1	1.0	1.1	1.4	1.3	1.5	1.4	1.9	2.5	1.8	2.2	2.6	2.4	1.2	1.2	1.0	1.2	1.1	1.0	0.5	0.8	1.1	1.5	2.6
10-Apr	1.7	1.3	0.9	0.8	0.7	0.9	0.9	0.7	1.0	0.8	1.2	0.9	1.4	2.3	2.4	2.3	2.1	1.3	0.8	1.2	1.0	1.1	0.8	0.8	2.4
11-Apr	1.3	1.2	0.9	0.7	0.8	1.0	1.2	1.4	1.6	1.5	0.9	1.3	1.7	1.7	2.4	1.7	1.4	1.6	1.9	2.5	2.8	2.8	1.5	1.3	2.8
12-Apr	0.7	0.9	1.0	1.2	1.4	1.4	1.7	2.1	1.7	1.5	2.6	3.2	2.6	2.4	2.9	3.1	3.3	3.5	3.3	3.3	1.6	2.4	1.7	1.4	3.5
13-Apr	1.8	2.3	2.3	1.9	4.5	3.0	2.2	2.1	3.6	6.0	4.7	4.3	4.9	4.8	5.1	4.1	3.7	3.1	1.8	0.6	0.2	0.6	0.7	0.9	6.0
14-Apr	1.2	1.9	1.7	1.7	1.8	1.8	2.1	2.0	2.3	2.1	2.0	2.1	2.6	2.4	2.5	2.7	3.4	3.4	2.9	2.2	1.6	1.8	2.7	2.9	3.4
15-Apr	2.2	1.2	1.4	1.0	0.9	1.3	1.3	1.4	1.5	1.3	2.0	2.3	2.6	1.7	2.7	2.0	2.4	1.5	0.9	0.6	1.9	3.1	1.5	1.4	3.1
16-Apr	0.9	1.4	1.6	1.1	1.4	1.6	1.4	1.3	1.7	1.7	2.2	3.2	2.2	1.8	2.2	2.0	2.0	3.4	2.2	2.5	1.9	1.5	1.0	1.2	3.4
17-Apr	1.2	1.2	1.2	1.4	0.9	0.8	0.9	0.9	0.6	1.1	1.7	2.2	3.0	2.9	4.4	2.3	1.8	2.6	2.4	1.5	2.1	1.1	0.5	0.3	4.4
18-Apr	0.4	0.8	1.5	2.0	2.4	1.9	2.4	1.9	2.2	3.2	4.1	4.0	4.0	3.4	4.1	3.3	2.9	2.0	2.7	1.2	0.4	0.3	0.5	0.2	4.1
19-Apr	0.3	0.4	0.6	0.3	0.4	0.5	0.6	0.5	0.5	0.8	1.3	1.8	2.6	2.2	2.3	2.3	2.4	2.2	0.8	0.4	0.8	0.9	1.1	0.8	2.6
20-Apr	0.7	0.8	0.5	0.5	0.3	0.2	0.1	0.4	1.0	1.6	1.8	1.8	2.9	3.0	3.2	2.4	2.8	2.6	2.0	1.6	1.8	2.1	1.5	1.2	3.2
21-Apr	1.1	0.6	1.1	1.1	0.9	1.0	0.9	1.3	1.4	2.2	3.3	3.3	3.8	3.3	4.0	3.6	3.3	3.0	2.5	1.6	1.7	3.4	3.4	2.4	4.0
22-Apr	2.1	1.8	1.8	1.8	1.5	1.9	2.5	2.6	2.1	2.4	2.8	4.1	3.6	3.8	3.3	3.2	3.6	3.4	3.0	3.5	3.7	4.1	3.4	2.9	4.1
23-Apr	2.7	2.2	2.3	2.6	2.4	2.5	2.2	2.9	3.4	2.8	3.0	3.7	4.0	5.0	4.8	4.3	4.3	3.4	2.9	2.6	3.2	3.3	2.5	2.0	5.0
24-Apr	1.3	0.9	0.8	0.9	0.9	1.4	2.7	3.1	3.0	3.9	4.0	4.2	4.6	4.7	5.0	4.9	4.5	4.6	3.7	3.3	2.9	3.1	2.8	2.3	5.0
25-Apr	2.2	2.1	1.9	1.1	1.3	2.2	1.6	1.6	2.1	2.5	3.4	3.8	3.7	3.9	3.8	3.6	3.7	3.1	2.1	1.2	0.5	0.8	1.7	1.8	3.9
26-Apr	1.0	0.5	0.4	0.5	0.5	0.6	0.7	0.8	0.7	1.2	2.1	2.6	3.0	3.1	2.9	2.2	2.3	1.8	1.7	1.2	0.7	1.2	1.5	2.6	3.1
27-Apr	2.9	2.1	1.9	1.8	2.4	1.4	1.6	2.0	2.1	1.9	2.5	2.7	3.1	4.0	3.8	3.4	2.5	2.3	1.8	1.0	0.6	0.7	0.4	0.9	4.0
28-Apr	1.5	0.8	0.6	0.5	0.6	0.7	0.8	0.8	0.8	1.1	2.6	2.9	2.8	2.9	3.0	2.4	1.8	1.7	1.2	2.2	1.8	1.1	1.7	3.0	3.0
29-Apr	1.6	2.2	2.0	1.1	0.6	0.8	1.7	1.0	1.6	1.2	1.2	1.5	2.0	1.9	1.6	1.8	1.0	1.0	1.0	1.7	0.9	0.9	1.2	1.4	2.2
30-Apr	1.3	1.2	1.1	1.1	1.6	1.3	1.3	1.5	1.3	1.7	2.2	2.2	3.5	2.8	3.1	2.4	3.0	2.3	1.9	0.7	0.5	0.7	1.3	1.2	3.5
	2.9	2.8	3.5	3.9	4.8	4.4	4.6	4.2	3.8	6.0	4.7	4.3	4.9	5.0	5.1	4.9	4.5	4.6	3.7	3.5	3.7	4.1	3.4	3.0	
	Diurnal Maximum																								

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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 4  
BUFFALO VIEWPOINT  
APRIL 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

May 29, 2015

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

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	686	34	34	100.00	28	0	5	0
H2S (ppb) Average	682	38	38	100.00	2	0	0	0
THC (ppm) Average	687	33	33	100.00	3.5	-	2.4	-
Temperature (C) Average	720	0	0	100.00	24.2	-	15.9	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	76	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	38	-	25	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	686	0.6	2	-	0	0	0	0	0	1	28
H2S (ppb) Average	682	0.2	0	-	0	0	0	0	0	0	2
THC (ppm) Average	687	2.21	0.1	-	2	2.1	2.1	2.2	2.2	2.3	3.5
Temperature 2 m (C) Average	720	4.86	7.7	-	-15.4	-5.4	-0.9	5	10.8	14.5	24.2
Relative Humidity (%) Average	720	46.7	20	-	13	24	30	43	59	77	99
Wind Speed 10 m (km/h) Average	720	13.2	6	-	2	6	9	12	17	21	38
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
APRIL 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:	720
Maximum Value: 28 ppb on Apr 25 14:00	Maximum Daily Average: 4.7 ppb on Apr 25		Hours of Data:	686
Minimum Value: 0 ppb on Apr 17 05:00	Minimum Daily Average: 0.1 ppb on Apr 17		Hours of Missing Data:	34
Maximum Diurnal Average: 2.4 ppb at hour 14	Minimum Diurnal Average: 0.2 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 0.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Apr	0	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-Apr	0	0	0	Z	0	0	0	0	0	2	6	0	0	0	0	0	0	0	0	0	0	0	0	6	0.8	6
4-Apr	2	1	0	0	Z	0	0	0	1	0	0	3	6	1	5	6	5	1	0	0	0	0	0	0	1.4	6
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	Z	1	1	0	0	0	0	0	0	0	1	0	0	1	1	1	0	1	1	1	1	0	0	0	0.5	1
7-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Apr	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	8	2	1	0	0	0.8	8
9-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	3	3	0	0	1	0	0	0	0	0	0	0.5	3
11-Apr	0	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
15-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	2	1	0	0	0	0	0	0.2	2
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Apr	Z	0	0	1	1	0	0	0	0	1	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0.6	3
19-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	0	0.4	2
20-Apr	0	0	Z	0	0	0	0	0	1	1	0	1	14	23	13	7	1	1	0	0	0	0	0	0	2.8	23
21-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.2	1
22-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
23-Apr	1	0	0	0	0	Z	0	0	0	0	4	4	9	6	1	0	0	0	0	2	2	4	2	0	1.7	9
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Apr	0	Z	0	0	0	0	0	0	1	5	0	0	10	28	25	18	13	3	0	0	0	0	0	0	4.7	28
26-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	1	2	2	2	0	0	0	0	0	0	0	0	0.5	2
27-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0.3	2

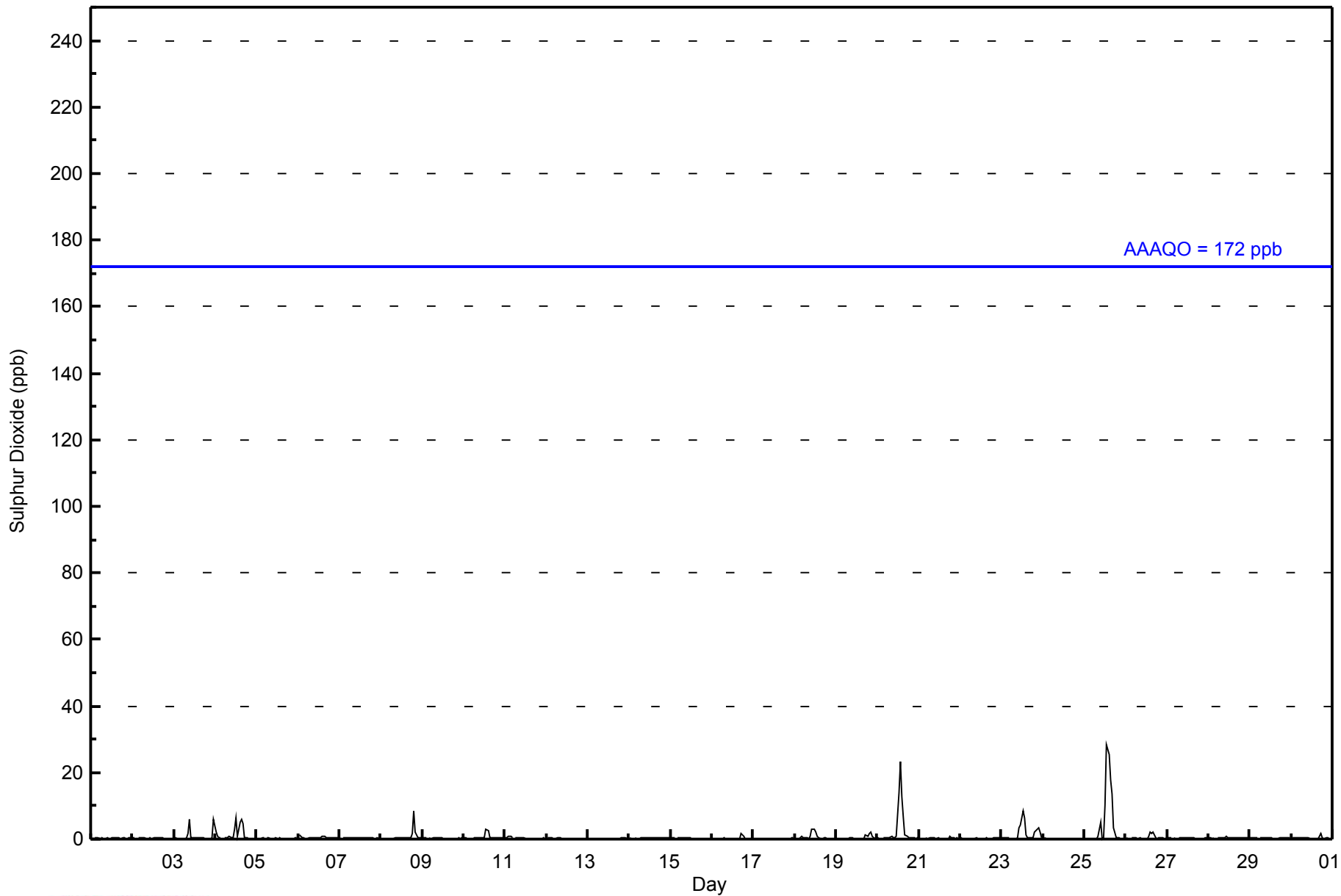
0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.4	0.6	0.5	0.6	1.6	2.4	1.9	1.3	0.9	0.5	0.3	0.6	0.4	0.4	0.3	0.4	Diurnal Average	
2	1	1	1	1	0	0	0	2	6	4	4	14	28	25	18	13	3	2	8	2	4	2	6	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Buffalo Viewpoint - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	679	98.98	98.98
11 - 20	4	0.58	99.56
21 - 60	3	0.44	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Buffalo Viewpoint - April 2015**

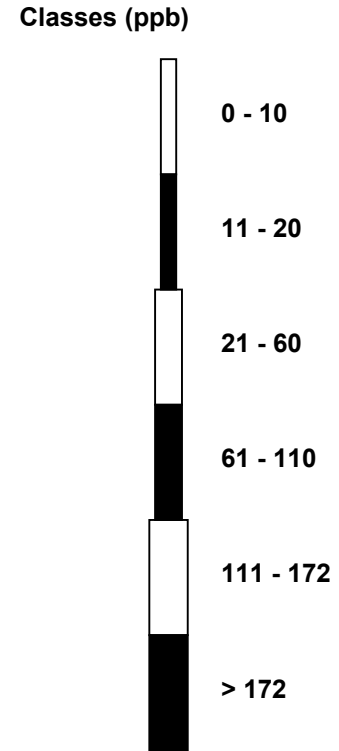
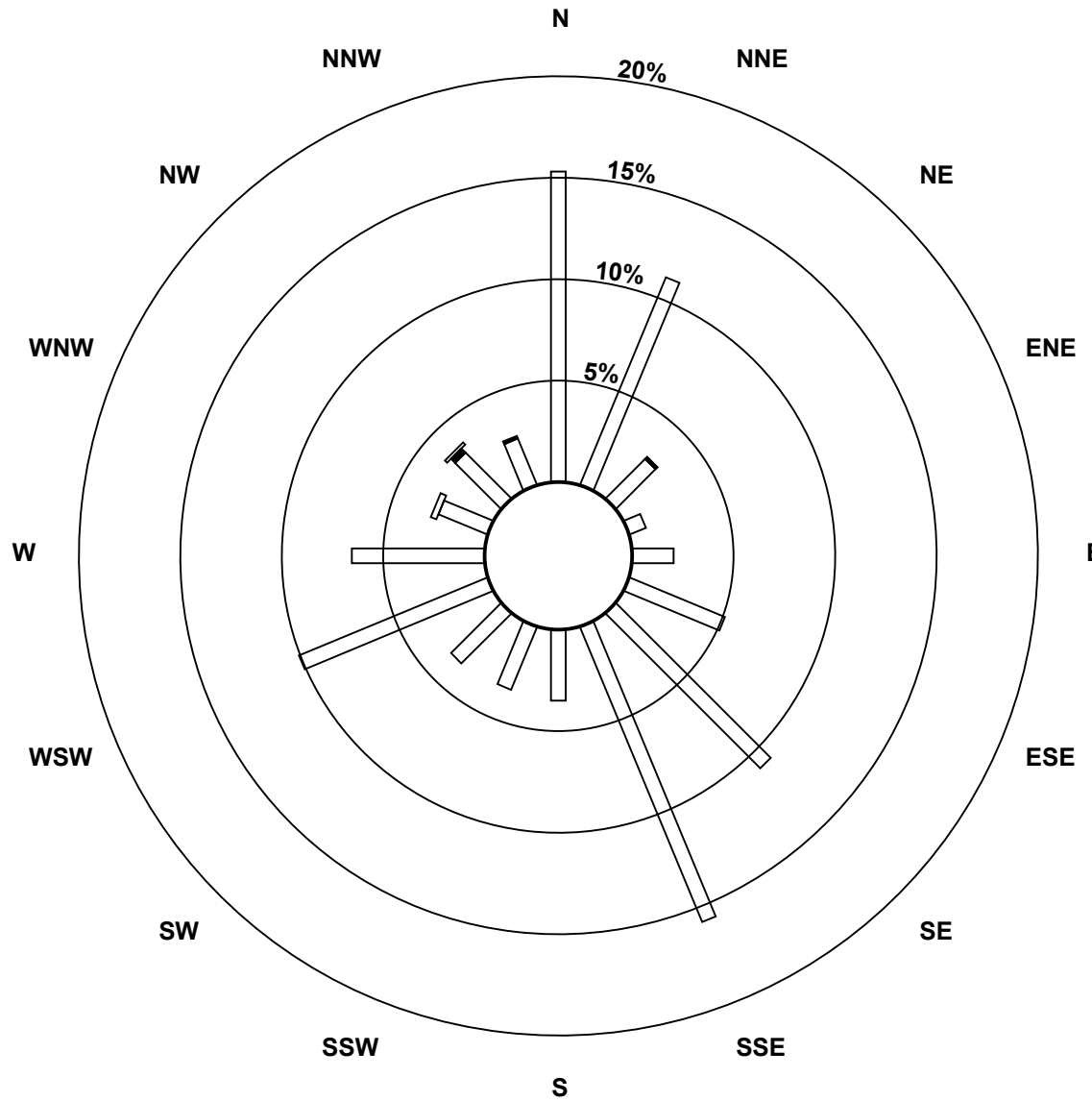
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	105	76	19	6	14	35	74	108	24	23	24	69	45	18	22	17	679
11 - 20	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	105	76	20	6	14	35	74	108	24	23	24	69	45	20	25	18	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint (AMS 4)**

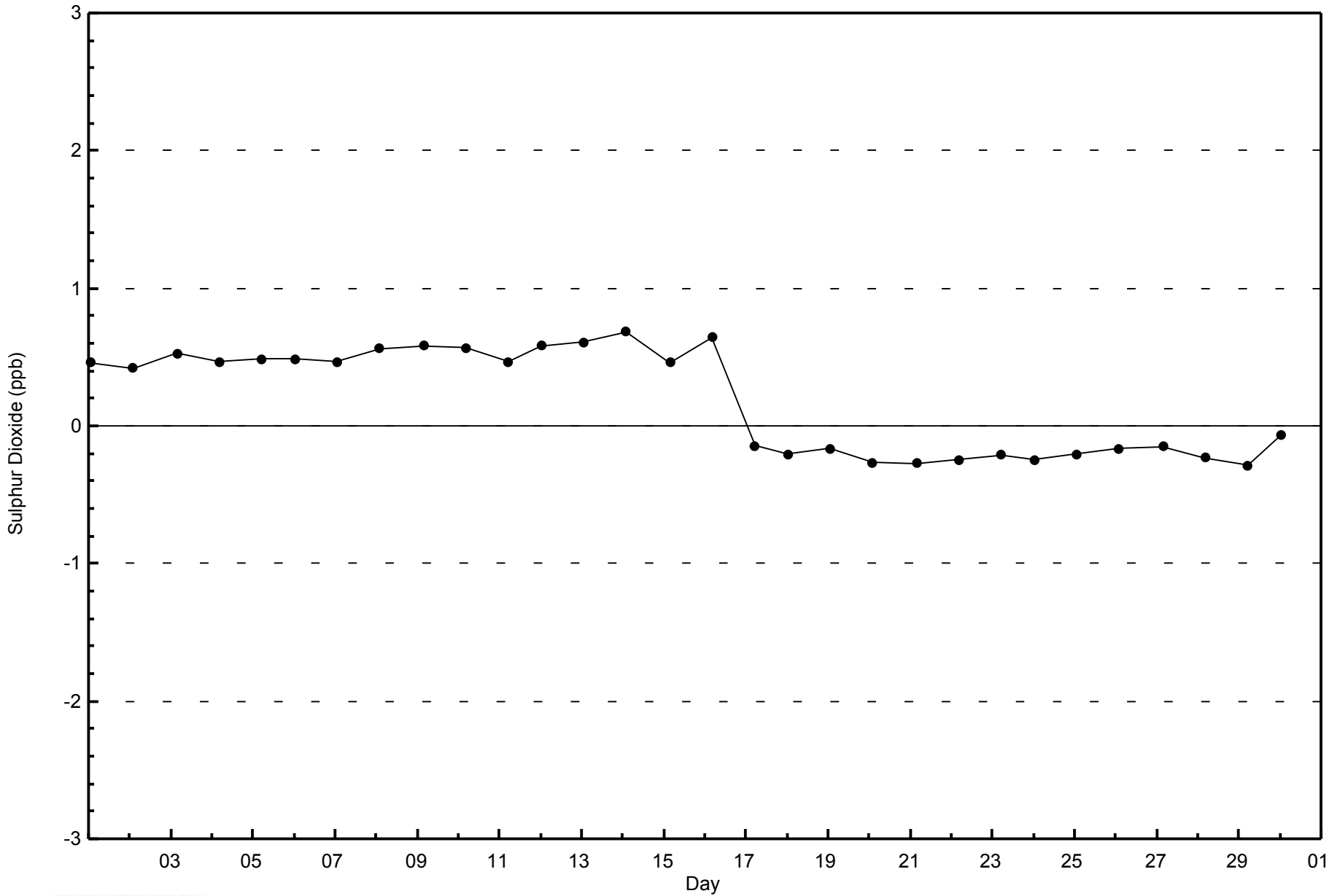


**Total Number of Valid Hours: 686**



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - April 2015

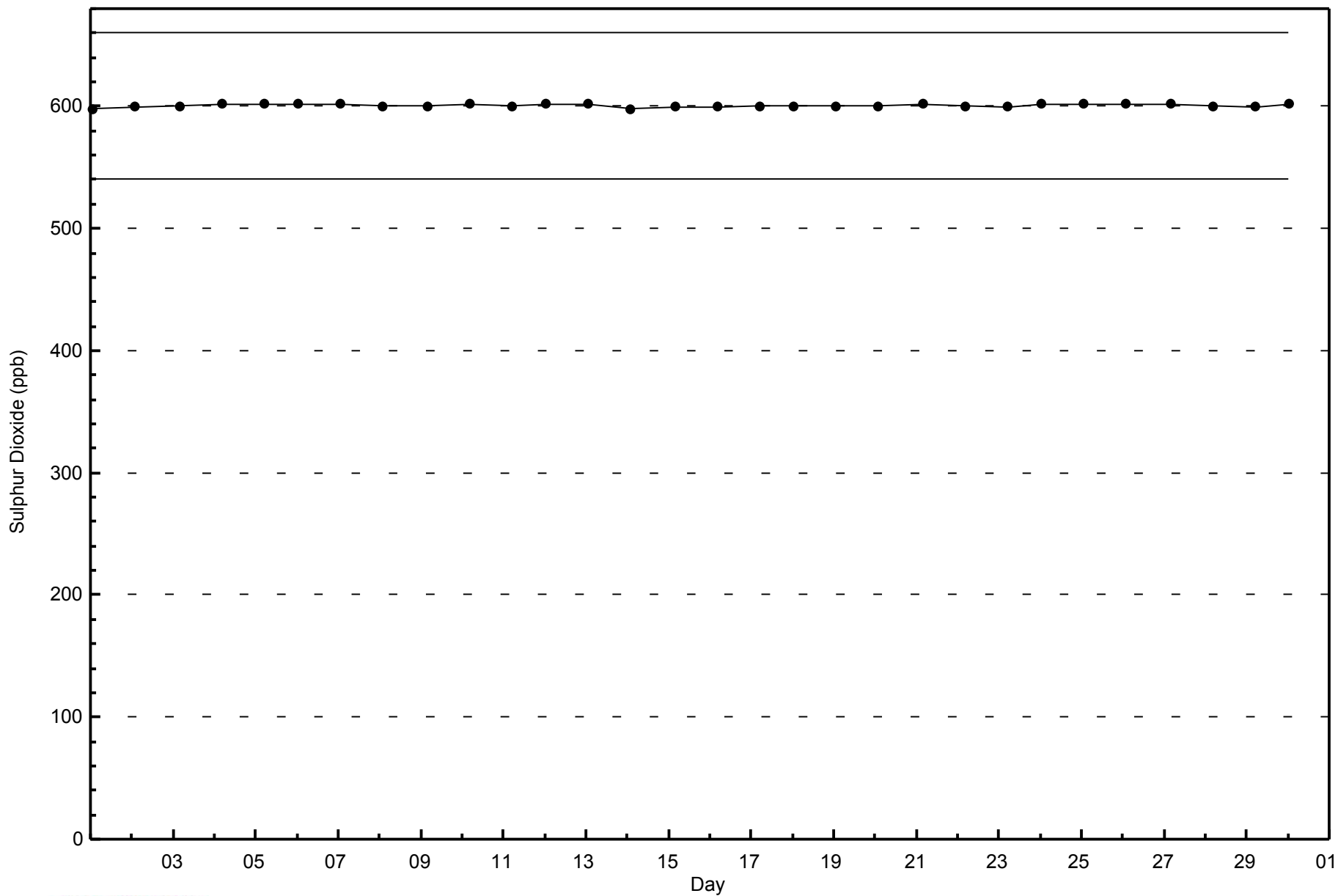






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Apr 20 09:00	Maximum Daily Average: 0.5 ppb on Apr 4		Hours of Data:	682
Minimum Value: 0 ppb on Apr 17 00:00	Minimum Daily Average: 0.1 ppb on Apr 29		Hours of Missing Data:	38
Maximum Diurnal Average: 0.3 ppb at hour 9	Minimum Diurnal Average: 0.1 ppb at hour 17		Hours of Calibration:	38
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	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
3-Apr	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
4-Apr	1	0	0	0	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
5-Apr	0	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Apr	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1
9-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Apr	0	0	Z	0	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
14-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
16-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Apr	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
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Apr	0	0	0	Z	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	2
21-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
26-Apr	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
27-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
30-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

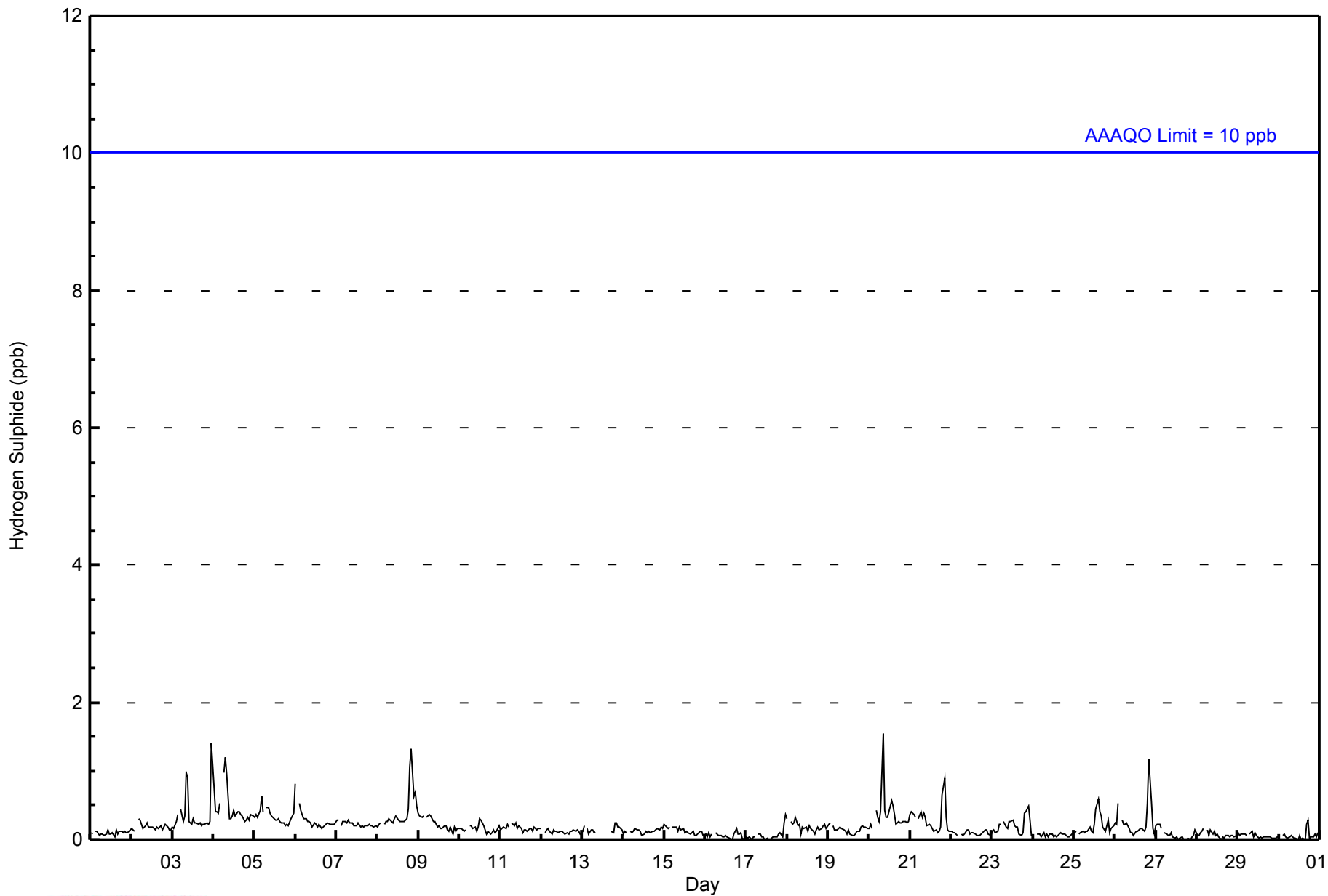
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	0.2	0.2	Diurnal Average
1	0	1	0	1	0	1	1	1	2	1	0	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Buffalo Viewpoint - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Buffalo Viewpoint - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	682	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: 682

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Buffalo Viewpoint - April 2015**

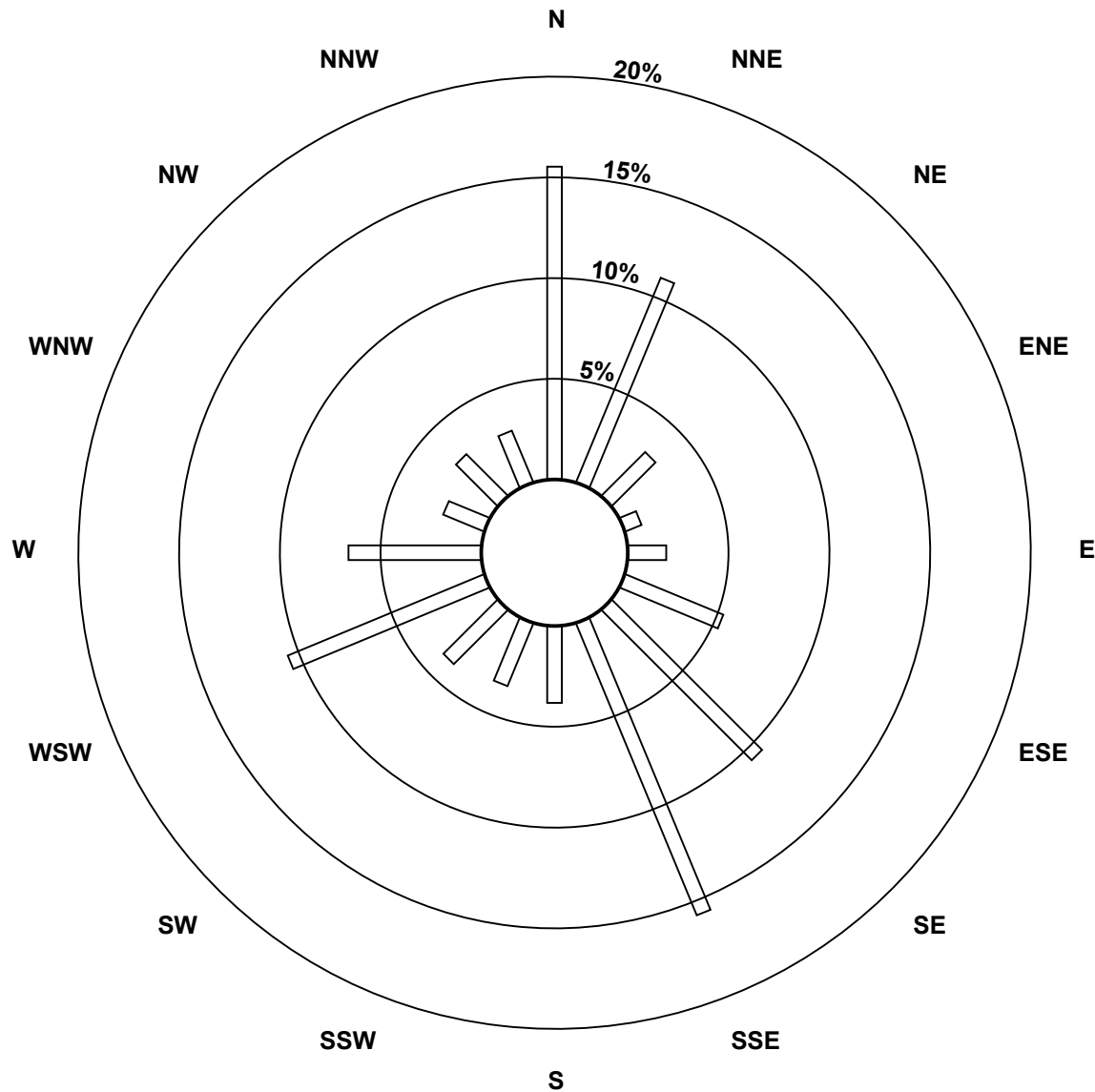
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	106	75	21	6	13	36	72	107	26	23	26	72	45	15	20	19	682
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	106	75	21	6	13	36	72	107	26	23	26	72	45	15	20	19	682

Total Number of Valid Hours: 682

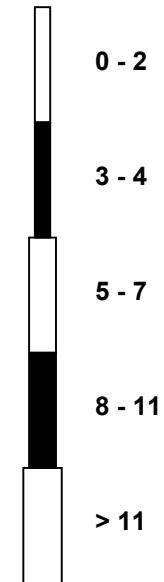
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint (AMS 4)



Classes (ppb)

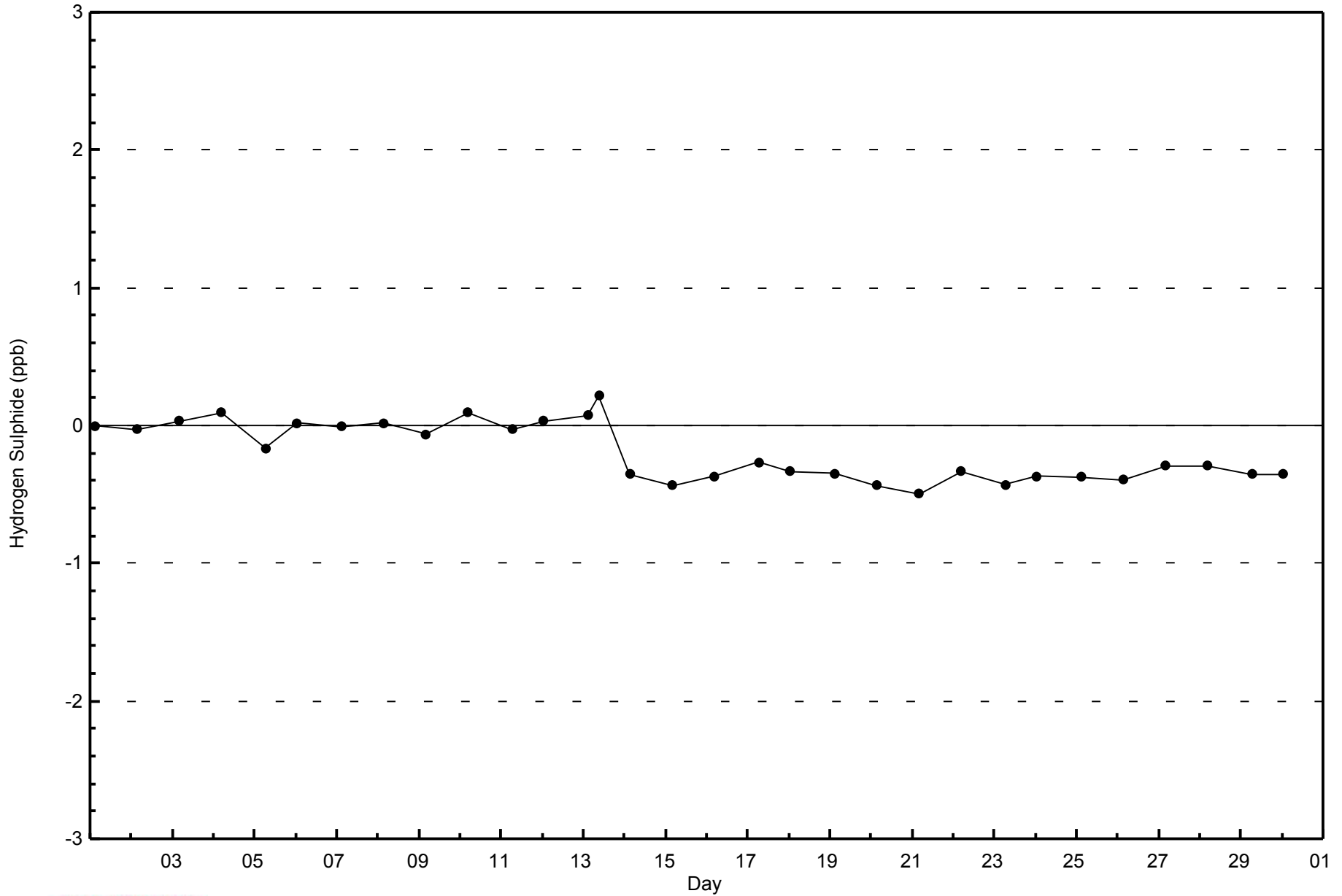


Total Number of Valid Hours: 682



WBEA  
Zero Responses

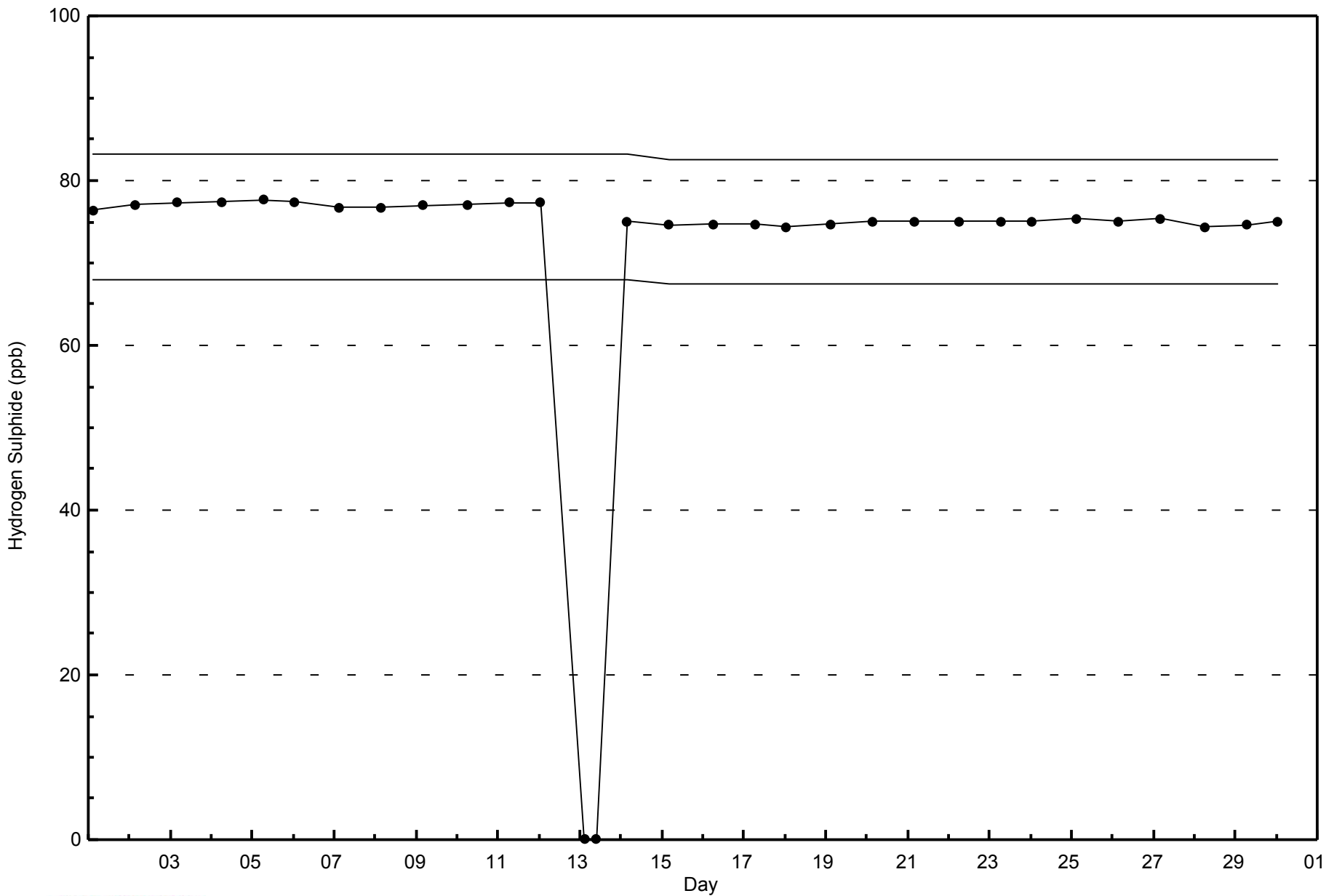
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - April 2015



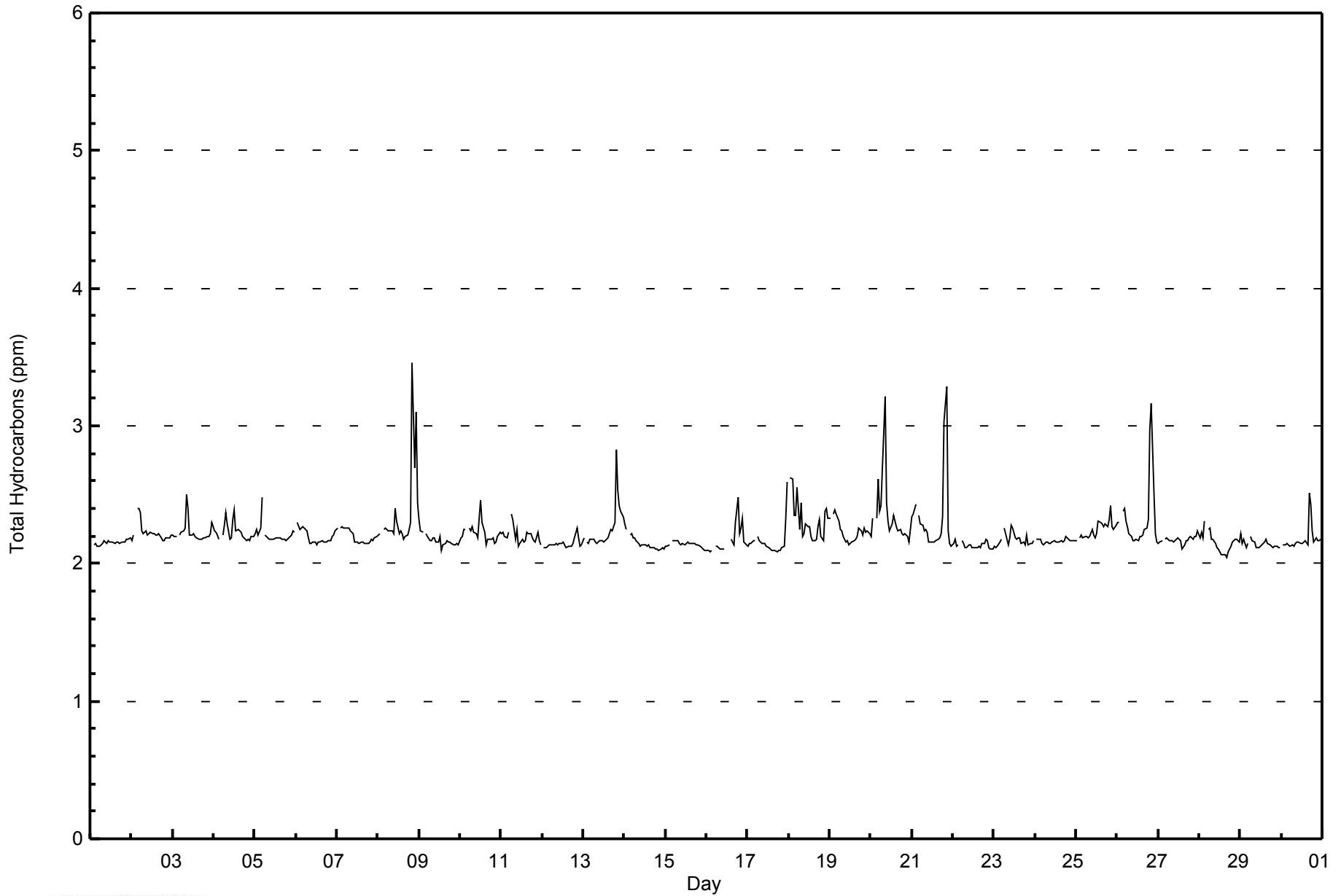






**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	1	0.15	0.15
2.1 - 3.0	681	99.13	99.27
3.1 - 10.0	5	0.73	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 687

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

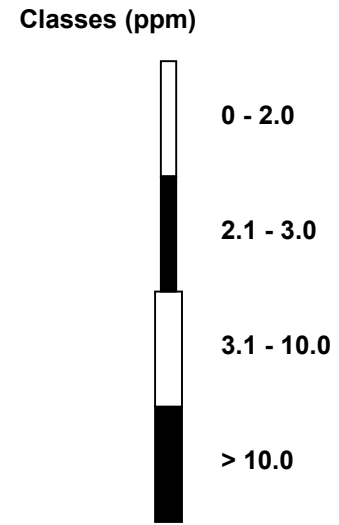
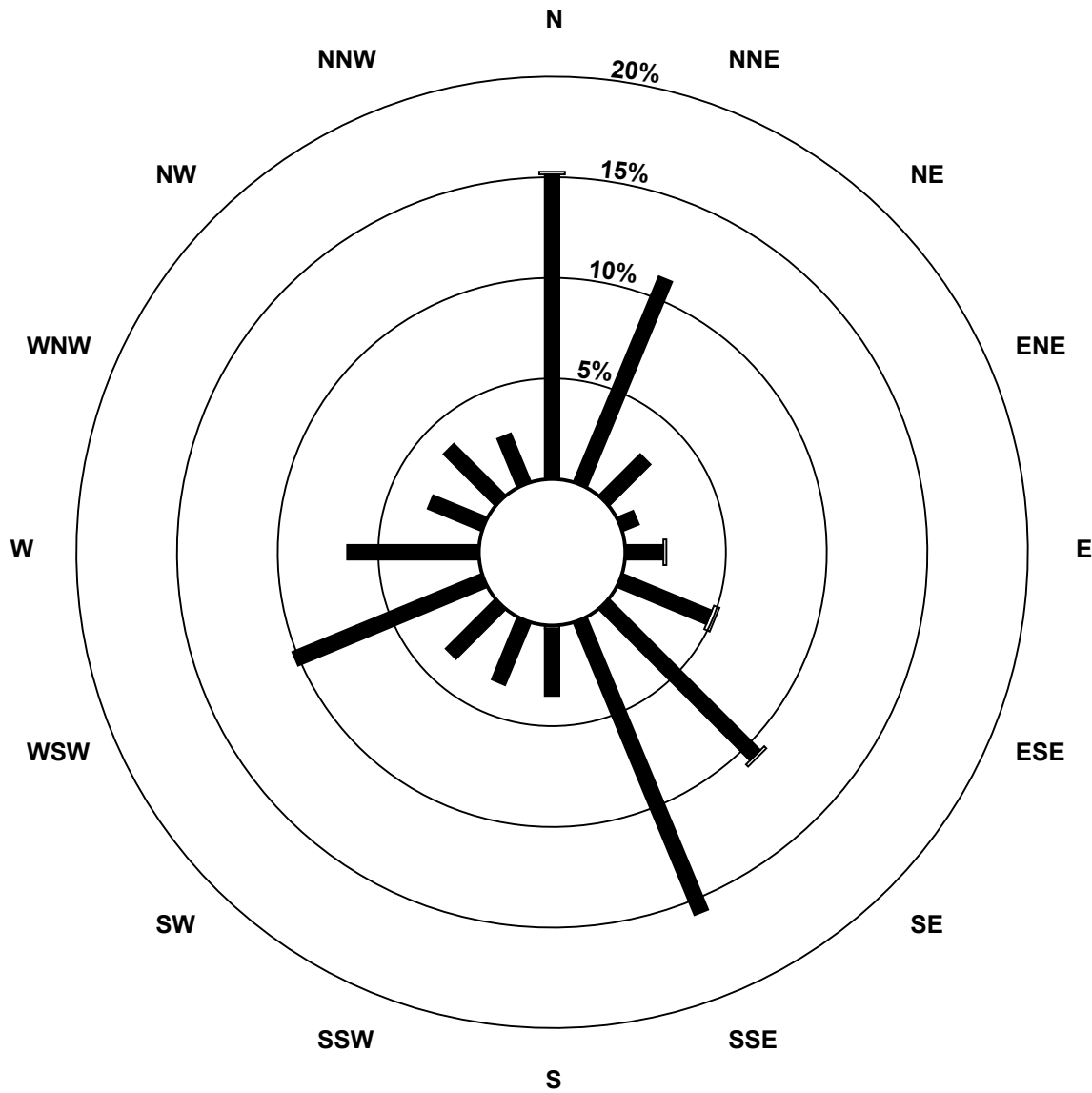
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2.1 - 3.0	104	76	20	6	13	33	73	108	23	23	24	70	45	20	25	18	681
3.1 - 10.0	1	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	105	76	20	6	14	35	74	108	24	23	24	70	45	20	25	18	687

Total Number of Valid Hours: 687

Total Number of Hours: 720

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

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

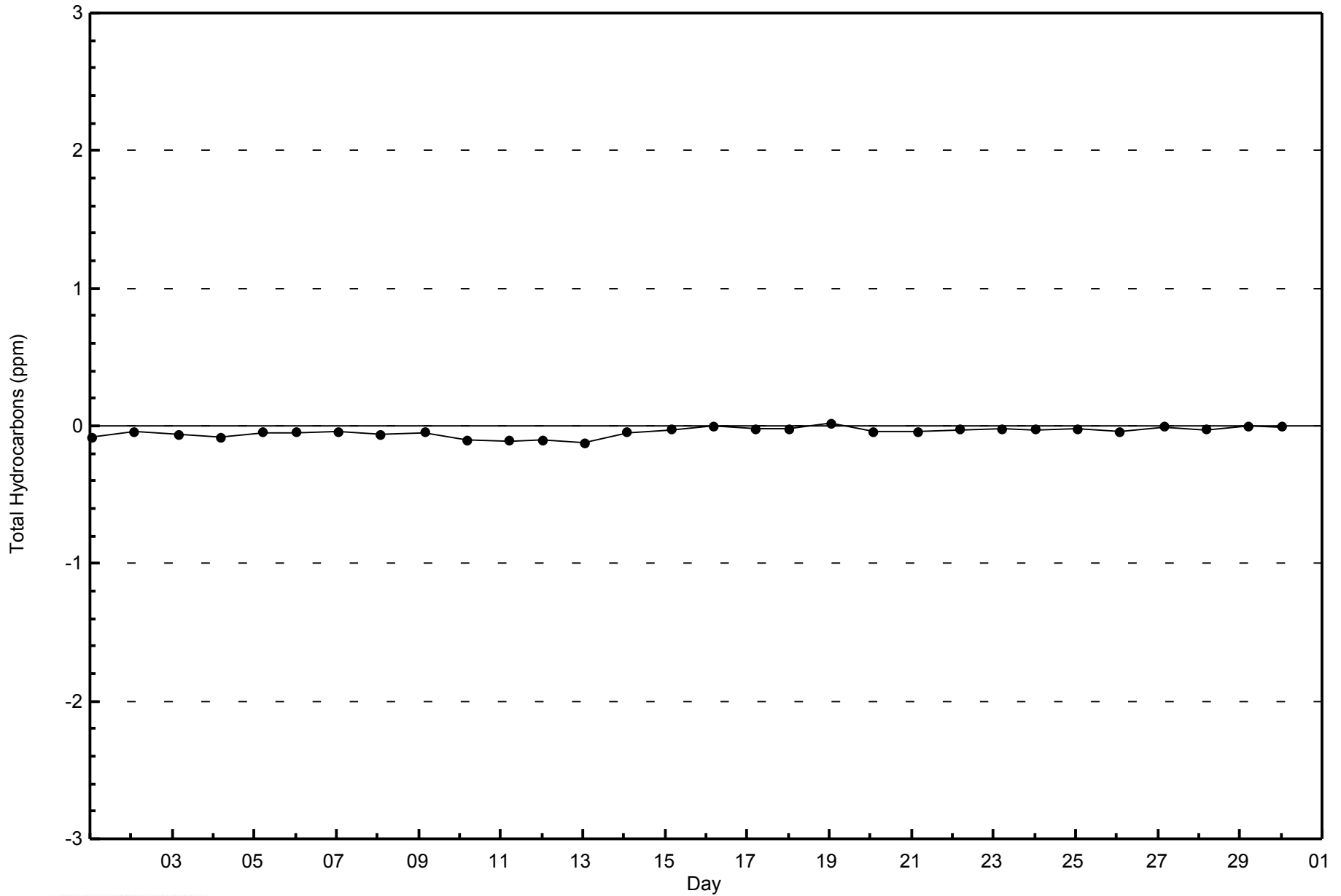


**Total Number of Valid Hours: 687**



WBEA  
Zero Responses

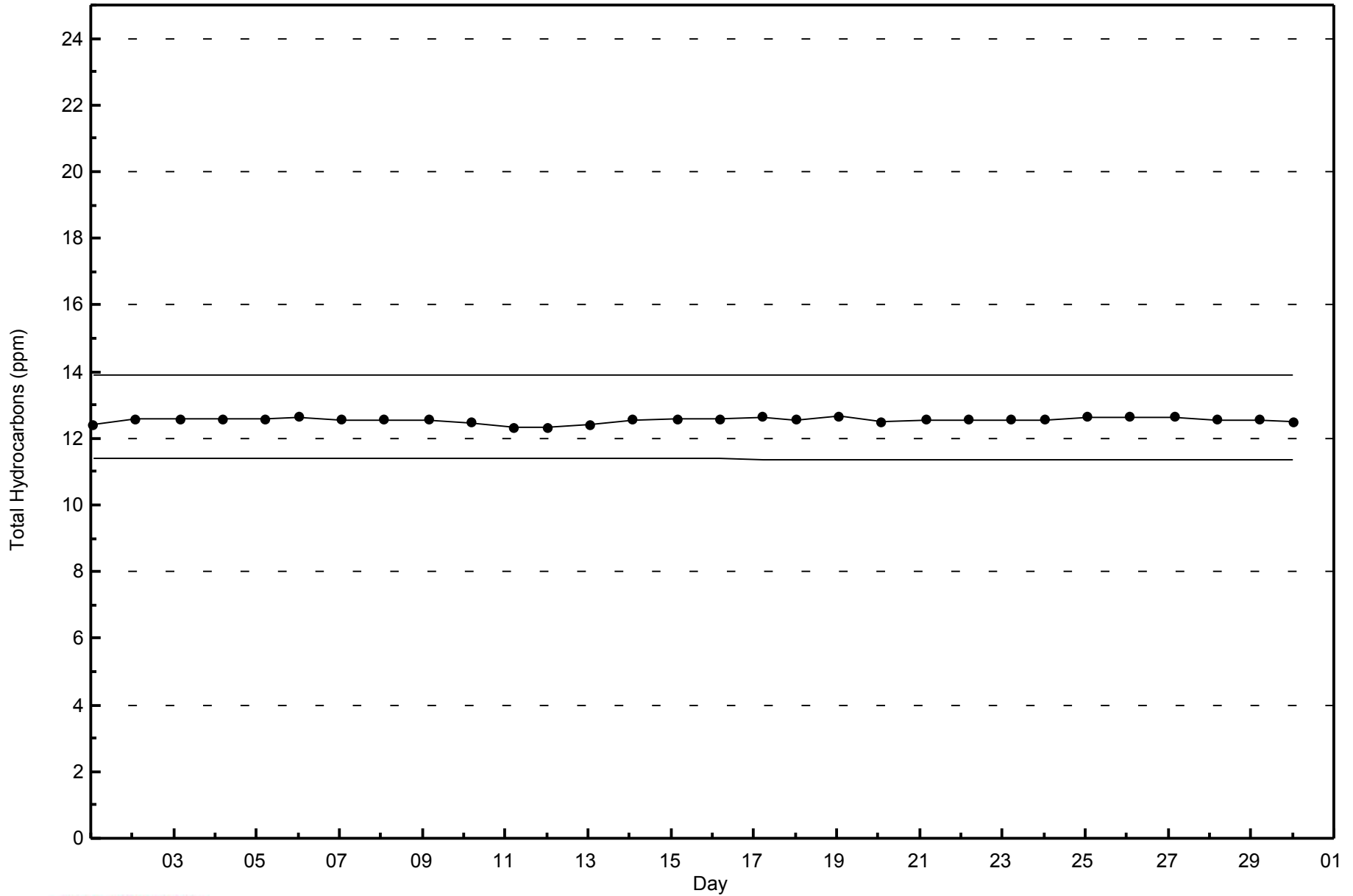
Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - April 2015





**WBEA**  
**Span Responses**

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





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Ambient Temperature (AT) - C**

**Buffalo Viewpoint - April 2015**

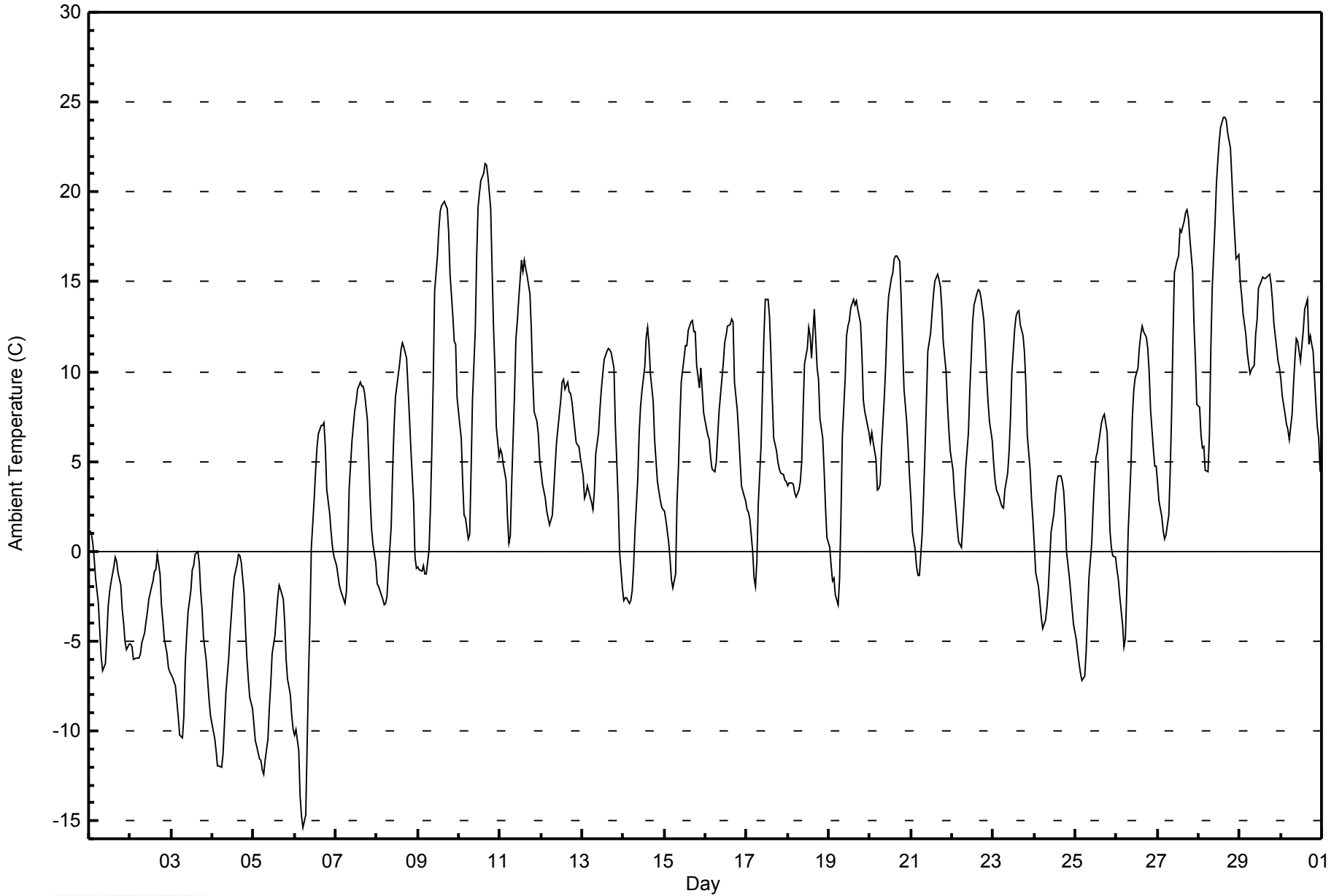
Maximum Value: 24.2 C on Apr 28 16:00		Maximum Daily Average: 15.9 C on Apr 28		Hours in Service: 720																							
Minimum Value: -15.4 C on Apr 6 06:00		Minimum Daily Average: -7.7 C on Apr 5		Hours of Data: 720																							
Maximum Diurnal Average: 11.0 C at hour 16		Minimum Diurnal Average: -1.7 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 4.86 C		Percentiles: P <sub>1</sub> = -12.0 P <sub>10</sub> = -5.4 Q <sub>1</sub> = -0.9 Median = 5.0 Q <sub>3</sub> = 10.8 P <sub>90</sub> = 14.5 P <sub>99</sub> = 22.2		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	1.2	1.0	0.4	-0.4	-1.5	-2.9	-4.5	-5.9	-6.6	-6.3	-4.7	-3.1	-2.3	-1.7	-0.9	-0.3	-0.6	-1.2	-1.9	-3.3	-4.0	-5.0	-5.5	-5.2	-2.7	1.2	
2-Apr	-5.1	-5.3	-6.0	-5.9	-5.9	-5.9	-5.7	-5.1	-4.6	-3.9	-3.4	-2.6	-2.0	-1.6	-1.1	-1.1	-0.1	-1.3	-3.0	-3.8	-4.9	-5.7	-6.5	-6.7	-4.1	-0.1	
3-Apr	-6.9	-7.0	-7.5	-8.3	-9.2	-10.2	-10.4	-9.2	-6.3	-4.7	-3.4	-2.2	-1.0	-0.8	-0.2	0.0	-0.7	-2.2	-3.2	-4.8	-6.1	-7.2	-8.3	-9.1	-5.4	0.0	
4-Apr	-10.0	-10.4	-11.1	-12.0	-11.9	-12.0	-11.2	-9.6	-7.9	-5.9	-4.5	-3.4	-2.3	-1.4	-0.7	-0.2	-0.3	-0.6	-2.3	-4.3	-5.9	-7.1	-8.1	-8.8	-6.3	-0.2	
5-Apr	-9.6	-10.5	-10.9	-11.5	-11.6	-12.2	-12.4	-11.6	-10.5	-8.8	-7.4	-5.7	-4.7	-3.6	-2.6	-1.9	-2.1	-2.6	-4.0	-6.0	-7.1	-8.0	-9.2	-9.9	-7.7	-1.9	
6-Apr	-10.2	-9.9	-11.1	-13.6	-14.7	-15.4	-14.6	-10.8	-6.9	-3.9	0.2	2.9	4.4	5.7	6.5	7.0	7.0	7.1	5.8	3.4	2.2	1.1	0.3	-0.3	-2.4	7.1	
7-Apr	-0.8	-1.4	-1.9	-2.2	-2.5	-2.9	-2.3	0.1	3.5	6.1	7.0	7.9	8.3	9.1	9.4	9.2	9.2	8.8	7.3	5.1	2.9	1.2	0.4	-0.6	3.4	9.4	
8-Apr	-1.8	-2.0	-2.2	-2.7	-3.0	-2.9	-2.5	-1.1	1.4	4.4	6.8	8.5	9.8	10.5	11.2	11.6	11.4	10.8	9.1	7.4	5.7	2.7	-0.3	-0.9	3.8	11.6	
9-Apr	-0.9	-1.0	-1.1	-0.8	-1.2	-1.2	0.1	2.4	5.7	9.5	14.5	16.5	17.9	18.9	19.2	19.5	19.2	19.1	17.8	15.4	13.1	11.7	11.5	8.6	9.8	19.5	
10-Apr	7.0	6.3	3.9	2.0	1.9	0.7	0.9	4.4	8.4	12.3	16.4	19.1	20.0	20.6	21.1	21.6	21.5	20.9	19.1	15.7	12.6	10.3	6.9	5.2	11.6	21.6	
11-Apr	5.7	5.4	4.8	4.0	1.9	0.5	0.8	3.8	8.7	11.8	12.8	14.0	16.2	15.6	16.2	15.8	15.4	14.3	12.4	9.6	7.8	7.2	6.5	5.0	9.0	16.2	
12-Apr	4.5	3.7	2.9	2.3	1.9	1.5	2.0	3.3	4.7	6.1	6.8	8.4	9.4	9.6	9.0	9.4	8.9	8.8	8.3	7.6	6.1	5.9	5.9	5.2	5.9	9.6	
13-Apr	4.2	3.0	3.2	3.7	3.3	2.7	2.3	3.3	5.5	6.6	7.9	9.0	9.9	10.7	11.2	11.3	11.2	11.1	10.2	7.0	4.9	2.9	0.0	-2.0	6.0	11.3	
14-Apr	-2.7	-2.6	-2.6	-2.9	-2.7	-2.2	-0.8	1.2	4.1	6.6	8.1	9.0	10.3	11.9	12.5	11.6	9.9	8.4	6.2	5.0	3.9	2.9	2.5	2.3	4.2	12.5	
15-Apr	2.2	1.8	0.5	-0.4	-1.6	-2.1	-1.3	2.8	4.7	7.3	9.4	10.8	11.4	11.5	12.3	12.8	12.9	12.2	12.2	10.3	9.1	10.2	9.0	7.7	6.9	12.9	
16-Apr	6.8	6.5	6.2	5.2	4.6	4.4	5.0	6.4	7.8	9.6	10.4	11.6	12.0	12.6	12.6	12.9	12.8	9.4	7.9	6.5	5.1	3.6	3.3	2.8	7.7	12.9	
17-Apr	2.3	2.2	1.7	0.0	-1.5	-2.0	-0.5	2.6	5.9	9.0	11.9	14.0	14.0	13.1	11.0	8.5	6.3	5.6	5.0	4.6	4.4	4.3	4.0	3.9	5.4	14.0	
18-Apr	3.7	3.8	3.8	3.7	3.3	3.0	3.4	3.9	5.0	7.9	10.4	11.3	12.5	12.0	10.8	13.5	11.8	10.2	9.6	7.4	6.3	4.5	2.4	0.8	6.9	13.5	
19-Apr	0.2	-0.8	-1.6	-1.5	-2.4	-3.0	-1.6	1.9	6.4	9.6	12.0	12.5	12.9	13.5	14.1	13.7	13.9	13.5	12.7	10.9	8.4	7.7	7.4	6.6	7.0	14.1	
20-Apr	6.0	6.6	6.0	5.1	3.4	3.5	3.7	5.8	8.6	10.5	12.9	14.2	15.2	15.5	16.3	16.5	16.5	16.1	14.0	11.5	9.0	7.1	5.7	4.1	9.7	16.5	
21-Apr	2.8	1.1	0.1	-0.9	-1.3	-1.3	1.0	3.1	5.6	8.3	11.1	12.2	13.2	14.3	15.1	15.4	15.1	14.7	13.6	11.7	10.0	8.3	6.8	5.6	7.7	15.4	
22-Apr	4.5	3.1	2.3	1.3	0.6	0.2	1.5	2.9	4.6	6.6	9.0	10.8	12.8	13.7	14.3	14.6	14.5	14.1	12.8	11.4	9.6	8.3	7.2	6.1	7.8	14.6	
23-Apr	4.9	4.0	3.4	3.0	2.7	2.5	2.4	3.4	4.4	5.6	7.4	9.9	12.3	13.1	13.3	13.4	12.6	12.0	11.1	9.3	6.4	4.6	3.0	1.8	6.9	13.4	
24-Apr	0.3	-1.2	-2.0	-2.8	-3.7	-4.3	-3.8	-3.1	-2.1	-0.5	1.1	2.1	3.1	3.8	4.2	4.2	3.9	3.3	2.0	-0.1	-1.4	-2.3	-3.2	-4.1	-0.3	4.2	
25-Apr	-4.9	-5.6	-6.2	-6.8	-7.2	-7.0	-5.6	-3.5	-1.5	0.4	2.4	4.0	5.2	5.5	6.6	7.2	7.4	7.6	6.6	4.1	1.2	0.2	-0.3	-0.3	0.4	7.6	
26-Apr	-1.0	-1.6	-2.5	-4.1	-5.3	-4.8	-2.2	1.1	4.7	7.4	8.9	9.7	10.2	11.4	12.0	12.5	12.2	11.9	11.3	9.9	7.8	5.7	4.7	4.7	5.2	12.5	
27-Apr	3.8	2.8	1.9	1.1	0.7	0.9	2.0	4.4	7.7	11.9	15.5	16.2	16.4	17.9	17.7	18.4	18.8	19.0	18.5	17.4	15.6	12.6	10.6	8.2	10.8	19.0	
28-Apr	8.0	6.5	5.8	5.8	4.5	4.4	6.4	11.2	14.6	18.3	20.5	21.7	22.8	23.6	24.1	24.2	24.0	23.3	22.5	20.8	19.1	17.7	16.3	16.5	15.9	24.2	
29-Apr	15.1	14.3	13.3	12.0	11.0	10.4	9.9	10.1	10.4	12.1	12.9	14.7	15.0	15.2	15.2	15.2	15.3	15.4	14.8	14.0	12.7	11.3	10.6	10.2	13.0	15.4	
30-Apr	9.6	8.6	7.7	7.1	6.7	6.2	7.6	9.2	10.7	11.8	11.7	10.6	11.4	12.3	13.5	14.0	11.5	12.0	11.5	11.1	8.2	7.0	6.3	4.4	9.6	14.0	
		1.3	0.7	0.0	-0.7	-1.4	-1.7	-1.0	0.9	3.2	5.5	7.5	8.8	9.8	10.4	10.8	11.0	10.6	10.1	8.9	7.2	5.4	4.1	3.0	2.1	Diurnal Average	
		15.1	14.3	13.3	12.0	11.0	10.4	9.9	11.2	14.6	18.3	20.5	21.7	22.8	23.6	24.1	24.2	24.0	23.3	22.5	20.8	19.1	17.7	16.3	16.5	Diurnal Maximum	





**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	210	29.17	29.17
0 - 10	308	42.78	71.94
10 - 20	187	25.97	97.92
> 20	15	2.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

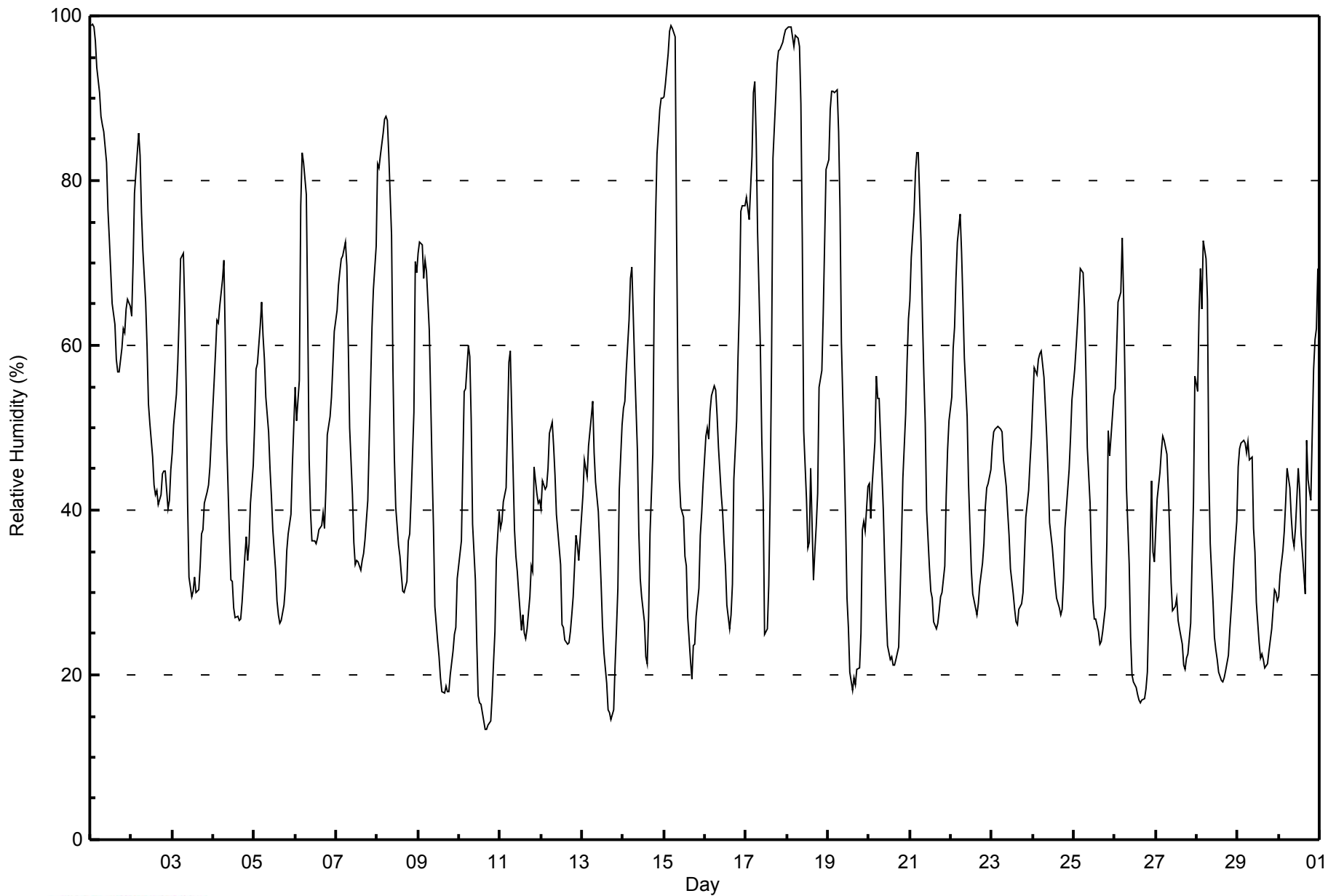


Maximum Value: 99 % on Apr 1 02:00																		Maximum Daily Average: 75.7 % on Apr 1																		Hours in Service: 720													
Minimum Value: 13 % on Apr 10 16:00																		Minimum Daily Average: 31.1 % on Apr 10																		Hours of Data: 720													
Maximum Diurnal Average: 69.2 % at hour 6																		Minimum Diurnal Average: 27.7 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 46.7 %																		Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 24 Q <sub>1</sub> = 30 Median = 43 Q <sub>3</sub> = 59 P <sub>90</sub> = 77 P <sub>99</sub> = 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-Apr	99	99	99	97	94	91	88	87	86	82	76	73	69	65	63	58	57	57	60	62	62	64	66	65	75.7	99																							
2-Apr	64	70	78	83	86	83	76	72	65	60	53	51	46	43	42	42	41	42	44	45	45	40	41	45	56.5	86																							
3-Apr	47	50	54	58	64	71	71	64	55	41	32	30	30	32	30	30	33	37	38	41	42	43	45	49	45.3	71																							
4-Apr	56	59	63	63	65	68	70	60	48	37	32	31	28	27	27	27	29	34	37	34	36	41	45	45	43.5	70																							
5-Apr	50	57	58	62	65	61	58	54	49	45	42	38	33	29	27	26	27	28	31	35	37	39	45	50	43.7	65																							
6-Apr	55	51	56	77	83	82	78	64	46	40	36	36	36	37	38	38	40	38	43	49	51	54	58	62	52.0	83																							
7-Apr	64	67	69	71	71	72	70	60	50	42	36	33	34	34	33	34	35	36	41	48	55	62	67	72	52.4	72																							
8-Apr	82	82	83	86	87	88	87	83	73	57	46	40	36	34	32	30	30	31	36	37	42	52	70	69	58.1	88																							
9-Apr	71	72	72	68	70	69	62	54	45	38	28	24	22	20	18	18	19	18	18	20	23	25	26	32	38.8	72																							
10-Apr	35	36	45	54	55	60	59	51	38	32	24	18	17	16	14	13	13	14	14	17	21	25	34	40	31.1	60																							
11-Apr	38	39	41	43	50	58	59	52	38	34	32	30	25	27	25	24	26	29	33	33	45	42	41	41	37.8	59																							
12-Apr	40	43	43	43	45	49	51	48	44	39	37	33	26	26	24	24	24	25	27	30	37	36	34	37	36.1	51																							
13-Apr	42	46	45	44	48	51	53	47	43	40	36	31	26	23	19	16	15	15	16	21	26	31	43	50	34.4	53																							
14-Apr	52	53	57	63	68	69	64	58	47	37	32	29	26	22	21	27	37	47	66	76	83	89	90	90	54.4	90																							
15-Apr	90	92	95	98	99	99	98	74	55	44	40	39	34	33	27	22	20	23	24	27	31	37	40	43	53.4	99																							
16-Apr	49	50	49	52	54	55	55	52	48	42	40	36	33	29	26	27	31	44	51	59	65	76	77	77	48.9	77																							
17-Apr	78	77	75	83	91	92	85	74	60	49	41	25	26	31	42	58	83	90	94	96	96	97	98	98	72.4	98																							
18-Apr	98	99	99	97	96	98	97	96	89	73	50	41	35	36	45	32	35	38	42	55	57	64	73	81	67.8	99																							
19-Apr	83	89	91	91	91	91	86	77	60	47	39	29	26	20	18	20	19	21	21	25	38	39	37	43	49.9	91																							
20-Apr	43	39	43	48	56	54	54	49	40	34	28	24	22	22	21	21	22	23	30	36	44	52	58	63	38.6	63																							
21-Apr	65	71	76	81	83	83	73	64	57	50	40	33	30	29	26	26	26	28	29	30	33	42	47	51	48.9	83																							
22-Apr	54	60	62	68	72	76	71	65	59	51	43	38	33	30	28	27	29	31	34	36	40	43	43	45	47.4	76																							
23-Apr	48	50	50	50	50	50	50	46	43	40	37	33	30	28	27	26	28	29	30	34	39	42	46	49	39.7	50																							
24-Apr	53	57	56	58	59	59	56	53	49	44	38	35	33	31	29	28	27	28	32	38	43	45	49	53	44.0	59																							
25-Apr	57	60	63	66	69	69	65	57	48	41	34	29	27	27	25	24	24	25	28	36	50	47	49	54	44.7	69																							
26-Apr	55	60	65	66	73	66	55	43	33	25	20	19	19	18	17	17	17	17	18	20	28	44	35	34	35.9	73																							
27-Apr	38	41	45	47	49	48	47	42	37	31	28	28	29	27	26	24	21	21	22	23	26	34	41	56	34.6	56																							
28-Apr	54	64	69	64	73	71	66	45	36	29	25	23	22	20	19	19	20	21	22	25	28	31	34	39	38.2	73																							
29-Apr	45	47	48	49	48	47	48	46	46	38	35	29	24	22	23	22	21	21	23	24	26	30	30	29	34.2	49																							
30-Apr	29	32	35	38	41	45	43	39	37	36	38	45	42	37	35	30	48	44	42	41	57	61	62	69	42.8	69																							
																								57.8	60.4	62.8	65.6	68.5	69.2	66.4	59.1	50.8	43.2	37.3	33.5	30.7	29.1	28.2	27.7	29.8	31.7	34.8	38.5	43.4	47.3	50.6	54.4	Diurnal Average	
																								99	99	99	98	99	99	98	96	89	82	76	73	69	65	63	58	83	90	94	96	96	97	98	98	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Buffalo Viewpoint - April 2015**





Maximum Speed: 38 km/h on Apr 1 07:00	Maximum Daily Speed Average: 25.4 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 2 km/h on Apr 17 22:00	Minimum Daily Speed Average: 2.9 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 4.8 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 1.1 km/h 305.8 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 12 Q <sub>3</sub> = 17 P <sub>90</sub> = 21 P <sub>99</sub> = 32	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	N23	N24	N29	N31	N31	N37	NNE38	N34	N34	N32	N27	N29	N30	N29	N30	N26	N27	N23	N19	NNE18	NNE14	NNE10	NNE9	NNE8	N25.4	NNE38
2-Apr	N8	N10	NNW4	NW6	NW6	NNW6	N8	N7	NNE9	N13	N15	N15	N12	N11	N14	N11	NNE11	NNE12	NE13	NNE16	NNE14	NE14	NE11	NNE7	N9.9	NNE16
3-Apr	NE7	NNE7	NNE8	NNE8	NNE7	NNE7	NNE8	NNE6	N5	N8	N8	N9	N11	N16	N12	N12	NNE15	NNE16	NNE17	NNE17	NNE17	NE13	NE11	NE9	NNE10.2	NNE17
4-Apr	NE7	NE7	NNE9	NNE7	NNE5	NNE6	NNE7	NE6	NNE6	NNE8	N6	NNW6	NNW10	N12	N8	N6	N7	NNE9	NNE17	NNE19	NNE18	NNE13	NNE11	N12	NNE8.8	NNE19
5-Apr	NNE10	N6	N6	N5	N8	N14	NNE15	N14	N14	N12	NNE9	N9	NNE9	N8	NNE8	NNE9	NNE10	NNE12	NNE14	NNE14	NNE14	NE9	NE9	NNE10.3	NNE15	
6-Apr	NE6	ESE5	SE6	S4	SW3	S4	SSE5	S5	SSE7	SSE8	SE7	SSE10	S12	S9	S9	SSE9	SSE13	SSE12	SE11	SSE10	SSE11	SSE11	SSE11	SSE12	SSE7.8	SSE13
7-Apr	SSE12	SSE12	SSE12	SSE12	SSE12	SSE11	SSE12	SSE11	SSE10	S12	S16	S17	S17	S15	SSW15	SSW12	SW13	SSW12	SW12	SSW8	SSE9	SSE11	SSE12	SSE10	S11.4	S17
8-Apr	SE11	SE12	SE10	SE7	SE7	SSE8	SSE9	SSE7	SSE5	W9	NW8	N9	N15	N15	N14	N9	NNE6	NE7	NE7	E8	ESE6	SSE7	SE9	SSE9	E2.9	N15
9-Apr	SE9	SE11	SE10	SE9	SE10	SE13	SSE17	SSE17	SE14	SE13	S12	SSW14	SW13	SW16	WSW19	WSW19	W17	WSW14	SW11	SSW10	S9	SSW9	SW10	SSW10	S9.4	WSW19
10-Apr	SSE8	SE9	SSE10	SE10	ESE10	SE10	SE7	SE7	SE9	SE10	SE8	NNW3	NE8	NNE11	SW3	S6	S9	SSE13	SSE9	SSE10	SSE8	SSE9	SE10	SE10	SE7.0	SSE13
11-Apr	SSE12	SSE12	SSE8	SE8	SSE7	SSE8	SE9	S7	WSW10	W10	WSW16	W12	W15	WSW18	W18	WNN16	W15	W19	WSW28	WSW36	WSW27	WNN14	W9	WSW12	WSW10.5	WSW36
12-Apr	WSW18	WSW20	WSW20	WSW19	WSW19	WSW20	WSW20	WSW22	WSW19	WSW18	SW19	WSW20	W28	WSW27	WSW24	WSW28	W30	W26	W22	WNN17	NW14	WSW10	WSW14	SW15	WSW19.7	W30
13-Apr	W13	SW5	WSW14	W22	WNN19	W14	WSW15	W16	WNN21	NW32	NW33	NW30	NNW29	NNW25	NNW24	NNW23	NW19	NW18	NW12	NNW5	SSE3	SSE5	SSE6	SSE7	NNW14.5	NW33
14-Apr	SSE7	SSE9	SSE9	SSE9	SSE11	SE11	SSE8	SE5	SE10	SE12	SE13	SE12	SE13	SSE12	S10	SSE17	SE18	SE19	SE16	SE16	SE15	SSE14	SSE17	SSE13	SSE12.1	SE19
15-Apr	SSE11	SSE9	SSE8	S8	SSE7	SSE8	SSE6	WSW8	WSW14	WSW16	W14	W19	W17	WNN17	W16	WSW20	WSW19	WSW17	WSW12	S6	SW11	W21	WSW13	SW14	WSW10.0	W21
16-Apr	WSW15	SW17	WSW23	WSW19	WSW19	SW15	WSW16	W12	WSW9	SSW9	SW13	SW18	WSW20	WSW24	WSW28	WSW25	WSW23	NNW30	NW22	WNN19	WNN13	WNN9	W8	W11	W15.1	NNW30
17-Apr	W14	W11	WSW5	SSE5	SSE8	SE8	SSE7	SE7	SE9	SE9	ESE11	SSW15	SSW15	SSW17	SSW20	SSW19	SSE8	SSE10	SE10	SE6	ESE3	ESE2	N4	NNW6	S6.1	SSW20
18-Apr	NW11	NW13	NW17	NW21	NNW24	NNW25	NNW34	NW18	NW18	NW22	NNW26	NNW24	NNW25	N18	NNE14	NNE16	NNE20	NW16	NNW14	NNE8	W4	SW3	SW4	SSE5	NNW14.7	NNW34
19-Apr	SSW5	S5	SE7	SE7	SSW9	SE10	SSE9	SSE7	SE6	SE7	ESE4	SSW4	WSW7	WSW12	W13	WNN10	WSW6	NW5	SE3	SE6	SE8	SSE8	SSE8	SE10	S4.4	W13
20-Apr	SE5	WNN7	WSW6	WNN9	WNN8	WSW5	W3	WNN5	N6	N6	N5	NW5	NNW4	WNN6	NE7	NE7	NNE6	N10	NNE17	NNE17	NNE17	N16	NNE15	N12	N6.3	NNE17
21-Apr	N11	N11	N11	N10	N10	N11	N12	N14	N12	N13	N16	N20	N18	N16	N17	N16	NNE18	N19	NE13	E14	E13	ESE17	SE16	SE13	NNE10.4	N20
22-Apr	ESE13	SE7	SE9	SE10	SE9	SE10	ESE13	ESE17	ESE17	ESE15	ESE16	ESE18	ESE19	SE20	SE20	SE21	ESE21	ESE18	ESE18	ESE16	ESE18	SE20	SE18	SE15	ESE15.7	SE21
23-Apr	ESE10	ESE10	ESE12	ESE13	ESE14	ESE12	E12	ESE13	ESE15	ESE12	ESE11	E14	ENE14	E16	E19	E18	SE17	ESE16	ESE14	ENE15	ENE20	ENE16	NE13	NNE15	E12.7	ENE20
24-Apr	NNE17	NNE20	NNE21	NNE21	NNE21	NNE21	NNE19	NNE20	N22	N23	N24	N25	N23	N23	N25	N28	N29	N29	N31	N30	N30	NNE27	N21	NNE19	N23.6	N31
25-Apr	NNE17	NNE17	NNE17	NNE16	N16	NNE14	N14	N10	N9	N11	N9	NNW9	NW10	WNN10	NW10	NW9	NW12	NNW14	N15	N14	N12	N11	N10	NNE10	N11.4	NNE17
26-Apr	NNE6	NNE5	SSE5	SSE6	SSE8	SSE8	SSE7	SSE9	SE7	SE8	ESE8	ESE10	E9	ENE7	ENE11	NE7	E7	E8	E8	E9	ESE8	SE9	SE9	SSE12	ESE6.3	SSE12
27-Apr	SSE13	SSE14	SSE12	SSE10	SSE10	SSE7	SSE11	SSE13	SSE14	SSE14	S15	SSW16	SW13	SSW20	SW17	SW20	WSW18	WSW20	SW16	WSW13	SSW9	S9	S10	SSE10	SSW11.0	SW20
28-Apr	SE10	SE10	SE8	E4	SE8	SE6	SSE7	SSE9	SE9	SSE9	SSE14	SE15	SSE17	SSE18	SSE17	S19	S20	S19	SSE15	SSE14	SSE13	SSE12	SSE10	WSW20	SSE11.3	WSW20
29-Apr	W14	W16	WSW11	W9	W10	W18	W13	W17	W12	WSW11	W12	W14	W19	W17	W16	W12	WSW11	WSW13	SW10	SW10	SW11	SSW11	SSW14	SW16	WSW12.6	W19
30-Apr	WSW18	WSW20	WSW22	WSW19	WSW20	WSW17	WSW16	WSW18	WSW16	WSW19	WSW24	WSW23	SW19	WSW20	W15	WSW15	NW17	NNW18	W3	SSE5	SSE7	SE3	SSE8	S8	WSW12.8	WSW24

S0.3SSW0.6SSW0.8	W0.8WNN0.5	NE0.3	NE0.8	W0.4	NW1.0	NW1.8	WNN1.8	WNN3.3	NNW4.5	NNW4.8	W4.2	WNN3.2	NW3.6	N2.3	NE2.3	ENE2.5	E2.1	SE2.7	SSE2.4	Diurnal Average				
N23	N24	N29	N31	N31	N37	NNE38	N34	N34	NW32	NW33	NW30	N30	N29	N30	WSW28	W30	NNW30	N31	WSW36	N30	NNE27	N21	WSW20	Diurnal Maximum

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

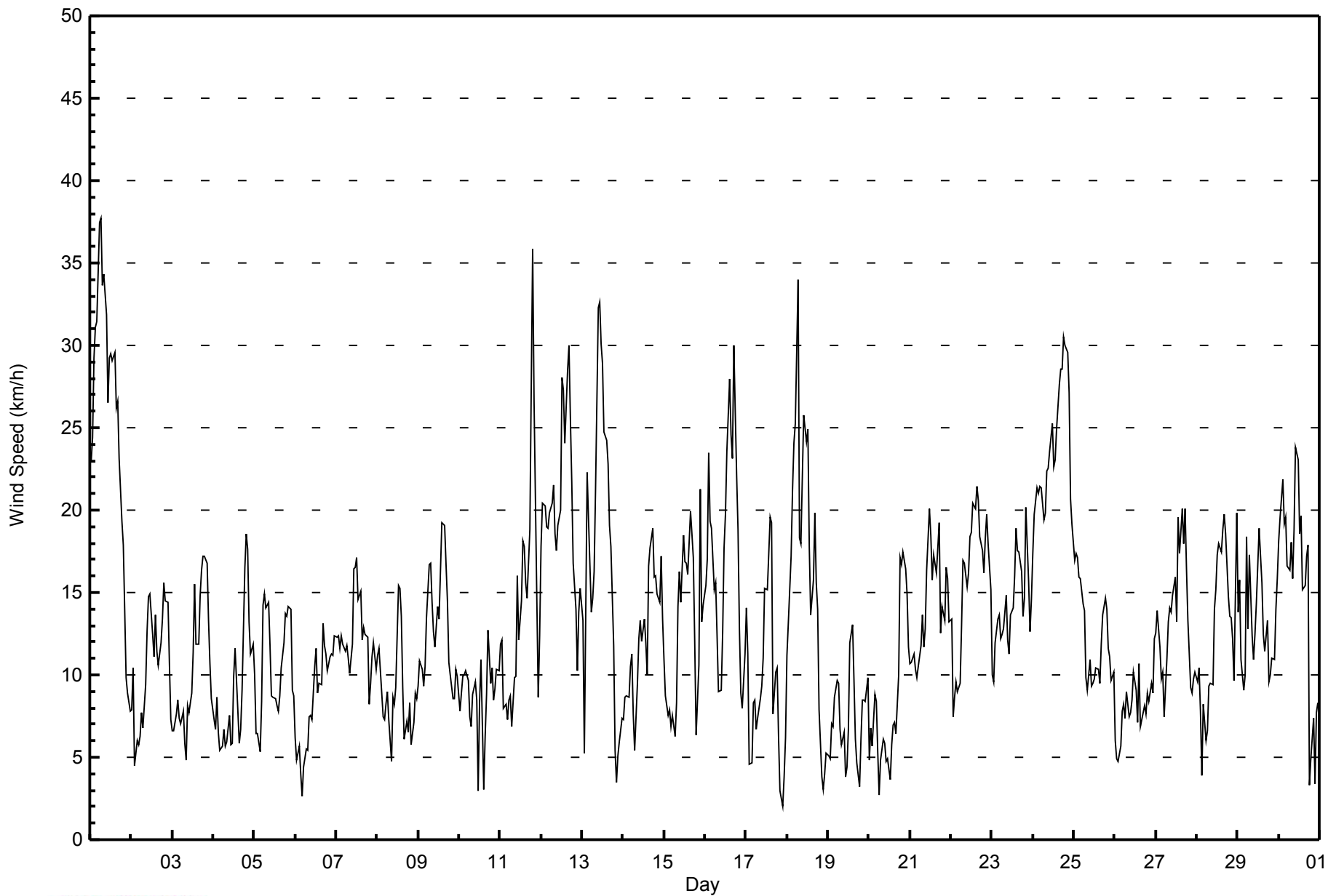


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Apr 18 15:00 Minimum Value: 1 km/h on Apr 8 22:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 8																	Hours in Service: 720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



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	46	6.39	6.39
6 - 11	287	39.86	46.25
12 - 19	285	39.58	85.83
20 - 28	77	10.69	96.53
29 - 38	25	3.47	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

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

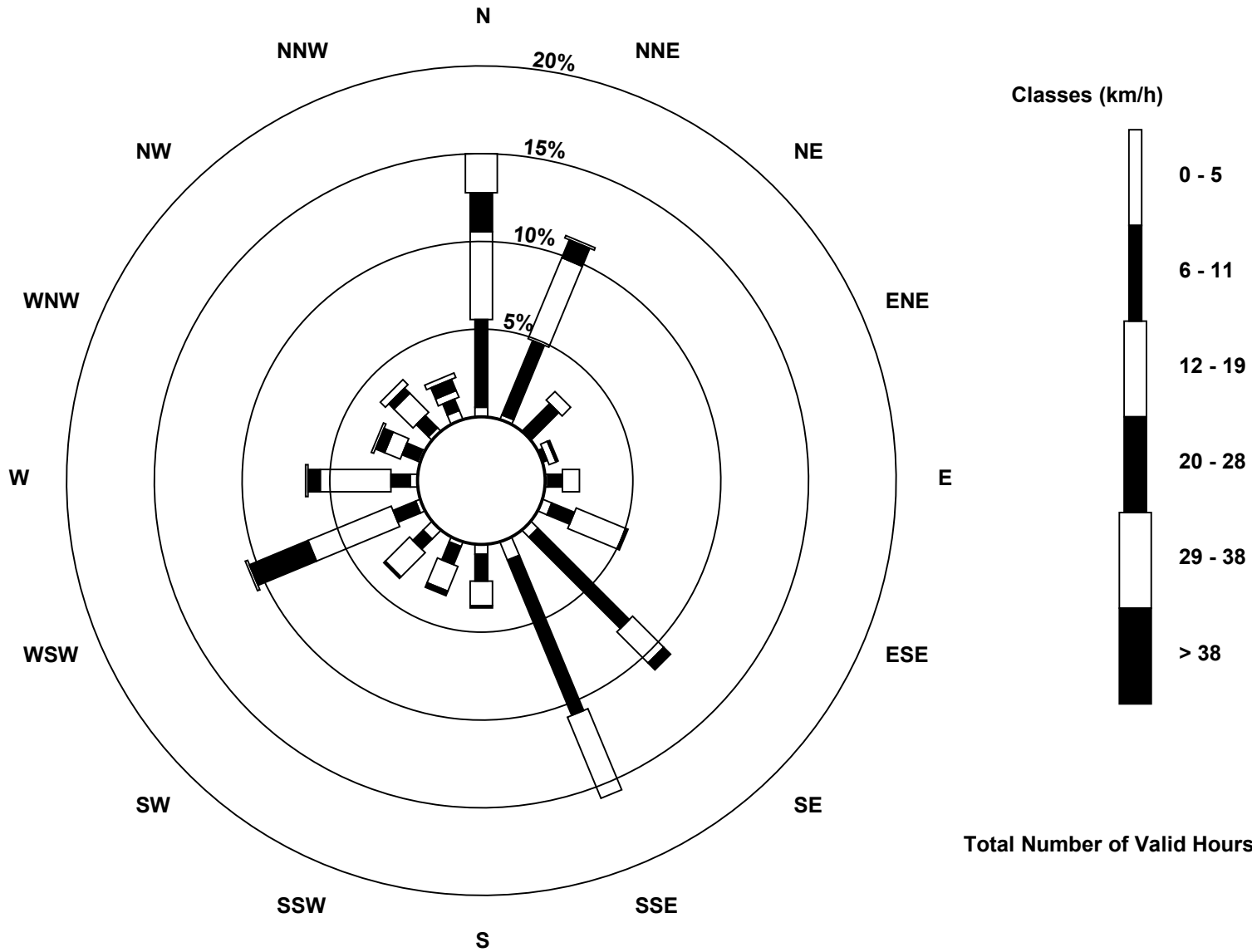
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	2	0	0	1	4	4	8	4	2	5	2	3	1	2	4	46
6 - 11	36	33	16	2	6	10	53	69	11	8	6	10	8	7	7	5	287
12 - 19	36	36	5	3	7	22	18	36	10	11	14	37	29	7	11	3	285
20 - 28	16	8	0	1	0	1	4	0	1	2	1	26	5	4	3	5	77
29 - 38	16	1	0	0	0	0	0	0	0	0	0	1	1	1	3	2	25
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	108	80	21	6	14	37	79	113	26	23	26	76	46	20	26	19	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Buffalo Viewpoint - April 2015**

Direction of Maximum Speed: 12 deg on Apr 1 07:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 6.5 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 103 deg on Apr 17 22:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.9 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 238.0 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-Apr	6	5	7	8	9	11	12	4	0	3	5	3	4	4	3	359	4	6	8	14	22	14	15	12	6.5
2-Apr	3	8	338	304	304	332	359	9	15	6	10	356	353	6	358	357	13	33	34	22	33	35	34	24	9.6
3-Apr	35	29	25	27	24	13	20	12	2	0	360	356	360	4	9	4	16	18	28	24	28	37	46	53	19.2
4-Apr	39	40	33	25	27	12	29	42	15	26	11	329	345	8	355	10	11	21	27	20	26	22	12	10	18.0
5-Apr	12	4	7	357	360	10	12	10	1	2	13	1	17	4	15	16	15	24	23	23	29	28	34	42	15.0
6-Apr	42	104	130	175	214	183	150	170	150	152	132	149	173	187	173	164	166	164	141	150	158	157	154	151	155.8
7-Apr	150	147	147	149	152	150	150	152	157	179	184	181	178	186	196	201	216	211	214	193	154	152	151	149	171.9
8-Apr	136	143	144	142	145	155	151	149	164	273	313	356	6	4	3	4	32	40	55	84	123	160	142	149	93.2
9-Apr	141	139	139	145	140	141	149	150	145	138	180	211	214	233	249	243	259	237	226	196	190	206	217	202	191.0
10-Apr	161	133	149	138	123	141	143	139	135	133	134	346	44	20	230	179	175	166	155	154	149	154	141	143	141.8
11-Apr	157	152	154	145	149	150	145	171	256	264	246	261	278	258	261	282	265	263	254	254	258	297	260	239	245.7
12-Apr	247	248	247	242	243	246	244	247	257	246	232	242	261	255	257	254	264	265	270	285	313	244	242	233	253.6
13-Apr	280	227	238	261	282	271	258	271	297	306	307	306	301	300	303	300	306	316	321	340	161	155	161	165	290.9
14-Apr	164	166	162	162	149	146	158	132	144	125	136	137	145	149	174	167	146	139	145	144	143	148	150	155	148.6
15-Apr	154	161	162	174	149	150	157	258	258	254	262	277	265	285	267	254	254	258	242	184	226	270	237	231	243.4
16-Apr	240	232	248	249	248	236	251	269	251	206	224	224	255	256	258	253	244	336	319	287	285	284	264	267	259.2
17-Apr	273	264	240	154	151	145	155	134	125	124	122	199	197	208	211	198	157	147	135	124	112	103	6	329	178.7
18-Apr	319	314	315	322	332	340	347	320	307	313	331	341	341	360	26	15	12	305	344	15	267	236	236	168	334.8
19-Apr	193	182	142	142	193	145	150	151	138	126	121	193	257	254	262	287	255	304	143	142	143	152	148	146	177.3
20-Apr	130	289	258	294	298	257	270	295	359	1	360	326	339	300	48	43	28	10	18	19	15	11	16	5	357.4
21-Apr	354	349	3	359	357	359	356	357	354	356	10	6	355	5	1	10	12	7	39	90	92	118	127	127	18.6
22-Apr	123	135	132	126	128	126	123	122	121	110	112	119	115	130	130	129	123	121	122	111	119	126	128	127	122.7
23-Apr	121	118	113	112	105	104	98	110	117	111	106	97	77	85	95	101	128	120	120	65	62	60	44	23	95.2
24-Apr	17	13	14	12	16	17	18	16	9	6	4	2	2	6	6	7	9	6	5	6	10	13	11	13	9.4
25-Apr	16	16	16	13	11	19	10	9	1	359	356	335	318	299	308	312	325	346	352	353	357	353	1	29	356.4
26-Apr	21	22	158	166	168	151	153	151	137	125	107	106	86	77	67	49	86	94	89	89	114	131	144	150	113.5
27-Apr	156	157	152	150	158	161	149	152	151	155	181	197	220	205	224	231	246	242	233	244	207	181	181	157	192.6
28-Apr	146	136	137	88	135	139	147	151	137	155	148	141	162	165	168	170	169	171	161	152	155	160	162	256	159.4
29-Apr	263	262	258	266	269	261	269	265	267	252	266	263	261	259	273	267	252	250	218	220	226	209	213	228	253.2
30-Apr	242	243	245	243	242	247	238	250	255	257	246	241	236	256	272	258	325	332	277	164	158	139	165	169	248.4

172.1 201.0 208.0 267.6 281.8 51.2 51.1 277.0 324.4 322.8 302.9 292.1 298.0 290.5 289.5 280.5 300.4 324.3 357.8 34.6 69.1 94.9 133.3 161.5

Diurnal Average

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

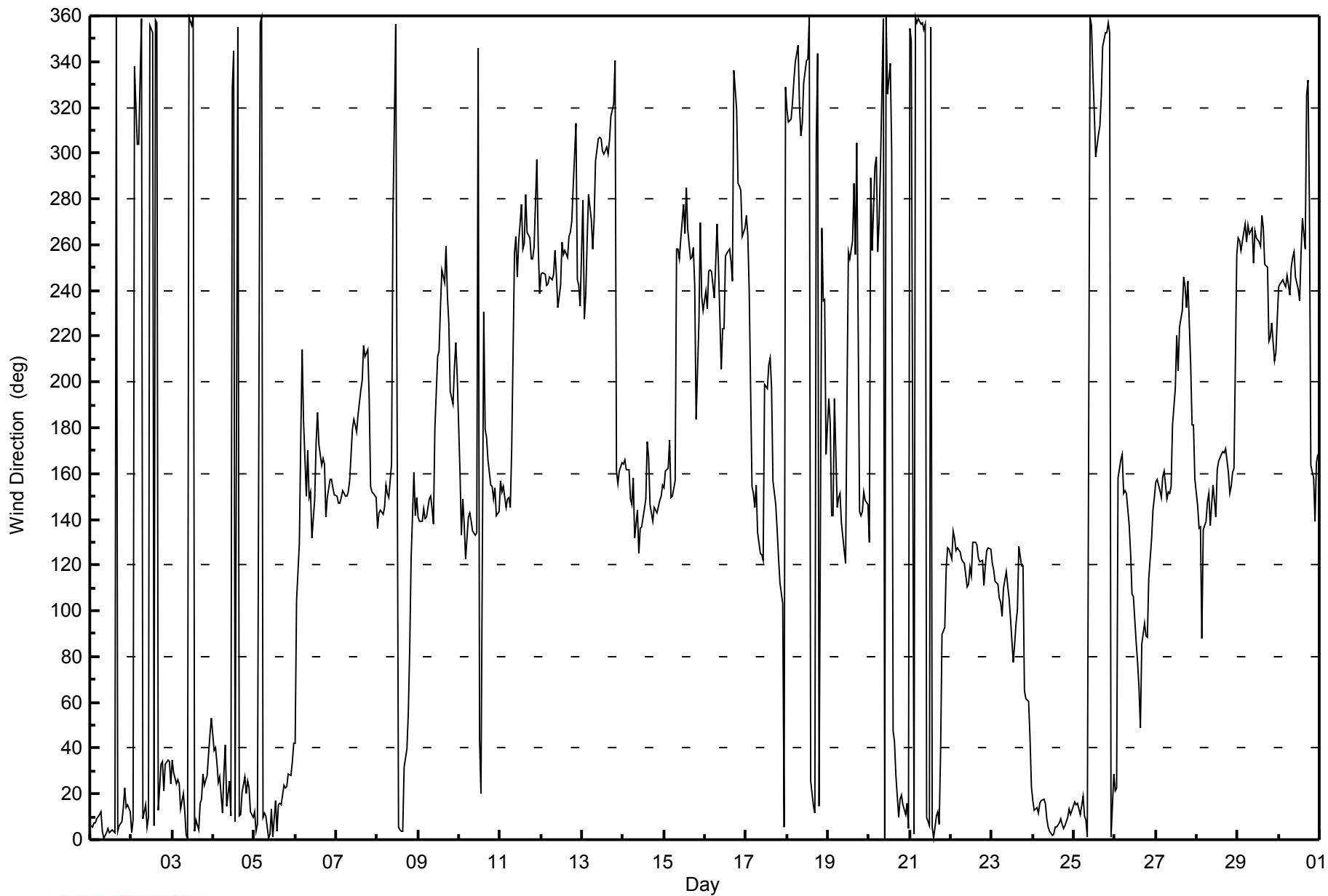


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 87 deg on Apr 10 12:00 Minimum Value: 0 deg on Apr 15 06:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 11 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 21 P <sub>90</sub> = 31 P <sub>99</sub> = 69																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0										
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	13	14	14	15	15	15	15	17	19	17	16	17	17	16	19	18	17	15	14	14	14	12	13	13	19		
2-Apr	13	13	29	12	15	28	13	16	17	15	17	16	18	20	16	17	26	17	14	13	13	14	15	15	29		
3-Apr	14	16	11	12	8	7	15	16	24	19	24	21	25	17	20	20	17	14	14	13	14	14	13	24	25		
4-Apr	18	12	8	15	37	10	15	15	26	23	49	56	33	22	34	41	29	20	14	14	14	14	13	9	56		
5-Apr	9	13	13	16	20	13	15	14	14	18	30	36	30	33	35	31	22	16	14	12	12	10	9	8	36		
6-Apr	5	27	11	20	19	14	14	24	22	27	37	37	27	38	34	30	21	20	17	13	12	11	11	11	38		
7-Apr	11	10	11	12	12	11	12	16	20	22	21	24	26	27	23	19	21	16	20	19	9	10	10	10	27		
8-Apr	6	8	11	14	9	14	15	15	41	34	31	17	18	17	17	22	35	16	13	10	22	9	5	7	41		
9-Apr	10	9	10	11	9	10	13	13	15	19	30	17	21	24	20	17	16	17	16	13	14	20	17	20	30		
10-Apr	19	8	11	10	5	9	8	16	14	14	20	87	25	18	85	62	27	20	14	13	15	15	9	8	87		
11-Apr	9	8	8	10	25	14	13	22	23	23	16	20	25	17	17	18	17	14	13	11	17	28	18	14	28		
12-Apr	11	11	11	14	14	13	14	16	19	21	20	22	17	16	16	16	16	18	17	22	11	22	15	14	22		
13-Apr	29	51	14	15	17	16	13	17	15	15	14	14	15	17	15	14	17	14	12	41	63	35	22	16	63		
14-Apr	12	9	8	11	12	14	19	33	24	19	19	20	20	24	28	23	25	21	18	17	16	16	17	17	33		
15-Apr	19	16	17	17	2	0	21	34	16	17	23	19	22	20	26	19	20	13	16	27	30	16	15	13	34		
16-Apr	13	15	12	12	13	16	17	21	32	22	19	18	16	17	14	16	17	28	19	18	12	24	16	15	32		
17-Apr	14	20	44	56	9	10	17	16	18	22	20	23	20	17	23	19	24	17	16	20	54	84	22	31	84		
18-Apr	11	10	10	12	14	12	16	14	12	15	15	17	18	37	25	23	18	23	34	37	42	49	38	23	49		
19-Apr	32	25	18	17	10	11	7	16	22	31	69	78	66	31	24	23	40	48	54	9	8	8	11	6	78		
20-Apr	70	21	30	17	13	8	31	21	20	24	39	57	83	55	42	37	37	17	13	12	11	11	11	12	83		
21-Apr	9	13	9	8	8	9	11	14	18	15	22	18	15	19	17	19	17	15	40	14	16	17	17	17	40		
22-Apr	17	20	16	16	17	17	18	17	19	21	22	23	20	19	21	19	17	17	16	16	17	16	17	18	23		
23-Apr	18	15	16	16	17	16	17	22	19	23	23	28	28	27	21	20	18	17	18	19	17	18	18	17	28		
24-Apr	12	12	13	13	12	13	14	15	16	18	18	17	18	19	19	18	17	17	17	16	14	14	13	13	19		
25-Apr	12	11	11	10	11	11	13	18	21	18	28	33	29	26	31	37	23	17	16	12	10	11	15	12	37		
26-Apr	18	21	28	15	15	9	13	18	25	36	40	40	47	56	36	64	44	30	20	11	12	8	14	14	64		
27-Apr	13	13	14	14	15	18	16	18	18	21	24	21	24	20	24	18	18	17	16	14	17	14	10	16	24		
28-Apr	16	7	8	35	11	11	16	19	22	25	22	22	22	21	24	20	20	18	17	15	13	14	19	17	35		
29-Apr	13	15	15	13	14	15	16	16	19	24	18	18	18	17	18	18	17	14	20	24	12	10	9	14	24		
30-Apr	13	13	12	13	13	13	15	16	18	20	17	17	21	19	22	27	41	18	65	18	20	64	36	18	65		
																	70 51 44 56 37 28 31 34 41 36 69 87 83 56 85 64 44 48 65 41 63 84 38 31										
Diurnal Maximum																											



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Buffalo Viewpoint - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 16, 2015	Last Calibration	March 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	13:58
Gas Cert Reference	LL107926	Station temp.	22 Deg C
Cal Gas Concentration	51 ppm	Cal Gas Exp Date	5/29/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2636

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-593	-592
Analyzer IP address	192.168.1.43		Lamp voltage	841	839
Calculated slope	0.996193	0.995400	Chamber temp	45.2	45.0
Calculated intercept	-0.457976	0.211577	Pressure	705.4	690.1
Analyzer Background	9.2	10.1	Flow	0.504	0.489
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	0.6	----
as found span	5000	58.8	599.8	601.3	0.997
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	58.8	599.8	602.0	0.996
second point	5000	29.4	299.9	302.2	0.992
third point	5000	14.7	149.9	149.7	1.002
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	58.8	599.8	600.2	0.999
Average Correction Factor					0.997

Corrected As found 600.8 Previous response 602.5 % change 0.3%

**Notes:**

Sample inlet filter changed after as founds. Slightly adjusted zero.

Calibration Performed By: Asad Hidayat



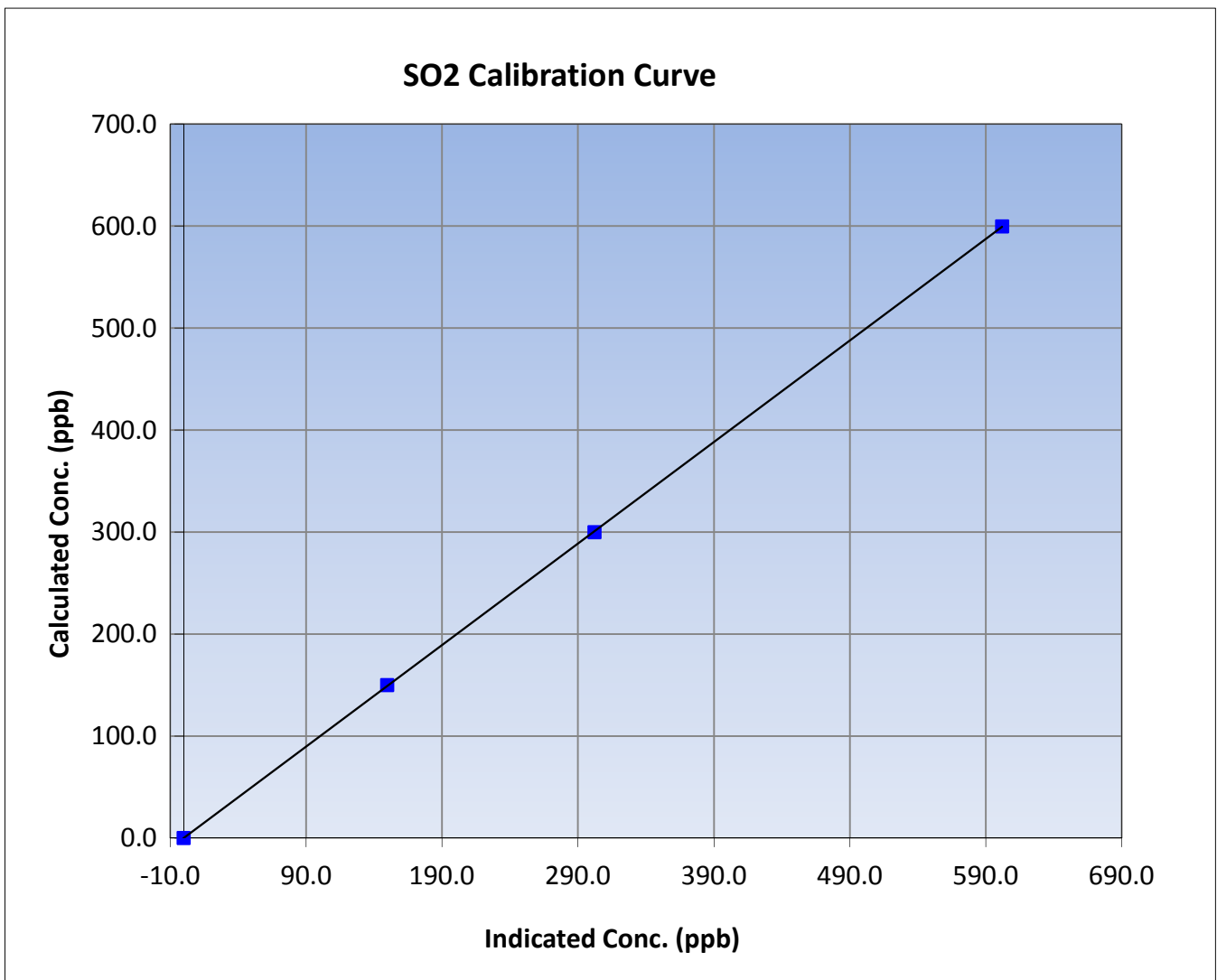
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 16, 2015	Previous Calibration	March 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:10	End Time (MST)	13:58
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

## Calibration Data

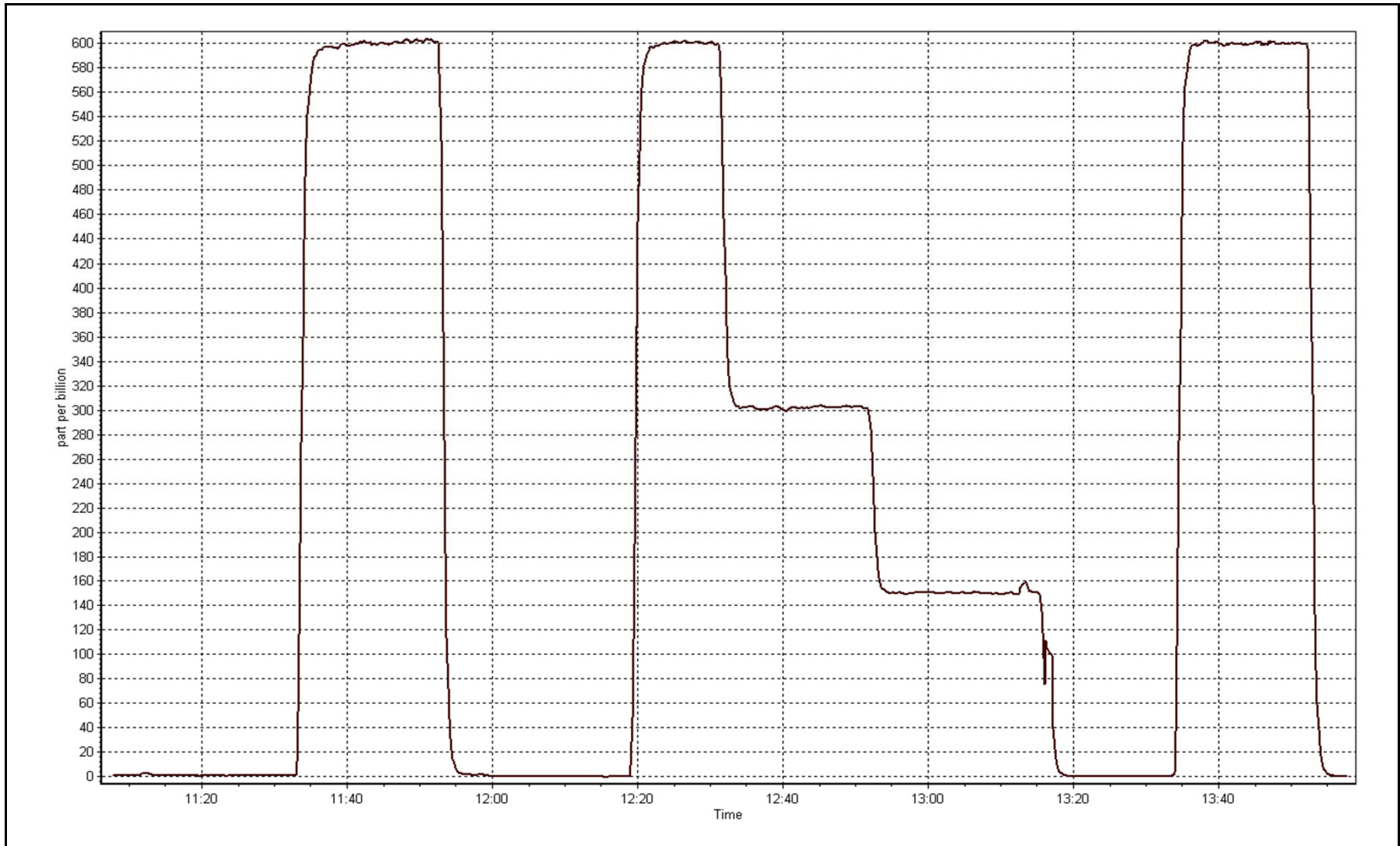
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999990
599.8	602.0	0.9964		
299.9	302.2	0.9925	Slope	0.995400
149.9	149.7	1.0018		
			Intercept	0.211577





SO2 Calibration Plot

Date: April 16, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	April 13, 2015	Last Calibration	March 6, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	12:50	End Time (MST)	16:15
Gas Cert Reference	LL10590	Station temp.	22 Deg C
Cal Gas Concentration	9.75 ppm	Cal Gas Exp Date	12/21/2012
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG air Make/Model	API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635
SO2 gas concentration	51 ppm	SO2 gas cert/exp	LL107926 5/29/2014

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-618	-617
Analyzer IP address	192.168.1.42		Lamp voltage	873	872
Calculated slope	0.995082	0.988238	Chamber temp	45	45
Calculated intercept	-0.517344	0.190178	Pressure	554.4	547.5
Analyzer Background	14.7	14.8	Flow	1.056	1.053
Analyzer Coefficient	0.887	0.868	Intensity	94	94
			Converter temp.	332	329
Analyzer make/model	TEI 450i		Analyzer serial #	1336160094	
Converter make/model	NA		Converter serial #	NA	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	46.2	75.1	77.1	0.973
SO2 scrubber check	5000	14.7	149.9	3.0	----
calibrator zero	6000	0.0	0.0	-0.2	----
high point	6000	46.2	75.1	75.7	0.991
second point	6000	25.9	42.1	42.5	0.991
third point	6000	15.4	25.0	25.1	0.997
as left zero	6000	0.0	0.0	-0.3	----
as left span	6000	46.1	74.9	75.8	0.988
Average Correction Factor					0.993

Corrected As found	77.2	Previous response	76.0	% change	-1.5%
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**Notes:**

Scrubber check done after as founds. Sample inlet filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



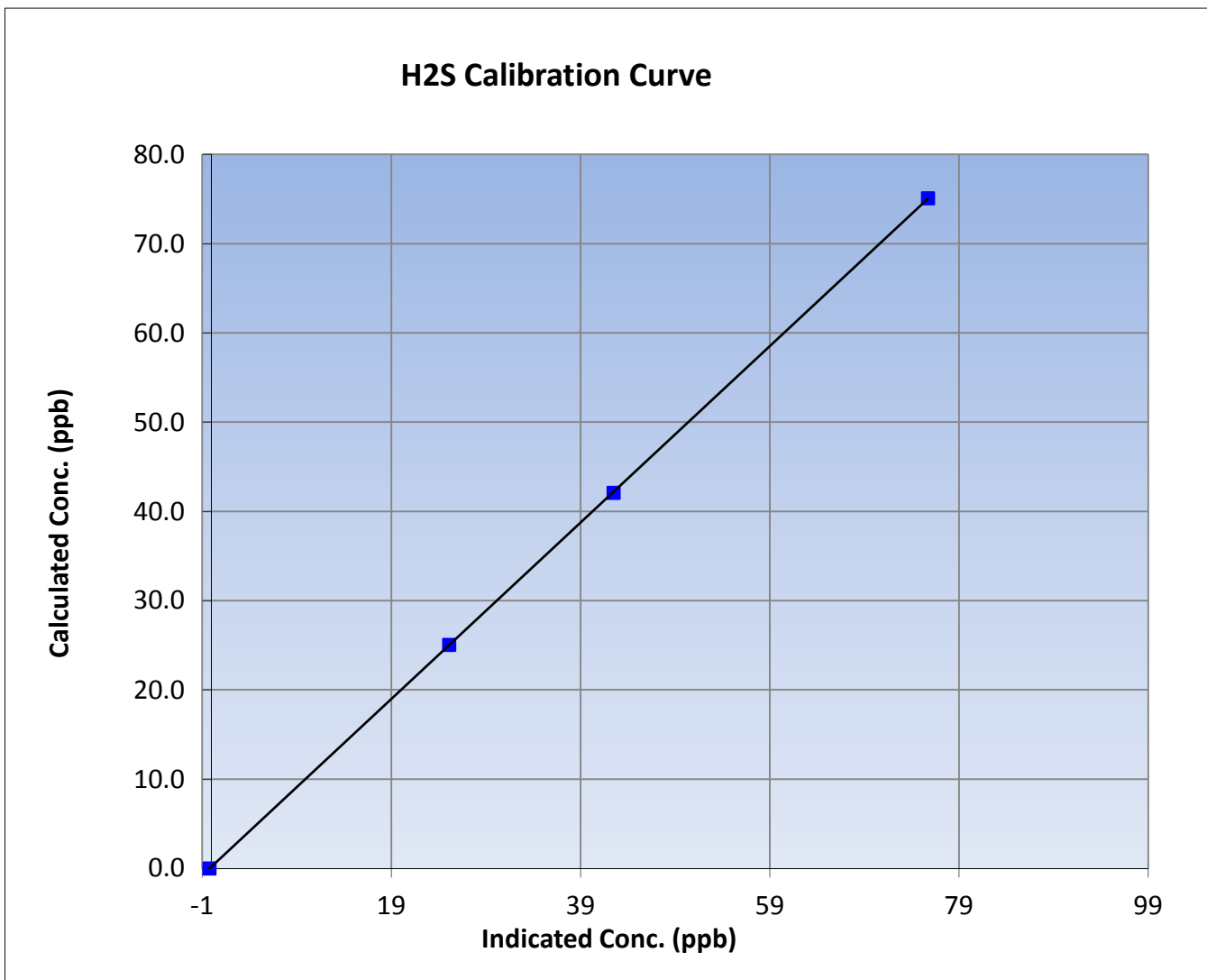
# Wood Buffalo Environmental Association H2S Calibration Report

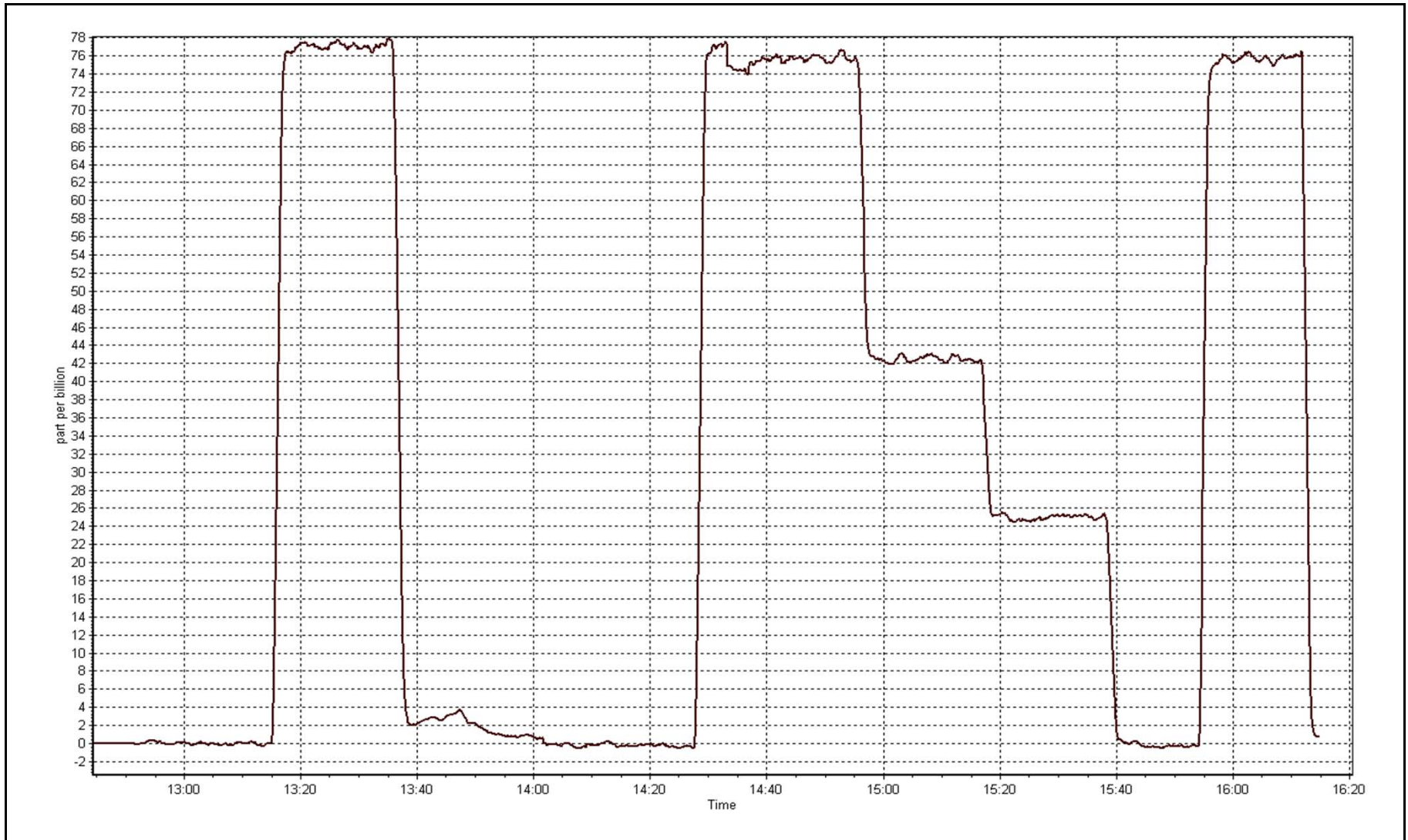
## Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 6, 2015
Station Name	AMS 4	Station Number	AMS 4
Start Time (MST)	12:50	End Time (MST)	16:15
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	----	Correlation Coefficient	0.999996
75.1	75.7	0.9914		
42.1	42.5	0.9905	Slope	0.988238
25.0	25.1	0.9966		
			Intercept	0.190178







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Thursday, April 16, 2015	Last Calibration	Tuesday, March 03, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	11:10	End Time (MST)	13:57
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	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11551008
ZAG make/model	Teledyne API 701	Serial Number	4297
DACS make/model	Campbell Scientific CR3000	Serial Number	2635

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	30.4	30.4
Calculated slope	0.995201	1.000116	Fuel Pressure	19.8	19.8
Calculated intercept	0.046555	-0.029566	Analyzer Coeff	4.0	4.0
			Analyzer BKG	1.300	1.270

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

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.01	----
as found span	5000	58.8	12.56	12.55	1.001
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	58.8	12.56	12.55	1.001
second point	5000	29.4	6.28	6.37	0.986
third point	5000	14.7	3.14	3.18	0.987
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	58.8	12.56	12.62	0.995
Average Correction Factor					0.991

Corrected As found	12.56	Previous response	12.57	% change	0.1%
--------------------	-------	-------------------	-------	----------	------

**Notes:**

Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association THC Calibration Report

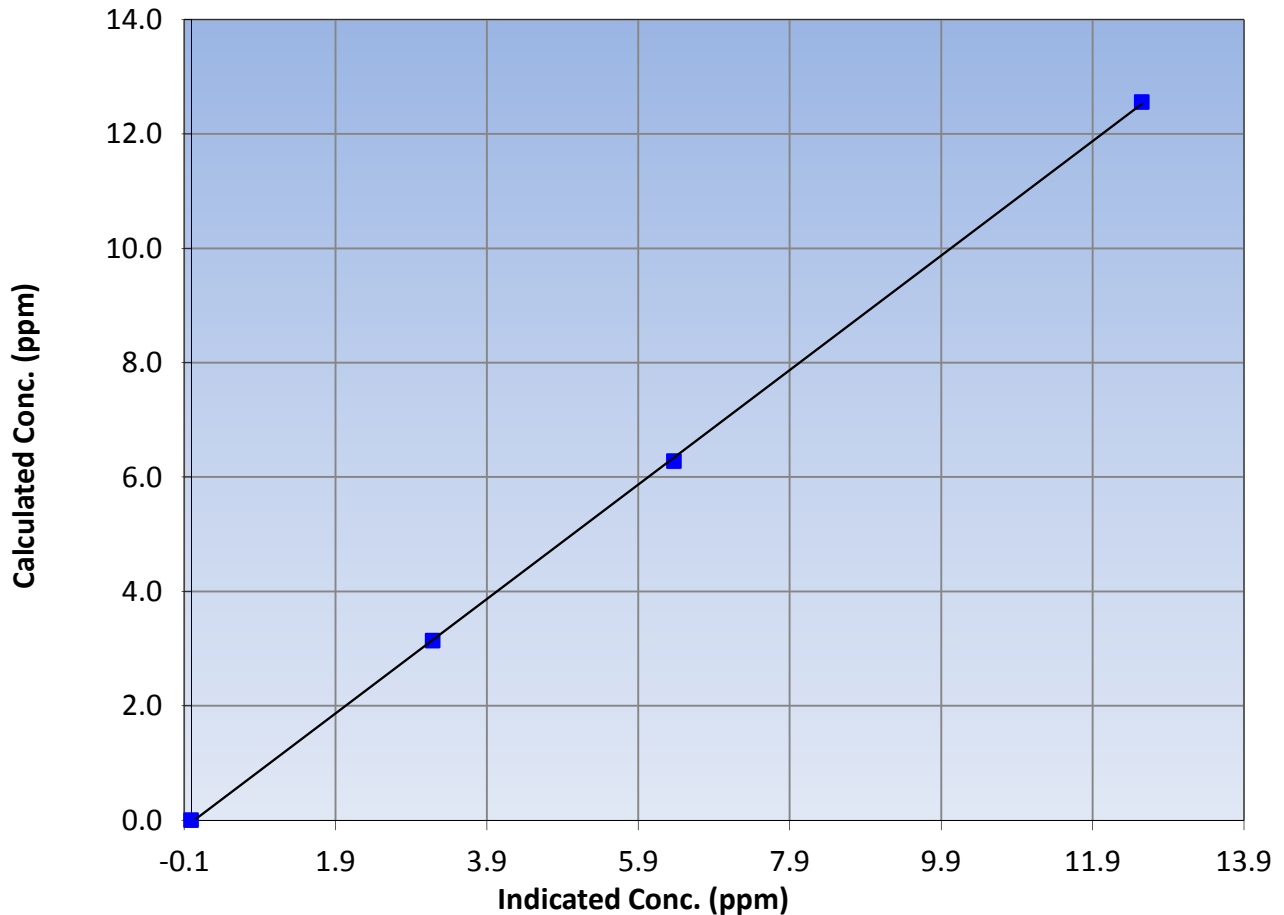
## Station Information

Calibration Date	April 16, 2015	Previous Calibration	March 3, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	11:10	End Time (MST)	13:57
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

## Calibration Data

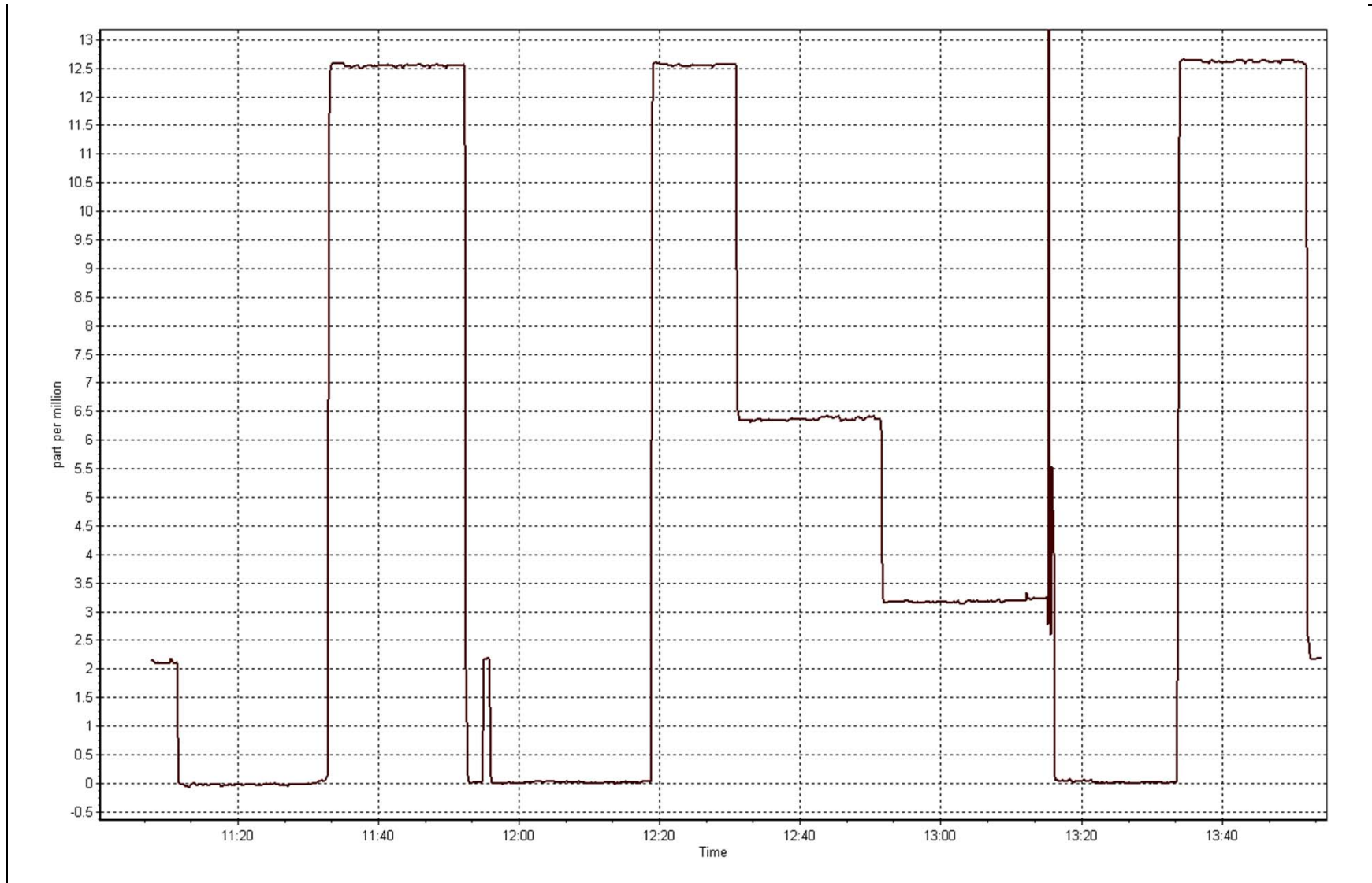
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999920
12.56	12.55	1.0005		
6.28	6.37	0.9856	Slope	1.000116
3.14	3.18	0.9872		
			Intercept	-0.029566

**THC Calibration Curve**



THC Calibration Plot

Date: April 16, 2015



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 5  
MANNIX  
APRIL 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

May 29, 2015

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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)

APRIL 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	685	33	35	99.72	76	0	20	0
H2S (ppb) Average	686	34	34	100.00	8	0	1	0
THC (ppm) Average	675	43	45	99.72	3.6	-	2.4	-
Temperature 2 m (C) Average	720	0	0	100.00	24.4	-	16.2	-
Temperature 20 m (C) Average	720	0	0	100.00	23.8	-	16.6	-
Temperature 45 m (C) Average	720	0	0	100.00	23.5	-	16.8	-
Temperature 75 m (C) Average	720	0	0	100.00	23.2	-	17	-
Temperature 90 m (C) Average	720	0	0	100.00	23.1	-	17.2	-
Relative Humidity 2 m (%) Average	720	0	0	100.00	96	-	74	-
Relative Humidity 20 m (%) Average	720	0	0	100.00	97	-	74	-
Relative Humidity 45 m (%) Average	720	0	0	100.00	97	-	75	-
Relative Humidity 75 m (%) Average	720	0	0	100.00	98	-	76	-
Relative Humidity 90 m (%) Average	720	0	0	100.00	99	-	77	-
Wind Speed 20 m (km/h) Average	720	0	0	100.00	36	-	22	-
Wind Speed 45 m (km/h) Average	720	0	0	100.00	44	-	28	-
Wind Speed 75 m (km/h) Average	720	0	0	100.00	49	-	32	-
Wind Speed 90 m (km/h) Average	720	0	0	100.00	50	-	33	-
Wind Direction 20 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 75 m (deg) Average	720	0	0	100.00	-	-	-	-
Wind Direction 90 m (deg) Average	720	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	0	0	100.00	0.8	-	0.4	-
Vertical Wind Speed 45 m (km/h) Average	720	0	0	100.00	1.2	-	0.7	-
Vertical Wind Speed 75 m (km/h) Average	720	0	0	100.00	1.5	-	0.5	-
Vertical Wind Speed 90 m (km/h) Average	720	0	0	100.00	4.6	-	2.5	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	685	3	9	-	0	0	0	0	1	7	76
H2S (ppb) Average	686	0.4	1	-	0	0	0	0	0	1	8
THC (ppm) Average	675	2.14	0.2	-	1.9	2	2.1	2.1	2.2	2.3	3.6
Temperature 2 m (C) Average	720	5.12	7.5	-	-12.7	-5.3	-0.6	5.3	10.7	14.4	24.4
Temperature 20 m (C) Average	720	5.11	7.4	-	-13.1	-5.6	0.3	5.4	10.5	14.1	23.8
Temperature 45 m (C) Average	720	5.02	7.4	-	-13.4	-5.9	0.4	5.4	10.4	13.8	23.5
Temperature 75 m (C) Average	720	4.93	7.4	-	-13.7	-6.2	0.7	5.4	10.2	13.8	23.2
Temperature 90 m (C) Average	720	4.87	7.4	-	-13.9	-6.3	0.8	5.3	10.1	13.7	23.1
Relative Humidity 2 m (%) Average	720	45.5	19	-	14	24	31	42	56	75	96
Relative Humidity 20 m (%) Average	720	43.7	19	-	13	23	29	41	53	71	97
Relative Humidity 45 m (%) Average	720	42.9	19	-	13	22	29	40	52	71	97
Relative Humidity 75 m (%) Average	720	42.7	18	-	13	22	30	39	51	69	98
Relative Humidity 90 m (%) Average	720	42.9	18	-	13	23	30	40	52	68	99
Wind Speed 20 m (km/h) Average	720	13.4	6	-	0	6	9	13	17	22	36
Wind Speed 45 m (km/h) Average	720	17.6	8	-	1	7	12	17	23	27	44
Wind Speed 75 m (km/h) Average	720	19.5	9	-	2	8	12	19	26	31	49
Wind Speed 90 m (km/h) Average	720	20.9	9	-	2	8	13	21	28	33	50
Wind Direction 20 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	720	-0.03	0.4	-	-1.4	-0.5	-0.3	0	0.3	0.4	0.8
Vertical Wind Speed 45 m (km/h) Average	720	0.12	0.5	-	-1.3	-0.5	-0.3	0.2	0.5	0.8	1.2
Vertical Wind Speed 75 m (km/h) Average	720	0.08	0.4	-	-1	-0.4	-0.2	0.1	0.4	0.6	1.5
Vertical Wind Speed 90 m (km/h) Average	720	0.82	1.1	-	-1.5	-0.4	0	0.6	1.5	2.4	4.6

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	07 Apr 2015 14:00	07 Apr 2015 15:00	2	Maintenance - manifold cleaning
THC	07 Apr 2015 14:00	07 Apr 2015 15:00	2	Maintenance - manifold cleaning

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Summary of Hour Averages

Mannix - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 76 ppb on Apr 21 00:00	Maximum Daily Average: 19.9 ppb on Apr 1		Hours of Data:	685
Minimum Value: 0 ppb on Apr 11 14:00	Minimum Daily Average: 0.0 ppb on Apr 12		Hours of Missing Data:	35
Maximum Diurnal Average: 7.6 ppb at hour 11	Minimum Diurnal Average: 0.8 ppb at hour 20		Hours of Calibration:	33
Monthly Average: 3.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 7 P <sub>99</sub> = 54		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-Apr	3	Z	1	1	18	41	45	38	32	39	67	31	15	31	33	15	8	32	7	1	0	0	0	0	19.9	67
2-Apr	3	10	Z	4	2	5	5	1	0	4	2	3	2	1	1	1	1	3	0	0	0	0	0	0	2.2	10
3-Apr	0	0	0	Z	0	0	0	0	0	0	3	5	8	6	4	14	7	0	0	0	0	0	0	2.1	14	
4-Apr	0	0	0	0	Z	0	0	0	0	0	12	4	1	1	1	6	12	7	0	0	0	0	0	2.0	12	
5-Apr	1	0	1	2	3	Z	0	6	49	21	35	20	8	18	8	5	3	1	0	0	0	0	0	8.0	49	
6-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0.3	1	
7-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	M	M	0	0	0	0	0	0	0	0	0.2	0	
8-Apr	0	0	Z	0	0	0	0	0	0	0	7	4	2	9	5	1	2	3	0	0	0	0	0	1.5	9	
9-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
10-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
11-Apr	0	0	1	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
12-Apr	Z	0	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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	9	2	1	1	0.6	9	
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
15-Apr	0	0	0	Z	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	0.3	4	
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
18-Apr	Z	0	0	0	0	1	2	1	1	3	1	1	1	11	4	1	9	2	1	1	0	1	1	1.8	11	
19-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	6	1	0	0	1.0	12	
20-Apr	0	0	Z	0	0	0	0	3	25	35	65	27	2	2	4	5	9	2	0	0	1	10	43	76	13.5	76
21-Apr	67	58	23	21	20	Z	54	54	32	12	18	20	17	3	13	7	14	4	0	0	0	0	0	19.1	67	
22-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
23-Apr	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
24-Apr	Z	0	0	0	0	0	0	0	0	2	3	0	5	6	12	14	13	6	1	3	31	26	11	22	6.7	31
25-Apr	28	Z	1	0	2	5	14	30	22	27	5	16	5	4	8	5	2	0	1	3	0	0	0	7.8	30	
26-Apr	0	0	Z	1	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0.3	2	
27-Apr	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
28-Apr	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
29-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0.3	2	

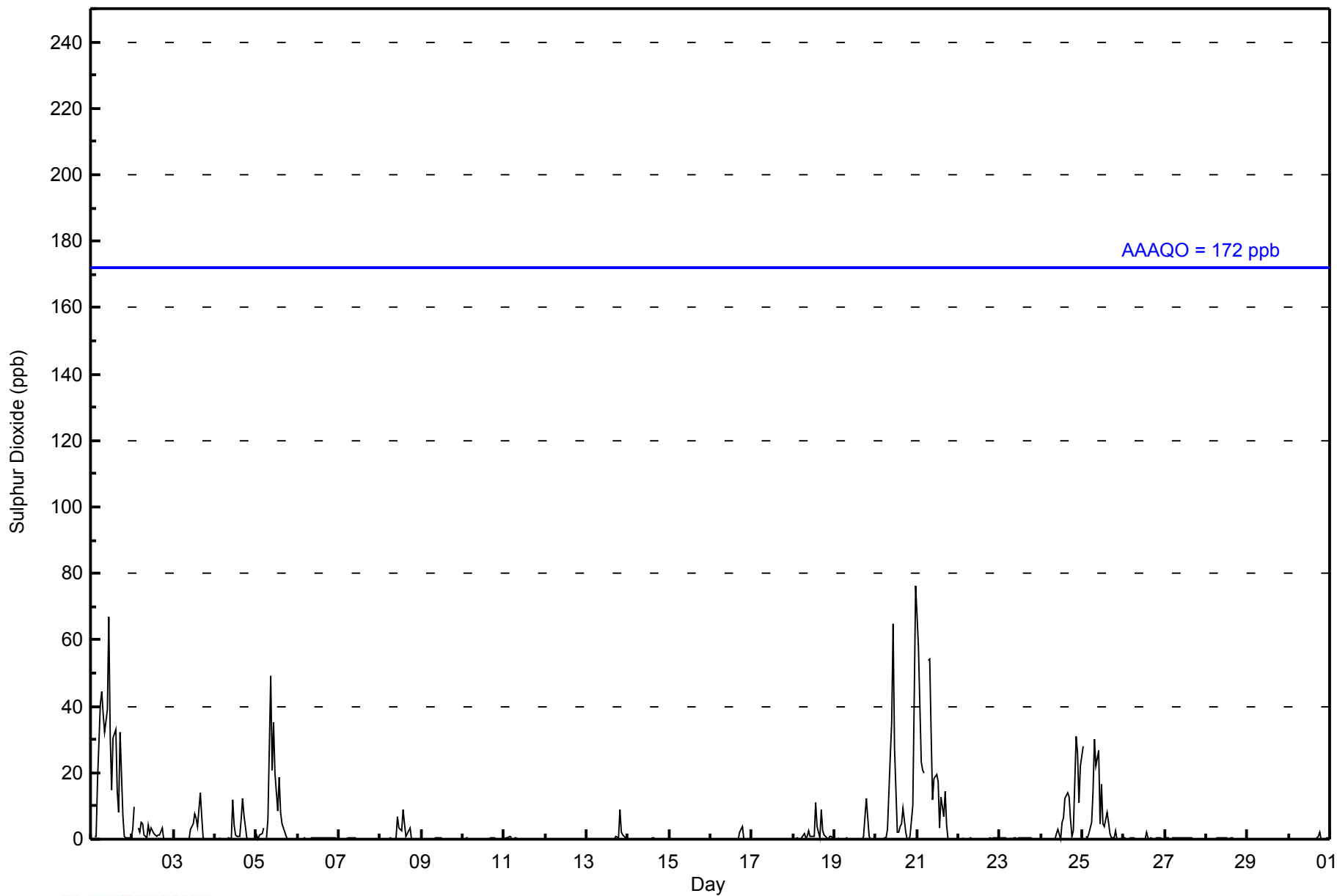
4.2	2.8	1.2	1.2	1.9	2.3	4.1	4.5	5.5	5.0	7.6	4.6	2.3	3.3	3.3	2.5	2.8	2.3	1.1	0.8	1.2	1.4	2.0	3.4	Diurnal Average	
67	58	23	21	20	41	54	54	49	39	67	31	17	31	33	15	14	32	12	9	31	26	43	76	Diurnal Maximum	

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 (SO<sub>2</sub>) - ppb  
Mannix - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	629	91.82	91.82
11 - 20	23	3.36	95.18
21 - 60	29	4.23	99.42
61 - 110	4	0.58	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - April 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	27	62	23	16	23	30	82	97	28	24	34	56	56	27	24	20	629
11 - 20	13	4	1	0	0	0	0	0	0	0	0	0	1	0	2	2	23
21 - 60	17	5	1	0	0	0	0	0	0	0	1	0	0	0	2	3	29
61 - 110	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	4
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
<b>Totals</b>	60	71	25	16	23	30	82	97	28	24	35	57	57	27	28	25	685

Total Number of Valid Hours: 685

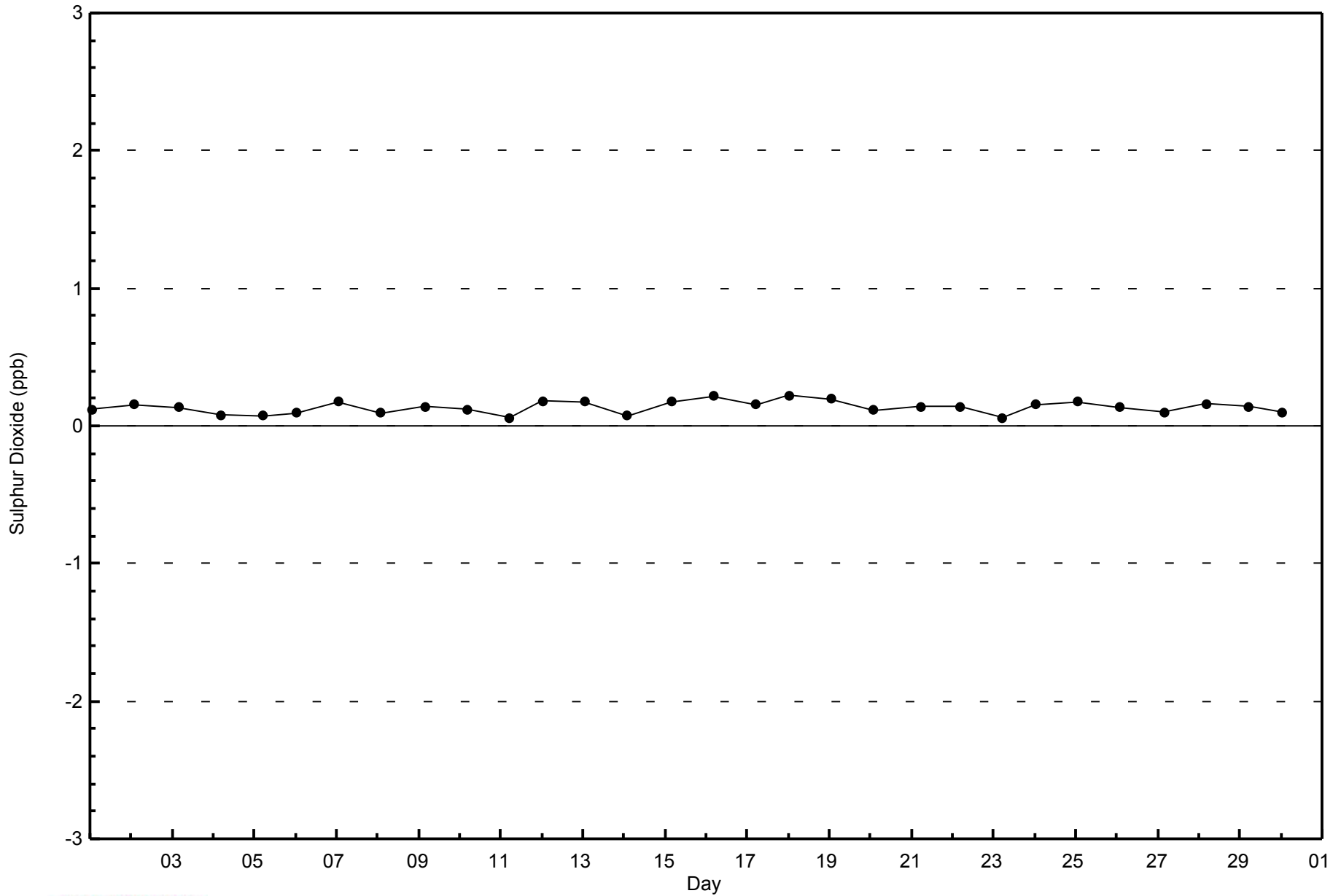
Total Number of Hours: 720





WBEA  
Zero Responses

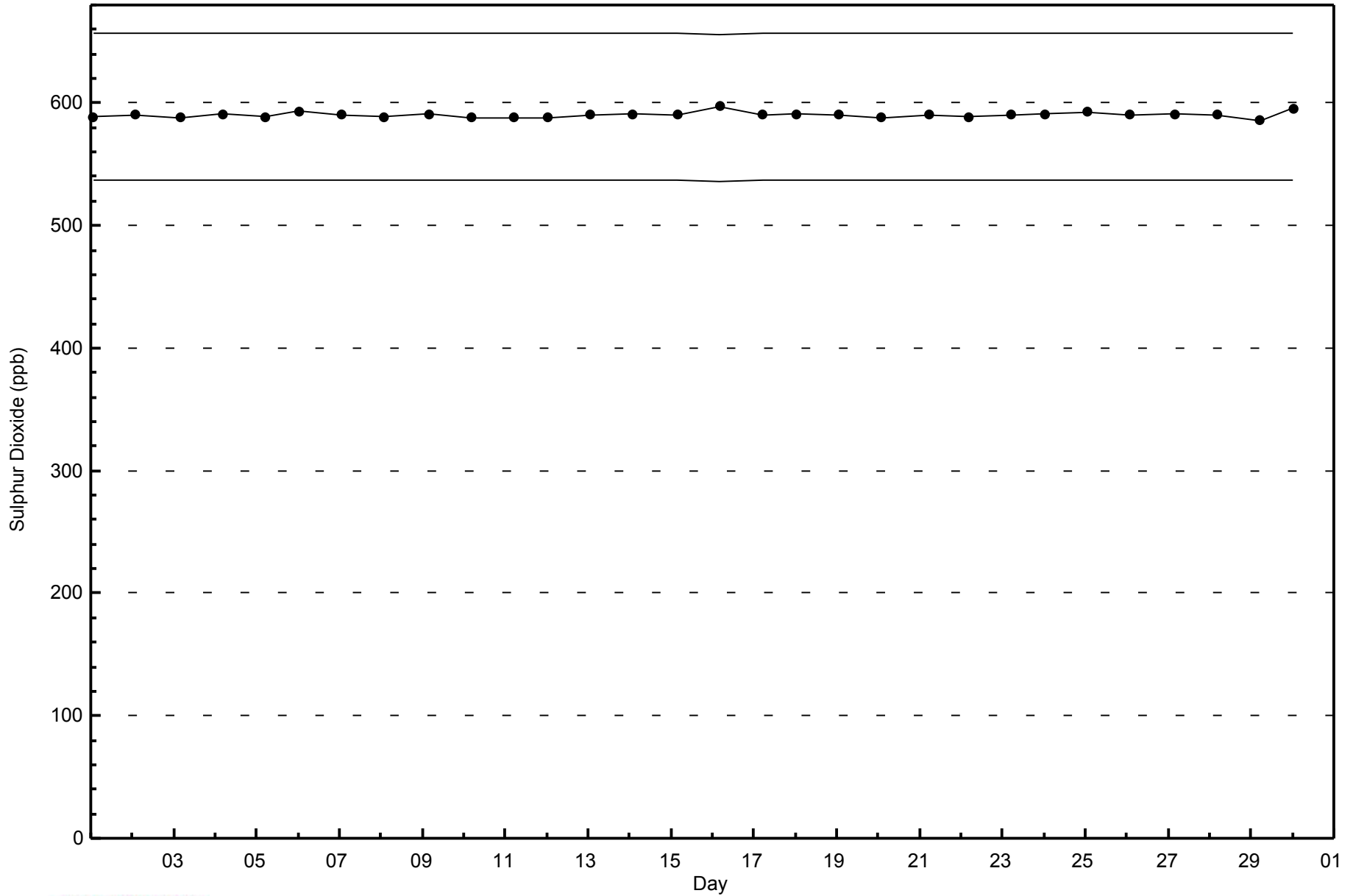
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - April 2015





Summary of Hour Averages

Mannix - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Apr 21 01:00	Maximum Daily Average: 1.3 ppb on Apr 21		Hours of Data:	686
Minimum Value: 0 ppb on Apr 26 11:00	Minimum Daily Average: 0.1 ppb on Apr 29		Hours of Missing Data:	34
Maximum Diurnal Average: 0.7 ppb at hour 1	Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.4 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 3		Percent Operational Time:	100.0

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

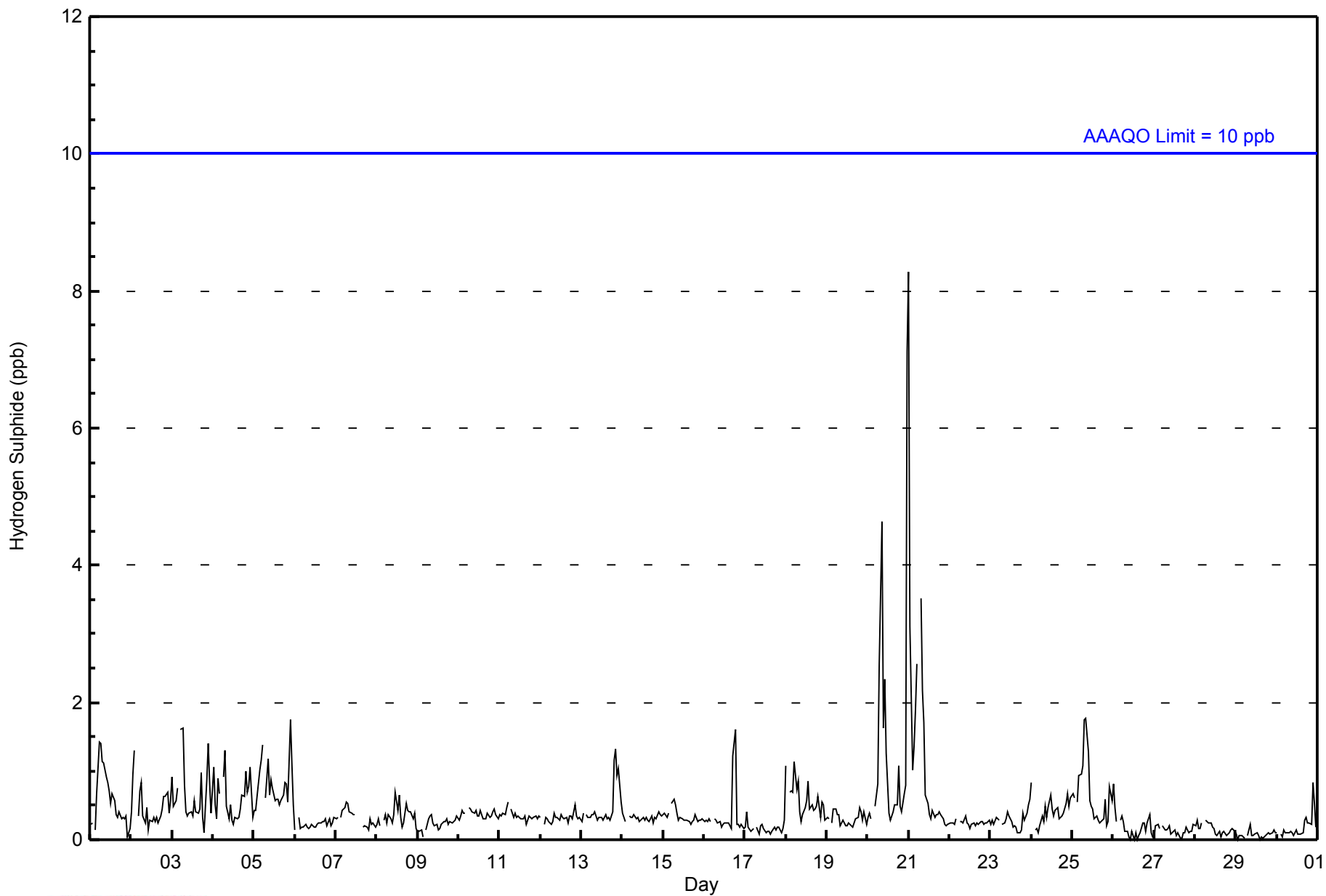
0.7	0.5	0.4	0.4	0.5	0.6	0.5	0.6	0.6	0.6	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.4	0.5	Diurnal Average
8	3	1	1	2	3	2	4	5	2	2	1	1	1	1	1	1	1	1	2	1	1	2	1	7	Diurnal Maximum

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



WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mannix - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	679	98.98	98.98
3 - 4	4	0.58	99.56
5 - 7	2	0.29	99.85
8 - 11	1	0.15	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Mannix - April 2015**

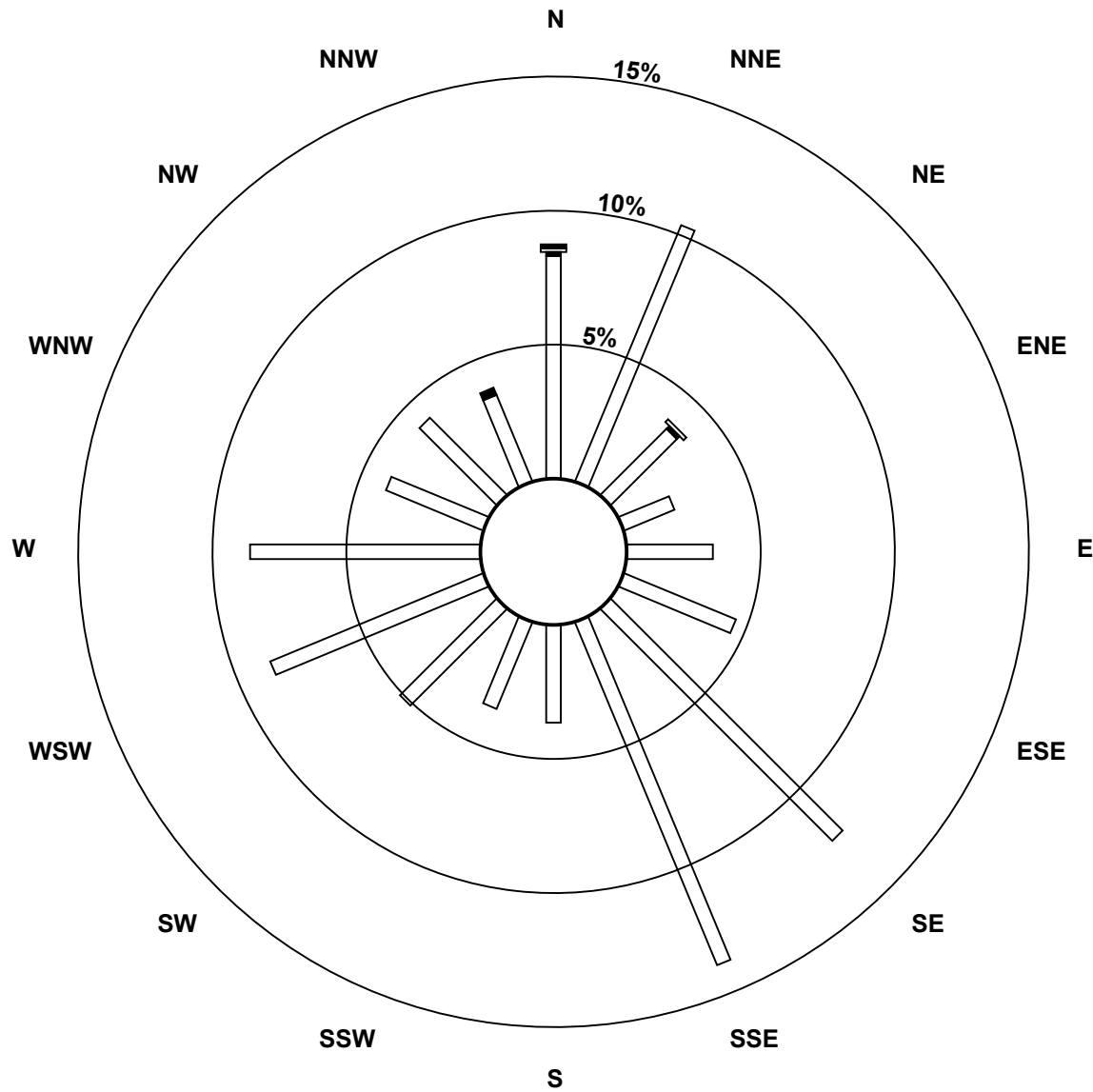
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	57	71	24	14	22	31	84	95	25	24	35	59	59	27	28	24	679
3 - 4	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	4
5 - 7	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8 - 11	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	71	26	14	22	31	84	95	25	24	35	59	59	27	28	26	686

Total Number of Valid Hours: 686

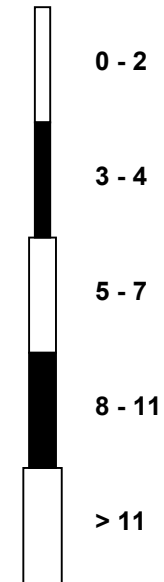
Total Number of Hours: 720

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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix (AMS 5)**



Classes (ppb)

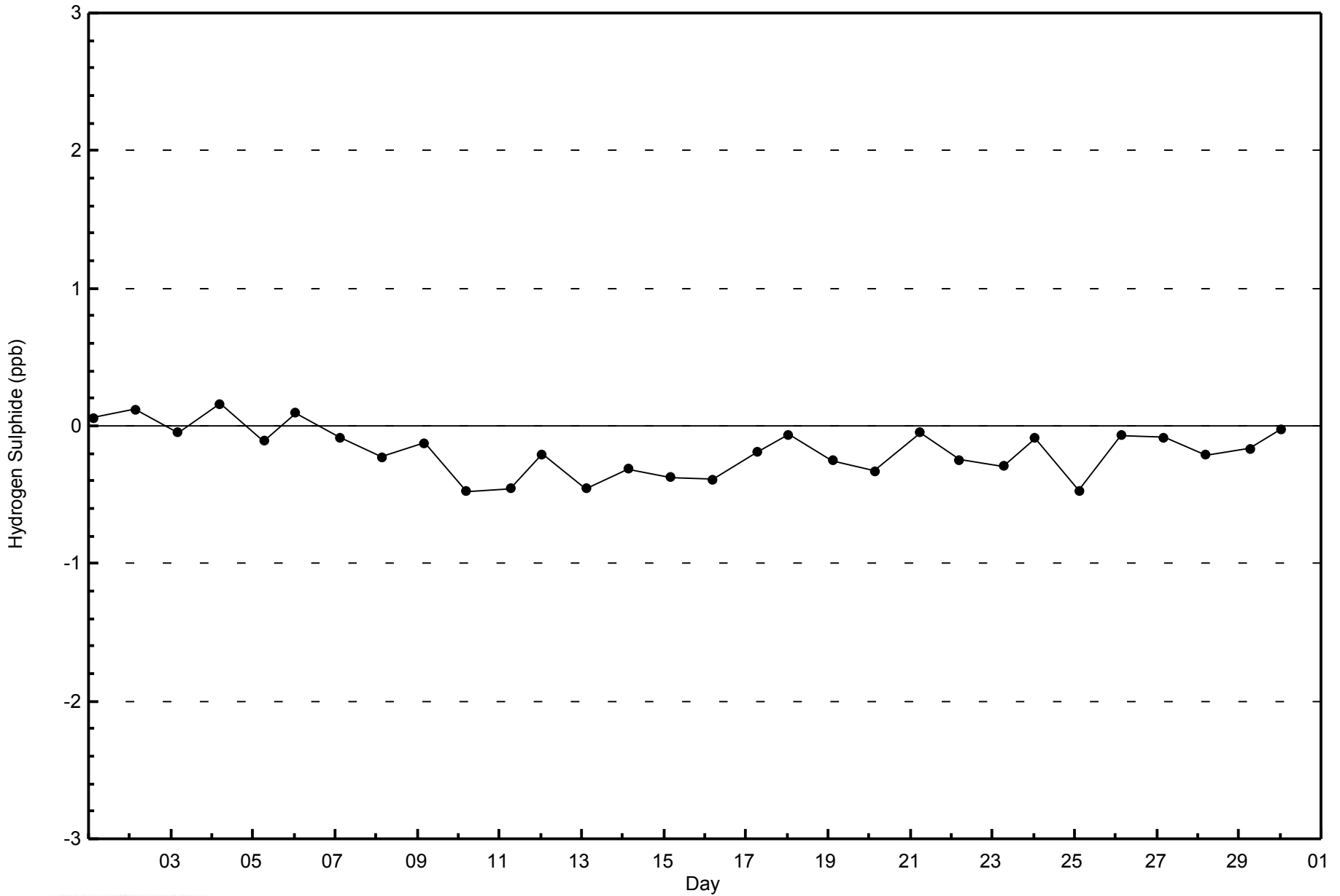


**Total Number of Valid Hours: 686**



WBEA  
Zero Responses

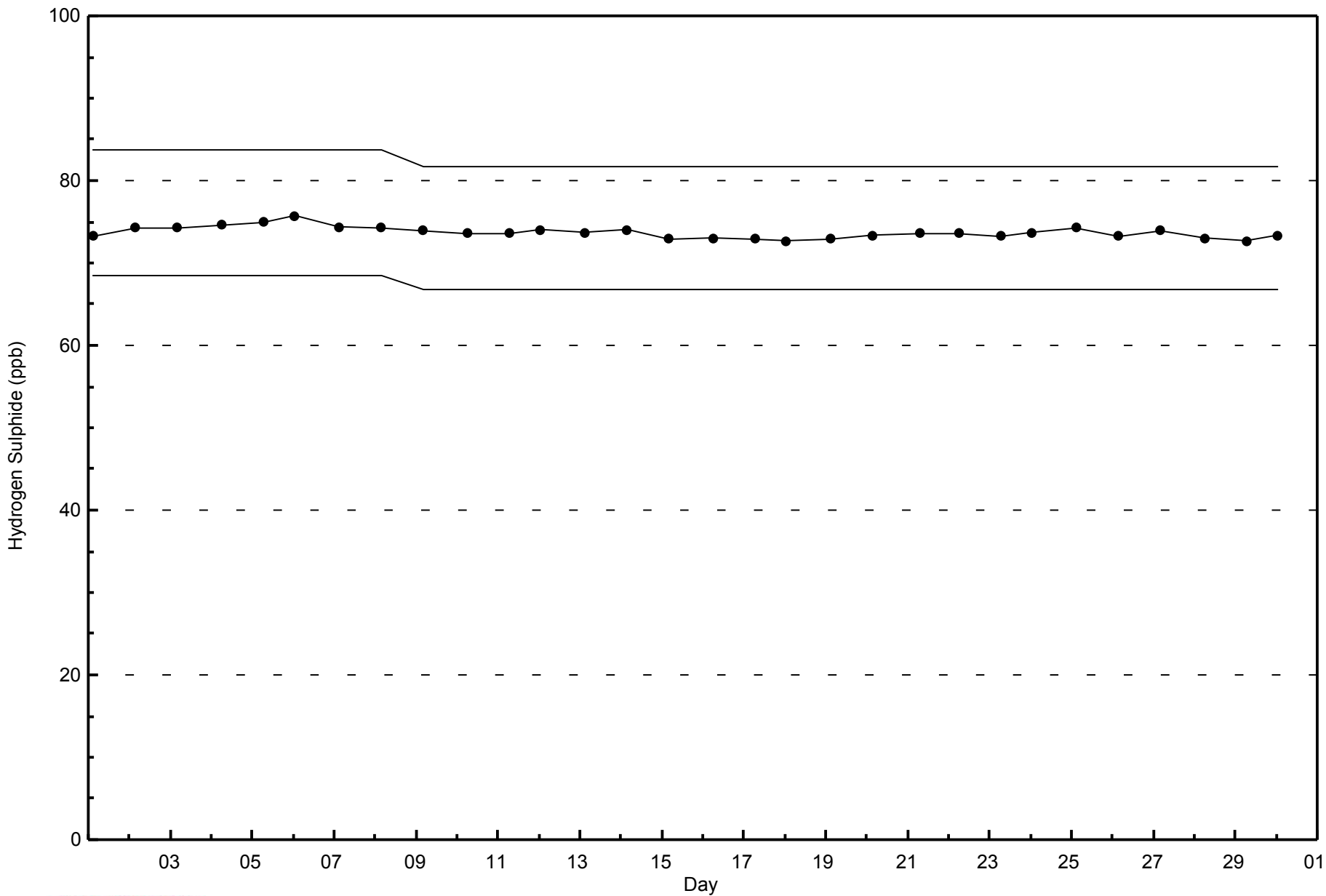
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - April 2015



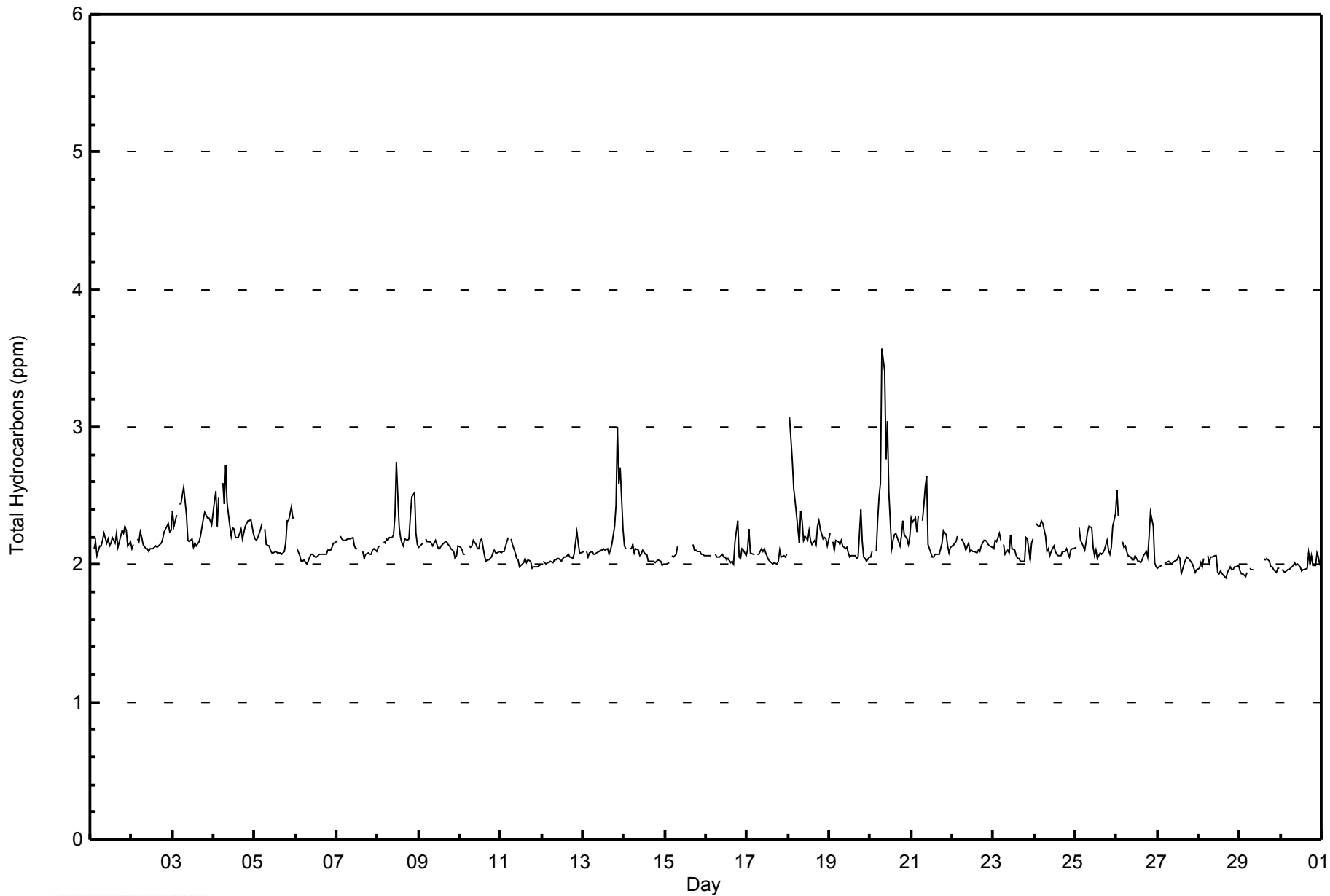


Maximum Value: 3.6 ppm on Apr 20 08:00																	Maximum Daily Average: 2.4 ppm on Apr 20																	Hours in Service: 720	
Minimum Value: 1.9 ppm on Apr 28 17:00																	Minimum Daily Average: 2.0 ppm on Apr 29																	Hours of Data: 675	
Maximum Diurnal Average: 2.2 ppm at hour 8																	Minimum Diurnal Average: 2.1 ppm at hour 15																	Hours of Missing Data: 45	
Monthly Average: 2.14 ppm																	Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.1 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.3 P <sub>99</sub> = 2.8																	Hours of Calibration: 43	
																																		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-Apr	2.1	Z	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.3	2.2	2.1	2.2	2.2	2.3									
2-Apr	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.2	2.3									
3-Apr	2.4	2.3	2.4	Z	2.4	2.4	2.6	2.5	2.4	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3	2.6									
4-Apr	2.5	2.5	2.3	2.5	Z	2.6	2.4	2.7	2.5	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.7									
5-Apr	2.2	2.2	2.2	2.3	2.3	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.4									
6-Apr	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2									
7-Apr	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	M	M	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2									
8-Apr	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.7	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.5	2.5	2.2	2.1	2.2	2.7									
9-Apr	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.2									
10-Apr	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2									
11-Apr	2.1	2.1	2.1	2.2	2.2	Z	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2									
12-Apr	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	2.2	2.1	2.1	2.1	2.2									
13-Apr	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	2.3	2.4	3.0	2.6	2.7	2.3	3.0									
14-Apr	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1									
15-Apr	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	C	C	C	C	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1									
16-Apr	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.3	2.1	2.0	2.1	2.1	2.1	2.3									
17-Apr	2.1	2.3	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.3									
18-Apr	Z	3.1	2.8	2.6	2.5	2.4	2.2	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.3	2.3	2.3	2.2	2.2	2.2	2.1	2.3										
19-Apr	2.2	Z	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.4	2.2	2.0	2.0	2.0	2.1	2.4										
20-Apr	2.1	2.1	Z	2.1	2.3	2.5	2.6	3.6	3.4	2.8	3.0	2.5	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.1	2.2	3.6										
21-Apr	2.3	2.3	2.3	2.2	2.3	Z	2.3	2.4	2.6	2.6	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.6										
22-Apr	2.1	2.2	2.2	2.2	Z	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.2										
23-Apr	2.1	2.2	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.0	2.2	2.2	2.2										
24-Apr	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3										
25-Apr	2.1	Z	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.3	2.4										
26-Apr	2.5	2.3	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.4	2.3	2.0	2.0	2.5										
27-Apr	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0	1.9	2.0	2.1										
28-Apr	2.0	2.0	2.0	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1										
29-Apr	2.0	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0										
30-Apr	Z	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	2.0	2.1	2.0	2.0	2.1	2.1	2.0	2.1										
																								Diurnal Average											
																								Diurnal Maximum											
Z - zerospan      C - Calibration      M - Maintenance																																			



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Mannix - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mannix - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	161	23.85	23.85
2.1 - 3.0	511	75.70	99.56
3.1 - 10.0	3	0.44	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 675

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Mannix - April 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	2	0	0	2	4	3	20	32	7	11	18	33	25	3	0	1	161
2.1 - 3.0	58	71	23	14	19	27	62	65	21	13	16	22	25	24	27	24	511
3.1 - 10.0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	3
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	71	25	16	23	30	82	97	28	24	34	55	50	27	28	25	675

Total Number of Valid Hours: 675

Total Number of Hours: 720

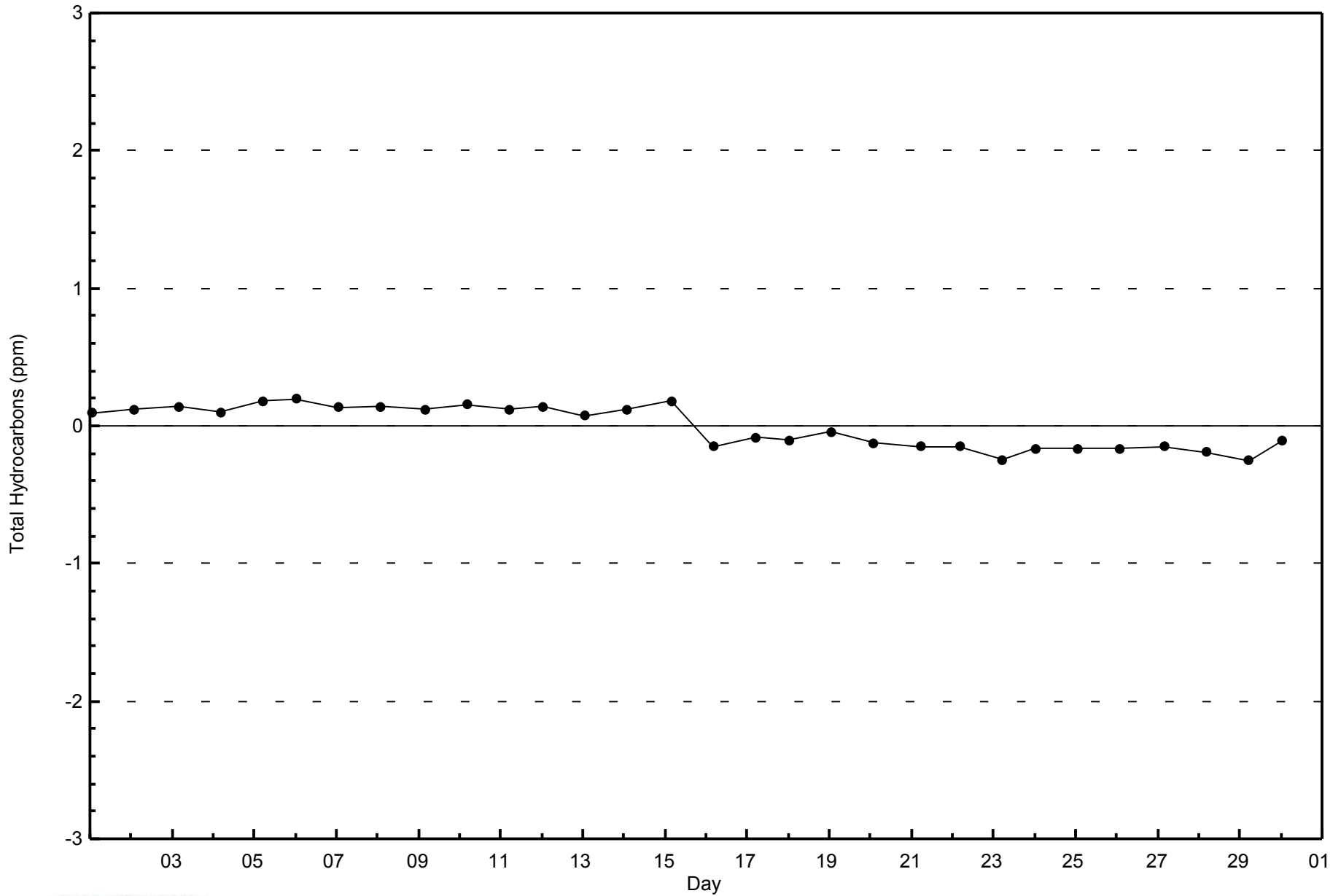






WBEA  
Zero Responses

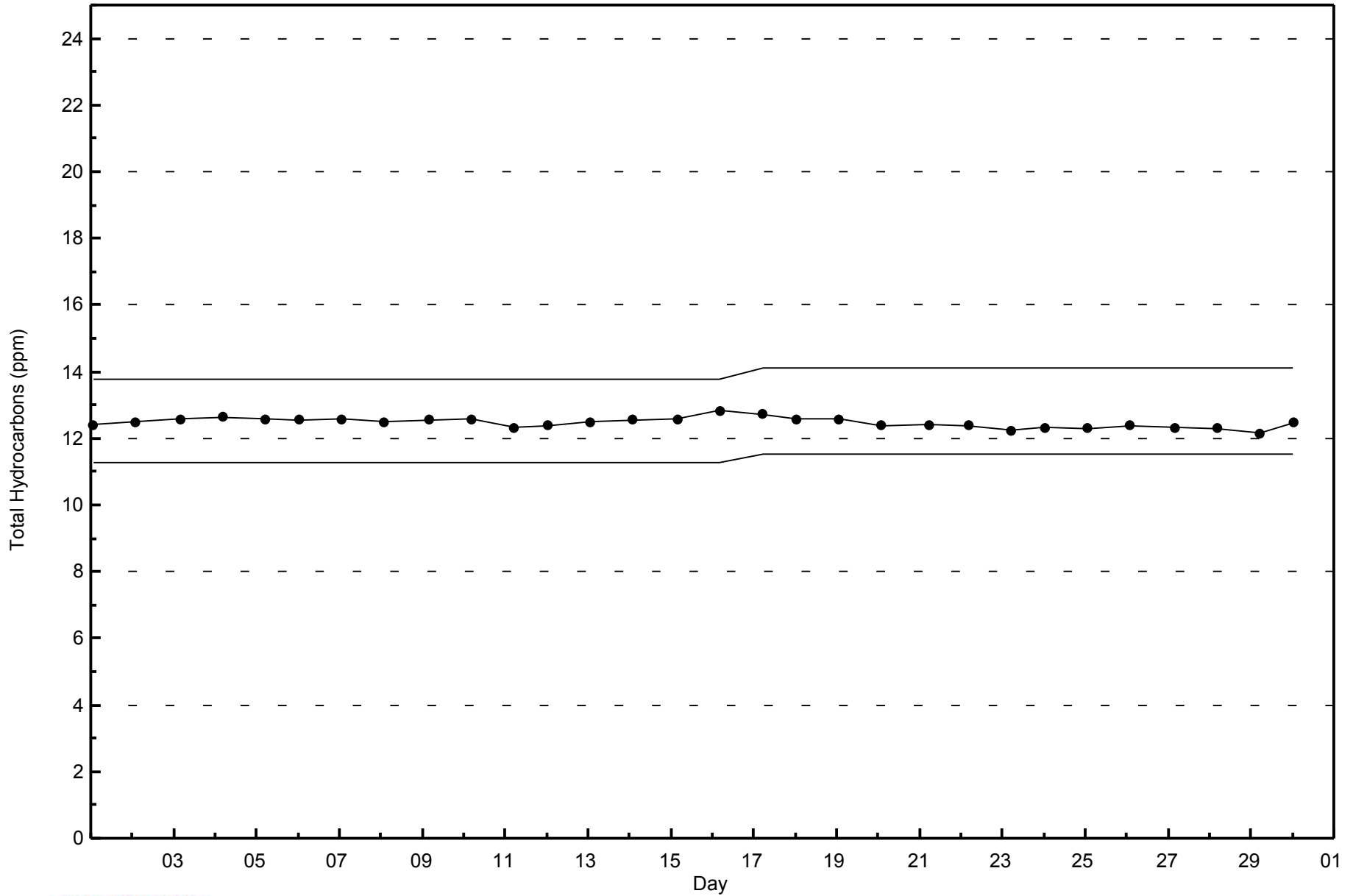
Total Hydrocarbons (THC) - ppm  
Mannix - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Mannix - April 2015





Summary of Hour Averages

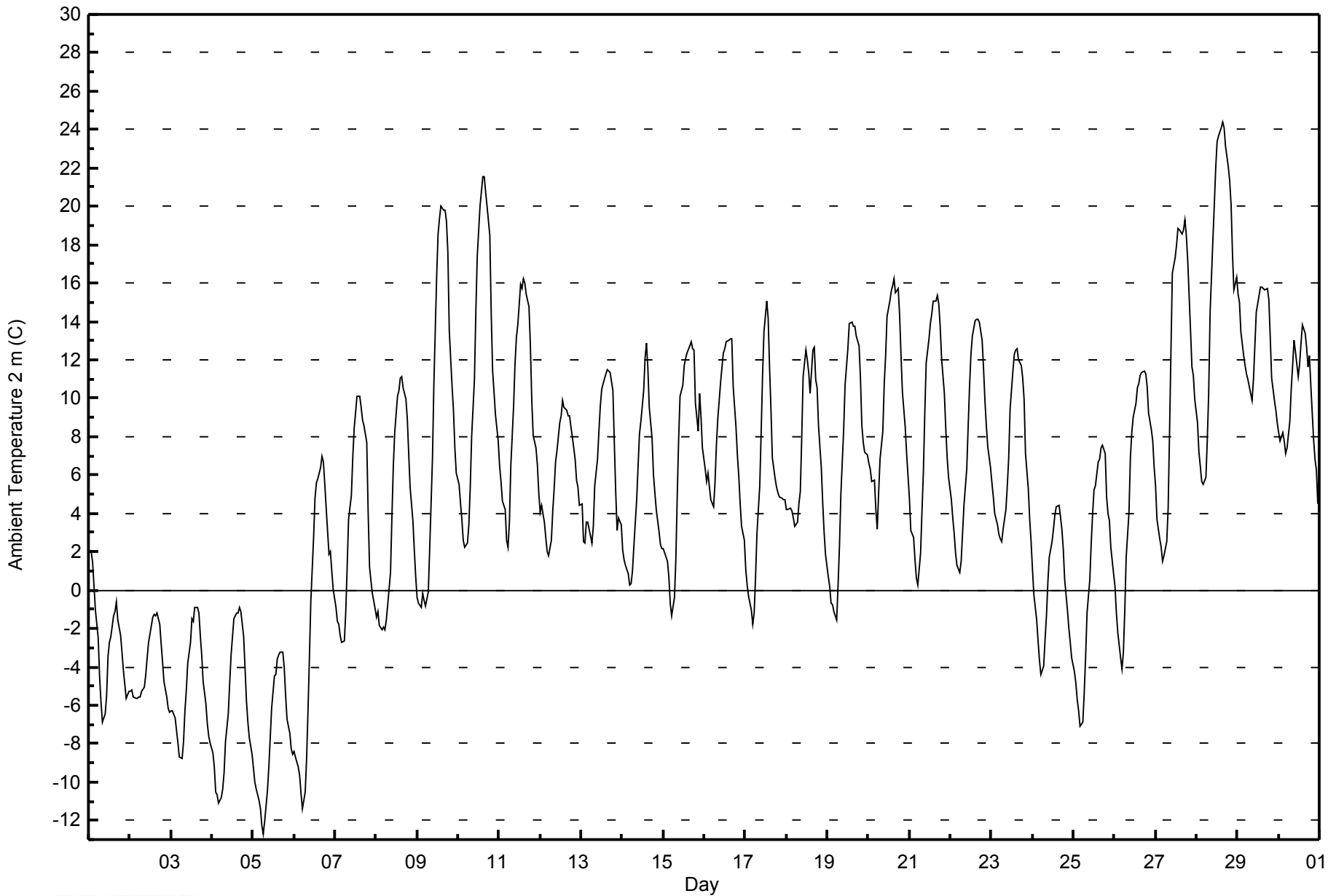
Mannix - April 2015

Maximum Value: 24.4 C on Apr 28 16:00																				Maximum Daily Average: 16.2 C on Apr 28					Hours in Service: 720																								
Minimum Value: -12.7 C on Apr 5 07:00																				Minimum Daily Average: -7.7 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 10.8 C at hour 15																				Minimum Diurnal Average: -0.8 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 5.12 C																				Percentiles: P <sub>1</sub> = -10.8 P <sub>10</sub> = -5.3 Q <sub>1</sub> = -0.6 Median = 5.3 Q <sub>3</sub> = 10.7 P <sub>90</sub> = 14.4 P <sub>99</sub> = 21.4					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-Apr	2.1	2.0	1.4	0.2	-1.1	-2.5	-4.6	-5.9	-6.8	-6.4	-5.5	-3.5	-2.7	-2.4	-1.3	-1.1	-0.6	-1.5	-2.3	-3.2	-4.2	-4.9	-5.7	-5.3	-2.7	2.1																							
2-Apr	-5.3	-5.2	-5.6	-5.6	-5.6	-5.6	-5.6	-5.3	-5.0	-4.4	-3.5	-2.7	-1.8	-1.4	-1.2	-1.4	-1.2	-1.8	-2.8	-3.8	-4.8	-5.6	-6.2	-6.4	-4.1	-1.2																							
3-Apr	-6.3	-6.3	-6.6	-7.3	-8.0	-8.7	-8.8	-7.9	-6.3	-5.2	-3.8	-2.7	-1.5	-1.6	-0.9	-0.9	-1.2	-2.4	-3.4	-4.7	-6.0	-7.0	-7.6	-7.9	-5.1	-0.9																							
4-Apr	-8.5	-9.2	-10.5	-10.7	-11.1	-10.8	-10.4	-9.5	-7.9	-6.4	-4.8	-3.4	-2.4	-1.5	-1.2	-1.2	-0.9	-1.1	-2.4	-4.1	-5.8	-6.9	-7.6	-8.6	-6.1	-0.9																							
5-Apr	-9.3	-10.0	-10.4	-11.0	-11.4	-12.3	-12.7	-12.0	-10.5	-9.2	-7.7	-6.1	-4.5	-4.4	-3.6	-3.4	-3.2	-3.3	-4.0	-5.5	-6.7	-7.5	-8.3	-8.6	-7.7	-3.2																							
6-Apr	-8.4	-8.7	-9.2	-9.6	-10.6	-11.4	-10.5	-8.8	-6.3	-3.5	-0.6	2.7	4.8	5.6	5.8	6.4	6.9	6.7	5.5	4.2	1.9	2.0	1.0	0.0	-1.4	6.9																							
7-Apr	-0.9	-1.6	-1.8	-2.4	-2.7	-2.6	-1.1	1.2	3.7	4.9	6.9	8.5	9.2	10.1	10.1	9.5	8.9	8.6	7.7	4.1	1.2	0.5	-0.2	-1.0	3.4	10.1																							
8-Apr	-1.4	-1.1	-1.8	-2.0	-2.0	-2.0	-1.6	-0.8	0.9	3.8	6.5	8.2	10.1	10.4	11.0	11.1	10.5	9.9	8.9	7.1	5.4	3.6	2.1	0.7	4.1	11.1																							
9-Apr	-0.4	-0.7	-0.9	-0.2	-0.6	-0.8	-0.1	2.1	4.5	6.9	10.7	16.3	18.5	19.4	20.0	19.8	19.8	19.2	17.6	13.5	10.6	9.4	7.4	6.1	9.1	20.0																							
10-Apr	5.5	4.6	3.7	2.6	2.2	2.5	3.4	5.4	8.0	11.0	14.5	17.4	18.7	20.0	21.6	21.5	20.8	20.0	18.5	14.4	11.4	10.3	9.1	7.8	11.4	21.6																							
11-Apr	6.5	5.7	4.7	4.2	2.6	2.2	3.5	6.5	9.6	11.8	13.2	13.8	16.0	15.7	16.2	16.0	15.4	14.7	12.8	9.9	8.1	7.4	6.5	5.0	9.5	16.2																							
12-Apr	4.1	4.4	3.6	2.7	2.0	1.8	2.6	4.1	5.3	6.7	7.3	8.7	9.1	9.9	9.5	9.4	9.1	9.1	8.5	8.0	6.9	5.7	5.4	4.4	6.2	9.9																							
13-Apr	4.5	2.6	2.5	3.6	3.6	2.9	2.5	3.3	5.5	6.8	8.3	9.6	10.5	10.7	11.3	11.5	11.4	11.3	10.4	7.7	5.2	3.1	3.7	3.4	6.5	11.5																							
14-Apr	2.1	1.6	1.3	0.8	0.3	0.3	1.0	2.3	4.7	6.4	8.1	8.8	10.4	12.0	12.8	11.5	9.5	7.9	6.0	5.1	4.2	3.1	2.4	2.2	5.2	12.8																							
15-Apr	2.2	2.0	1.5	0.7	-0.7	-1.4	-0.4	1.6	4.9	7.8	10.1	10.7	11.7	12.1	12.4	12.7	13.0	12.6	12.5	9.8	8.3	10.2	9.0	7.4	7.1	13.0																							
16-Apr	6.3	5.6	6.1	5.4	4.7	4.3	5.6	7.6	8.9	10.9	11.6	12.3	12.6	12.9	13.0	13.1	13.1	10.6	8.5	7.0	6.0	4.5	3.3	2.6	8.2	13.1																							
17-Apr	1.0	0.3	-0.3	-1.1	-1.8	-1.2	0.7	3.0	5.4	8.2	11.2	13.5	15.0	14.2	11.6	9.4	6.9	5.8	5.4	5.1	4.8	4.8	4.7	4.7	5.5	15.0																							
18-Apr	4.2	4.2	4.3	4.1	3.7	3.4	3.5	4.5	5.1	7.9	11.2	12.5	12.0	11.3	10.3	12.5	12.6	11.0	10.6	8.6	6.4	4.6	3.1	1.9	7.2	12.6																							
19-Apr	0.7	0.2	-0.7	-0.7	-1.2	-1.6	0.3	2.3	5.0	8.4	10.7	11.7	12.6	13.9	14.0	13.8	13.7	13.3	12.7	11.0	8.6	7.7	7.2	7.0	7.1	14.0																							
20-Apr	6.6	6.3	5.7	5.7	4.2	3.2	5.1	6.8	8.3	10.8	12.2	14.3	15.1	15.6	15.8	16.2	15.5	15.7	14.4	12.2	10.3	8.5	7.1	5.9	10.1	16.2																							
21-Apr	4.8	3.1	2.7	1.6	0.6	0.3	1.9	4.1	6.2	9.2	11.8	13.1	13.9	14.4	15.1	15.0	15.3	14.9	13.8	12.1	10.3	8.4	6.9	5.9	8.6	15.3																							
22-Apr	4.7	3.8	3.0	2.0	1.3	0.9	1.5	2.9	4.4	6.3	8.5	10.6	12.3	13.3	14.0	14.1	14.1	14.0	13.0	11.5	9.9	8.6	7.4	6.4	7.9	14.1																							
23-Apr	5.6	4.8	4.0	3.4	2.9	2.7	2.6	3.2	4.2	5.5	6.9	9.5	11.4	12.3	12.5	12.6	12.0	11.7	11.1	10.0	7.1	5.3	3.7	2.5	7.0	12.6																							
24-Apr	1.0	-0.3	-1.5	-2.6	-3.7	-4.4	-3.9	-2.6	-1.4	0.4	1.7	2.5	3.2	3.9	4.4	4.4	3.8	3.2	2.1	0.6	-1.1	-2.0	-2.7	-3.5	0.1	4.4																							
25-Apr	-4.3	-4.9	-5.7	-6.3	-7.1	-6.9	-5.4	-3.4	-1.2	0.5	2.4	4.0	5.2	5.4	6.7	6.8	7.4	7.6	7.1	4.9	4.0	3.6	2.2	0.9	1.0	7.6																							
26-Apr	0.2	-1.2	-2.2	-3.5	-4.1	-3.2	-1.0	1.7	4.0	6.9	8.2	9.0	9.7	10.5	10.8	11.2	11.4	11.4	11.3	10.6	9.2	8.4	7.8	6.4	5.6	11.4																							
27-Apr	5.5	3.7	2.6	2.3	1.5	1.8	2.5	4.3	8.2	12.4	16.5	17.3	18.0	18.8	18.8	18.6	18.8	19.3	18.5	17.1	13.6	11.6	11.2	9.9	11.4	19.3																							
28-Apr	8.7	7.2	6.5	5.7	5.5	5.9	7.8	10.3	14.5	18.2	20.1	22.0	23.3	23.6	24.1	24.4	24.1	23.1	22.1	21.3	20.1	17.6	15.7	16.3	16.2	24.4																							
29-Apr	15.4	15.0	13.5	12.2	11.7	11.3	11.0	10.6	9.9	11.0	12.7	14.5	15.4	15.8	15.8	15.7	15.6	15.7	15.1	13.2	11.0	9.9	9.4	8.7	12.9	15.8																							
30-Apr	8.2	7.8	8.2	7.7	7.1	7.4	8.8	10.5	11.7	13.0	12.4	11.1	11.8	12.9	13.8	13.4	12.7	11.7	12.2	10.7	7.9	6.8	6.3	4.5	9.9	13.8																							
																								1.8	1.2	0.6	0.1	-0.6	-0.8	-0.1	1.4	3.2	5.4	7.3	8.8	9.9	10.4	10.8	10.8	10.5	10.0	9.0	7.3	5.5	4.4	3.5	2.6	Diurnal Average	
																								15.4	15.0	13.5	12.2	11.7	11.3	11.0	10.6	14.5	18.2	20.1	22.0	23.3	23.6	24.1	24.4	24.1	23.1	22.1	21.3	20.1	17.6	15.7	16.3	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2 m (AT2m) - C**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 2 m (AT2m) - C**  
**Mannix - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	189	26.25	26.25
0 - 10	326	45.28	71.53
10 - 20	189	26.25	97.78
> 20	16	2.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

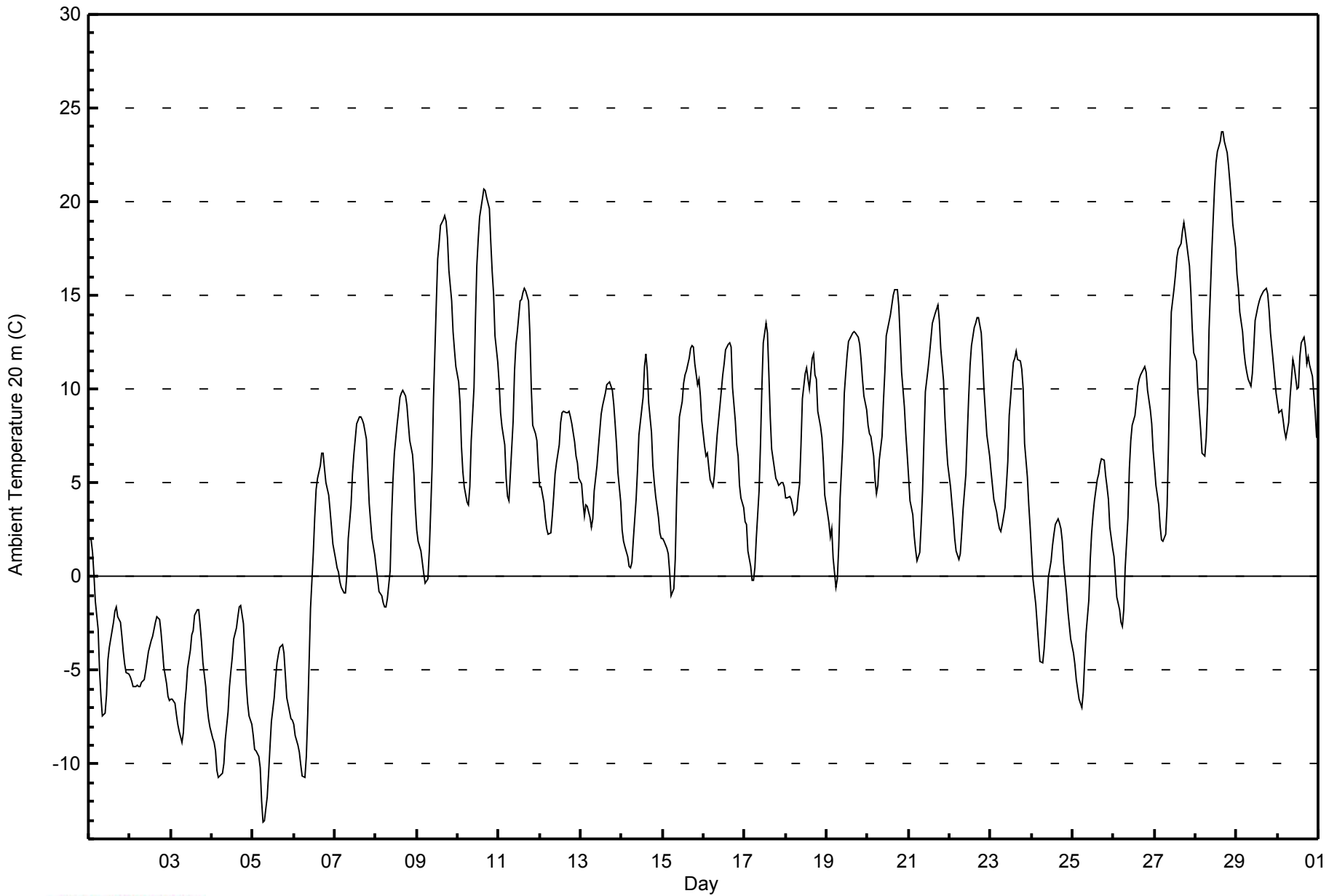
Mannix - April 2015

Maximum Value: 23.8 C on Apr 28 17:00		Maximum Daily Average: 16.6 C on Apr 28		Hours in Service: 720																							
Minimum Value: -13.1 C on Apr 5 07:00		Minimum Daily Average: -7.9 C on Apr 5		Hours of Data: 720																							
Maximum Diurnal Average: 9.9 C at hour 17		Minimum Diurnal Average: -0.4 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 5.11 C		Percentiles: P <sub>1</sub> = -10.5 P <sub>10</sub> = -5.6 Q <sub>1</sub> = 0.3 Median = 5.4 Q <sub>3</sub> = 10.5 P <sub>90</sub> = 14.1 P <sub>99</sub> = 21.7		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-Apr	2.1	1.9	1.3	0.1	-1.3	-2.8	-4.9	-6.4	-7.4	-7.3	-6.3	-4.5	-3.8	-3.3	-2.4	-1.9	-1.6	-2.1	-2.4	-3.2	-4.0	-4.7	-5.1	-5.2	-3.1	2.1	
2-Apr	-5.4	-5.6	-5.9	-5.9	-5.8	-5.8	-5.9	-5.7	-5.5	-5.1	-4.5	-4.0	-3.4	-3.2	-2.8	-2.4	-2.1	-2.3	-3.0	-3.8	-4.9	-5.7	-6.4	-6.6	-4.7	-2.1	
3-Apr	-6.6	-6.6	-6.8	-7.4	-7.8	-8.3	-8.9	-8.3	-6.8	-6.0	-4.9	-3.9	-3.1	-2.9	-2.0	-1.8	-1.8	-2.6	-3.5	-4.6	-5.9	-6.9	-7.6	-8.1	-5.5	-1.8	
4-Apr	-8.6	-8.8	-9.3	-10.3	-10.7	-10.5	-10.5	-10.0	-8.7	-7.2	-5.9	-5.0	-4.3	-3.3	-2.8	-2.1	-1.6	-1.6	-2.5	-4.0	-5.7	-6.7	-7.5	-7.9	-6.5	-1.6	
5-Apr	-8.5	-9.2	-9.3	-9.6	-10.2	-12.0	-13.1	-13.0	-11.8	-10.5	-9.1	-7.7	-6.5	-5.5	-4.6	-4.1	-3.8	-3.6	-4.1	-5.3	-6.5	-7.2	-7.6	-7.7	-7.9	-3.6	
6-Apr	-7.9	-8.5	-9.0	-9.4	-10.1	-10.6	-10.7	-9.6	-7.4	-4.5	-1.7	1.3	3.2	4.6	5.2	5.9	6.6	6.6	5.8	5.1	4.4	3.5	2.6	1.7	-1.4	6.6	
7-Apr	1.0	0.5	0.3	-0.3	-0.6	-0.9	-0.9	0.1	2.0	3.8	5.5	6.5	7.3	8.1	8.5	8.5	8.4	8.1	7.3	5.6	3.9	2.9	2.1	1.1	3.7	8.5	
8-Apr	0.5	-0.1	-0.8	-1.0	-1.4	-1.6	-1.6	-1.2	0.3	3.2	5.1	6.6	8.1	8.8	9.5	9.8	9.9	9.7	9.1	8.1	7.3	6.5	5.4	3.6	4.3	9.9	
9-Apr	2.5	1.9	1.4	0.8	0.1	-0.4	-0.1	1.4	3.5	5.8	9.5	14.6	17.0	17.8	18.8	19.1	19.3	19.0	18.1	16.3	14.7	13.0	12.1	11.2	9.9	19.3	
10-Apr	10.4	9.3	6.9	5.6	4.8	4.0	3.8	4.8	7.2	10.1	13.6	16.6	18.0	19.2	20.1	20.7	20.6	20.3	19.6	17.9	16.3	15.1	12.8	11.4	12.9	20.7	
11-Apr	10.3	8.7	8.0	7.0	5.2	4.3	4.1	5.4	8.3	11.0	12.4	13.1	14.7	14.8	15.2	15.4	15.2	14.7	12.9	10.0	8.1	7.6	7.2	5.8	10.0	15.4	
12-Apr	4.8	4.8	4.0	3.1	2.5	2.3	2.4	3.2	4.2	5.5	6.1	7.1	8.2	8.8	8.8	8.7	8.8	8.8	8.5	8.2	7.2	6.4	6.1	5.3	6.0	8.8	
13-Apr	5.0	4.0	3.2	3.8	3.7	3.1	2.7	3.1	4.5	5.9	6.9	7.8	8.7	9.2	9.8	10.2	10.3	10.4	9.9	9.2	8.2	7.1	5.5	3.9	6.5	10.4	
14-Apr	2.4	1.9	1.6	1.1	0.6	0.5	0.8	2.0	4.2	5.7	7.5	8.3	9.6	11.2	11.9	11.0	9.3	7.7	5.9	5.0	4.3	3.2	2.4	2.1	5.0	11.9	
15-Apr	2.0	1.9	1.5	1.2	0.3	-1.0	-0.7	0.9	4.2	6.6	8.5	9.3	10.3	10.8	11.0	11.7	12.2	12.3	12.3	11.4	10.2	10.5	9.7	8.3	6.9	12.3	
16-Apr	7.0	6.5	6.6	5.8	5.2	4.8	5.4	6.5	7.5	9.1	9.9	10.8	11.4	12.1	12.4	12.5	12.3	10.1	8.3	7.0	6.4	4.9	4.2	3.6	7.9	12.5	
17-Apr	3.0	2.8	1.3	0.5	-0.2	-0.2	0.5	2.0	4.5	7.0	10.1	12.5	13.5	13.0	10.8	8.5	6.8	5.8	5.3	5.1	4.9	5.0	5.0	4.8	5.5	13.5	
18-Apr	4.2	4.2	4.3	4.1	3.8	3.3	3.5	4.4	4.9	7.0	9.5	10.8	11.1	10.6	10.0	11.6	11.8	10.8	10.6	8.8	8.0	7.4	6.1	4.4	7.3	11.8	
19-Apr	3.4	2.8	2.1	2.6	1.0	-0.6	-0.1	1.6	4.2	7.3	9.8	10.9	11.8	12.6	12.9	13.0	13.1	13.0	12.8	12.4	11.6	10.5	9.6	8.9	7.8	13.1	
20-Apr	8.0	7.6	7.5	6.4	5.2	4.4	4.9	6.2	7.5	9.3	10.9	12.8	13.6	13.9	14.5	15.0	15.3	15.3	14.4	12.7	10.9	9.0	7.6	6.5	10.0	15.3	
21-Apr	5.3	4.1	3.3	2.2	1.4	0.8	1.3	2.8	4.6	7.3	9.9	11.1	11.8	12.7	13.5	14.0	14.3	14.5	13.7	12.2	10.4	8.5	7.1	6.0	8.0	14.5	
22-Apr	4.8	3.9	3.1	2.1	1.4	0.9	1.2	2.3	3.6	5.5	7.5	9.5	11.3	12.3	13.3	13.5	13.8	13.8	13.0	11.6	10.0	8.7	7.5	6.5	7.5	13.8	
23-Apr	5.6	4.9	4.1	3.5	2.9	2.6	2.4	2.8	3.7	4.9	6.1	8.6	10.5	11.4	11.7	12.0	11.6	11.5	11.0	10.0	7.1	5.3	3.8	2.6	6.7	12.0	
24-Apr	1.2	-0.2	-1.5	-2.5	-3.6	-4.6	-4.6	-3.9	-2.6	-1.4	-0.1	0.9	1.6	2.2	2.8	3.1	2.9	2.6	1.9	0.7	-0.9	-1.8	-2.6	-3.4	-0.6	3.1	
25-Apr	-4.1	-4.7	-5.5	-6.0	-6.6	-7.0	-6.2	-4.6	-3.0	-1.2	0.9	2.3	3.3	4.0	5.1	5.4	6.0	6.3	6.2	5.4	4.8	4.1	2.6	1.5	0.4	6.3	
26-Apr	1.1	0.0	-1.1	-1.8	-2.4	-2.6	-1.7	0.5	3.2	5.7	7.2	8.1	8.6	9.4	10.2	10.5	10.8	11.0	11.2	10.9	9.9	8.9	8.1	6.7	5.5	11.2	
27-Apr	5.9	4.9	3.8	2.7	2.0	1.9	2.2	3.8	7.1	11.1	14.1	15.4	16.2	17.0	17.5	17.8	18.4	18.9	18.4	17.7	16.6	15.1	13.2	11.9	11.4	18.9	
28-Apr	11.5	10.0	8.9	7.8	6.6	6.4	7.4	9.3	13.1	17.3	19.1	20.8	22.1	22.7	23.2	23.8	23.8	23.2	22.6	21.9	21.0	20.0	18.8	17.5	16.6	23.8	
29-Apr	16.1	15.4	14.1	13.0	12.0	11.4	10.9	10.6	10.2	10.8	12.2	13.7	14.4	14.7	14.9	15.1	15.2	15.4	15.1	14.2	13.0	11.4	10.6	9.8	13.1	16.1	
30-Apr	9.3	8.8	8.9	8.4	7.8	7.4	8.2	9.6	10.6	11.6	11.2	10.0	10.1	11.7	12.5	12.8	12.3	11.4	11.8	11.3	10.7	9.7	8.7	7.4	10.1	12.8	
		2.9	2.2	1.6	0.9	0.2	-0.4	-0.3	0.7	2.3	4.3	6.0	7.5	8.5	9.2	9.7	9.9	9.9	9.6	9.0	7.9	6.7	5.7	4.7	3.8	Diurnal Average	
		16.1	15.4	14.1	13.0	12.0	11.4	10.9	10.6	13.1	17.3	19.1	20.8	22.1	22.7	23.2	23.8	23.8	23.2	22.6	21.9	21.0	20.0	18.8	17.5	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature 20 m (AT20m) - C**  
**Mannix - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 20 m (AT20m) - C**  
**Mannix - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	175	24.31	24.31
0 - 10	347	48.19	72.50
10 - 20	183	25.42	97.92
> 20	15	2.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

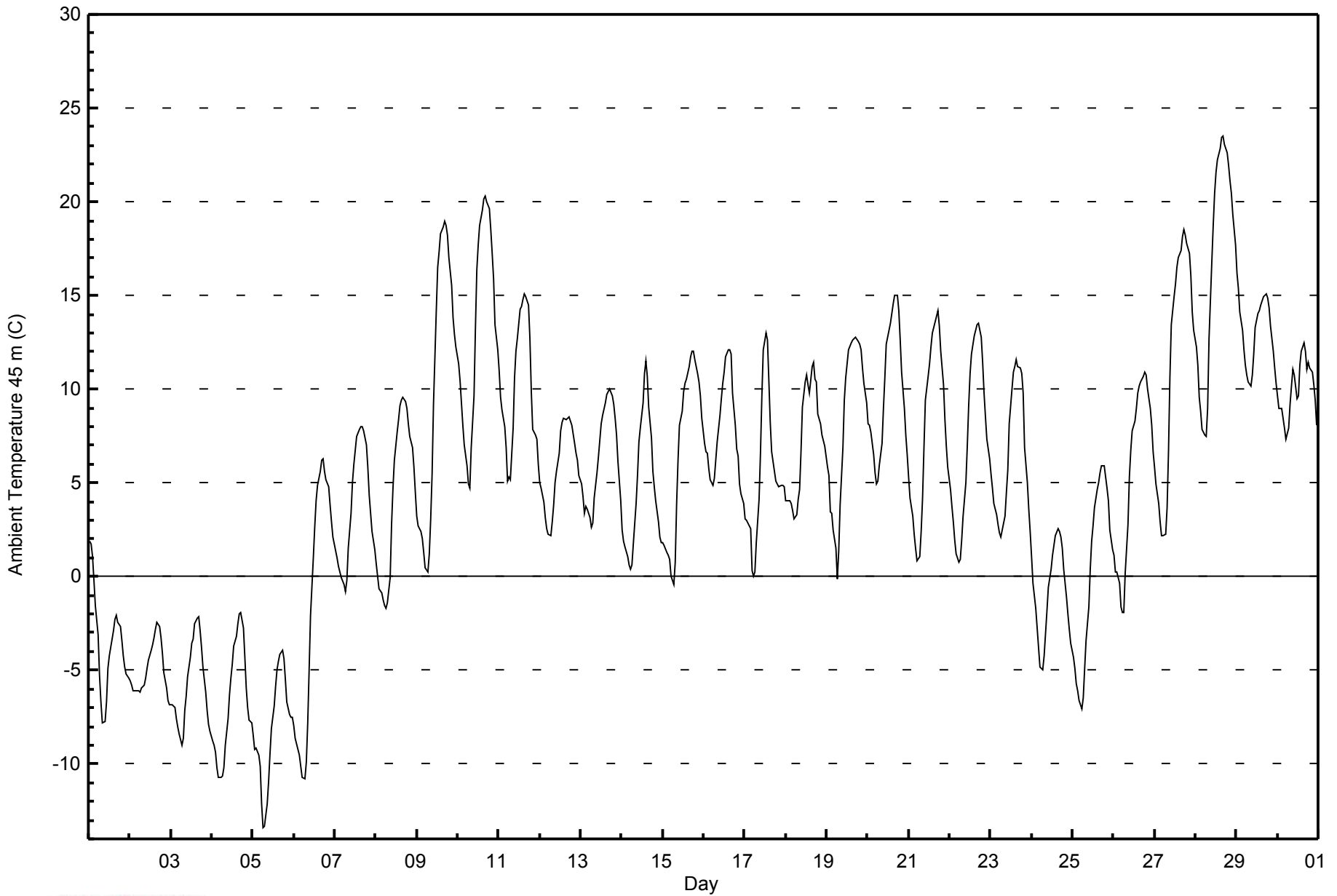
Mannix - April 2015

Maximum Value: 23.5 C on Apr 28 17:00																				Maximum Daily Average: 16.8 C on Apr 28					Hours in Service: 720																							
Minimum Value: -13.4 C on Apr 5 07:00																				Minimum Daily Average: -8.1 C on Apr 5					Hours of Data: 720																							
Maximum Diurnal Average: 9.6 C at hour 17																				Minimum Diurnal Average: -0.3 C at hour 7					Hours of Missing Data: 0																							
Monthly Average: 5.02 C																				Percentiles: P <sub>1</sub> = -10.7 P <sub>10</sub> = -5.9 Q <sub>1</sub> = 0.4 Median = 5.4 Q <sub>3</sub> = 10.4 P <sub>90</sub> = 13.8 P <sub>99</sub> = 21.7					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-Apr	1.9	1.7	1.1	-0.2	-1.5	-3.1	-5.3	-6.7	-7.8	-7.7	-6.7	-4.9	-4.2	-3.8	-2.9	-2.3	-2.1	-2.4	-2.7	-3.4	-4.2	-4.9	-5.2	-5.4	-3.4	1.9																						
2-Apr	-5.6	-5.8	-6.1	-6.1	-6.1	-6.1	-6.1	-5.9	-5.8	-5.4	-4.9	-4.4	-3.9	-3.6	-3.2	-2.8	-2.5	-2.7	-3.3	-4.1	-5.1	-6.0	-6.7	-6.9	-5.0	-2.5																						
3-Apr	-6.8	-6.8	-7.0	-7.6	-8.0	-8.4	-9.0	-8.6	-7.2	-6.4	-5.3	-4.3	-3.6	-3.3	-2.5	-2.2	-2.2	-2.9	-3.7	-4.9	-6.1	-7.1	-7.9	-8.3	-5.8	-2.2																						
4-Apr	-8.8	-9.0	-9.4	-10.2	-10.7	-10.7	-10.6	-10.2	-9.0	-7.6	-6.3	-5.4	-4.7	-3.7	-3.2	-2.5	-2.0	-1.9	-2.8	-4.3	-5.9	-7.0	-7.6	-7.8	-6.7	-1.9																						
5-Apr	-8.5	-9.2	-9.1	-9.5	-10.1	-12.2	-13.4	-13.4	-12.1	-10.9	-9.5	-8.1	-6.9	-5.9	-5.0	-4.5	-4.1	-4.0	-4.3	-5.5	-6.7	-7.4	-7.5	-7.5	-8.1	-4.0																						
6-Apr	-8.0	-8.6	-9.2	-9.5	-10.1	-10.7	-10.8	-9.9	-7.8	-5.0	-2.0	1.0	2.6	4.1	4.9	5.6	6.2	6.3	5.6	5.1	4.8	3.8	2.9	2.1	-1.5	6.3																						
7-Apr	1.4	1.0	0.6	0.3	0.0	-0.5	-0.8	-0.2	1.5	3.4	5.0	6.0	6.7	7.5	7.9	8.0	8.0	7.8	7.1	5.8	4.4	3.3	2.4	1.5	3.7	8.0																						
8-Apr	0.7	0.0	-0.6	-0.9	-1.2	-1.5	-1.7	-1.4	-0.1	2.8	4.7	6.2	7.7	8.4	9.1	9.4	9.6	9.4	8.9	8.2	7.5	6.9	5.9	4.5	4.3	9.6																						
9-Apr	3.3	2.7	2.4	2.0	1.3	0.5	0.3	1.2	3.1	5.5	9.2	14.2	16.5	17.3	18.3	18.6	18.9	18.8	18.2	17.0	15.6	13.8	12.9	12.2	10.2	18.9																						
10-Apr	11.3	10.4	9.3	8.1	7.0	5.9	5.0	4.7	6.9	9.6	13.2	16.3	17.7	18.8	19.6	20.1	20.3	20.0	19.6	18.5	17.3	15.9	13.5	12.1	13.4	20.3																						
11-Apr	11.0	9.6	8.9	8.0	6.9	5.1	5.3	5.2	7.9	10.6	12.1	12.7	14.2	14.4	14.8	15.1	15.0	14.5	12.7	9.8	7.9	7.6	7.3	6.0	10.1	15.1																						
12-Apr	5.0	4.7	4.0	3.1	2.5	2.2	2.2	2.9	3.8	5.0	5.6	6.6	7.8	8.3	8.4	8.4	8.5	8.5	8.3	8.1	7.1	6.6	6.2	5.4	5.8	8.5																						
13-Apr	5.0	4.2	3.4	3.7	3.6	3.1	2.6	2.9	4.2	5.5	6.4	7.3	8.1	8.6	9.3	9.7	9.9	10.0	9.7	9.2	8.5	7.6	6.1	4.0	6.4	10.0																						
14-Apr	2.5	1.9	1.6	1.1	0.6	0.4	0.6	1.8	3.9	5.4	7.2	7.9	9.2	10.8	11.5	10.7	9.0	7.4	5.6	4.8	4.1	3.0	2.1	1.8	4.8	11.5																						
15-Apr	1.8	1.6	1.3	1.1	0.9	0.0	-0.4	0.7	3.9	6.2	8.0	8.8	9.8	10.3	10.5	11.2	11.7	12.0	12.0	11.6	10.9	10.4	9.7	8.4	6.8	12.0																						
16-Apr	7.1	6.6	6.6	5.8	5.2	4.9	5.2	6.2	7.1	8.6	9.5	10.3	10.9	11.7	12.1	12.1	11.8	9.8	8.1	6.8	6.4	4.9	4.4	3.9	7.8	12.1																						
17-Apr	3.1	3.0	2.8	2.5	0.3	0.1	0.2	1.8	4.1	6.6	9.6	12.1	13.0	12.6	10.5	8.2	6.7	5.6	5.1	4.9	4.8	4.9	4.9	4.8	5.5	13.0																						
18-Apr	4.1	4.0	4.1	3.9	3.5	3.1	3.3	4.2	4.7	6.7	9.1	10.4	10.7	10.2	9.8	11.2	11.4	10.6	10.4	8.7	8.2	7.5	7.2	7.0	7.2	11.4																						
19-Apr	5.8	5.4	3.4	3.3	2.4	1.5	-0.1	1.4	3.8	6.9	9.4	10.6	11.4	12.1	12.4	12.6	12.7	12.7	12.6	12.4	12.1	11.2	10.3	9.3	8.2	12.7																						
20-Apr	8.2	8.1	7.7	6.5	5.6	5.0	5.1	5.9	7.1	9.0	10.6	12.4	13.1	13.5	14.0	14.6	15.0	15.0	14.2	12.6	10.9	9.0	7.6	6.5	9.9	15.0																						
21-Apr	5.3	4.2	3.3	2.2	1.5	0.9	1.1	2.4	4.2	6.9	9.4	10.6	11.3	12.2	13.0	13.6	13.9	14.2	13.4	12.0	10.3	8.4	6.9	5.8	7.8	14.2																						
22-Apr	4.6	3.7	2.9	1.9	1.2	0.7	0.9	1.9	3.2	5.0	7.0	9.1	10.8	11.9	12.8	13.1	13.4	13.5	12.8	11.4	9.8	8.5	7.4	6.3	7.2	13.5																						
23-Apr	5.4	4.7	3.9	3.3	2.8	2.3	2.1	2.4	3.3	4.5	5.7	8.1	10.0	10.9	11.2	11.6	11.2	11.1	10.8	9.8	6.8	5.1	3.6	2.4	6.4	11.6																						
24-Apr	1.1	-0.4	-1.7	-2.7	-3.8	-4.8	-4.9	-4.3	-3.1	-1.9	-0.6	0.4	1.1	1.7	2.2	2.5	2.4	2.1	1.5	0.4	-1.1	-2.0	-2.8	-3.6	-0.9	2.5																						
25-Apr	-4.3	-4.9	-5.7	-6.1	-6.6	-7.0	-6.5	-4.9	-3.4	-1.6	0.4	1.9	2.7	3.6	4.7	5.0	5.5	5.9	5.9	5.3	4.7	4.1	2.5	1.5	0.1	5.9																						
26-Apr	1.1	0.2	0.2	-0.4	-1.6	-1.9	-1.9	0.2	2.8	5.3	6.8	7.8	8.3	9.0	9.8	10.2	10.4	10.7	10.9	10.8	10.0	8.9	8.1	6.6	5.5	10.9																						
27-Apr	5.8	5.0	3.9	3.0	2.2	2.2	2.2	3.6	6.6	10.6	13.4	14.9	15.6	16.5	17.0	17.4	18.1	18.5	18.2	17.8	17.3	16.0	14.1	13.2	11.4	18.5																						
28-Apr	12.3	11.3	9.6	8.8	7.8	7.5	7.5	9.0	12.7	16.8	18.7	20.4	21.6	22.3	22.8	23.4	23.5	23.0	22.6	21.9	21.1	20.4	19.4	17.7	16.8	23.5																						
29-Apr	16.2	15.4	14.1	13.1	12.1	11.3	10.8	10.4	10.2	10.7	11.9	13.3	14.0	14.2	14.5	14.7	14.9	15.1	14.9	14.4	13.4	12.0	11.1	10.3	13.0	16.2																						
30-Apr	9.7	9.0	9.0	8.5	7.9	7.4	7.9	9.2	10.2	11.0	10.7	9.5	9.6	11.3	12.0	12.5	12.0	11.1	11.4	11.1	10.9	10.2	9.4	8.1	10.0	12.5																						
																								3.1	2.5	1.8	1.2	0.5	-0.1	-0.3	0.4	2.0	3.9	5.6	7.1	8.1	8.7	9.2	9.5	9.6	9.3	8.8	7.9	6.8	5.9	4.9	4.1	Diurnal Average
																								16.2	15.4	14.1	13.1	12.1	11.3	10.8	10.4	12.7	16.8	18.7	20.4	21.6	22.3	22.8	23.4	23.5	23.0	22.6	21.9	21.1	20.4	19.4	17.7	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Ambient Temperature 45 m (AT45m) - C**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 45 m (AT45m) - C**  
**Mannix - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	171	23.75	23.75
0 - 10	356	49.44	73.19
10 - 20	179	24.86	98.06
> 20	14	1.94	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

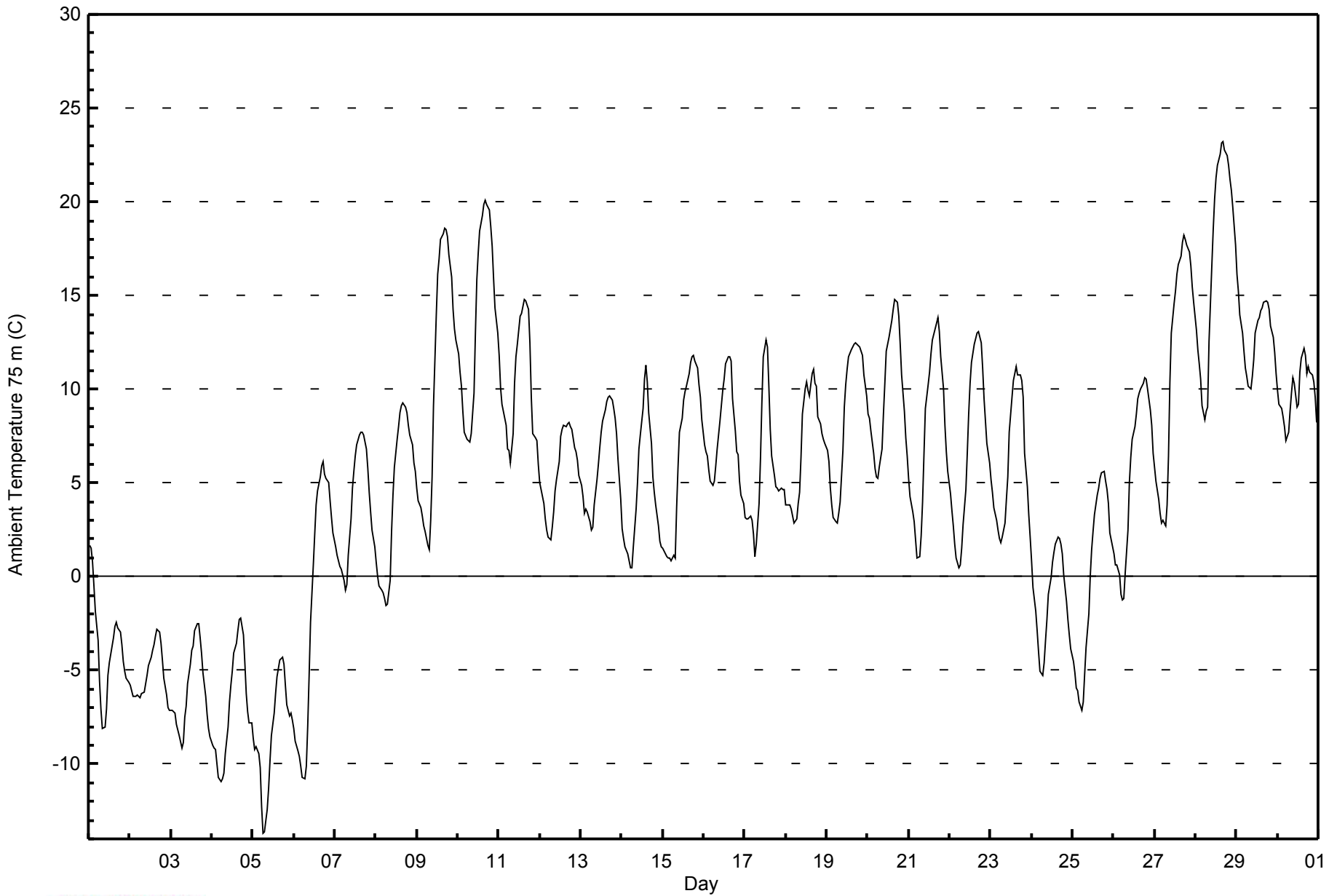
Mannix - April 2015

Maximum Value: 23.2 C on Apr 28 17:00		Maximum Daily Average: 17.0 C on Apr 28		Hours in Service: 720																							
Minimum Value: -13.7 C on Apr 5 07:00		Minimum Daily Average: -8.4 C on Apr 5		Hours of Data: 720																							
Maximum Diurnal Average: 9.3 C at hour 17		Minimum Diurnal Average: 0.0 C at hour 7		Hours of Missing Data: 0																							
Monthly Average: 4.93 C		Percentiles: P <sub>1</sub> = -10.8 P <sub>10</sub> = -6.2 Q <sub>1</sub> = 0.7 Median = 5.4 Q <sub>3</sub> = 10.2 P <sub>90</sub> = 13.8 P <sub>99</sub> = 21.9		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-Apr	1.7	1.5	0.8	-0.5	-1.9	-3.4	-5.6	-7.1	-8.1	-8.1	-7.1	-5.3	-4.6	-4.2	-3.2	-2.7	-2.4	-2.8	-3.0	-3.7	-4.5	-5.1	-5.4	-5.7	-3.8	1.7	
2-Apr	-5.8	-6.1	-6.4	-6.4	-6.3	-6.4	-6.4	-6.2	-6.1	-5.7	-5.3	-4.8	-4.3	-4.0	-3.6	-3.2	-2.8	-3.0	-3.6	-4.4	-5.4	-6.3	-7.0	-7.2	-5.3	-2.8	
3-Apr	-7.1	-7.1	-7.3	-7.9	-8.2	-8.5	-9.1	-8.9	-7.5	-6.9	-5.7	-4.7	-3.9	-3.7	-2.9	-2.5	-2.5	-3.2	-4.1	-5.1	-6.4	-7.4	-8.1	-8.5	-6.1	-2.5	
4-Apr	-9.0	-9.2	-9.2	-10.0	-10.7	-10.9	-10.8	-10.5	-9.4	-8.1	-6.7	-5.8	-5.0	-4.1	-3.5	-2.9	-2.3	-2.2	-3.1	-4.6	-6.2	-7.2	-7.8	-7.8	-7.0	-2.2	
5-Apr	-8.7	-9.2	-9.1	-9.5	-10.2	-12.3	-13.7	-13.6	-12.5	-11.3	-9.9	-8.5	-7.3	-6.2	-5.4	-4.9	-4.5	-4.3	-4.7	-5.8	-6.9	-7.4	-7.3	-7.7	-8.4	-4.3	
6-Apr	-8.1	-8.8	-9.3	-9.6	-10.1	-10.7	-10.8	-10.1	-8.0	-5.3	-2.4	0.6	2.2	3.8	4.6	5.3	5.9	6.1	5.5	5.2	5.0	4.0	3.1	2.3	-1.6	6.1	
7-Apr	1.6	1.1	0.8	0.6	0.4	-0.2	-0.7	-0.4	1.2	3.1	4.7	5.6	6.4	7.1	7.5	7.7	7.7	7.5	6.8	5.8	4.5	3.5	2.5	1.6	3.6	7.7	
8-Apr	0.8	0.0	-0.5	-0.8	-0.9	-1.2	-1.5	-1.5	-0.2	2.4	4.4	5.9	7.4	8.0	8.7	9.1	9.2	9.1	8.7	8.1	7.5	7.0	6.1	5.6	4.2	9.2	
9-Apr	4.7	4.1	3.7	3.2	2.7	2.4	1.7	1.4	3.0	5.3	9.1	14.0	16.1	16.9	18.0	18.3	18.6	18.5	18.1	17.2	15.9	14.3	13.2	12.6	10.5	18.6	
10-Apr	11.9	10.9	10.2	8.9	7.7	7.3	7.3	7.2	7.6	9.8	13.0	15.8	17.3	18.4	19.3	19.9	20.1	19.8	19.5	18.7	17.6	15.9	14.3	13.0	13.8	20.1	
11-Apr	11.8	10.1	9.2	8.4	8.0	6.8	6.7	6.1	7.7	10.3	11.7	12.4	13.9	14.1	14.4	14.8	14.7	14.3	12.5	9.6	7.6	7.4	7.3	6.0	10.2	14.8	
12-Apr	5.0	4.6	3.9	3.1	2.5	2.1	2.0	2.6	3.4	4.6	5.2	6.2	7.4	7.9	8.1	8.0	8.2	8.2	8.0	7.8	6.9	6.6	6.2	5.4	5.6	8.2	
13-Apr	4.9	4.3	3.4	3.6	3.4	3.0	2.5	2.7	3.8	5.1	6.0	6.9	7.7	8.3	8.9	9.3	9.5	9.7	9.4	9.0	8.4	7.6	6.3	4.1	6.2	9.7	
14-Apr	2.6	2.0	1.6	1.2	0.8	0.5	0.5	1.6	3.6	5.0	6.8	7.6	9.0	10.5	11.3	10.4	8.7	7.1	5.3	4.5	3.8	2.7	1.9	1.5	4.6	11.3	
15-Apr	1.5	1.4	1.0	1.0	1.0	0.9	1.1	1.0	3.7	5.8	7.7	8.5	9.4	9.9	10.2	10.8	11.4	11.8	11.8	11.5	11.1	10.2	9.6	8.4	6.7	11.8	
16-Apr	7.1	6.7	6.5	5.7	5.1	4.9	5.1	5.9	6.8	8.3	9.1	9.9	10.5	11.3	11.7	11.7	11.5	9.5	7.8	6.6	6.5	5.1	4.3	3.9	7.6	11.7	
17-Apr	3.2	3.1	3.1	3.3	3.0	2.3	1.1	1.7	3.9	6.3	9.3	11.7	12.7	12.2	10.2	7.9	6.4	5.4	4.8	4.7	4.6	4.7	4.7	4.7	5.6	12.7	
18-Apr	3.8	3.8	3.8	3.6	3.2	2.8	3.1	3.9	4.5	6.4	8.7	10.0	10.4	9.9	9.6	10.9	11.1	10.3	10.1	8.5	8.1	7.6	7.4	7.1	7.0	11.1	
19-Apr	6.7	6.1	4.7	3.8	3.2	2.9	2.9	3.4	4.0	6.8	9.0	10.2	11.1	11.7	12.1	12.3	12.4	12.5	12.3	12.2	12.0	11.8	10.8	9.6	8.5	12.5	
20-Apr	8.7	8.4	7.8	6.6	5.7	5.3	5.2	5.8	6.8	8.7	10.3	12.0	12.8	13.2	13.7	14.2	14.8	14.7	13.9	12.4	10.7	8.8	7.4	6.4	9.8	14.8	
21-Apr	5.2	4.3	3.5	2.9	1.9	1.0	1.1	2.2	3.9	6.5	9.0	10.2	10.9	11.9	12.6	13.2	13.5	13.8	13.1	11.7	10.0	8.1	6.7	5.6	7.6	13.8	
22-Apr	4.4	3.5	2.7	1.7	1.0	0.5	0.6	1.5	2.8	4.6	6.6	8.7	10.3	11.4	12.4	12.7	13.0	13.1	12.5	11.1	9.5	8.3	7.1	6.0	6.9	13.1	
23-Apr	5.2	4.5	3.7	3.0	2.5	2.1	1.8	2.1	2.9	4.1	5.3	7.7	9.6	10.5	10.8	11.2	10.8	10.8	10.5	9.5	6.6	4.8	3.3	2.1	6.1	11.2	
24-Apr	0.9	-0.5	-1.9	-2.9	-4.0	-5.0	-5.3	-4.6	-3.4	-2.3	-1.0	0.0	0.7	1.3	1.8	2.1	2.0	1.7	1.2	0.1	-1.3	-2.3	-3.1	-3.9	-1.2	2.1	
25-Apr	-4.6	-5.1	-5.9	-6.1	-6.7	-7.2	-6.7	-5.2	-3.8	-2.0	0.0	1.5	2.4	3.3	4.3	4.7	5.2	5.6	5.6	5.1	4.6	3.9	2.4	1.6	-0.1	5.6	
26-Apr	1.2	0.6	0.6	0.1	-0.9	-1.2	-1.2	0.2	2.5	5.0	6.4	7.3	8.0	8.7	9.5	9.8	10.0	10.3	10.6	10.5	10.0	8.9	8.0	6.6	5.5	10.6	
27-Apr	5.8	5.1	4.1	3.4	2.9	3.0	2.7	3.8	6.4	10.4	13.0	14.6	15.2	16.1	16.7	17.1	17.8	18.2	18.0	17.7	17.3	16.6	15.5	14.6	11.5	18.2	
28-Apr	13.2	12.1	11.4	10.5	9.1	8.4	8.8	9.0	12.5	16.6	18.5	20.1	21.3	22.0	22.6	23.1	23.2	22.8	22.4	22.0	21.2	20.6	19.7	17.7	17.0	23.2	
29-Apr	16.2	15.2	13.9	13.0	12.0	11.1	10.7	10.2	10.0	10.7	11.6	13.0	13.7	13.9	14.2	14.3	14.6	14.7	14.6	14.3	13.4	12.7	11.9	10.8	12.9	16.2	
30-Apr	9.9	9.2	9.0	8.5	8.0	7.2	7.7	8.9	9.8	10.6	10.3	9.1	9.2	10.9	11.6	12.2	11.8	10.8	11.2	10.9	10.8	10.4	9.5	8.2	9.8	12.2	
		3.2	2.6	2.0	1.4	0.8	0.2	0.0	0.4	1.7	3.6	5.3	6.7	7.7	8.4	8.9	9.2	9.3	9.0	8.5	7.7	6.8	5.9	5.0	4.2	Diurnal Average	
		16.2	15.2	13.9	13.0	12.0	11.1	10.7	10.2	12.5	16.6	18.5	20.1	21.3	22.0	22.6	23.1	23.2	22.8	22.4	22.0	21.2	20.6	19.7	17.7	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature 75 m (AT75m) - C**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 75 m (AT75m) - C**  
**Mannix - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	167	23.19	23.19
0 - 10	364	50.56	73.75
10 - 20	177	24.58	98.33
> 20	12	1.67	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

Mannix - April 2015

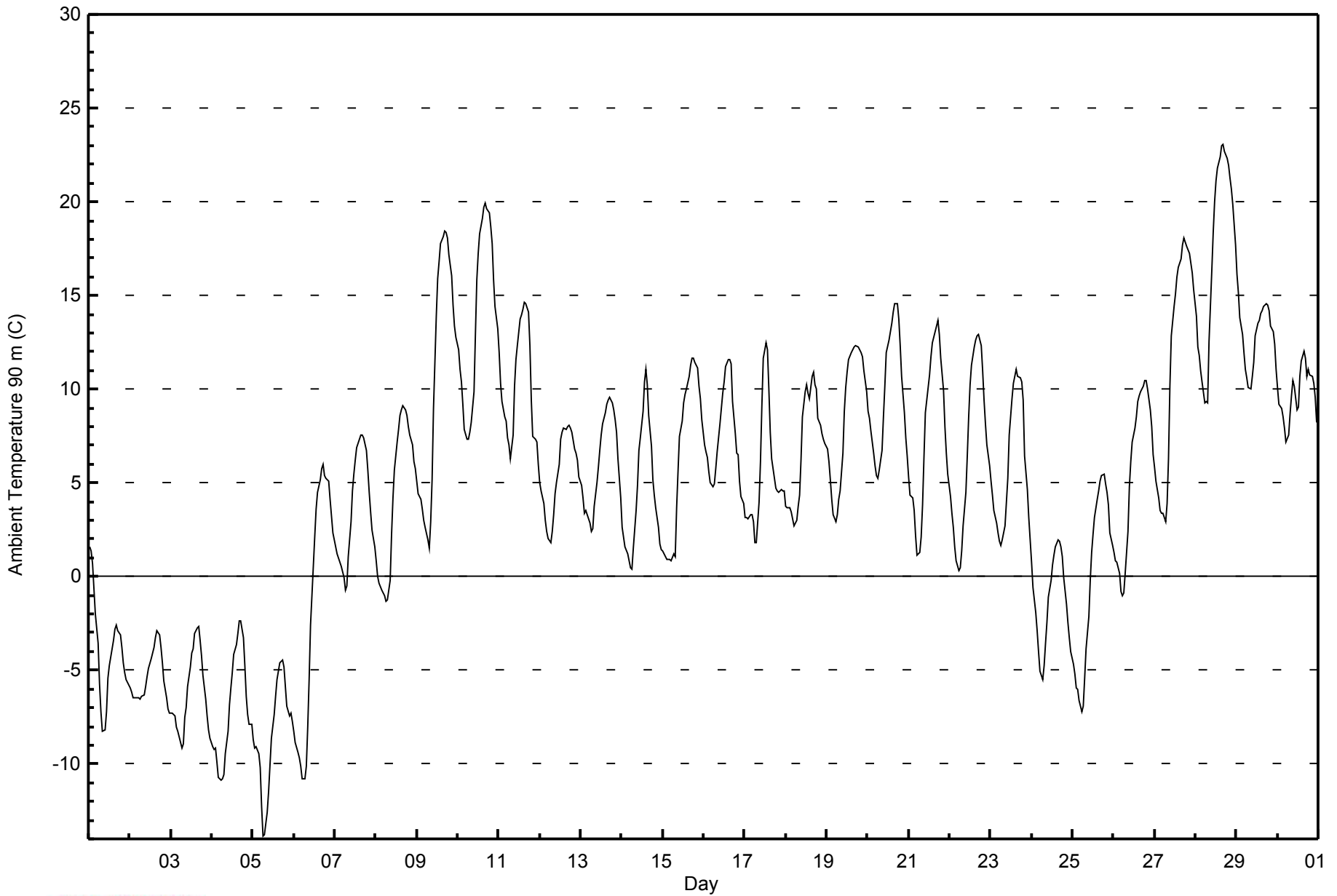
Maximum Value: 23.1 C on Apr 28 17:00		Maximum Daily Average: 17.2 C on Apr 28		Hours in Service: 720																																												
Minimum Value: -13.9 C on Apr 5 07:00		Minimum Daily Average: -8.5 C on Apr 5		Hours of Data: 720																																												
Maximum Diurnal Average: 9.1 C at hour 17		Minimum Diurnal Average: 0.1 C at hour 7		Hours of Missing Data: 0																																												
Monthly Average: 4.87 C		Percentiles: P <sub>1</sub> = -10.8 P <sub>10</sub> = -6.3 Q <sub>1</sub> = 0.8 Median = 5.3 Q <sub>3</sub> = 10.1 P <sub>90</sub> = 13.7 P <sub>99</sub> = 21.7		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-Apr	1.6	1.4	0.7	-0.6	-2.0	-3.5	-5.7	-7.2	-8.3	-8.2	-7.2	-5.4	-4.8	-4.3	-3.4	-2.8	-2.6	-2.9	-3.1	-3.8	-4.6	-5.1	-5.5	-5.8	-3.9	1.6																						
2-Apr	-5.9	-6.2	-6.5	-6.5	-6.5	-6.5	-6.6	-6.4	-6.3	-5.9	-5.4	-4.9	-4.4	-4.1	-3.8	-3.3	-2.9	-3.1	-3.7	-4.6	-5.6	-6.5	-7.1	-7.3	-5.4	-2.9																						
3-Apr	-7.3	-7.3	-7.5	-8.0	-8.3	-8.5	-9.2	-8.9	-7.5	-7.0	-5.9	-4.9	-4.1	-3.9	-3.1	-2.7	-2.7	-3.4	-4.2	-5.3	-6.5	-7.4	-8.2	-8.6	-6.3	-2.7																						
4-Apr	-9.1	-9.2	-9.1	-9.9	-10.7	-10.9	-10.8	-10.6	-9.4	-8.2	-6.9	-5.9	-5.1	-4.2	-3.7	-3.0	-2.4	-2.4	-3.2	-4.7	-6.4	-7.4	-7.9	-7.9	-7.0	-2.4																						
5-Apr	-8.7	-9.2	-9.1	-9.5	-10.2	-12.3	-13.9	-13.8	-12.6	-11.4	-10.1	-8.6	-7.4	-6.4	-5.5	-5.0	-4.6	-4.5	-4.8	-5.9	-6.9	-7.4	-7.3	-7.7	-8.5	-4.5																						
6-Apr	-8.2	-8.9	-9.3	-9.7	-10.1	-10.8	-10.8	-10.1	-8.0	-5.5	-2.6	0.5	2.1	3.6	4.5	5.2	5.8	6.0	5.4	5.2	5.1	4.1	3.2	2.4	-1.7	6.0																						
7-Apr	1.6	1.2	1.0	0.8	0.5	0.0	-0.7	-0.5	1.0	2.9	4.5	5.4	6.2	6.9	7.3	7.5	7.6	7.4	6.7	5.7	4.5	3.5	2.5	1.6	3.5	7.6																						
8-Apr	0.8	0.0	-0.4	-0.7	-0.9	-1.1	-1.3	-1.3	-0.2	2.2	4.2	5.7	7.2	7.9	8.6	8.9	9.1	8.9	8.6	8.0	7.5	7.0	6.1	5.8	4.2	9.1																						
9-Apr	5.1	4.4	4.1	3.6	3.0	2.6	2.0	1.5	3.0	5.2	9.0	13.9	15.9	16.8	17.8	18.1	18.5	18.4	18.0	17.2	16.0	14.5	13.4	12.7	10.6	18.5																						
10-Apr	12.1	11.1	10.4	9.2	7.8	7.4	7.3	7.7	8.3	9.9	12.9	15.8	17.2	18.3	19.1	19.7	19.9	19.7	19.4	18.7	17.7	15.9	14.4	13.2	13.9	19.9																						
11-Apr	11.9	10.3	9.3	8.5	8.3	7.4	7.1	6.3	7.6	10.1	11.6	12.3	13.7	13.9	14.3	14.6	14.6	14.1	12.4	9.5	7.5	7.4	7.2	6.0	10.2	14.6																						
12-Apr	5.0	4.6	3.9	3.0	2.4	2.0	1.8	2.4	3.3	4.4	5.0	6.0	7.3	7.7	7.9	7.9	8.0	8.1	7.9	7.7	6.8	6.6	6.2	5.3	5.5	8.1																						
13-Apr	4.9	4.2	3.4	3.5	3.3	2.9	2.4	2.5	3.7	5.0	5.8	6.7	7.6	8.1	8.8	9.2	9.4	9.5	9.3	8.9	8.4	7.7	6.3	4.2	6.1	9.5																						
14-Apr	2.6	2.1	1.6	1.2	0.8	0.5	0.4	1.5	3.5	4.9	6.7	7.4	8.8	10.4	11.1	10.2	8.6	7.0	5.2	4.4	3.7	2.6	1.7	1.4	4.5	11.1																						
15-Apr	1.4	1.2	0.9	0.9	0.9	0.9	1.2	1.1	3.6	5.6	7.5	8.3	9.2	9.7	10.0	10.7	11.3	11.6	11.6	11.4	11.1	10.1	9.5	8.3	6.6	11.6																						
16-Apr	7.0	6.7	6.4	5.6	5.0	4.8	4.9	5.7	6.7	8.1	9.0	9.8	10.4	11.2	11.6	11.6	11.4	9.3	7.6	6.6	6.5	5.1	4.3	3.9	7.5	11.6																						
17-Apr	3.2	3.1	3.1	3.3	3.3	2.9	1.8	1.8	4.0	6.2	9.1	11.6	12.5	12.1	10.0	7.7	6.3	5.3	4.7	4.6	4.5	4.6	4.6	4.6	5.6	12.5																						
18-Apr	3.8	3.7	3.7	3.5	3.1	2.7	3.0	3.8	4.4	6.2	8.5	9.8	10.2	9.8	9.5	10.7	10.9	10.2	10.0	8.4	8.1	7.6	7.3	7.1	6.9	10.9																						
19-Apr	6.8	6.1	5.1	4.1	3.3	2.9	3.3	4.1	4.5	6.6	8.8	10.1	10.9	11.6	12.0	12.1	12.3	12.3	12.2	12.1	11.9	11.8	10.9	9.8	8.6	12.3																						
20-Apr	8.8	8.5	7.8	6.6	5.9	5.4	5.2	5.7	6.8	8.5	10.1	11.9	12.6	13.0	13.5	14.1	14.6	14.5	13.8	12.3	10.7	8.7	7.4	6.4	9.7	14.6																						
21-Apr	5.3	4.4	4.2	3.6	2.2	1.1	1.3	2.1	3.9	6.4	8.8	10.1	10.8	11.7	12.5	13.1	13.4	13.7	12.9	11.6	9.9	8.0	6.6	5.4	7.6	13.7																						
22-Apr	4.3	3.4	2.6	1.6	0.9	0.3	0.4	1.4	2.7	4.5	6.4	8.5	10.2	11.3	12.3	12.6	12.9	12.9	12.3	11.0	9.4	8.2	7.0	5.9	6.8	12.9																						
23-Apr	5.1	4.4	3.5	2.9	2.4	1.9	1.7	2.0	2.7	4.0	5.2	7.6	9.5	10.3	10.7	11.0	10.7	10.6	10.4	9.4	6.4	4.6	3.1	2.0	5.9	11.0																						
24-Apr	0.8	-0.6	-1.9	-2.9	-4.0	-5.1	-5.5	-4.8	-3.5	-2.4	-1.1	-0.2	0.6	1.1	1.6	1.9	1.9	1.6	1.0	0.0	-1.4	-2.4	-3.2	-4.0	-1.4	1.9																						
25-Apr	-4.7	-5.2	-5.9	-6.0	-6.6	-7.2	-6.9	-5.4	-3.8	-2.1	-0.2	1.3	2.2	3.1	4.1	4.5	5.1	5.4	5.5	4.9	4.5	3.8	2.3	1.7	-0.2	5.5																						
26-Apr	1.3	0.8	0.8	0.2	-0.8	-1.0	-0.9	0.2	2.4	4.8	6.2	7.2	7.9	8.5	9.4	9.6	9.9	10.2	10.5	10.5	10.0	8.9	8.0	6.5	5.5	10.5																						
27-Apr	5.8	5.1	4.2	3.5	3.4	3.4	2.9	3.9	6.3	10.2	12.8	14.4	15.1	16.0	16.5	16.9	17.7	18.1	17.8	17.6	17.3	16.7	16.2	15.3	11.5	18.1																						
28-Apr	13.9	12.2	11.8	11.0	10.4	9.3	9.4	9.2	12.5	16.4	18.4	20.0	21.1	21.8	22.4	23.0	23.1	22.7	22.4	21.9	21.3	20.7	19.9	17.7	17.2	23.1																						
29-Apr	16.1	15.2	13.8	12.9	11.9	11.1	10.6	10.1	10.0	10.7	11.5	12.8	13.5	13.7	14.0	14.2	14.5	14.6	14.5	14.2	13.3	13.1	12.4	11.1	12.9	16.1																						
30-Apr	10.1	9.2	8.9	8.5	8.0	7.2	7.5	8.7	9.6	10.5	10.2	8.9	9.0	10.7	11.5	12.1	11.7	10.7	11.0	10.8	10.7	10.3	9.6	8.2	9.7	12.1																						
																								3.2	2.6	2.1	1.5	0.9	0.3	0.1	0.4	1.7	3.4	5.1	6.5	7.5	8.2	8.7	9.0	9.1	8.9	8.4	7.6	6.7	5.8	5.0	4.2	Diurnal Average
																								16.1	15.2	13.8	12.9	11.9	11.1	10.6	10.1	12.5	16.4	18.4	20.0	21.1	21.8	22.4	23.0	23.1	22.7	22.4	21.9	21.3	20.7	19.9	17.7	Diurnal Maximum





**WBEA**  
**Hourly Averages**

**Ambient Temperature 90 m (AT90m) - C**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 90 m (AT90m) - C**  
**Mannix - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	168	23.33	23.33
0 - 10	364	50.56	73.89
10 - 20	177	24.58	98.47
> 20	11	1.53	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

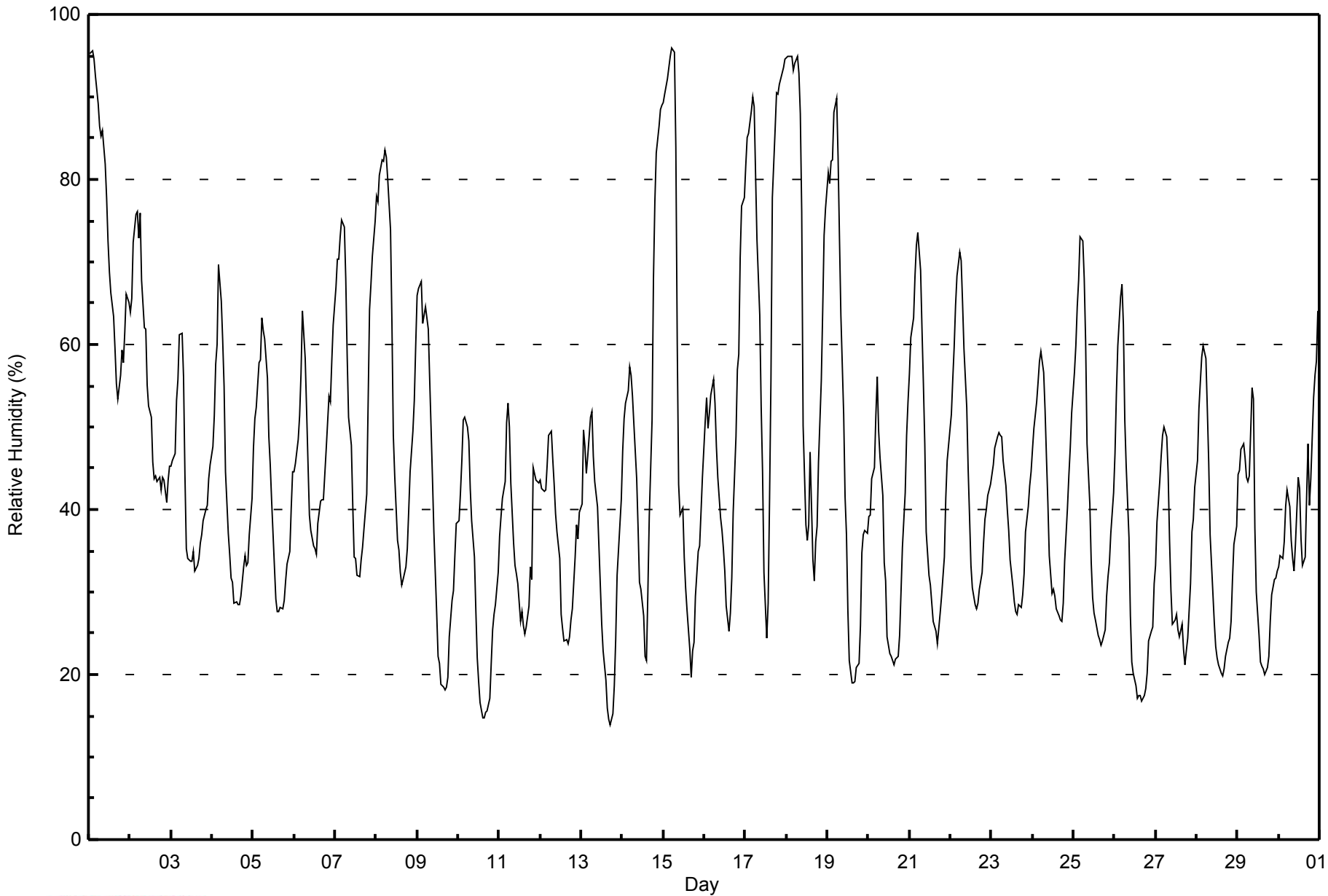


Maximum Value: 96 % on Apr 15 06:00														Maximum Daily Average: 74.4 % on Apr 1														Hours in Service: 720																					
Minimum Value: 14 % on Apr 13 18:00														Minimum Daily Average: 30.9 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 65.3 % at hour 6														Minimum Diurnal Average: 28.6 % at hour 15														Hours of Missing Data: 0																					
Monthly Average: 45.5 %														Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 24 Q <sub>1</sub> = 31 Median = 42 Q <sub>3</sub> = 56 P <sub>90</sub> = 75 P <sub>99</sub> = 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-Apr	95	95	96	95	93	89	86	85	86	82	78	72	69	66	63	59	55	53	56	59	58	62	66	65	74.4	96																							
2-Apr	64	66	72	76	76	73	76	68	62	62	55	52	51	46	44	44	43	44	42	44	44	41	44	45	55.5	76																							
3-Apr	45	46	47	53	56	61	61	56	44	35	34	34	34	35	33	33	34	36	37	39	40	40	44	45	42.6	61																							
4-Apr	48	51	58	60	70	65	61	55	45	37	35	32	31	29	29	29	28	30	33	34	33	34	37	41	41.8	70																							
5-Apr	47	51	52	58	58	63	62	61	56	49	45	41	33	29	28	28	28	28	29	31	33	35	40	45	43.0	63																							
6-Apr	45	46	49	51	56	64	58	52	46	39	37	36	35	35	38	41	41	41	44	47	54	53	58	62	47.1	64																							
7-Apr	67	70	70	73	75	74	68	59	51	48	40	34	34	32	32	34	36	38	42	53	64	67	71	75	54.5	75																							
8-Apr	78	77	80	82	82	84	83	80	74	63	49	44	36	35	32	31	32	33	35	40	45	49	53	60	56.6	84																							
9-Apr	66	67	68	63	64	65	62	56	50	44	37	27	22	21	19	18	18	19	20	24	29	30	34	38	40.0	68																							
10-Apr	39	42	46	51	51	50	48	43	39	34	28	22	19	17	15	15	15	16	17	21	25	27	28	32	30.9	51																							
11-Apr	37	39	41	43	50	53	50	43	36	33	32	31	26	28	26	25	26	28	33	32	45	44	43	43	37.0	53																							
12-Apr	44	42	42	42	45	49	50	46	43	39	37	34	27	26	24	24	24	25	27	28	34	38	36	40	36.1	50																							
13-Apr	41	50	48	44	46	51	52	47	43	40	36	31	26	23	19	16	15	14	15	19	24	32	35	41	33.6	52																							
14-Apr	47	51	53	54	57	56	54	50	44	38	31	30	27	22	22	30	39	51	68	77	83	86	88	89	52.1	89																							
15-Apr	89	90	92	94	95	96	95	84	60	43	39	40	34	31	28	23	20	23	24	29	35	36	40	44	53.5	96																							
16-Apr	51	54	50	52	54	56	53	48	44	39	37	35	32	28	25	27	32	40	49	57	59	71	77	78	47.8	78																							
17-Apr	82	85	86	88	90	89	81	73	64	53	45	32	24	29	41	56	78	86	91	90	92	93	94	95	72.2	95																							
18-Apr	95	95	95	95	93	94	95	93	88	76	50	38	36	38	47	34	31	36	38	46	56	64	73	77	66.0	95																							
19-Apr	81	79	82	82	88	90	83	73	64	52	42	37	28	22	19	19	19	21	21	26	35	37	37	37	48.9	90																							
20-Apr	39	39	44	45	51	56	50	46	42	34	31	25	22	22	22	21	22	22	25	30	35	42	49	53	36.2	56																							
21-Apr	56	61	63	68	72	74	69	62	55	48	37	32	31	29	26	25	24	26	28	30	34	41	46	48	45.2	74																							
22-Apr	51	56	60	65	68	71	70	65	60	52	45	39	33	31	28	28	29	30	32	36	39	40	42	43	46.4	71																							
23-Apr	44	45	47	49	49	49	49	46	43	40	38	34	31	29	28	27	29	28	30	32	37	40	43	44	38.8	49																							
24-Apr	47	50	53	55	58	59	57	52	46	41	34	30	30	29	28	27	27	29	34	40	44	47	52	52	41.5	59																							
25-Apr	57	60	65	68	73	72	68	60	48	41	34	29	27	27	25	24	24	24	25	29	32	34	37	42	42.7	73																							
26-Apr	47	54	60	66	67	62	51	45	37	27	22	20	19	17	18	17	17	18	18	20	24	25	26	31	33.6	67																							
27-Apr	33	39	43	46	49	50	49	44	36	30	26	27	27	25	25	26	23	21	23	24	31	37	39	43	34.1	50																							
28-Apr	46	52	55	59	60	58	52	46	37	30	26	23	22	21	20	20	21	22	24	24	26	32	36	38	35.5	60																							
29-Apr	44	45	47	48	46	44	43	44	55	53	38	30	25	22	21	21	20	21	22	26	30	32	32	32	35.0	55																							
30-Apr	33	34	34	36	40	42	40	36	34	33	36	44	42	36	33	34	42	48	41	44	54	56	58	64	41.5	64																							
																								55.2	57.7	59.9	62.1	64.5	65.3	62.5	57.3	51.0	44.5	38.5	34.6	31.2	29.3	28.6	28.6	29.6	31.5	33.9	37.6	42.3	45.4	48.4	51.4	Diurnal Average	
																								95	95	96	95	95	96	95	93	88	82	78	72	69	66	63	59	78	86	91	90	92	93	94	95	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Mannix - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	31	4.31	4.31
20 - 40	296	41.11	45.42
40 - 60	248	34.44	79.86
60 - 80	88	12.22	92.08
80 - 100	57	7.92	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

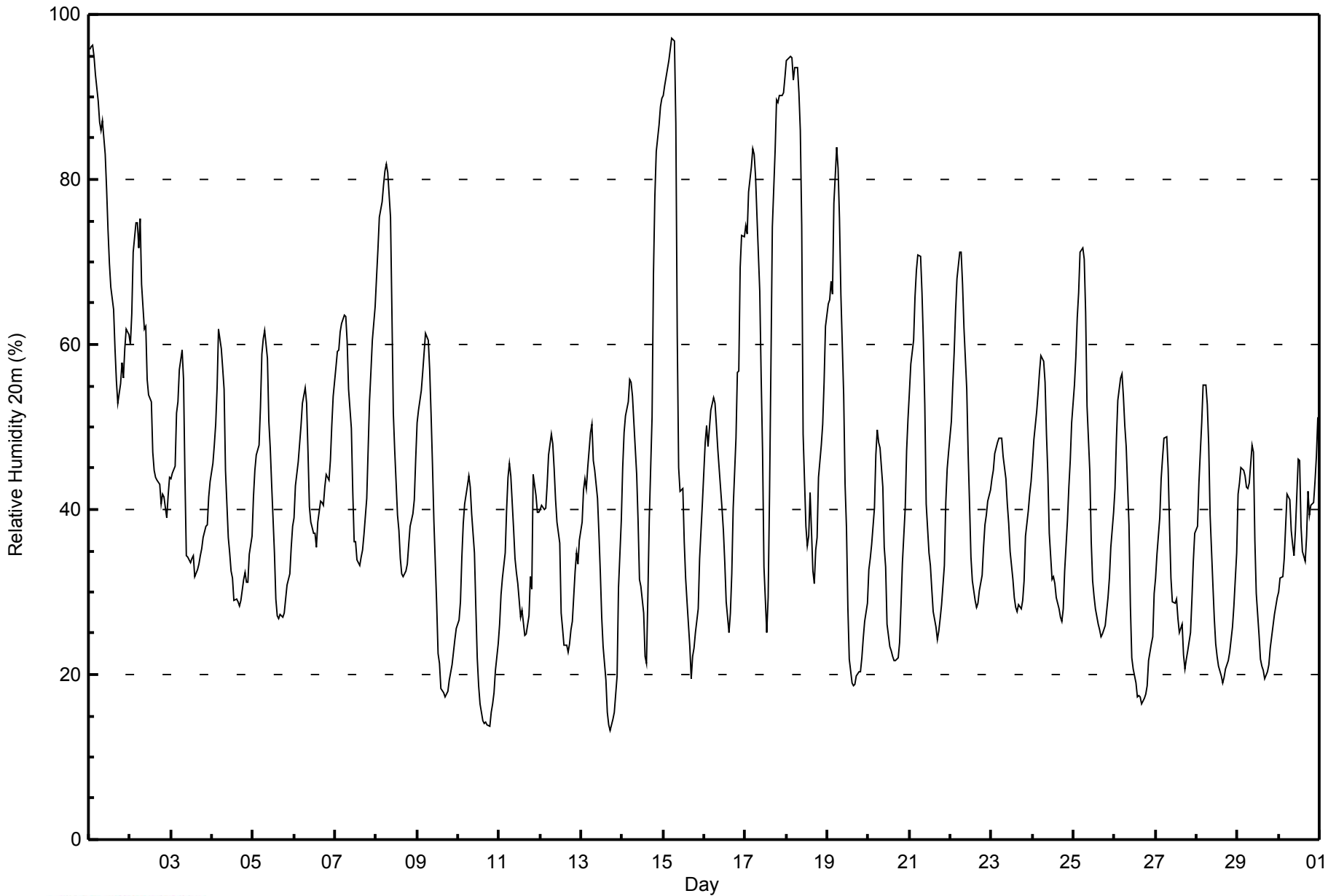


Maximum Value: 97 % on Apr 15 06:00														Maximum Daily Average: 74.2 % on Apr 1														Hours in Service: 720	
Minimum Value: 13 % on Apr 13 18:00														Minimum Daily Average: 25.9 % on Apr 10														Hours of Data: 720	
Maximum Diurnal Average: 61.9 % at hour 6														Minimum Diurnal Average: 28.6 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 43.7 %														Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 23 Q <sub>1</sub> = 29 Median = 41 Q <sub>3</sub> = 53 P <sub>90</sub> = 71 P <sub>99</sub> = 94														Hours of Calibration: 0	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Apr	96	96	96	95	93	89	87	86	87	83	79	74	70	67	64	60	56	53	55	58	56	60	62	61	74.2	96			
2-Apr	60	64	71	75	75	72	75	67	62	62	56	54	53	47	45	44	44	43	41	42	42	39	42	44	54.9	75			
3-Apr	44	44	45	52	53	57	59	56	44	34	34	34	34	32	33	33	34	35	37	38	38	42	43	41.2	59				
4-Apr	46	48	50	55	62	60	57	55	45	37	35	32	32	29	29	29	28	29	31	32	31	31	35	37	39.7	62			
5-Apr	42	45	47	48	52	59	61	62	58	51	47	43	35	29	27	27	27	27	27	29	31	32	35	38	40.8	62			
6-Apr	39	43	46	48	50	53	55	53	47	40	38	37	37	35	39	41	41	40	43	44	43	46	50	54	44.3	55			
7-Apr	57	59	59	61	63	64	63	60	55	50	42	36	36	34	33	34	35	37	41	47	53	57	61	65	50.1	65			
8-Apr	68	72	75	77	79	81	82	81	76	64	52	47	39	37	34	32	32	33	33	36	38	40	41	46	53.9	82			
9-Apr	50	52	54	57	59	61	61	57	52	45	39	28	23	21	18	18	17	18	18	19	21	23	24	26	35.9	61			
10-Apr	27	29	34	38	41	43	44	43	39	35	28	22	19	17	14	14	14	14	14	15	16	18	21	24	25.9	44			
11-Apr	26	30	32	35	40	44	46	44	38	34	32	31	27	28	26	25	25	27	32	30	44	42	40	40	34.0	46			
12-Apr	40	40	40	40	43	47	49	48	45	41	38	36	27	26	23	24	23	24	25	26	33	35	33	36	35.2	49			
13-Apr	38	42	44	43	45	49	50	46	45	41	37	32	27	23	19	15	14	13	14	15	18	20	30	39	31.8	50			
14-Apr	45	49	51	53	56	55	54	51	44	39	31	31	27	22	21	29	39	51	68	78	83	87	89	90	51.9	90			
15-Apr	90	91	93	94	96	97	97	87	61	45	42	43	36	32	29	23	20	22	23	25	28	34	37	41	53.7	97			
16-Apr	48	50	48	50	52	54	53	50	47	43	40	37	34	29	25	27	32	40	49	57	57	69	73	73	47.4	73			
17-Apr	74	73	78	81	84	83	80	76	66	56	47	33	25	29	42	58	74	84	90	89	90	90	92	92	70.3	92			
18-Apr	94	95	95	95	92	94	94	90	86	74	49	38	36	37	42	32	31	35	37	44	48	50	55	62	62.7	95			
19-Apr	65	65	68	66	77	84	81	75	66	54	43	38	28	22	19	19	19	20	20	20	22	24	26	29	43.8	84			
20-Apr	33	34	36	40	47	50	48	47	43	35	33	26	23	23	22	22	22	22	24	29	34	40	47	51	34.6	51			
21-Apr	54	58	61	66	69	71	71	66	60	53	41	35	33	30	28	26	24	25	27	29	33	41	45	47	45.5	71			
22-Apr	51	55	59	64	68	71	71	67	62	55	47	41	34	31	29	28	29	30	32	35	38	39	41	42	46.7	71			
23-Apr	44	45	47	48	49	49	49	46	44	41	38	35	32	29	28	28	29	28	29	31	37	40	42	43	38.7	49			
24-Apr	46	49	52	54	57	59	58	55	49	44	37	32	32	31	29	28	27	26	28	33	39	43	46	50	41.8	59			
25-Apr	55	58	63	66	71	72	70	64	53	45	36	31	29	28	26	25	25	25	26	28	29	32	35	40	43.0	72			
26-Apr	43	49	53	56	56	54	50	48	38	28	22	21	19	17	17	17	17	17	18	19	22	24	25	30	31.6	56			
27-Apr	32	35	39	44	46	49	49	45	38	32	29	29	29	27	25	26	22	21	22	23	25	29	34	37	32.7	49			
28-Apr	38	43	47	50	55	55	53	48	39	31	27	24	22	21	20	19	20	21	22	23	24	26	28	35	32.9	55			
29-Apr	42	43	45	45	44	43	43	43	48	47	36	30	25	22	21	21	19	20	21	23	24	27	28	29	32.9	48			
30-Apr	30	32	32	34	38	42	41	38	36	34	37	46	46	38	35	34	37	42	39	40	41	43	47	51	38.9	51			
																												Diurnal Average	
																												Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity 20m (RH20m) - %**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity 20m (RH20m) - %**  
**Mannix - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	41	5.69	5.69
20 - 40	304	42.22	47.92
40 - 60	252	35.00	82.92
60 - 80	76	10.56	93.47
80 - 100	47	6.53	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720





Summary of Hour Averages

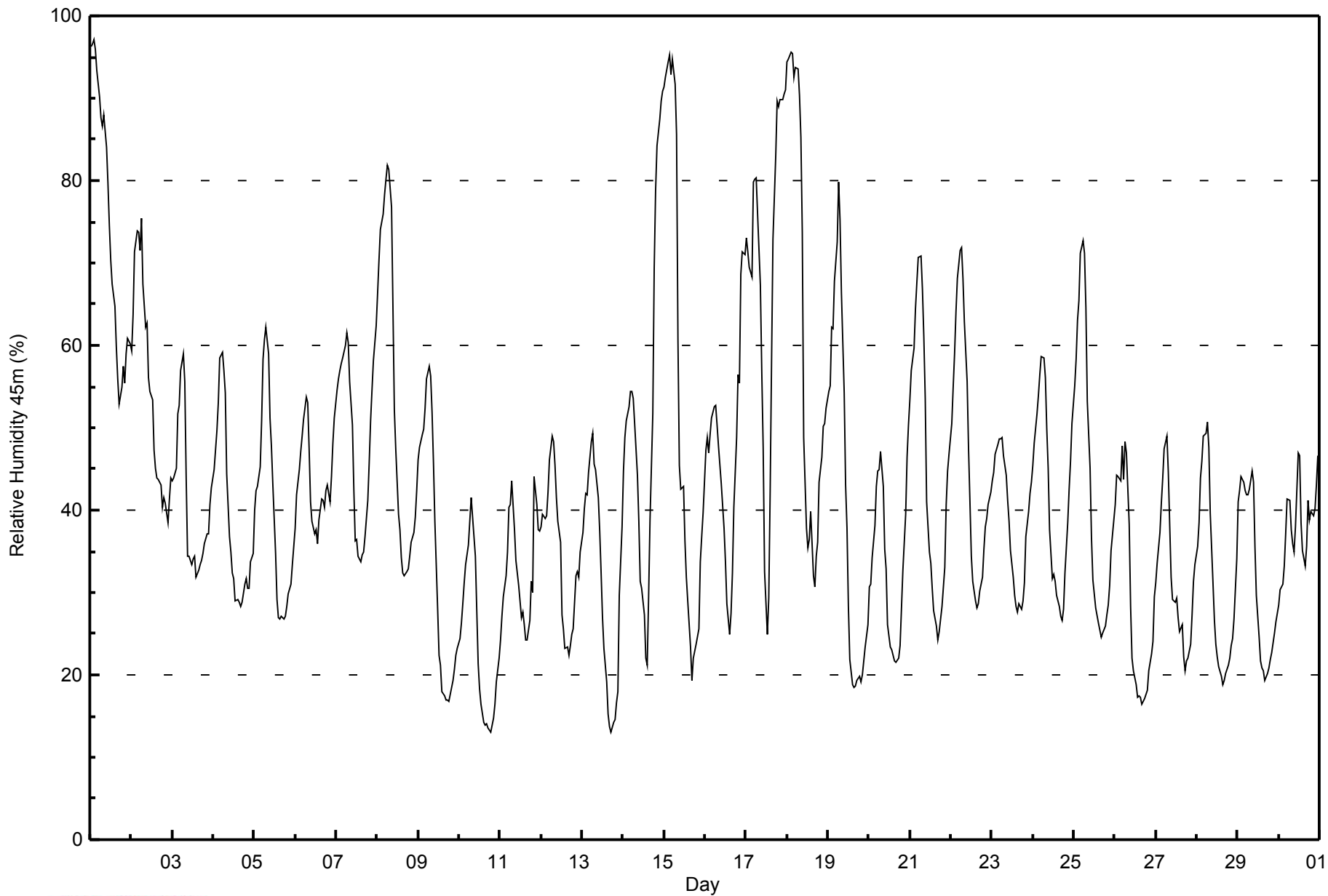
Mannix - April 2015

Maximum Value: 97 % on Apr 1 03:00																		Maximum Daily Average: 74.5 % on Apr 1																		Hours in Service: 720													
Minimum Value: 13 % on Apr 13 18:00																		Minimum Daily Average: 23.9 % on Apr 10																		Hours of Data: 720													
Maximum Diurnal Average: 60.7 % at hour 7																		Minimum Diurnal Average: 28.5 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 42.9 %																		Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 22 Q <sub>1</sub> = 29 Median = 40 Q <sub>3</sub> = 52 P <sub>90</sub> = 71 P <sub>99</sub> = 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-Apr	96	97	97	96	93	90	88	87	88	84	80	75	70	67	65	60	56	53	55	57	55	59	61	60	74.5	97																							
2-Apr	59	64	71	74	74	72	75	68	62	63	56	54	53	47	45	44	44	43	40	42	41	39	41	44	54.8	75																							
3-Apr	44	44	45	52	53	57	59	56	44	34	34	33	34	34	32	33	33	34	35	36	37	37	41	43	41.0	59																							
4-Apr	45	47	50	53	59	59	57	54	44	37	35	32	32	29	29	29	28	29	31	32	30	30	34	35	39.2	59																							
5-Apr	40	42	43	45	51	58	61	62	59	51	48	43	35	29	27	27	27	27	27	28	30	31	33	36	40.0	62																							
6-Apr	38	42	45	47	49	51	54	53	47	41	39	37	38	36	39	41	41	40	42	43	41	44	48	51	43.7	54																							
7-Apr	55	56	57	58	58	60	62	60	56	50	42	36	36	34	34	35	35	37	41	46	51	55	58	62	48.9	62																							
8-Apr	66	70	74	76	78	80	82	81	77	65	52	47	39	38	34	32	32	33	33	34	36	37	39	42	53.3	82																							
9-Apr	46	48	49	50	52	56	57	56	52	46	39	28	22	21	18	17	17	17	17	18	19	21	22	23	33.8	57																							
10-Apr	24	26	29	31	33	36	39	42	39	34	28	21	18	16	14	14	14	14	13	14	15	16	19	22	23.9	42																							
11-Apr	24	27	29	32	35	40	41	44	38	34	32	31	27	28	26	24	24	27	31	30	44	41	38	37	32.7	44																							
12-Apr	38	40	39	39	42	46	49	48	45	42	39	36	27	26	23	23	22	23	25	26	32	33	32	35	34.6	49																							
13-Apr	37	40	42	42	45	48	49	46	45	42	37	32	27	23	19	15	14	13	14	15	17	18	30	38	31.2	49																							
14-Apr	45	49	51	52	54	54	54	50	44	39	31	30	27	22	21	29	39	52	69	79	84	87	90	91	51.9	91																							
15-Apr	91	92	94	95	93	95	92	86	61	45	43	43	36	32	29	23	19	22	23	24	26	34	37	40	53.1	95																							
16-Apr	47	49	47	49	51	52	53	50	48	43	40	38	34	29	25	27	32	40	49	56	55	69	71	71	47.0	71																							
17-Apr	73	71	69	68	80	80	80	76	67	57	48	33	25	29	42	58	73	83	90	89	90	90	90	91	68.9	91																							
18-Apr	94	95	96	95	93	94	94	90	85	74	49	38	35	36	40	32	31	34	36	43	46	50	50	52	61.8	96																							
19-Apr	54	55	62	62	68	73	80	75	66	54	43	38	28	22	19	18	19	19	20	19	20	22	23	26	41.1	80																							
20-Apr	31	31	34	38	43	45	45	47	43	35	33	26	23	23	22	22	22	22	24	28	33	40	46	50	33.6	50																							
21-Apr	53	57	60	64	68	71	71	67	61	53	41	35	33	30	28	26	24	25	27	28	33	41	45	47	45.4	71																							
22-Apr	51	55	59	64	68	72	72	68	63	56	47	41	34	31	29	28	29	30	32	35	38	39	41	42	46.8	72																							
23-Apr	43	45	47	48	49	49	49	47	44	41	39	35	32	30	28	28	29	28	29	31	37	40	42	43	38.8	49																							
24-Apr	45	48	52	54	56	59	59	56	50	45	38	32	32	31	30	28	27	27	28	32	38	43	46	50	41.9	59																							
25-Apr	55	58	63	65	71	73	71	65	53	45	37	32	30	28	26	25	25	25	26	27	28	31	35	39	43.1	73																							
26-Apr	41	44	44	44	48	44	48	47	38	28	22	20	19	17	17	17	16	17	18	18	21	23	24	30	29.4	48																							
27-Apr	31	34	37	41	44	47	49	45	38	32	29	29	29	27	25	26	22	20	22	22	24	27	31	33	31.9	49																							
28-Apr	36	38	44	46	49	49	51	48	40	31	27	24	22	21	20	19	19	20	21	22	23	24	27	34	31.4	51																							
29-Apr	41	42	44	43	42	42	42	43	45	43	36	30	25	22	21	21	19	20	21	22	23	25	26	27	31.8	45																							
30-Apr	28	30	31	33	37	41	41	38	36	35	38	47	47	38	35	33	36	41	39	40	39	40	43	47	38.1	47																							
																								49.1	51.2	53.5	55.3	57.9	59.8	60.7	58.4	52.6	46.0	40.0	35.9	32.4	30.0	28.8	28.5	28.9	30.5	32.6	34.6	36.9	39.5	42.2	44.8	Diurnal Average	
																								96	97	97	96	93	95	94	90	88	84	80	75	70	67	65	60	73	83	90	89	90	90	90	91	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity 45m (RH45m) - %**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity 45m (RH45m) - %**  
**Mannix - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	46	6.39	6.39
20 - 40	315	43.75	50.14
40 - 60	248	34.44	84.58
60 - 80	68	9.44	94.03
80 - 100	43	5.97	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

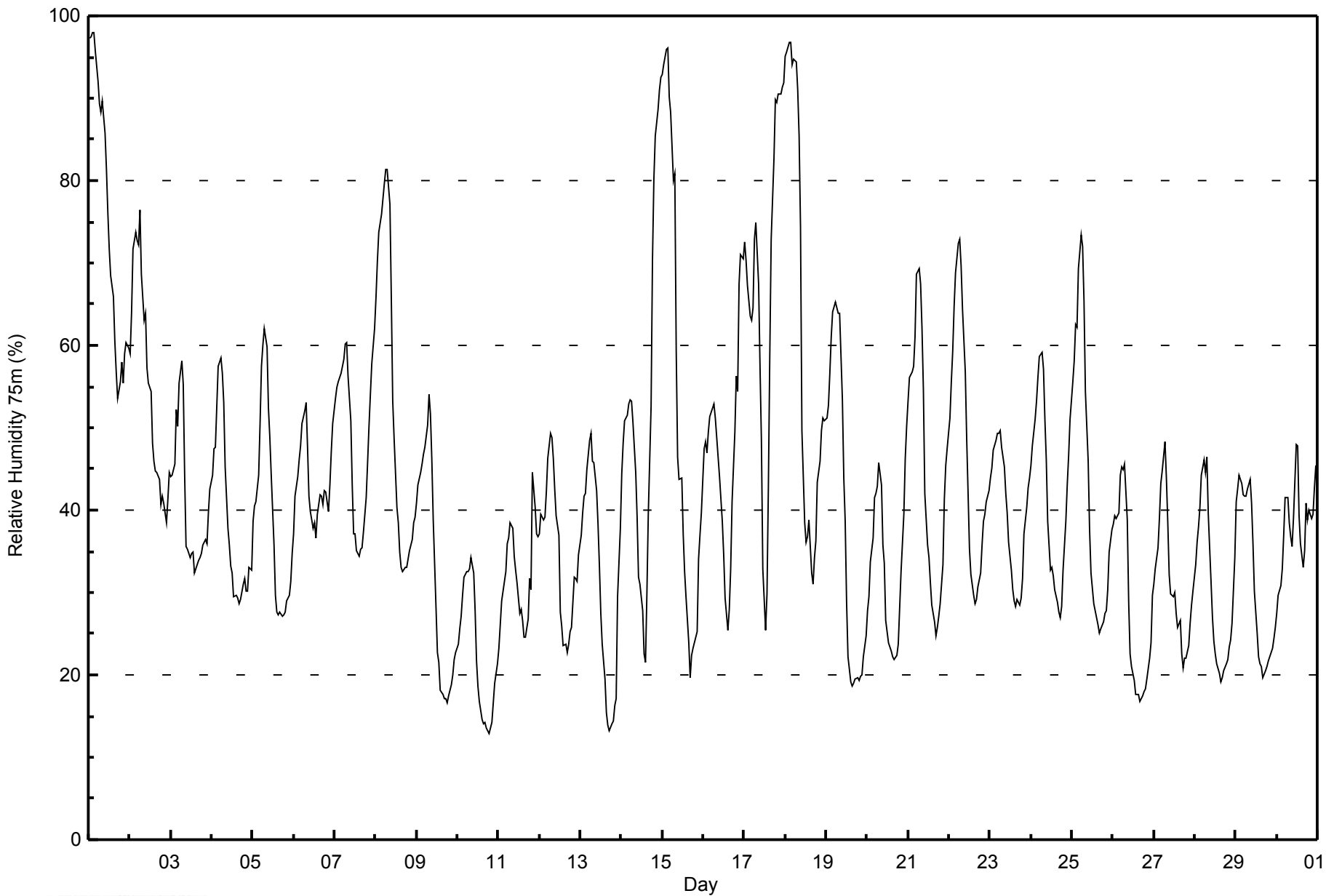
Mannix - April 2015

Maximum Value: 98 % on Apr 1 03:00																		Maximum Daily Average: 75.6 % on Apr 1																		Hours in Service: 720													
Minimum Value: 13 % on Apr 10 19:00																		Minimum Daily Average: 22.6 % on Apr 10																		Hours of Data: 720													
Maximum Diurnal Average: 58.6 % at hour 7																		Minimum Diurnal Average: 29.0 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 42.7 %																		Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 22 Q <sub>1</sub> = 30 Median = 39 Q <sub>3</sub> = 51 P <sub>90</sub> = 69 P <sub>99</sub> = 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-Apr	97	98	98	98	96	92	89	88	90	86	81	76	72	69	66	61	57	54	56	58	55	59	60	60	75.6	98																							
2-Apr	59	64	72	74	73	72	76	69	63	64	57	55	54	48	46	45	45	44	41	42	41	39	41	45	55.3	76																							
3-Apr	44	44	46	52	50	55	58	55	44	36	35	34	35	32	33	34	34	35	36	36	36	40	42	40.9	58																								
4-Apr	44	47	48	53	58	59	57	53	45	38	36	33	32	30	30	29	29	29	31	32	30	30	33	33	39.0	59																							
5-Apr	39	41	41	44	51	57	60	62	60	52	49	44	36	30	28	27	28	27	27	28	29	30	31	35	39.8	62																							
6-Apr	37	42	44	46	48	50	52	53	48	42	40	38	38	37	39	42	42	41	42	42	40	43	47	51	43.5	53																							
7-Apr	54	55	56	56	57	58	60	60	56	51	43	37	37	35	34	35	35	37	41	46	50	54	58	62	48.7	62																							
8-Apr	66	70	74	76	78	80	81	81	77	66	53	49	40	38	35	33	33	33	33	34	35	36	39	39	53.3	81																							
9-Apr	41	43	45	46	47	48	50	54	52	46	39	28	23	22	18	18	17	17	17	17	19	20	22	23	32.1	54																							
10-Apr	24	26	27	30	32	33	33	33	34	32	28	22	19	17	15	14	14	14	13	14	14	17	19	21	22.6	34																							
11-Apr	23	26	29	31	33	36	37	39	38	34	33	31	27	28	27	25	24	27	32	30	45	40	37	37	32.0	45																							
12-Apr	37	40	39	39	42	46	49	49	46	42	39	37	28	26	24	24	23	24	25	26	32	32	31	35	34.8	49																							
13-Apr	37	40	42	42	45	48	49	46	46	42	38	33	27	24	20	15	14	13	14	14	16	17	29	38	31.3	49																							
14-Apr	44	48	51	52	53	53	53	51	45	39	32	31	28	22	22	30	39	53	70	80	85	89	91	93	52.2	93																							
15-Apr	93	94	96	96	90	88	80	81	59	46	44	44	37	33	30	24	20	22	23	24	25	34	37	40	52.5	96																							
16-Apr	47	48	47	49	51	52	53	51	49	44	41	39	35	29	25	28	33	41	50	56	54	67	71	71	47.2	71																							
17-Apr	73	70	67	64	63	65	73	75	67	57	48	33	25	30	43	59	73	83	90	89	90	90	91	92	67.1	92																							
18-Apr	95	96	97	97	94	95	94	91	85	74	50	39	36	37	39	32	31	34	36	43	46	50	51	51	62.2	97																							
19-Apr	51	53	57	61	64	65	65	64	64	53	44	39	29	22	19	19	19	19	20	19	20	20	22	25	38.8	65																							
20-Apr	28	30	34	37	41	42	43	46	43	36	34	27	24	23	23	22	22	22	24	28	33	39	46	50	33.2	50																							
21-Apr	53	56	57	58	61	69	69	67	62	55	42	36	34	31	28	26	25	26	27	29	33	41	45	47	44.9	69																							
22-Apr	51	56	59	65	69	72	73	70	64	57	49	42	35	32	30	29	29	31	32	36	39	39	41	42	47.6	73																							
23-Apr	44	45	47	49	49	49	50	48	45	42	40	36	33	30	29	28	29	28	29	32	37	40	43	44	39.4	50																							
24-Apr	45	48	51	53	56	59	59	57	51	46	39	33	33	32	30	29	28	27	28	33	39	43	47	51	42.3	59																							
25-Apr	56	58	63	62	69	73	72	65	54	46	38	32	31	29	27	26	25	26	26	28	28	30	35	38	43.2	73																							
26-Apr	38	39	39	40	44	45	45	46	39	29	23	21	19	18	18	18	17	17	18	18	20	22	24	30	28.6	46																							
27-Apr	31	33	35	39	43	45	48	44	38	32	30	29	30	28	26	27	23	21	22	22	24	26	29	30	31.4	48																							
28-Apr	33	36	38	40	44	46	45	46	39	31	27	24	23	21	20	19	20	20	21	22	23	24	26	34	30.2	46																							
29-Apr	41	42	44	43	42	42	42	43	44	41	36	30	25	22	21	21	20	21	21	22	22	23	24	26	31.6	44																							
30-Apr	28	30	31	33	37	42	42	38	37	36	39	48	48	39	36	33	35	41	39	40	39	39	43	45	38.2	48																							
																								48.4	50.6	52.4	54.1	56.0	57.9	58.6	57.5	52.8	46.5	40.8	36.7	33.1	30.5	29.3	29.0	29.3	30.9	32.8	34.6	36.7	39.1	41.8	44.2	Diurnal Average	
																								97	98	98	98	96	95	94	91	90	86	81	76	72	69	66	61	73	83	90	89	90	90	91	93	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity 75m (RH75m) - %**  
**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity 75m (RH75m) - %**  
**Mannix - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	46	6.39	6.39
20 - 40	328	45.56	51.94
40 - 60	239	33.19	85.14
60 - 80	66	9.17	94.31
80 - 100	41	5.69	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

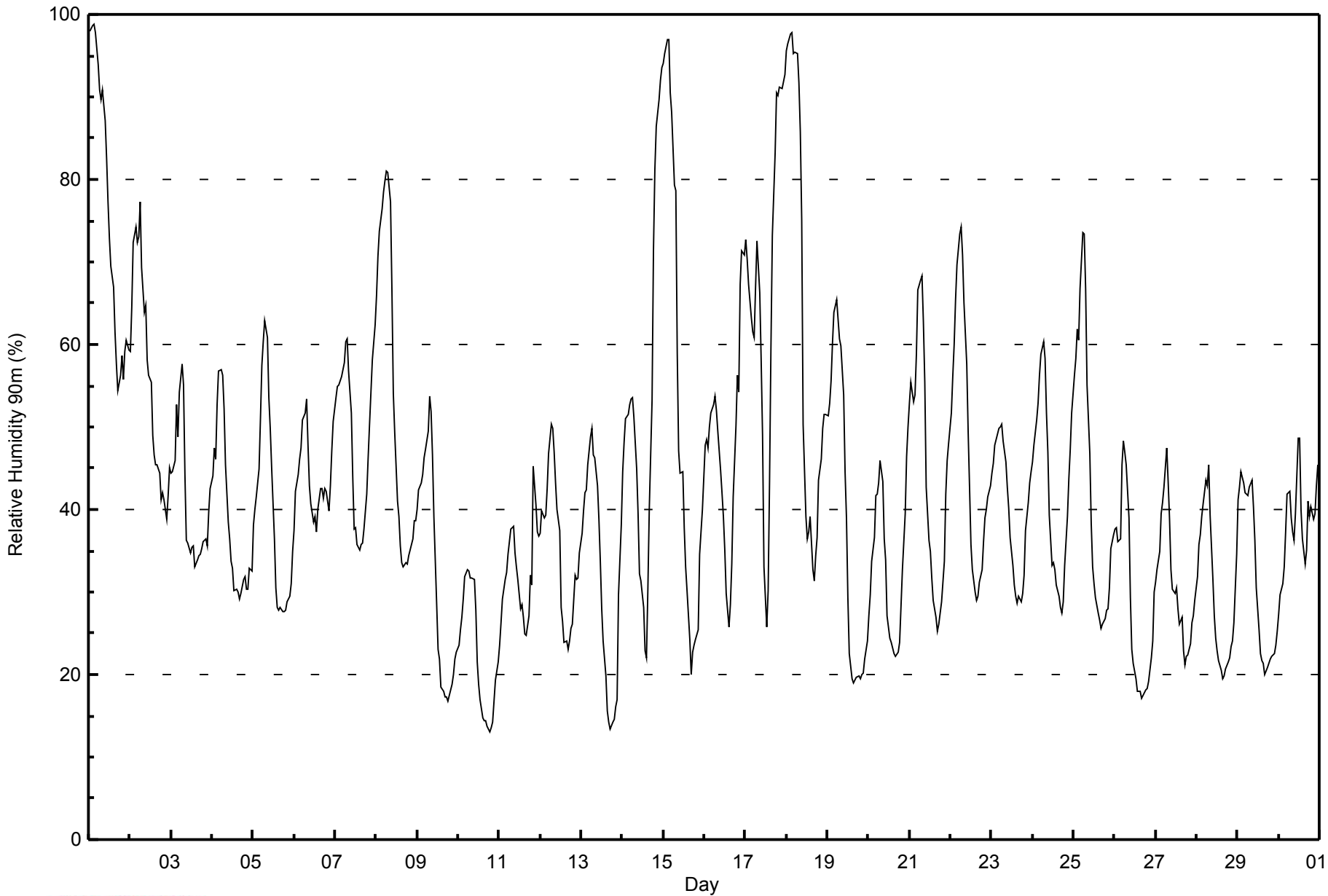
Mannix - April 2015

Maximum Value: 99 % on Apr 1 04:00																	Maximum Daily Average: 76.5 % on Apr 1																	Hours in Service: 720															
Minimum Value: 13 % on Apr 10 19:00																	Minimum Daily Average: 22.4 % on Apr 10																	Hours of Data: 720															
Maximum Diurnal Average: 58.5 % at hour 7																	Minimum Diurnal Average: 29.5 % at hour 16																	Hours of Missing Data: 0															
Monthly Average: 42.9 %																	Percentiles: P <sub>1</sub> = 14 P <sub>10</sub> = 23 Q <sub>1</sub> = 30 Median = 40 Q <sub>3</sub> = 52 P <sub>90</sub> = 68 P <sub>99</sub> = 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-Apr	98	98	99	99	98	94	91	90	91	87	83	77	73	70	67	61	58	54	56	59	56	59	61	59	76.5	99																							
2-Apr	59	65	72	74	72	73	77	69	64	65	58	56	55	49	47	46	45	44	41	42	41	39	42	45	55.9	77																							
3-Apr	44	45	46	53	49	54	58	55	44	36	36	35	35	36	33	34	34	35	35	36	36	36	40	43	41.1	58																							
4-Apr	44	47	46	53	57	57	56	52	45	39	37	34	33	30	30	30	29	30	31	32	30	30	33	33	39.1	57																							
5-Apr	38	40	42	45	51	57	60	63	61	54	50	45	36	30	28	28	28	28	28	28	29	29	31	35	40.2	63																							
6-Apr	37	42	44	46	48	51	52	53	48	43	41	39	39	37	40	43	42	41	43	42	40	43	47	51	43.8	53																							
7-Apr	54	55	55	56	56	58	60	61	57	52	44	38	38	36	35	36	36	38	42	46	50	54	58	62	49.0	62																							
8-Apr	66	71	74	76	79	80	81	81	77	67	54	49	41	39	36	34	33	34	33	34	35	36	39	39	53.6	81																							
9-Apr	40	42	43	44	46	47	50	54	52	47	39	28	23	22	18	18	17	17	17	18	19	20	22	23	31.9	54																							
10-Apr	23	25	27	29	32	33	33	32	32	32	28	22	19	17	15	14	14	14	13	14	14	17	19	21	22.4	33																							
11-Apr	24	26	29	32	32	35	36	38	38	35	33	32	28	28	27	25	25	27	32	31	45	41	37	37	32.1	45																							
12-Apr	37	40	39	39	43	47	50	50	47	43	40	37	28	26	24	24	23	24	26	26	32	32	32	35	35.2	50																							
13-Apr	37	40	42	42	45	49	50	47	46	43	39	34	28	24	20	16	14	13	14	15	16	17	30	38	31.6	50																							
14-Apr	45	48	51	52	53	53	54	51	45	40	32	31	28	23	22	30	40	53	71	81	86	90	92	94	52.7	94																							
15-Apr	94	95	97	97	90	88	79	79	59	47	44	45	38	33	30	24	20	23	24	24	25	35	37	40	52.8	97																							
16-Apr	48	48	47	50	52	53	54	52	49	45	42	39	35	30	26	28	33	42	50	56	54	67	71	71	47.6	71																							
17-Apr	73	70	67	63	62	61	67	73	66	58	49	33	26	30	43	60	73	83	90	90	91	91	92	93	66.9	93																							
18-Apr	96	96	98	98	95	95	95	92	86	75	50	39	36	37	39	33	31	34	37	44	46	50	51	52	62.8	98																							
19-Apr	51	53	56	60	64	65	63	61	60	54	45	39	29	23	19	19	19	20	20	20	20	20	22	24	38.5	65																							
20-Apr	27	30	34	37	42	42	43	46	43	36	34	27	24	24	23	23	22	23	24	28	33	40	46	50	33.4	50																							
21-Apr	53	56	53	54	59	67	68	68	63	55	43	36	35	32	29	27	25	26	27	29	34	42	46	48	44.7	68																							
22-Apr	52	56	60	65	70	73	74	71	65	58	49	43	36	33	30	29	30	31	33	36	39	40	41	43	48.2	74																							
23-Apr	44	46	48	49	50	50	50	48	46	43	40	37	33	31	29	29	30	29	30	32	37	41	43	45	40.0	50																							
24-Apr	46	48	51	53	56	59	60	58	52	47	39	33	34	33	31	29	28	27	29	33	39	44	47	52	42.9	60																							
25-Apr	56	58	62	60	67	74	73	67	55	47	38	33	31	29	27	27	26	26	27	28	28	31	35	37	43.4	74																							
26-Apr	38	38	36	36	45	48	47	45	39	29	23	21	20	18	18	18	17	18	18	18	19	22	24	30	28.6	48																							
27-Apr	31	33	35	40	41	43	47	43	39	33	30	30	31	28	26	27	23	21	22	22	24	26	27	29	31.3	47																							
28-Apr	32	36	37	39	41	44	43	45	39	32	27	24	23	22	21	19	20	21	22	22	23	24	26	35	29.8	45																							
29-Apr	41	43	45	43	42	42	42	43	44	40	36	31	25	23	22	21	20	21	21	22	22	23	23	25	31.6	45																							
30-Apr	27	30	31	33	37	42	42	39	37	36	40	49	49	40	36	33	35	41	39	40	39	40	43	45	38.5	49																							
																								48.5	50.7	52.1	53.9	55.7	57.8	58.5	57.5	53.0	47.2	41.4	37.2	33.6	31.1	29.7	29.5	29.8	31.3	33.2	34.9	36.8	39.2	41.9	44.4	Diurnal Average	
																								98	98	99	99	98	95	95	92	91	87	83	77	73	70	67	61	73	83	90	90	91	91	92	94	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity 90m (RH90m) - %**  
**Mannix - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity 90m (RH90m) - %**  
**Mannix - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	45	6.25	6.25
20 - 40	327	45.42	51.67
40 - 60	240	33.33	85.00
60 - 80	68	9.44	94.44
80 - 100	40	5.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 36 km/h on Apr 11 20:00	Maximum Daily Speed Average: 21.5 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 17 23:00	Minimum Daily Speed Average: 3.1 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 6.4 km/h at hour 15	Minimum Diurnal Speed Average: 0.6 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 1.5 km/h 234.9 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 9 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 22 P <sub>99</sub> = 32	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NNE20	N20	N25	N27	N26	N32	N34	N28	N28	N26	N26	N21	N23	N26	N24	NNE25	N21	N23	NNE17	NNE15	NNE12	NNE8	N5	NNE6	N21.5	N34
2-Apr	N6	N8	WNW5	W4	W4	NNW6	N5	NNE5	NNE8	NNE8	NNW8	NNW10	NNW11	NW12	NNW13	NW13	NNW10	NNE11	NNE14	NNE12	NNE13	NE10	NNE7	NE5	N7.4	NNE14
3-Apr	E6	E6	NE6	NE6	ENE5	NE6	NE6	E5	E5	ENE8	N3	NNW4	N10	NNE13	NNE11	NNE10	NNE13	NNE15	NNE15	NNE16	NNE13	NNE13	NE11	E8	NE8.1	NNE16
4-Apr	ENE7	ENE5	NE5	NNE3	NNE2	ENE3	NE5	ENE5	NE6	ENE6	NE4	NW9	NNW12	NW13	NW12	NW6	NW6	NNE7	NNE15	NNE15	NNE14	NNE12	NNE10	N9	NE5.9	NNE15
5-Apr	N9	NNE7	NNE6	NNE4	N6	N12	NNE15	NNE13	N9	NNE10	NNE9	N8	NNW10	NNE10	NE10	NE12	NE11	NNE11	NNE11	NNE12	NNE10	NE6	E4	NNE9.0	NNE15	
6-Apr	SE7	SE8	SE8	SE9	SSE9	SSE9	SSE10	SE9	SSE9	SE6	SE7	SSE13	S13	SSE9	SE10	SSE9	SSE14	SE14	SE14	SE14	S15	S18	S17	SSE15	SSE10.8	S18
7-Apr	SSE14	SSE13	S13	SSE14	SSE14	SSE14	SSE15	S15	S12	SSE11	SSE14	S21	S18	S17	S16	S15	S14	SSW13	SSW12	S11	S13	S13	S13	SSE13	S13.8	S21
8-Apr	SSE13	SSE13	SSE12	SSE13	SSE12	SSE16	SSE17	SSE11	SE6	SW1	NNW11	NW9	NNW13	N13	N11	NNW11	N6	NE8	NE8	ENE8	E6	SE7	SSE8	SSE11	SE3.1	SSE17
9-Apr	SSE12	SSE12	SSE13	SSE12	SE11	SE11	SE12	SSE12	SE12	SE14	SE15	S13	SW19	SW21	SW23	WSW21	WSW19	WSW20	SW16	SSW11	SSW12	SW11	SW9	SSW9	SSW10.9	SW23
10-Apr	SSW9	S8	SSE9	SSE9	SE9	SE11	SSE10	SE11	SE7	SE8	SE8	ESE7	ENE8	NNE2	SSW13	SSW11	SSE15	SSE16	SSE11	S12	SSE12	SSE13	SE11	SSE12	SSE9.1	SSE16
11-Apr	SSE13	SSE12	SSE11	SSE8	SSE10	SSE12	SSE9	SSE8	WSW5	W10	WSW20	W19	W15	W22	W20	NNW18	W21	W25	WSW31	WSW36	W36	NNW16	W10	WSW12	WSW12.7	WSW36
12-Apr	W15	W23	WSW19	WSW19	WSW18	WSW16	SW16	SW16	WSW20	WSW20	WSW24	SW26	W33	WSW31	WSW31	W32	W32	W32	W27	W22	NNW15	WSW10	SW13	SW15	WSW21.3	W33
13-Apr	W17	WSW8	WSW12	W26	W25	W18	W19	W23	NNW23	NNW30	NNW32	NNW31	NNW30	NNW31	NNW26	NNW24	NNW22	NW18	NNW10	NNW6	WSW2	ESE2	SE8	SE10	NNW16.4	NNW32
14-Apr	SE12	SE13	SE12	SE13	SE13	SE14	SE15	ESE10	SE12	SE13	SE13	SE12	SE12	SE11	SSE13	SSE26	SE19	SE20	SE17	SE16	SE13	SE15	SSE16	SE14	SE14.0	SSE26
15-Apr	SSE12	SSE11	SSE10	SSE6	S6	SSE8	SSE6	SE5	WSW8	W14	WSW15	W20	W18	W22	W24	W22	W24	W22	WSW15	SSW8	SSW12	W26	WSW16	SW16	WSW11.0	W26
16-Apr	WSW16	SW17	WSW21	WSW20	WSW17	WSW16	WSW15	WSW11	SW9	SSW9	SSW13	SW17	WSW22	WSW26	W31	WSW28	WSW26	NW24	NW15	W25	NNW17	NNW17	W11	WSW10	WSW16.2	W31
17-Apr	SSW5	SW4	SSE8	SSE9	SSE9	SSE8	SSE10	SE7	SE6	SE8	SE10	SSE10	SSW16	SSW20	SSW24	SSW21	SSE12	SE12	SE12	SE9	SSE5	SE4	NW0	W7	S8.2	SSW24
18-Apr	NW11	NW12	NW17	NW18	NW22	NNW20	NNW19	NW20	NNW17	NNW20	NW24	NNW22	NNW21	NNW17	NW8	N13	N18	NW15	NNW12	NE13	S2	WSW3	W6	W7	NW13.2	NW24
19-Apr	WSW7	WSW7	SSE5	SSW5	S7	SSE9	SSE7	SE4	SE5	SE7	ESE7	SE6	SSW4	SW11	W12	W12	W9	NNW8	W1	SSE5	SSE11	SSE13	SSE11	SSE9	SSW4.7	SSE13
20-Apr	SSE7	SSE3	W6	NNW11	NNW7	W4	NNW2	NE1	NE4	NW3	WSW7	SW4	NNW10	NNW13	W11	NW6	NE3	NNE7	NNE14	NNE14	NNE16	N19	N20	N16	NNW5.2	N20
21-Apr	N14	N10	NNE13	NNE11	N8	NNW7	N10	NNW7	NNW10	NW11	N12	N12	N14	N13	NNE14	NNE12	N14	NE12	ENE17	E16	E12	ESE12	SE14	ESE13	NNE8.2	ENE17
22-Apr	ESE15	ESE12	ESE11	ESE10	ESE11	ESE10	SE15	ESE13	ESE15	E17	E18	ESE16	ESE19	SE20	SE19	SE21	SE20	ESE16	ESE15	ESE16	ESE16	SE20	SE19	SE18	ESE15.6	SE21
23-Apr	SE15	ESE13	ESE12	ESE14	ESE15	ESE14	E14	ESE14	ESE15	E13	E14	E14	E15	ESE17	E22	ESE18	SE16	ESE16	ESE13	ENE17	ENE26	ENE18	ENE13	NE12	E14.4	ENE26
24-Apr	NNE13	NNE14	NNE17	NNE17	NNE17	NNE19	NNE17	NNE14	NNE16	N16	NNE17	NNE19	NNE15	NNE20	N21	N23	N25	N25	N26	N25	N28	N23	N21	N21	NNE19.4	N28
25-Apr	N19	NNE19	NNE17	NNE13	N12	N11	N10	NNE5	NW8	NNW7	NNW4	NNW7	NNW9	W10	NW7	NNW10	NW10	NW12	NNW11	N11	NNE16	NNE17	NNE11	NE9	N9.5	N19
26-Apr	E5	SE6	SE6	SSE7	S6	S5	SSE7	SSE8	SE6	SE6	E6	E5	E4	N4	E5	ENE9	ENE13	NE11	NE10	E9	E9	SE11	SE18	SE17	ESE6.2	SE18
27-Apr	SE15	SSE11	SE10	SE14	SSE14	SE13	SSE13	SSE12	SSE10	SSE12	S17	SSW17	SW15	SSW20	SW25	SW19	SW23	WSW26	SW19	WSW13	SW10	SSW12	SW10	SW12	SSW12.0	WSW26
28-Apr	SSW7	SSE8	SSE7	SE7	SE7	SE10	SE8	SE7	SE7	SE8	SE11	SSE14	SSE19	SSE21	SSE22	SSE22	S23	S19	SSE16	SSE16	SSE16	SSE14	S13	WSW19	SSE12.0	S23
29-Apr	W16	W17	W12	W13	W15	W21	W20	W19	WSW12	SW10	W13	W15	W22	WSW21	W19	W16	WSW11	WSW13	SW11	SW10	SW10	SW12	SW15	SW16	WSW14.2	W22
30-Apr	WSW14	WSW15	WSW19	WSW18	WSW19	WSW13	WSW16	WSW19	WSW18	WSW21	WSW27	WSW28	SW21	WSW18	WSW20	W13	NW17	NNW14	NW7	SSW3	S7	SSE4	S8	S8	WSW13.2	WSW28
S1.7 S1.9 S1.5 SSW1.6 SSW1.6 S1.3 SE1.5 SSE1.6 S0.8 WSW0.6 WSW1.9 WSW3.4 W5.5 W5.7 W6.4 W5.1 W3.8 WNW3.1 NNW1.3 NE1.4 E1.4 SE1.6 SSE3.0 S3.3																								Diurnal Average		
NNE20 W23 N25 N27 N26 N32 N34 N28 N28 WNW30 WNW32 WNW31 W33 WSW31 W31 W32 W32 W32 W32 WSW31 WSW36 W36 W26 N21 N21																								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: 10 km/h on Apr 18 15:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 1 km/h on Apr 19 05:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 4 Q <sub>3</sub> = 5 P <sub>90</sub> = 7 P <sub>99</sub> = 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-Apr	5	5	6	7	7	9	8	8	8	8	8	6	7	8	6	7	7	7	5	4	4	3	1	2	9
2-Apr	2	2	2	2	2	2	2	2	2	3	3	4	4	4	4	3	4	3	3	3	3	3	2	2	4
3-Apr	1	2	1	1	1	1	1	1	2	3	3	3	4	4	4	3	4	3	3	3	3	3	3	3	4
4-Apr	2	2	1	2	2	1	1	1	2	2	2	4	3	4	4	3	3	4	3	4	4	4	3	2	4
5-Apr	2	2	1	2	2	4	4	4	3	3	3	4	4	4	4	4	3	3	4	2	3	2	3	2	4
6-Apr	2	3	3	3	2	1	2	3	3	3	3	4	5	5	4	4	5	4	4	3	3	4	3	3	5
7-Apr	2	2	2	2	2	2	3	4	4	3	6	6	7	6	7	6	5	4	5	3	2	2	2	2	7
8-Apr	2	3	2	3	3	3	3	4	2	3	3	3	4	4	4	4	3	3	2	1	2	1	1	2	4
9-Apr	2	2	2	2	2	3	3	3	4	4	4	5	6	6	7	5	5	5	5	2	2	2	2	1	7
10-Apr	1	1	2	1	2	2	2	3	3	3	3	3	3	3	5	5	5	4	3	3	2	2	2	2	5
11-Apr	3	4	2	2	2	3	3	3	2	6	4	5	6	5	6	4	5	7	9	8	10	4	3	2	10
12-Apr	5	4	4	4	4	3	4	4	5	5	6	7	7	7	8	8	8	7	7	5	4	2	3	4	8
13-Apr	5	1	2	7	6	4	3	4	6	9	7	7	8	7	6	6	6	5	3	2	1	2	3	3	9
14-Apr	4	4	5	4	4	5	6	4	5	4	5	4	4	5	4	5	7	8	6	5	4	5	5	4	8
15-Apr	4	4	3	2	1	1	2	2	5	4	6	5	6	5	6	6	5	6	4	3	5	7	4	4	7
16-Apr	3	4	5	5	4	3	4	3	3	4	5	6	6	7	7	7	6	8	6	8	4	4	3	3	8
17-Apr	3	3	1	2	2	2	3	2	2	3	4	6	6	6	8	8	4	3	4	4	4	2	2	2	8
18-Apr	3	3	4	5	6	5	6	5	4	5	6	6	6	9	10	7	6	5	5	6	1	1	1	3	10
19-Apr	2	2	1	1	1	2	3	1	2	2	3	3	4	5	5	5	3	2	2	2	1	1	2	1	5
20-Apr	2	1	3	2	2	1	1	1	2	2	2	3	4	4	4	3	3	3	4	3	3	4	4	5	5
21-Apr	4	3	3	3	2	2	4	3	3	3	4	5	5	5	5	5	5	4	4	4	4	5	5	5	5
22-Apr	5	4	5	4	4	4	5	5	6	6	7	6	7	7	7	8	7	7	6	5	6	7	7	7	8
23-Apr	6	5	5	5	5	5	5	5	6	5	4	5	5	6	7	7	6	6	5	7	6	6	5	4	7
24-Apr	3	4	3	3	3	3	4	4	4	4	5	6	6	6	6	6	6	7	6	6	7	6	5	5	7
25-Apr	4	4	3	3	3	3	3	2	2	3	3	4	4	4	4	4	4	4	4	3	4	3	3	3	4
26-Apr	1	1	1	2	2	1	2	2	2	3	3	3	3	2	3	4	3	3	2	2	2	5	6	5	6
27-Apr	4	3	3	3	3	3	3	3	3	5	7	7	5	9	8	7	7	6	5	4	1	2	2	2	9
28-Apr	3	2	2	2	2	2	3	2	2	4	4	4	6	6	6	7	7	6	4	4	4	3	3	6	7
29-Apr	3	5	5	3	3	3	3	4	4	3	3	4	4	5	4	4	3	4	4	2	2	3	3	3	5
30-Apr	3	3	4	4	4	5	4	4	5	5	7	7	7	7	7	6	8	5	5	2	2	3	2	3	8

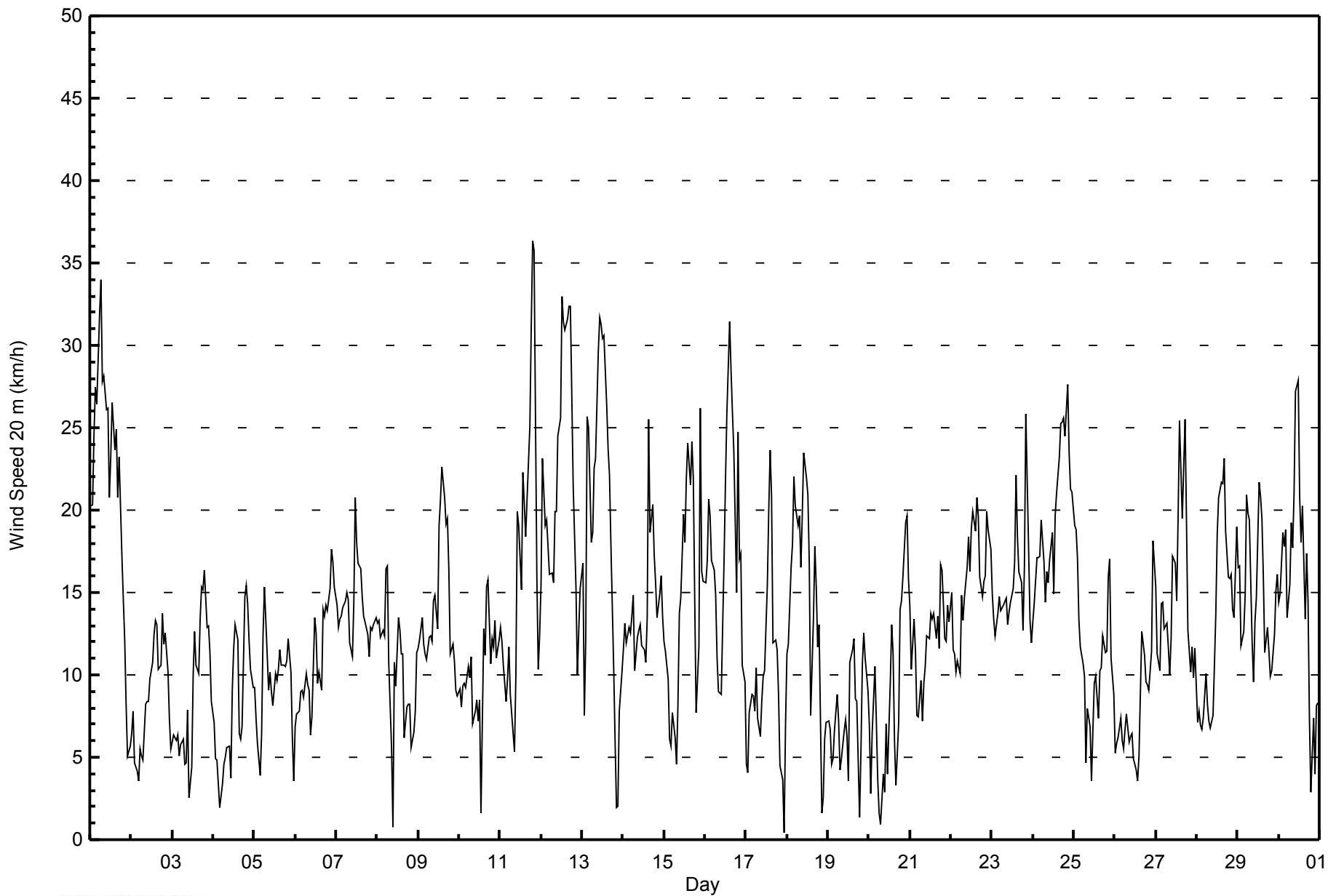
Diurnal Maximum



**WBEA**  
**Hourly Averages**

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

**Mannix - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	60	8.33	8.33
6 - 11	237	32.92	41.25
12 - 19	304	42.22	83.47
20 - 28	102	14.17	97.64
29 - 38	17	2.36	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

**Mannix - April 2015**

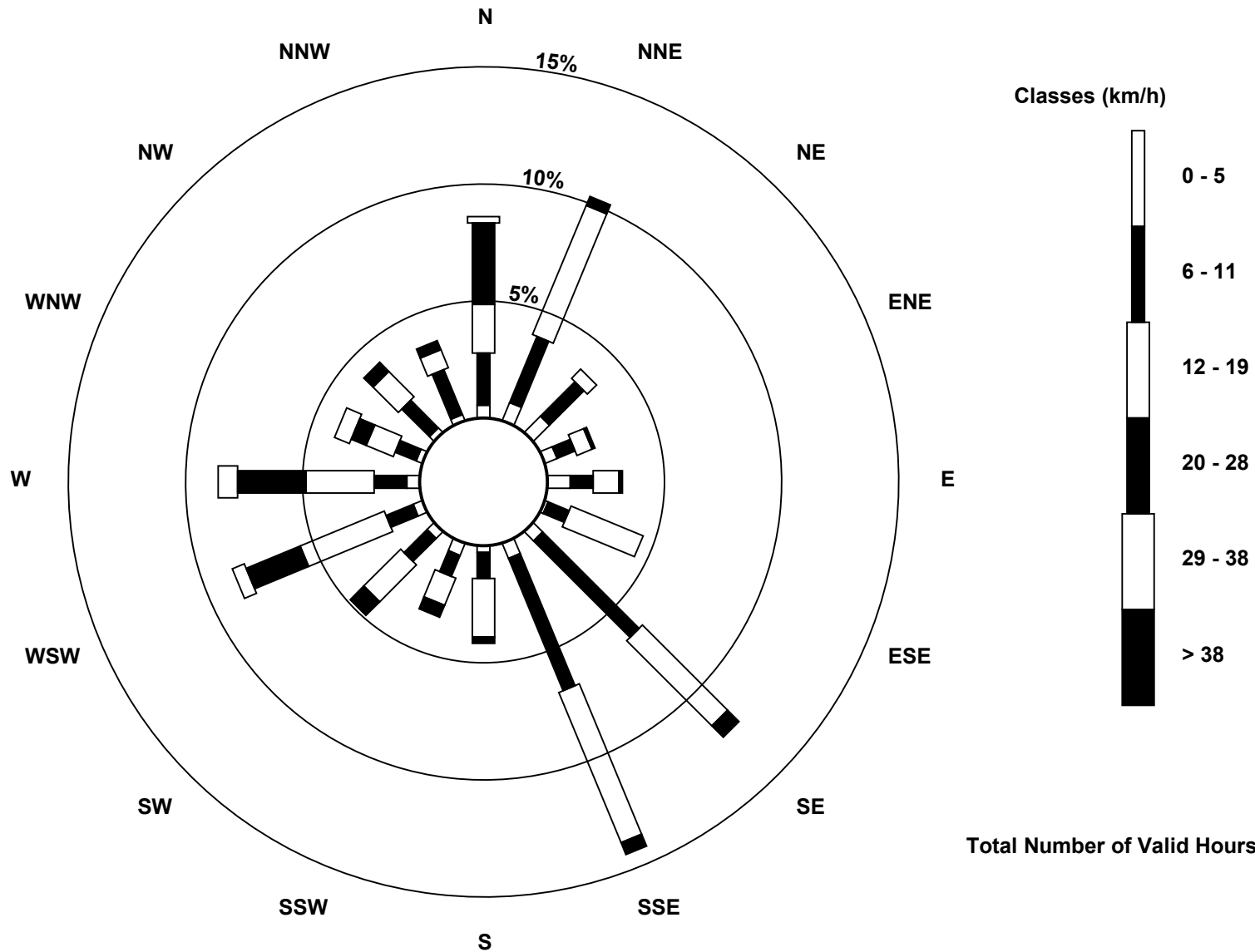
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	6	7	4	7	1	4	5	2	4	3	3	4	2	2	2	60
6 - 11	16	22	15	6	7	7	42	44	8	7	10	9	10	7	12	15	237
12 - 19	15	43	4	5	8	24	37	50	18	9	16	28	21	9	11	6	304
20 - 28	25	3	0	1	1	0	5	4	2	4	6	18	21	5	4	3	102
29 - 38	2	0	0	0	0	0	0	0	0	0	0	4	6	5	0	0	17
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	62	74	26	16	23	32	88	103	30	24	35	62	62	28	29	26	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

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



Total Number of Valid Hours: 720



Maximum Speed: 44 km/h on Apr 11 20:00	Maximum Daily Speed Average: 28.3 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 17 23:00	Minimum Daily Speed Average: 5.3 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 7.4 km/h at hour 15	Minimum Diurnal Speed Average: 0.8 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 2.2 km/h 219.1 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 7 Q <sub>1</sub> = 12 Median = 17 Q <sub>3</sub> = 23 P <sub>90</sub> = 27 P <sub>99</sub> = 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-Apr	NNE27	N27	N33	N35	N36	N43	N44	N36	N38	N35	N33	N26	N30	N34	N30	NNE31	N28	N31	NNE23	NNE19	NNE16	NNE11	N8	NNE8	N28.3	N44	
2-Apr	N9	N10	NW5	WNW5	WNW3	NNW7	N6	NNE5	NNE10	NNE10	NNW10	NNW12	NNW13	NW15	NNW16	NW15	NNW12	NNE12	NNE16	NNE14	NNE15	NE12	NNE9	NE6	N9.0	NNE16	
3-Apr	ENE7	E7	NE6	NE7	ENE6	ENE6	ENE7	E5	E5	ENE9	N4	NNW6	N11	NNE14	NNE12	NNE12	NNE16	NNE19	NNE19	NNE21	NNE17	NE18	NE15	E11	NE9.7	NNE21	
4-Apr	E9	E6	ENE5	NE4	NE3	ENE4	ENE5	ENE5	NE6	ENE7	NNE4	NW10	NW13	NW16	NW14	NW8	NW7	NNE8	NNE18	NNE20	NNE18	NNE16	NNE15	NNE15	NNE7.2	NNE20	
5-Apr	NNE13	NNE10	N9	N6	N8	NNE16	NNE20	NNE16	N11	NNE12	NNE10	N9	NNW12	NNE11	NNE12	NE12	NE12	NE12	NNE12	NNE15	NNE16	NE13	ENE9	ESE7	NNE11.0	NNE20	
6-Apr	SE10	SE11	SE12	SE13	SE14	SSE12	SE14	SE11	SSE10	SE8	SE8	SSE16	S17	SSE12	SE12	SSE12	SSE18	SSE18	SE19	SSE20	S25	S27	S27	SSE24	SSE14.9	S27	
7-Apr	SSE22	S21	S22	S22	S23	S23	SSE22	S19	S16	SSE14	SSE18	S27	S24	S24	S23	S21	S21	SSW20	S20	S18	S21	S21	S22	S21	S20.7	S27	
8-Apr	S20	SSE21	SSE19	SSE19	SSE20	SSE23	SSE22	SSE13	SSE7	W2WNW12	NW11	NNW16	N14	N14	NNW14	N7	NE9	NE11	ENE12	E9	SE10	SSE13	SSE20	SE5.3	SSE23		
9-Apr	SSE19	SSE21	SSE23	SSE23	SSE21	SE19	SSE18	SSE17	SE16	SE17	SSE17	S17	SW24	SW26	SW29	WSW25	WSW24	WSW26	SW24	SW20	SW22	SW20	SW18	SW16	SSW16.3	SW29	
10-Apr	SW17	SW14	SSW11	S14	SSE14	SSE18	SSE17	SSE15	SE9	SE11	SE11	ESE9	E10	NNE2	SSW17	SSW14	SSE19	SSE20	SSE16	S23	S20	SSE21	SSE19	SSE22	SSE13.3	S23	
11-Apr	SSE22	SSE20	S20	SSE14	SSE17	SSE20	S14	S10	WSW7	W11	WSW23	W21	W17	W25	W23	WNW22	W24	W28	WSW38	WSW44	W42	WNW21	W14	WSW19	WSW15.7	WSW44	
12-Apr	W22	W29	WSW26	WSW27	WSW24	WSW21	WSW21	SW19	WSW23	WSW23	WSW30	WSW31	W36	WSW36	WSW36	W37	W38	W37	W31	W25	NNW21	W15	WSW19	SW23	WSW26.4	W38	
13-Apr	W22	W11	WSW19	W31	W29	W22	W23	W26	WNW27	WNW36	WNW38	WNW37	WNW36	WNW35	WNW30	WNW28	WNW26	NW22	NNW14	NNW9	WNW3	ESE3	ESE12	SE17	WNW19.7	WNW38	
14-Apr	SE19	SE20	SE18	SE19	SE19	SE20	SE21	ESE14	SE16	SE16	SE17	SE14	SE13	SE13	SSE17	SSE31	SE24	SE25	SE22	SE20	SE19	SE21	SSE20	SE17	SE18.7	SSE31	
15-Apr	SSE15	SSE15	SSE13	SSE9	S8	S12	S9	SE5	WSW10	W15	WSW17	W22	W20	W24	W27	W24	W27	W25	WSW19	SSW13	SSW22	W30	WSW22	SW23	WSW13.7	W30	
16-Apr	WSW23	WSW25	WSW27	WSW25	WSW23	WSW23	WSW19	WSW14	SW11	SSW12	SSW18	SW21	WSW26	WSW30	WSW36	WSW33	WSW31	NW30	NW19	W29	WNW22	WNW23	W15	W16	WSW20.6	WSW36	
17-Apr	WSW8	WSW8	S8	SSE12	SSE16	SSE14	SSE15	SSE9	SE7	SE9	SE12	S15	SSW23	SSW29	SSW34	SSW31	SSE17	SE16	SE15	SE12	SSE7	SE6	SE1	WNW9	S11.6	SSW34	
18-Apr	NW15	NW16	NW21	NW23	NW28	NNW27	NNW26	NW26	WNW21	WNW24	NW28	NNW27	NNW27	NNW22	NNW10	N18	N23	NW20	NNW16	NE17	SE4	S3	WSW6	WNW7	NNW16.9	NW28	
19-Apr	W7	WNW11	SW2	WSW4	S9	S14	SSE10	SSE5	SE6	SE8	ESE7	SE7	SSW5	SW12	W14	W15	W10	WNW10	W2	SSE6	SSE16	SSE19	S19	SSE16	SSW6.0	SSE19	
20-Apr	SSE13	SSW3	W11	WNW15	WNW14	WNW9	NNW3	N2	NE4	NNW3	W6	SW5	WNW11	WNW14	W12	NW7	NE4	NNE8	NNE18	NNE20	NNE22	NNE26	N27	N23	NNW7.2	N27	
21-Apr	N21	N16	NNE19	N17	N12	N11	N14	NNW8	NNW11	NW13	N15	N15	N16	NNE16	NNE17	NNE14	NNE16	NE14	ENE20	E20	E15	ESE16	SE18	ESE17	NNE10.9	N21	
22-Apr	ESE19	ESE15	ESE16	ESE14	ESE14	ESE13	SE19	ESE18	ESE18	ESE19	ESE21	ESE20	ESE23	SE25	SE24	SE26	SE25	ESE21	ESE20	ESE20	ESE20	SE26	SE24	SE24	ESE19.9	SE26	
23-Apr	ESE20	ESE18	ESE17	ESE18	ESE18	ESE18	E17	ESE18	ESE18	E15	E17	E17	E18	ESE20	E26	ESE22	SE20	ESE20	ESE16	ENE20	ENE32	ENE21	ENE16	NE14	E17.9	ENE32	
24-Apr	NNE18	NNE20	NNE22	NNE22	NNE22	NNE24	NNE20	NNE17	NNE19	NNE19	NNE20	NNE22	NNE17	NNE23	NNE26	N29	NNE32	N32	N37	N31	N28	N27	N27	N27	NNE24.5	N37	
25-Apr	NNE25	NNE24	NNE22	NNE18	N15	N15	N12	N5	NNW9	NNW8	N4	NNW7	WNW11	WNW11	NW8	WNW11	WNW11	NW12	NW15	NNW14	N16	NNE22	NNE23	NNE15	NE11	N12.0	NNE25
26-Apr	ESE6	SE10	SE9	SSE13	SSE11	SSE12	SSE10	SSE9	SE6	SE7	E7	ESE6	E6	NNE4	E5	ENE10	ENE14	NE13	NE11	E12	ESE13	SE16	SE24	SE23	ESE8.5	SE24	
27-Apr	SE22	SE17	SSE17	SE21	SE21	SE19	SE18	SSE16	SSE13	SSE15	S25	SSW24	SW19	SSW27	SW33	SW26	SW29	WSW31	SW25	WSW18	SW17	SW21	SW20	SW23	SSW17.1	SW33	
28-Apr	SW15	SSE13	SSE15	SSE13	SE16	SE20	SSE15	SSE10	SSE9	SE10	SE13	SSE17	SSE24	SSE26	SSE27	SSE30	S33	S28	SSE22	SSE23	SSE24	SSE23	S23	WSW25	SSE18.0	S33	
29-Apr	W21	W21	W16	W17	W19	W25	W24	W23	W16	WSW14	W14	W16	W25	WSW24	W22	W18	WSW14	WSW16	SW15	SW17	SW17	SW22	SW26	WSW25	WSW18.5	SW26	
30-Apr	WSW23	WSW22	WSW26	WSW26	WSW26	WSW19	WSW20	WSW22	WSW20	WSW25	WSW33	WSW34	SW26	SW22	WSW24	W16	NW21	NNW19	NW10	SSW4	S10	SSE8	S15	SSW15	WSW17.3	WSW34	
S2.9 S3.0 S2.9SSW3.0 S3.1 SSE3.1 SE2.7 SSE2.1SSW1.1WSW0.8WSW2.2WSW3.8 W6.3 W6.6WSW7.4WSW5.9 W4.2WNW3.4NNW1.3 ENE1.5 ESE1.9 SSE2.8 SSE5.0 S5.4																								Diurnal Average			
NNE27 W29 N33 N35 N36 N43 N44 N36 N38WNW36WNW38WNW37 W36WSW36WSW36 W37 W38 W37WSW38WSW44 W42 N31 N28 N27																								Diurnal Maximum			

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





Summary of Hour Standard Deviations

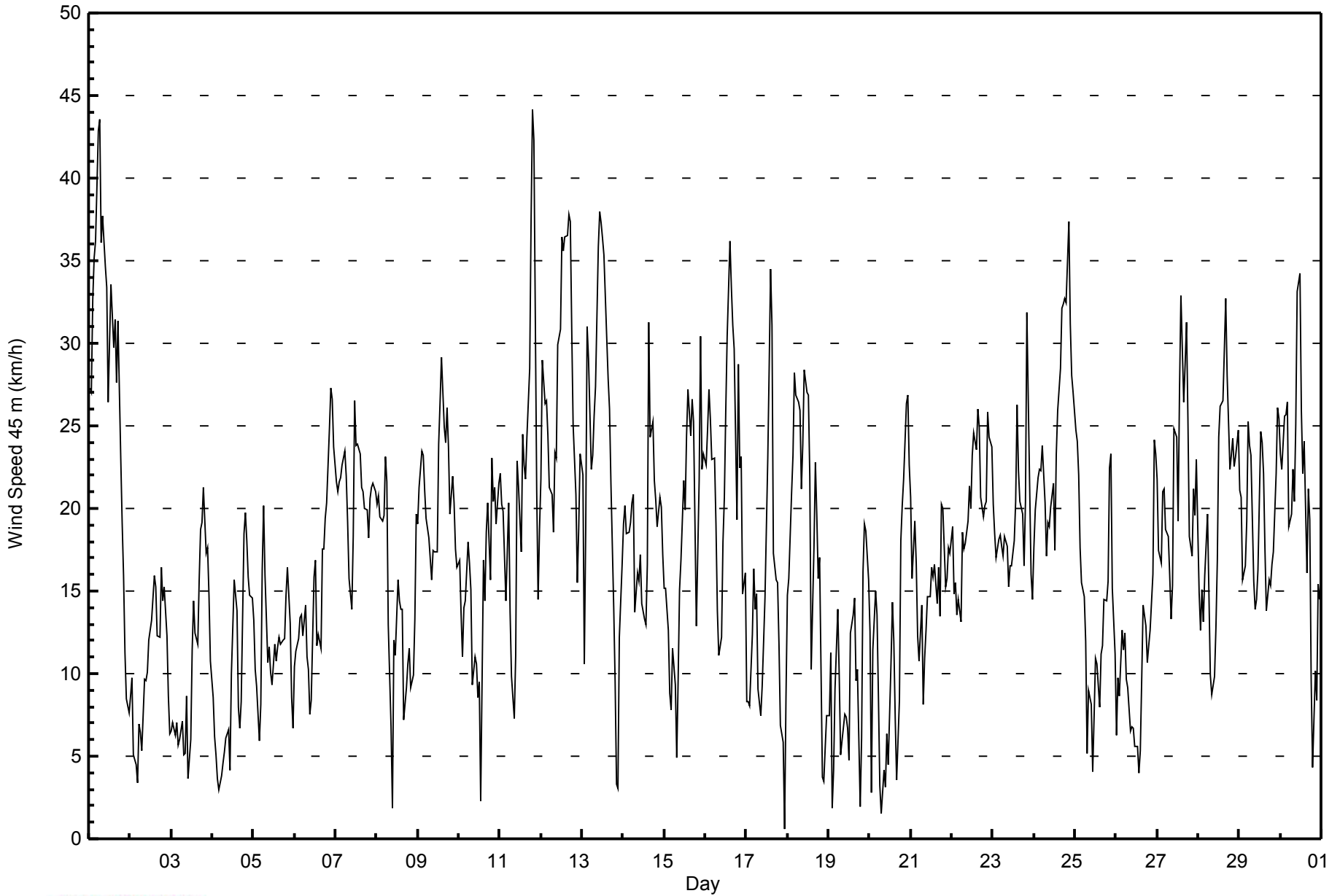
Mannix - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Apr 18 15:00 Minimum Value: 1 km/h on Apr 26 03:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 9																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	4	5	5	7	6	8	7	8	7	8	7	6	7	7	6	6	6	6	5	5	4	4	2	2	8
2-Apr	1	2	2	2	1	2	1	2	2	3	3	4	3	3	3	3	4	3	3	4	3	3	2	1	4
3-Apr	1	2	1	1	1	1	1	2	2	3	3	4	4	4	4	4	4	3	3	3	3	3	3	3	4
4-Apr	2	2	2	2	2	1	1	1	2	2	3	4	3	4	3	4	3	4	4	4	4	4	4	3	4
5-Apr	2	2	1	2	3	4	4	5	2	3	3	4	4	4	4	4	3	3	2	3	2	3	3	2	5
6-Apr	3	3	3	3	2	1	2	3	2	2	3	4	5	4	4	3	4	3	3	3	2	3	3	3	5
7-Apr	2	2	2	2	2	2	2	3	3	3	7	5	5	6	6	4	3	3	4	2	2	2	2	2	7
8-Apr	2	2	2	2	2	2	2	5	2	3	3	3	4	4	4	4	3	2	2	2	2	2	1	2	5
9-Apr	2	2	2	2	2	4	2	3	3	3	3	5	5	6	6	5	5	6	4	3	1	2	2	1	6
10-Apr	1	2	1	2	1	1	2	3	2	2	2	4	3	3	5	5	5	4	2	3	2	3	2	2	5
11-Apr	3	4	2	3	2	3	3	3	2	6	4	6	7	5	6	5	4	7	10	8	11	4	3	2	11
12-Apr	5	4	4	4	5	3	4	5	5	4	6	7	6	7	9	9	8	7	7	5	4	3	2	4	9
13-Apr	5	2	3	7	6	4	3	4	5	9	6	6	7	6	5	6	6	5	3	3	2	3	3	4	9
14-Apr	4	4	5	4	4	5	5	4	5	4	5	4	4	5	5	6	9	6	5	4	5	5	5	4	9
15-Apr	3	3	3	2	1	1	3	1	4	4	6	5	6	6	5	5	5	5	5	4	4	7	4	3	7
16-Apr	3	3	5	5	4	3	4	3	3	3	5	6	6	8	7	7	6	8	7	9	3	5	3	3	9
17-Apr	3	4	2	3	1	2	2	2	3	3	7	6	6	7	8	4	3	4	4	4	5	2	2	4	8
18-Apr	3	3	3	5	5	5	6	5	3	4	5	6	6	12	12	8	7	5	6	8	2	1	1	1	12
19-Apr	3	2	3	1	2	2	3	1	2	2	3	3	4	4	5	5	2	2	2	3	2	1	2	1	5
20-Apr	2	2	3	2	1	2	1	1	2	2	2	3	4	4	4	3	3	3	5	3	3	3	3	5	5
21-Apr	4	3	2	3	2	3	4	3	3	3	4	5	4	5	5	5	4	4	4	4	4	5	5	5	5
22-Apr	5	4	5	4	4	4	5	5	5	6	6	7	7	8	7	8	7	6	6	5	6	7	6	7	8
23-Apr	6	5	5	5	5	5	5	5	5	4	3	6	5	6	6	7	6	6	5	8	6	6	6	5	8
24-Apr	3	3	3	3	3	3	4	3	3	4	5	6	6	6	6	6	5	5	5	5	5	6	4	3	6
25-Apr	4	3	3	3	3	2	3	2	2	3	4	5	3	4	4	4	4	4	3	3	4	3	4	2	5
26-Apr	1	2	1	3	3	2	2	2	2	3	3	3	3	2	3	5	3	3	2	3	2	6	5	4	6
27-Apr	4	2	3	2	2	3	2	3	3	4	6	6	6	9	9	6	7	7	6	4	2	1	2	2	9
28-Apr	4	3	2	2	2	1	4	2	2	4	3	4	5	6	5	6	7	6	4	4	3	3	2	4	7
29-Apr	3	4	5	2	3	3	3	3	4	3	3	4	4	5	4	3	3	4	3	2	2	2	2	3	5
30-Apr	2	3	4	4	4	6	4	5	5	4	7	7	7	8	8	6	10	5	6	2	4	5	2	2	10
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	39	5.42	5.42
6 - 11	129	17.92	23.33
12 - 19	264	36.67	60.00
20 - 28	226	31.39	91.39
29 - 38	58	8.06	99.44
> 38	4	0.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

**Mannix - April 2015**

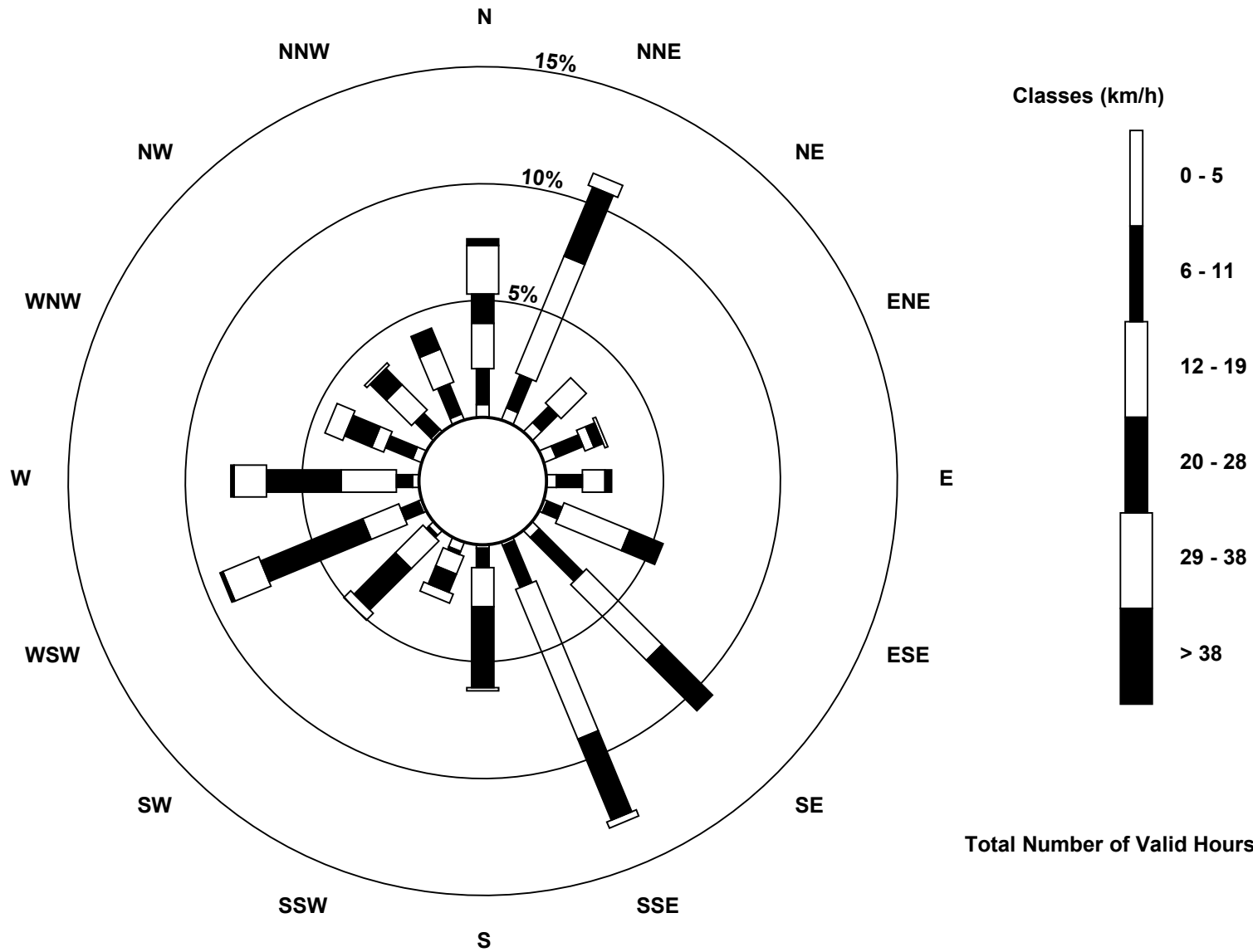
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	4	4	4	3	1	3	1	1	3	2	1	2	3	1	2	39
6 - 11	11	11	7	9	8	5	19	14	6	1	1	6	5	9	7	10	129
12 - 19	14	39	11	3	7	22	33	50	12	6	12	12	17	4	11	11	264
20 - 28	9	23	0	3	2	11	22	27	25	6	18	34	23	9	7	7	226
29 - 38	15	4	0	1	0	0	0	2	1	3	3	12	10	6	1	0	58
> 38	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	4
<b>Totals</b>	55	81	22	20	20	39	77	94	45	19	36	66	58	31	27	30	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

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





Maximum Speed: 49 km/h on Apr 11 20:00	Maximum Daily Speed Average: 31.8 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 2 km/h on Apr 10 14:00	Minimum Daily Speed Average: 6.4 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 7.9 km/h at hour 15	Minimum Diurnal Speed Average: 1.4 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 2.9 km/h 225.1 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 8 Q <sub>1</sub> = 12 Median = 19 Q <sub>3</sub> = 26 P <sub>90</sub> = 31 P <sub>99</sub> = 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-Apr	NNE31	NNE31	NNE37	NNE39	N40	N48	N47	N39	N42	N38	N37	N29	N33	N37	N32	NNE35	N31	N35	NNE27	NNE23	NNE21	NNE15	NNE11	NNE10	N31.8	N48
2-Apr	N10	N10	NW5	NW5	NNW3	NNW7	N7	NNE5	NNE10	NNE10	NNW10	NNW12	NNW14	NNW14	NNW16	NW16	NNW12	NNE13	NNE18	NNE17	NNE18	NE14	NE9	NE7	N9.6	NNE18
3-Apr	ENE7	E6	NE6	NE7	E6	E7	E8	ESE4	E5	ENE9	N4	NNW7	N12	NNE15	NNE13	NNE13	NNE17	NNE21	NNE21	NNE24	NNE22	NE22	NE18	E11	NE10.7	NNE24
4-Apr	E9	E6	E4	E3	E3	E4	ENE4	ENE6	ENE6	ENE7	NNE5	NW10	NW13	NW16	NW14	NW9	NW6	NNE9	NNE21	NNE23	NNE22	NNE20	NNE19	NNE19	NNE7.9	NNE23
5-Apr	NNE17	NNE14	N12	N7	N10	NNE20	NNE24	NNE18	N11	NNE12	NNE11	N10	NNW12	NNE11	NNE12	NE13	NE12	NE13	NNE14	NNE18	NNE20	NE16	E9	ESE6	NNE12.4	NNE24
6-Apr	SE12	SE12	SE14	SE18	SE15	SE13	SE18	SE11	SE11	SSE8	SE8	SSE16	S18	S12	SE12	SSE12	SSE19	SSE19	SE23	SSE26	S32	S35	S34	S31	SSE17.2	S35
7-Apr	S28	S28	S28	S29	S30	S30	S28	S22	S18	SSE16	SSE20	S28	S25	S26	S25	S23	S23	S23	S21	S25	S26	S26	S26	S24.5	S30	
8-Apr	S25	S24	S24	S22	SSE24	SSE27	SSE25	SSE14	S7	W4	NW12	NW11	NNW16	N15	N14	N14	N8	NE10	ENE12	ENE14	E11	SE8	SSE17	SSE27	SSE6.4	SSE27
9-Apr	SSE28	SSE29	S27	SSE28	SSE28	SSE30	SSE28	SSE23	SSE17	SSE19	SSE19	S20	SW26	SW29	SW32	WSW27	WSW26	WSW29	SW27	SW25	SW29	SW28	WSW24	WSW22	SSW20.8	SW32
10-Apr	SW24	SW20	SW13	SSW14	S12	S13	S14	SSE14	SSE11	SSE12	SE11	SE8	E9	NNE2	SSW18	SSW15	SSE19	SSE24	S19	S29	S26	S24	SSE26	SSE30	S14.6	SSE30
11-Apr	SSE31	SSE28	S23	S11	SSE12	SSE17	SSW12	SSW13	WSW10	W12	WSW25	W22	W18	W26	W24	WNW23	W26	W30	WSW41	WSW49	W46	WNW24	W17	WSW23	WSW18.0	WSW49
12-Apr	W27	W34	WSW32	WSW32	WSW30	WSW25	WSW24	SW20	WSW25	WSW24	WSW32	SW33	W38	WSW38	WSW39	WSW39	W41	W40	W33	W28	NW24	W20	WSW23	SW28	WSW29.7	W41
13-Apr	W26	W14	WSW25	W35	W32	W25	W27	W28	WNW29	WNW38	WNW39	WNW38	WNW38	WNW36	WNW31	WNW29	WNW27	NW22	NNW16	NNW11	NNW5	E2	ESE8	SE18	WNW21.5	WNW39
14-Apr	SE23	SE26	SE21	SE18	SE19	SE20	SE21	SE12	SE16	SE13	SE16	SE11	SE12	SE13	SSE17	SSE33	SE25	SE26	SE23	SE22	SE20	SE21	SSE23	SE20	SE19.4	SSE33
15-Apr	SSE18	SSE17	SSE14	SE10	SSW8	SSW9	SSW12	SSW12	WSW16	WSW16	WSW18	W22	W21	WSW26	W28	W25	W28	WSW27	WSW21	SSW15	SSW27	W33	WSW26	SW28	WSW15.8	W33
16-Apr	WSW28	WSW30	WSW33	WSW30	WSW28	WSW28	WSW23	WSW16	SW12	SSW13	SSW19	SW22	WSW28	WSW33	WSW39	WSW37	WSW34	NNW33	NW21	W32	WNW27	WNW27	W17	W20	WSW23.4	WSW39
17-Apr	WSW12	WSW14	SW10	S8	SSE13	S17	SSE19	SSE12	SSE8	SE9	SE12	S16	SSW25	SSW31	SSW38	SSW34	SSE20	SE19	SE16	SE9	SSE7	SSE8	SSE2	W9	S12.9	SSW38
18-Apr	NNW18	NW18	NW23	NW26	NNW32	NNW31	NNW31	NNW30	NNW24	WNW25	NNW30	NNW29	NNW29	N24	NNW12	N20	NNE26	NW22	NNW18	NE20	SE6	SSE5	SW6	W6	NNW18.6	NNW32
19-Apr	W4	WNW9	W8	WNW6	SSW6	SSW9	SSW10	S11	SSE8	SSE8	ESE6	SE6	SSW5	SW13	W14	W16	W10	WNW11	WNW3	S5	SSE16	SSE24	S24	S21	SSW6.9	S24
20-Apr	S18	W5	W17	WNW18	NW16	NW10	N6	NNW3	NNE5	N4	W6	SW4	WNW11	WNW14	WNW12	NW7	NE4	NNE9	NNE22	NNE25	NNE26	NNE29	NNE31	NNE28	NNW8.5	NNE31
21-Apr	NNE25	NNE20	NNE23	NNE19	NNE13	N13	NNE19	NNW7	NNW11	NW12	N15	N15	N17	NNE17	NNE18	NNE15	NNE18	NE15	ENE22	E23	E17	ESE14	SE16	ESE13	NNE12.6	NNE25
22-Apr	ESE14	ESE12	SE12	SE11	ESE11	SE11	SE14	SE13	ESE14	ESE16	ESE18	ESE17	SE18	SE20	SE20	SE23	SE20	ESE16	ESE15	ESE16	ESE16	SE20	SE19	SE19	ESE15.8	SE23
23-Apr	SE16	SE15	ESE13	ESE14	ESE15	ESE14	ESE14	ESE14	ESE13	E13	E16	E16	E18	E24	ESE20	SE17	ESE15	ESE13	ENE22	ENE37	ENE25	ENE18	NE16	E16.1	ENE37	
24-Apr	NNE20	NNE24	NNE26	NNE27	NNE27	NNE27	NNE22	NNE18	NNE20	NNE20	NNE21	NNE23	NNE19	NNE24	NNE28	N31	NNE35	NNE36	NNE36	NNE36	N42	N34	NNE30	NNE30	NNE27.0	N42
25-Apr	NNE27	NNE27	NNE26	NNE20	N18	N16	N13	N5	NNW9	NNW9	N5	NNW8	NNW11	W10	NW8	WNW11	NW12	NNW15	NNW15	N18	NNE26	NNE27	NNE19	ENE13	N13.1	NNE27
26-Apr	SE7	SSE12	SSE12	SSE13	SE15	SE13	SE12	SSE11	SSE7	SE7	E6	ESE5	E6	NNE4	E5	ENE10	ENE15	NE13	ENE11	E13	E11	SE16	SE28	SE28	ESE9.6	SE28
27-Apr	SE27	SSE24	SSE23	SE22	SE22	SE23	SE21	SSE21	SSE16	SSE17	S27	SSW26	SW21	SSW29	SW36	SW29	SW32	WSW34	SW28	WSW21	SW19	SW25	SW28	SW30	SSW19.2	SW36
28-Apr	SW21	SSW13	S14	S13	SSE22	SSE26	SSE23	SSE13	SSE11	SSE11	SE14	SSE18	SSE26	SSE28	SSE28	SSE32	S36	S31	SSE26	SSE30	SSE31	SSE29	S30	WSW29	SSE21.0	S36
29-Apr	W25	W24	W18	W20	W23	W28	W27	W26	W19	WSW17	W16	W17	W26	WSW25	WSW23	W18	WSW15	WSW17	SW17	SW19	SW21	SW31	SW36	WSW33	WSW21.4	SW36
30-Apr	WSW30	WSW29	WSW31	WSW33	WSW32	WSW23	WSW23	WSW24	WSW22	WSW27	WSW35	WSW37	SW28	SW24	WSW26	W18	NW22	NNW22	NW10	SSW5	S10	SSE11	S18	SSW16	WSW19.9	WSW37

SSW4.3	SSW4.1	SSW4.2	SW3.6	SSW3.4	S3.1	SSE2.9	SSW2.9	SW1.7	WSW1.5	WSW2.7	WSW4.2	W6.6	W7.0	WSW7.9	WSW6.2	W4.5	WNW3.8	NNW1.4	ENE1.5	ESE1.9	SSE3.0	S6.3	SSW7.1	Diurnal Average
SSE31	W34	NNE37	NNE39	N40	N48	N47	N39	N42	N38	WNW39	NNW38	W38	WSW38	WSW39	WSW39	W41	W40	WSW41	WSW49	W46	S35	SW36	WSW33	Diurnal Maximum

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



Summary of Hour Standard Deviations

Mannix - April 2015

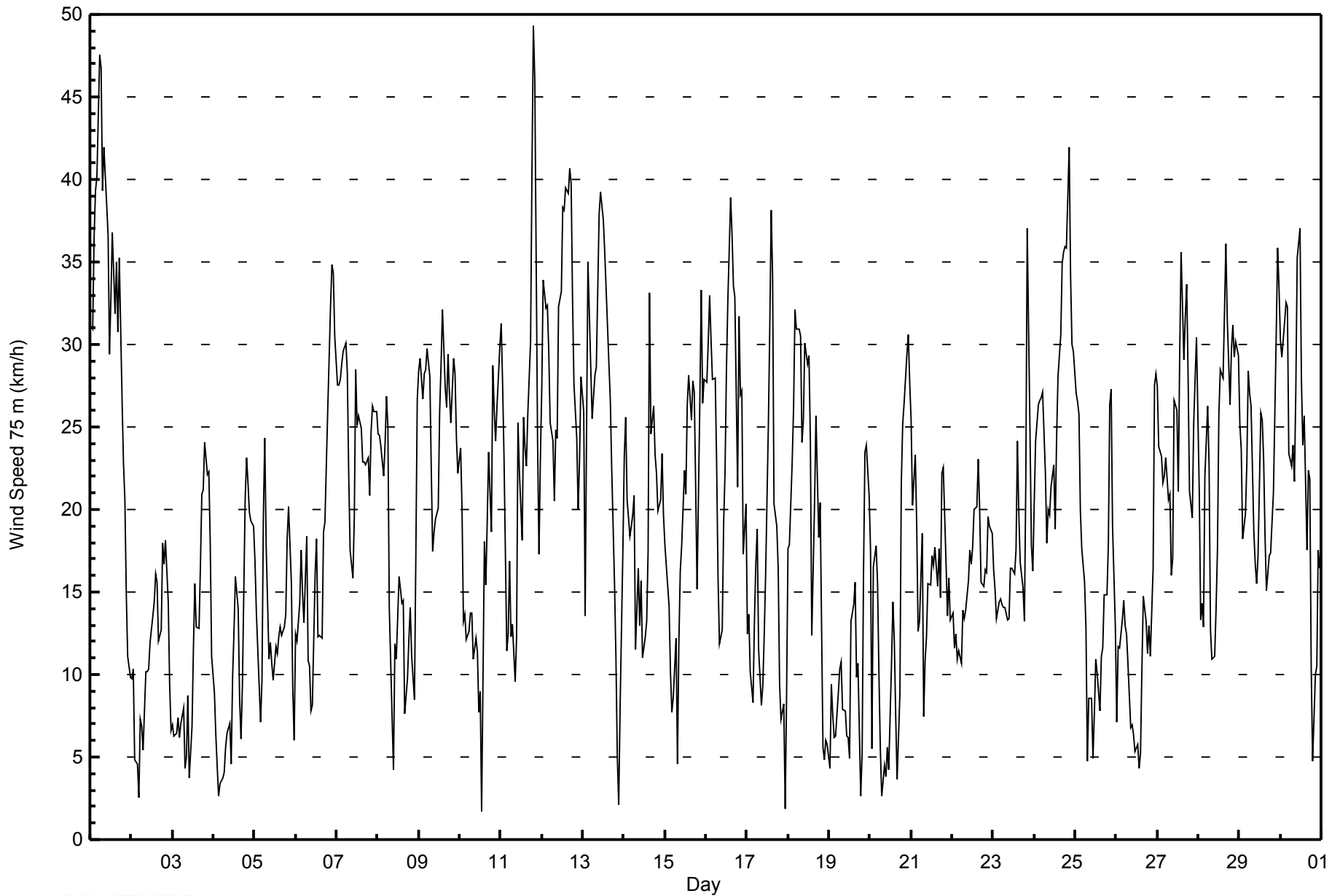
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 13 km/h on Apr 18 15:00	Hours of Data: 720
Minimum Value: 1 km/h on Apr 26 03:00	Hours of Missing Data: 0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 10	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-Apr	4	4	5	6	5	7	6	7	6	7	7	6	6	6	5	5	6	6	5	4	5	4	2	2	7
2-Apr	1	2	1	2	1	1	1	2	2	3	4	3	3	3	3	3	3	3	3	4	3	3	3	1	4
3-Apr	2	2	1	1	1	1	1	2	2	3	3	4	4	4	4	3	3	3	3	3	3	2	3	4	
4-Apr	2	2	1	2	1	1	1	1	2	2	3	4	3	3	3	3	2	4	3	4	4	4	4	3	4
5-Apr	2	3	1	2	4	4	4	5	2	3	3	3	4	4	4	4	3	4	2	3	2	2	4	2	5
6-Apr	3	4	3	3	3	3	3	4	3	3	3	4	5	4	5	3	4	3	3	2	2	3	2	3	5
7-Apr	2	2	2	2	1	1	2	4	3	3	7	5	5	5	5	4	3	3	5	2	3	2	1	2	7
8-Apr	2	1	1	2	2	1	2	5	2	4	3	3	4	4	4	3	4	2	2	2	3	4	2	2	5
9-Apr	1	2	2	2	1	2	2	3	2	3	3	5	5	5	5	5	5	5	4	4	1	2	2	1	5
10-Apr	1	3	2	2	2	2	1	1	2	1	2	3	3	4	5	5	6	4	2	4	3	2	2	1	6
11-Apr	2	3	3	5	3	4	4	2	3	6	4	6	7	5	6	5	4	7	11	7	12	4	3	3	12
12-Apr	5	4	4	4	5	4	4	5	5	4	5	6	6	6	8	8	8	8	7	5	4	3	2	3	8
13-Apr	5	4	3	6	6	4	3	4	5	10	6	6	6	6	5	5	5	5	3	3	2	2	2	5	10
14-Apr	5	4	6	6	6	7	7	4	6	5	6	4	5	5	5	6	10	8	6	5	6	7	5	4	10
15-Apr	4	4	3	2	2	1	2	2	3	4	6	5	6	5	5	6	5	5	5	5	5	8	5	3	8
16-Apr	3	3	4	5	4	3	4	4	3	3	5	7	6	8	7	6	6	8	7	8	3	5	3	3	8
17-Apr	3	4	2	2	2	4	2	3	2	3	4	7	5	6	7	7	4	3	6	4	4	2	2	4	7
18-Apr	2	3	4	5	5	5	6	5	4	4	5	6	6	13	13	9	8	5	7	8	2	1	1	1	13
19-Apr	2	1	1	2	2	1	1	2	1	2	2	3	4	4	5	6	2	2	2	3	2	2	1	1	6
20-Apr	3	2	2	1	2	2	1	2	2	3	2	3	4	4	4	3	3	3	6	3	3	3	3	4	6
21-Apr	3	2	2	2	2	2	4	3	3	3	4	4	4	5	5	5	4	3	4	4	5	5	6	5	6
22-Apr	5	4	5	4	4	4	6	5	5	5	6	7	7	8	8	9	8	5	5	5	6	8	7	7	9
23-Apr	6	6	4	4	5	4	5	5	4	4	3	6	6	6	7	7	7	5	5	10	5	7	6	5	10
24-Apr	3	3	3	2	2	2	3	3	3	4	5	5	6	6	6	6	5	4	5	5	3	6	3	3	6
25-Apr	3	3	3	2	3	2	2	2	2	3	4	4	3	4	4	4	3	4	3	3	3	2	4	2	4
26-Apr	3	1	1	2	2	1	2	3	2	3	3	4	3	2	3	5	3	3	2	3	3	8	6	5	8
27-Apr	4	2	2	3	3	3	3	3	3	4	6	6	6	10	9	6	7	6	5	3	1	3	1	2	10
28-Apr	4	2	2	3	3	1	3	3	3	4	3	5	6	6	5	6	7	6	4	3	3	3	2	4	7
29-Apr	3	4	4	3	2	3	3	4	5	3	3	4	4	4	4	4	3	4	3	2	3	2	2	3	5
30-Apr	3	3	4	3	4	6	4	5	5	4	7	6	8	8	8	6	11	5	6	2	4	6	2	1	11
	6	6	6	6	6	7	7	7	6	10	7	7	8	13	13	9	11	8	11	10	12	8	7	7	
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

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







**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	36	5.00	5.00
6 - 11	116	16.11	21.11
12 - 19	226	31.39	52.50
20 - 28	224	31.11	83.61
29 - 38	102	14.17	97.78
> 38	16	2.22	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

**Mannix - April 2015**

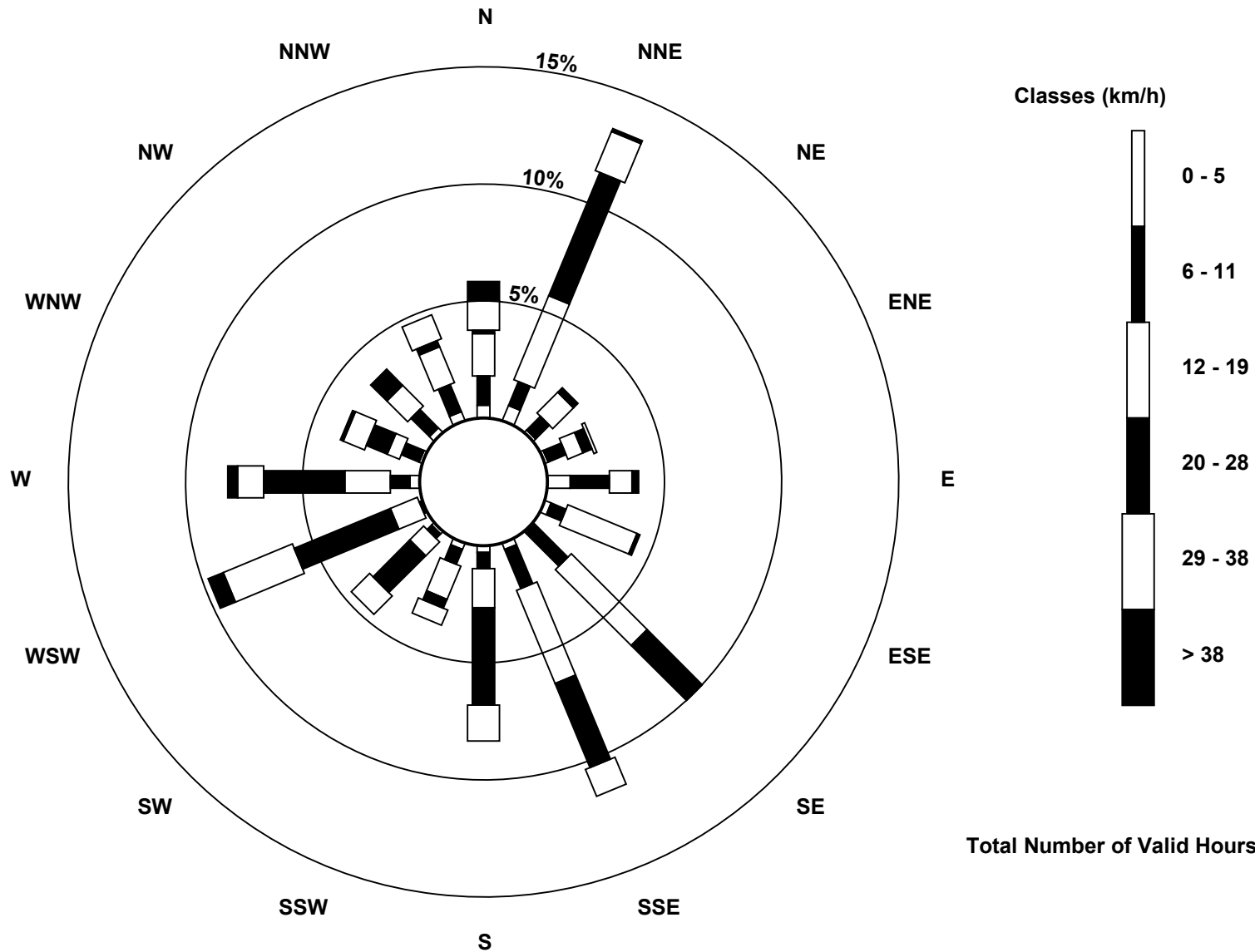
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	5	1	1	7	2	0	2	2	2	1	0	3	1	2	3	36
6 - 11	9	8	6	6	12	5	15	13	5	5	2	1	6	6	8	9	116
12 - 19	13	28	9	5	7	23	33	31	12	11	6	9	14	4	9	12	226
20 - 28	1	41	2	3	2	1	24	28	30	3	16	32	25	7	7	2	224
29 - 38	9	13	0	1	0	0	0	9	11	5	8	23	8	7	0	8	102
> 38	6	1	0	0	0	0	0	0	0	0	0	5	3	1	0	0	16
<b>Totals</b>	42	96	18	16	28	31	72	83	60	26	33	70	59	26	26	34	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

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





Maximum Speed: 50 km/h on Apr 11 20:00	Maximum Daily Speed Average: 33.3 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 2 km/h on Apr 10 14:00	Minimum Daily Speed Average: 6.6 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 7.7 km/h at hour 15	Minimum Diurnal Speed Average: 1.2 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 2.9 km/h 211.8 deg	Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 8 Q <sub>1</sub> = 13 Median = 21 Q <sub>3</sub> = 28 P <sub>90</sub> = 33 P <sub>99</sub> = 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-Apr	N33	N33	N38	N41	N42	N49	N49	N41	N44	N40	N38	N31	N34	N38	N33	N36	N32	N37	N28	NNE24	NNE23	NNE17	NNE12	NNE11	N33.3	N49	
2-Apr	N10	N10	NW5	WNW5	NNW3	NNW7	N7	NNE6	NNE10	NNE11	NNW10	NNW12	NNW14	NW14	NW16	NW16	NNW12	NNE13	NNE19	NNE18	NNE20	NE16	NNE10	NE7	N9.9	NNE20	
3-Apr	ENE7	E7	NE6	NE8	ENE7	E8	E9	E6	E6	NE9	N4	NNW7	N12	NNE16	N13	NNE13	NNE17	NNE22	NNE22	NNE25	NNE25	NNE25	NE19	ENE13	NNE11.2	NNE25	
4-Apr	E10	E9	E6	ESE3	E4	E4	ENE4	ENE6	NE6	NE7	NNE5	NW10	NW13	NW16	NW14	WNW9	NW6	N10	NNE21	NNE25	NNE23	NNE22	NNE21	NNE20	NNE8.3	NNE25	
5-Apr	N19	NNE15	N12	N7	N11	N21	NNE26	N19	N11	NNE12	N11	N10	NNW12	NNE12	NNE13	NNE13	NNE13	NNE13	NNE13	NNE14	NNE20	NNE22	NE17	E12	ESE9	NNE13.1	NNE26
6-Apr	SE15	SE15	SE17	SE20	SE15	SE14	SE21	SE12	SE11	SSE8	SE9	SE17	S19	SSE13	SE13	SSE13	SSE19	SE20	SE25	SSE28	S36	S38	S38	SSE34	SSE18.7	S38	
7-Apr	SSE30	SSE30	S30	S31	S32	S33	S31	S25	S19	SSE17	SSE21	SSE29	S26	S26	S26	S24	S24	S24	S25	S22	S26	SSE28	S28	S28	S26.2	S33	
8-Apr	S26	S26	S26	S23	SSE24	SSE27	SSE24	SSE14	S8	W6	WNW12	NW11	NNW16	N15	NNW15	NNW15	N8	NE10	NE12	ENE15	E15	ESE13	SSE18	SSE29	SSE6.6	SSE29	
9-Apr	SSE30	SSE30	S29	SSE30	SSE30	SE32	SSE32	SSE25	SSE19	SSE20	SSE21	S21	SW26	SSW30	SW33	WSW27	WSW26	WSW30	SW28	SW27	SW32	SW32	SW28	WSW25	SSW22.4	SSW33	
10-Apr	WSW27	SW23	SW16	SW15	SSW13	S12	S14	S11	SSE9	SSE12	SE12	ESE9	E10	NNE2	SSW19	S16	SE21	SSE25	SSE20	S31	S29	SSE26	SSE27	SSE32	S15.1	SSE32	
11-Apr	SSE33	SSE30	S23	SSW10	SSE9	S13	SSW11	SSW14	WSW11	W13	WSW25	WSW22	W18	WSW25	W24	W22	W26	W30	WSW41	WSW50	WSW46	WNW25	W18	WSW24	WSW18.7	WSW50	
12-Apr	WSW29	WSW35	WSW34	WSW34	WSW31	WSW27	WSW25	SW21	WSW25	WSW24	SW33	SW34	WSW38	WSW38	WSW40	WSW39	WSW41	WSW39	WSW33	W28	WNW25	W21	WSW24	SW30	WSW30.4	WSW41	
13-Apr	W27	W15	WSW26	W36	W32	W26	W28	W28	W29	WNW38	WNW39	WNW38	WNW37	WNW35	WNW31	WNW28	WNW26	WNW23	NW16	NNW12	NNW7	E3	ESE15	SE20	W21.4	WNW39	
14-Apr	SE27	SE29	SE24	ESE22	ESE23	ESE26	ESE26	ESE18	SE20	ESE17	ESE19	ESE17	SE14	SE15	SSE18	SSE34	SE27	SE29	SE25	SE25	SE23	SE24	SE26	SE22	SE22.5	SSE34	
15-Apr	SSE20	SSE17	SSE15	SSE10	SW8	SSW8	SW13	SW6	WSW13	WSW16	WSW18	W22	WSW21	WSW26	W28	WSW25	W27	WSW27	WSW22	SSW16	SSW28	W34	WSW28	SW30	WSW16.4	W34	
16-Apr	WSW30	SW33	WSW34	WSW31	WSW29	WSW30	WSW24	SW17	SSW12	SSW13	SSW20	SW23	SW29	WSW33	WSW39	WSW37	WSW34	NW34	NW22	W32	W29	WNW27	W18	WSW22	WSW24.2	WSW39	
17-Apr	WSW15	WSW16	SW12	SSW9	S11	S14	SSE18	SSE13	SE9	SE11	SE14	SSE17	SSW26	SSW32	SSW39	S35	SSE22	SE21	SE20	ESE14	SE9	SE9	SSE3	W9	S13.6	SSW39	
18-Apr	NW19	NW19	NW24	NW27	NW33	NNW33	NNW33	NW32	WNW25	WNW26	NW30	NNW30	NNW31	NNW25	NW10	N22	N27	NW23	NNW20	NNE22	ESE6	SE5	SSW6	W6	NNW19.3	NW33	
19-Apr	W4	WNW9	W7	WNW7	SW6	SSW8	SSW11	S13	S10	SSE8	ESE7	SE7	S5	SW13	WSW14	W16	W10	W11	W3	S5	SSE16	SSE24	S26	S23	SSW7.3	S26	
20-Apr	S17	W8	W18	WNW18	NW16	NW11	NNW7	NW4	N5	N4	WSW5	SW4	W10	WNW14	W12	NW7	NNE4	N9	NNE23	NNE27	NNE28	N31	N32	N30	NNW9.2	N32	
21-Apr	N27	N22	NNE23	NNE17	NNE10	N14	N20	NNW8	NNW11	NW12	N16	N16	N18	N17	N18	NNE16	N18	NE15	ENE24	ENE25	E20	ESE21	ESE20	ESE22	NNE13.3	N27	
22-Apr	ESE25	ESE20	ESE20	ESE17	ESE19	ESE16	ESE22	ESE21	ESE20	E22	E25	ESE23	ESE26	ESE26	ESE26	ESE27	ESE27	ESE27	ESE26	ESE28	ESE27	ESE29	ESE30	ESE29	ESE24.0	ESE30	
23-Apr	ESE26	ESE25	ESE23	ESE25	ESE24	ESE22	E20	ESE23	ESE21	E18	ENE19	E19	E21	E24	E31	E25	ESE23	ESE26	ESE20	ENE26	ENE40	ENE27	ENE19	NE17	E22.2	ENE40	
24-Apr	NNE21	NNE26	NNE28	NNE28	NNE29	NNE28	NNE23	NNE18	NNE20	N20	NNE22	NNE23	NNE20	N25	N29	N31	N36	N37	N37	N43	N35	N31	N30	N30	NNE28.0	N43	
25-Apr	N28	N27	NNE27	NNE20	N18	N16	N13	N5	NNW8	NNW9	NNW5	NNW8	WNW11	W10	NW8	WNW11	NW12	NW15	NW15	N19	N27	NNE29	NNE21	ENE14	N13.4	NNE29	
26-Apr	SE10	SSE13	SSE14	SSE14	SE15	SE14	SE13	SE12	SSE7	SE7	E7	ESE6	E6	N4	E5	ENE11	NE15	NE13	ENE12	E15	E19	SE21	SE31	SE32	ESE11.1	SE32	
27-Apr	SE31	SE27	SE26	SE23	SE27	SE28	SE25	SE24	SSE18	SSE18	S28	S27	SW21	SSW30	SW36	SSW30	SW32	WSW34	SW29	WSW22	SW20	SW26	WSW31	SW32	S19.9	SW36	
28-Apr	SW24	SSW15	SSW15	S12	SSE18	SSE25	SSE24	SE15	SSE13	SSE12	SE15	SE19	SSE27	SE30	SE29	SSE33	SSE38	SSE33	SSE29	SE33	SSE35	SSE33	S33	WSW31	SSE22.0	SSE38	
29-Apr	W27	W25	W19	W21	W24	W29	W28	W27	W20	WSW18	W16	WSW17	W26	WSW25	WSW23	W18	SW15	WSW18	SW18	SW20	SW23	SW34	SW40	WSW37	WSW22.6	SW40	
30-Apr	WSW33	WSW32	WSW33	WSW35	WSW34	WSW25	WSW23	WSW24	WSW22	WSW27	WSW35	WSW37	SW28	SW24	WSW26	W18	NW23	NNW23	NW11	SSW5	S10	SSE11	S18	SSW18	WSW20.7	WSW37	
S4.8 S4.5 SSW4.5 SSW3.9 S3.4 S3.1 SSE3.1 S3.3 SSW2.0 WSW1.5 SW2.5 WSW3.9 WSW6.3 WSW7.7 WSW6.0 WSW4.0 WNW3.2 N1.2 ENE2.1 ESE2.6 SE3.7 SSE7.0 S7.6																								Diurnal Average			
SSE33 WSW35 N38 N41 N42 N49 N49 N41 N44 N40 WNW39 WNW38 WSW38 WSW38 WSW40 WSW39 WSW41 WSW39 WSW41 WSW50 WSW46 S38 SW40 WSW37																								Diurnal Maximum			

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



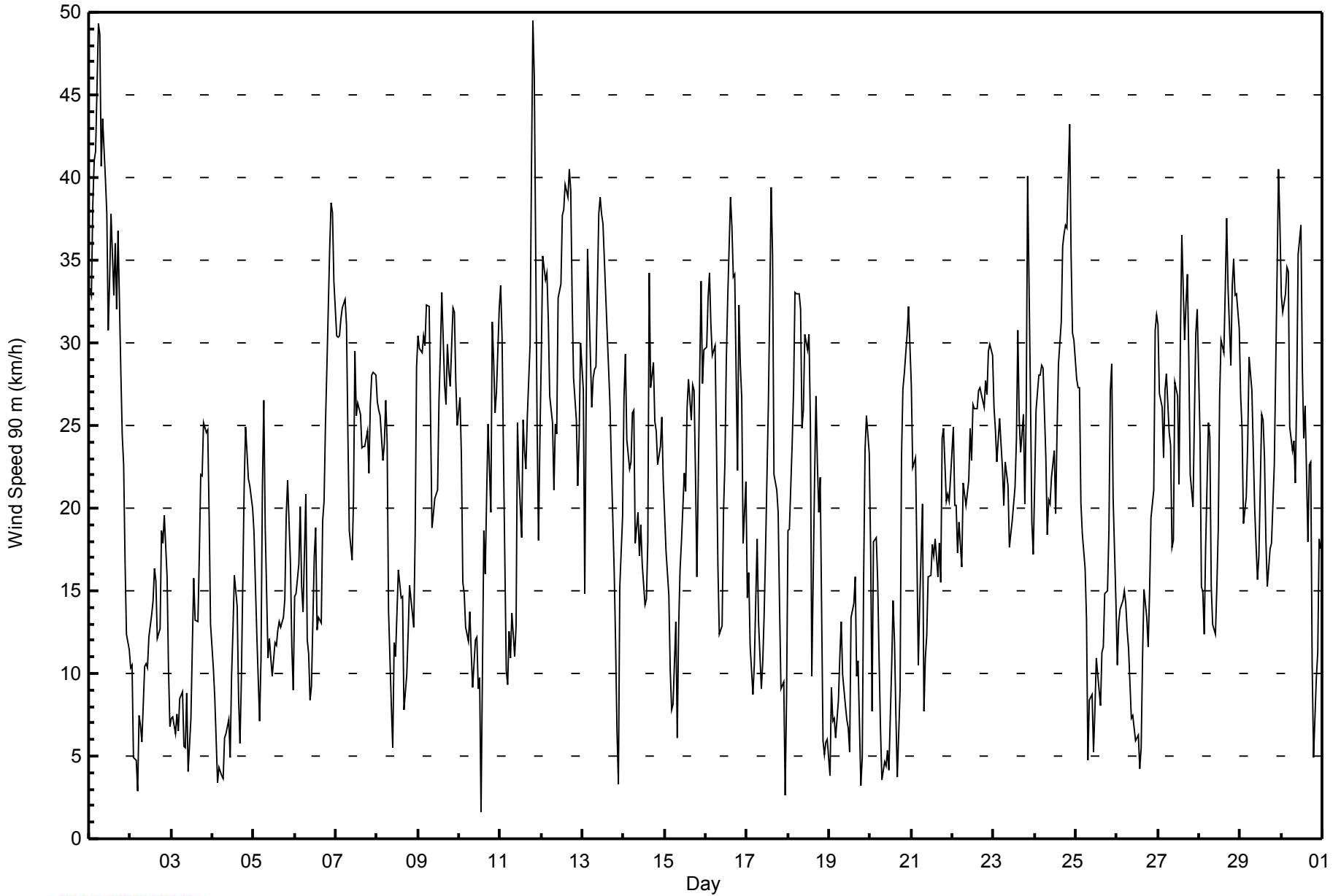
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Apr 18 14:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 1 km/h on Apr 26 03:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 10	

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



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	28	3.89	3.89
6 - 11	108	15.00	18.89
12 - 19	182	25.28	44.17
20 - 28	244	33.89	78.06
29 - 38	138	19.17	97.22
> 38	20	2.78	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed 90 m (WS90m) - km/h**

**Mannix - April 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	3	0	1	4	1	1	1	2	1	1	1	2	1	2	2	28
6 - 11	11	6	7	4	11	6	8	7	5	7	3	2	8	6	6	11	108
12 - 19	17	19	8	6	6	10	19	23	11	9	8	9	12	4	13	8	182
20 - 28	11	36	0	4	7	34	26	19	22	3	15	31	20	8	5	3	244
29 - 38	23	2	0	0	1	3	9	20	13	5	13	29	7	5	4	4	138
> 38	8	0	0	1	0	0	0	0	0	1	1	8	0	1	0	0	20
<b>Totals</b>	75	66	15	16	29	54	63	70	53	26	41	80	49	25	30	28	720

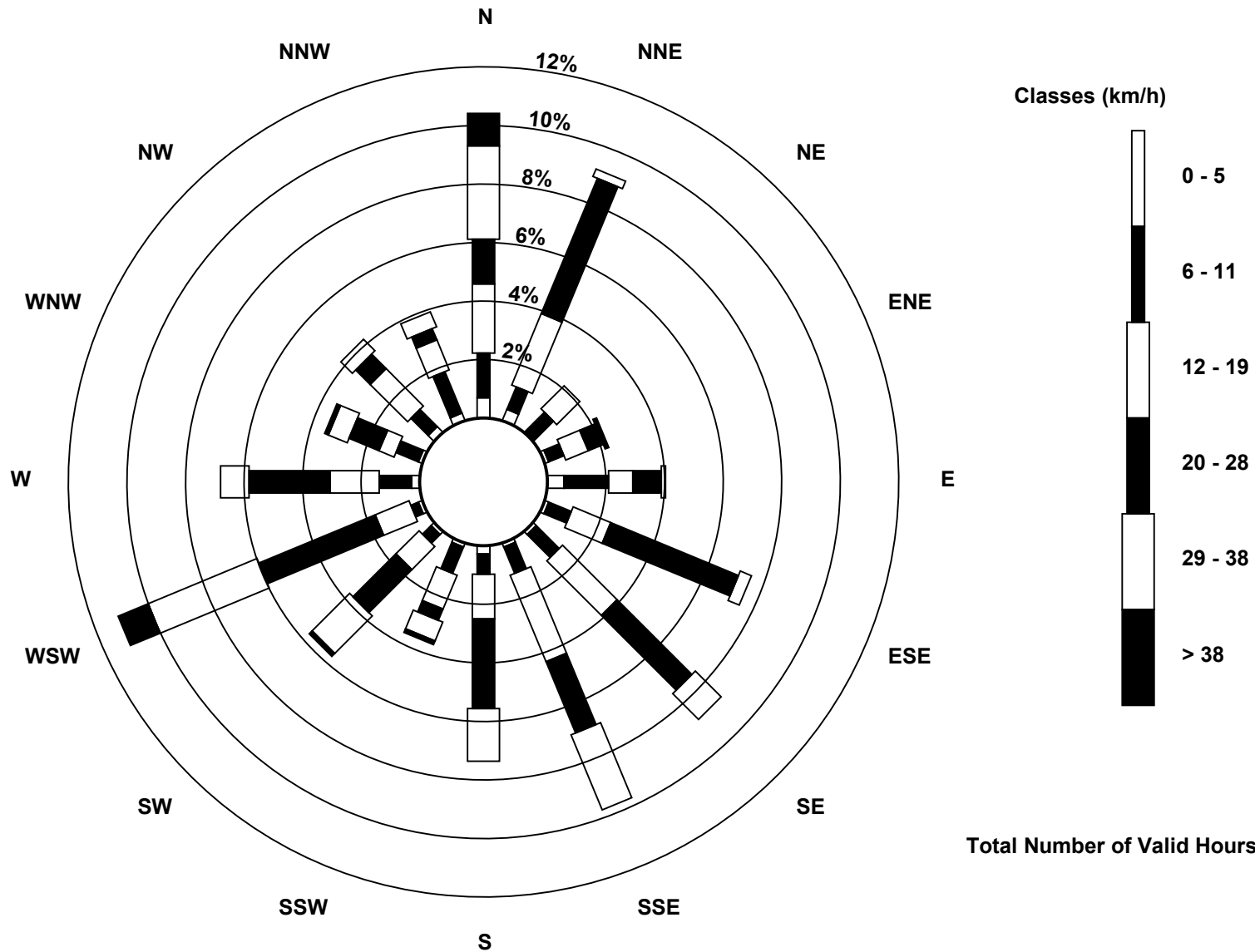
Total Number of Valid Hours: 720

Total Number of Hours: 720



Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

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



Total Number of Valid Hours: 720



Summary of Hour Averages

Mannix - April 2015

Direction of Maximum Speed: 256 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 7.9 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 315 deg on Apr 17 23:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 3.1 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 237.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	12	8	8	10	5	5	8	6	9	4	9	3	5	11	6	14	355	3	15	18	18	20	359	12	7.9
2-Apr	356	352	303	274	275	336	353	20	27	18	339	340	331	324	329	316	335	27	23	26	28	37	24	36	355.5
3-Apr	79	92	42	43	58	50	48	88	90	64	355	342	353	26	18	21	28	30	18	19	30	33	48	86	36.0
4-Apr	77	71	40	32	28	61	45	73	55	65	38	307	302	315	304	310	307	18	25	27	22	25	26	10	10.6
5-Apr	10	12	16	20	3	11	18	14	9	23	16	351	334	27	34	40	39	39	31	24	23	32	46	101	21.2
6-Apr	139	132	136	141	151	157	151	143	151	140	131	148	178	166	141	157	159	146	141	146	172	172	169	163	153.8
7-Apr	162	165	169	165	164	165	164	169	173	147	158	171	176	189	187	183	188	194	192	182	169	171	171	167	172.8
8-Apr	164	159	159	157	154	160	160	154	141	215	297	310	332	7	351	344	6	48	55	68	93	139	150	159	133.0
9-Apr	160	158	158	149	146	141	144	150	139	139	142	179	226	214	217	245	245	245	235	208	212	222	222	209	194.0
10-Apr	207	183	156	154	144	146	148	145	137	136	133	122	78	31	208	195	147	152	166	172	164	161	146	154	156.1
11-Apr	160	161	168	158	152	160	162	166	237	266	256	264	274	265	271	283	274	266	257	256	259	286	264	252	249.5
12-Apr	259	260	253	249	246	244	236	232	247	248	239	236	264	258	254	259	260	262	264	268	303	251	234	228	253.4
13-Apr	270	248	239	262	272	272	263	270	284	295	294	296	294	290	290	288	295	305	329	333	249	117	128	131	283.4
14-Apr	135	138	128	129	131	127	127	119	134	129	129	126	140	146	162	163	143	145	143	140	134	134	149	146	138.9
15-Apr	151	158	156	161	175	168	157	132	245	259	255	273	266	260	278	263	266	260	244	199	204	266	244	228	242.9
16-Apr	239	234	254	257	256	240	255	237	216	203	211	232	239	255	259	254	248	321	320	275	282	283	277	257	256.6
17-Apr	213	219	155	150	153	147	151	143	133	136	137	167	199	202	204	198	159	145	134	128	153	141	315	281	169.6
18-Apr	317	309	311	319	323	333	340	324	291	297	322	331	333	343	321	359	9	305	339	35	185	242	265	271	325.2
19-Apr	251	258	163	200	171	167	158	139	134	136	123	132	193	228	263	272	274	282	264	167	162	165	163	159	191.7
20-Apr	155	159	272	289	292	278	292	51	49	316	258	229	283	293	277	323	48	24	28	21	14	10	10	4	341.1
21-Apr	11	2	12	12	5	344	6	330	327	314	1	359	3	9	13	25	11	48	77	79	87	121	136	120	27.1
22-Apr	107	113	116	122	114	120	126	122	113	101	100	114	123	128	130	134	128	119	117	108	122	129	128	126	119.9
23-Apr	125	121	121	113	106	103	98	110	111	97	82	86	98	102	95	106	125	108	123	74	66	71	62	42	97.0
24-Apr	24	25	20	18	19	21	19	13	29	11	22	32	29	13	11	10	10	10	11	11	6	8	10	11	15.2
25-Apr	11	12	17	12	1	357	7	12	320	339	347	343	298	280	313	290	306	312	328	357	12	14	27	36	351.7
26-Apr	89	135	137	154	185	175	152	155	131	132	93	98	89	10	90	63	58	50	55	82	101	134	140	140	112.3
27-Apr	142	149	144	145	148	146	148	147	153	155	182	198	219	209	226	217	234	244	234	240	214	208	226	225	196.5
28-Apr	213	148	151	140	134	138	140	144	144	142	144	150	165	151	154	167	173	172	163	148	150	164	173	254	161.0
29-Apr	277	277	270	264	268	271	277	267	256	233	266	262	266	255	259	266	243	249	234	216	218	223	225	235	256.2
30-Apr	240	246	253	249	243	248	240	251	252	246	244	243	231	237	255	276	309	342	305	202	173	149	177	188	247.9
	169.0	175.0	178.9	199.1	201.1	170.5	140.4	166.4	187.7	245.6	256.0	254.9	267.9	265.3	260.1	262.2	269.8	298.5	334.4	54.5	91.3	133.8	154.2	177.0	

Diurnal Average

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



Summary of Hour Standard Deviations

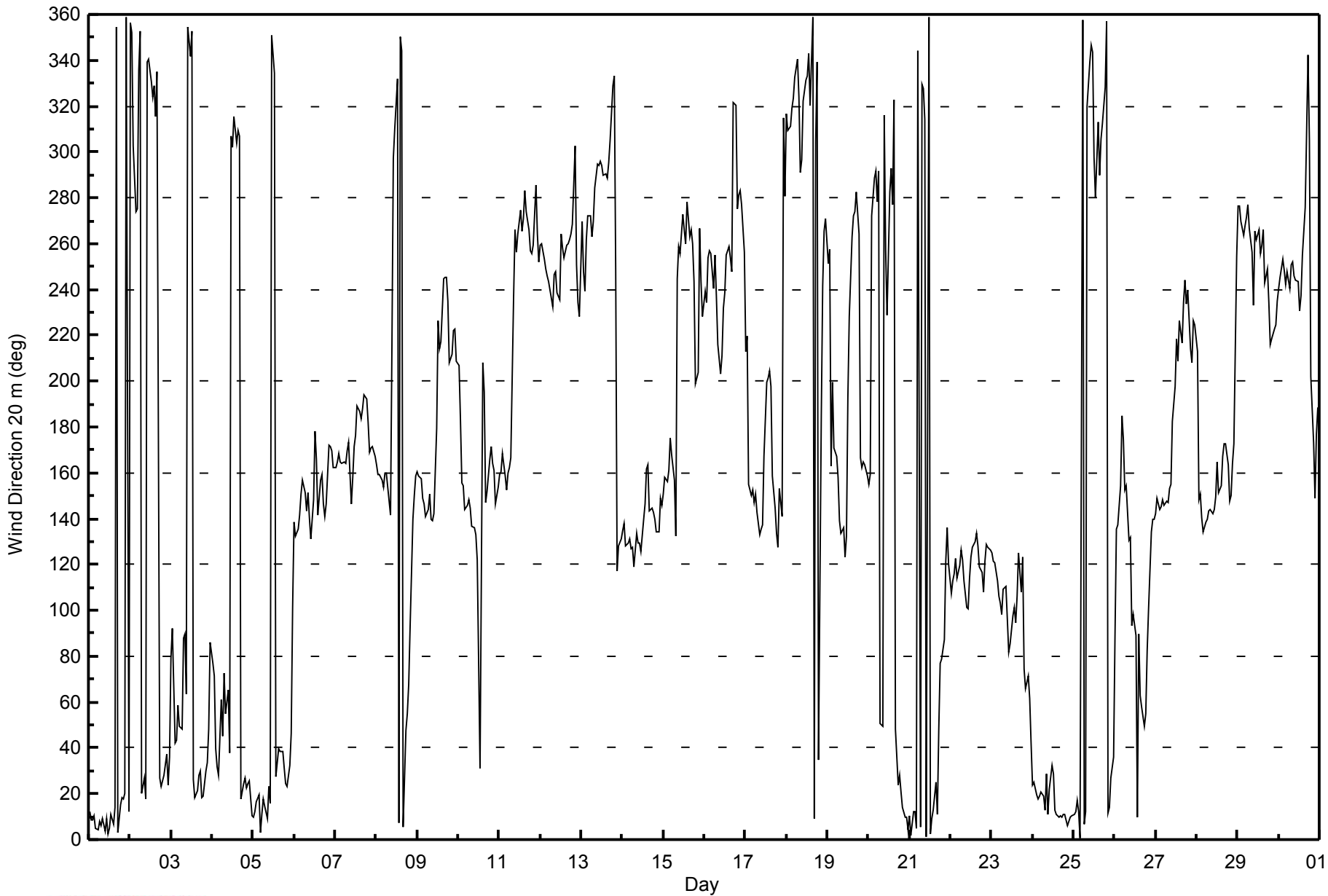
Mannix - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Apr 17 23:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 4 deg on Apr 19 22:00																									
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 14 Q <sub>3</sub> = 20 P <sub>90</sub> = 30 P <sub>99</sub> = 76																									
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-Apr	10	11	11	11	12	11	11	13	12	14	13	14	16	12	15	12	17	16	13	13	11	16	15	16	17
2-Apr	14	13	23	39	30	16	20	20	17	20	28	29	25	20	16	17	23	20	11	11	11	13	14	20	39
3-Apr	22	15	13	15	13	9	15	20	27	24	87	71	32	22	28	22	19	13	10	9	13	11	14	20	87
4-Apr	11	23	15	55	71	22	14	23	26	35	69	36	17	22	19	52	38	39	12	12	12	11	13	16	71
5-Apr	11	11	9	13	14	14	12	13	24	20	22	41	31	27	23	19	17	17	14	10	10	8	18	37	41
6-Apr	13	13	11	11	9	8	10	13	13	24	16	15	22	30	20	26	19	12	9	10	9	9	9	6	30
7-Apr	6	7	8	5	5	6	7	11	15	17	23	17	20	21	19	21	16	15	16	17	7	7	8	5	23
8-Apr	7	9	8	7	8	7	7	13	15	84	22	20	21	24	30	23	45	20	10	16	17	10	9	7	84
9-Apr	6	7	7	8	9	9	8	11	11	9	9	31	19	14	14	14	14	11	9	12	8	9	9	10	31
10-Apr	9	21	7	6	7	6	7	9	13	11	13	25	30	90	24	36	16	10	10	13	9	9	6	8	90
11-Apr	7	8	7	12	9	10	16	16	33	15	13	12	22	12	15	12	11	9	10	10	9	12	12	9	33
12-Apr	10	9	10	10	9	11	12	18	12	14	14	16	11	13	14	13	13	11	10	12	10	25	12	11	25
13-Apr	21	28	9	10	9	8	7	7	11	13	11	11	13	13	14	13	14	12	17	20	71	64	11	12	71
14-Apr	13	10	12	12	11	13	13	17	14	13	15	16	18	20	14	11	21	13	11	10	12	11	12	11	21
15-Apr	12	12	11	19	21	11	16	21	48	18	25	17	19	17	18	19	11	14	14	17	23	11	11	11	48
16-Apr	8	9	11	9	11	9	11	21	25	25	18	20	15	14	12	14	14	36	22	11	9	11	10	10	36
17-Apr	28	42	12	8	8	10	10	12	15	17	15	38	19	18	17	15	19	10	13	16	62	19	94	12	94
18-Apr	10	11	11	12	11	12	13	14	13	14	17	16	16	34	63	50	17	23	32	26	68	43	13	15	68
19-Apr	11	16	31	17	11	11	15	15	12	14	22	30	84	26	29	33	23	21	51	17	5	4	5	9	84
20-Apr	12	41	12	9	11	33	56	88	46	65	21	52	35	19	20	49	63	44	12	10	9	8	10	11	88
21-Apr	11	12	9	9	14	15	20	26	27	21	20	24	18	22	24	31	29	31	15	11	17	18	15	16	31
22-Apr	13	14	15	16	14	15	14	17	20	18	15	19	17	16	16	14	15	17	16	15	16	13	13	13	20
23-Apr	14	16	15	15	13	15	13	17	17	21	21	23	23	20	16	20	18	16	17	22	12	14	24	24	24
24-Apr	18	11	9	8	9	8	11	12	16	22	23	21	33	17	17	15	13	12	12	12	10	10	10	10	33
25-Apr	10	10	9	10	10	11	13	31	21	42	79	56	33	34	47	29	19	16	17	14	9	9	10	18	79
26-Apr	18	16	7	14	13	16	11	14	20	25	45	50	79	65	51	39	18	15	13	10	10	15	10	10	79
27-Apr	10	9	12	8	9	10	11	10	14	17	19	19	26	22	14	15	15	16	10	11	7	8	7	7	26
28-Apr	33	11	12	9	8	8	13	16	17	18	14	15	17	15	13	16	13	13	11	10	10	11	9	28	33
29-Apr	8	10	13	7	8	7	7	9	28	22	11	13	17	17	18	14	18	16	18	15	9	9	9	8	28
30-Apr	10	9	11	9	9	13	10	14	14	14	16	16	16	23	24	25	32	16	26	23	12	60	15	23	60
																	33 42 31 55 71 33 56 88 48 84 87 71 84 90 63 52 63 44 51 26 71 64 94 37								
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

**Wind Direction 20 m (WD20m) - deg**  
**Mannix - April 2015**





Summary of Hour Averages

Mannix - April 2015

Direction of Maximum Speed: 256 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 9.0 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 142 deg on Apr 17 23:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 5.3 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 238.2 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	14	10	10	11	6	5	8	7	9	5	9	4	6	11	7	14	356	5	16	20	21	25	11	21	9.0
2-Apr	359	354	311	289	293	341	355	22	27	20	341	345	334	326	331	319	338	25	25	28	29	39	32	43	358.6
3-Apr	77	91	44	48	69	71	62	95	92	61	357	340	355	24	18	21	28	29	21	21	29	35	48	86	36.8
4-Apr	80	83	60	51	54	70	57	78	56	57	30	311	307	319	306	307	311	16	25	27	24	25	24	16	13.9
5-Apr	15	15	10	5	1	13	19	15	9	25	13	354	339	24	32	39	36	39	32	26	26	38	65	112	22.3
6-Apr	136	130	134	138	142	148	144	139	147	141	131	148	178	168	141	157	160	148	141	150	176	175	173	167	154.2
7-Apr	166	169	170	169	169	169	168	172	176	152	159	172	176	188	187	183	187	193	191	186	170	170	174	172	174.9
8-Apr	170	163	165	161	158	160	159	156	153	260	302	315	337	6	350	348	6	47	55	70	97	135	156	161	142.2
9-Apr	160	161	161	154	149	139	150	154	143	143	147	183	227	215	219	245	245	246	236	215	217	228	234	228	195.5
10-Apr	227	217	193	178	163	157	158	147	144	143	136	123	82	14	206	193	147	153	168	175	170	166	155	158	165.7
11-Apr	159	161	170	168	158	162	172	177	240	264	256	263	275	265	271	283	275	266	258	256	259	289	265	255	243.7
12-Apr	260	260	254	250	247	247	239	236	249	247	239	237	264	258	255	259	260	262	264	269	304	260	240	233	254.2
13-Apr	272	268	245	263	274	273	265	271	285	296	295	297	295	291	291	289	297	305	332	340	299	109	123	132	285.0
14-Apr	135	136	128	128	129	127	126	119	132	127	129	124	137	144	161	163	143	143	142	139	134	133	147	146	137.3
15-Apr	151	160	156	159	185	171	173	145	243	259	254	273	265	259	279	263	266	259	244	205	204	267	247	232	239.5
16-Apr	241	237	255	257	254	242	255	237	216	202	209	231	241	256	258	253	248	324	322	277	282	286	277	263	257.0
17-Apr	238	246	190	162	155	154	154	152	137	133	138	169	198	200	203	195	160	145	134	125	150	143	142	283	173.8
18-Apr	323	316	316	323	326	336	343	326	295	300	325	334	335	346	331	2	10	308	344	35	143	179	252	299	330.2
19-Apr	273	287	235	240	186	179	163	147	145	139	120	127	192	232	262	270	275	283	275	168	162	164	169	165	195.7
20-Apr	158	210	271	290	301	296	346	1	35	340	259	226	284	295	280	326	40	20	27	22	15	12	11	7	343.3
21-Apr	10	8	13	11	8	358	7	332	334	319	3	4	6	12	16	24	13	50	77	80	90	120	132	121	28.9
22-Apr	111	117	119	120	117	122	125	122	113	103	103	114	123	127	128	130	126	119	117	110	120	126	125	125	119.7
23-Apr	123	122	122	114	108	105	100	110	111	97	83	86	98	102	95	106	124	110	121	75	65	72	62	43	98.1
24-Apr	27	26	21	20	22	23	20	15	28	13	22	32	28	13	12	10	12	11	12	11	7	9	11	11	16.0
25-Apr	12	13	17	13	6	4	8	9	328	343	350	345	296	282	313	295	311	315	331	1	12	15	27	46	356.0
26-Apr	104	145	146	148	160	167	148	151	138	136	95	106	96	12	92	66	59	48	56	83	103	133	139	140	118.7
27-Apr	141	149	147	144	144	138	141	148	158	157	182	197	219	208	226	216	234	245	235	242	222	216	228	226	196.4
28-Apr	217	165	160	150	136	141	148	148	156	146	144	148	165	152	153	167	173	173	164	150	152	164	174	254	163.0
29-Apr	277	276	273	267	268	272	278	268	261	237	265	261	266	255	259	265	241	248	234	217	228	227	227	237	255.2
30-Apr	243	247	254	249	244	250	242	251	252	245	244	244	231	236	254	272	312	344	308	204	175	160	180	197	246.7

179.1 183.6 189.8 192.1 182.5 163.5 146.0 167.5 196.1 245.5 250.0 250.9 265.3 262.0 256.7 256.1 265.1 297.1 335.4 76.5 121.7 149.9 164.8 184.3

Diurnal Average

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



Summary of Hour Standard Deviations

Mannix - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 101 deg on Apr 8 10:00			Hours of Data:	720
Minimum Value: 2 deg on Apr 19 22:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 25 P <sub>99</sub> = 68				

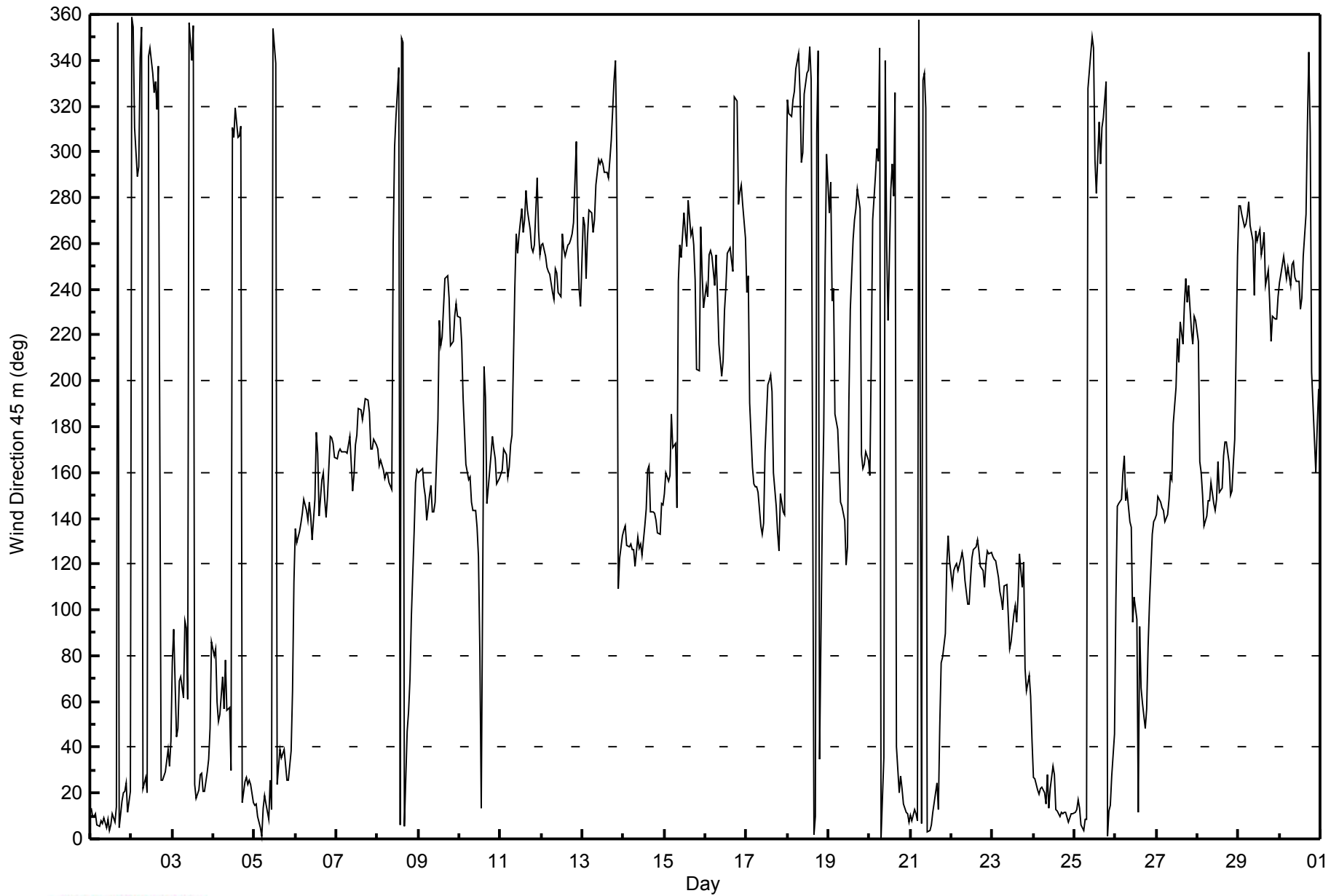
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	6	7	7	7	7	6	7	9	9	10	9	10	12	9	11	9	13	12	9	10	9	12	9	13	13
2-Apr	9	10	25	38	35	13	16	16	13	18	25	25	19	18	15	15	21	17	9	8	9	10	12	18	38
3-Apr	18	14	12	12	10	10	12	15	28	20	69	64	28	18	25	17	16	10	7	6	10	8	11	17	69
4-Apr	9	13	18	30	29	14	12	17	24	30	69	29	14	18	18	35	31	34	9	8	9	8	9	10	69
5-Apr	9	8	6	14	12	12	9	9	17	15	21	34	27	19	19	15	17	14	10	7	7	11	17	18	34
6-Apr	8	7	7	7	6	5	7	9	10	22	13	12	16	25	17	22	15	9	7	8	4	5	5	4	25
7-Apr	4	4	4	3	3	3	4	7	11	15	21	14	16	16	14	15	9	11	12	13	3	4	3	3	21
8-Apr	5	5	5	5	4	4	5	10	15	101	21	17	18	21	24	19	41	18	7	14	12	8	6	4	101
9-Apr	4	3	3	4	6	5	7	8	9	7	8	27	16	10	11	12	13	9	6	8	4	6	5	7	27
10-Apr	5	14	9	8	7	3	5	6	10	7	10	20	25	81	19	32	14	8	7	10	7	6	3	4	81
11-Apr	5	5	3	9	5	6	20	12	26	14	10	11	19	12	14	11	10	8	8	8	8	10	11	7	26
12-Apr	7	7	7	7	7	10	10	14	9	12	12	13	9	11	13	11	11	10	8	10	7	20	9	7	20
13-Apr	21	28	6	8	8	7	6	7	9	11	9	9	11	11	12	11	12	11	14	14	31	65	8	8	65
14-Apr	7	6	6	7	6	8	8	11	10	8	10	11	15	19	14	8	18	12	9	8	8	7	10	9	19
15-Apr	10	8	8	15	25	9	11	16	39	15	23	16	19	16	17	11	12	11	16	22	9	9	7	39	
16-Apr	5	6	9	7	8	5	9	18	20	16	13	17	13	13	10	12	12	37	21	10	6	7	8	5	37
17-Apr	17	21	18	8	3	6	6	10	12	14	12	34	14	14	14	11	16	8	9	10	50	11	85	13	85
18-Apr	9	9	9	9	9	9	11	12	11	13	15	14	13	30	52	45	14	22	32	25	50	41	21	14	52
19-Apr	12	6	56	24	12	6	13	13	13	14	18	28	76	20	28	28	19	20	42	25	3	2	3	6	76
20-Apr	6	53	9	10	6	11	27	64	35	66	22	53	32	18	19	46	64	38	10	7	6	5	5	7	66
21-Apr	6	6	4	5	6	11	12	25	22	17	15	17	13	17	19	26	23	31	12	9	16	13	13	11	31
22-Apr	9	10	11	11	10	11	9	11	16	13	11	16	12	11	13	11	11	12	12	10	12	10	8	9	16
23-Apr	10	11	10	10	10	11	10	12	14	19	18	21	18	18	13	18	13	13	12	22	9	12	22	20	22
24-Apr	14	8	6	6	6	5	8	10	13	17	18	17	29	13	12	12	9	9	7	8	6	7	6	6	29
25-Apr	6	6	7	6	6	6	8	25	18	37	82	52	28	31	46	27	16	14	14	13	5	5	8	20	82
26-Apr	15	11	4	10	8	7	7	10	14	20	40	48	53	57	55	37	15	11	10	9	8	13	7	7	57
27-Apr	7	6	8	5	5	5	7	8	12	13	12	15	24	17	13	13	14	14	8	8	4	4	3	4	24
28-Apr	20	12	6	12	4	4	10	11	12	14	11	13	15	13	10	12	9	7	9	7	7	9	5	27	27
29-Apr	6	8	10	5	6	6	5	8	24	16	10	11	15	15	17	13	15	13	15	12	6	5	4	5	24
30-Apr	6	6	8	6	6	9	8	12	11	11	13	14	14	21	23	20	33	12	23	16	12	46	10	24	46

	21	53	56	38	35	14	27	64	39	101	82	64	76	81	55	46	64	38	42	25	50	65	85	27	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction 45 m (WD45m) - deg**  
**Mannix - April 2015**





Summary of Hour Averages

Mannix - April 2015

Direction of Maximum Speed: 256 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 10.6 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 27 deg on Apr 10 14:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 6.4 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 239.8 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-Apr	16	13	12	13	8	7	9	7	9	5	8	4	7	11	9	14	359	6	18	21	23	29	19	26	10.6
2-Apr	360	356	322	305	328	347	356	23	28	22	343	347	337	328	332	321	338	25	27	30	32	42	39	53	2.9
3-Apr	76	91	46	54	80	89	83	102	94	61	357	346	1	23	18	23	30	30	23	23	32	38	53	84	39.2
4-Apr	88	93	91	95	83	82	71	78	59	53	29	313	308	322	309	308	312	18	27	29	25	27	23	19	17.8
5-Apr	18	19	8	357	4	17	19	16	8	25	16	358	344	24	32	37	37	40	33	27	30	50	91	119	24.4
6-Apr	137	134	136	137	137	139	138	137	145	148	137	149	176	170	143	157	159	150	142	153	178	177	176	170	155.7
7-Apr	170	171	174	172	173	174	172	175	177	159	160	171	175	186	186	181	186	191	190	190	172	171	179	180	176.4
8-Apr	178	171	174	171	167	167	164	163	169	273	304	321	341	7	352	350	8	48	57	71	91	131	156	166	153.2
9-Apr	164	168	173	163	154	147	151	161	150	150	155	185	225	214	218	243	245	244	235	219	221	231	237	238	197.2
10-Apr	236	231	227	209	189	179	183	162	153	152	144	129	84	27	205	192	148	154	169	177	174	171	164	166	176.8
11-Apr	166	165	176	187	163	167	192	197	249	264	255	263	272	263	270	283	274	265	258	256	259	290	266	257	244.8
12-Apr	259	259	255	250	248	247	240	235	248	246	237	236	263	257	253	258	260	261	263	269	305	264	245	236	254.1
13-Apr	272	279	249	263	275	273	266	270	286	297	294	297	295	292	291	289	298	306	333	343	330	96	123	135	285.5
14-Apr	137	137	134	132	133	131	132	125	134	130	132	125	137	145	161	162	144	143	142	140	136	136	147	146	139.7
15-Apr	152	159	156	164	209	194	210	182	244	258	253	273	263	257	278	262	265	258	242	209	210	267	248	234	240.4
16-Apr	242	238	255	257	253	243	254	237	215	201	208	229	240	255	257	252	247	327	324	279	282	289	276	262	257.0
17-Apr	250	252	224	191	166	170	159	160	148	138	143	172	197	198	201	194	161	146	136	125	157	148	154	280	179.9
18-Apr	327	322	319	326	329	339	346	329	299	302	328	336	337	349	336	3	12	311	348	38	126	149	219	277	333.9
19-Apr	277	292	268	291	210	201	200	187	168	151	120	128	192	234	261	268	275	283	283	175	162	166	174	177	205.3
20-Apr	171	260	265	295	308	312	349	330	15	358	260	227	285	296	283	326	36	19	28	24	20	15	15	12	346.3
21-Apr	13	13	20	24	22	7	12	334	343	326	6	7	9	14	18	26	16	51	77	82	90	118	131	122	31.3
22-Apr	113	119	124	124	122	124	125	124	113	103	103	114	124	129	129	132	127	121	117	109	120	126	126	127	121.2
23-Apr	125	124	122	116	109	107	102	110	113	96	82	86	98	100	94	106	126	109	121	74	66	73	65	48	95.7
24-Apr	32	31	26	25	27	27	23	18	29	15	24	32	27	14	13	11	13	13	14	13	8	11	14	14	18.6
25-Apr	14	16	19	19	11	10	10	6	334	347	352	347	295	281	312	298	314	316	332	5	14	19	32	62	1.2
26-Apr	128	151	164	158	144	144	138	147	150	141	99	110	100	13	94	69	62	53	62	86	101	134	139	141	121.8
27-Apr	141	148	147	138	137	137	137	150	160	160	180	194	218	207	225	215	233	243	235	243	228	227	236	233	196.2
28-Apr	228	194	188	178	153	152	159	150	160	152	145	148	164	152	152	166	172	173	164	151	153	164	177	256	167.4
29-Apr	277	276	273	268	267	272	279	269	265	244	265	259	265	254	257	265	240	247	233	218	234	230	227	239	255.0
30-Apr	245	248	255	250	246	249	242	249	251	244	242	242	230	236	252	269	312	344	310	206	174	164	185	210	246.7

194.5 197.6 213.4 216.9 197.9 177.5 167.4 192.8 219.8 253.2 249.8 251.1 264.5 261.3 255.9 255.9 265.0 295.7 334.5 76.7 121.1 161.1 175.7 195.2

Diurnal Average

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





Summary of Hour Standard Deviations

Mannix - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 85 deg on Apr 10 14:00			Hours of Data:	720
Minimum Value: 2 deg on Apr 9 01:00			Hours of Missing Data:	0
			Hours of Calibration:	0
			Percent Operational Time:	100.0
Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 15 P <sub>90</sub> = 23 P <sub>99</sub> = 62				

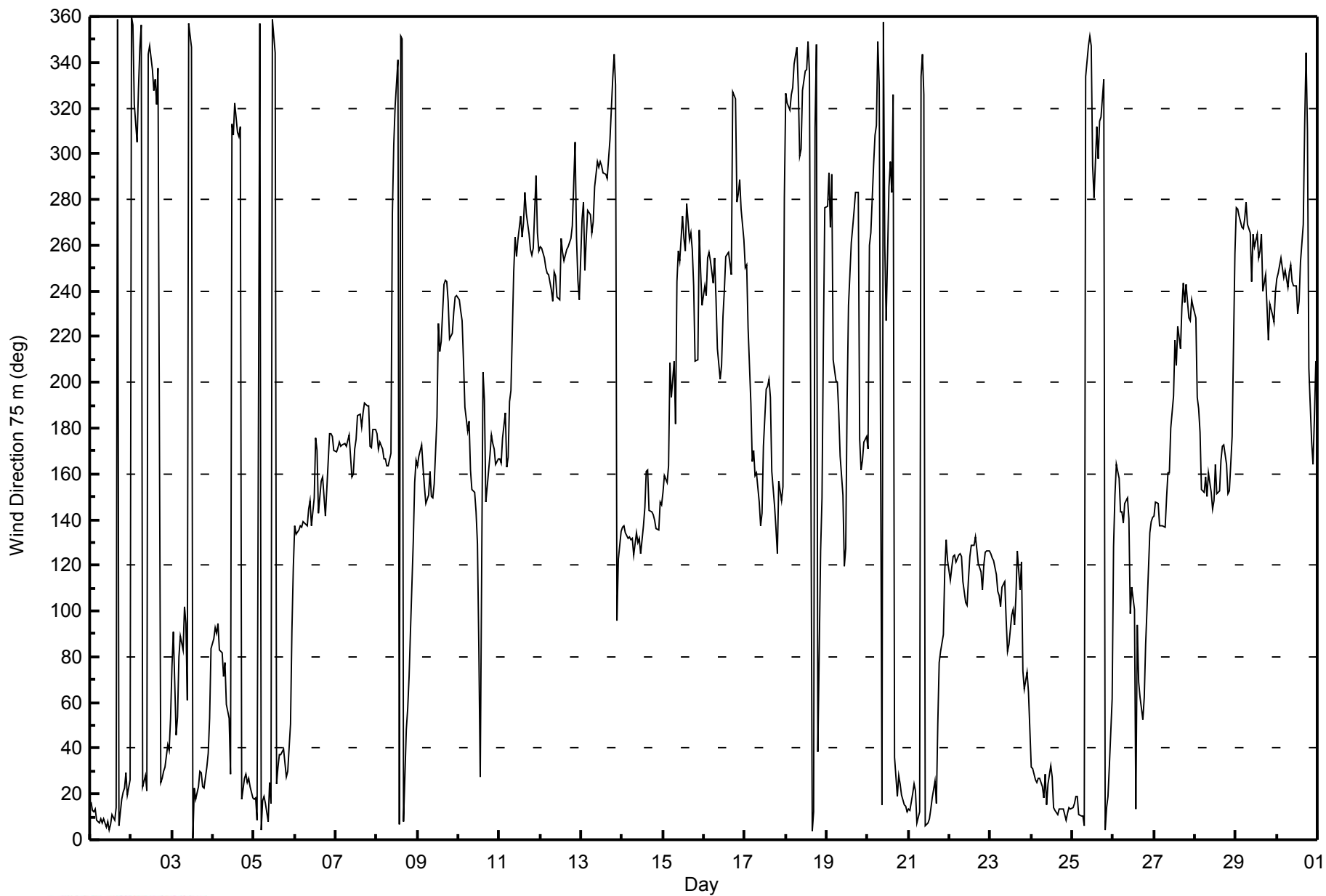
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	5	6	6	6	5	5	6	8	8	8	8	9	10	7	10	8	12	10	7	8	7	10	7	11	12
2-Apr	7	8	29	40	36	12	13	16	11	16	25	23	18	16	14	13	22	15	7	7	7	9	10	15	40
3-Apr	15	13	12	12	7	9	10	16	25	17	66	59	27	16	23	17	15	8	6	5	7	5	9	14	66
4-Apr	9	11	20	41	23	14	15	13	19	27	64	31	15	17	15	23	31	31	7	7	7	7	7	8	64
5-Apr	9	6	6	7	8	10	6	8	15	13	18	31	26	18	18	16	13	12	8	5	6	13	17	15	31
6-Apr	6	8	6	4	5	5	4	9	11	18	15	11	14	24	14	20	13	8	5	9	3	4	4	3	24
7-Apr	3	3	3	2	2	2	3	6	8	13	18	12	15	14	13	14	7	10	11	10	3	3	3	3	18
8-Apr	5	4	3	3	3	2	4	7	14	67	20	18	16	19	23	19	38	15	7	12	12	13	9	4	67
9-Apr	2	3	2	6	4	3	4	6	10	7	8	22	15	9	9	10	11	8	5	7	3	5	3	5	22
10-Apr	3	7	9	14	9	4	7	7	6	5	9	15	23	85	17	30	12	8	6	9	7	5	2	2	85
11-Apr	3	4	5	18	7	14	22	10	22	14	9	10	18	11	13	11	10	7	7	6	9	9	10	7	22
12-Apr	6	6	6	6	6	8	9	13	8	10	10	12	9	10	13	10	10	9	8	9	7	17	8	6	17
13-Apr	21	26	5	8	8	6	6	7	9	10	9	8	11	10	12	10	11	10	14	10	22	53	12	6	53
14-Apr	5	4	5	6	6	8	7	11	9	9	9	11	13	15	13	8	16	10	7	6	7	7	7	7	16
15-Apr	9	8	8	12	24	12	12	28	23	14	22	15	19	15	17	16	11	11	10	15	21	9	8	6	28
16-Apr	5	6	8	6	6	5	8	18	19	14	11	17	12	12	9	11	11	37	21	9	6	5	8	4	37
17-Apr	8	9	11	16	5	7	6	8	13	11	11	32	12	14	14	10	13	6	9	12	41	9	85	14	85
18-Apr	6	9	8	8	8	8	10	10	10	12	13	13	12	28	42	40	12	21	31	23	36	18	18	17	42
19-Apr	15	7	16	13	22	11	8	5	11	12	17	26	71	17	28	27	18	20	30	34	3	2	3	5	71
20-Apr	8	41	7	10	5	13	13	48	28	64	26	56	32	19	17	44	63	32	8	5	5	4	4	6	64
21-Apr	4	4	4	4	7	8	7	29	18	16	12	15	12	16	16	23	20	29	10	7	14	14	14	12	29
22-Apr	12	12	11	11	11	11	10	11	16	14	12	17	12	11	12	9	11	12	13	12	13	10	9	9	17
23-Apr	10	11	11	12	12	12	11	14	14	19	15	19	17	19	13	19	13	13	22	8	11	19	19	22	
24-Apr	13	6	4	3	4	3	7	9	12	16	16	16	25	11	11	10	7	7	6	6	4	6	5	5	25
25-Apr	6	5	5	6	5	4	7	28	18	32	72	49	25	33	44	25	19	15	13	13	3	4	8	19	72
26-Apr	16	8	3	5	8	6	6	12	15	18	32	46	41	47	51	33	13	11	9	9	10	13	5	5	51
27-Apr	4	4	5	3	3	3	3	8	10	11	11	15	22	16	11	13	13	15	7	7	4	3	3	5	22
28-Apr	12	15	12	19	3	4	7	11	11	13	9	11	14	10	9	11	8	6	8	5	5	8	6	25	25
29-Apr	5	8	8	5	5	5	5	8	19	11	9	10	15	15	16	12	14	12	14	12	5	5	3	5	19
30-Apr	5	5	6	5	5	8	7	10	10	10	12	12	13	20	21	17	34	12	22	14	13	31	8	24	34

	21	41	29	41	36	14	22	48	28	67	72	59	71	85	51	44	63	37	31	34	41	53	85	25	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction 75 m (WD75m) - deg**  
**Mannix - April 2015**





Summary of Hour Standard Deviations

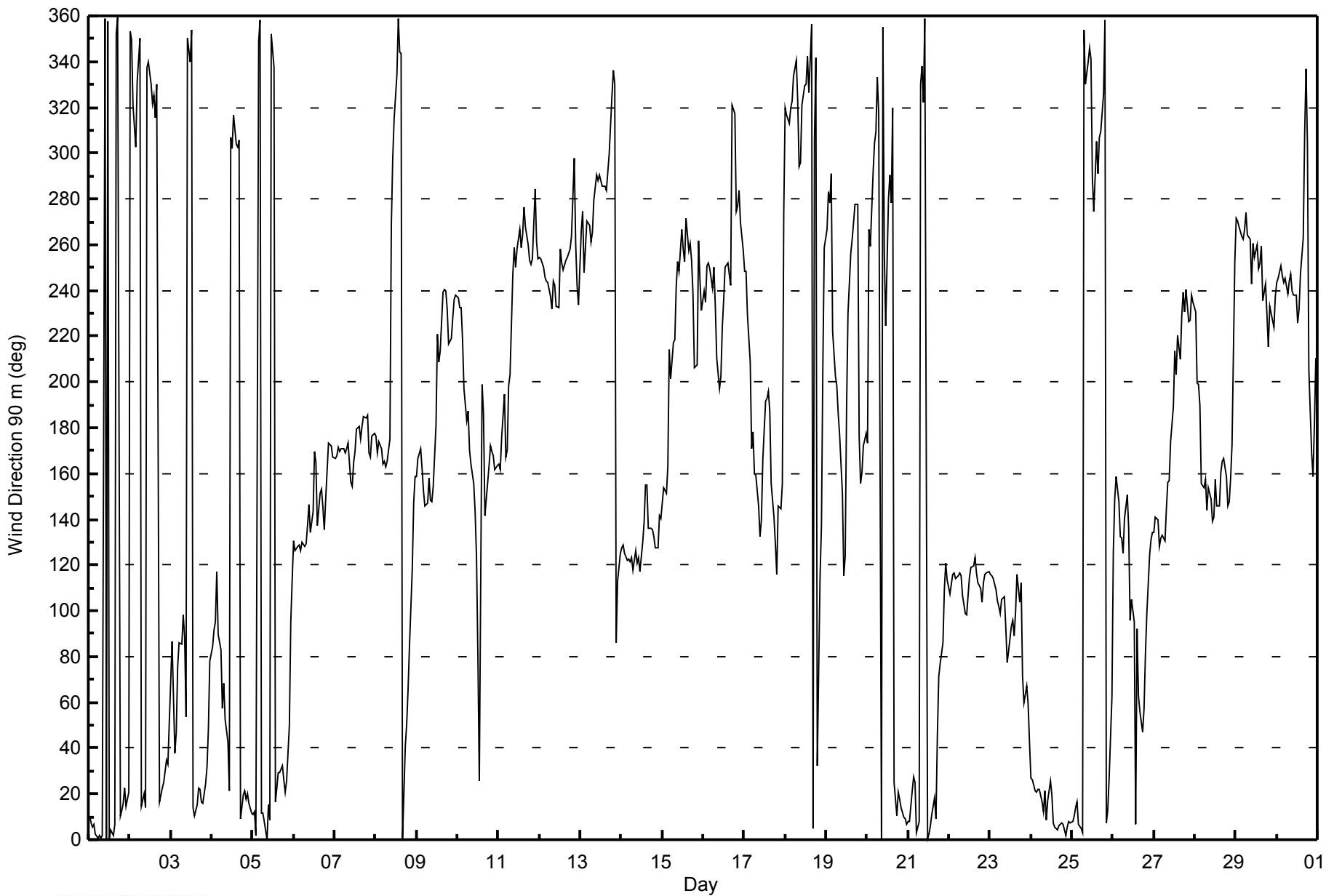
Mannix - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 88 deg on Apr 17 23:00																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 deg on Apr 9 03:00																									
Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 15 P <sub>90</sub> = 23 P <sub>99</sub> = 61																									
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-Apr	5	6	5	5	5	4	5	7	7	8	7	8	9	7	10	8	11	9	6	7	6	9	5	10	11
2-Apr	7	7	29	36	31	11	12	15	10	15	24	22	17	16	14	13	20	14	6	6	7	8	8	15	36
3-Apr	14	12	13	11	8	7	8	15	29	17	61	55	26	16	22	16	14	7	5	4	6	4	9	13	61
4-Apr	8	7	14	32	21	22	18	13	21	26	60	28	15	17	14	22	26	31	7	6	7	6	5	7	60
5-Apr	8	5	5	6	7	10	6	7	14	13	16	30	24	16	17	16	13	12	7	4	7	14	14	12	30
6-Apr	6	5	5	3	4	5	3	8	11	19	16	11	15	25	17	19	14	8	5	10	3	3	3	3	25
7-Apr	3	3	3	2	2	2	3	5	8	13	18	12	15	14	13	13	7	10	11	9	4	4	4	3	18
8-Apr	4	3	3	4	3	2	3	8	15	52	19	18	16	19	21	17	38	16	7	12	10	10	10	4	52
9-Apr	2	5	1	5	3	3	2	6	10	8	8	21	15	10	9	10	11	8	5	7	3	5	3	5	21
10-Apr	3	6	7	12	12	4	5	10	9	7	9	17	23	86	18	30	12	7	6	9	7	5	2	2	86
11-Apr	2	3	7	23	13	17	22	8	18	12	8	9	17	10	12	11	10	6	7	6	8	8	9	7	23
12-Apr	5	6	5	6	5	8	8	12	8	10	10	11	8	10	12	9	10	8	8	9	6	15	8	6	15
13-Apr	20	23	4	8	7	6	5	6	9	9	8	7	10	10	11	10	11	9	13	10	17	38	6	4	38
14-Apr	4	4	4	3	4	5	4	7	8	8	8	8	13	16	12	8	17	11	7	6	6	7	8	7	17
15-Apr	9	8	7	12	21	12	12	24	18	12	20	14	18	15	16	15	10	10	9	16	22	8	7	6	24
16-Apr	4	5	7	6	5	4	6	16	18	13	11	17	12	12	9	11	10	36	20	9	5	5	8	4	36
17-Apr	6	7	9	18	8	10	7	5	13	11	12	31	13	14	14	10	13	6	8	9	40	10	88	14	88
18-Apr	5	8	7	8	7	7	10	9	9	11	13	12	11	27	37	35	11	21	29	22	37	17	18	14	37
19-Apr	14	9	10	7	29	13	11	5	11	13	22	29	66	17	27	26	17	19	23	35	3	3	5	6	66
20-Apr	13	28	6	10	3	11	10	41	25	61	27	58	31	18	16	42	64	32	7	4	5	4	4	5	64
21-Apr	4	4	4	4	8	7	6	28	16	16	12	15	11	15	15	22	20	29	10	7	14	12	12	9	29
22-Apr	7	8	8	9	8	8	7	8	13	14	10	17	11	9	10	8	9	9	9	9	10	8	6	5	17
23-Apr	7	8	7	8	9	9	9	11	12	18	15	20	17	17	11	18	11	10	9	21	8	11	19	19	21
24-Apr	13	6	4	3	3	3	6	9	12	15	16	15	24	11	10	9	7	7	6	5	3	5	5	5	24
25-Apr	5	5	5	8	6	4	7	28	18	29	70	46	24	33	39	23	19	15	13	13	2	4	8	20	70
26-Apr	14	8	3	5	7	4	4	16	15	21	35	48	40	46	52	32	13	11	10	9	6	11	5	5	52
27-Apr	4	3	5	3	4	3	4	8	9	11	11	15	22	16	11	13	13	14	7	6	4	4	3	6	22
28-Apr	12	13	11	19	3	4	4	13	10	12	9	11	14	11	9	11	8	6	7	4	4	7	8	23	23
29-Apr	5	7	7	4	4	5	5	7	17	9	8	9	14	14	15	11	13	11	14	12	5	6	2	5	17
30-Apr	4	4	6	5	5	7	7	9	9	9	12	12	13	19	20	16	37	13	21	12	16	25	7	24	37
																	Diurnal Maximum								
																	20 28 29 36 31 22 22 41 29 61 70 58 66 86 52 42 64 36 29 35 40 38 88 24								



**WBEA**  
**Hourly Averages**

**Wind Direction 90 m (WD90m) - deg**  
**Mannix - April 2015**





Summary of Hour Averages

Mannix - April 2015

Maximum Value: 0.8 km/h on Apr 23 21:00																				Maximum Daily Average: 0.4 km/h on Apr 23					Hours in Service: 720	
Minimum Value: -1.4 km/h on Apr 1 07:00																				Minimum Daily Average: -0.5 km/h on Apr 1					Hours of Data: 720	
Maximum Diurnal Average: 0.1 km/h at hour 8																				Minimum Diurnal Average: -0.2 km/h at hour 14					Hours of Missing Data: 0	
Monthly Average: -0.03 km/h																				Percentiles: P <sub>1</sub> = -0.9 P <sub>10</sub> = -0.5 Q <sub>1</sub> = -0.3 Median = 0.0 Q <sub>3</sub> = 0.3 P <sub>90</sub> = 0.4 P <sub>99</sub> = 0.7					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-Apr	-0.4	-0.5	-0.7	-0.9	-0.6	-1.0	-1.4	-0.8	-0.4	-0.6	-0.6	-0.5	-0.6	-0.7	-0.7	-0.5	-0.5	-0.5	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.5	-0.1
2-Apr	-0.2	-0.3	-0.1	0.0	0.0	-0.3	-0.1	-0.1	-0.2	-0.1	0.1	0.3	0.0	-0.2	-0.5	-0.4	-0.2	-0.1	-0.2	0.0	0.0	0.2	0.2	0.2	-0.1	0.3
3-Apr	0.3	0.2	0.1	0.3	0.2	0.2	0.3	0.1	0.0	0.1	0.2	0.2	0.0	-0.3	0.2	-0.2	0.0	-0.1	-0.4	-0.3	0.1	0.1	0.2	0.4	0.1	0.4
4-Apr	0.4	0.2	0.1	0.1	0.1	0.3	0.2	0.2	-0.1	0.2	0.2	-0.2	-0.3	-0.1	-0.5	-0.1	0.0	0.3	-0.1	0.1	-0.1	-0.1	-0.1	-0.2	0.0	0.4
5-Apr	-0.2	-0.3	-0.1	0.0	-0.2	-0.3	-0.2	-0.2	-0.2	-0.1	0.0	0.1	-0.1	-0.1	0.1	0.0	0.0	0.3	0.0	0.0	-0.1	-0.1	0.2	0.2	-0.1	0.3
6-Apr	0.2	0.1	0.1	0.4	0.3	0.2	0.3	0.4	0.2	0.1	0.2	0.4	-0.1	0.3	0.2	0.3	0.3	0.5	0.4	0.4	0.2	0.2	0.4	0.7	0.3	0.7
7-Apr	0.7	0.5	0.4	0.5	0.6	0.6	0.8	0.1	0.1	0.4	0.2	0.3	0.2	0.0	0.0	0.1	0.0	-0.1	-0.1	0.1	0.3	0.3	0.3	0.4	0.3	0.8
8-Apr	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.1	-0.1	-0.2	-0.2	-0.2	0.0	-0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.5	0.2	0.6
9-Apr	0.5	0.6	0.6	0.4	0.4	0.5	0.2	0.4	0.3	0.2	0.3	0.2	-0.3	-0.6	-0.7	-0.4	-0.3	-0.4	-0.3	-0.3	-0.3	-0.3	-0.2	-0.2	0.0	0.6
10-Apr	-0.2	-0.1	0.1	0.1	0.3	0.4	0.3	0.2	0.0	0.2	0.2	0.6	0.0	0.1	-0.4	-0.2	0.4	0.5	0.3	0.3	0.4	0.5	0.6	0.5	0.2	0.6
11-Apr	0.6	0.5	0.3	0.3	0.4	0.6	0.2	0.3	-0.1	-0.4	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4	-0.2	-0.2	-0.8	-0.8	-0.7	-0.2	-0.1	-0.4	-0.1	0.6
12-Apr	-0.3	-0.4	-0.4	-0.5	-0.6	-0.6	-0.6	-0.5	-0.5	-0.3	-0.6	-0.6	-0.5	-0.6	-0.8	-0.6	-0.5	-0.6	-0.2	-0.2	-0.4	-0.3	-0.4	-0.3	-0.5	-0.2
13-Apr	-0.4	-0.2	-0.4	-0.3	-0.2	-0.1	-0.3	-0.2	-0.3	-0.4	-0.7	-0.6	-0.4	-0.6	-0.6	-0.2	-0.5	-0.4	-0.3	-0.2	-0.1	0.1	0.1	0.3	-0.3	0.3
14-Apr	0.4	0.4	0.0	0.0	0.0	0.2	0.2	0.5	0.4	0.0	0.3	0.4	0.1	0.2	0.3	0.5	0.5	0.5	0.5	0.3	0.3	0.4	0.5	0.5	0.3	0.5
15-Apr	0.4	0.4	0.4	0.2	0.0	0.1	0.1	0.3	0.0	-0.1	-0.2	-0.2	0.1	-0.4	-0.4	-0.3	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1	-0.5	-0.4	-0.1	0.4
16-Apr	-0.4	-0.4	-0.4	-0.5	-0.4	-0.6	-0.4	-0.2	-0.3	-0.1	-0.1	-0.3	-0.6	-0.4	-0.7	-0.3	-0.7	-1.0	-0.4	-0.3	-0.3	-0.4	-0.2	-0.2	-0.4	-0.1
17-Apr	-0.1	-0.1	0.0	0.1	0.3	0.3	0.5	0.3	0.1	0.1	0.0	0.2	0.0	-0.4	-0.2	-0.1	0.4	0.3	0.3	0.2	0.0	0.2	0.0	-0.1	0.1	0.5
18-Apr	-0.3	-0.2	-0.5	-0.5	-0.8	-0.9	-0.6	-0.6	-0.2	-0.4	-0.8	-0.7	-0.7	-0.2	-0.2	-0.3	-0.4	-0.5	-0.3	0.0	0.0	-0.1	-0.1	-0.1	-0.4	0.0
19-Apr	-0.2	-0.1	0.0	-0.1	-0.1	0.0	0.1	0.2	-0.1	-0.1	0.6	0.3	0.1	-0.1	-0.1	-0.4	-0.1	-0.1	-0.1	0.1	0.4	0.5	0.5	0.5	0.1	0.6
20-Apr	0.4	0.0	-0.1	-0.3	0.0	-0.1	0.0	0.1	0.1	0.0	-0.3	0.1	-0.3	-0.6	-0.1	-0.1	0.0	0.1	0.2	-0.1	-0.5	-0.5	-0.6	-0.5	-0.1	0.4
21-Apr	-0.3	-0.4	-0.2	-0.3	-0.3	-0.4	0.1	-0.2	-0.2	0.2	-0.2	-0.1	-0.5	-0.3	-0.1	-0.1	-0.3	0.3	0.7	0.5	0.3	0.2	0.3	0.3	0.0	0.7
22-Apr	0.4	0.3	0.3	0.3	0.5	0.4	0.1	0.5	0.7	0.6	0.4	0.7	0.4	0.1	0.4	0.5	0.3	0.7	0.2	0.4	0.3	0.3	0.2	0.3	0.4	0.7
23-Apr	0.2	0.2	0.4	0.3	0.3	0.5	0.6	0.5	0.5	0.3	0.2	0.5	0.7	0.6	0.4	0.5	0.4	0.2	0.3	0.5	0.8	0.7	0.4	0.2	0.4	0.8
24-Apr	-0.1	0.0	-0.5	-0.5	-0.3	-0.5	-0.3	-0.1	-0.2	-0.4	-0.1	0.1	-0.1	-0.5	-0.4	-0.4	-0.7	-0.8	-0.6	-0.5	-1.0	-0.7	-0.6	-0.4	-0.4	0.1
25-Apr	-0.4	-0.6	-0.3	-0.3	-0.4	-0.4	-0.2	0.4	0.0	0.0	0.3	0.0	0.2	-0.2	0.2	-0.4	-0.4	-0.4	-0.2	-0.3	-0.5	-0.5	0.0	0.0	-0.2	0.4
26-Apr	0.2	0.2	0.2	0.1	-0.1	0.0	0.2	0.1	0.2	0.2	0.4	0.3	0.1	-0.2	0.1	0.3	0.3	0.4	0.1	0.3	0.2	0.3	0.4	0.3	0.2	0.4
27-Apr	0.3	0.4	0.3	0.4	0.5	0.4	0.2	0.3	0.4	0.6	0.1	0.0	-0.1	-0.3	-0.6	-0.3	-0.4	-0.7	-0.4	-0.2	-0.3	-0.3	-0.3	-0.4	0.0	0.6
28-Apr	-0.2	0.2	0.2	0.3	0.1	0.3	0.3	0.2	0.3	0.3	0.2	0.5	0.4	0.6	0.6	0.5	0.4	0.4	0.4	0.5	0.6	0.5	0.3	-0.2	0.3	0.6
29-Apr	-0.2	-0.1	0.0	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.1	-0.2	-0.3	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.2	-0.3	-0.4	-0.5	-0.4	-0.2	0.0
30-Apr	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.6	-0.4	-0.3	-0.2	-0.6	-0.5	-0.4	-0.1	-0.4	-0.2	-0.4	-0.6	-0.1	0.0	0.0	0.1	0.1	0.0	-0.3	0.1
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.4 km/h on Apr 1 06:00 Minimum Value: 0.2 km/h on Apr 19 04:00 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.2 Median = 1.8 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.9 P <sub>99</sub> = 3.7																								Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	2.7	2.7	3.2	3.5	3.8	4.4	4.2	3.7	4.0	3.8	3.6	3.1	3.5	3.6	3.2	3.3	3.2	3.3	2.5	2.1	1.7	1.2	0.7	0.8	4.4
2-Apr	0.8	1.0	0.7	0.8	0.8	0.8	0.9	1.1	1.3	1.7	1.8	2.0	2.0	2.1	2.0	1.8	1.6	1.6	1.7	1.5	1.7	1.6	1.1	1.0	2.1
3-Apr	1.0	0.9	1.0	1.0	0.6	0.6	0.9	1.0	1.3	1.7	1.7	2.1	2.3	2.2	2.2	2.0	2.1	2.0	1.8	1.9	1.8	1.8	1.5	1.2	2.3
4-Apr	0.9	0.6	0.5	0.6	0.4	0.5	0.7	1.1	1.5	1.6	1.8	1.9	1.9	2.2	1.9	1.7	1.5	1.4	1.8	2.1	2.1	1.6	1.4	1.2	2.2
5-Apr	1.1	0.6	0.5	0.2	0.5	1.4	2.2	2.1	1.8	2.1	2.2	2.1	2.3	2.3	2.2	1.9	1.8	1.8	1.4	1.3	1.5	1.0	0.7	0.9	2.3
6-Apr	1.1	1.3	1.2	1.2	1.0	0.7	1.2	1.5	1.5	1.6	1.8	2.0	2.2	2.1	1.8	1.6	1.9	1.7	1.7	1.4	1.5	2.0	1.7	1.2	2.2
7-Apr	1.1	1.0	1.1	0.9	0.9	1.1	1.3	1.8	2.0	1.7	2.3	2.8	2.7	2.8	2.6	2.3	2.1	1.9	2.0	1.2	0.9	1.1	1.1	0.9	2.8
8-Apr	1.0	1.4	1.1	1.1	1.2	1.4	1.5	1.2	1.1	1.3	1.8	1.9	2.2	2.2	2.2	2.0	1.8	1.1	0.8	0.7	0.5	0.4	0.4	0.7	2.2
9-Apr	0.6	0.9	1.1	1.2	1.2	1.3	1.2	1.5	1.7	1.9	1.8	2.2	2.5	2.5	2.9	2.6	2.5	2.5	1.7	0.9	0.9	0.9	0.8	0.5	2.9
10-Apr	0.6	0.4	0.3	0.5	0.8	0.8	0.9	1.3	1.2	1.4	1.6	1.7	1.6	1.7	2.2	2.1	1.9	1.9	1.1	1.4	0.7	0.8	0.8	1.0	2.2
11-Apr	1.1	0.8	0.7	0.5	0.7	1.0	0.9	1.1	1.3	1.4	2.3	1.9	2.1	2.2	2.0	1.8	1.7	2.0	3.4	4.2	3.9	1.5	0.9	1.2	4.2
12-Apr	1.7	2.5	2.4	2.5	2.1	1.9	2.1	2.2	2.5	2.5	2.9	3.1	3.0	3.4	3.5	3.3	3.3	3.3	2.7	1.9	1.6	1.0	1.3	1.8	3.5
13-Apr	1.9	0.5	1.4	2.6	2.0	1.4	1.6	1.8	2.3	3.1	3.3	3.2	3.1	2.9	2.7	2.6	2.2	1.9	1.4	0.7	0.4	0.4	1.0	1.5	3.3
14-Apr	1.8	1.8	2.1	2.2	2.0	2.4	2.7	2.2	2.0	2.3	2.4	2.3	1.8	1.8	1.7	2.7	2.8	2.7	2.2	2.1	2.0	2.2	2.1	1.7	2.8
15-Apr	1.5	1.4	1.1	0.7	0.5	0.6	0.8	1.0	1.4	1.9	2.0	2.3	2.5	2.6	2.6	2.5	2.4	2.1	1.9	0.6	1.7	2.4	1.9	1.8	2.6
16-Apr	1.6	1.8	2.7	2.4	2.0	1.7	1.9	1.9	1.5	1.7	2.0	2.4	2.8	2.9	3.4	3.5	2.9	3.4	2.1	2.3	1.1	1.2	0.5	1.2	3.5
17-Apr	0.7	0.7	0.6	0.7	0.8	0.9	1.3	1.2	1.4	1.7	1.7	2.2	2.5	2.9	3.3	2.9	1.7	1.5	1.7	1.6	1.2	0.5	0.3	0.6	3.3
18-Apr	1.3	1.3	1.8	2.3	2.7	2.7	3.0	2.6	1.8	2.2	2.8	3.0	2.9	2.9	1.9	2.6	2.8	1.8	1.8	1.8	0.4	0.3	0.3	0.3	3.0
19-Apr	0.3	0.2	0.2	0.2	0.3	0.7	0.8	1.0	1.1	1.5	1.8	1.5	1.7	2.0	1.8	1.9	1.2	1.0	0.4	0.3	0.5	0.6	0.7	0.7	2.0
20-Apr	0.8	0.5	0.4	0.7	0.8	0.8	0.6	0.8	1.2	1.7	1.4	1.8	2.0	2.0	1.9	1.7	1.4	1.5	1.9	1.8	1.7	2.3	2.3	2.2	2.3
21-Apr	1.8	1.2	1.5	1.1	0.9	0.9	1.5	1.3	1.7	1.8	2.4	2.4	2.4	2.5	2.4	2.1	2.2	1.9	2.1	2.0	1.9	2.5	2.3	2.5	2.5
22-Apr	2.3	2.1	2.1	2.0	2.2	2.0	2.8	2.9	2.5	2.6	2.6	3.0	3.4	3.4	3.4	3.4	3.5	3.3	3.0	2.9	3.2	3.5	3.4	3.4	3.5
23-Apr	3.0	2.9	2.6	2.7	2.4	2.3	2.2	2.5	2.7	2.1	2.0	2.4	2.8	3.1	2.9	3.0	2.9	2.8	2.4	2.3	3.3	2.5	2.1	1.9	3.3
24-Apr	1.7	1.7	1.9	1.8	1.9	2.0	2.1	2.2	2.3	2.7	2.7	2.8	2.8	3.1	3.2	3.3	3.3	3.3	3.2	3.1	3.6	3.0	2.7	2.5	3.6
25-Apr	2.3	2.1	1.9	1.5	1.3	1.3	1.5	1.3	1.6	2.0	2.0	2.0	2.1	2.3	2.1	1.9	1.7	1.8	1.7	1.5	1.8	1.8	1.4	0.8	2.3
26-Apr	0.5	0.5	0.5	0.5	0.5	0.6	0.9	1.2	1.4	1.7	1.8	1.9	2.1	2.1	2.2	2.0	1.9	1.6	1.1	0.9	1.0	1.7	2.3	2.1	2.3
27-Apr	1.9	1.3	1.2	1.4	1.5	1.4	1.5	1.5	1.7	2.0	2.8	2.5	2.4	2.9	3.1	2.7	2.8	3.0	2.3	1.4	0.7	0.8	0.7	0.9	3.1
28-Apr	0.5	0.6	0.7	0.7	0.7	1.0	1.3	1.4	1.4	1.7	1.7	2.0	2.5	2.7	2.6	2.8	3.1	2.7	1.8	1.9	2.0	1.5	1.3	1.9	3.1
29-Apr	1.1	1.5	1.1	0.8	1.0	1.5	1.4	1.6	1.1	1.2	1.4	1.7	2.3	2.4	2.1	1.7	1.5	1.6	1.5	1.0	1.0	1.3	1.6	1.5	2.4
30-Apr	1.5	1.6	2.4	2.2	2.1	1.8	1.9	2.3	2.3	2.8	3.1	3.3	2.9	2.8	2.7	1.8	2.4	2.1	1.2	0.4	0.3	0.5	0.7	0.7	3.3
Diurnal Maximum																									



Summary of Hour Averages

Mannix - April 2015

Maximum Value: 1.2 km/h on Apr 23 09:00		Maximum Daily Average: 0.7 km/h on Apr 22		Hours in Service: 720																							
Minimum Value: -1.3 km/h on Apr 1 07:00		Minimum Daily Average: -0.6 km/h on Apr 12		Hours of Data: 720																							
Maximum Diurnal Average: 0.3 km/h at hour 8		Minimum Diurnal Average: -0.1 km/h at hour 15		Hours of Missing Data: 0																							
Monthly Average: 0.12 km/h		Percentiles: P <sub>1</sub> = -1.0 P <sub>10</sub> = -0.5 Q <sub>1</sub> = -0.3 Median = 0.2 Q <sub>3</sub> = 0.5 P <sub>90</sub> = 0.8 P <sub>99</sub> = 1.1		Hours of Calibration: 0																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	-0.3	-0.3	-0.6	-0.6	-0.5	-0.8	-1.3	-0.2	-0.1	0.1	0.2	0.2	0.0	-0.2	-0.4	-0.3	-0.3	-0.2	0.2	0.3	0.1	0.0	-0.1	0.1	-0.2	0.3	
2-Apr	-0.2	-0.3	-0.1	0.2	0.3	-0.4	-0.1	0.1	0.0	0.4	0.4	1.0	0.2	0.0	-0.5	-0.3	0.0	0.0	0.2	0.5	0.3	0.6	0.3	0.6	0.1	1.0	
3-Apr	0.4	0.4	0.3	0.7	0.4	0.6	0.5	0.2	0.0	0.0	0.5	0.5	0.6	-0.2	0.6	0.1	0.1	0.1	-0.1	-0.3	0.2	0.3	0.4	0.7	0.3	0.7	
4-Apr	0.6	0.3	0.2	0.3	0.2	0.5	0.4	0.5	0.0	0.4	0.6	0.0	-0.4	0.2	-0.6	0.2	0.1	0.5	-0.1	0.2	0.1	0.0	0.0	0.0	0.2	0.6	
5-Apr	0.1	-0.1	-0.1	0.0	-0.2	-0.2	0.0	0.1	-0.2	0.1	0.2	0.6	0.4	0.0	0.2	0.2	0.1	0.6	0.5	0.3	0.1	0.1	0.4	0.6	0.2	0.6	
6-Apr	0.4	0.3	0.3	0.5	0.5	0.5	0.5	0.8	0.3	0.5	0.2	0.6	0.3	0.5	0.7	0.6	0.7	0.7	0.7	0.7	0.5	0.4	0.6	0.7	0.5	0.8	
7-Apr	0.7	0.6	0.5	0.5	0.5	0.6	0.8	0.5	0.3	0.7	0.6	0.6	0.5	0.2	0.4	0.5	0.0	0.1	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.8	
8-Apr	0.6	0.9	0.7	0.7	0.8	0.9	0.6	0.6	0.6	0.5	-0.2	-0.2	0.0	-0.1	0.2	0.0	0.5	0.2	0.2	0.5	0.3	0.5	0.6	0.8	0.4	0.9	
9-Apr	0.7	0.9	0.9	1.1	1.0	1.2	0.5	0.8	0.7	0.5	0.7	0.4	-0.3	-0.5	-0.5	-0.4	-0.4	-0.6	-0.6	-0.4	-0.5	-0.5	-0.3	-0.3	0.2	1.2	
10-Apr	-0.4	-0.2	0.0	0.1	0.5	0.8	0.7	0.7	0.4	0.4	0.5	0.9	0.1	0.1	-0.2	-0.1	0.5	0.8	0.4	0.4	0.5	0.6	1.0	0.8	0.4	1.0	
11-Apr	0.8	0.7	0.4	0.5	0.8	0.9	0.3	0.4	-0.1	-0.3	-0.5	-0.4	-0.5	-0.4	-0.5	-0.4	-0.5	-0.4	-1.1	-1.0	-1.0	-0.5	-0.2	-0.5	-0.1	0.9	
12-Apr	-0.4	-0.6	-0.7	-0.8	-0.8	-0.7	-0.7	-0.5	-0.5	-0.3	-0.8	-0.7	-0.7	-0.8	-0.8	-0.5	-0.9	-0.8	-0.5	-0.3	-0.5	-0.4	-0.6	-0.4	-0.6	-0.3	
13-Apr	-0.5	-0.2	-0.5	-0.4	-0.5	-0.2	-0.4	-0.2	-0.5	-0.6	-0.5	-1.0	-0.4	-1.0	-0.7	0.0	-0.5	0.0	-0.2	-0.3	0.1	0.2	0.4	0.6	-0.3	0.6	
14-Apr	0.7	1.0	0.6	0.6	0.7	0.7	0.4	0.7	0.7	0.1	0.6	0.7	0.3	0.5	0.4	0.7	0.5	0.7	0.7	0.9	0.5	0.6	0.8	0.8	0.6	1.0	
15-Apr	0.7	0.5	0.5	0.5	0.2	0.1	0.1	0.3	0.3	0.0	0.2	-0.3	0.4	-0.3	-0.4	-0.4	-0.3	-0.4	-0.5	-0.1	-0.2	-0.4	-0.7	-0.6	0.0	0.7	
16-Apr	-0.6	-0.7	-0.5	-0.6	-0.4	-0.8	-0.4	-0.2	-0.1	0.3	0.0	-0.3	-0.5	-0.6	-0.9	-0.3	-0.8	-0.9	-0.4	-0.6	-0.5	-0.6	-0.3	-0.2	-0.5	0.3	
17-Apr	0.0	0.0	0.1	0.4	0.8	0.6	0.8	0.6	0.3	0.3	0.4	0.3	0.2	-0.3	-0.3	0.0	0.6	0.6	0.5	0.5	0.1	0.4	0.2	0.0	0.3	0.8	
18-Apr	-0.4	-0.3	-0.5	-0.5	-1.0	-1.2	-1.0	-0.8	-0.2	-0.4	-1.1	-0.7	-0.9	-0.1	-0.1	-0.2	-0.1	-0.4	0.0	0.1	0.3	0.1	0.0	-0.1	-0.4	0.3	
19-Apr	-0.1	-0.2	0.0	0.0	0.1	0.0	0.2	0.2	0.0	-0.1	1.0	0.5	0.4	0.4	0.0	-0.6	0.0	-0.2	0.0	0.2	0.5	0.5	0.5	0.7	0.2	1.0	
20-Apr	0.7	0.0	-0.3	-0.6	0.2	-0.2	0.0	0.3	0.3	0.5	0.0	0.2	-0.4	-0.6	-0.1	0.4	0.2	0.6	0.2	0.1	-0.2	-0.4	-0.4	-0.3	0.0	0.7	
21-Apr	-0.1	-0.2	0.0	0.0	-0.1	-0.3	0.3	-0.2	0.1	0.5	0.0	0.1	-0.1	-0.2	0.3	0.2	-0.3	0.4	0.7	0.7	0.7	0.5	0.5	0.6	0.2	0.7	
22-Apr	0.6	0.7	0.8	0.9	1.1	1.0	0.3	0.7	1.0	1.0	0.6	1.0	0.5	0.4	0.8	0.8	0.7	1.0	0.7	0.4	1.1	0.6	0.5	0.8	0.7	1.1	
23-Apr	0.8	0.8	0.8	0.7	0.6	0.9	0.9	0.7	1.2	0.6	0.0	0.8	1.1	0.7	0.4	0.8	0.7	0.6	0.7	0.9	0.9	0.9	0.2	0.4	0.7	1.2	
24-Apr	0.3	0.2	-0.1	-0.2	-0.1	-0.2	0.1	0.2	-0.3	-0.3	0.1	0.3	0.4	-0.2	-0.6	-0.2	-0.4	-0.5	-0.5	-0.5	-0.9	-0.5	-0.4	-0.2	-0.2	0.4	
25-Apr	-0.2	-0.4	-0.1	-0.1	-0.2	-0.1	-0.1	1.0	0.1	0.0	0.3	0.5	0.4	0.1	0.5	-0.3	-0.5	-0.4	0.2	0.1	-0.3	-0.3	0.1	0.2	0.0	1.0	
26-Apr	0.3	0.6	0.4	0.6	0.3	0.2	0.3	0.2	0.4	0.4	0.9	1.0	-0.2	-0.3	0.4	0.7	0.6	0.5	0.2	0.4	0.3	0.8	0.8	0.7	0.4	1.0	
27-Apr	0.8	0.6	0.6	0.9	1.1	1.0	0.8	0.5	0.6	1.0	0.5	0.3	0.2	-0.2	-0.8	-0.2	-0.3	-0.7	-0.6	-0.4	-0.3	-0.4	-0.5	-0.5	0.2	1.1	
28-Apr	-0.3	0.3	0.4	0.7	0.6	1.0	0.4	0.3	0.5	0.3	0.3	0.9	0.9	0.9	0.8	0.8	0.6	0.9	0.8	0.9	1.0	0.7	0.4	-0.4	0.6	1.0	
29-Apr	-0.4	-0.2	0.0	-0.3	-0.3	-0.5	-0.4	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2	-0.3	-0.4	-0.2	-0.2	-0.2	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6	-0.6	-0.3	0.0
30-Apr	-0.6	-0.6	-0.6	-0.7	-0.8	-0.6	-0.7	-0.4	-0.5	-0.5	-0.9	-0.8	-0.3	0.1	-0.6	-0.2	-0.8	-0.7	-0.2	0.1	0.2	0.2	0.4	0.0	-0.4	0.4	
																								Diurnal Average			
																								Diurnal Maximum			



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.3 km/h on Apr 11 20:00 Minimum Value: 0.2 km/h on Apr 30 21:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.7 Q <sub>1</sub> = 1.1 Median = 1.9 Q <sub>3</sub> = 2.6 P <sub>90</sub> = 3.1 P <sub>99</sub> = 3.7																								Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	2.3	2.6	2.9	3.2	3.6	3.9	3.7	3.7	3.8	3.8	3.7	3.4	3.4	3.4	3.2	3.3	3.4	3.3	2.5	2.2	1.9	1.3	0.8	1.1	3.9
2-Apr	0.9	0.9	0.8	1.1	0.9	1.0	0.9	1.4	1.6	2.0	2.2	2.8	2.8	2.9	2.6	2.2	2.2	1.8	1.8	1.7	1.8	1.8	1.3	1.3	2.9
3-Apr	1.2	1.1	1.2	1.2	0.7	0.8	0.9	1.0	1.4	1.9	2.2	2.7	3.0	2.7	2.6	2.3	2.4	2.0	1.8	1.7	2.1	1.8	1.4	1.2	3.0
4-Apr	0.8	0.6	0.5	0.6	0.4	0.7	0.7	1.2	1.5	2.0	2.2	2.4	2.5	2.9	2.4	2.3	1.8	1.7	1.7	2.4	2.3	1.8	1.7	1.3	2.9
5-Apr	1.2	0.8	0.5	0.3	0.7	1.4	2.4	2.2	2.0	2.4	2.7	2.8	3.0	2.8	2.6	2.3	2.3	1.9	1.7	1.6	1.6	1.0	0.7	1.0	3.0
6-Apr	1.1	1.1	1.1	1.3	1.0	0.7	1.3	1.9	1.9	2.0	1.8	2.5	2.6	2.6	2.1	1.8	2.3	1.9	1.6	1.4	1.3	1.4	1.4	1.3	2.6
7-Apr	1.0	1.0	1.1	0.8	0.8	1.1	1.3	1.8	1.9	2.0	2.6	3.2	3.0	3.0	2.8	2.5	1.8	1.8	1.8	1.0	0.6	0.7	0.7	0.8	3.2
8-Apr	0.8	1.1	0.8	0.9	1.1	1.1	1.4	1.2	1.1	1.6	2.2	2.6	3.0	2.8	2.9	2.7	2.3	1.4	0.8	0.8	0.6	0.4	0.4	0.7	3.0
9-Apr	0.8	0.9	0.9	0.9	0.9	1.3	1.2	1.7	1.6	1.7	1.7	2.3	2.7	2.8	3.1	2.8	2.5	2.5	1.6	0.6	0.6	0.7	0.8	0.5	3.1
10-Apr	0.5	0.5	0.4	0.7	0.6	0.5	0.6	1.1	1.0	1.1	1.5	1.7	1.9	2.2	2.8	2.5	2.2	2.2	1.0	1.0	0.6	0.6	0.7	1.1	2.8
11-Apr	1.3	0.9	0.5	0.5	0.6	0.7	0.8	1.1	1.4	1.6	2.4	1.9	2.2	2.4	2.3	2.0	1.9	2.2	3.0	4.3	4.0	1.8	0.9	0.9	4.3
12-Apr	1.7	2.5	2.4	2.4	2.2	2.0	2.5	2.7	2.8	2.6	3.1	3.6	3.4	3.7	3.8	3.7	3.6	3.6	2.9	2.2	1.7	1.1	1.2	1.7	3.8
13-Apr	1.9	0.7	1.5	2.6	2.3	1.6	1.6	2.1	2.4	3.4	3.7	3.5	3.5	3.2	3.1	2.9	2.6	2.5	1.6	0.7	0.8	0.4	0.9	1.3	3.7
14-Apr	1.7	1.7	1.7	1.9	1.5	2.0	2.4	2.2	2.1	2.0	2.3	2.4	2.1	2.1	2.1	2.8	3.1	2.9	2.5	2.2	1.9	1.9	2.2	2.1	3.1
15-Apr	1.8	1.5	1.2	0.8	0.6	0.4	0.7	1.0	1.9	2.3	2.6	2.6	3.3	3.1	3.1	2.7	2.6	2.3	2.1	0.5	1.6	2.7	2.1	1.6	3.3
16-Apr	1.6	1.7	2.9	2.5	2.2	1.6	2.1	2.0	1.9	2.2	2.3	2.8	3.2	3.2	3.7	3.8	3.3	3.8	2.5	2.2	1.1	1.0	0.5	0.8	3.8
17-Apr	0.8	1.0	0.9	0.7	0.6	0.9	1.3	1.2	1.2	1.8	1.8	2.3	2.5	2.8	3.2	2.9	1.8	1.6	1.8	1.7	1.1	0.8	0.3	0.3	3.2
18-Apr	1.5	1.6	2.1	2.9	3.1	3.1	3.3	3.2	1.9	2.5	3.4	3.7	3.5	3.3	2.4	3.1	3.0	1.8	2.1	1.7	0.6	0.5	0.2	0.2	3.7
19-Apr	0.3	0.2	0.2	0.2	0.2	0.3	0.6	0.7	0.7	1.3	2.1	2.0	2.2	2.6	2.3	2.3	1.3	1.2	0.5	0.3	0.3	0.4	0.6	0.8	2.6
20-Apr	1.0	0.8	0.6	0.7	0.6	0.8	0.5	0.9	1.5	2.0	1.8	2.2	2.6	2.6	2.4	2.4	1.8	1.9	2.0	1.8	1.6	1.7	1.8	2.2	2.6
21-Apr	1.7	1.1	1.2	0.8	0.8	0.9	1.7	1.5	2.1	2.4	2.8	3.0	3.0	3.0	3.1	2.6	2.4	2.2	2.4	2.3	2.5	3.0	2.7	2.7	3.1
22-Apr	2.4	2.3	2.3	2.2	2.4	2.1	2.7	3.0	2.8	2.8	2.8	3.4	3.4	3.1	3.5	3.3	3.6	3.4	3.2	3.0	3.5	3.6	3.2	3.4	3.6
23-Apr	3.1	3.1	2.8	3.0	2.5	2.5	2.3	2.6	2.9	2.4	2.0	2.7	3.1	3.2	3.1	3.0	2.8	2.7	2.3	2.5	3.7	3.0	2.7	2.3	3.7
24-Apr	1.8	1.7	1.8	1.7	1.8	1.8	2.1	2.5	2.5	3.0	3.4	3.3	3.5	3.3	3.4	3.6	3.2	3.1	2.8	2.9	2.8	2.6	2.5	2.2	3.6
25-Apr	2.1	1.9	2.0	1.3	1.1	1.0	1.5	1.6	2.0	2.4	2.6	2.7	2.9	3.2	2.7	2.6	2.2	2.3	2.2	1.6	1.4	1.5	1.4	0.7	3.2
26-Apr	0.7	0.4	0.2	0.4	0.3	0.4	0.9	1.2	1.6	1.9	2.3	2.5	2.5	2.6	2.6	2.5	2.2	1.8	1.2	0.9	1.0	1.9	2.4	2.2	2.6
27-Apr	1.9	1.3	1.2	1.3	1.1	1.2	1.2	1.5	2.2	2.5	3.2	3.1	2.9	3.1	3.6	3.1	3.2	3.2	2.3	1.4	0.3	0.3	0.4	0.5	3.6
28-Apr	0.5	0.8	0.8	0.8	0.6	0.6	1.3	1.2	1.7	1.8	1.9	2.7	2.8	3.2	2.9	2.7	2.9	2.5	1.9	2.1	2.2	1.4	1.1	2.0	3.2
29-Apr	1.2	1.8	1.2	0.8	0.9	1.5	1.4	1.7	1.2	1.1	1.5	1.8	2.5	2.6	2.5	2.0	1.5	1.7	1.5	0.8	0.7	0.8	1.1	1.2	2.6
30-Apr	1.4	1.6	2.4	2.2	2.1	1.9	2.1	2.5	2.6	3.0	3.0	3.3	3.5	3.1	3.1	2.2	2.5	2.3	1.4	0.4	0.2	0.6	0.7	0.6	3.5
Diurnal Maximum																									
3.1 3.1 2.9 3.2 3.6 3.9 3.7 3.7 3.8 3.8 3.7 3.7 3.5 3.7 3.8 3.8 3.6 3.8 3.2 4.3 4.0 3.6 3.2 3.4																									





Summary of Hour Averages

Mannix - April 2015

Maximum Value: 1.5 km/h on Apr 2 12:00		Maximum Daily Average: 0.5 km/h on Apr 1		Hours in Service: 720																						
Minimum Value: -1.0 km/h on Apr 11 21:00		Minimum Daily Average: -0.5 km/h on Apr 12		Hours of Data: 720																						
Maximum Diurnal Average: 0.3 km/h at hour 12		Minimum Diurnal Average: 0.0 km/h at hour 15		Hours of Missing Data: 0																						
Monthly Average: 0.08 km/h		Percentiles: $P_1 = -0.8$ $P_{10} = -0.4$ $Q_1 = -0.2$ Median = 0.1 $Q_3 = 0.4$ $P_{90} = 0.6$ $P_{99} = 1.2$		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0.2	0.2	0.2	0.0	0.3	-0.2	-0.7	0.8	0.9	1.2	1.2	1.2	0.8	0.6	0.4	0.4	0.4	0.9	0.6	0.6	0.2	0.3	0.1	0.2	0.5	1.2
2-Apr	-0.2	-0.2	-0.1	0.3	0.0	-0.5	-0.1	0.1	0.1	0.4	0.8	1.5	0.6	0.4	-0.4	-0.1	0.3	0.1	0.5	0.5	0.4	0.7	0.3	0.6	0.3	1.5
3-Apr	0.4	0.2	0.1	0.6	0.1	0.2	0.3	-0.1	-0.2	-0.3	0.5	0.8	1.2	0.1	1.2	0.3	0.3	0.2	0.3	0.2	0.5	0.6	0.8	0.5	0.4	1.2
4-Apr	0.4	0.0	-0.1	0.1	0.1	0.1	0.3	0.2	-0.2	0.4	0.6	0.1	-0.3	0.7	-0.4	0.0	0.3	0.6	0.1	0.4	0.2	0.2	0.3	0.4	0.2	0.7
5-Apr	0.5	0.0	0.0	0.1	-0.1	0.1	0.3	0.5	-0.1	0.3	0.1	1.0	1.1	-0.3	0.1	0.2	0.0	0.6	0.6	0.3	0.2	0.2	0.2	0.6	0.3	1.1
6-Apr	-0.1	-0.2	-0.2	-0.1	0.0	0.0	-0.2	0.2	-0.1	0.4	-0.3	0.0	0.2	0.5	0.3	0.5	0.6	0.3	-0.1	0.1	0.4	0.4	0.4	0.4	0.1	0.6
7-Apr	0.5	0.4	0.4	0.4	0.3	0.6	0.6	0.4	0.1	0.5	0.5	0.4	0.3	-0.3	0.1	0.2	-0.4	-0.2	0.2	0.1	0.3	0.4	0.3	0.4	0.3	0.6
8-Apr	0.4	0.5	0.4	0.3	0.4	0.7	0.6	0.3	0.5	0.6	0.1	0.1	0.3	0.2	0.6	0.4	0.6	0.5	0.5	0.5	0.1	0.0	0.3	0.7	0.4	0.7
9-Apr	0.6	0.7	0.3	0.9	0.8	0.6	0.0	0.5	0.2	0.2	0.6	0.2	-0.3	-0.7	-0.5	-0.2	-0.1	-0.5	-0.6	-0.6	-0.6	-0.6	-0.4	-0.4	0.0	0.9
10-Apr	-0.5	-0.4	-0.3	-0.3	0.0	0.2	0.1	0.3	0.3	0.1	0.1	0.5	-0.2	0.2	-0.4	-0.3	-0.1	0.2	0.3	0.2	0.3	0.4	0.8	0.6	0.1	0.8
11-Apr	0.6	0.7	0.4	0.2	0.4	0.6	0.1	0.0	-0.2	-0.1	-0.4	-0.3	-0.3	-0.1	-0.5	0.0	-0.3	-0.1	-0.8	-0.8	-1.0	0.0	-0.1	-0.3	-0.1	0.7
12-Apr	-0.1	-0.4	-0.4	-0.7	-0.8	-0.8	-0.7	-0.3	-0.6	-0.2	-0.8	-0.9	-0.4	-0.8	-0.5	-0.2	-0.7	-0.3	0.0	0.0	0.1	-0.2	-0.5	-0.5	-0.5	0.1
13-Apr	-0.1	-0.1	-0.5	-0.2	-0.1	0.0	-0.3	0.1	0.1	0.3	0.2	0.0	0.7	-0.5	0.2	0.8	-0.1	0.7	0.1	-0.2	0.1	0.1	-0.2	-0.2	0.0	0.8
14-Apr	0.0	0.1	-0.3	-0.3	-0.3	-0.4	-0.6	0.2	-0.1	-0.6	-0.3	0.2	0.0	0.2	0.0	0.5	-0.2	-0.1	0.0	0.0	-0.3	-0.4	0.4	0.2	-0.1	0.5
15-Apr	0.3	0.3	0.2	0.4	0.0	-0.1	-0.2	-0.1	0.2	0.0	0.2	0.0	1.0	0.1	-0.2	0.0	0.2	-0.2	-0.4	-0.2	-0.5	0.0	-0.7	-0.7	0.0	1.0
16-Apr	-0.7	-0.7	-0.5	-0.5	-0.1	-0.9	-0.4	-0.2	-0.2	0.3	-0.3	-0.2	-0.6	-0.3	-0.4	0.2	-0.9	0.0	0.0	-0.1	-0.3	-0.2	-0.2	0.0	-0.3	0.3
17-Apr	0.0	-0.1	-0.1	0.1	0.4	0.4	0.5	0.4	0.3	0.0	-0.1	0.0	0.0	-0.4	-0.7	-0.3	0.3	0.2	-0.2	0.0	-0.3	0.1	0.1	0.0	0.0	0.5
18-Apr	-0.2	0.0	0.1	-0.2	-0.6	-0.7	-0.6	-0.3	0.1	0.2	-0.5	-0.1	-0.3	0.6	0.2	-0.1	0.4	0.0	0.4	0.3	0.3	0.1	0.0	0.1	0.0	0.6
19-Apr	0.0	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.1	0.0	-0.2	1.0	0.4	0.3	0.7	-0.1	-0.6	0.2	0.0	-0.1	0.1	0.3	0.4	0.4	0.5	0.1	1.0
20-Apr	0.7	0.0	-0.3	-0.3	0.5	0.0	0.0	0.2	0.1	0.7	0.1	-0.3	-0.3	-0.5	-0.1	0.7	0.0	0.9	0.4	0.3	0.0	0.0	-0.1	0.3	0.1	0.9
21-Apr	0.4	0.2	0.4	0.3	0.1	-0.3	0.6	-0.2	0.6	0.7	0.0	0.6	-0.2	-0.1	0.5	0.4	-0.2	0.6	0.6	0.6	0.3	0.0	-0.3	-0.1	0.2	0.7
22-Apr	-0.1	-0.1	0.2	0.4	0.6	0.4	-0.4	0.0	0.4	0.5	-0.1	0.6	-0.2	-0.5	-0.2	-0.4	-0.3	0.3	0.4	0.2	0.4	-0.3	-0.4	-0.5	0.0	0.6
23-Apr	0.0	0.2	0.1	0.1	0.4	0.6	0.5	-0.1	0.7	0.1	-0.4	0.8	0.8	0.2	-0.5	0.1	-0.1	0.3	0.1	0.9	1.3	0.9	0.1	0.6	0.3	1.3
24-Apr	0.6	0.5	0.3	0.2	0.3	0.2	0.4	0.5	-0.1	-0.1	0.4	0.4	1.0	0.0	-0.5	0.3	0.0	0.0	0.3	0.0	-0.4	0.2	0.2	0.2	0.2	1.0
25-Apr	0.2	-0.1	0.2	0.4	-0.1	0.1	0.0	1.3	0.1	0.0	0.3	0.6	0.7	0.0	0.8	-0.3	-0.3	-0.2	0.8	0.5	0.1	0.1	0.2	0.1	0.2	1.3
26-Apr	0.0	0.3	0.2	0.3	0.1	0.1	0.0	-0.1	0.0	0.2	0.9	1.1	-0.5	-0.4	0.3	0.8	0.4	0.5	0.3	0.1	0.2	0.1	-0.2	-0.2	0.2	1.1
27-Apr	0.0	-0.1	-0.1	0.0	0.2	0.2	0.0	-0.1	0.2	1.0	0.2	0.1	0.4	-0.4	-0.8	-0.2	-0.2	-0.4	-0.6	-0.4	-0.3	-0.5	-0.7	-0.7	-0.1	1.0
28-Apr	-0.4	-0.1	-0.1	0.2	0.3	0.6	0.2	0.1	0.1	0.2	-0.1	0.2	0.6	0.3	0.2	0.7	0.5	0.7	0.6	0.3	0.5	0.5	0.3	-0.4	0.3	0.7
29-Apr	-0.1	0.0	0.1	-0.2	-0.2	-0.3	-0.1	-0.1	-0.3	-0.3	-0.2	0.0	-0.1	-0.2	0.0	0.2	-0.3	0.0	-0.1	-0.5	-0.4	-0.7	-0.8	-0.8	-0.2	0.2
30-Apr	-0.6	-0.6	-0.4	-0.6	-1.0	-0.4	-0.8	-0.1	-0.7	-0.5	-0.7	-0.7	-0.4	0.2	-0.5	-0.1	-0.5	-0.4	-0.1	0.0	0.1	0.1	0.3	-0.2	-0.4	0.3
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.2 km/h on Apr 11 20:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 0.2 km/h on Apr 26 03:00																									
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 2.0 Q <sub>3</sub> = 2.9 P <sub>90</sub> = 3.4 P <sub>99</sub> = 4.1																									
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-Apr	2.1	2.5	2.7	3.3	3.1	3.3	3.5	3.5	3.7	3.8	3.6	3.4	3.1	3.4	3.3	3.1	3.2	3.4	2.2	2.1	1.6	1.0	0.8	1.1	3.8
2-Apr	1.0	0.9	1.0	1.2	0.9	0.9	0.9	1.6	2.0	2.2	2.4	3.0	3.3	3.3	2.8	2.3	2.6	1.8	1.7	1.6	1.7	1.7	1.3	1.3	3.3
3-Apr	1.2	1.3	1.1	1.2	0.6	0.9	0.9	1.1	1.6	2.0	2.7	3.1	3.3	3.1	3.0	2.7	2.5	1.8	1.5	1.4	1.8	1.4	1.0	1.5	3.3
4-Apr	0.9	0.9	0.8	0.4	0.5	0.6	0.5	1.1	1.5	2.1	2.5	2.7	2.8	3.5	2.9	2.6	1.9	1.9	1.4	2.1	2.2	1.7	1.5	1.0	3.5
5-Apr	1.2	0.7	0.6	0.4	0.8	1.1	2.1	2.1	2.3	2.6	2.8	3.3	3.3	2.9	2.9	2.6	2.5	2.0	1.6	1.2	1.2	0.8	1.1	1.4	3.3
6-Apr	1.1	1.2	1.1	1.1	1.0	0.7	1.2	1.9	1.7	2.2	1.8	2.5	2.9	2.9	2.3	2.0	2.4	1.7	1.6	1.1	1.1	1.2	1.2	1.2	2.9
7-Apr	1.0	0.9	0.9	0.7	0.5	0.7	1.1	1.7	1.9	2.0	2.8	3.3	3.0	3.1	3.1	2.8	1.8	1.6	1.8	1.1	0.7	0.6	0.9	0.9	3.3
8-Apr	0.8	0.8	0.6	0.6	0.7	0.6	0.9	0.8	1.1	1.8	2.5	2.7	3.2	3.1	3.4	3.1	2.4	1.6	0.8	0.9	1.1	1.1	0.4	0.4	3.4
9-Apr	0.5	0.6	0.5	0.6	0.6	0.6	0.8	1.4	1.5	1.5	1.5	2.4	2.7	2.8	3.0	2.8	2.9	2.3	1.6	0.6	0.5	0.8	0.9	0.6	3.0
10-Apr	0.4	0.6	0.6	1.0	0.7	0.5	0.4	0.6	0.6	0.7	1.1	1.9	2.3	2.5	3.1	2.8	2.2	1.9	1.0	1.0	0.6	0.7	0.5	0.6	3.1
11-Apr	0.8	0.8	0.6	0.7	0.7	0.8	0.7	0.9	1.6	1.6	2.1	2.0	2.3	2.8	2.6	2.2	1.9	2.3	3.1	4.2	3.9	1.8	1.1	0.8	4.2
12-Apr	1.9	2.5	2.3	2.3	2.2	2.3	2.9	3.1	2.6	2.7	3.0	3.8	3.6	3.8	3.7	3.7	3.6	3.7	3.1	2.5	1.7	1.0	1.4	1.7	3.8
13-Apr	2.0	0.8	1.5	2.8	2.5	1.7	1.7	2.4	2.7	3.6	3.9	4.1	4.0	3.5	3.5	3.3	2.9	2.9	1.7	0.7	0.9	0.6	1.6	1.4	4.1
14-Apr	1.5	1.5	1.5	1.6	1.6	2.0	1.9	2.4	2.1	2.0	2.1	2.4	2.3	2.4	2.5	2.8	3.3	2.7	2.5	2.1	1.8	1.7	2.2	2.1	3.3
15-Apr	1.8	1.4	1.1	1.0	0.7	0.4	0.9	0.8	2.0	2.3	3.0	2.9	3.5	3.2	3.4	3.3	2.8	2.5	1.9	0.5	1.6	3.0	2.0	1.7	3.5
16-Apr	1.6	1.8	2.9	2.4	1.9	1.7	2.2	2.1	2.3	2.6	2.4	3.1	3.3	3.3	3.9	3.8	3.6	3.7	2.5	2.2	1.1	0.7	0.6	0.9	3.9
17-Apr	0.9	1.3	1.1	1.0	0.5	0.6	1.0	1.1	1.0	1.7	1.7	2.5	2.7	2.7	3.4	2.9	1.6	1.4	1.6	1.9	1.3	0.8	0.3	0.3	3.4
18-Apr	1.2	1.5	2.1	2.7	2.8	2.9	3.1	3.0	1.9	2.7	3.4	3.8	3.3	3.4	2.6	3.0	2.7	1.8	2.2	1.5	0.6	0.5	0.2	0.3	3.8
19-Apr	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.5	0.7	1.1	2.5	2.2	2.5	2.9	2.5	2.4	1.5	1.4	0.6	0.3	0.3	0.2	0.3	0.8	2.9
20-Apr	0.9	1.0	0.6	0.6	0.6	0.7	0.5	0.8	1.5	2.2	2.2	2.5	3.0	3.0	2.6	2.7	2.0	2.4	1.6	1.7	1.4	1.6	1.6	2.0	3.0
21-Apr	1.4	1.0	0.8	0.6	0.8	1.1	1.7	1.5	2.1	2.5	2.9	3.5	3.2	3.4	3.5	2.9	2.6	2.4	2.3	2.4	3.1	3.6	3.0	3.0	3.6
22-Apr	3.3	2.9	2.6	2.4	2.8	2.4	2.6	3.0	3.4	3.7	3.9	4.1	3.7	3.3	3.5	3.1	3.5	3.7	3.7	4.0	4.2	3.6	3.1	3.0	4.2
23-Apr	3.1	3.3	3.0	3.7	3.6	3.5	3.1	3.5	3.5	3.0	2.5	3.3	3.9	4.1	4.2	4.0	3.2	3.6	2.8	2.9	3.6	3.4	3.1	2.7	4.2
24-Apr	1.8	1.2	1.2	1.0	1.3	1.3	2.0	2.5	2.5	3.1	3.7	3.7	4.1	3.5	3.6	3.8	3.2	3.2	2.8	2.5	2.1	2.5	2.5	2.1	4.1
25-Apr	2.1	1.8	1.8	1.0	1.0	1.0	1.3	1.7	2.2	2.7	2.9	3.2	3.5	3.7	3.2	2.8	2.6	2.6	2.4	1.6	0.9	1.2	1.2	0.8	3.7
26-Apr	1.0	0.3	0.2	0.3	0.4	0.4	0.8	1.0	1.4	2.1	2.6	3.1	2.9	2.8	3.2	3.2	2.4	2.0	1.3	1.0	2.2	2.1	2.4	2.1	3.2
27-Apr	1.5	1.0	0.9	1.0	0.9	0.8	0.9	1.3	2.1	2.5	3.6	3.3	3.0	3.4	3.7	3.4	3.3	3.3	2.2	1.5	0.4	0.3	0.3	0.2	3.7
28-Apr	0.6	1.2	0.9	1.2	0.6	0.6	0.8	1.0	1.5	1.8	1.9	3.0	3.1	3.0	3.0	3.0	2.9	2.5	1.9	1.7	1.9	1.4	1.0	2.3	3.1
29-Apr	1.5	2.1	1.3	1.0	1.0	1.7	1.4	1.7	1.3	1.1	1.5	1.8	2.7	2.8	2.7	2.2	1.6	1.9	1.4	0.8	0.8	0.5	0.7	1.2	2.8
30-Apr	1.4	1.6	2.4	2.1	2.2	2.0	2.1	2.7	2.6	2.9	2.9	3.1	3.6	3.1	3.4	2.4	2.5	2.1	1.4	0.4	0.2	0.7	0.7	0.7	3.6
	3.3	3.3	3.0	3.7	3.6	3.5	3.5	3.5	3.7	3.8	3.9	4.1	4.1	4.1	4.2	4.0	3.6	3.7	3.7	4.2	4.2	3.6	3.1	3.0	
	Diurnal Maximum																								



Summary of Hour Averages

Mannix - April 2015

Maximum Value: 4.6 km/h on Apr 13 13:00		Maximum Daily Average: 2.5 km/h on Apr 13		Hours in Service: 720																																												
Minimum Value: -1.5 km/h on Apr 14 06:00		Minimum Daily Average: -0.9 km/h on Apr 22		Hours of Data: 720																																												
Maximum Diurnal Average: 1.2 km/h at hour 16		Minimum Diurnal Average: 0.5 km/h at hour 21		Hours of Missing Data: 0																																												
Monthly Average: 0.82 km/h		Percentiles: P <sub>1</sub> = -1.4 P <sub>10</sub> = -0.4 Q <sub>1</sub> = 0.0 Median = 0.6 Q <sub>3</sub> = 1.5 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.8		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-Apr	0.0	0.3	0.2	0.3	0.8	0.7	-0.2	1.7	1.5	2.4	1.9	2.1	1.8	1.1	1.0	0.7	1.7	2.0	0.7	0.5	0.0	0.0	0.1	0.1	0.9	2.4																						
2-Apr	-0.1	0.1	0.2	0.7	-0.1	-0.3	0.1	0.0	-0.1	0.4	1.3	2.1	1.5	1.4	0.6	1.2	0.9	-0.1	0.1	0.1	-0.1	0.2	0.0	0.2	0.4	2.1																						
3-Apr	0.0	-0.1	-0.1	0.2	-0.1	-0.2	-0.1	-0.4	-0.6	-0.8	0.5	1.1	1.7	0.1	1.5	0.2	-0.1	-0.3	0.1	0.0	0.0	-0.1	0.2	0.0	0.1	1.7																						
4-Apr	0.1	-0.3	-0.3	0.0	-0.1	-0.1	0.0	-0.1	-0.6	0.1	0.5	0.9	0.6	2.1	0.6	0.5	0.7	0.5	-0.1	-0.1	-0.3	-0.1	0.2	0.4	0.2	2.1																						
5-Apr	0.5	-0.1	0.1	0.3	0.0	0.0	0.3	0.6	0.1	0.1	0.1	1.3	1.8	-0.4	-0.1	-0.2	-0.5	0.0	0.2	0.0	-0.3	-0.4	-0.3	0.2	0.1	1.8																						
6-Apr	-0.1	-0.5	-0.4	-0.3	-0.4	-0.2	-0.5	-0.1	-0.1	0.4	-0.4	0.1	0.9	0.9	0.4	0.8	1.1	0.7	0.1	0.9	1.7	1.8	1.8	1.8	0.4	1.8																						
7-Apr	1.6	1.5	1.5	1.5	1.4	1.6	1.6	1.2	0.7	0.9	1.1	1.3	1.3	0.8	1.2	1.0	0.7	0.9	1.3	1.0	1.2	1.4	1.3	1.4	1.2	1.6																						
8-Apr	1.4	1.3	1.2	1.0	1.2	1.8	1.5	0.6	0.7	1.1	1.2	0.9	1.3	0.6	1.4	1.1	0.7	0.2	0.0	-0.1	-0.4	-0.3	0.8	1.9	0.9	1.9																						
9-Apr	1.8	1.7	1.2	2.0	1.8	1.7	1.1	1.4	0.6	0.8	1.2	1.2	1.6	0.6	1.3	2.2	2.5	2.0	1.4	0.8	1.0	1.5	1.8	1.6	1.4	2.5																						
10-Apr	1.6	1.3	0.7	0.5	0.4	0.5	0.5	0.5	0.5	0.3	0.2	0.0	-0.7	0.3	0.5	0.5	0.2	0.9	0.9	1.6	1.5	1.2	1.8	2.0	0.7	2.0																						
11-Apr	2.1	1.9	1.3	0.5	0.5	0.7	0.5	0.4	0.6	1.2	1.9	1.9	1.5	2.6	1.9	2.4	2.5	3.1	3.2	4.2	3.5	2.6	1.7	2.0	1.9	4.2																						
12-Apr	2.7	3.1	2.9	2.4	2.0	1.5	1.3	1.1	1.5	2.0	1.6	1.4	3.5	2.9	3.3	3.8	3.3	3.8	3.3	2.9	2.9	2.0	1.6	1.8	2.4	3.8																						
13-Apr	2.8	1.6	2.1	3.7	3.3	2.8	2.6	3.1	3.1	4.4	4.4	4.0	4.6	3.3	3.5	3.8	2.7	3.0	1.1	0.3	0.6	-0.1	-0.6	-0.9	2.5	4.6																						
14-Apr	-0.4	-0.1	-0.9	-1.2	-1.1	-1.5	-1.5	-0.7	-0.4	-1.3	-1.0	-0.5	-0.3	0.3	0.4	1.5	-0.2	0.1	0.2	0.0	-0.6	-0.6	0.8	0.4	-0.4	1.5																						
15-Apr	0.6	0.7	0.5	0.6	0.4	0.2	0.4	0.1	1.3	1.4	1.8	2.2	3.2	2.7	2.7	2.5	3.0	2.4	1.4	0.5	1.3	3.6	1.8	1.4	1.5	3.6																						
16-Apr	1.8	1.9	2.8	2.6	2.8	1.6	2.0	1.1	0.4	0.8	0.6	1.4	1.6	2.9	3.6	3.9	2.1	2.9	1.9	3.3	2.9	3.0	1.6	2.2	2.2	3.9																						
17-Apr	1.3	1.4	0.5	0.4	0.5	0.7	0.9	0.8	0.5	-0.1	0.0	0.4	1.1	1.2	1.3	1.6	0.9	0.5	-0.4	-0.6	-0.5	0.2	0.2	1.0	0.6	1.6																						
18-Apr	1.3	1.7	2.4	2.2	2.2	1.1	1.1	2.3	2.8	2.9	1.9	2.0	1.8	2.0	0.8	0.4	0.6	2.4	1.4	-0.2	0.2	0.0	0.2	0.6	1.4	2.9																						
19-Apr	0.4	1.1	0.9	0.9	0.3	0.2	0.4	0.4	0.3	0.0	0.1	0.0	0.4	1.8	1.3	0.8	1.2	1.1	0.0	0.2	0.7	1.4	1.3	1.4	0.7	1.8																						
20-Apr	1.2	0.7	1.4	1.7	2.4	1.1	0.3	0.4	0.2	0.6	0.3	-0.2	0.5	0.7	0.9	1.2	-0.1	0.9	-0.1	0.0	-0.2	0.0	0.0	0.5	0.6	2.4																						
21-Apr	0.6	0.2	0.1	-0.1	-0.1	-0.3	0.8	0.2	1.1	1.5	0.1	1.0	-0.2	-0.2	0.5	0.4	-0.2	0.2	-0.3	-0.3	-0.5	-0.8	-0.8	-1.0	0.1	1.5																						
22-Apr	-1.2	-0.8	-0.6	-0.2	-0.3	-0.2	-1.1	-0.8	-0.6	-0.5	-1.1	-0.4	-1.5	-1.5	-1.0	-1.3	-1.4	-0.7	-0.5	-0.9	-0.8	-1.4	-1.4	-1.4	-0.9	-0.2																						
23-Apr	-1.0	-0.7	-0.7	-0.8	-0.6	-0.4	-0.3	-1.1	-0.1	-0.6	-1.1	-0.1	-0.3	-0.9	-1.4	-0.9	-0.8	-0.6	-0.6	-0.1	-0.2	-0.2	-0.7	0.3	-0.6	0.3																						
24-Apr	0.2	-0.2	-0.1	-0.2	-0.1	-0.2	0.2	0.5	-0.5	-0.1	0.3	-0.1	0.9	0.0	-0.4	0.7	0.2	0.1	0.4	0.2	0.1	0.5	0.4	0.4	0.1	0.9																						
25-Apr	0.3	-0.2	0.1	0.2	-0.1	0.0	0.1	1.5	0.5	0.3	0.4	1.0	1.6	0.7	1.3	0.5	0.5	1.1	1.9	1.0	0.1	-0.1	-0.2	-0.3	0.5	1.9																						
26-Apr	-0.3	0.6	0.7	0.6	0.0	0.0	-0.5	0.0	0.0	-0.1	0.1	0.7	-1.0	-0.6	0.0	0.1	-0.4	0.0	-0.2	-0.3	-0.8	0.0	-0.2	0.1	-0.1	0.7																						
27-Apr	0.5	0.4	0.5	-0.4	0.2	0.7	0.0	0.4	0.5	1.5	1.1	1.2	1.7	1.1	1.4	1.3	2.3	2.7	1.4	1.4	0.8	1.0	1.7	1.7	1.1	2.7																						
28-Apr	1.2	0.4	0.4	0.6	0.9	1.5	1.1	0.3	0.3	0.4	0.0	0.5	1.6	1.0	0.6	1.9	1.8	2.1	1.6	1.2	1.4	1.7	1.6	2.6	1.1	2.6																						
29-Apr	2.6	2.6	2.1	1.9	2.2	2.7	2.8	2.6	1.6	1.2	1.3	1.7	2.4	2.3	2.3	2.2	0.8	1.6	1.0	0.5	1.1	1.5	1.6	2.3	1.9	2.8																						
30-Apr	2.3	2.4	2.8	2.6	2.1	1.9	1.2	2.1	1.3	1.7	2.2	2.3	1.5	2.2	1.9	1.8	2.5	0.9	0.8	0.1	0.4	0.4	1.0	0.8	1.6	2.8																						
																								0.9	0.8	0.8	0.8	0.7	0.7	0.6	0.7	0.6	0.8	0.8	1.0	1.2	1.1	1.1	1.2	1.0	1.2	0.8	0.6	0.5	0.7	0.6	0.8	Diurnal Average
																								2.8	3.1	2.9	3.7	3.3	2.8	2.8	3.1	3.1	4.4	4.4	4.0	4.6	3.3	3.6	3.9	3.3	3.8	3.3	4.2	3.5	3.6	1.8	2.6	Diurnal Maximum



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6.8 km/h on Apr 30 17:00 Minimum Value: 0.2 km/h on Apr 26 03:00 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 1.0 Median = 2.0 Q <sub>3</sub> = 2.9 P <sub>90</sub> = 3.4 P <sub>99</sub> = 4.1																								Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	2.2	2.6	2.8	3.2	3.2	3.5	3.9	3.8	3.9	4.0	3.8	3.2	3.3	3.7	3.5	3.3	3.2	3.9	2.2	2.2	1.4	0.9	0.7	1.1	4.0
2-Apr	1.0	1.0	1.1	1.2	0.9	0.9	0.9	1.7	2.1	2.3	2.5	3.1	3.5	3.5	2.9	2.4	2.6	1.9	1.7	1.6	1.7	1.8	1.4	1.2	3.5
3-Apr	1.0	1.0	1.1	1.1	0.4	0.6	0.6	0.8	1.2	1.9	2.9	3.3	3.4	3.4	3.2	2.9	2.5	1.8	1.5	1.2	1.7	1.3	0.9	1.1	3.4
4-Apr	0.6	0.6	0.5	0.4	0.3	0.4	0.4	0.9	1.4	2.0	2.6	2.7	2.9	3.6	3.1	2.8	2.0	2.0	1.4	2.0	2.2	1.6	1.3	0.9	3.6
5-Apr	1.0	0.5	0.8	0.5	0.9	1.1	2.0	2.1	2.4	2.8	2.9	3.6	3.5	3.1	3.0	2.7	2.6	2.0	1.6	1.0	1.1	0.8	0.8	1.1	3.6
6-Apr	1.1	1.1	1.0	0.8	0.8	0.7	1.0	1.7	1.6	2.1	1.6	2.5	3.0	3.0	2.4	2.0	2.5	1.8	1.4	1.2	1.1	1.2	1.3	1.1	3.0
7-Apr	1.0	0.9	1.0	0.6	0.5	0.7	1.1	1.7	1.9	2.0	2.9	3.3	3.2	3.1	3.2	2.8	1.9	1.6	1.7	1.1	0.8	0.7	1.0	0.9	3.3
8-Apr	0.8	0.8	0.6	0.6	0.7	0.5	0.7	0.8	1.1	1.6	2.5	2.7	3.3	3.4	3.4	3.2	2.5	1.6	0.8	0.9	0.7	0.8	0.5	0.4	3.4
9-Apr	0.4	0.5	0.5	0.5	0.6	0.6	0.7	1.3	1.4	1.5	1.6	2.4	3.1	2.8	3.2	3.1	3.0	2.5	1.8	0.7	0.6	0.9	1.0	0.7	3.2
10-Apr	0.5	0.7	0.9	1.1	0.8	0.6	0.5	0.7	0.5	0.8	1.0	1.6	2.0	2.7	3.3	2.9	2.3	1.9	1.1	1.0	0.7	0.8	0.5	0.5	3.3
11-Apr	0.7	0.6	0.7	0.9	0.8	0.9	0.8	0.8	1.7	1.8	2.3	2.1	2.5	3.0	2.8	2.3	2.0	2.5	3.3	4.5	4.3	1.7	1.4	0.9	4.5
12-Apr	2.1	2.6	2.5	2.6	2.5	2.6	3.1	3.2	2.8	3.0	3.2	4.1	4.0	4.0	4.1	4.0	3.8	4.0	3.4	2.8	1.5	1.1	1.6	2.0	4.1
13-Apr	2.1	1.0	1.6	3.2	2.6	1.7	1.8	2.4	2.7	3.2	3.8	3.7	3.6	3.6	3.3	3.2	2.8	2.6	1.7	0.7	1.0	0.4	1.2	1.4	3.8
14-Apr	1.4	1.3	1.4	1.5	1.6	1.9	1.8	2.1	2.0	2.0	2.0	2.3	2.2	2.5	2.6	2.9	3.5	2.8	2.6	2.1	1.7	1.6	2.2	1.9	3.5
15-Apr	1.8	1.4	1.2	1.0	0.8	0.4	1.0	1.0	2.1	2.4	3.0	3.2	3.7	3.5	3.5	3.5	3.1	2.8	2.1	0.6	2.0	3.3	2.2	1.9	3.7
16-Apr	1.8	2.0	3.1	2.6	2.2	1.9	2.4	2.2	2.4	2.7	2.6	3.3	3.4	3.5	4.2	4.0	3.8	3.9	2.5	2.5	1.1	0.8	0.8	1.0	4.2
17-Apr	1.1	1.4	1.1	1.2	0.5	0.6	0.8	1.0	1.0	1.4	1.6	2.6	2.6	2.8	3.6	3.0	1.7	1.4	1.6	1.8	1.5	0.9	0.3	0.7	3.6
18-Apr	1.2	1.5	2.1	2.7	3.0	2.8	3.1	3.0	1.9	2.6	3.4	3.8	3.3	3.5	2.5	3.0	2.8	1.8	2.4	1.5	0.5	0.4	0.2	0.4	3.8
19-Apr	0.3	0.5	0.3	0.4	0.3	0.3	0.4	0.5	0.8	1.0	1.9	2.0	2.7	3.0	2.8	2.5	1.7	1.5	0.6	0.3	0.3	0.2	0.3	0.8	3.0
20-Apr	0.9	1.0	0.6	0.8	0.6	0.8	0.5	0.8	1.7	2.3	2.2	2.4	3.2	3.2	2.9	2.8	2.2	2.6	1.5	1.5	1.5	1.7	1.7	2.0	3.2
21-Apr	1.3	1.0	0.7	0.5	0.7	1.1	1.9	1.7	2.1	2.5	3.0	3.7	3.3	3.6	3.7	3.3	2.8	2.3	2.0	2.2	2.6	3.2	3.1	2.8	3.7
22-Apr	2.4	2.4	2.3	2.2	2.4	2.1	2.5	2.7	2.7	2.6	2.7	3.3	3.1	3.2	3.3	3.3	3.3	3.1	2.8	2.9	3.6	3.5	3.2	3.0	3.6
23-Apr	3.0	2.9	2.7	2.9	2.6	2.4	2.2	2.4	2.6	2.5	2.2	2.7	3.1	3.3	3.2	3.1	2.7	2.5	2.1	2.3	3.3	3.2	3.0	2.9	3.3
24-Apr	1.9	1.1	1.0	0.9	1.2	1.1	2.1	2.5	2.7	3.2	4.0	3.9	4.3	3.7	3.7	4.2	3.5	3.3	2.8	2.6	2.2	2.8	2.7	2.3	4.3
25-Apr	2.3	1.9	1.8	1.1	1.2	1.0	1.2	1.8	2.3	2.9	2.9	3.5	3.6	4.0	3.3	3.0	2.8	2.7	2.4	1.6	0.7	1.1	1.2	0.7	4.0
26-Apr	1.0	0.3	0.2	0.3	0.4	0.4	0.7	1.0	1.3	2.0	2.4	3.1	2.6	2.9	3.1	3.2	2.4	2.0	1.3	0.8	1.0	2.0	2.2	2.1	3.2
27-Apr	1.4	0.9	0.8	0.8	0.8	0.7	0.8	1.2	2.1	2.6	3.5	3.2	3.2	3.4	4.0	3.5	3.4	3.6	2.5	1.6	0.5	0.4	0.3	0.4	4.0
28-Apr	0.7	1.2	0.9	1.3	0.6	0.4	0.7	1.0	1.6	1.8	2.0	3.1	3.2	3.1	3.2	3.2	3.0	2.7	1.9	1.6	1.8	1.3	1.0	2.7	3.2
29-Apr	1.6	2.2	1.5	1.1	1.0	1.7	1.4	1.8	1.6	1.3	1.7	2.0	2.7	3.1	2.8	2.3	1.8	2.0	1.7	1.0	0.9	0.4	0.6	1.2	3.1
30-Apr	1.5	1.8	2.6	2.4	2.5	2.3	2.3	2.8	2.9	3.1	3.3	3.4	3.7	3.4	3.6	3.0	6.8	1.9	1.6	0.5	0.4	0.9	0.8	0.7	6.8
Diurnal Maximum																									



# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 15, 2015	Last Calibration	March 4, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	11:15
Gas Cert Reference	S9610161A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	26-Sep-17
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-634	-634
Analyzer IP address	192.168.1.43		Lamp voltage	878	874
Calculated slope	0.995534	0.995744	Chamber temp	44.8	44.9
Calculated intercept	-0.191646	0.592006	Pressure	701.0	694.0
Analyzer Background	7.3	7.3	Flow	0.474	0.467
Analyzer Coefficient	1.009	1.009	Intensity	88	90
Analyzer make	TEI 43i		Analyzer serial #	1008841399	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	60.0	600.0	596.0	1.007
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	60.0	600.0	602.0	0.997
second point	5000	30.0	300.0	301.2	0.996
third point	5000	15.0	150.0	148.9	1.007
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	60.0	600.0	598.7	1.002
Average Correction Factor					1.000

Corrected As found	595.9	Previous response	602.9	% change	1.2%
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**Notes:**

Inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



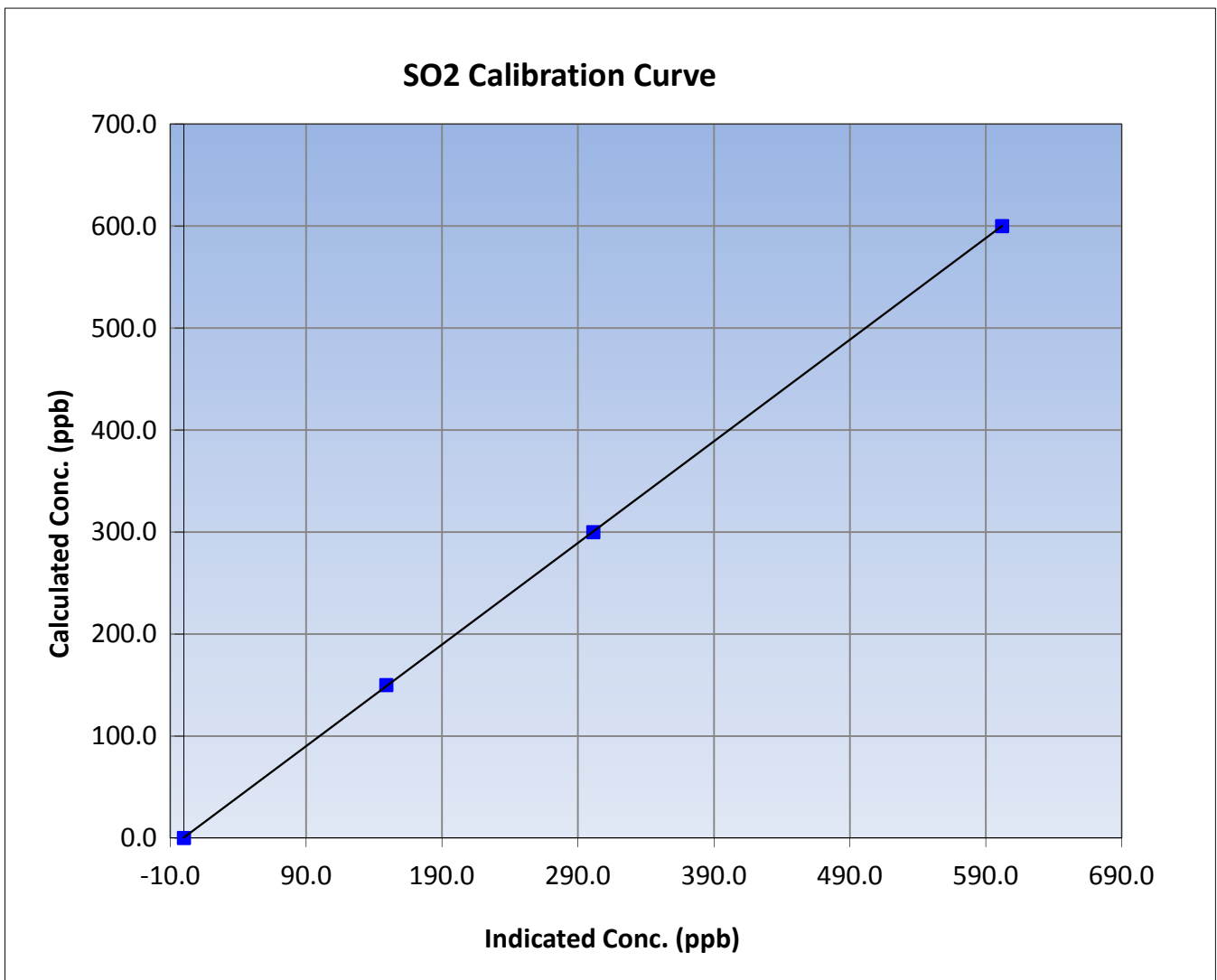
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 15, 2015	Previous Calibration	March 4, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:50	End Time (MST)	11:15
Analyzer make	TEI 43i	Analyzer serial #	1008841399

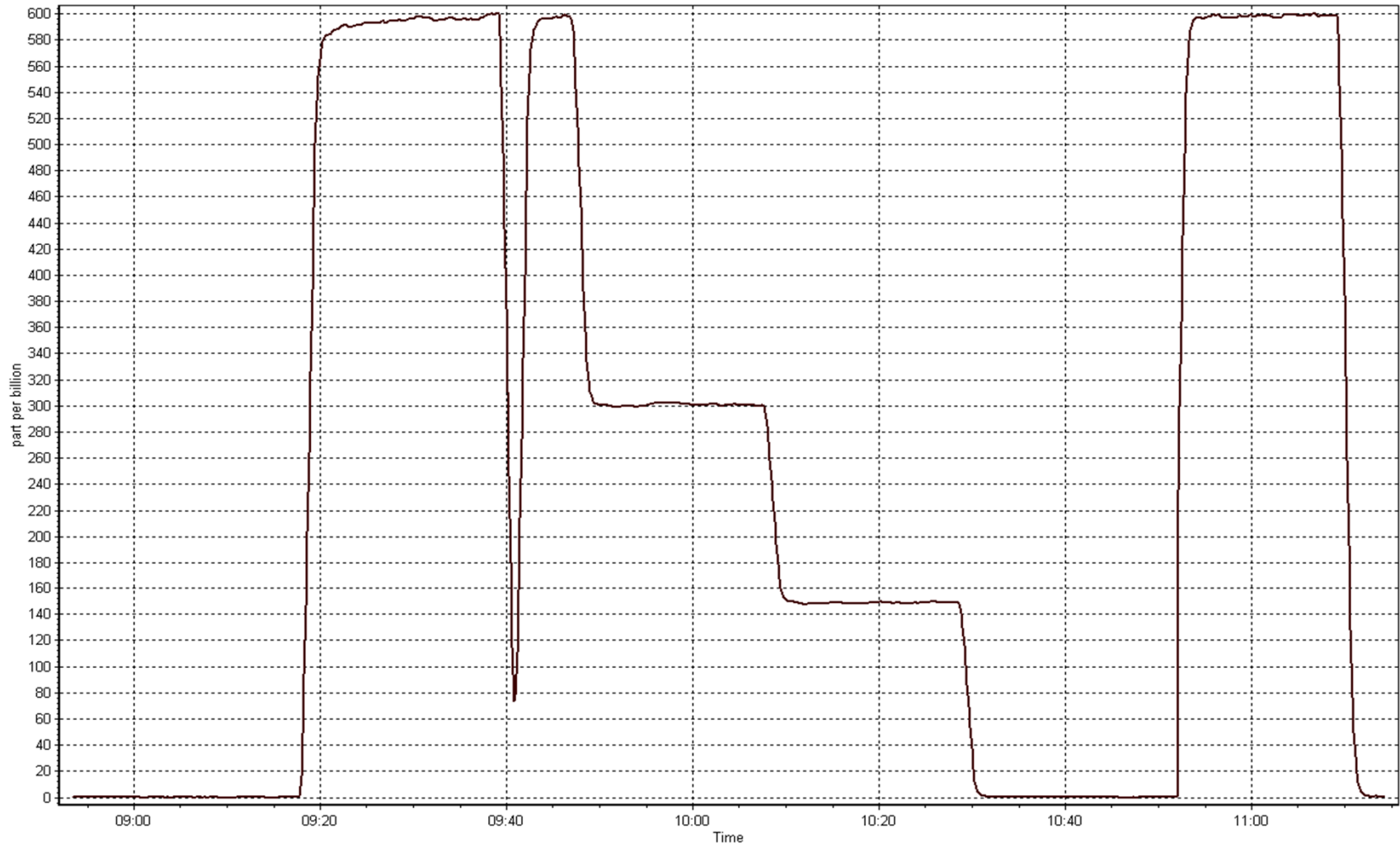
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
600.0	602.0	0.9967		
300.0	301.2	0.9960	Slope	0.995744
150.0	148.9	1.0073		
			Intercept	0.592006



SO2 Calibration Plot

Date: April 15, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	April 7, 2015	Last Calibration	March 9, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	12:10	End Time (MST)	15:15
Gas Cert Reference	CC62844	Station temp.	21 Deg C
Cal Gas Concentration	5.04 ppm	Cal Gas Exp Date	9/9/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG air Make/Model	API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633
SO2 gas concentration	50 ppm	SO2 gas cert/exp	S960161A Saturday, September 09, 2017

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-624	-624
Analyzer IP address	192.168.1.42		Lamp voltage	887	889
Calculated slope	0.986617	0.990775	Chamber temp	45.2	45
Calculated intercept	-0.280270	0.069249	Pressure	520.1	526.8
Analyzer Background	16.6	16.8	Flow	1.066	1.075
Analyzer Coefficient	1.325	1.325	Intensity	116	114
			Converter temp.	323	327

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	0.1	----
as found span	5000	74.4	75.0	75.6	0.992
SO2 scrubber check	5000	15.0	150.0	1.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.4	75.0	75.6	0.992
second point	5000	41.7	42.0	42.3	0.993
third point	5000	24.8	25.0	25.3	0.988
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	74.4	75.0	74.9	1.001
Average Correction Factor					0.991

Corrected As found	75.5	Previous response	76.3	% change	1.0%
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Notes:

Changed inlet filter after as founds. Slightly adjusted zero.

Calibration Performed By: Asad Hidayat





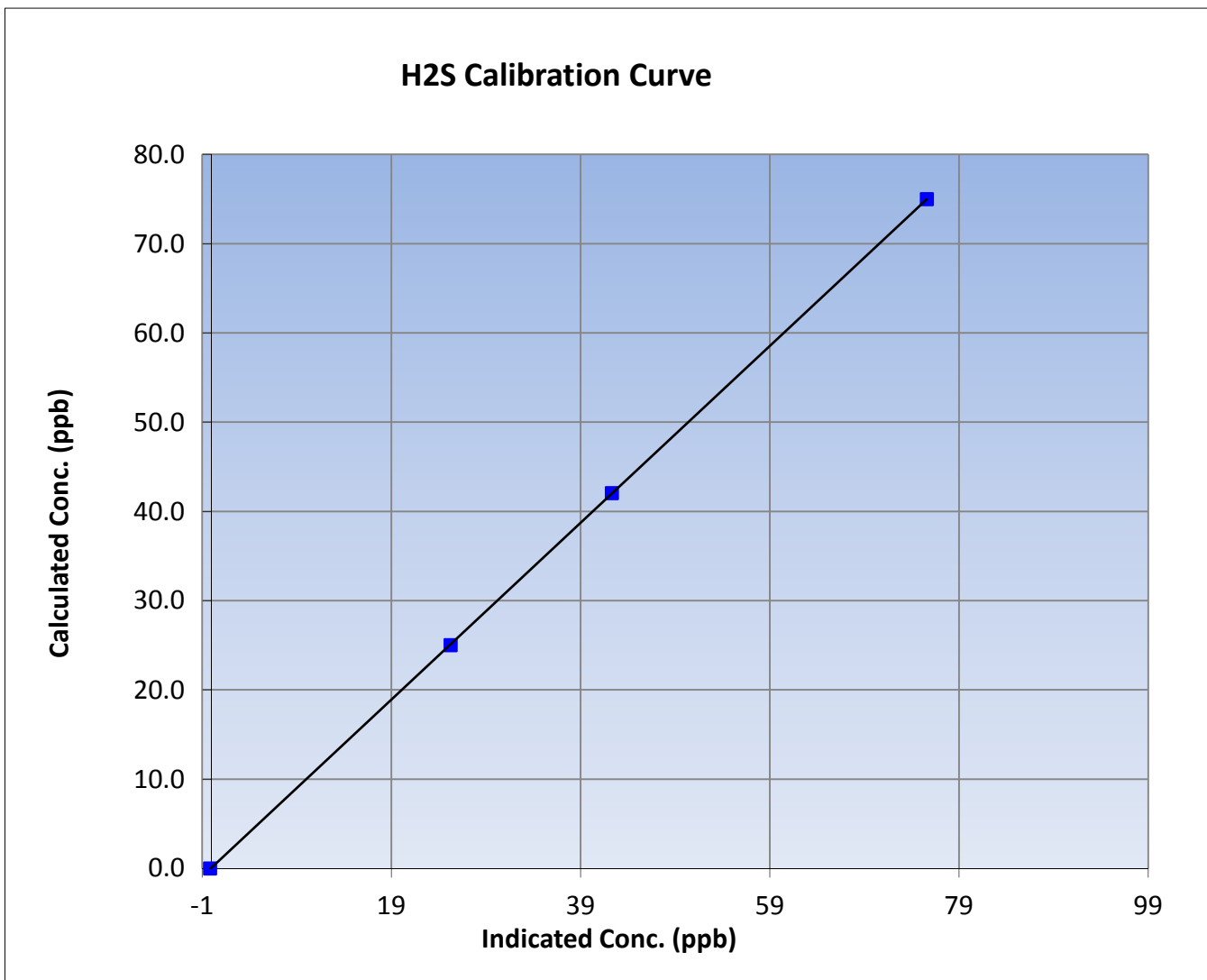
# Wood Buffalo Environmental Association H2S Calibration Report

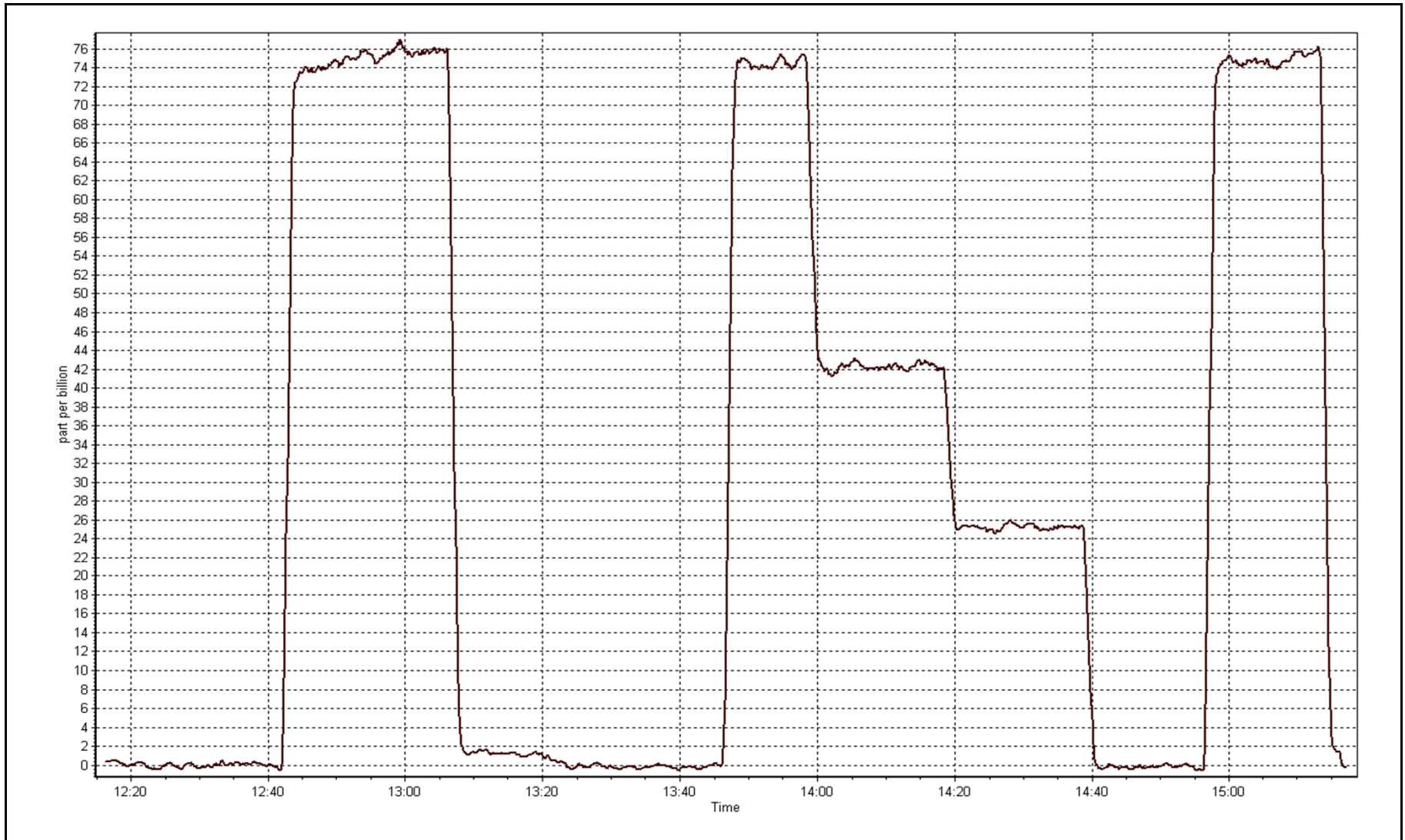
## Station Information

Calibration Date	April 7, 2015	Previous Calibration	March 9, 2015
Station Name	AMS 5	Station Number	AMS 5
Start Time (MST)	12:10	End Time (MST)	15:15
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	-0.1	----	Correlation Coefficient	0.999992
75.0	75.6	0.9920		
42.0	42.3	0.9932	Slope	0.990775
25.0	25.3	0.9885		
			Intercept	0.069249







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Wednesday, April 15, 2015	Last Calibration	Wednesday, March 04, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Removal		
Start Time (MST)	8:50	End Time (MST)	10:30
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Tuesday, September 26, 2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	9.4
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.3
Calculated slope	1.009889	0.996490	Fuel Pressure	20.2	20.2
Calculated intercept	-0.064496	-0.081022	Analyzer Coeff	3.5	3.7
			Analyzer BKG	3.722	3.490

Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.13	----
as found span	5000	60.0	12.46	12.54	0.993
calibrator zero	5000	0.0	0.00	0.05	----
high point	5000	60.0	12.46	12.54	0.993
second point	5000	30.0	6.23	6.42	0.970
third point	5000	15.0	3.11	3.19	0.976
as left zero					
as left span					
Average Correction Factor					0.980

Corrected As found	12.41	Previous response	12.40	% change	-0.1%
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**Notes:**

Removal cal. No adjustments made.

Calibration Performed By:

Asad Hidayat



## Wood Buffalo Environmental Association THC Calibration Report

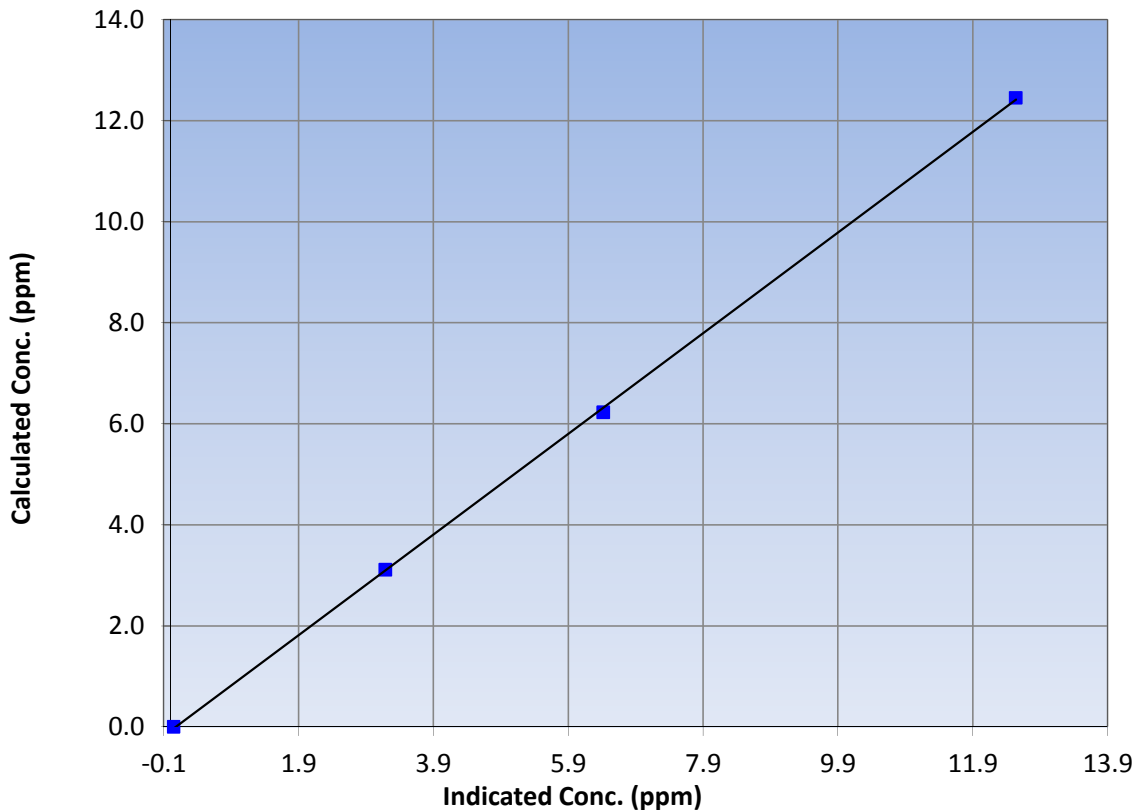
### Station Information

Calibration Date	April 15, 2015	Previous Calibration	March 4, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	8:50	End Time (MST)	10:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958295

### Calibration Data

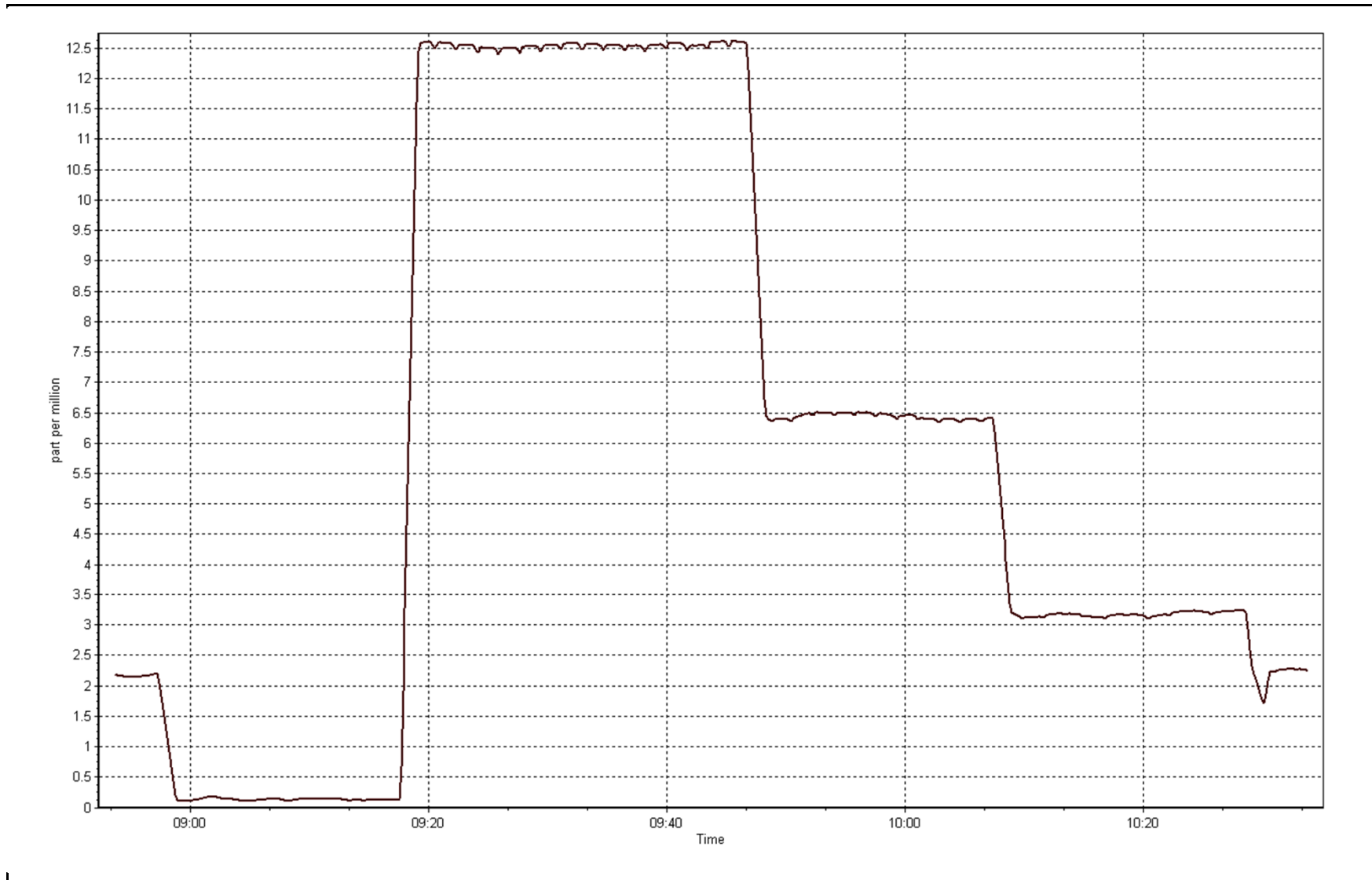
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	----	Correlation Coefficient	0.999873
12.46	12.54	0.9933		
6.23	6.42	0.9701	Slope	0.996490
3.11	3.19	0.9762		
			Intercept	-0.081022

**THC Calibration Curve**



THC Calibration Plot

Date: April 15, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Wednesday, April 15, 2015	Last Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Reason:	Install		
Start Time (MST)	11:50	End Time (MST)	15:40
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	NA	7.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	NA	25.1
Calculated slope	NA	1.001826	Fuel Pressure	NA	40.2
Calculated intercept	NA	0.002073	Analyzer Coeff	NA	6.9
			Analyzer BKG	NA	4.290

Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353
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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					
as found span					
calibrator zero	5000	0.0	0.00	0.01	----
high point	5000	60.0	12.46	12.43	1.002
second point	5000	30.0	6.23	6.23	1.000
third point	5000	15.0	3.11	3.08	1.011
as left zero	5000	0.0	0.00	0.01	----
as left span	5000	60.0	12.46	12.93	0.963
Average Correction Factor					1.004

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Install cal. Adjusted Zero. Span coeff adjusted. Inlet filter changed before calibrator zero.

Calibration Performed By: Asad Hidayat



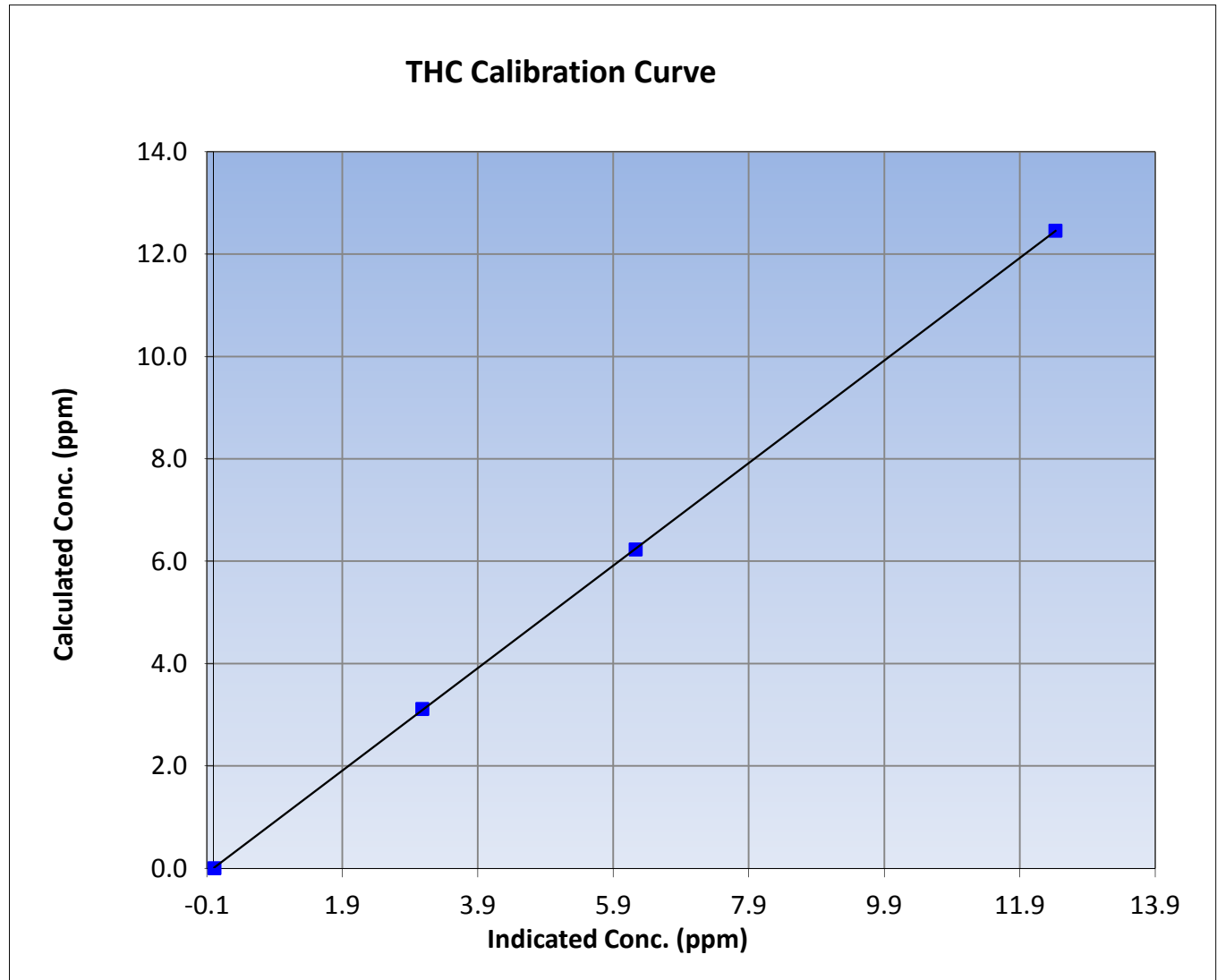
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 15, 2015	Previous Calibration	NA
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:50	End Time (MST)	15:40
Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353

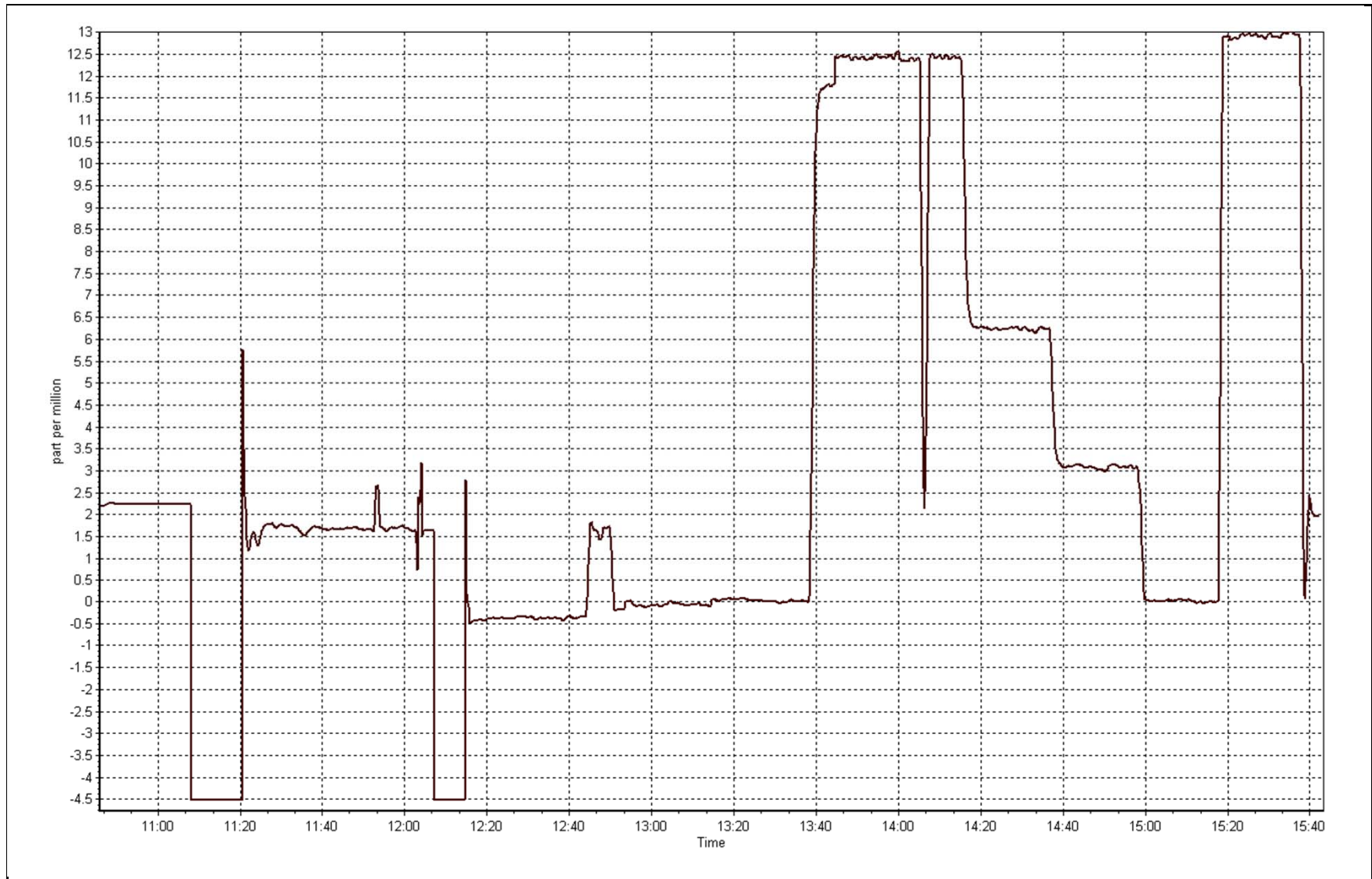
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	----	Correlation Coefficient	0.999987
12.46	12.43	1.0021		
6.23	6.23	0.9997	Slope	1.001826
3.11	3.08	1.0110		
			Intercept	0.002073



THC Calibration Plot

Date: April 15, 2015







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Friday, April 29, 1904	Last Calibration	Wednesday, April 15, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:20
Gas Cert Reference	S961061A	Cal Gas Expiry Date	Sept-26-2017
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
ZAG make/model	Teledyne API 701	Serial Number	1083
DACS make/model	Campbell Scientific CR3000	Serial Number	2633

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	7.8	7.6
Analyzer IP address	192.168.1.51		Air or Bypass Press	25.1	25.1
Calculated slope	1.001826	0.999437	Fuel Pressure	40.2	40.2
Calculated intercept	0.002073	-0.019917	Analyzer Coeff	6.899	7.194
			Analyzer BKG	4.290	4.240

Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353
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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	-0.29	----
as found span	5000	60.0	12.46	11.81	1.055
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.0	12.46	12.47	0.999
second point	5000	30.0	6.23	6.27	0.993
third point	5000	15.0	3.11	3.15	0.989
as left zero	5000	0.0	0.00	0.05	----
as left span	5000	60.0	12.46	12.29	1.014
Average Correction Factor					0.994

Corrected As found	12.10	Previous response	12.43	% change	2.7%
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**Notes:**

Zero is low, diagnostic are good, as left zero redone after exhaust line shortened

Calibration Performed By:

Melissa Lemay



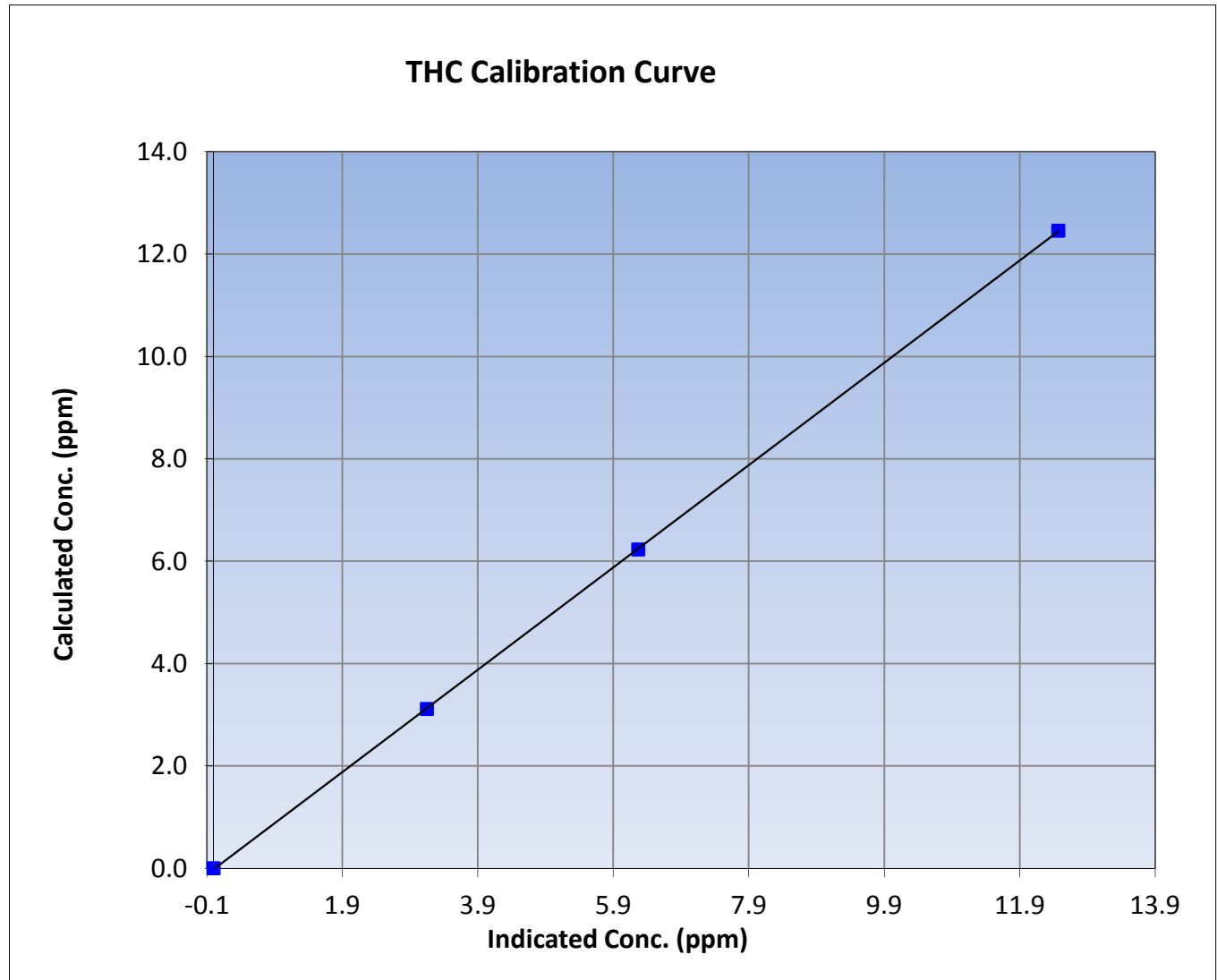
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 29, 1904	Previous Calibration	April 15, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:45	End Time (MST)	13:20
Analyzer make	Thermo 51i-LT	Analyzer serial #	128153353

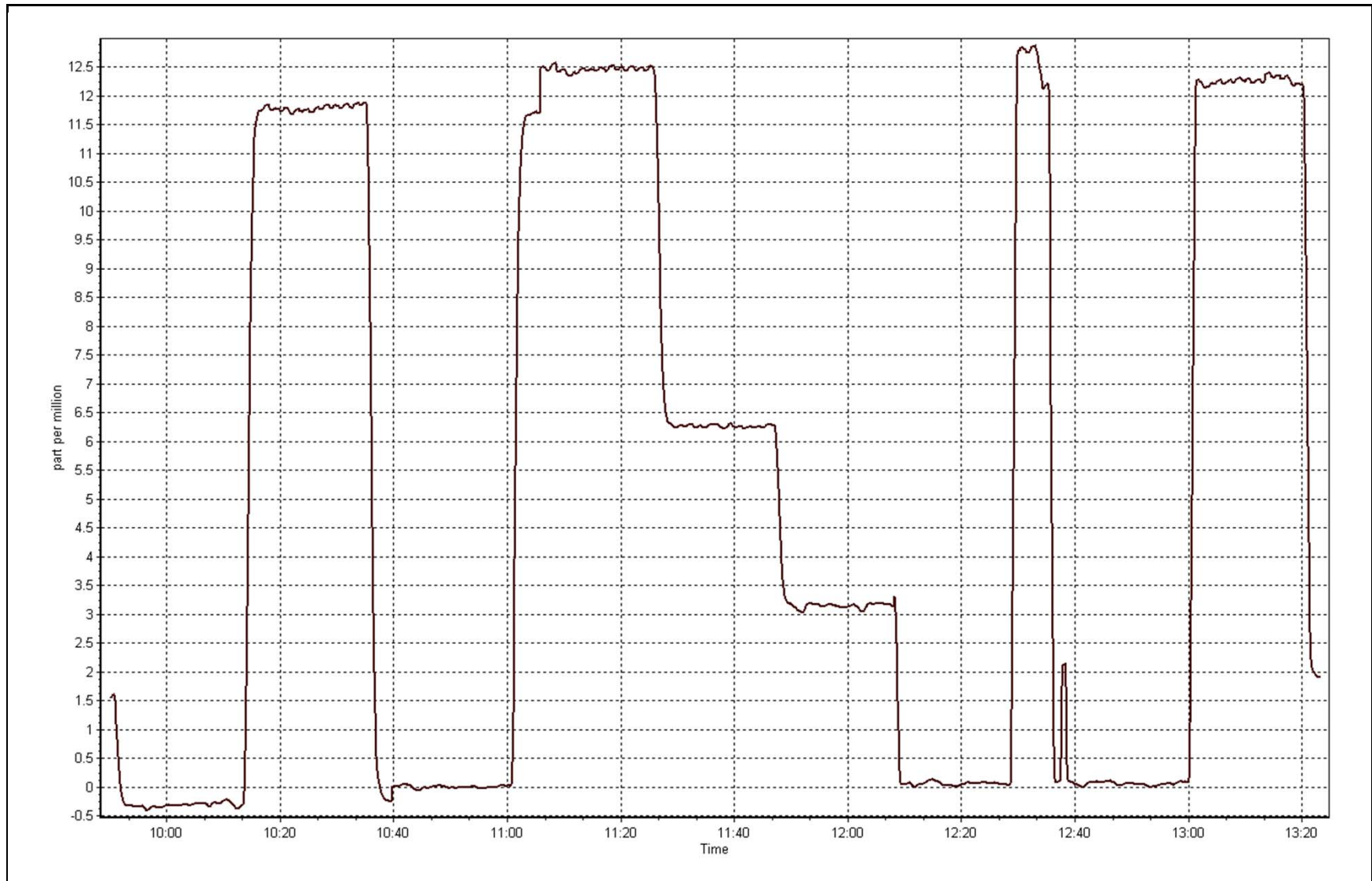
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999987
12.46	12.47	0.9989		
6.23	6.27	0.9933	Slope	0.999437
3.11	3.15	0.9886		
			Intercept	-0.019917



THC Calibration Plot

Date: April 29, 1904



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# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 6  
PATRICIA MCINNES  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)

APRIL 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	684	35	36	99.86	36	0	5	0
TRS (ppb) Average	684	35	36	99.86	1	0	1	0
THC (ppm) Average	681	35	39	99.44	2.2	-	2	-
NMHC(ppm) Average	681	35	39	99.44	0.018	-	0.001	-
CH4(ppm) Average	681	35	39	99.44	2.2	-	2	-
O3 (ppb) Average	686	34	34	100.00	50	0	41	-
NO2 (ppb) Average	682	37	38	99.86	32	0	7	-
NO (ppb) Average	682	37	38	99.86	28	-	3	-
NOX (ppb) Average	682	37	38	99.86	59	-	10	-
NH3 (ppb) Average	633	41	87	93.61	0	-	0	-
PM2.5 (ug/m3) Average	719	0	1	99.86	20.9	-	6.8	0
Temperature 2 m (C) Average	720	0	0	100.00	24	-	15.5	-
Relative Humidity (%) Average	720	0	0	100.00	97	-	74	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	35	-	22	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	0	-

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

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

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	684	1	3	-	0	0	0	0	0	3	36
TRS (ppb) Average	684	0.4	0	-	0	0	0	0	0	0	1
THC (ppm) Average	681	1.89	0	-	1.8	1.9	1.9	1.9	1.9	1.9	2.2
NMHC(ppm) Average	681	0	0.001	-	0	0	0	0	0	0	0.018
CH4(ppm) Average	681	1.89	0	-	1.8	1.9	1.9	1.9	1.9	1.9	2.2
O3 (ppb) Average	686	32.6	8	-	4	21	28	34	39	41	50
NO2 (ppb) Average	682	3.5	4	-	0	0	1	2	5	8	32
NO (ppb) Average	682	1.2	3	-	0	0	0	0	1	3	28
NOX (ppb) Average	682	4.7	7	-	0	0	1	3	6	10	59
NH3 (ppb) Average	633	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	719	3.54	3.3	-	0	0.4	1	2.7	5	7.6	20.9
Temperature 2 m (C) Average	720	4.83	7.5	-	-14.7	-5.2	-1	4.9	10.5	14.3	24
Relative Humidity (%) Average	720	45.4	20	-	13	22	30	41	57	78	97
Wind Speed 10 m (km/h) Average	720	12.6	6	-	0	5	8	12	16	22	35
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-



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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	10 Apr 2015 14:00	10 Apr 2015 14:00	1	Maintenance - sample manifold cleaned
TRS	10 Apr 2015 14:00	10 Apr 2015 14:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	02 Apr 2015 12:00	02 Apr 2015 13:00	2	Maintenance - replaced carrier gas
NMHC, CH4, THC	10 Apr 2015 14:00	10 Apr 2015 15:00	2	Maintenance - sample manifold cleaned
NO2, NO, NOX	10 Apr 2015 14:00	10 Apr 2015 14:00	1	Maintenance - sample manifold cleaned
NH3	01 Apr 2015 06:00	30 Apr 2015 05:00	39	Stabilization after daily span
NH3	06 Apr 2015 06:00	06 Apr 2015 06:00	1	Intermittent unstable operation - excessive baseline drift
NH3	08 Apr 2015 19:00	08 Apr 2015 19:00	1	Intermittent unstable operation - excessive baseline drift
NH3	10 Apr 2015 14:00	10 Apr 2015 14:00	1	Maintenance - sample manifold cleaned
NH3	11 Apr 2015 06:00	11 Apr 2015 06:00	1	Intermittent unstable operation - excessive baseline drift
NH3	14 Apr 2015 16:00	14 Apr 2015 16:00	1	Intermittent unstable operation - excessive baseline drift
NH3	23 Apr 2015 06:00	23 Apr 2015 06:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	10 Apr 2015 14:00	10 Apr 2015 14:00	1	Maintenance - Flow and zero check, sample head cleaning

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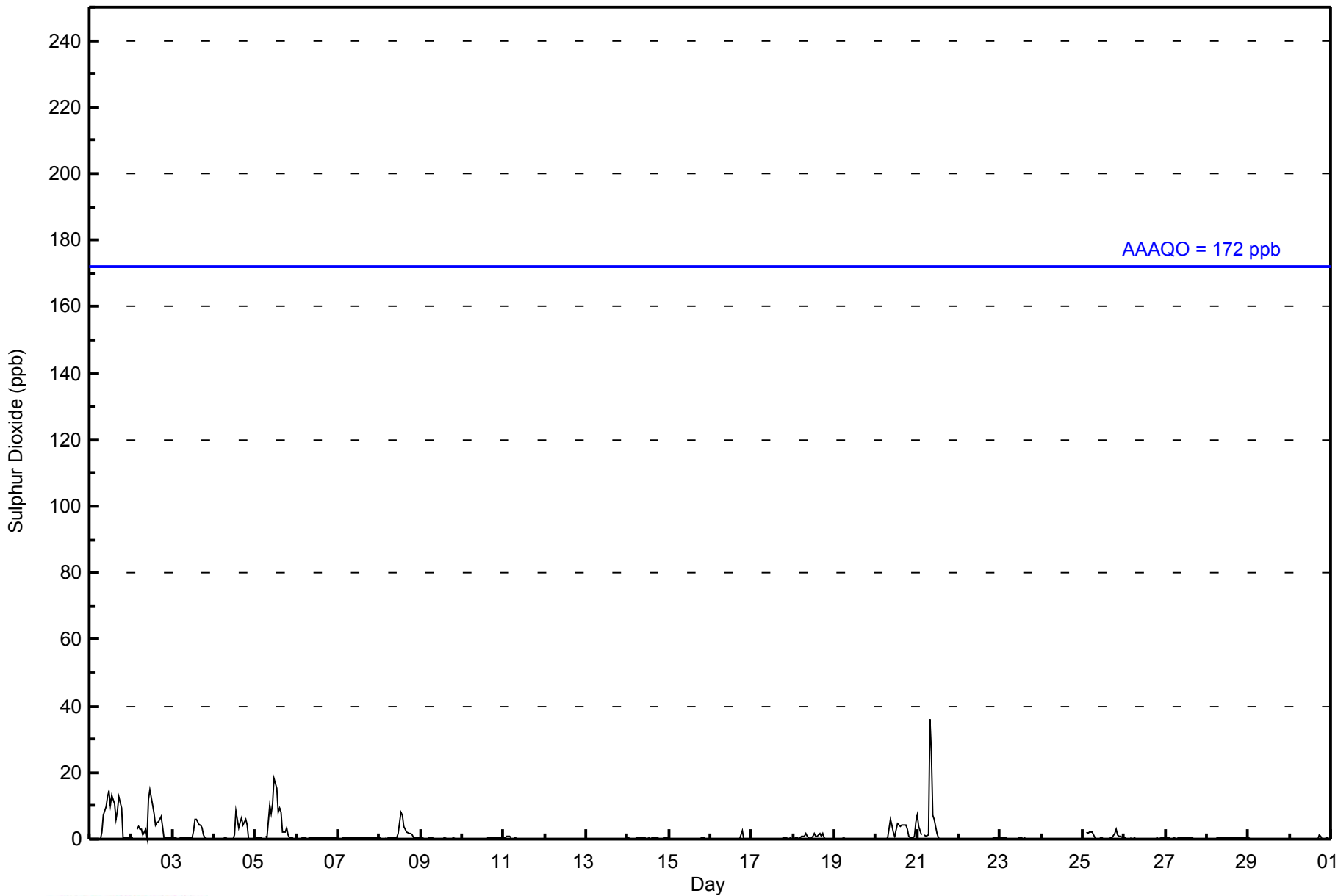


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 720																																							
Maximum Value: 36 ppb on Apr 21 08:00										Maximum Daily Average: 5.2 ppb on Apr 1										Hours of Data: 684																													
Minimum Value: 0 ppb on Apr 23 23:00										Minimum Daily Average: 0.0 ppb on Apr 24										Hours of Missing Data: 36																													
Maximum Diurnal Average: 2.0 ppb at hour 14										Minimum Diurnal Average: 0.2 ppb at hour 22										Hours of Calibration: 35																													
Monthly Average: 1.0 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 3 P <sub>99</sub> = 13										Percent Operational Time: 99.9																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	0	Z	0	0	0	0	0	2	7	10	13	14	10	13	11	6	9	13	9	0	0	0	0	0	5.2	14																							
2-Apr	0	0	Z	3	4	3	3	1	3	1	12	15	10	7	4	5	5	7	4	0	0	0	0	0	3.9	15																							
3-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	3	6	6	4	4	3	1	0	0	0	0	0	1.4	6																							
4-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	1	9	3	5	6	4	6	4	0	0	0	0	1.8	9																							
5-Apr	0	0	0	0	0	Z	1	0	10	8	10	18	15	8	9	8	2	2	3	1	0	0	0	0	4.3	18																							
6-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0.3	1																							
7-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
8-Apr	0	0	Z	0	0	0	0	0	0	0	0	2	8	7	4	3	2	2	2	1	1	0	0	0	1.5	8																							
9-Apr	0	0	0	Z	0	0	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
10-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	M	0	0	1	0	0	0	0	0	0	0.2	1																							
11-Apr	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
14-Apr	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
15-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0.3	3																							
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
18-Apr	Z	0	0	0	0	1	1	2	1	0	0	1	2	1	1	2	1	2	0	0	0	0	0	0	0.7	2																							
19-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	6	4	2	1	5	4	4	4	4	4	3	1	0	0	1	5	2.2	6																							
21-Apr	7	4	1	Z	1	1	1	36	26	7	6	2	0	0	0	0	0	0	0	0	0	0	0	0	4.1	36																							
22-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1																							
23-Apr	0	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-Apr	Z	0	0	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-Apr	0	Z	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	1	2	3	1	1	1	1	0.9	3																							
26-Apr	0	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-Apr	0	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-Apr	0	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-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1																							
																								0.5	0.4	0.3	0.4	0.4	0.4	0.4	1.6	2.0	1.2	1.6	2.0	2.0	2.0	1.5	1.4	1.3	1.4	1.3	0.5	0.2	0.2	0.2	0.4	Diurnal Average	
																								7	4	2	3	4	3	3	36	26	10	13	18	15	13	11	8	9	13	9	4	1	1	1	5	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 (SO<sub>2</sub>) - ppb  
Patricia McInnes - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	673	98.39	98.39
11 - 20	9	1.32	99.71
21 - 60	2	0.29	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - April 2015**

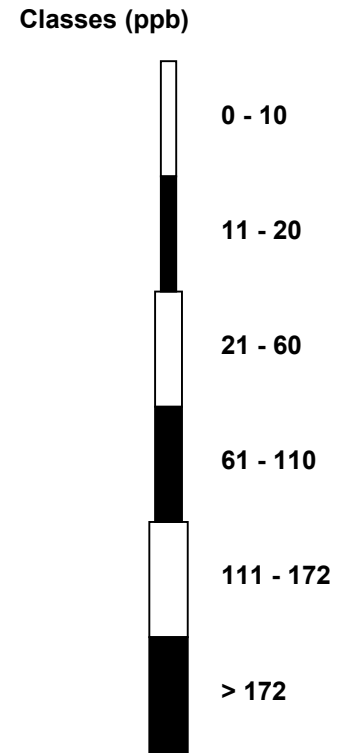
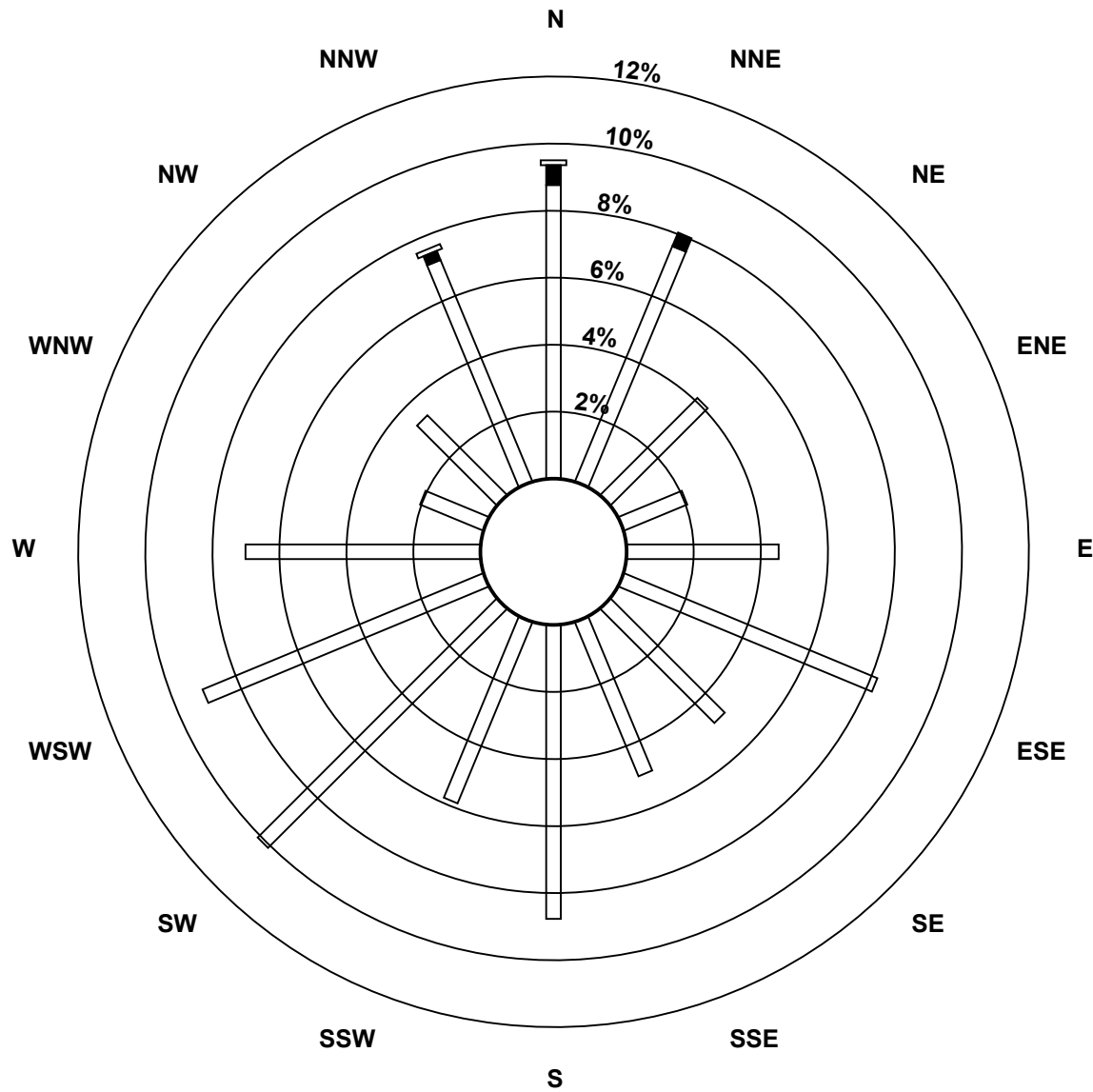
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	60	52	28	14	31	56	33	34	60	40	69	62	48	14	23	49	673
11 - 20	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9
21 - 60	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	65	55	28	14	31	56	33	34	60	40	69	62	48	14	23	52	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)

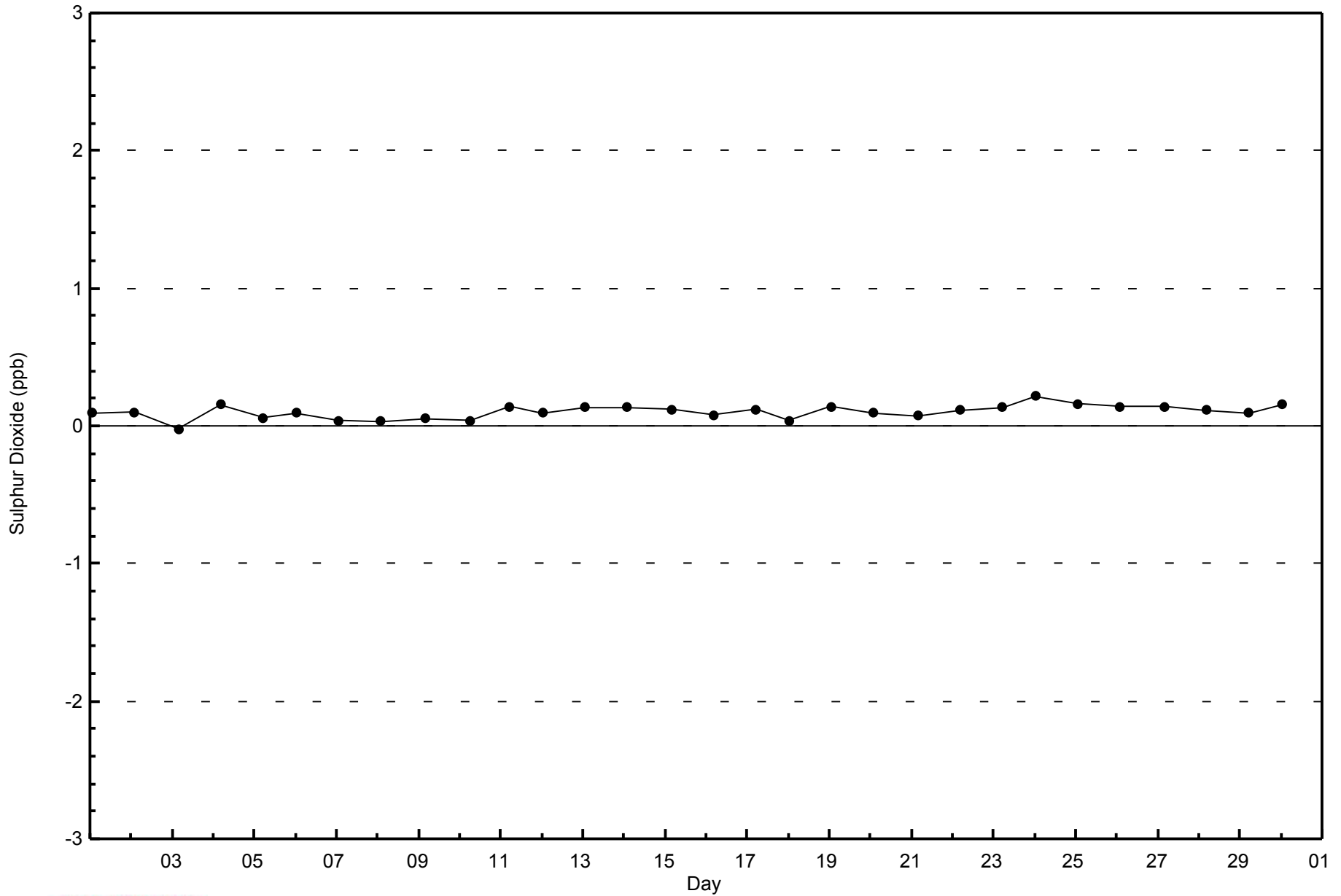


Total Number of Valid Hours: 684



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - April 2015

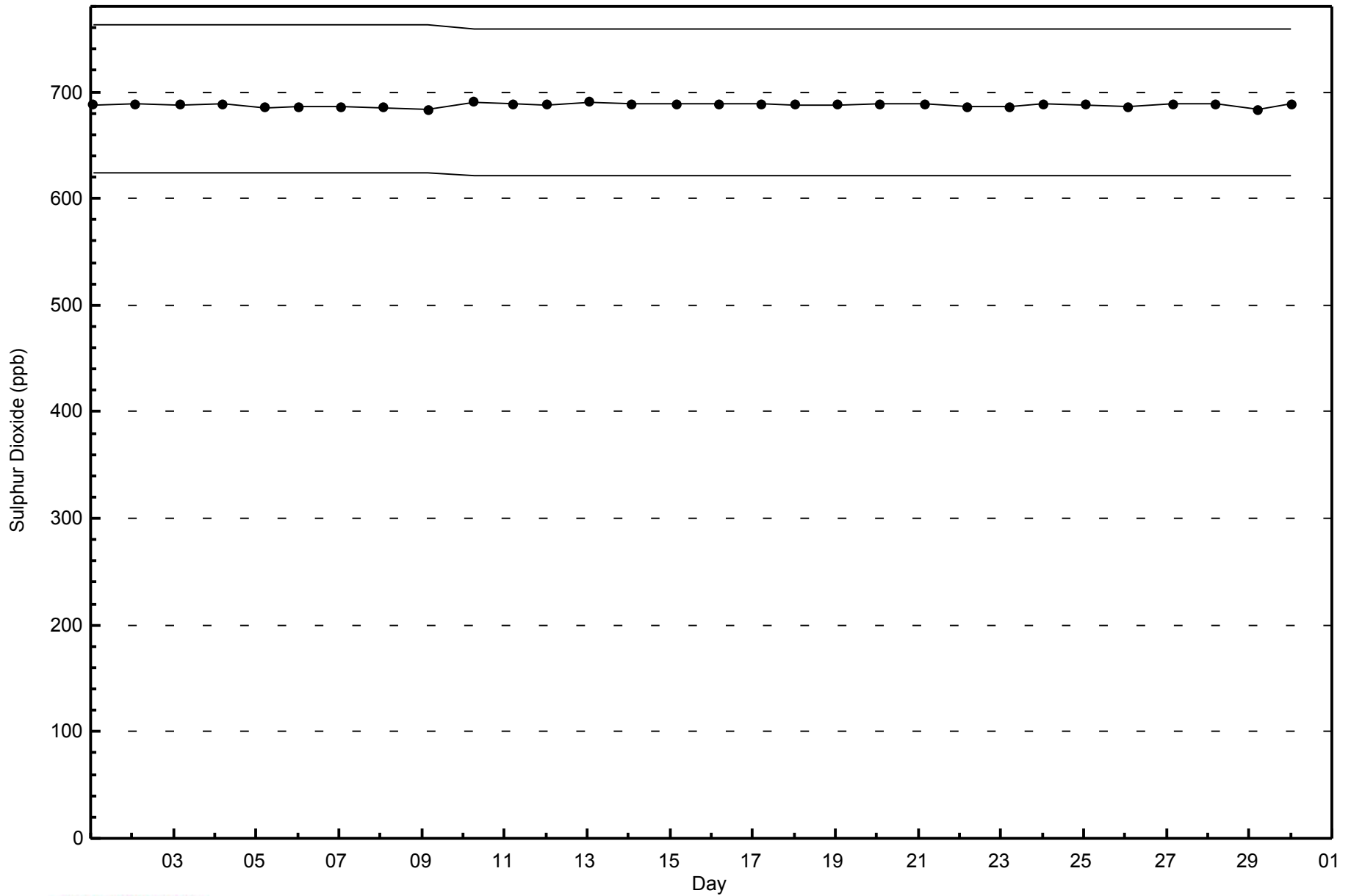






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - April 2015

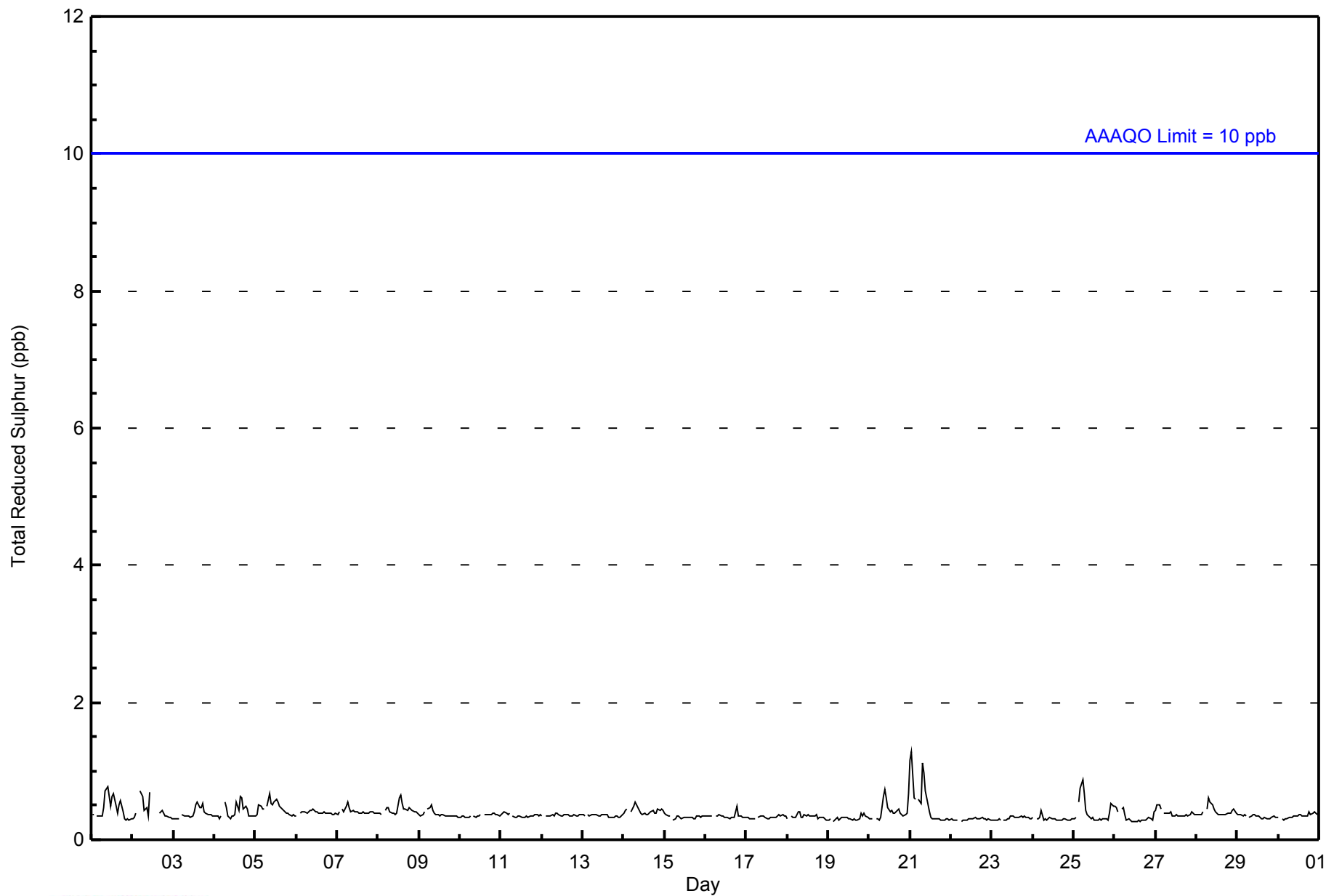






WBEA  
Hourly Averages

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





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	684	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - April 2015**

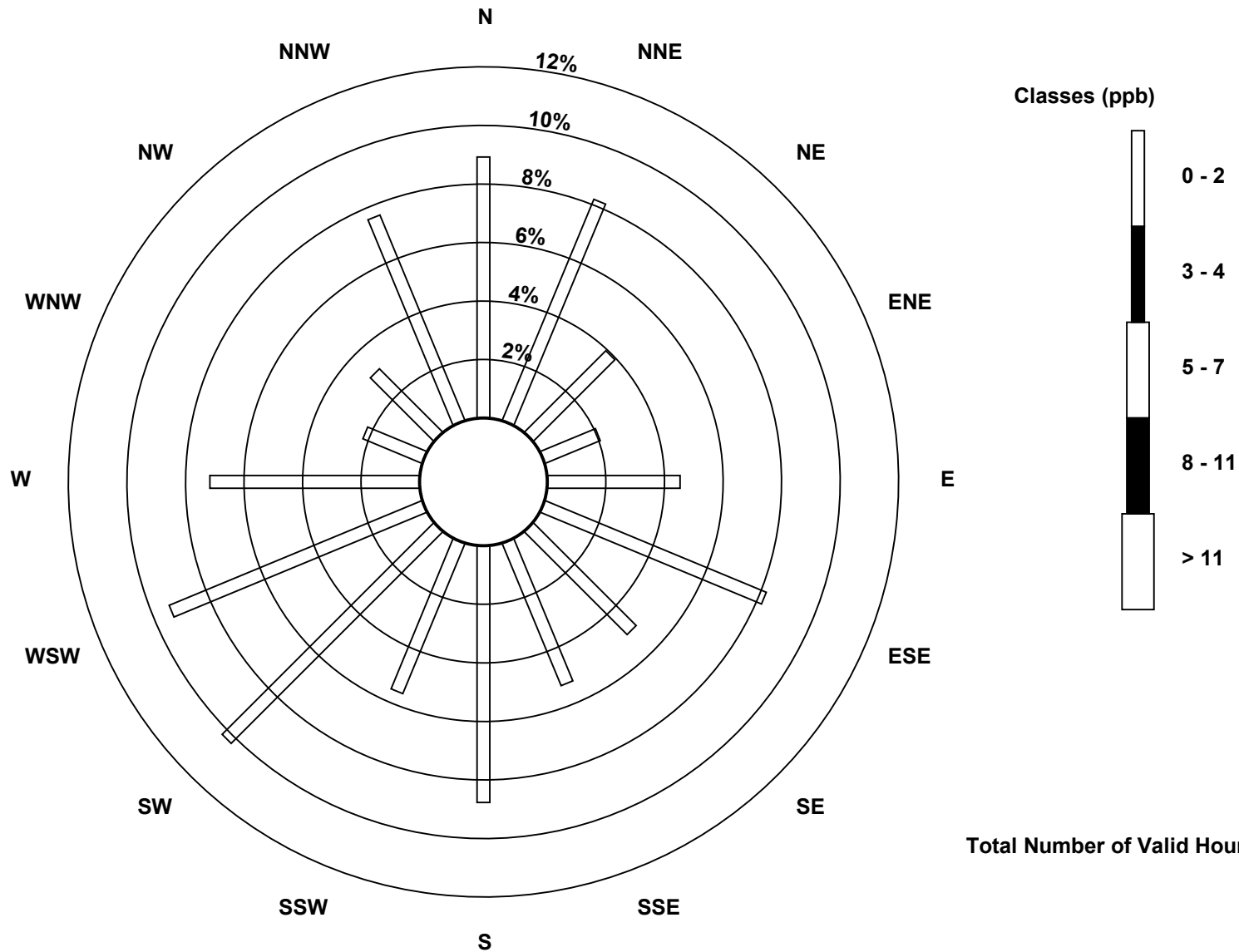
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	61	56	27	14	31	56	34	36	60	38	70	64	49	15	21	52	684
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	61	56	27	14	31	56	34	36	60	38	70	64	49	15	21	52	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

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

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

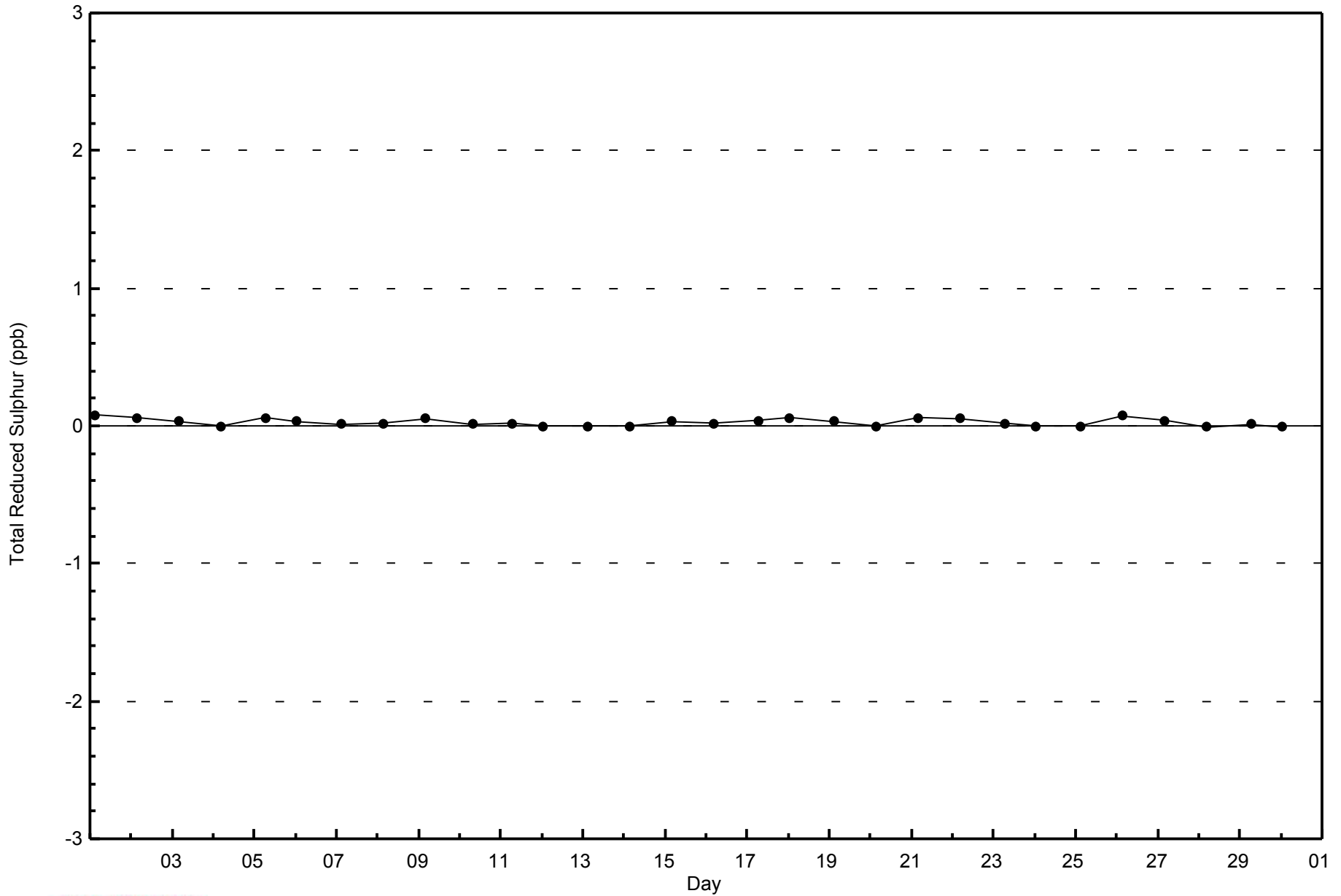


**Total Number of Valid Hours: 684**



WBEA  
Zero Responses

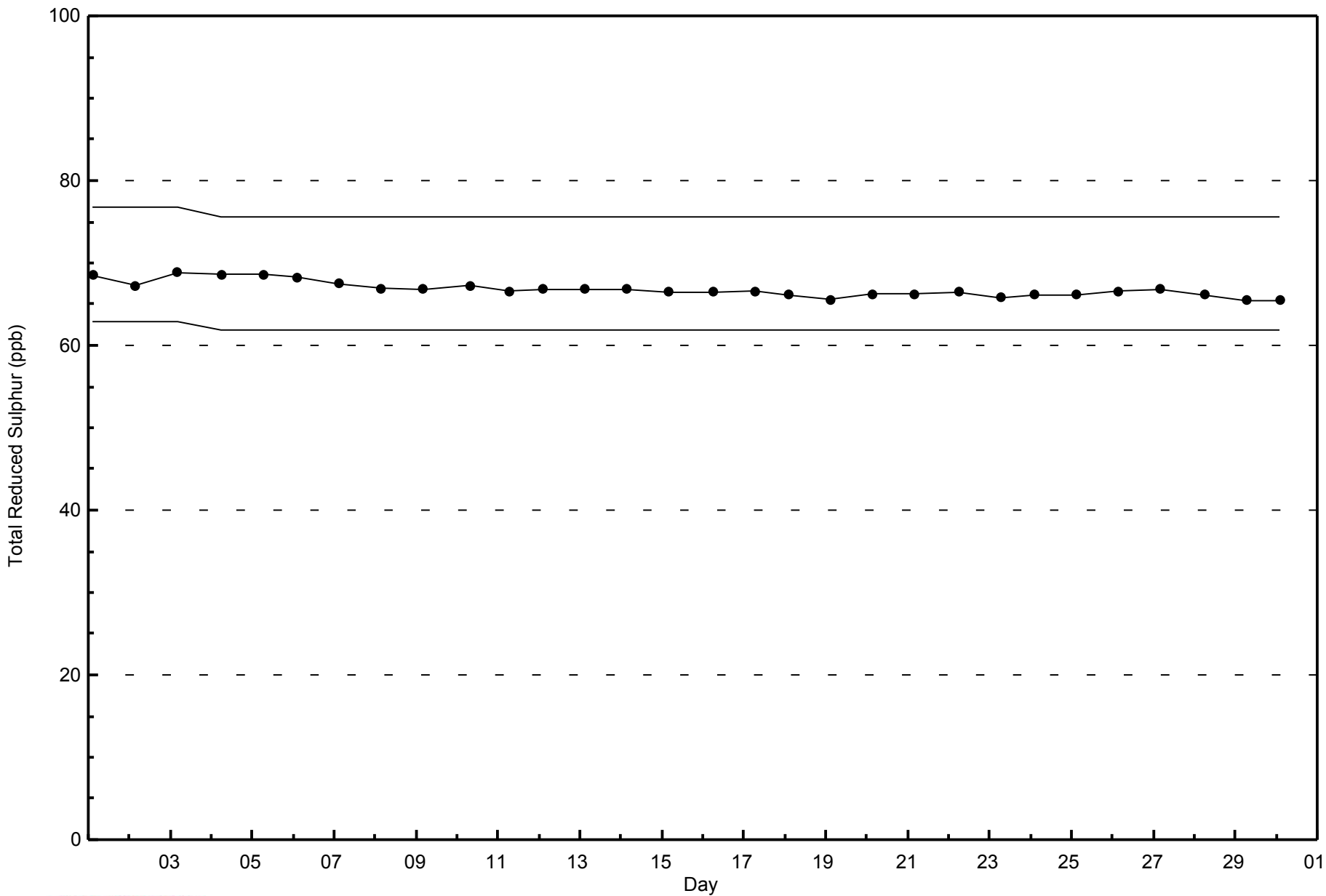
Total Reduced Sulphur (TRS) - ppb  
Patricia McInnes - April 2015





WBEA  
Span Responses

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



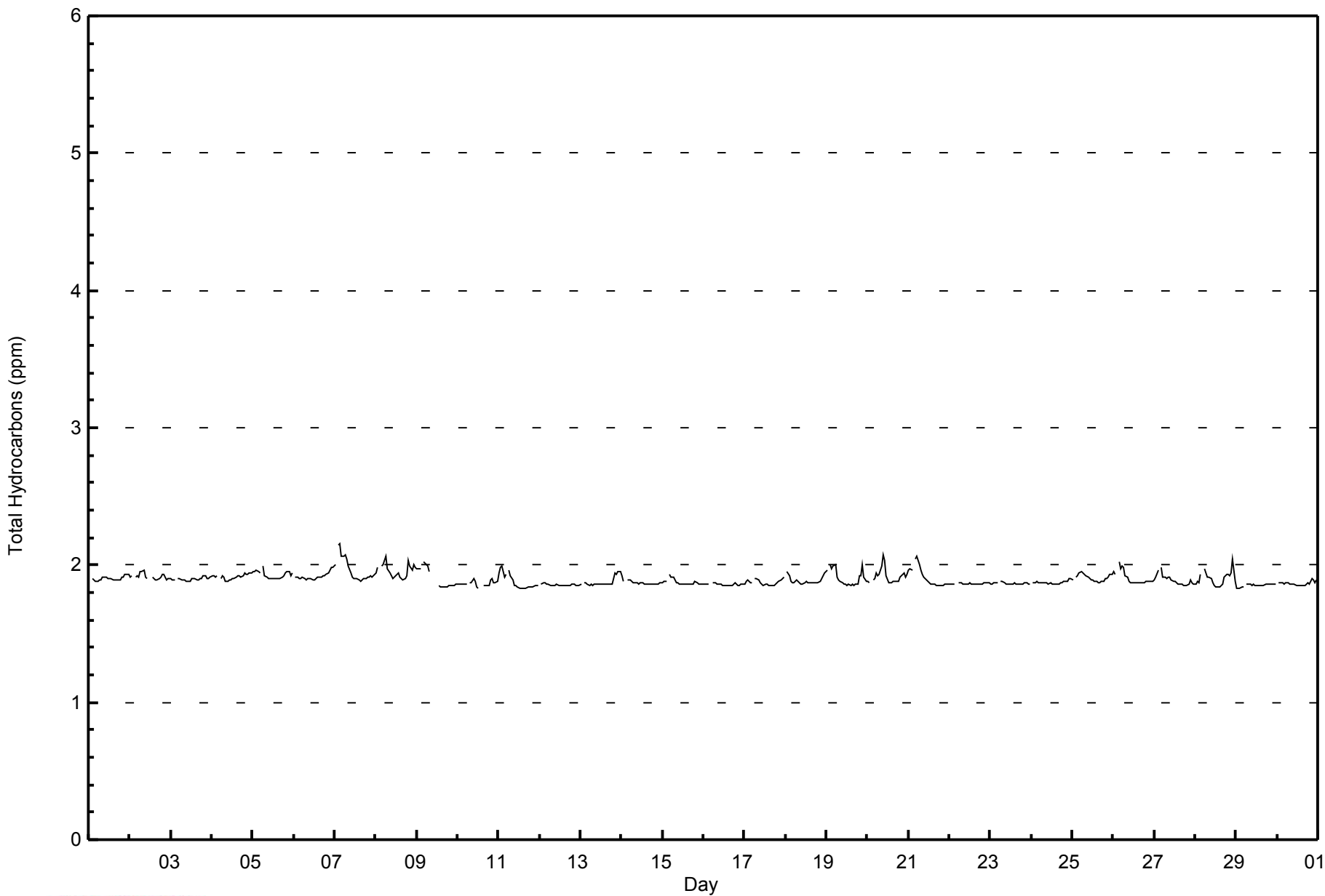






WBEA  
Hourly Averages

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





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	673	98.83	98.83
2.1 - 3.0	8	1.17	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - April 2015**

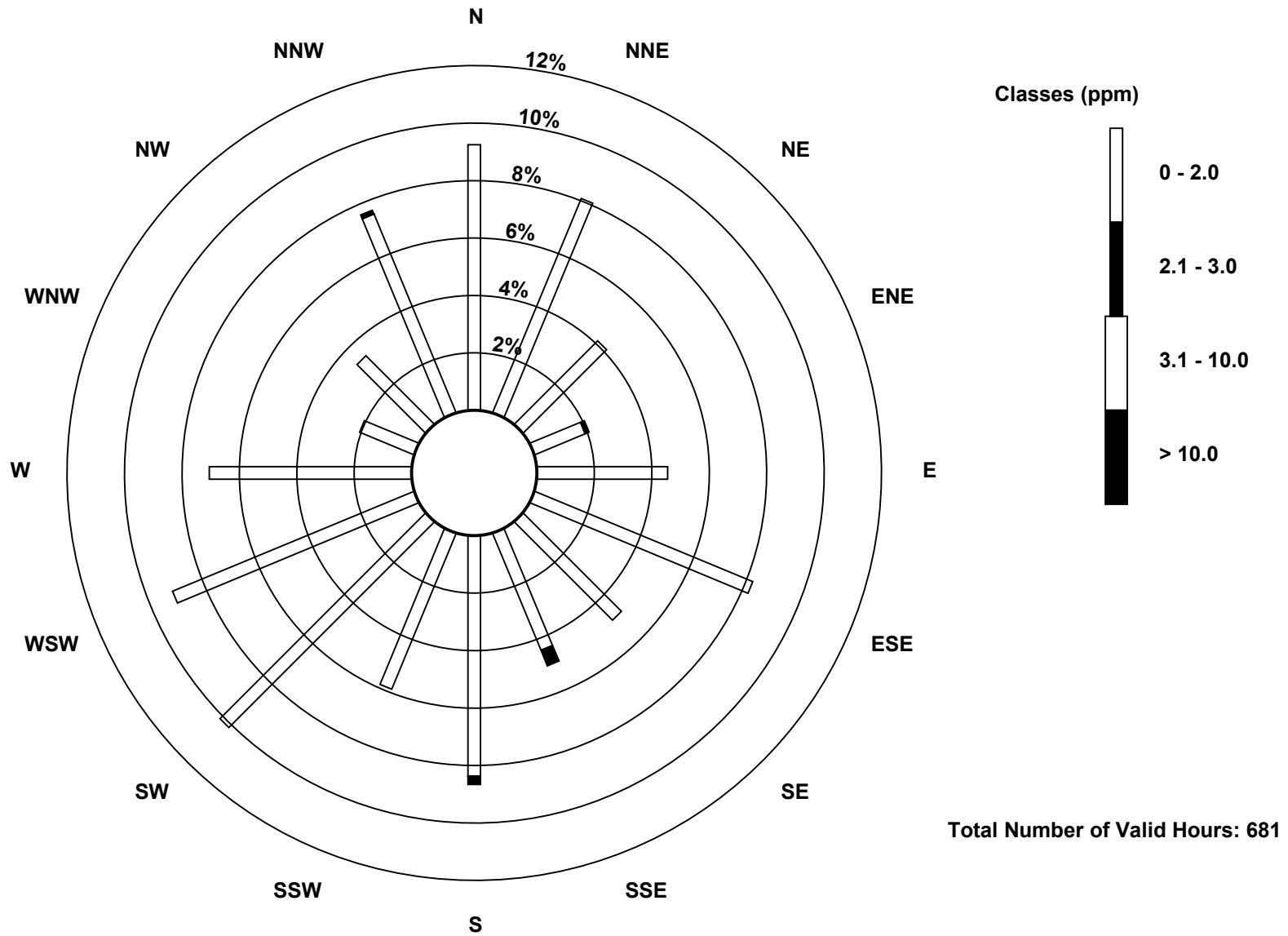
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	63	55	28	13	31	56	33	30	57	40	69	62	48	14	23	51	673
2.1 - 3.0	0	0	0	1	0	0	0	4	2	0	0	0	0	0	0	1	8
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	55	28	14	31	56	33	34	59	40	69	62	48	14	23	52	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

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

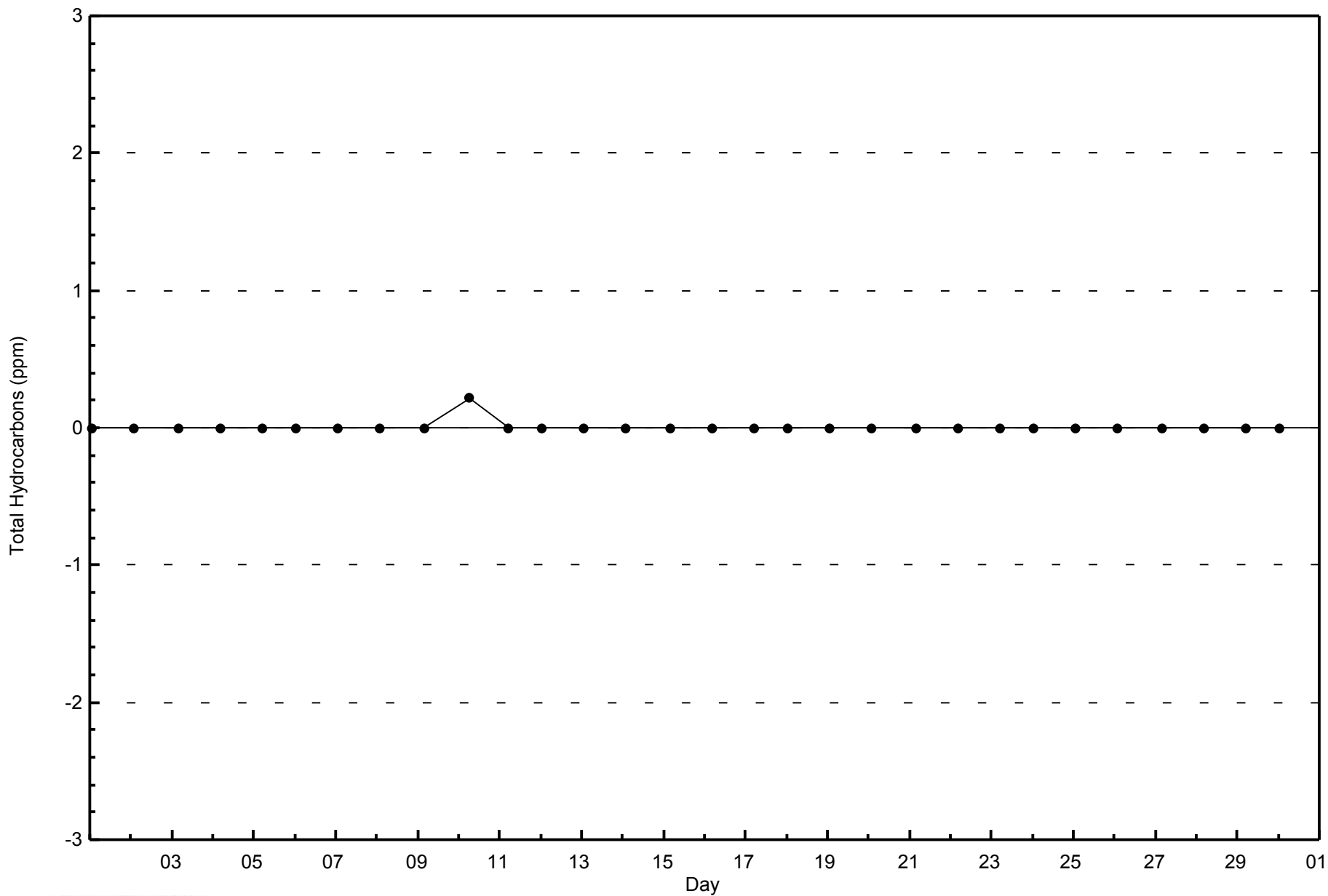
**Total Hydrocarbons (THC) - ppm  
Patricia McInnes (AMS 6)**





WBEA  
Zero Responses

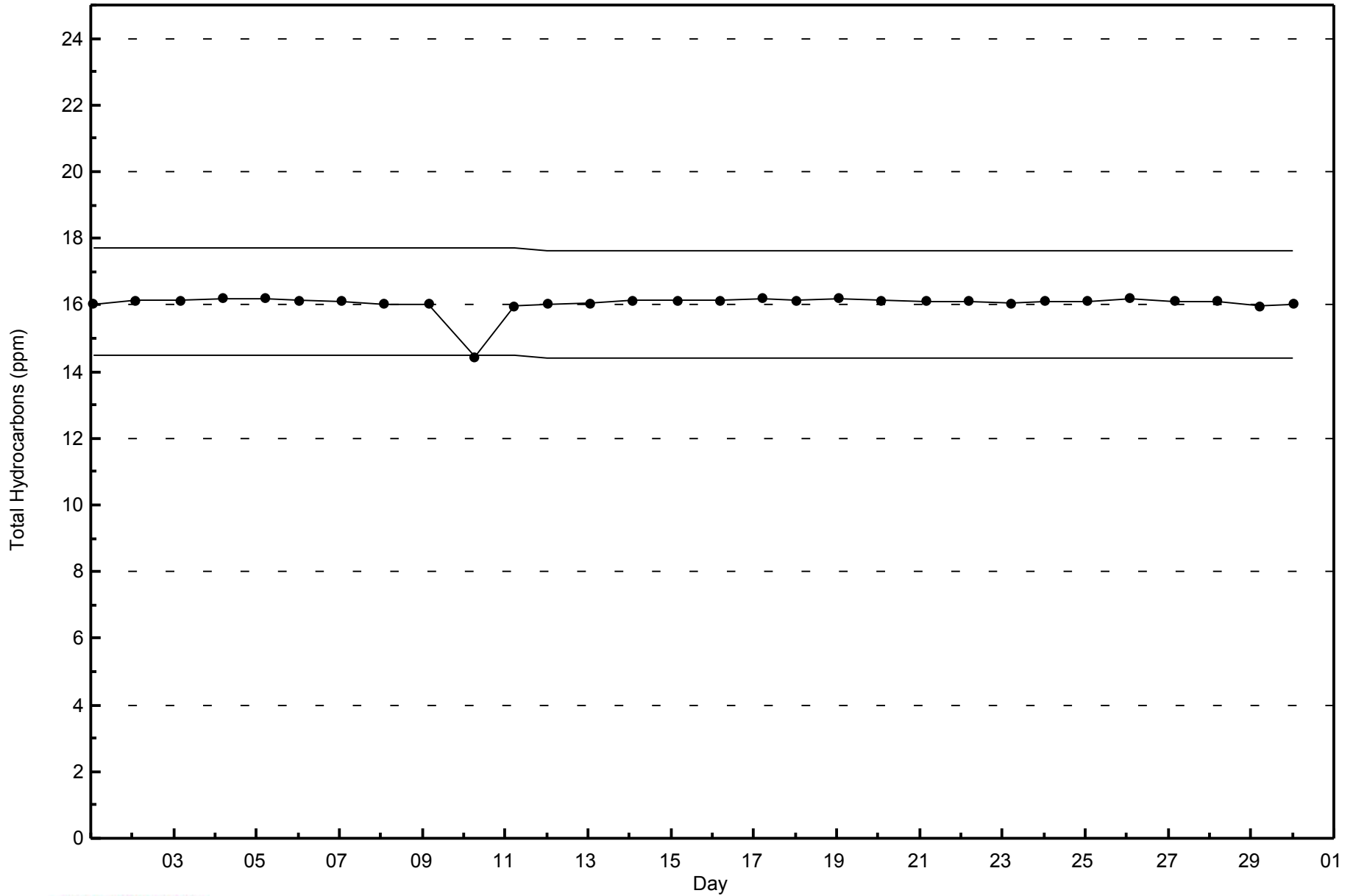
Total Hydrocarbons (THC) - ppm  
Patricia McInnes - April 2015





WBEA  
Span Responses

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





Summary of Hour Averages

Patricia McInnes - April 2015

Maximum Value: 0.018 ppm on Apr 28 23:00		Maximum Daily Average: 0.001 ppm on Apr 28		Hours in Service:	720																							
Minimum Value: 0.000 ppm on Apr 1 01:00		Minimum Daily Average: 0.000 ppm on Apr 1		Hours of Data:	681																							
Maximum Diurnal Average: 0.001 ppm at hour 23		Minimum Diurnal Average: 0.000 ppm at hour 1		Hours of Missing Data:	39																							
Monthly Average: 0.000 ppm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0		Hours of Calibration:	35																							
				Percent Operational Time:	99.4																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-Apr	0.000	0.000	Z	0.000	0.007	0.000	0.000	0.004	0.003	0.000	0.000	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.001	0.007	
3-Apr	0.000	0.000	0.000	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
4-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
7-Apr	0.000	Z	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.004
8-Apr	0.000	0.004	Z	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004
9-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10-Apr	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	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11-Apr	0.000	0.003	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
12-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
14-Apr	0.000	0.000	Z	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
15-Apr	0.000	0.000	0.000	Z	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003
16-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.003	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	0.003
18-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.003
19-Apr	0.000	Z	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.008
20-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.003	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.001	0.008	0.008
21-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Apr	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	0.003	0.000	0.000	0.003	0.000	0.000	0.003	0.003
25-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005
26-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002
27-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28-Apr	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	0.003	0.000	0.000	0.000	0.000	0.000	0.003	0.018	0.000	0.001	0.018	0.018
29-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
																								Diurnal Average				
																								Diurnal Maximum				
Z - zerospan      C - Calibration      M - Maintenance																												

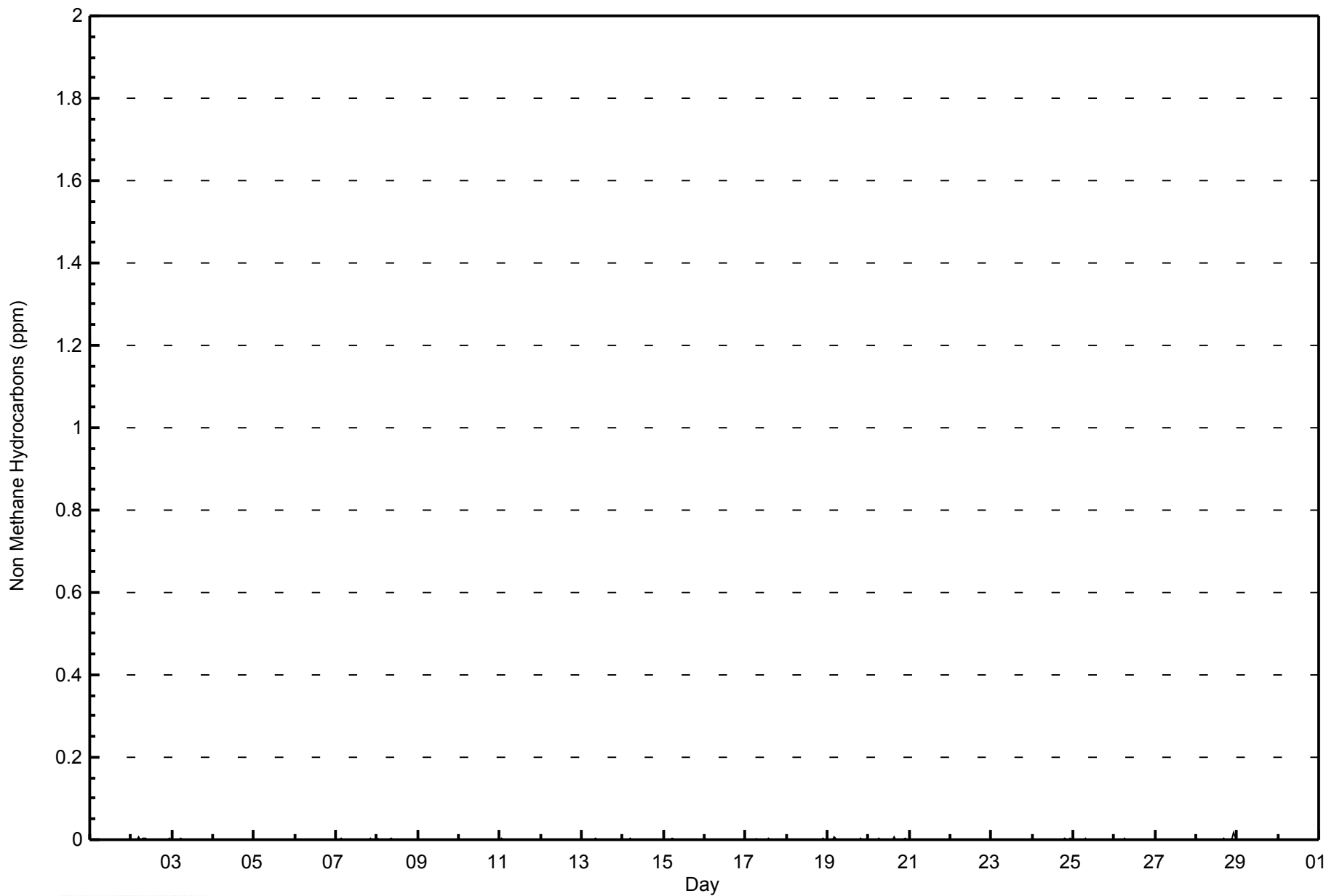




**WBEA**  
**Hourly Averages**

**Non Methane Hydrocarbons (NMHC) - ppm**

**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	677	99.41	99.41
0.006 - 0.05	4	0.59	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**

**Patricia McInnes - April 2015**

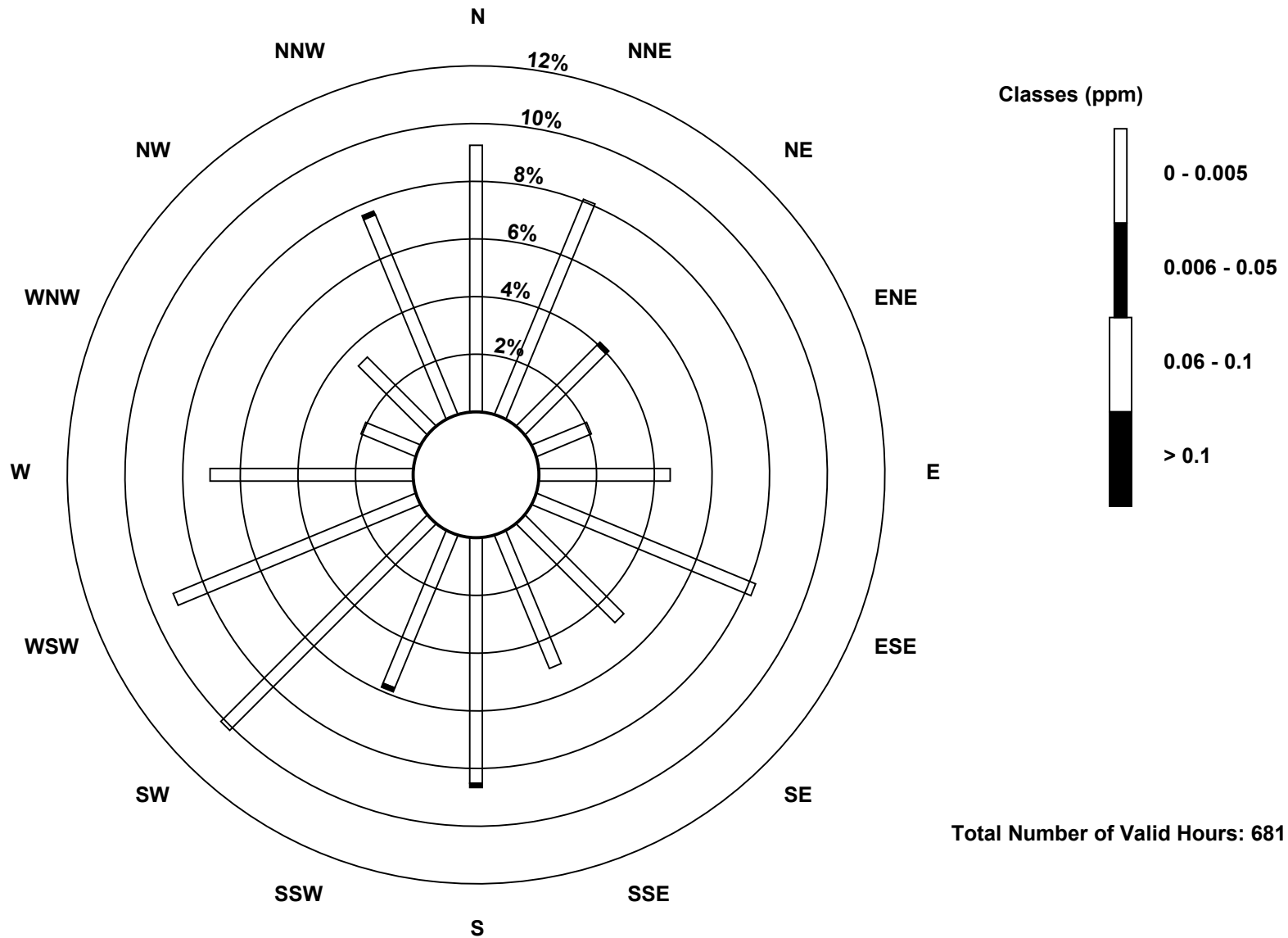
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	63	55	27	14	31	56	33	34	58	39	69	62	48	14	23	51	677
0.006 - 0.05	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	1	4
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	55	28	14	31	56	33	34	59	40	69	62	48	14	23	52	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

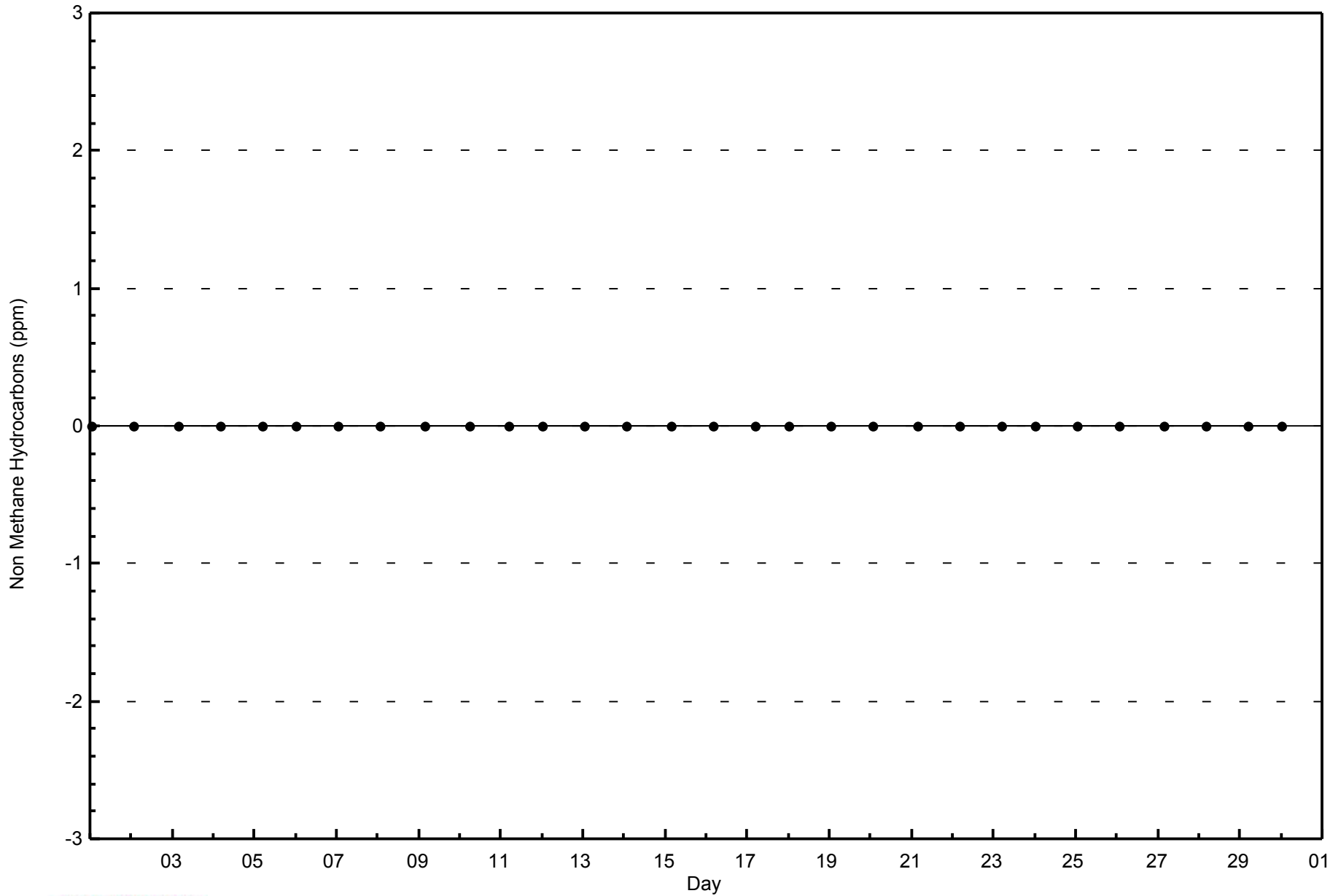
Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes (AMS 6)





WBEA  
Zero Responses

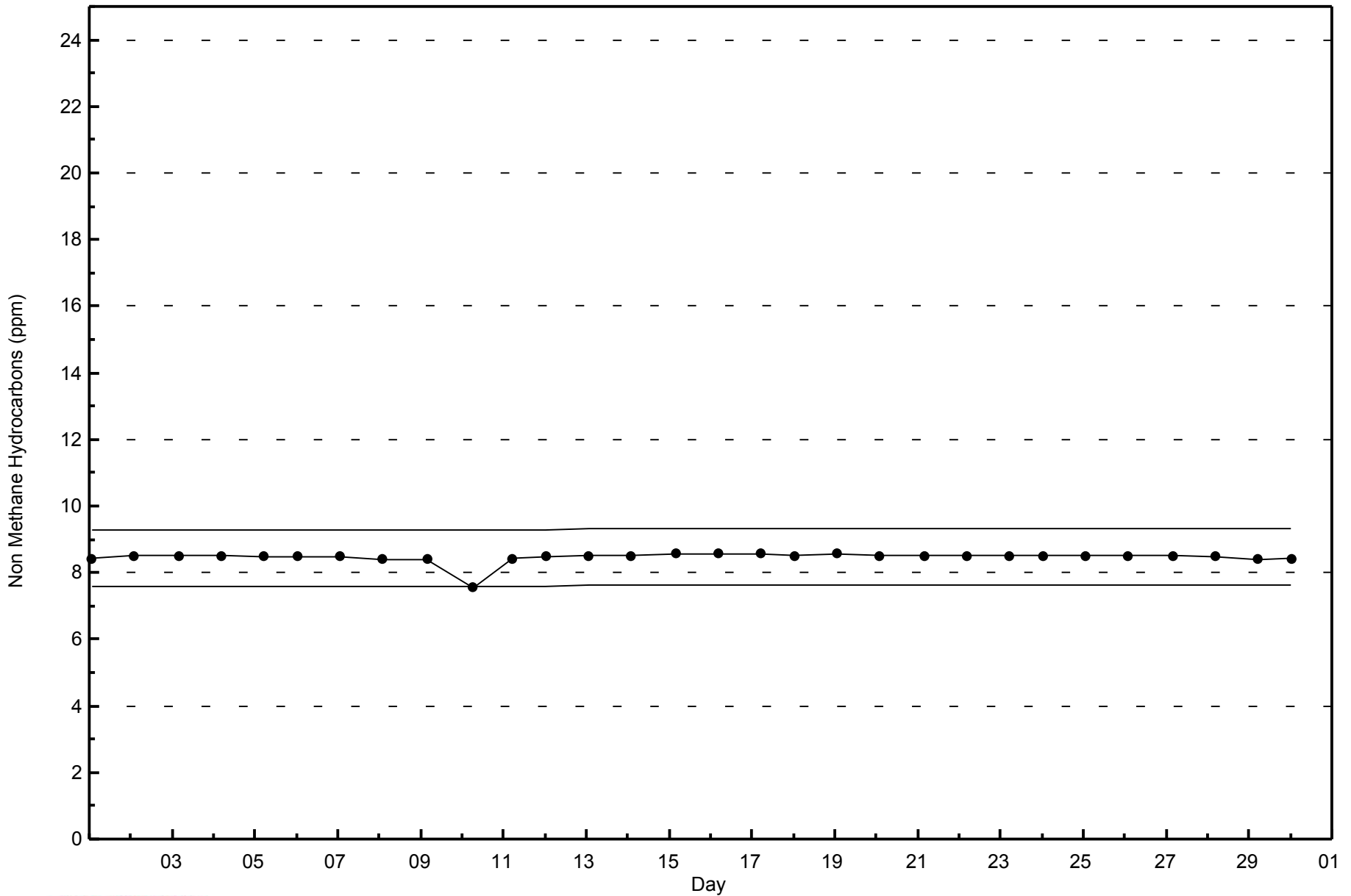
Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes - April 2015





WBEA  
Span Responses

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

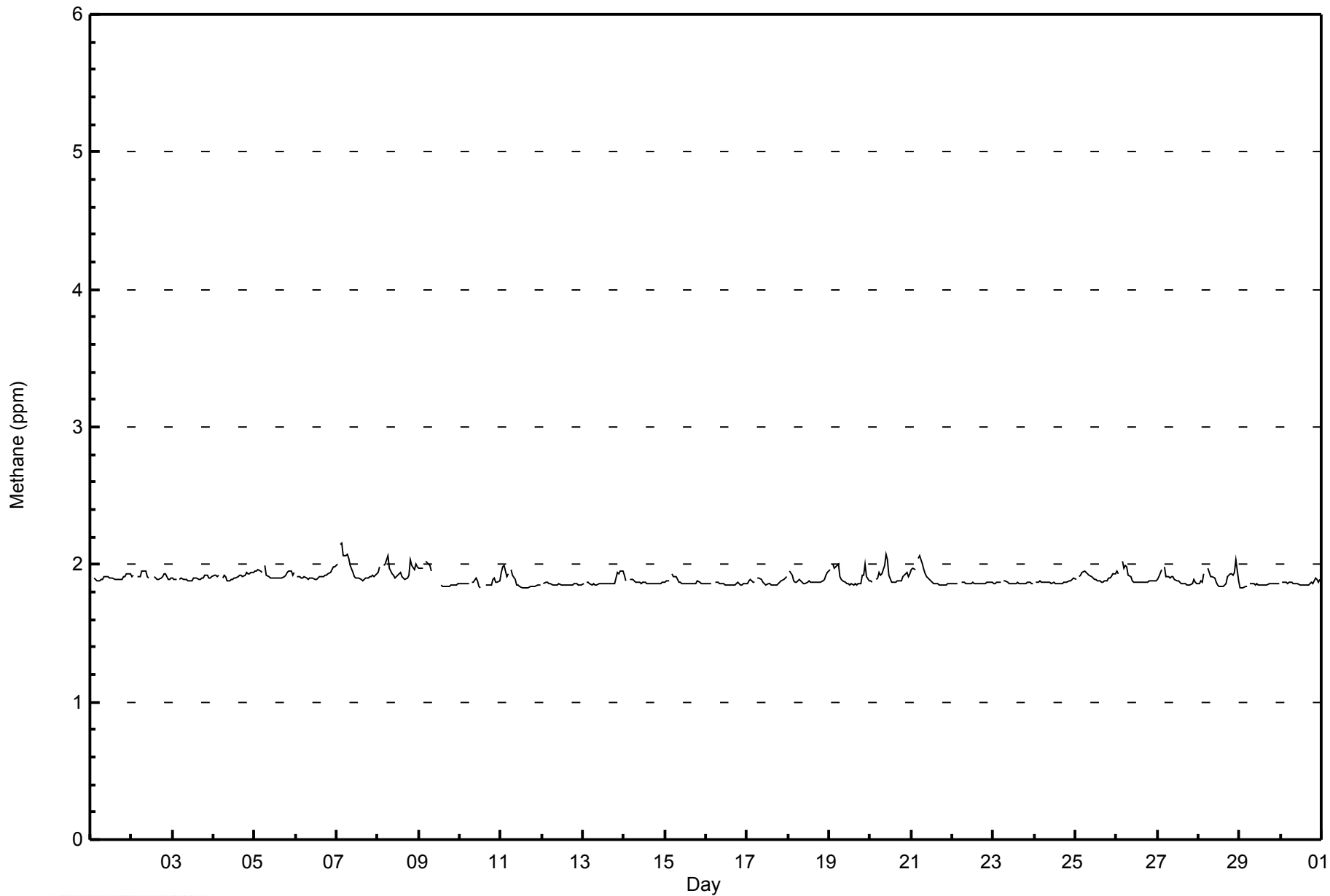






WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	673	98.83	98.83
2.1 - 3.0	8	1.17	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - April 2015**

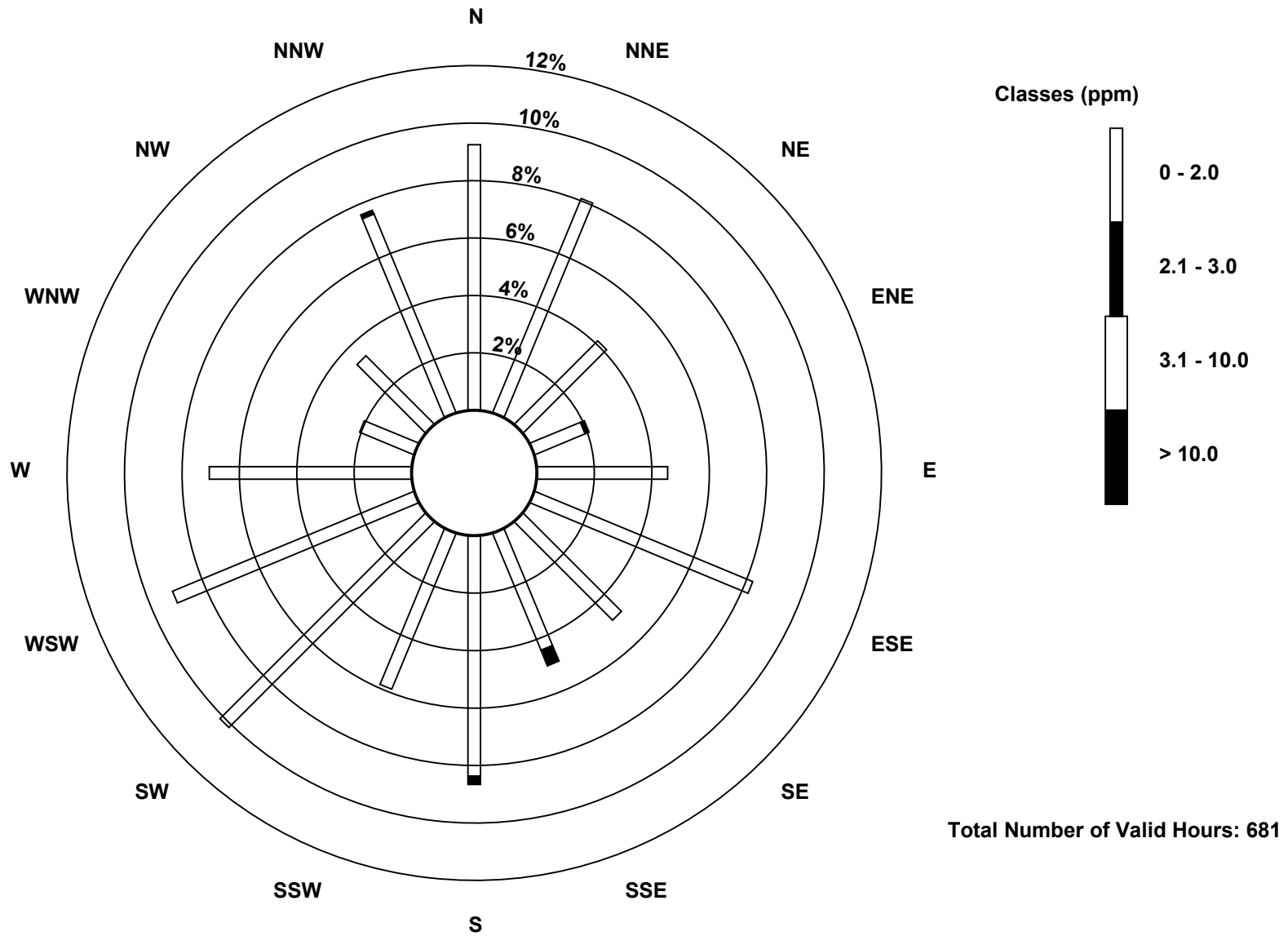
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	63	55	28	13	31	56	33	30	57	40	69	62	48	14	23	51	673
2.1 - 3.0	0	0	0	1	0	0	0	4	2	0	0	0	0	0	0	1	8
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	55	28	14	31	56	33	34	59	40	69	62	48	14	23	52	681

Total Number of Valid Hours: 681

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

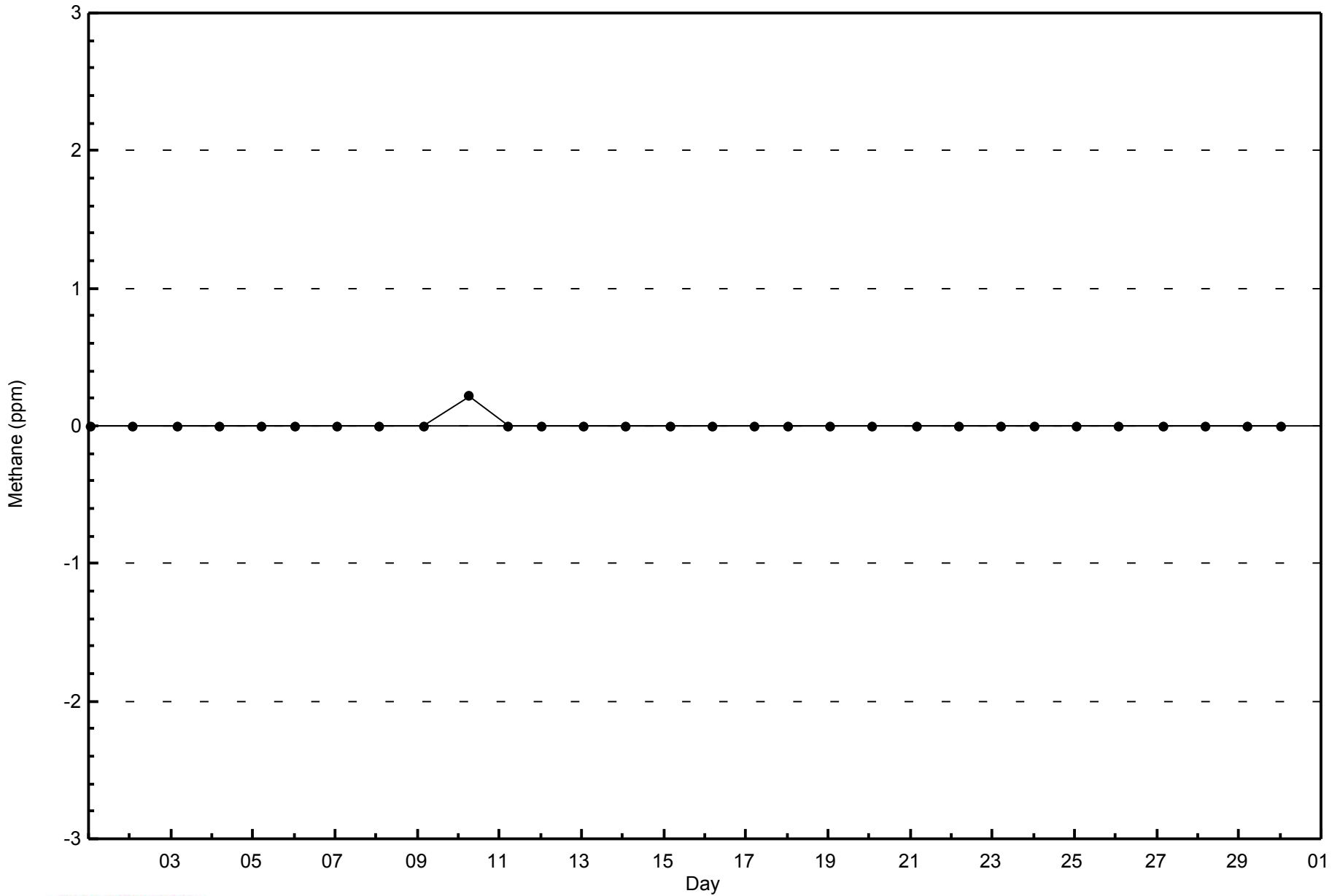
Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes (AMS 6)





WBEA  
Zero Responses

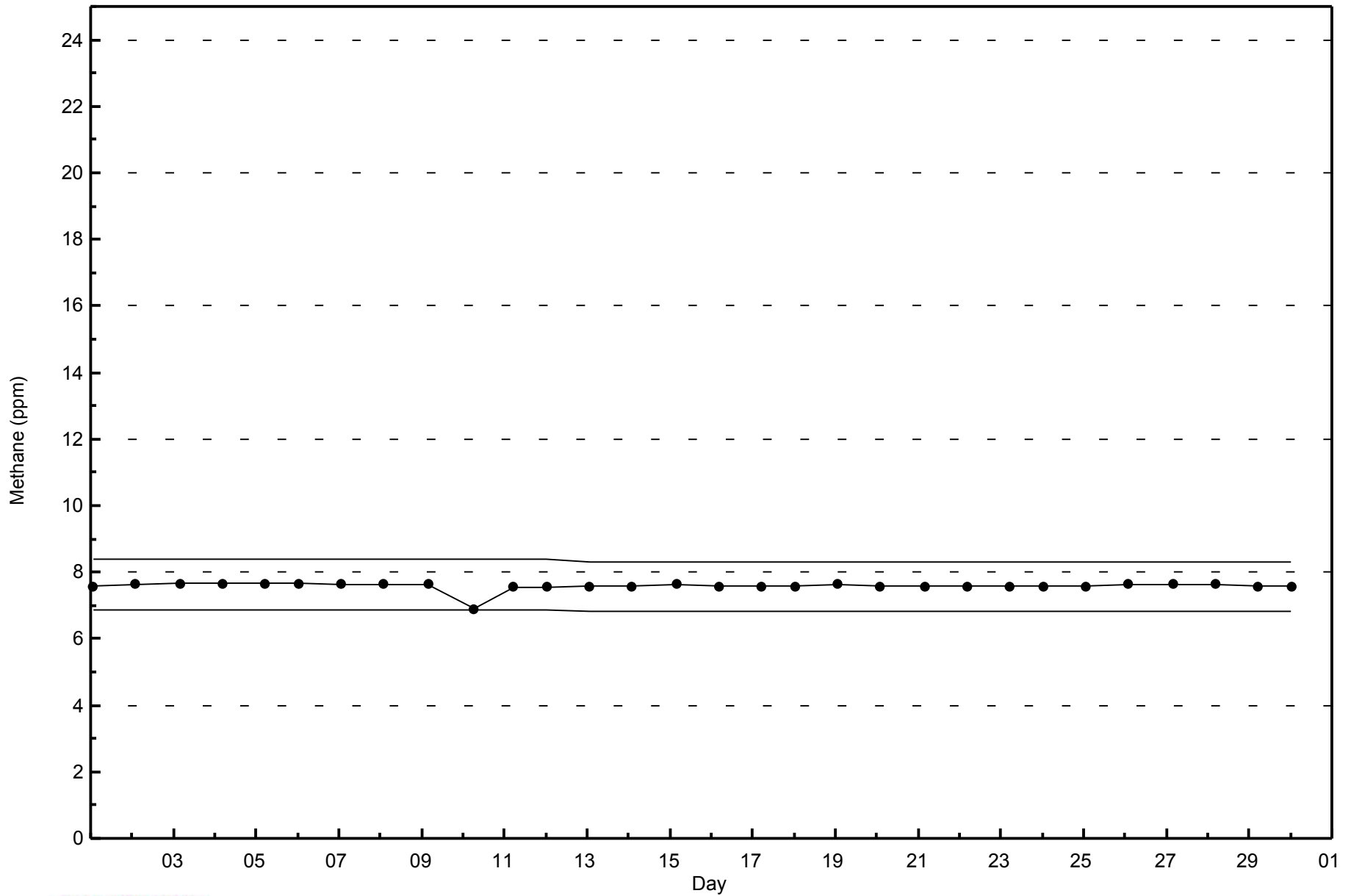
Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - April 2015





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 50 ppb on Apr 10 17:00	Maximum Daily Average: 41.3 ppb on Apr 10		Hours of Data:	686
Minimum Value: 4 ppb on Apr 19 06:00	Minimum Daily Average: 25.1 ppb on Apr 25		Hours of Missing Data:	34
Maximum Diurnal Average: 40.0 ppb at hour 16	Minimum Diurnal Average: 23.6 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 32.6 ppb	Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 21 Q <sub>1</sub> = 28 Median = 34 Q <sub>3</sub> = 39 P <sub>90</sub> = 41 P <sub>99</sub> = 46		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	29	27	26	Z	29	29	29	25	22	22	24	25	27	27	29	30	32	32	32	31	31	28	26	25	27.8	32
2-Apr	27	29	29	30	Z	30	27	27	26	31	28	28	32	34	35	36	35	34	32	27	32	35	39	39	31.4	39
3-Apr	39	39	39	39	37	Z	35	33	37	39	40	38	37	37	36	38	36	30	33	28	29	31	30	32	35.3	40
4-Apr	32	27	26	21	23	22	Z	23	32	35	35	35	33	36	34	31	31	29	24	30	28	27	26	26	29.4	36
5-Apr	26	27	25	24	21	17	20	Z	28	30	29	29	32	38	37	39	36	37	34	25	26	27	30	19	28.6	39
6-Apr	19	32	Z	32	26	22	28	32	32	32	32	34	37	39	39	39	39	40	39	37	37	36	34	33	33.4	40
7-Apr	28	20	10	Z	10	5	5	20	32	36	39	40	41	42	44	44	43	41	39	36	33	32	33	32	30.6	44
8-Apr	30	27	23	18	Z	5	8	21	26	30	36	32	33	36	38	40	38	37	32	26	22	21	16	13	26.4	40
9-Apr	12	11	11	6	4	Z	10	21	30	30	37	40	39	40	43	44	45	45	44	40	43	44	44	42	31.6	45
10-Apr	40	39	39	39	38	38	37	37	Z	36	40	C	C	C	C	49	50	50	47	40	41	43	42	41	41.3	50
11-Apr	36	30	30	30	25	20	25	Z	36	41	39	41	43	42	42	43	43	42	41	43	42	40	39	37	37.0	43
12-Apr	36	35	Z	35	34	33	34	35	36	37	37	37	38	39	39	39	38	38	38	38	37	37	36	36	36.5	39
13-Apr	35	35	34	Z	35	35	35	36	37	37	37	37	38	39	40	41	42	41	41	36	27	21	20	17	34.6	42
14-Apr	28	31	30	30	Z	27	28	29	30	32	33	33	35	40	42	40	39	37	33	32	32	31	31	31	33.2	42
15-Apr	29	24	22	12	9	Z	19	24	34	36	38	38	39	41	41	43	43	41	41	33	36	39	38	38	33.0	43
16-Apr	37	36	36	36	36	34	Z	34	36	36	38	40	42	44	44	43	43	44	39	41	41	39	37	36	38.8	44
17-Apr	35	29	28	31	30	26	23	Z	30	34	39	44	43	41	42	41	39	36	34	33	30	25	24	17	32.7	44
18-Apr	21	23	Z	28	28	29	32	34	34	33	33	36	37	37	39	38	37	37	38	34	30	25	21	17	31.3	39
19-Apr	11	9	9	Z	5	4	15	20	24	32	36	39	39	40	41	42	42	40	39	20	24	20	32	35	26.9	42
20-Apr	34	34	34	32	Z	21	20	22	21	23	27	37	40	41	41	40	39	36	37	28	27	23	28	28	31.0	41
21-Apr	25	24	23	18	14	Z	17	13	20	27	31	37	40	40	40	41	41	39	38	37	37	37	36	35	30.8	41
22-Apr	34	34	33	31	30	29	Z	30	31	32	33	34	34	35	35	35	35	35	35	34	33	34	34	34	33.2	35
23-Apr	34	34	34	33	32	32	32	Z	34	34	34	35	36	36	36	36	36	35	35	34	34	32	33	32	34.0	36
24-Apr	32	31	Z	32	31	29	33	33	33	33	33	36	38	38	38	38	39	36	34	32	28	23	21	21	32.2	39
25-Apr	20	19	17	Z	14	13	14	18	21	23	26	28	30	32	33	34	34	34	32	29	28	28	27	21	25.1	34
26-Apr	18	18	12	7	Z	8	12	23	27	33	35	36	37	38	38	39	39	38	38	32	27	35	34	31	28.5	39
27-Apr	29	26	17	12	9	Z	25	25	25	30	39	41	41	41	43	41	42	46	45	43	41	33	37	39	33.3	46
28-Apr	36	34	35	25	16	10	Z	30	31	33	40	44	46	46	46	45	46	45	42	38	38	33	26	36	35.8	46
29-Apr	37	40	42	39	39	41	40	Z	38	32	32	39	41	42	42	44	43	43	42	40	39	40	41	41	39.8	44
30-Apr	40	39	Z	34	33	32	32	33	37	38	38	40	44	43	43	43	44	43	41	38	27	32	35	31	37.4	44

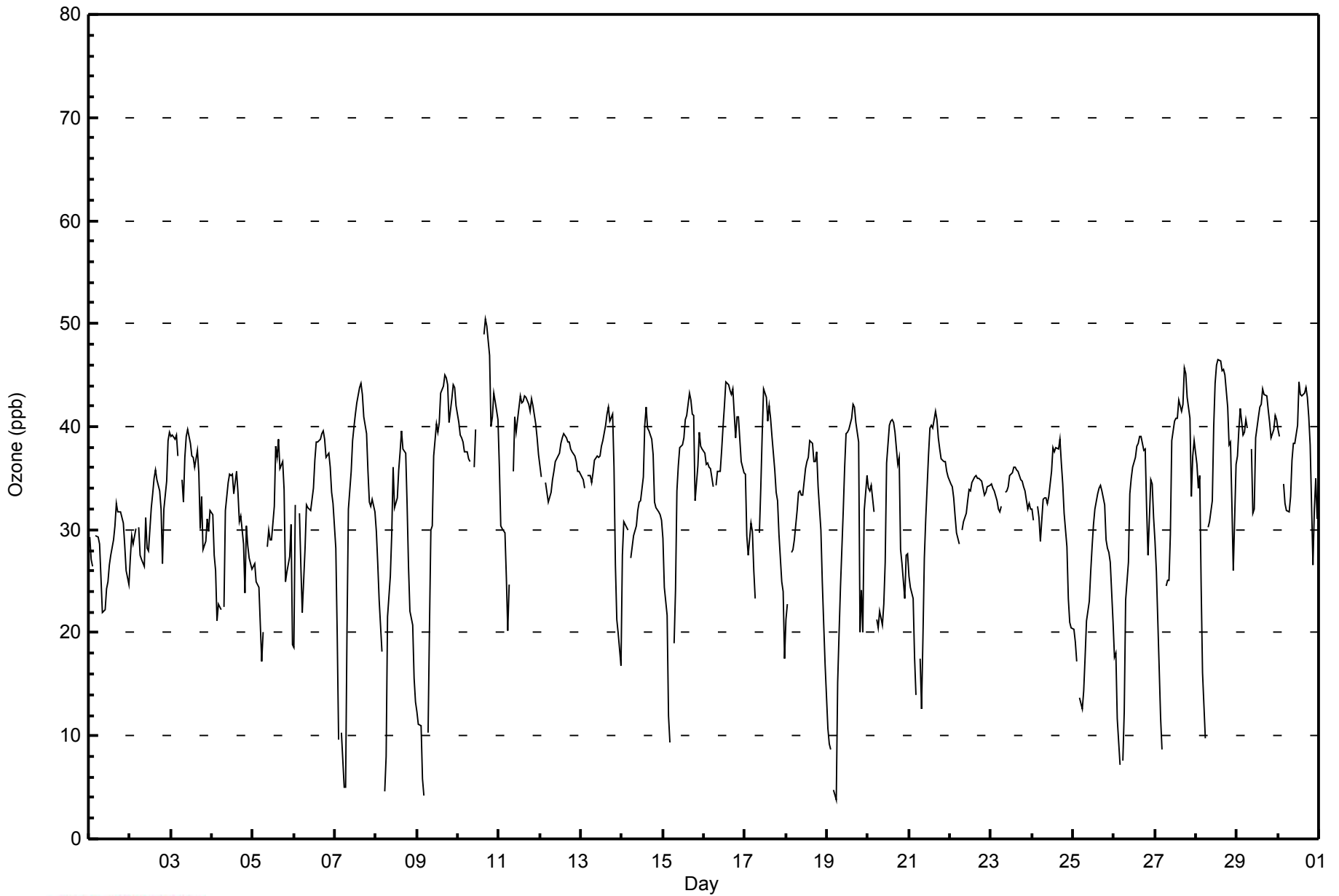
29.7	28.9	26.5	26.9	24.3	23.6	24.5	27.1	30.3	32.5	34.6	36.3	37.8	38.6	39.4	40.0	39.6	38.8	37.6	33.7	32.7	31.8	31.7	30.5	Diurnal Average		
40	40	42	39	39	41	40	37	38	41	40	44	46	46	46	49	50	50	50	47	43	43	44	44	42	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	62	9.04	9.04
21 - 50	624	90.96	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**

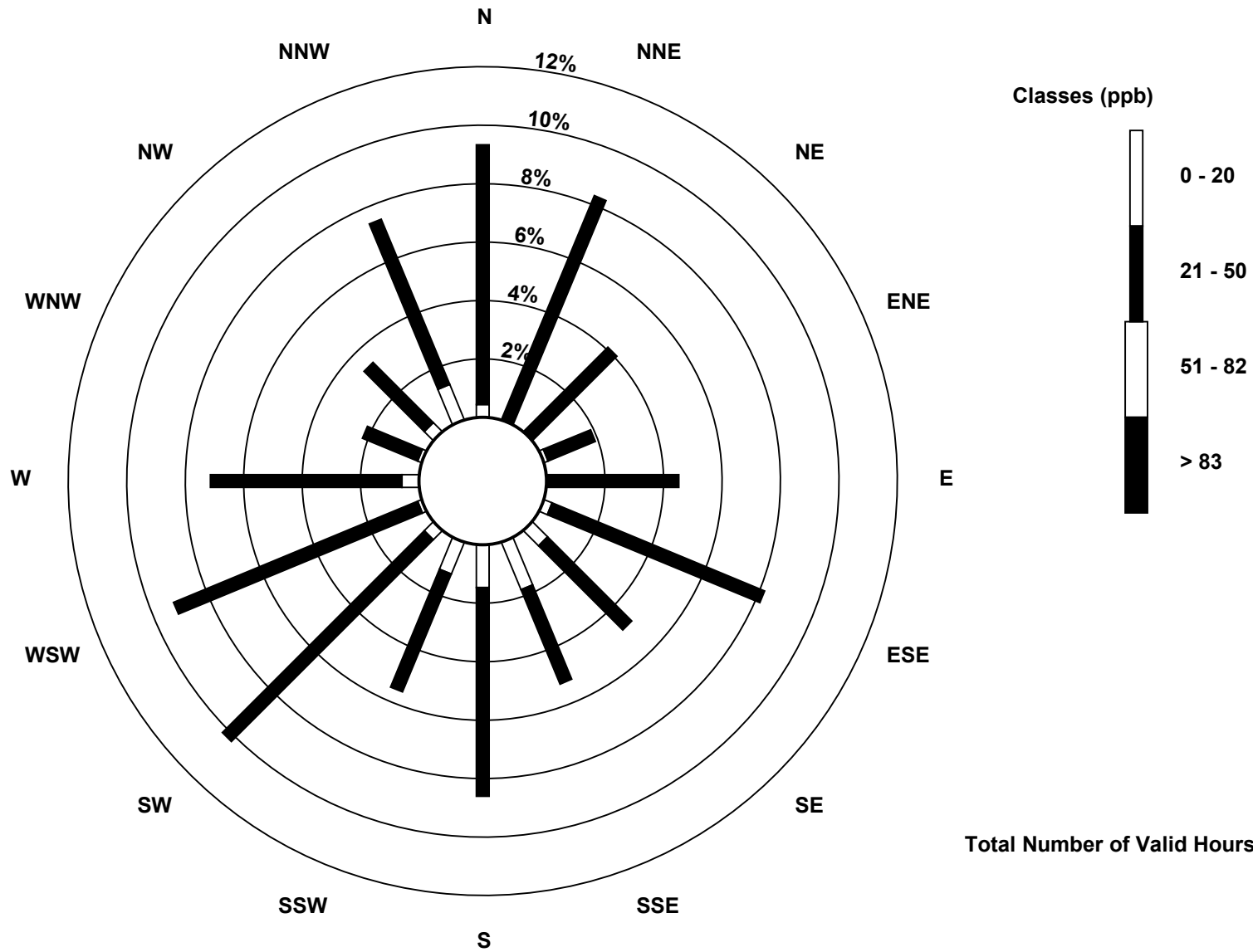
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	3	0	0	1	0	2	5	12	10	8	3	1	4	1	3	9	62
21 - 50	61	57	28	12	31	54	28	24	49	30	67	62	45	14	20	42	624
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	57	28	13	31	56	33	36	59	38	70	63	49	15	23	51	686

Total Number of Valid Hours: 686

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

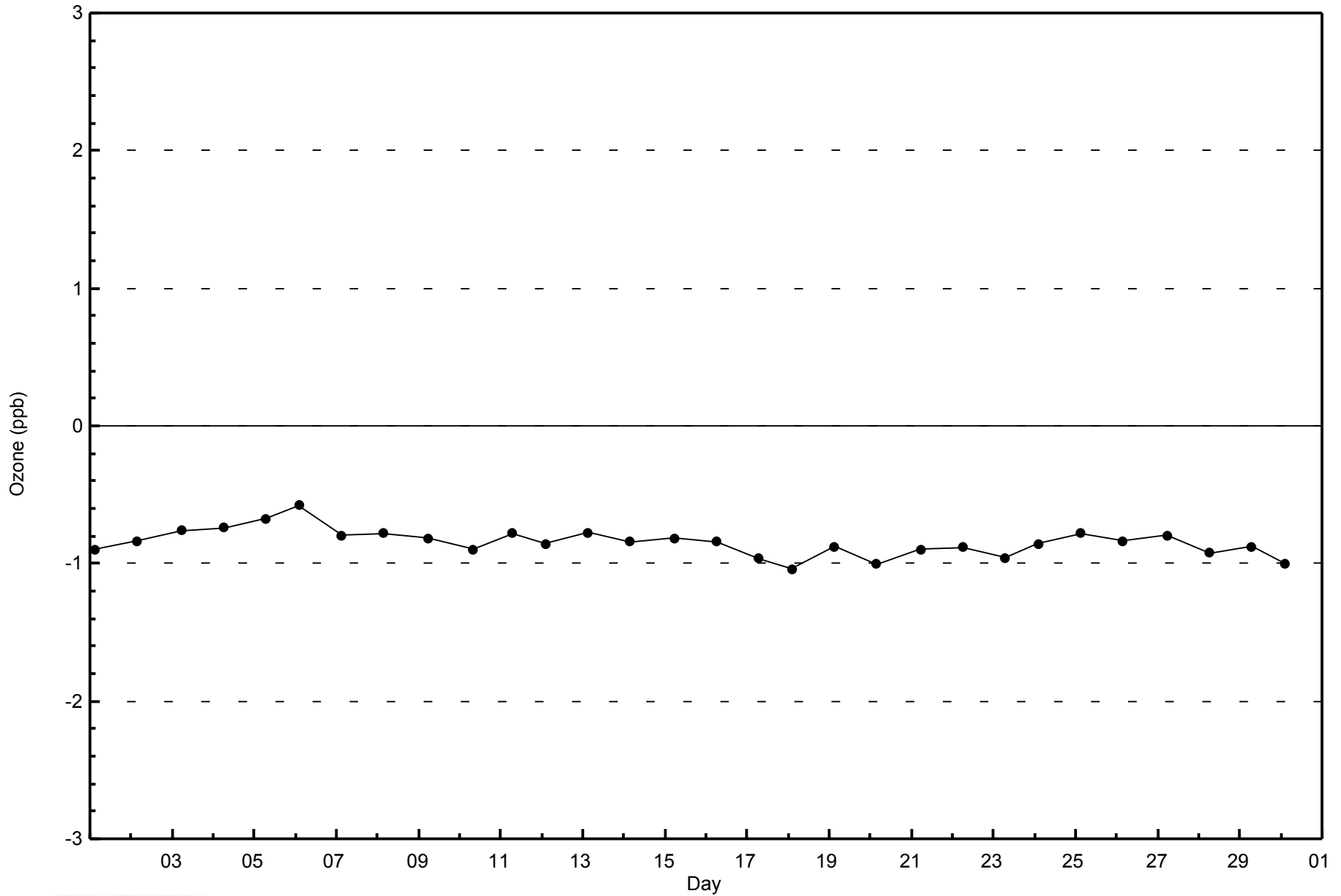
Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)





**WBEA**  
**Zero Responses**

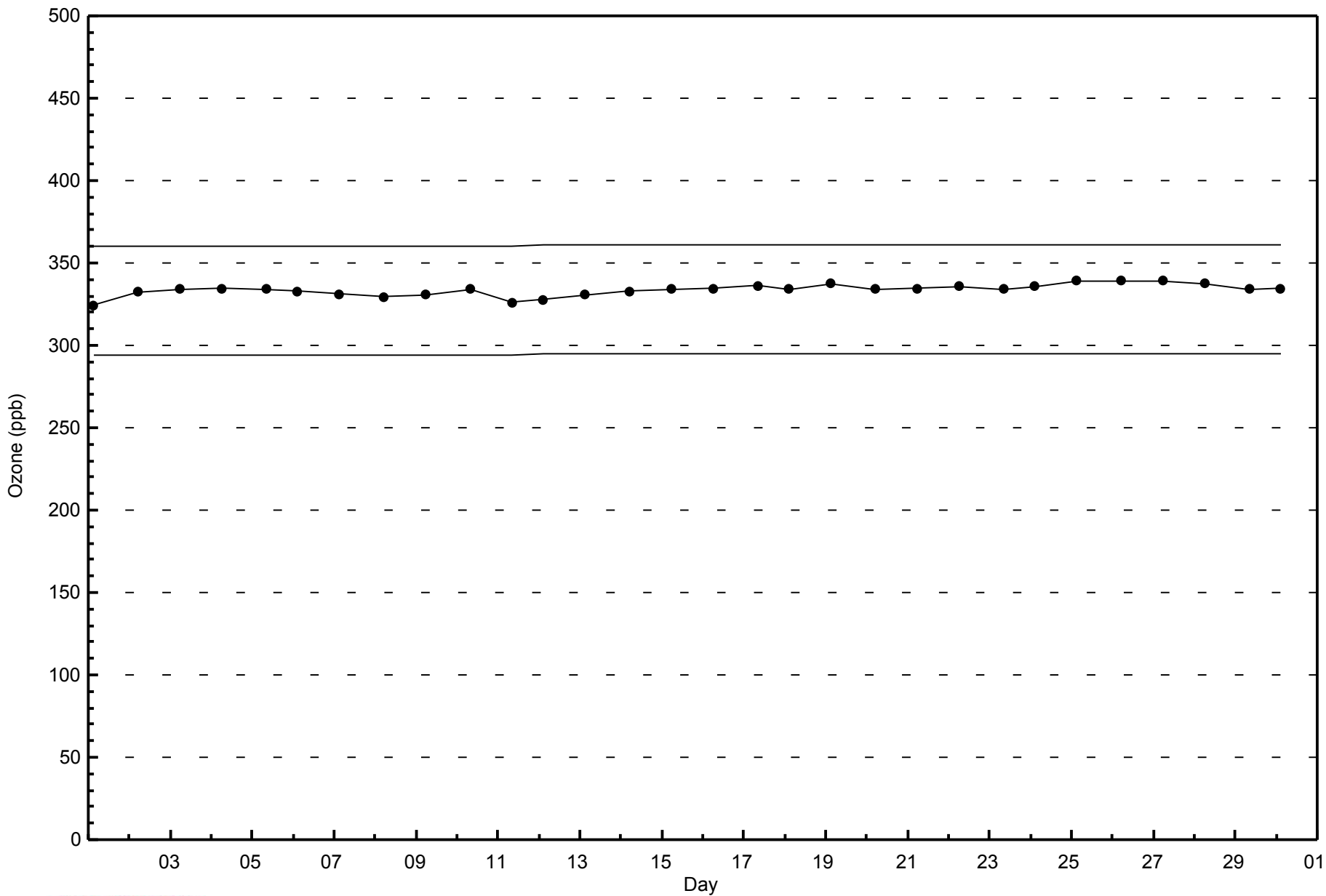
**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**



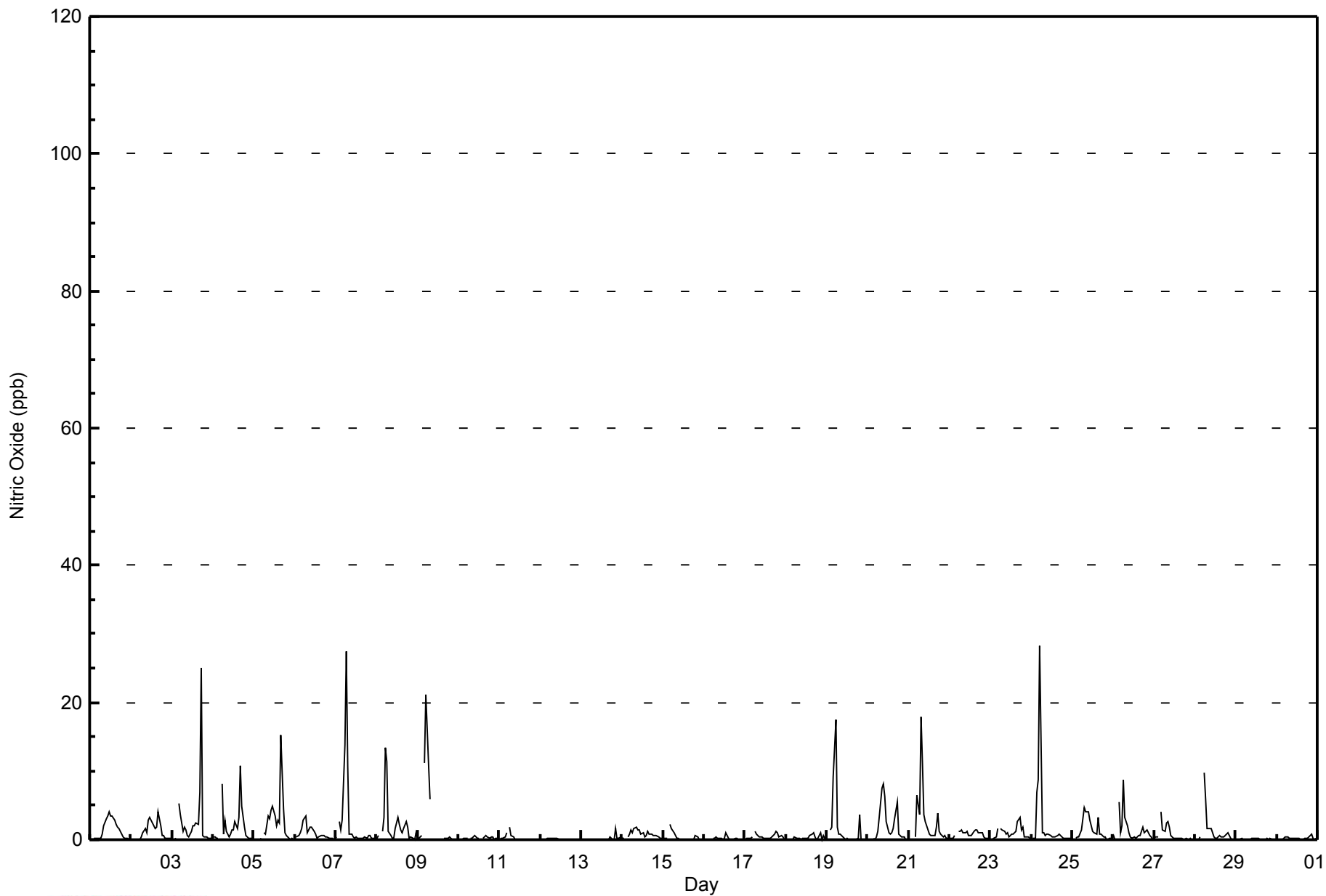


Maximum Value: 28 ppb on Apr 24 06:00														Maximum Daily Average: 2.8 ppb on Apr 7														Hours in Service: 720			
Minimum Value: 0 ppb on Apr 13 19:00														Minimum Daily Average: 0.1 ppb on Apr 12														Hours of Data: 682			
Maximum Diurnal Average: 5.5 ppb at hour 6														Minimum Diurnal Average: 0.1 ppb at hour 24														Hours of Missing Data: 38			
Monthly Average: 1.2 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 15														Hours of Calibration: 37			
																												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-Apr	0	Z	0	0	0	0	0	1	2	3	3	4	4	3	3	2	2	2	1	0	0	0	0	0	1.4	4					
2-Apr	0	0	Z	0	0	0	0	1	2	1	3	3	2	2	2	2	4	2	1	1	0	0	0	0	1.2	4					
3-Apr	0	0	0	Z	5	4	1	2	1	1	0	1	2	2	2	7	25	1	1	0	0	0	0	2.5	25						
4-Apr	0	0	0	0	Z	8	1	3	1	0	1	1	1	3	2	3	11	5	2	1	0	0	0	0	2.0	11					
5-Apr	0	0	0	0	0	Z	1	1	3	3	4	5	3	2	3	2	15	5	1	1	0	0	0	0	2.2	15					
6-Apr	Z	0	1	1	2	3	3	1	1	2	2	1	1	0	0	1	1	1	0	0	0	0	0	0	0.9	3					
7-Apr	0	Z	3	1	3	14	27	11	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2.8	27					
8-Apr	0	1	Z	1	3	13	11	1	1	0	0	2	3	2	1	1	2	3	2	0	0	0	0	1	2.2	13					
9-Apr	0	0	1	Z	11	21	11	6	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	21					
10-Apr	0	0	0	0	0	0	Z	0	0	1	0	0	0	0	M	0	0	1	0	0	0	0	0	0	0.3	1					
11-Apr	0	0	0	0	1	Z	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2					
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0					
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0.2	2					
14-Apr	0	0	Z	1	1	1	1	2	2	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0.8	2					
15-Apr	0	0	0	Z	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	2					
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1					
17-Apr	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0.4	1					
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	0.3	1					
19-Apr	0	Z	1	2	9	17	2	1	1	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	1.7	17					
20-Apr	0	0	Z	0	0	0	1	3	7	8	6	3	1	1	1	2	3	5	1	1	0	0	0	0	2.0	8					
21-Apr	0	0	0	Z	0	7	4	18	11	4	3	1	1	1	1	1	2	4	1	1	0	1	0	0	2.6	18					
22-Apr	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.8	1					
23-Apr	0	0	0	0	2	Z	2	1	1	1	1	0	1	1	1	1	3	3	1	2	0	0	0	0	1.0	3					
24-Apr	Z	0	0	7	9	28	1	1	1	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	2.3	28					
25-Apr	0	Z	0	0	0	1	3	5	4	4	3	2	1	1	1	3	1	1	0	0	0	0	0	0	1.4	5					
26-Apr	1	0	Z	5	1	2	9	3	2	1	0	0	0	0	0	1	1	2	1	1	1	1	0	0	1.5	9					
27-Apr	0	0	0	Z	4	1	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	4					
28-Apr	0	0	0	0	Z	10	6	2	2	2	1	0	0	0	1	0	0	0	1	1	1	0	0	0	1.2	10					
29-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1					
																												Diurnal Average			
																												Diurnal Maximum			
Z - zerospan														C - Calibration														M - Maintenance			



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	99.41	99.41
21 - 40	4	0.59	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: 682

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - April 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	65	55	26	14	31	56	33	32	60	40	67	62	48	14	23	52	678
21 - 40	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	55	28	14	31	56	33	34	60	40	67	62	48	14	23	52	682

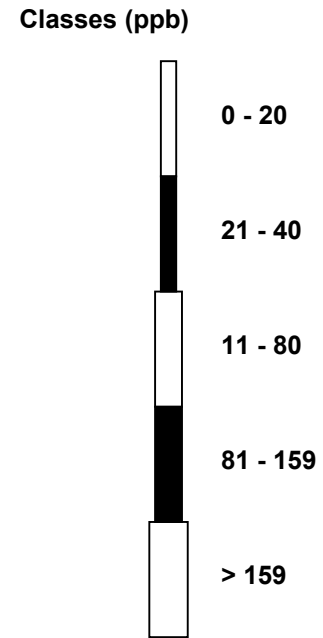
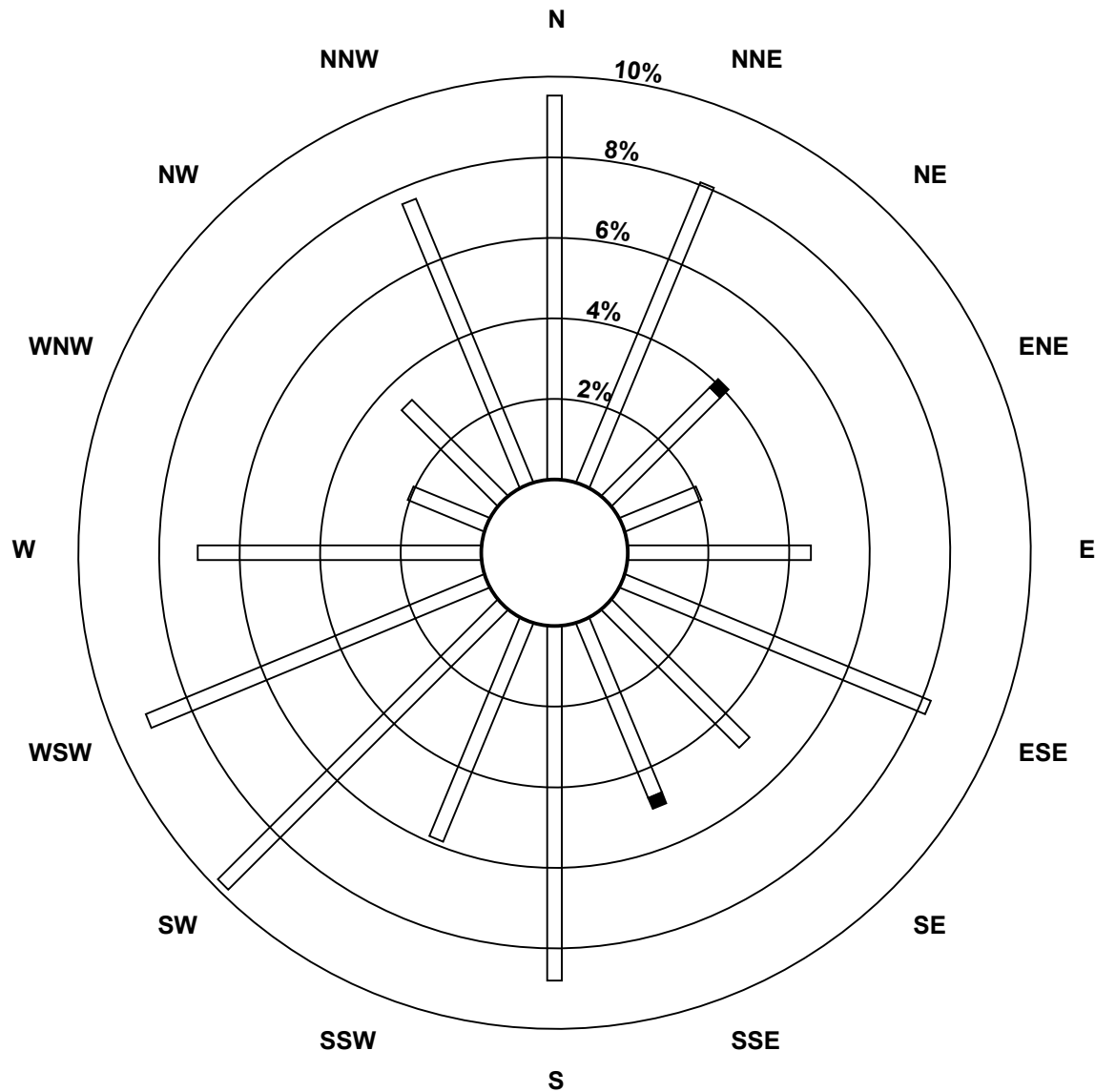
Total Number of Valid Hours: 682

Total Number of Hours: 720



Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

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

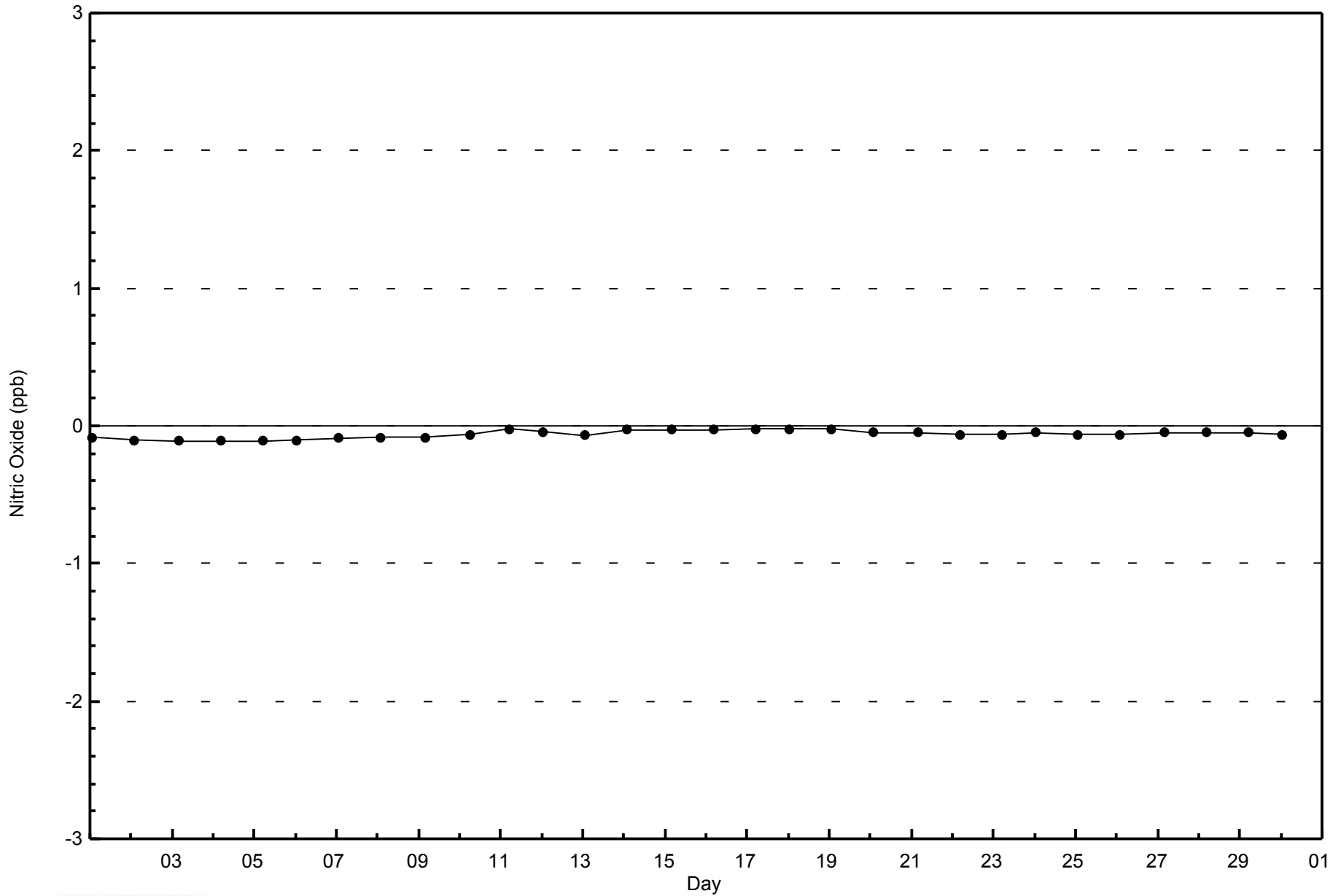


Total Number of Valid Hours: 682



WBEA  
Zero Responses

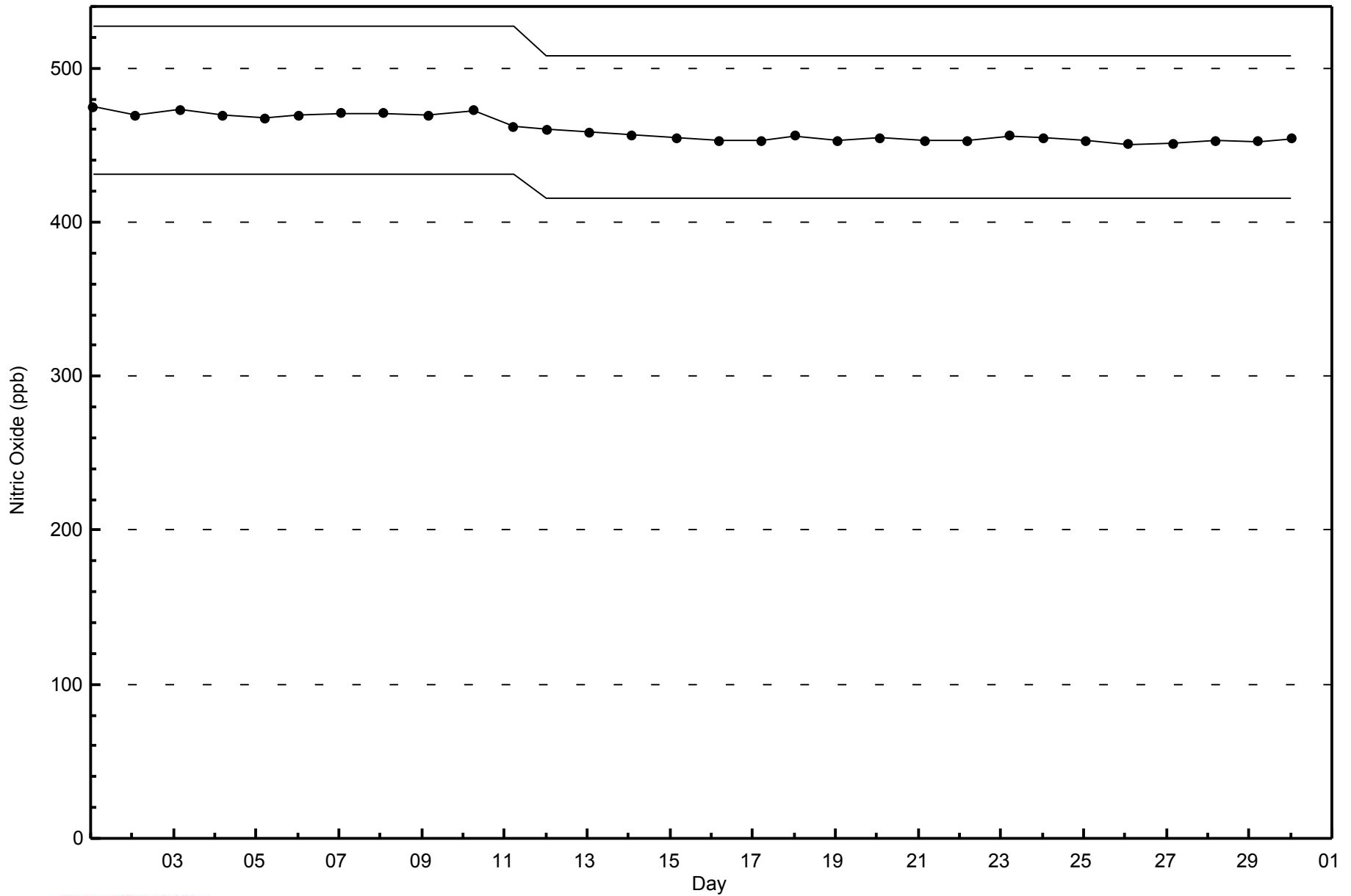
Nitric Oxide (NO) - ppb  
Patricia McInnes - April 2015





WBEA  
Span Responses

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





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 32 ppb on Apr 7 07:00	Maximum Daily Average: 7.4 ppb on Apr 7		Hours of Data:	682
Minimum Value: 0 ppb on Apr 9 16:00	Minimum Daily Average: 0.2 ppb on Apr 12		Hours of Missing Data:	38
Maximum Diurnal Average: 9.4 ppb at hour 6	Minimum Diurnal Average: 1.5 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 3.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 8 P <sub>99</sub> = 21		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-Apr	4	Z	4	3	1	1	1	4	8	8	7	7	6	6	5	4	5	7	6	4	4	6	8	7	4.9	8
2-Apr	3	3	Z	4	4	3	6	7	8	4	7	8	5	4	4	5	6	6	8	13	8	6	4	3	5.5	13
3-Apr	3	2	2	Z	6	10	4	6	3	1	1	2	4	4	5	5	9	14	7	11	9	6	7	5	5.4	14
4-Apr	5	8	9	4	Z	12	7	8	3	1	2	2	3	5	3	5	9	8	10	13	6	7	8	8	6.3	13
5-Apr	6	5	3	2	3	Z	7	3	6	5	6	7	5	4	6	5	11	8	8	16	12	8	8	5	6.4	16
6-Apr	Z	4	4	5	10	14	8	3	3	4	4	2	1	1	1	1	2	2	3	4	2	2	3	4	3.7	14
7-Apr	7	Z	25	19	13	27	32	15	2	2	1	1	1	1	1	1	1	2	2	5	6	5	2	2	7.4	32
8-Apr	2	4	Z	12	14	29	20	4	1	0	0	3	6	5	4	3	5	6	10	8	6	5	4	5	6.7	29
9-Apr	4	6	7	Z	22	28	20	12	C	C	C	C	C	C	C	0	0	0	1	6	3	1	1	0	--	28
10-Apr	0	1	1	1	2	2	Z	1	0	1	1	0	0	M	1	1	2	2	3	8	7	2	2	2	1.7	8
11-Apr	5	8	5	6	10	Z	10	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.1	10
12-Apr	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
13-Apr	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	5	2	4	6	0.9	6
14-Apr	4	2	Z	2	4	5	4	3	3	3	2	2	2	1	1	4	2	2	3	4	3	2	2	1	2.6	5
15-Apr	1	3	3	Z	11	4	2	1	0	0	0	0	0	0	0	0	0	0	0	9	4	0	1	0	1.7	11
16-Apr	0	1	0	0	Z	1	1	1	0	0	0	0	0	1	0	0	0	0	3	1	0	0	1	1	0.5	3
17-Apr	0	4	3	1	2	Z	4	1	1	1	1	0	0	0	1	2	3	4	4	4	4	4	4	2	1.9	4
18-Apr	Z	2	1	0	0	2	4	2	1	0	0	1	1	1	1	3	2	0	2	7	4	3	2	2	1.7	7
19-Apr	3	Z	7	5	14	15	4	1	1	0	0	0	0	0	0	0	0	0	2	20	6	7	4	1	3.9	20
20-Apr	1	0	Z	2	2	3	5	9	14	14	12	5	2	2	3	4	5	10	6	13	10	12	7	5	6.3	14
21-Apr	6	7	6	Z	10	12	10	20	15	7	5	3	2	2	2	3	4	3	3	1	1	1	1	1	5.4	20
22-Apr	1	1	1	2	Z	3	3	2	1	1	1	1	1	0	1	1	1	1	2	3	1	1	0	1	1.1	3
23-Apr	0	0	1	1	2	Z	2	2	1	1	1	1	1	1	2	2	3	4	3	4	2	1	0	1	1.5	4
24-Apr	Z	2	1	4	7	15	3	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	2.5	15
25-Apr	3	Z	4	6	6	7	6	7	5	5	4	3	2	2	1	2	2	2	3	4	3	2	5	6	4.0	7
26-Apr	6	3	Z	13	9	5	12	6	4	1	1	0	1	0	1	1	1	3	3	9	13	4	2	1	4.3	13
27-Apr	2	3	9	Z	18	8	5	5	5	3	1	1	1	1	0	1	1	0	0	2	2	4	1	1	3.2	18
28-Apr	1	2	1	6	Z	26	15	3	4	5	2	1	1	1	1	2	2	5	8	6	8	5	1	1	4.6	26
29-Apr	0	0	0	1	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	1	1	3	2	1	1	0.5	3
30-Apr	Z	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	1	2	5	10	4	2	3	1.5	10

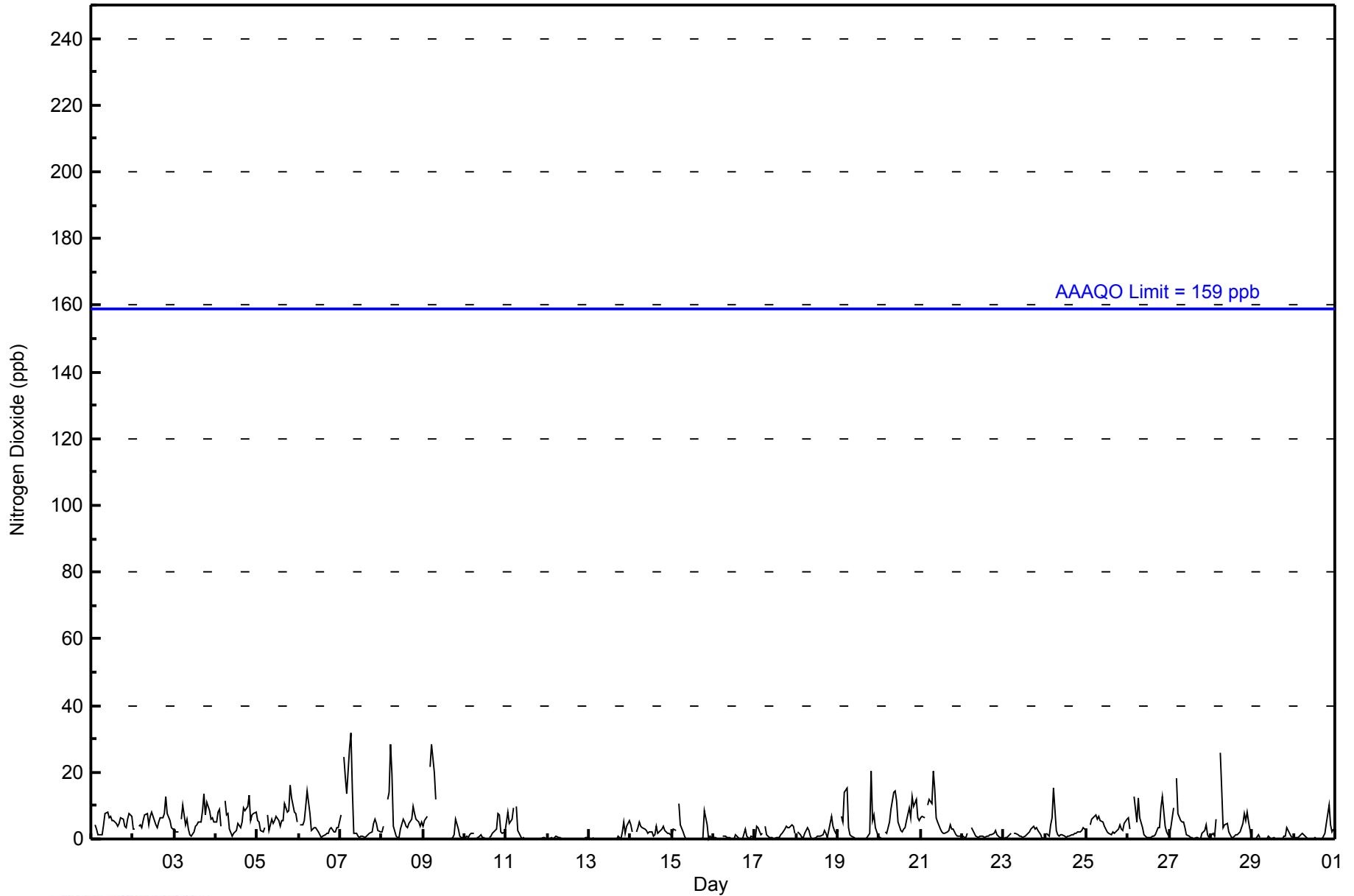
2.7	2.8	3.9	4.0	6.6	9.4	6.7	4.3	3.1	2.4	2.0	1.8	1.6	1.5	1.5	1.7	2.5	3.1	3.3	6.0	4.8	3.6	3.0	2.5	Diurnal Average	
7	8	25	19	22	29	32	20	15	14	12	8	6	6	6	5	11	14	10	20	13	12	8	8	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	675	98.97	98.97
21 - 40	7	1.03	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: 682

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - April 2015**

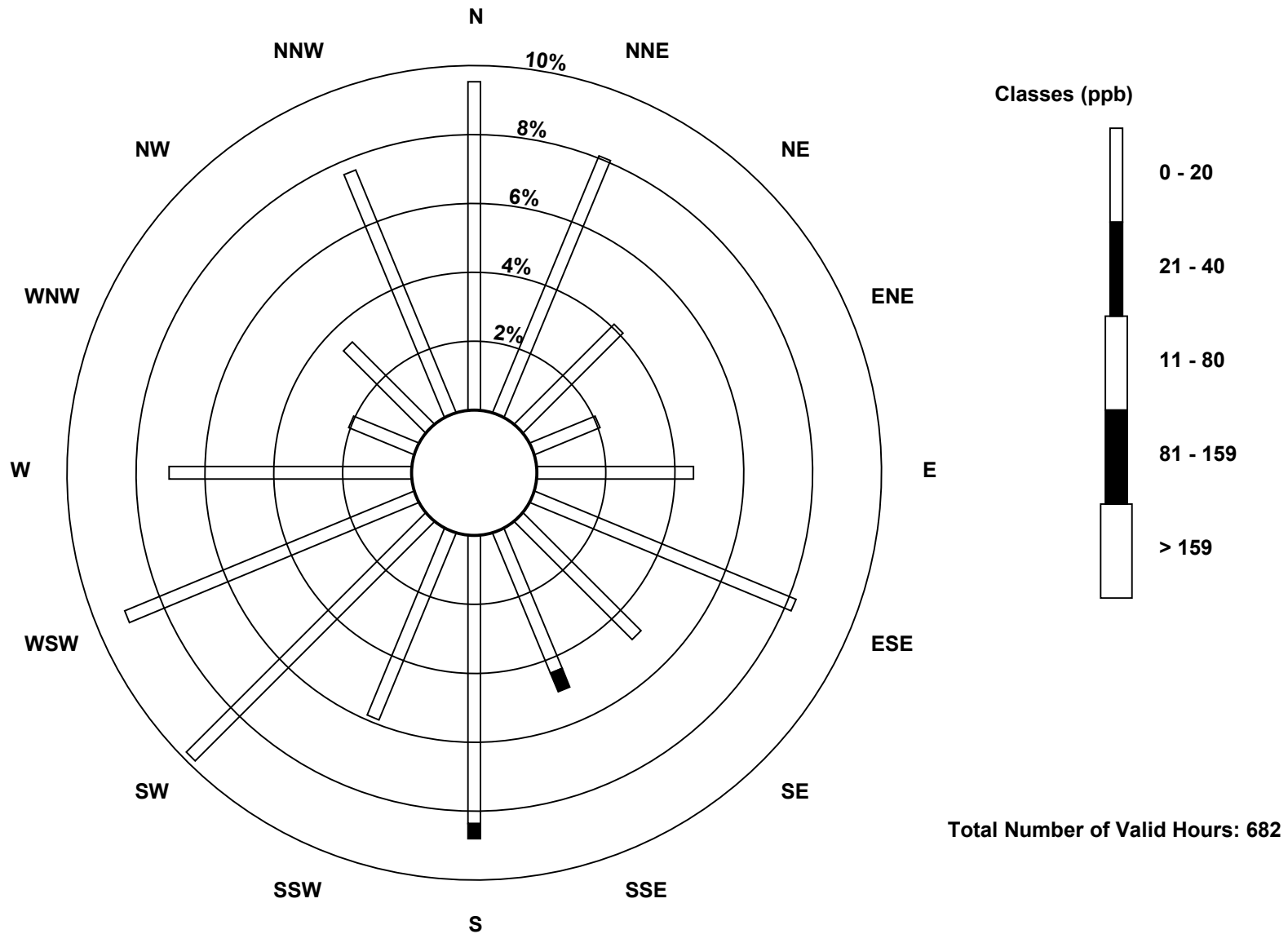
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	55	28	14	31	56	33	30	57	40	67	62	48	14	23	52	675
21 - 40	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0	7
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	55	28	14	31	56	33	34	60	40	67	62	48	14	23	52	682

Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)**

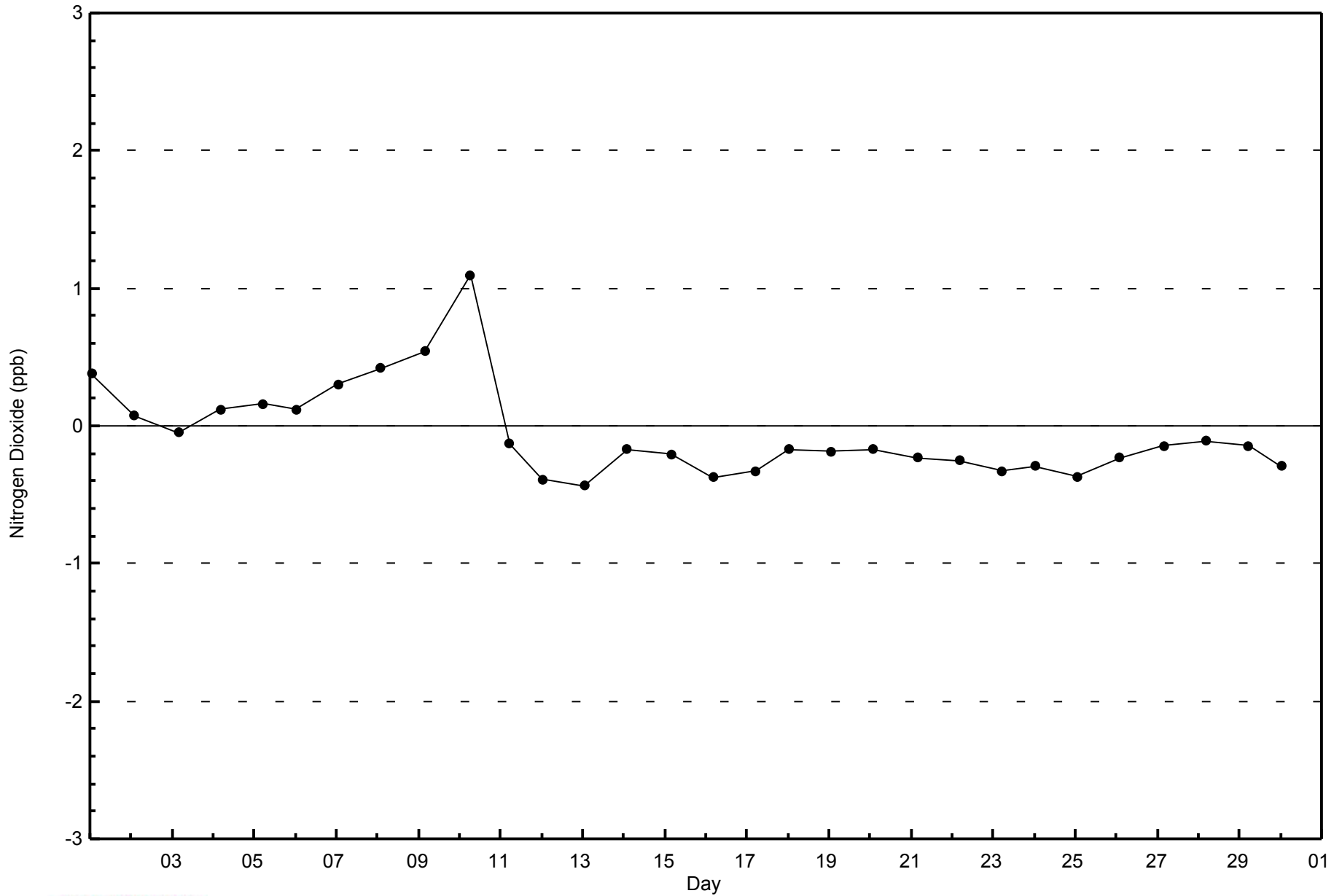






WBEA  
Zero Responses

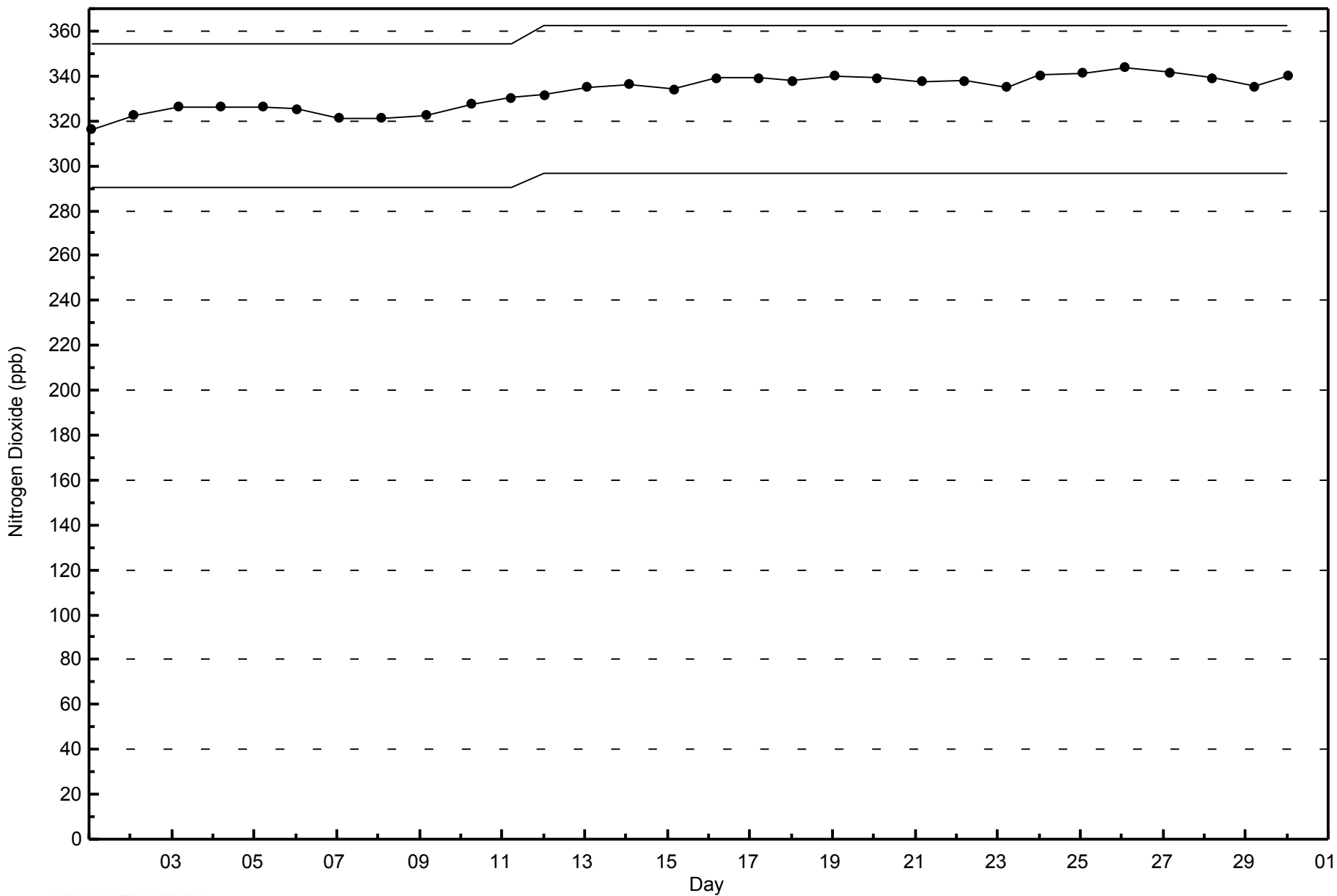
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - April 2015



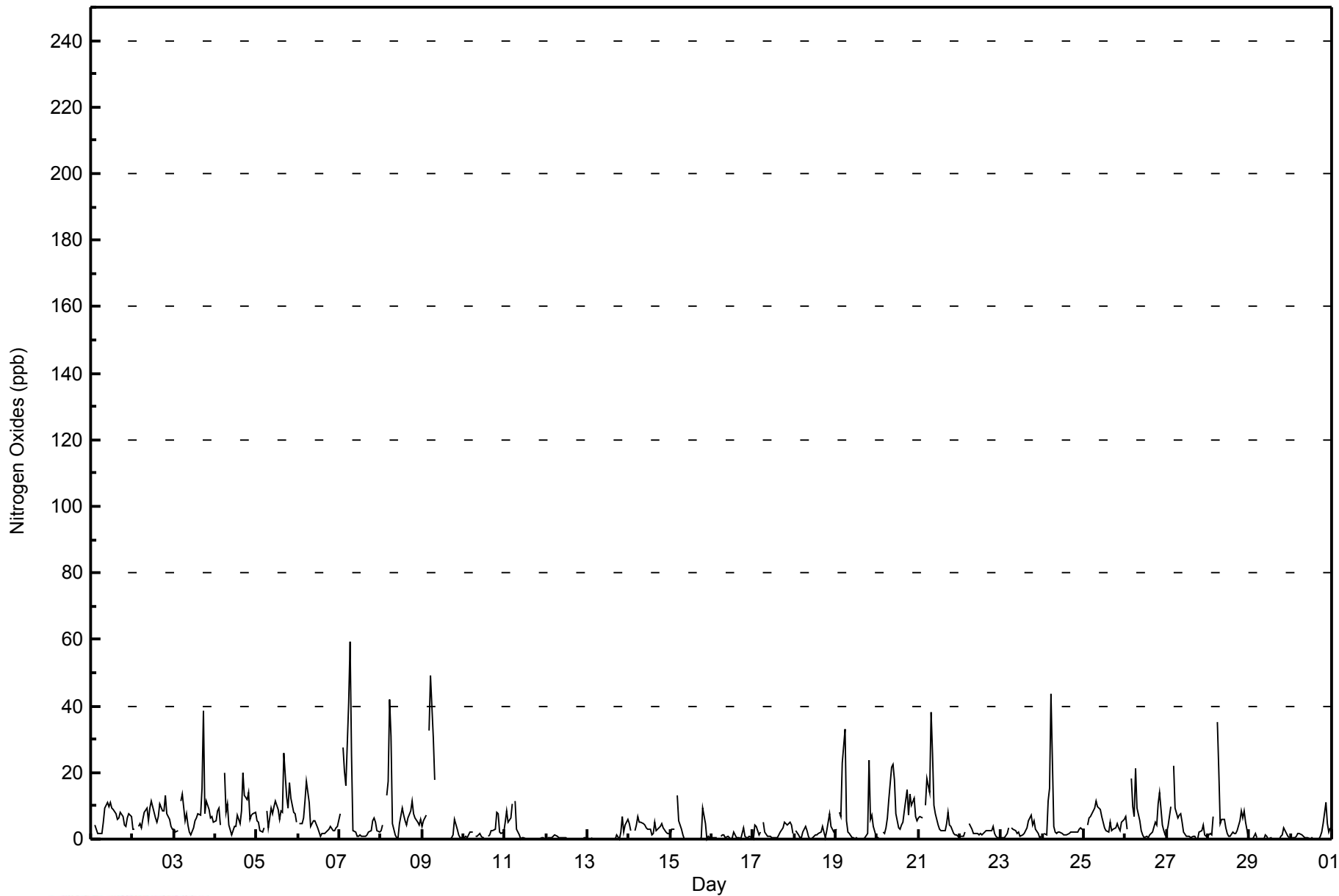


Maximum Value: 59 ppb on Apr 7 07:00																	Maximum Daily Average: 10.2 ppb on Apr 7																	Hours in Service: 720	
Minimum Value: 0 ppb on Apr 19 17:00																	Minimum Daily Average: 0.3 ppb on Apr 12																	Hours of Data: 682	
Maximum Diurnal Average: 14.8 ppb at hour 6																	Minimum Diurnal Average: 2.2 ppb at hour 15																	Hours of Missing Data: 38	
Monthly Average: 4.7 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 6 P <sub>90</sub> = 10 P <sub>99</sub> = 38																	Hours of Calibration: 37	
																																		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-Apr	4	Z	4	3	2	2	2	5	9	11	10	11	9	9	8	6	6	8	7	4	4	6	8	7	6.3	11									
2-Apr	3	3	Z	4	4	3	6	8	9	5	9	11	8	6	5	7	10	8	8	13	8	6	4	3	6.7	13									
3-Apr	3	2	2	Z	11	14	6	8	4	2	1	3	6	6	8	7	15	39	8	11	9	6	7	5	8.0	39									
4-Apr	5	8	9	4	Z	20	8	11	4	1	2	4	4	7	5	8	20	13	12	14	6	7	8	8	8.3	20									
5-Apr	6	5	3	2	3	Z	8	3	9	8	10	12	9	6	8	8	26	13	9	17	12	8	8	5	8.6	26									
6-Apr	Z	4	5	6	11	17	11	4	4	5	5	3	2	1	1	2	2	3	3	4	2	2	3	4	4.7	17									
7-Apr	8	Z	27	20	16	41	59	26	3	2	1	1	1	1	1	1	1	2	2	5	6	5	3	2	10.2	59									
8-Apr	3	4	Z	13	17	42	31	5	1	0	0	5	9	7	5	4	6	9	11	8	6	5	4	6	8.9	42									
9-Apr	4	6	7	Z	33	49	31	18	C	C	C	C	C	C	C	0	0	1	1	6	3	1	1	0	--	49									
10-Apr	0	1	1	1	2	2	Z	1	1	2	1	0	0	M	1	1	2	2	3	8	7	2	2	2	2.0	8									
11-Apr	5	8	5	6	10	Z	12	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3	12									
12-Apr	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1									
13-Apr	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	7	2	4	6	1.0	7									
14-Apr	5	2	Z	3	4	7	5	5	5	4	3	3	3	1	2	5	3	3	4	5	3	2	2	2	3.5	7									
15-Apr	1	3	3	Z	13	6	3	1	0	3	0	0	0	0	0	0	0	0	0	9	5	0	1	0	2.0	13									
16-Apr	1	1	0	0	Z	1	1	1	1	1	0	0	0	2	1	0	0	0	3	1	0	0	1	0	0.7	3									
17-Apr	0	4	4	1	2	Z	5	2	1	1	1	0	0	1	1	1	2	4	5	4	4	5	4	2	2.4	5									
18-Apr	Z	2	1	1	1	2	4	3	1	0	0	1	1	1	1	2	4	2	0	3	8	4	3	2	2.1	8									
19-Apr	3	Z	8	7	23	33	5	2	2	1	0	0	0	0	0	0	0	0	2	24	6	7	4	1	5.6	33									
20-Apr	1	0	Z	2	2	4	6	12	21	22	18	8	3	3	4	5	8	15	7	13	10	12	7	5	8.3	22									
21-Apr	6	7	6	Z	10	18	14	38	26	10	8	4	3	3	2	3	5	8	4	4	2	1	1	1	8.0	38									
22-Apr	1	1	1	2	Z	4	4	3	2	2	2	1	2	1	2	2	3	2	2	4	2	1	0	1	1.9	4									
23-Apr	0	0	1	2	3	Z	3	3	2	2	2	1	1	2	3	3	5	7	4	5	3	2	0	1	2.5	7									
24-Apr	Z	2	1	11	15	44	4	2	2	2	2	2	1	1	1	2	2	2	2	2	2	3	3	3	4.9	44									
25-Apr	3	Z	4	6	7	8	9	11	10	9	7	5	3	3	2	5	2	3	3	5	3	3	5	6	5.3	11									
26-Apr	7	3	Z	18	10	7	21	9	6	2	1	0	1	0	1	2	2	5	4	11	14	4	3	1	5.8	21									
27-Apr	2	4	10	Z	22	9	7	7	8	5	2	1	1	1	0	1	1	0	0	2	2	4	1	1	4.0	22									
28-Apr	1	2	1	7	Z	35	21	5	6	6	3	2	1	1	2	2	2	2	6	9	6	8	5	1	5.8	35									
29-Apr	0	0	0	1	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	1	1	3	2	1	1	0.6	3									
30-Apr	Z	0	0	1	2	2	1	1	0	0	0	0	1	0	0	0	0	1	2	5	11	4	2	3	1.7	11									
																	Diurnal Average																		
																	Diurnal Maximum																		
Z - zerospan																	C - Calibration																	M - Maintenance	



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	659	96.63	96.63
21 - 40	18	2.64	99.27
41 - 80	5	0.73	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 682

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - April 2015**

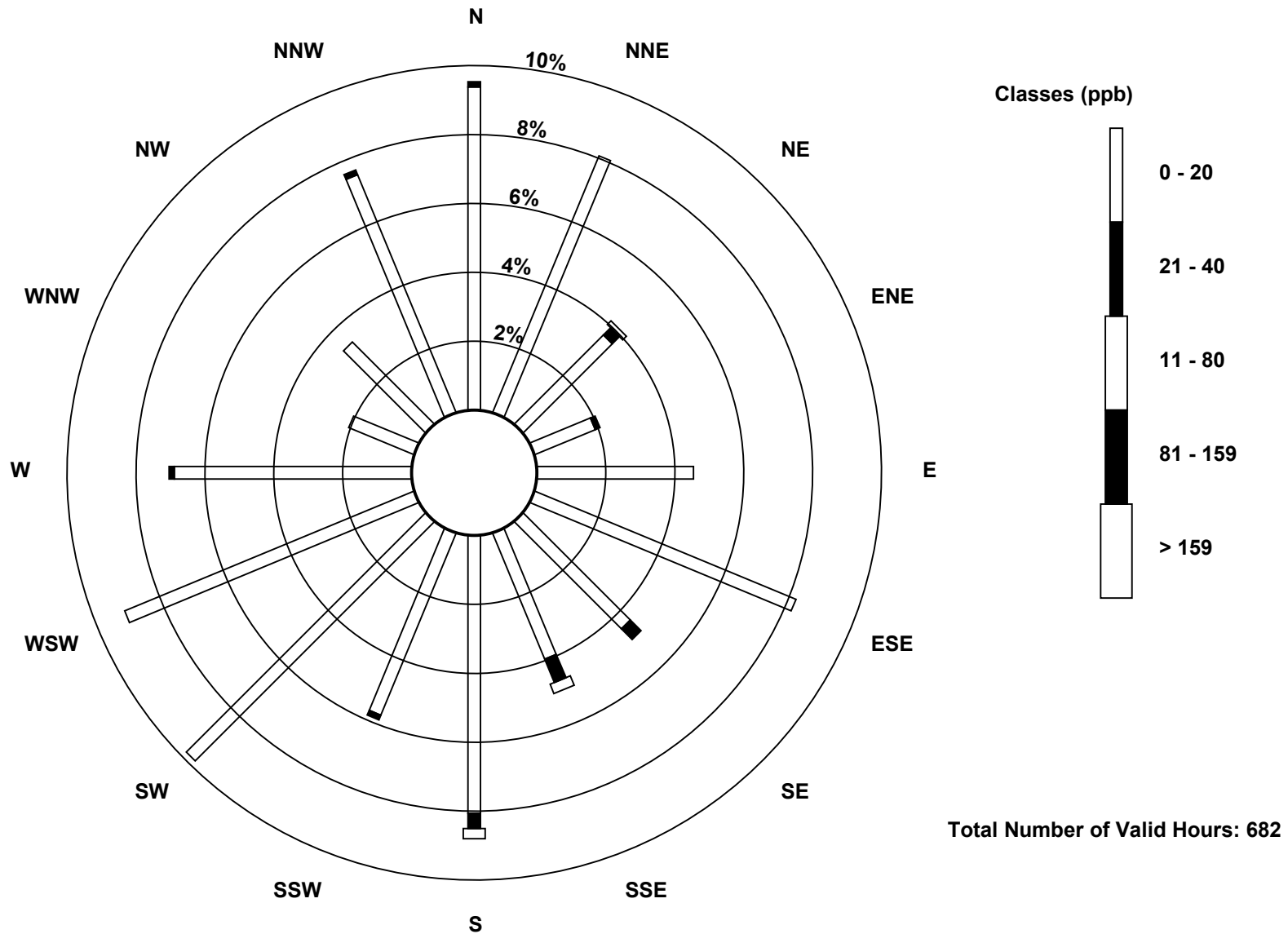
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	64	55	25	13	31	56	30	27	55	39	67	62	47	14	23	51	659
21 - 40	1	0	2	1	0	0	3	5	3	1	0	0	1	0	0	1	18
11 - 80	0	0	1	0	0	0	0	2	2	0	0	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	55	28	14	31	56	33	34	60	40	67	62	48	14	23	52	682

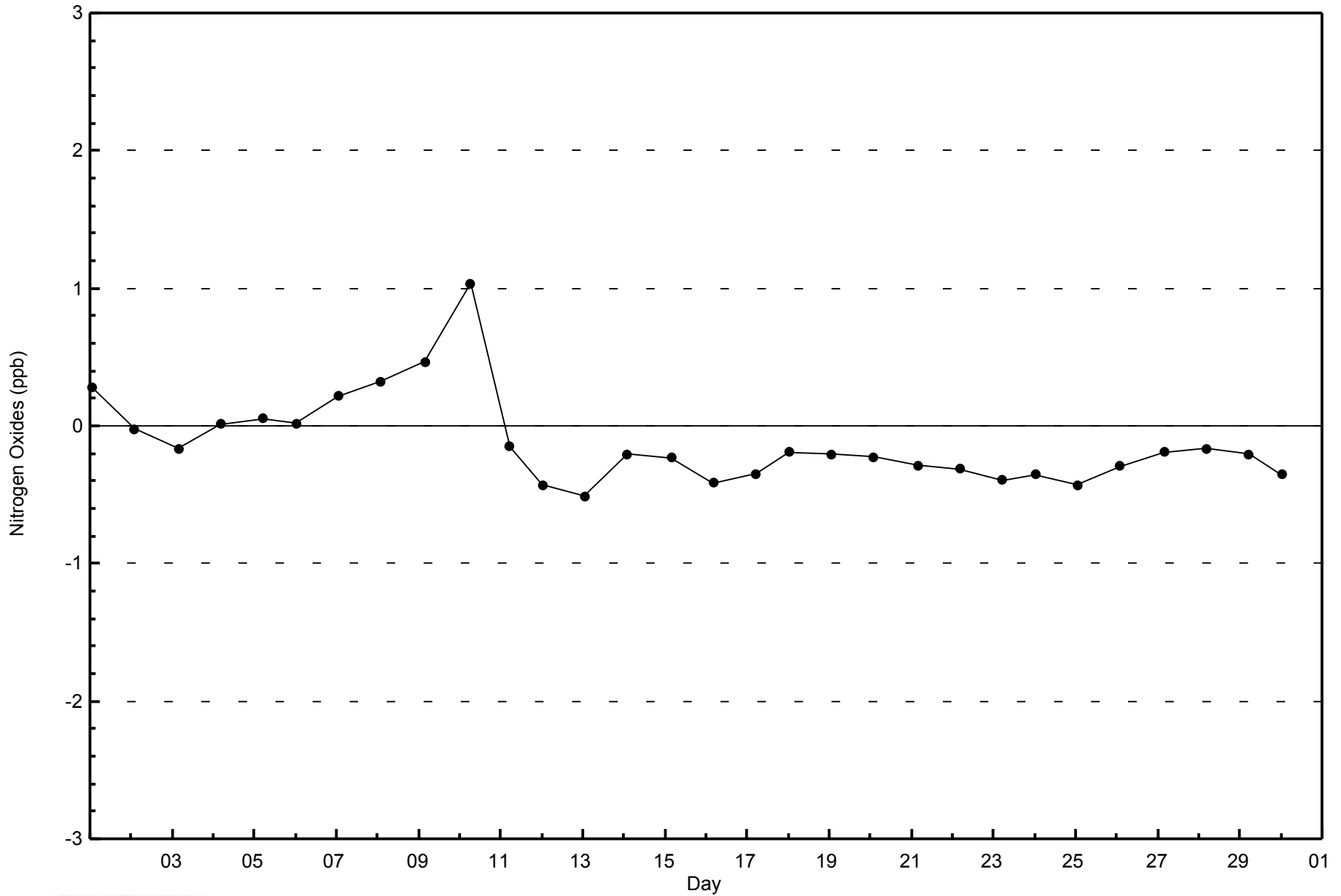
Total Number of Valid Hours: 682

Total Number of Hours: 720

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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes (AMS 6)**



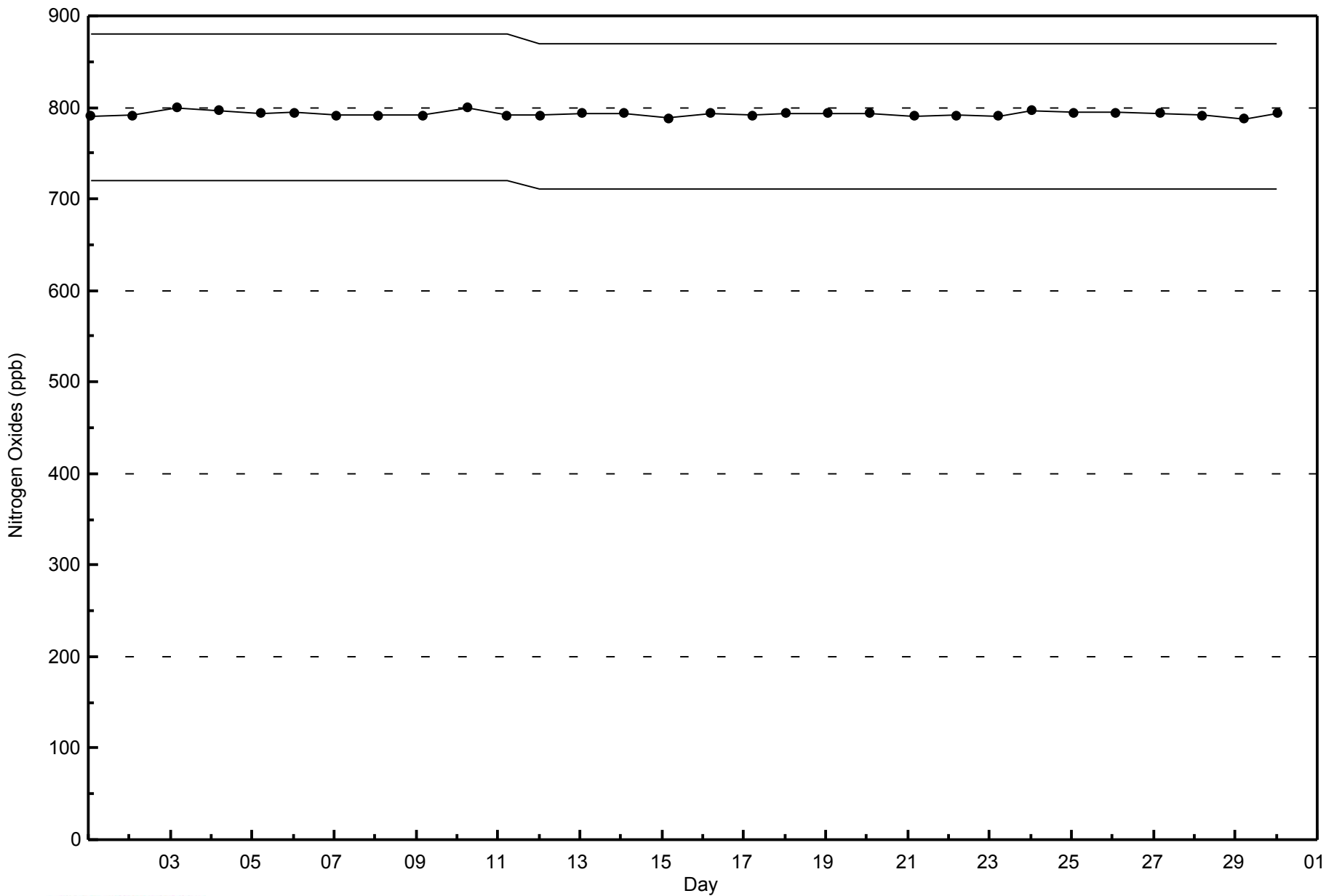






**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - April 2015**

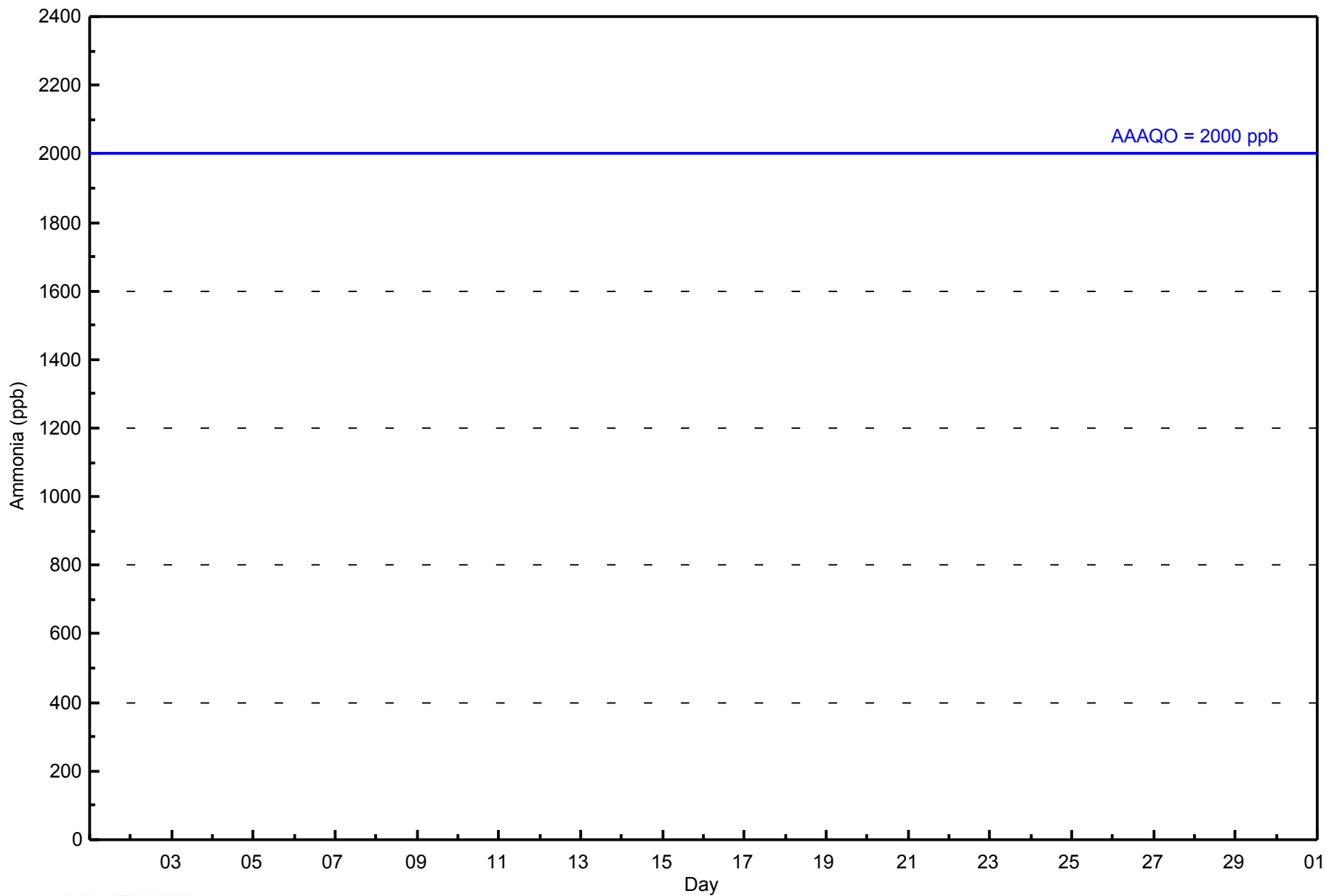






**WBEA**  
**Hourly Averages**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	633	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: 633

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - April 2015**

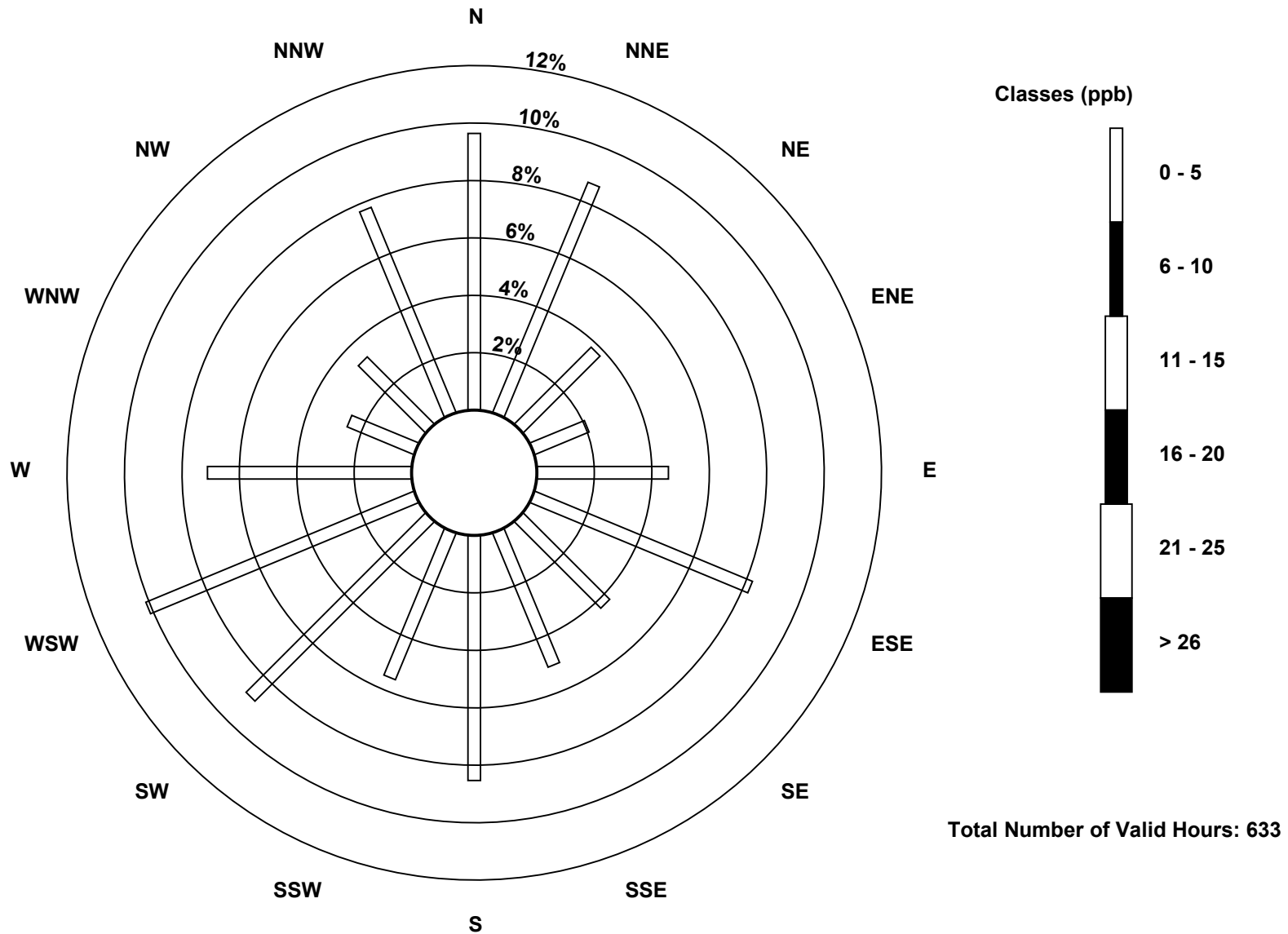
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	61	55	24	13	29	52	27	32	54	35	56	64	45	16	21	49	633
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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
<b>Totals</b>	61	55	24	13	29	52	27	32	54	35	56	64	45	16	21	49	633

Total Number of Valid Hours: 633

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

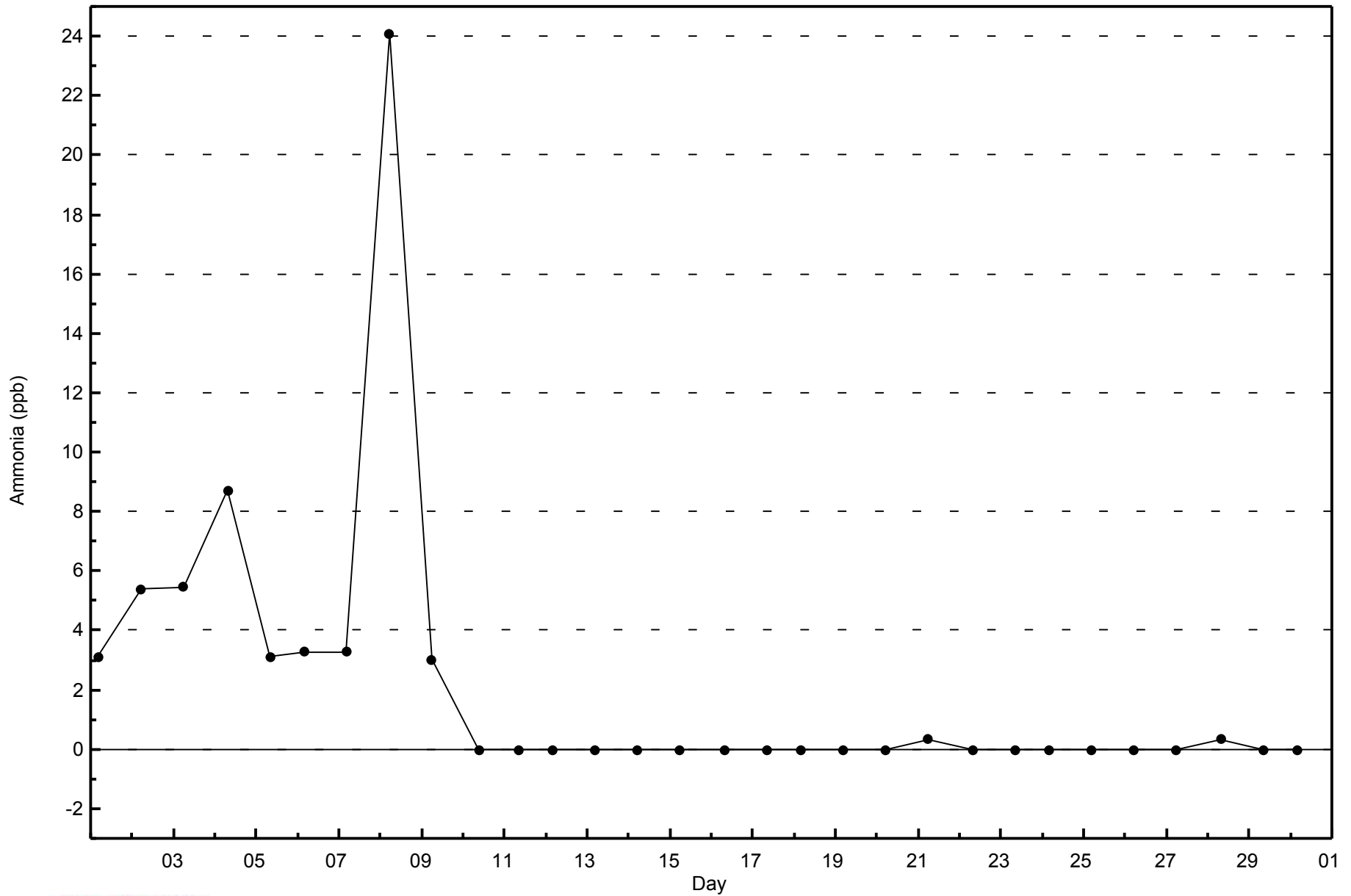
Ammonia (NH<sub>3</sub>) - ppb  
 Patricia McInnes (AMS 6)





WBEA  
Zero Responses

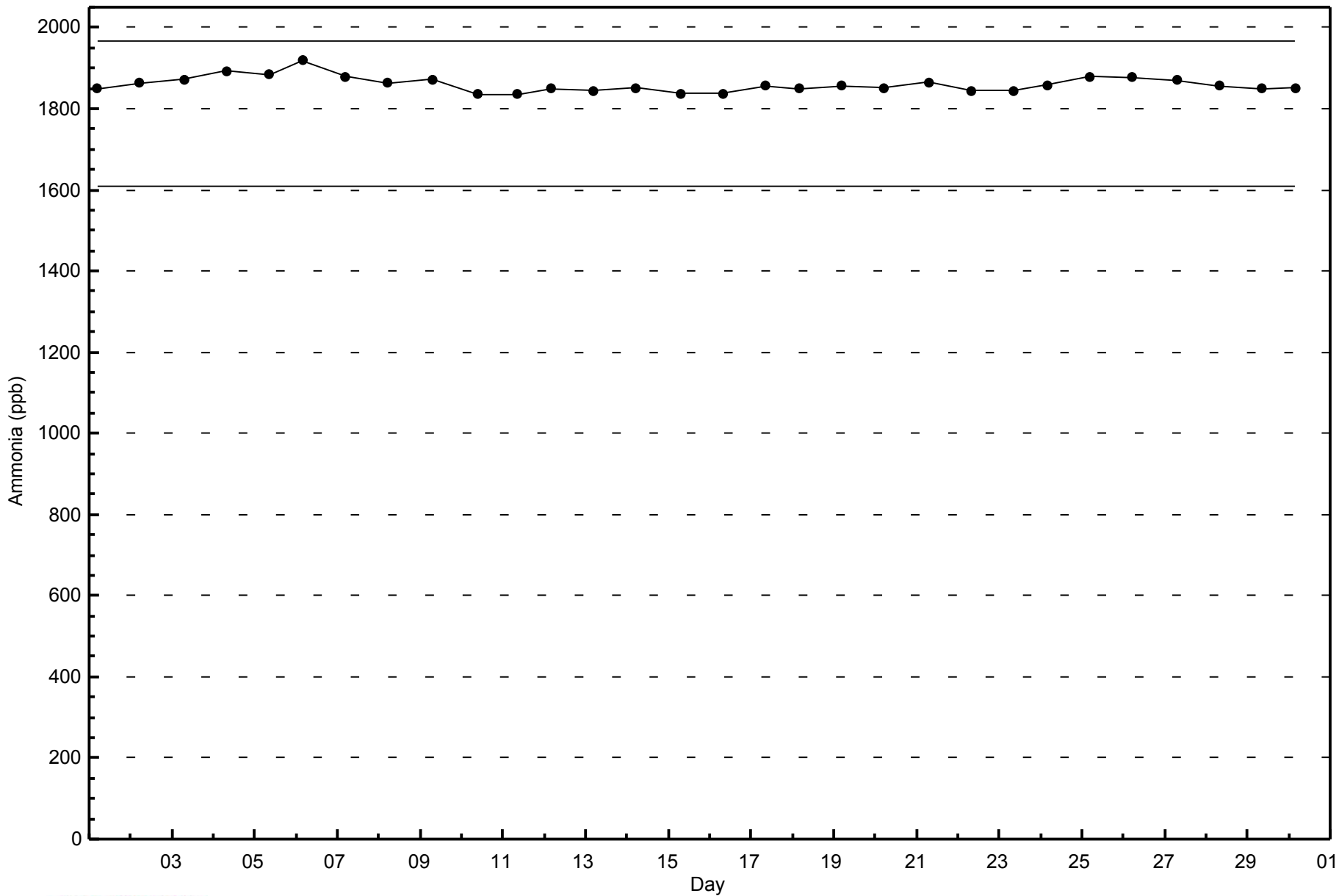
Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - April 2015





WBEA  
Span Responses

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - April 2015







Summary of Hour Averages

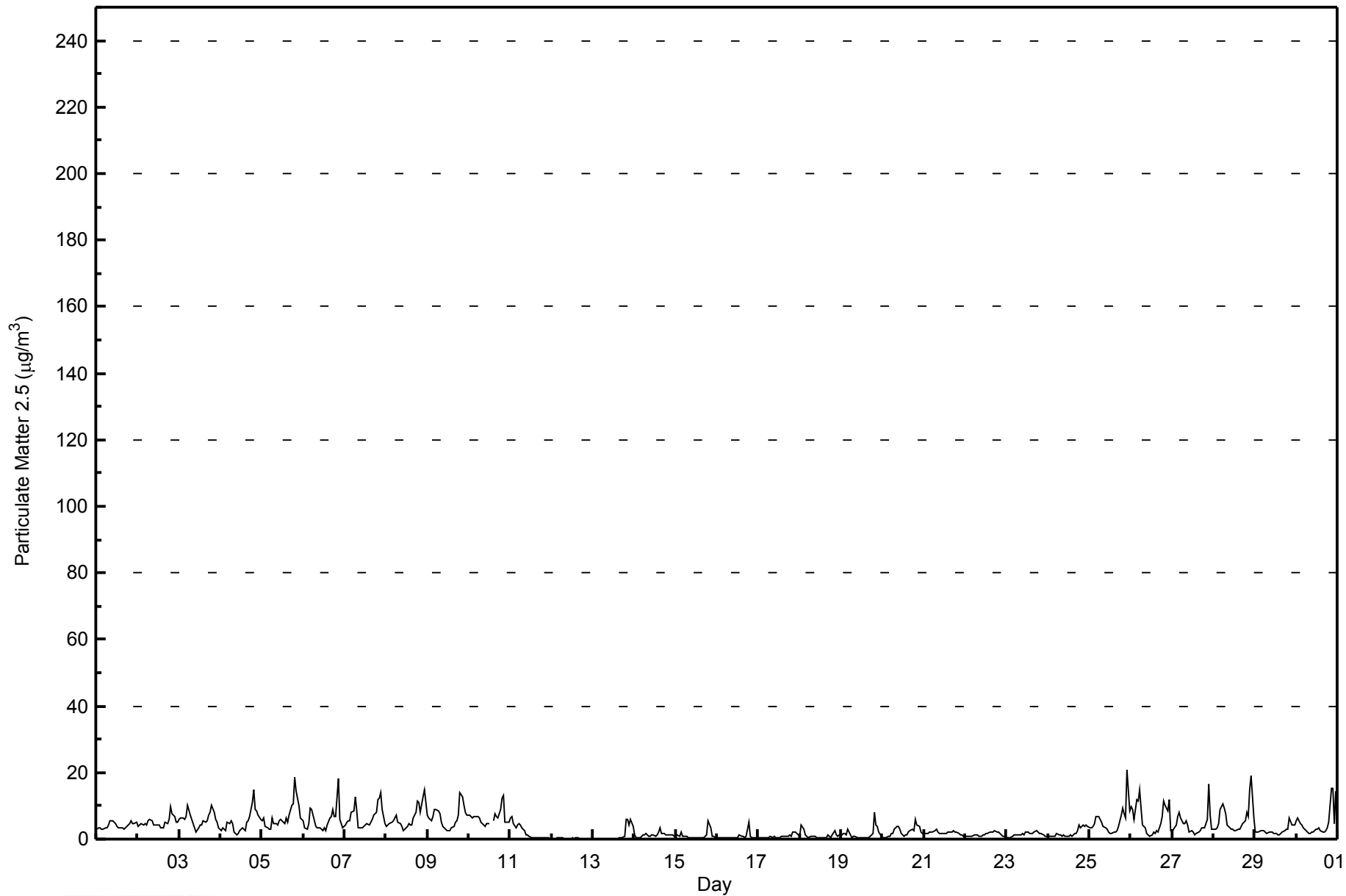
Patricia McInnes - April 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 720																								
Maximum Value: 20.9 µg/m <sup>3</sup> on Apr 25 23:00		Maximum Daily Average: 6.8 µg/m <sup>3</sup> on Apr 7																								
Minimum Value: 0.0 µg/m <sup>3</sup> on Apr 13 04:00		Hours of Data: 719																								
Maximum Diurnal Average: 6.5 µg/m <sup>3</sup> at hour 21		Hours of Missing Data: 1																								
Monthly Average: 3.54 µg/m <sup>3</sup>		Hours of Calibration: 0																								
Minimum Daily Average: 0.2 µg/m <sup>3</sup> on Apr 12		Percent Operational Time: 99.9																								
Minimum Diurnal Average: 2.0 µg/m <sup>3</sup> at hour 14																										
Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 1.0 Median = 2.7 Q <sub>3</sub> = 5.0 P <sub>90</sub> = 7.6 P <sub>99</sub> = 15.0																										
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	2.8	3.5	3.6	3.0	2.8	3.4	3.4	4.2	5.7	5.5	5.2	4.8	3.8	3.5	3.2	3.3	3.1	3.3	4.2	4.7	5.6	4.6	4.8	5.3	4.1	5.7
2-Apr	3.9	4.2	4.5	4.3	4.5	4.4	5.5	5.8	5.5	4.2	4.3	4.4	4.2	3.3	3.4	3.4	4.9	4.6	6.1	9.6	7.6	6.8	5.3	5.2	5.0	9.6
3-Apr	5.8	6.3	6.2	6.1	7.0	10.2	7.0	6.1	4.8	3.5	2.2	3.2	4.1	4.2	5.3	5.2	5.6	7.3	8.2	10.2	8.1	6.1	5.1	3.5	5.9	10.2
4-Apr	2.7	3.4	3.0	2.6	5.1	4.6	5.5	4.6	2.0	1.2	1.6	2.5	3.0	3.4	2.6	4.9	5.3	7.0	10.9	14.9	8.7	8.4	7.2	6.0	5.0	14.9
5-Apr	5.6	6.4	3.8	3.2	3.2	2.8	6.2	4.5	4.5	4.4	5.6	6.1	5.2	4.5	6.3	5.3	7.1	10.0	10.5	18.6	14.2	10.4	6.3	5.7	6.7	18.6
6-Apr	5.5	3.4	3.0	4.6	9.2	8.9	5.6	3.7	3.5	3.3	3.2	2.5	3.3	2.3	4.3	6.2	6.6	9.0	6.9	7.0	18.4	6.1	4.8	3.5	5.6	18.4
7-Apr	4.4	5.0	5.3	5.5	8.1	8.5	12.9	8.3	3.5	3.5	3.5	3.9	4.2	4.5	4.2	4.9	5.7	7.2	8.0	11.8	12.4	13.8	9.1	4.6	6.8	13.8
8-Apr	4.0	4.4	4.8	5.0	5.5	6.4	7.2	4.9	4.7	3.6	2.6	3.0	3.7	4.5	4.3	4.4	6.2	8.2	11.3	10.8	8.0	12.7	14.7	11.1	6.5	14.7
9-Apr	7.4	6.5	5.6	6.7	8.9	8.7	8.6	7.5	4.9	3.7	3.3	2.7	2.4	2.6	3.6	3.9	4.9	5.5	7.0	14.1	12.6	10.1	7.9	7.0	6.5	14.1
10-Apr	7.0	6.8	6.4	6.7	6.6	6.7	6.6	5.3	4.6	3.9	4.6	4.8	4.7	M	5.3	7.5	6.7	6.6	8.8	12.2	13.3	5.2	5.3	5.0	6.5	13.3
11-Apr	6.3	6.9	4.5	3.6	4.2	4.5	4.3	3.2	2.5	1.3	1.4	1.0	0.4	0.5	0.4	0.3	0.2	0.3	0.4	0.3	0.4	0.4	0.2	0.2	2.0	6.9
12-Apr	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.2	0.3	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4
13-Apr	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.9	6.1	5.8	4.1	6.0	3.9	1.2	6.1
14-Apr	1.3	0.5	0.3	0.4	0.7	1.1	1.1	1.5	0.8	1.0	1.1	1.4	0.9	1.1	2.0	3.4	1.7	1.7	1.3	1.4	1.1	1.1	1.2	1.0	1.2	3.4
15-Apr	1.0	1.1	1.0	2.0	1.0	0.7	0.8	0.6	0.3	0.3	0.2	0.2	0.2	0.4	0.6	0.6	0.5	0.8	1.3	5.5	3.5	0.7	0.6	0.6	1.0	5.5
16-Apr	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.6	0.3	0.3	0.3	0.3	0.4	1.3	0.9	1.0	0.6	0.7	5.0	0.8	0.5	0.4	0.5	0.3	0.7	5.0
17-Apr	0.3	0.5	0.5	0.4	0.5	0.5	0.6	0.7	0.6	0.7	0.6	0.5	0.6	0.7	0.8	0.7	1.0	1.0	1.3	1.0	2.1	2.1	1.7	1.3	0.9	2.1
18-Apr	1.0	4.1	2.8	1.3	0.7	0.5	1.0	0.8	0.7	0.6	0.5	0.3	0.3	0.4	0.6	0.4	1.2	0.8	0.5	1.1	2.5	1.3	1.1	1.2	1.1	4.1
19-Apr	1.2	1.7	1.5	1.1	2.8	1.1	0.6	0.6	0.8	0.5	0.5	0.3	0.3	0.3	0.3	0.4	0.6	0.8	1.6	8.2	4.3	4.0	2.3	0.7	1.5	8.2
20-Apr	0.6	0.5	0.5	0.8	0.9	1.8	1.8	3.2	3.8	3.7	2.9	1.5	1.1	1.3	1.5	2.1	2.5	3.0	2.5	6.1	4.1	4.0	2.2	1.5	2.2	6.1
21-Apr	1.6	1.7	1.6	2.3	2.0	2.0	2.4	2.9	2.1	1.5	1.5	1.5	1.8	1.9	1.9	2.2	2.2	2.4	2.2	2.1	1.5	1.2	1.1	1.0	1.9	2.9
22-Apr	0.8	0.7	0.7	0.8	0.9	1.2	1.4	1.2	0.9	0.9	1.4	1.4	1.7	1.6	2.0	2.1	2.2	2.5	2.3	1.9	1.5	1.2	1.0	0.7	1.4	2.5
23-Apr	0.6	0.6	0.6	0.8	1.1	1.3	1.3	1.5	1.4	1.5	1.3	2.0	2.2	1.8	1.9	1.9	2.3	2.7	1.9	1.9	1.8	1.5	0.9	0.7	1.5	2.7
24-Apr	0.7	0.7	0.7	0.8	1.0	1.7	1.3	1.1	0.9	1.1	1.1	0.9	1.0	1.1	1.1	1.6	1.6	2.7	4.2	3.6	4.1	4.0	4.1	3.6	1.9	4.2
25-Apr	3.3	3.4	3.7	4.8	6.6	6.9	5.7	4.9	3.7	3.3	2.8	2.0	1.6	1.8	2.1	2.2	2.7	4.0	7.0	9.4	7.8	6.2	20.9	8.3	5.2	20.9
26-Apr	9.8	8.9	5.9	11.8	11.5	14.7	9.2	4.1	3.3	1.9	1.1	0.9	1.4	2.3	1.8	2.4	2.1	4.5	6.6	11.3	10.1	8.5	12.1	2.7	6.2	14.7
27-Apr	2.3	2.9	4.1	6.6	8.2	6.3	4.7	4.8	5.5	4.1	2.0	2.5	1.9	1.4	1.7	2.1	2.7	3.4	3.6	3.5	5.7	16.6	7.3	3.0	4.5	16.6
28-Apr	3.0	3.2	3.5	4.6	8.8	10.4	9.5	7.7	4.3	3.6	3.0	3.0	2.7	2.7	2.9	3.1	3.8	4.7	5.7	8.0	7.0	14.7	19.0	6.2	6.0	19.0
29-Apr	2.2	2.0	2.0	2.5	2.5	2.4	2.2	1.7	1.9	2.3	2.2	1.6	1.5	1.4	1.3	1.6	2.0	2.4	2.8	3.0	6.2	4.3	4.1	4.1	2.5	6.2
30-Apr	5.4	6.3	4.8	4.2	3.4	3.2	2.2	1.8	1.9	1.9	2.3	2.9	3.0	3.3	2.7	2.2	2.0	2.4	3.5	4.9	15.1	15.2	4.8	14.3	4.7	15.2
																								Diurnal Average		
																								Diurnal Maximum		
																								3.0 3.2 2.8 3.2 3.9 4.2 4.0 3.3 2.6 2.2 2.1 2.1 2.1 2.0 2.3 2.7 3.0 3.7 4.6 6.5 6.5 5.9 5.4 3.8		
																								9.8 8.9 6.4 11.8 11.5 14.7 12.9 8.3 5.7 5.5 5.6 6.1 5.2 4.5 6.3 7.5 7.1 10.0 11.3 18.6 18.4 16.6 20.9 14.3		
M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO):				24-hr 30 µg/m <sup>3</sup>																						



**WBEA**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	388	53.96	53.96
6 - 15	148	20.58	74.55
16 - 25	5	0.70	75.24
26 - 80	0	0.00	75.24
> 81.0	0	0.00	75.24

Total Number of Valid Hours: 719

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**

**Patricia McInnes - April 2015**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	50	37	15	9	27	33	23	19	29	23	31	19	18	6	13	36	388
6 - 15	12	18	9	4	0	8	11	17	21	5	22	1	4	1	2	13	148
16 - 25	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	1	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
<b>Totals</b>	63	55	24	13	27	41	34	36	52	28	54	20	22	7	15	50	541

Total Number of Valid Hours: 719

Total Number of Hours: 720



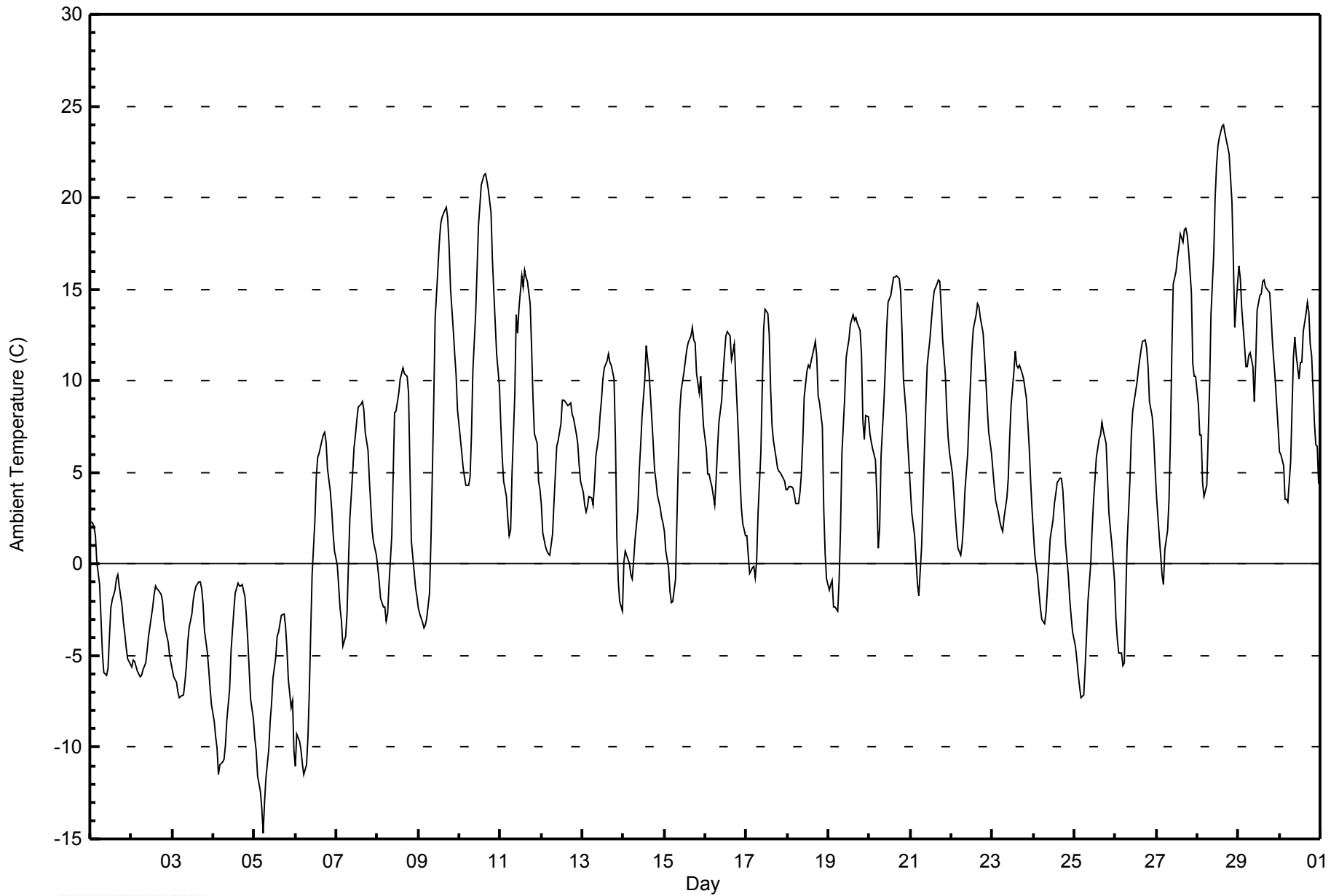


Maximum Value: 24.0 C on Apr 28 16:00		Maximum Daily Average: 15.5 C on Apr 28		Hours in Service: 720																							
Minimum Value: -14.7 C on Apr 5 06:00		Minimum Daily Average: -7.9 C on Apr 5		Hours of Data: 720																							
Maximum Diurnal Average: 10.4 C at hour 17		Minimum Diurnal Average: -1.5 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 4.83 C		Percentiles: P <sub>1</sub> = -11.6 P <sub>10</sub> = -5.2 Q <sub>1</sub> = -1.0 Median = 4.9 Q <sub>3</sub> = 10.5 P <sub>90</sub> = 14.3 P <sub>99</sub> = 22.0		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-Apr	2.3	2.2	2.0	1.5	0.1	-1.2	-3.0	-4.9	-5.9	-6.1	-5.7	-4.0	-2.4	-1.9	-1.4	-0.8	-0.6	-1.2	-2.3	-3.2	-3.8	-4.5	-5.2	-5.5	-2.3	2.3	
2-Apr	-5.6	-5.2	-5.3	-5.9	-6.0	-6.1	-6.1	-5.8	-5.4	-4.7	-3.9	-3.4	-2.3	-1.6	-1.2	-1.3	-1.4	-1.7	-2.0	-3.0	-3.5	-4.3	-4.9	-5.4	-4.0	-1.2	
3-Apr	-5.8	-6.2	-6.5	-7.0	-7.3	-7.3	-7.2	-6.4	-5.6	-4.3	-3.5	-2.7	-2.0	-1.5	-1.2	-0.9	-1.0	-1.4	-2.2	-3.6	-4.7	-5.7	-6.8	-7.7	-4.5	-0.9	
4-Apr	-8.6	-9.4	-10.0	-11.5	-11.0	-10.8	-10.7	-9.9	-8.5	-6.8	-4.8	-3.6	-2.6	-1.6	-1.1	-1.2	-1.2	-1.1	-1.8	-2.9	-4.2	-5.8	-7.4	-8.4	-6.0	-1.1	
5-Apr	-9.5	-10.2	-11.6	-12.4	-13.4	-14.7	-12.9	-11.7	-10.1	-8.6	-7.6	-6.2	-5.1	-3.9	-3.7	-3.3	-2.8	-2.7	-3.4	-4.6	-6.3	-7.8	-7.5	-10.2	-7.9	-2.7	
6-Apr	-11.1	-9.3	-9.7	-10.1	-10.9	-11.5	-11.0	-9.5	-7.0	-3.7	-0.6	2.4	4.8	5.9	6.0	6.7	7.0	7.2	6.7	5.2	4.0	3.0	1.7	0.7	-1.4	7.2	
7-Apr	-0.1	-1.2	-2.4	-3.1	-4.5	-3.9	-2.7	0.0	2.5	4.9	6.3	7.0	7.9	8.5	8.7	8.9	8.4	7.2	6.2	4.5	3.1	1.8	1.2	0.5	2.9	8.9	
8-Apr	-0.2	-1.0	-1.9	-2.4	-2.4	-3.1	-2.8	-1.1	1.5	4.9	8.2	8.4	9.4	10.1	10.4	10.7	10.4	10.2	9.3	5.1	1.2	-0.4	-1.2	-1.8	3.4	10.7	
9-Apr	-2.4	-2.7	-3.2	-3.5	-3.3	-2.9	-1.5	1.2	4.9	8.8	13.4	16.1	17.6	18.6	18.9	19.3	19.5	18.8	17.4	15.0	12.7	11.5	10.3	8.4	8.9	19.5	
10-Apr	6.9	6.1	5.3	4.7	4.3	4.3	4.8	7.0	10.5	13.7	16.0	18.5	19.6	20.7	21.2	21.3	20.9	20.4	19.2	16.6	14.8	13.1	11.5	9.7	13.0	21.3	
11-Apr	7.6	5.8	4.5	3.7	2.4	1.6	1.9	4.9	9.3	13.6	12.6	13.9	15.7	15.1	16.1	15.7	15.4	14.2	11.8	9.1	7.1	6.6	4.5	4.1	9.1	16.1	
12-Apr	3.2	1.7	0.9	0.7	0.5	0.5	1.7	3.3	4.9	6.4	6.7	7.7	9.0	9.0	8.8	8.7	8.7	8.8	8.2	8.0	7.2	6.5	5.4	4.5	5.5	9.0	
13-Apr	3.9	3.2	2.8	3.2	3.7	3.6	3.3	4.4	5.9	7.0	8.1	9.0	10.1	10.7	11.1	11.5	11.0	10.8	10.1	6.7	1.4	-0.9	-2.0	-2.5	5.7	11.5	
14-Apr	0.1	0.7	0.5	0.0	-0.6	-0.8	0.2	1.3	2.9	5.1	6.4	8.0	10.1	12.0	11.1	10.5	9.3	6.6	5.1	4.6	3.8	3.1	2.5	2.2	4.4	12.0	
15-Apr	1.8	0.7	-0.2	-1.5	-2.1	-2.0	-0.8	2.6	5.7	8.3	9.5	10.5	11.1	11.7	12.1	12.5	12.9	12.2	12.1	10.4	9.4	10.2	8.8	7.5	6.8	12.9	
16-Apr	6.3	4.9	4.9	4.6	4.2	3.3	4.6	6.3	7.8	9.0	10.4	11.5	12.5	12.7	12.5	11.2	11.5	12.0	8.7	7.0	4.9	3.1	2.2	1.6	7.4	12.7	
17-Apr	1.6	0.5	-0.5	-0.2	-0.1	-0.7	0.2	2.8	6.1	9.6	12.8	13.9	13.7	12.6	9.5	7.6	6.7	5.7	5.2	5.1	5.0	4.7	4.5	4.0	5.4	13.9	
18-Apr	4.0	4.2	4.2	4.2	3.8	3.3	3.3	3.9	4.9	6.7	9.1	10.6	10.8	10.7	11.1	11.8	12.1	11.3	9.2	8.8	7.5	3.0	0.5	-0.8	6.6	12.1	
19-Apr	-1.4	-1.1	-0.9	-2.3	-2.4	-2.5	-0.9	2.0	6.0	9.1	11.3	11.8	12.2	13.1	13.6	13.3	13.5	13.2	12.7	11.5	7.8	6.8	8.1	8.0	6.8	13.6	
20-Apr	7.1	6.7	6.3	5.7	3.7	0.9	2.0	5.9	8.8	10.6	12.8	14.3	14.7	15.2	15.7	15.7	15.7	15.6	14.9	12.7	10.1	8.2	6.8	5.4	9.8	15.7	
21-Apr	4.1	2.8	1.6	0.2	-1.1	-1.8	0.9	3.5	6.1	8.7	10.9	12.3	13.3	14.2	14.9	15.3	15.5	15.4	14.1	12.3	10.3	8.4	6.9	6.1	8.1	15.5	
22-Apr	5.0	3.9	2.8	1.7	0.8	0.5	1.1	2.3	4.0	6.1	8.1	9.9	11.7	12.9	13.6	14.2	14.0	13.5	12.6	11.4	10.0	8.5	7.2	6.1	7.6	14.2	
23-Apr	5.1	4.2	3.4	2.8	2.3	2.0	1.8	2.6	3.6	4.7	6.9	8.6	10.5	11.6	10.9	10.7	10.8	10.4	10.1	9.6	9.0	6.4	4.6	3.0	6.5	11.6	
24-Apr	1.7	0.5	-0.7	-1.6	-2.4	-3.0	-3.2	-2.6	-1.4	0.0	1.4	2.4	3.3	3.9	4.4	4.7	4.7	4.0	2.7	1.1	-0.7	-2.0	-2.9	-3.7	0.4	4.7	
25-Apr	-4.5	-5.2	-6.0	-6.7	-7.3	-7.1	-5.7	-3.9	-2.1	0.0	1.9	3.4	4.6	5.8	6.8	7.0	7.7	7.3	6.6	4.6	2.7	1.9	1.2	-0.9	0.5	7.7	
26-Apr	-3.0	-4.1	-4.8	-4.8	-5.5	-5.4	-1.9	1.1	4.5	7.0	8.3	8.9	9.8	10.6	11.2	11.7	12.2	12.2	11.8	10.8	8.9	8.0	7.0	5.3	5.0	12.2	
27-Apr	3.8	2.6	0.5	-0.6	-1.2	0.8	1.8	3.6	6.9	11.6	15.3	15.9	16.7	17.3	18.0	17.6	18.2	18.4	18.0	17.1	14.9	10.9	10.3	10.2	10.4	18.4	
28-Apr	8.8	7.1	7.0	4.5	3.7	4.3	6.9	9.6	13.6	17.0	20.0	21.8	22.8	23.3	23.9	24.0	23.5	23.1	22.4	21.1	19.8	16.7	12.9	15.3	15.5	24.0	
29-Apr	16.3	15.6	14.0	11.9	10.8	10.8	11.4	11.6	10.8	8.8	11.0	13.8	14.7	14.7	15.4	15.5	15.1	14.9	14.8	13.6	12.1	10.0	8.7	7.5	12.7	16.3	
30-Apr	6.1	6.0	5.4	3.5	3.6	3.4	5.6	8.5	11.3	12.4	11.4	10.1	11.0	11.0	12.7	13.7	14.3	13.7	12.0	11.4	7.7	6.5	6.4	4.4	8.8	14.3	
		1.5	0.8	0.1	-0.7	-1.2	-1.5	-0.6	1.1	3.2	5.3	7.1	8.4	9.4	10.0	10.3	10.4	10.4	10.0	9.0	7.5	5.7	4.2	3.2	2.3	Diurnal Average	
		16.3	15.6	14.0	11.9	10.8	10.8	11.4	11.6	13.6	17.0	20.0	21.8	22.8	23.3	23.9	24.0	23.5	23.1	22.4	21.1	19.8	16.7	12.9	15.3	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Patricia McInnes - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Patricia McInnes - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	206	28.61	28.61
0 - 10	311	43.19	71.81
10 - 20	188	26.11	97.92
> 20	15	2.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



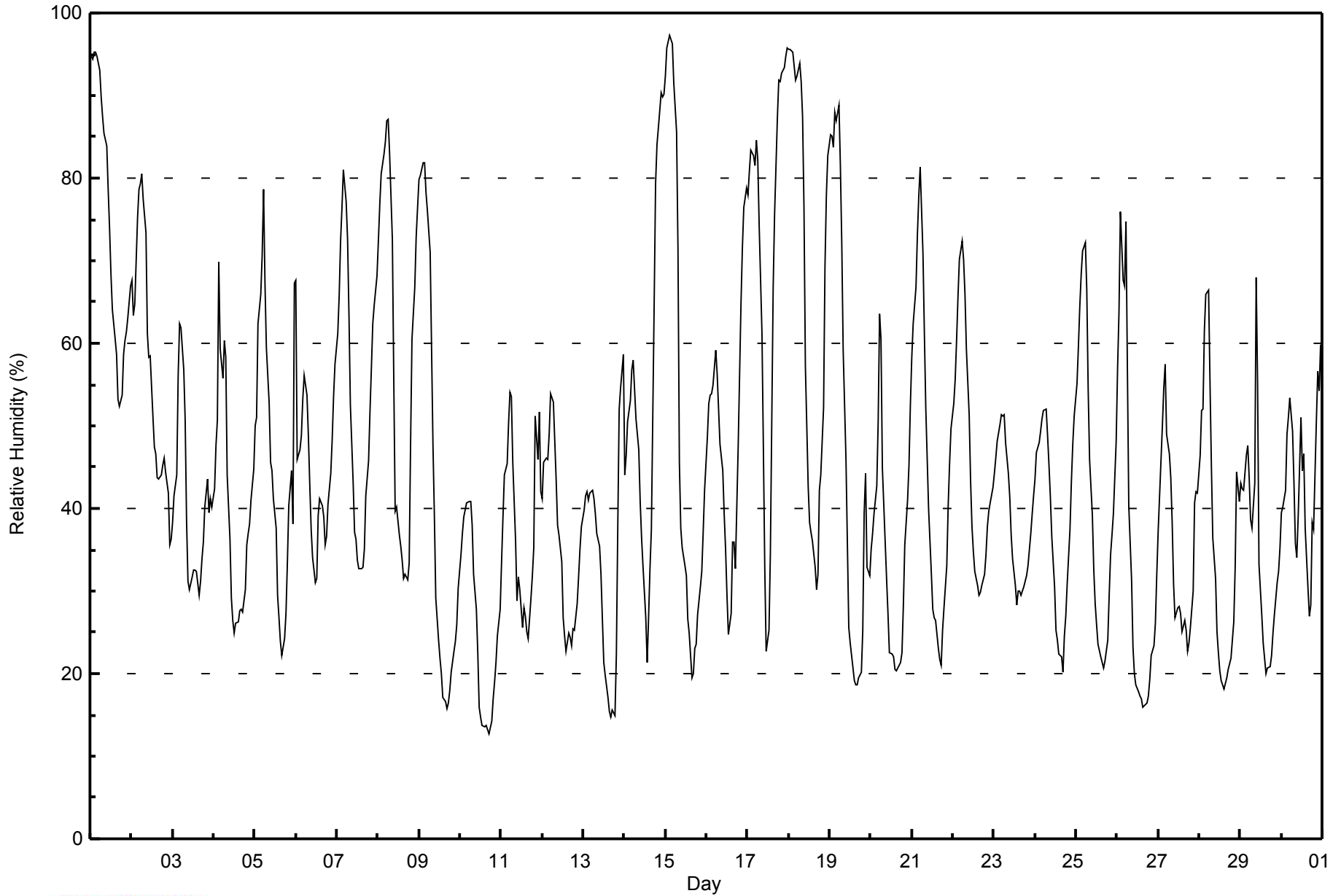


Maximum Value: 97 % on Apr 15 03:00														Maximum Daily Average: 74.5 % on Apr 1														Hours in Service: 720																					
Minimum Value: 13 % on Apr 10 18:00														Minimum Daily Average: 25.6 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 67.0 % at hour 6														Minimum Diurnal Average: 28.2 % at hour 17														Hours of Missing Data: 0																					
Monthly Average: 45.4 %														Percentiles: P <sub>1</sub> = 15 P <sub>10</sub> = 22 Q <sub>1</sub> = 30 Median = 41 Q <sub>3</sub> = 57 P <sub>90</sub> = 78 P <sub>99</sub> = 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-Apr	95	94	95	95	95	93	90	87	86	84	79	74	68	64	60	59	53	52	54	59	60	61	63	67	74.5	95																							
2-Apr	68	63	65	75	79	79	80	77	73	61	58	59	51	47	47	44	44	44	45	46	44	42	36	36	56.8	80																							
3-Apr	38	42	44	56	62	62	57	51	38	31	30	32	33	33	32	30	31	34	36	40	44	39	41	40	40.7	62																							
4-Apr	42	48	51	70	59	56	60	58	44	36	29	26	25	26	26	28	28	27	30	36	37	38	41	45	40.3	70																							
5-Apr	50	51	62	66	71	79	67	59	53	46	45	41	38	29	27	24	22	24	27	33	40	45	38	67	46.0	79																							
6-Apr	68	46	47	49	53	56	54	49	43	37	34	31	31	39	41	40	39	36	37	41	44	48	54	58	44.8	68																							
7-Apr	61	66	72	76	81	77	73	63	53	43	37	36	34	33	33	35	42	46	52	57	62	65	68	68	54.0	81																							
8-Apr	72	77	81	83	84	87	87	83	72	56	40	40	37	35	34	32	32	31	33	48	60	67	73	76	59.2	87																							
9-Apr	80	80	82	82	78	76	71	59	48	39	29	24	22	20	17	17	16	16	18	20	23	24	26	30	41.6	82																							
10-Apr	34	37	39	40	41	41	41	38	32	28	23	16	15	14	13	14	13	13	14	17	19	21	25	28	25.6	41																							
11-Apr	34	39	44	45	50	54	54	46	36	29	32	30	26	28	27	25	24	29	32	35	51	46	52	42	37.9	54																							
12-Apr	41	46	46	46	49	54	53	48	43	38	37	34	27	25	23	25	24	23	26	25	28	32	35	38	36.0	54																							
13-Apr	40	42	42	41	42	42	41	39	37	35	32	27	21	20	17	15	15	16	15	22	38	52	55	59	33.5	59																							
14-Apr	44	46	50	53	57	58	54	51	47	41	36	33	27	21	27	33	37	65	79	84	86	90	90	90	54.2	90																							
15-Apr	92	96	97	97	96	91	86	71	46	38	35	33	32	27	25	20	20	23	24	27	30	32	37	42	50.7	97																							
16-Apr	49	53	54	54	55	59	56	52	48	45	39	35	29	25	27	36	36	33	47	56	65	71	76	79	49.1	79																							
17-Apr	78	81	83	83	82	85	82	74	61	47	33	23	25	35	51	67	76	87	92	92	93	93	95	96	71.3	96																							
18-Apr	96	96	95	94	92	92	94	92	87	76	57	43	38	37	36	33	30	32	42	44	52	69	78	83	66.2	96																							
19-Apr	85	85	84	88	87	89	81	72	59	46	36	26	24	22	19	19	19	20	20	25	39	44	33	32	48.1	89																							
20-Apr	35	37	39	43	51	63	61	45	36	32	27	23	22	22	21	20	21	21	23	28	36	41	45	53	35.1	63																							
21-Apr	58	62	67	73	78	81	71	61	52	46	40	32	28	27	26	23	22	21	25	28	33	40	45	50	45.4	81																							
22-Apr	53	56	60	66	70	72	70	66	59	51	43	38	35	32	31	30	30	31	32	34	38	40	41	42	46.7	72																							
23-Apr	44	46	48	50	51	51	51	48	44	41	37	34	31	28	30	30	30	31	31	32	33	37	39	42	39.1	51																							
24-Apr	43	47	48	49	51	52	52	49	45	41	37	31	25	24	22	22	20	25	27	31	37	43	48	51	38.4	52																							
25-Apr	55	59	64	68	71	72	66	54	46	39	33	29	26	24	22	21	21	21	24	29	34	37	39	48	41.9	72																							
26-Apr	57	64	76	68	67	75	57	40	31	23	20	19	18	17	17	16	16	16	17	19	22	23	26	32	34.9	76																							
27-Apr	37	41	50	55	57	49	47	44	38	31	27	28	28	27	25	26	25	23	24	26	30	41	42	42	35.9	57																							
28-Apr	46	52	52	62	66	66	56	45	36	31	25	22	20	19	18	19	19	20	22	24	26	33	44	41	36.1	66																							
29-Apr	43	42	42	46	48	44	39	38	43	68	55	33	27	24	22	20	21	21	22	25	27	31	32	35	35.3	68																							
30-Apr	39	40	42	49	51	53	49	43	36	34	39	51	45	47	38	30	27	28	38	38	51	57	54	60	43.3	60																							
																								56.0	57.8	60.8	64.0	65.8	67.0	63.3	56.8	49.1	43.2	37.4	33.4	30.2	29.0	28.5	28.3	28.2	30.2	33.4	37.2	42.6	46.7	48.9	52.4	Diurnal Average	
																								96	96	97	97	96	93	94	92	87	84	79	74	68	64	60	67	76	87	92	92	93	93	95	96	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Patricia McInnes - April 2015**





Maximum Speed: 35 km/h on Apr 11 20:00	Maximum Daily Speed Average: 21.8 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 20 10:00	Minimum Daily Speed Average: 1.2 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 5.1 km/h at hour 14	Minimum Diurnal Speed Average: 0.4 km/h at hour 22	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 261.2 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 12 Q <sub>3</sub> = 16 P <sub>90</sub> = 22 P <sub>99</sub> = 31	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	N16	N16	N16	N22	N25	N27	N31	NNW33	N30	N27	N31	N25	NNW27	NNW28	N28	N26	NNW25	NNW24	N20	N14	N13	N10	NNW8	NNW5	N21.8	NNW33
2-Apr	WNW6	NNW8	NNW9	NW7	NNW8	NW7	NNW7	N8	N9	NNE8	NNE9	N10	N9	N11	N12	NNW13	N12	N11	NNE13	NNE11	NNE13	NNE11	NE9	NE8	N8.7	NNE13
3-Apr	NE8	NE9	NNE8	NNE9	NE7	ENE6	ENE8	NE8	ENE8	NE5	N10	NNE11	NNE12	NNE14	NNE16	NNE15	NNE14	NE12	NNE13	N12	N10	NNE11	NNE8	NE8	NNE9.6	NNE16
4-Apr	NE7	NE5	NNE5	NNW4	NNE5	NNE7	N6	NNE7	NNE9	NNE9	N7	NNE8	NNE10	NNE9	NNW13	NNE15	NNE13	NNE9	NE8	NNE10	N17	N13	N10	N8	NNE8.5	N17
5-Apr	NNW6	NNW6	NW5	NW5	NNW2	NNW4	NNW9	NNW14	N14	N12	NNE12	NNE13	N14	NE15	NNE14	NE10	NNE8	NNE8	N6	NNW8	NNW7	ENE6	ENE2	N7.6	NE15	
6-Apr	ESE3	ESE8	ESE8	ESE7	ESE6	SE5	ESE9	SE11	SE7	SE6	ESE5	E5	SE7	SSW13	SSE11	SSE9	SSE10	SSE12	S11	S13	S13	S12	S7	SSW6	SSE7.4	S13
7-Apr	S7	SSE7	SSE6	SSE4	S4	S5	SSE3	S6	S12	S15	S17	S19	S18	S17	SSW16	SSW15	SSW15	S16	S14	S11	SSE9	S7	S9	S9	S10.7	S19
8-Apr	S10	S9	SSE8	SSE8	SSE7	S6	SSE6	S6	SW11	WSW12	NW11	NNE14	NNE14	NNE16	N16	N15	NNE12	NNE9	NE7	NNE3	NNW2	SW2	SW4	SSW4	N1.2	N16
9-Apr	S4	S4	SSE4	SE6	S5	SSE7	SSE8	SSE8	SSE10	SSE10	S14	SSW18	SW19	SW19	SW23	SW22	SW20	SW20	SW14	SW9	SW9	SW12	SW11	SW10	SSW10.4	SW23
10-Apr	SW12	SW11	SW13	SW13	SW13	SW14	SW12	SSW14	SW9	SE7	SSE11	SSE10	S9	S9	S9	SSE14	SSE14	S13	S13	S10	S10	SSW9	SSW9	SSW7	SSW9.9	SSE14
11-Apr	S6	SSE9	S7	SSW7	S7	S7	S5	S7	SW6	W14	W18	W15	W18	W21	W17	W19	W19	W23	WSW31	W35	W26	WSW10	WSW13	WSW14	WSW12.8	W35
12-Apr	WSW16	WSW13	WSW14	WSW16	SW16	SW16	SW16	SW21	WSW24	WSW23	WSW24	WSW25	WSW27	W31	WSW25	WSW31	WSW26	W28	WSW20	W18	WSW18	W15	SW11	SW14	WSW20.0	W31
13-Apr	SW14	WSW13	SW12	WSW18	WSW18	W20	WSW19	W24	W29	NNW30	NNW28	NNW27	W25	NNW25	NNW22	NNW19	NNW19	NNW15	WNW8	NW3	WSW2	W3	W2	ESE4	W15.2	WNW30
14-Apr	ESE8	ESE11	ESE13	ESE11	ESE10	ESE11	SE11	ESE15	ESE16	ESE18	ESE17	ESE11	ESE8	SSE13	SSE16	ESE12	SE19	SE18	ESE13	SE11	ESE12	ESE14	SE13	SE11	ESE12.6	SE19
15-Apr	SSE10	S5	S5	SSE2	SSW5	SSW9	SSW9	SW11	WSW15	WSW14	WSW23	WSW22	W21	WSW25	WSW21	WSW20	WSW19	WSW15	S7	SW13	W17	WSW10	WSW14	WSW12.4	WSW25	
16-Apr	SW12	SW13	WSW16	WSW14	WSW15	WSW13	SW11	SSW10	SW14	SSW13	SSW15	WSW20	WSW23	W32	W25	WSW26	WSW22	W21	NNW20	NW19	W10	WSW10	WSW8	WSW10	WSW14.5	W32
17-Apr	WSW11	S7	S7	SW13	SSW12	S10	S6	S8	SSE9	S11	S11	SSW19	SSW20	SSW24	SSW26	S17	SSE13	SE12	ESE12	ESE12	SE7	E1	ESE3	WSW5	S9.8	SSW26
18-Apr	WNW9	NW12	NW13	NW16	NW18	NW20	NNW23	NNW22	NW19	NW21	NW23	NW26	NNW22	NNW20	N26	N14	N17	NNW16	W13	N5	E7	W4	W5	W4	NNW13.9	NW26
19-Apr	NW1	SW4	SSW4	SSW3	SSW4	S5	SSW5	S6	SSE6	SSE9	S9	W10	SW12	W13	SW15	W10	NNW13	W7	NNW1	SE4	SSW3	S5	SSW6	SSW9	SW5.0	SW15
20-Apr	SW9	SW11	WSW8	SW6	SW4	SW4	SW3	SE2	W1	ENE0	NE4	NNE7	N11	N13	N12	NE12	ENE10	NE9	NE7	N8	N11	NNW12	NNW15	NNW14	N4.0	NNW15
21-Apr	NNW11	NNW8	NW7	NNW4	NW4	NNW4	NNW7	NNW9	N11	N11	N11	NNE12	NNE12	N14	N14	N15	N16	ENE13	ENE17	ENE16	E16	E16	E12	ESE13	NNE8.1	ENE17
22-Apr	E11	ESE13	ESE12	ESE13	ESE13	ESE14	ESE17	ESE20	ESE19	E19	ESE22	ESE22	E21	E21	E21	E24	E23	E24	ESE22	E20	E23	ESE24	ESE25	ESE21	ESE19.3	ESE25
23-Apr	ESE20	ESE16	E14	E14	E17	E15	E18	E19	E17	E15	E18	E21	ESE18	E17	ESE17	ESE17	ESE18	E16	E14	E13	ENE15	ENE21	E20	ENE17	E16.4	ENE21
24-Apr	NE14	NE14	NE15	NE14	NE15	NE18	NE17	NE15	NNE14	N16	N18	N18	NNE21	NNE21	NNE21	NNE19	NNE17	N23	N23	N21	NNW19	N18	NNW15	NNW14	NNE16.4	N23
25-Apr	NNW13	NNW12	NNW11	NNW11	NNW11	NNW11	N10	N9	NNE9	N10	NNE9	NNW8	NW7	NNE4	NE3	N5	WNW4	NNW7	NNW12	NNW12	NNW11	NNW12	NNW10	NW3	NNW8.4	NNW13
26-Apr	W2	W2	WNW3	SE5	SW3	SSW2	SE3	SE5	ESE4	SE5	ESE6	E2	ESE4	NE3	NNE8	ENE7	NNE7	E11	ESE10	ESE7	ESE8	ESE11	ESE13	ESE13	ESE4.3	ESE13
27-Apr	SE10	SE7	SSE6	SSE6	SSE7	SE10	SE9	SE8	SE7	SE7	S13	SSW19	SSW16	SSW16	SW22	SSW21	SW14	WSW21	WSW16	SW10	SW7	SW7	SW10	SW11	SSW9.2	SW22
28-Apr	SW9	SSW8	SW9	S7	SE8	SSE6	SE6	SE6	SE3	SSE5	SE9	S14	SSE19	S19	SSE21	SSE22	S21	S17	SE11	ESE11	SE10	S6	S5	W15	S9.5	SSE22
29-Apr	WNW14	W13	W9	SW8	WSW11	W14	NNW17	W17	W12	SSW9	WSW10	W12	W16	W20	W16	W17	WSW15	WSW12	WSW9	SW11	SW9	SW11	SW12	SW13	WSW12.2	W20
30-Apr	SW15	SW16	SW13	SW13	SW14	SW14	SW17	WSW17	WSW19	SW22	SW24	WSW26	WSW24	WSW19	WSW18	WSW18	WSW24	W16	NNW16	NNE4	SSW2	SSW8	SW6	SW6	WSW14.0	WSW26
SW1.9 SW1.6 SW1.8 SW2.0 SW1.8 SW1.8WSW0.8WSW0.6 W1.7 W1.4 W2.1 W3.4 W4.3 W5.1 W4.1 W2.6 W2.3WNW2.3NNW1.5 N0.8 N0.4 W0.4 S1.3 SW2.3																								Diurnal Average		
ESE20 N16 WSW16 N22 N25 N27 NNW31 NNW33 N30 NNW30 N31 NNW27 NNW27 W32 N28 WSW31 WSW26 W28 WSW31 W35 W26 ESE24 ESE25 ESE21																								Diurnal Maximum		

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

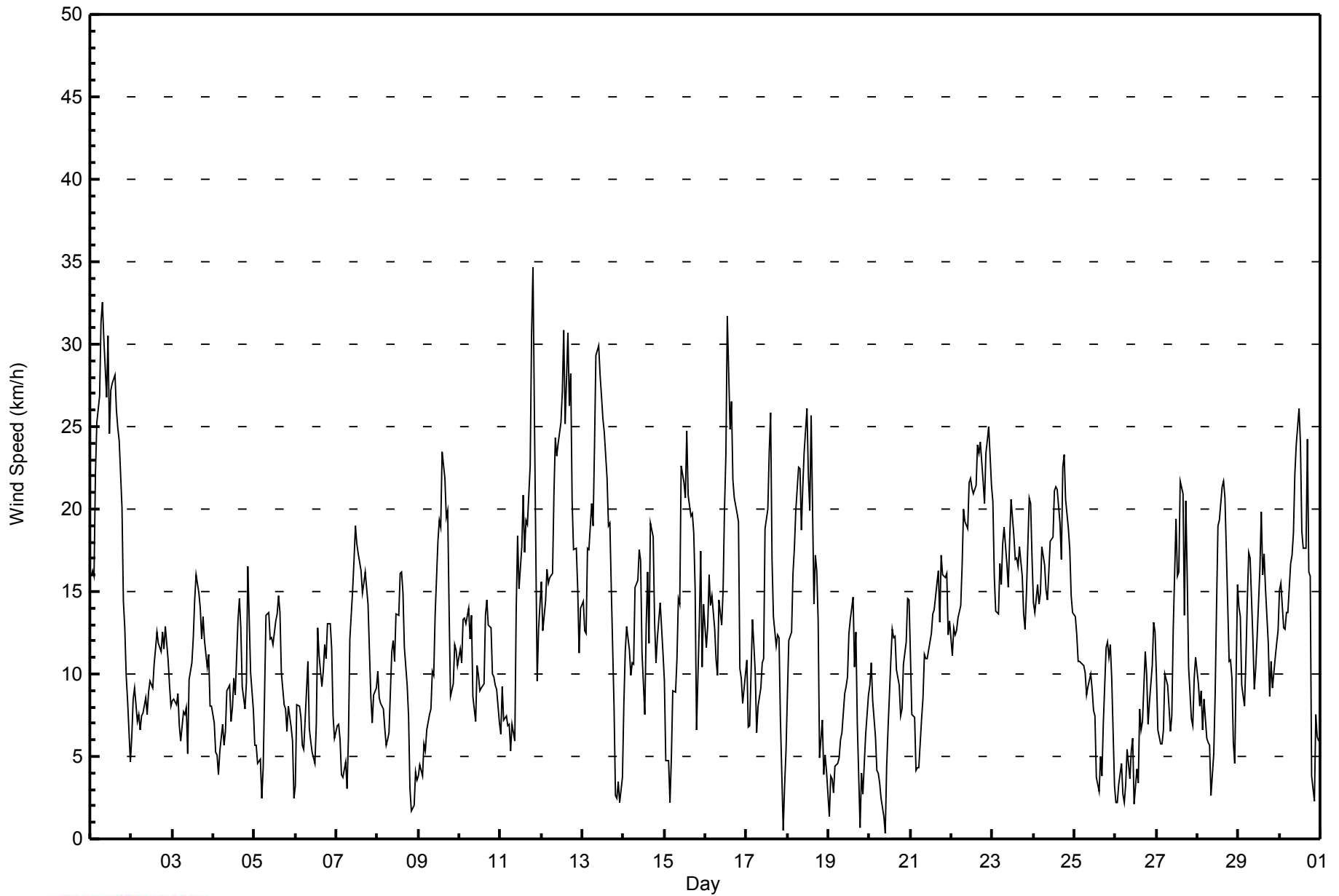
**Wind Speed (WS) - km/h**  
**Patricia McInnes - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Apr 11 21:00 Minimum Value: 1 km/h on Apr 5 06:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 8																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	3	3	3	4	5	5	6	6	7	6	5	5	5	5	5	5	5	5	4	4	3	2	2	1	7
2-Apr	2	2	2	1	1	1	1	2	2	3	2	3	3	3	4	4	3	3	3	2	2	2	2	1	4
3-Apr	1	1	1	1	2	1	1	1	2	3	3	3	4	4	3	3	3	3	2	3	3	2	2	1	4
4-Apr	1	1	1	1	1	1	1	1	2	2	3	3	3	3	4	4	3	3	2	2	3	4	4	2	4
5-Apr	1	1	1	1	2	1	3	3	2	3	3	3	4	4	4	3	3	3	2	2	2	2	2	1	4
6-Apr	3	2	2	1	2	1	3	2	2	2	2	2	3	4	3	3	3	3	2	3	2	2	1	1	4
7-Apr	1	1	1	1	1	1	1	2	2	3	4	4	4	4	5	4	4	3	3	2	1	1	1	2	5
8-Apr	2	1	1	1	1	1	1	2	3	3	3	3	4	4	4	3	3	2	2	1	1	1	1	1	4
9-Apr	1	1	1	1	1	1	1	2	2	2	4	4	4	5	5	5	4	4	3	2	1	1	1	1	5
10-Apr	1	1	2	2	2	2	2	2	2	2	2	3	4	4	4	4	4	3	3	2	2	2	2	2	4
11-Apr	1	1	2	2	2	1	2	2	2	4	4	4	5	5	4	5	5	5	9	8	9	2	5	2	9
12-Apr	2	2	2	3	3	3	4	5	6	5	6	6	8	8	6	8	7	8	7	5	4	6	3	2	8
13-Apr	3	3	4	4	4	5	4	7	7	7	6	6	7	6	6	7	6	4	4	1	1	1	1	2	7
14-Apr	2	2	3	2	3	3	3	4	3	4	4	3	2	5	5	3	6	5	3	2	3	3	3	3	6
15-Apr	2	2	2	1	1	2	2	2	4	4	5	5	5	6	6	6	5	4	6	1	9	4	4	4	9
16-Apr	2	2	3	3	3	2	2	3	4	3	4	5	5	7	7	7	6	5	6	8	2	3	2	3	8
17-Apr	3	1	3	2	3	2	1	2	2	2	3	5	5	6	6	4	3	2	3	3	2	2	2	2	6
18-Apr	1	2	2	3	4	5	5	5	4	5	5	6	6	6	9	5	4	5	5	3	3	1	1	1	9
19-Apr	1	1	1	1	1	1	1	1	1	2	3	4	5	6	6	4	4	3	2	1	1	1	1	1	6
20-Apr	2	2	2	2	1	1	1	1	1	1	2	3	4	5	5	4	3	3	2	2	2	2	2	2	5
21-Apr	2	2	3	1	1	1	2	2	2	2	3	4	4	4	4	4	3	3	4	3	4	4	4	5	5
22-Apr	4	4	3	3	3	3	5	5	4	4	5	5	5	5	5	6	6	6	6	6	6	6	6	5	6
23-Apr	5	5	4	4	4	4	4	4	4	4	5	5	4	5	4	5	4	4	3	3	5	5	5	4	5
24-Apr	3	3	3	3	3	3	3	3	4	4	4	5	5	5	4	5	4	5	5	4	3	3	2	2	5
25-Apr	3	2	2	2	2	1	2	2	3	3	3	4	4	3	3	4	3	3	3	2	1	1	2	2	4
26-Apr	1	1	1	2	1	1	1	2	2	2	4	3	3	3	3	3	3	3	2	1	2	2	3	3	4
27-Apr	3	1	1	1	1	2	2	2	2	2	6	5	5	4	6	5	5	5	4	2	1	1	1	1	6
28-Apr	2	1	2	1	1	2	2	2	1	2	2	6	5	5	5	5	5	5	3	2	2	1	1	5	6
29-Apr	5	4	3	1	2	3	3	3	3	2	3	4	4	4	5	4	4	3	2	2	2	1	1	2	5
30-Apr	3	2	2	2	2	2	3	3	4	5	5	6	6	9	9	7	7	5	5	3	2	3	1	3	9
																	Diurnal Maximum								



**WBEA**  
**Hourly Averages**

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





**WBEA**  
**Cumulative Frequency Distribution**

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	89	12.36	12.36
6 - 11	257	35.69	48.06
12 - 19	264	36.67	84.72
20 - 28	99	13.75	98.47
29 - 38	11	1.53	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

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

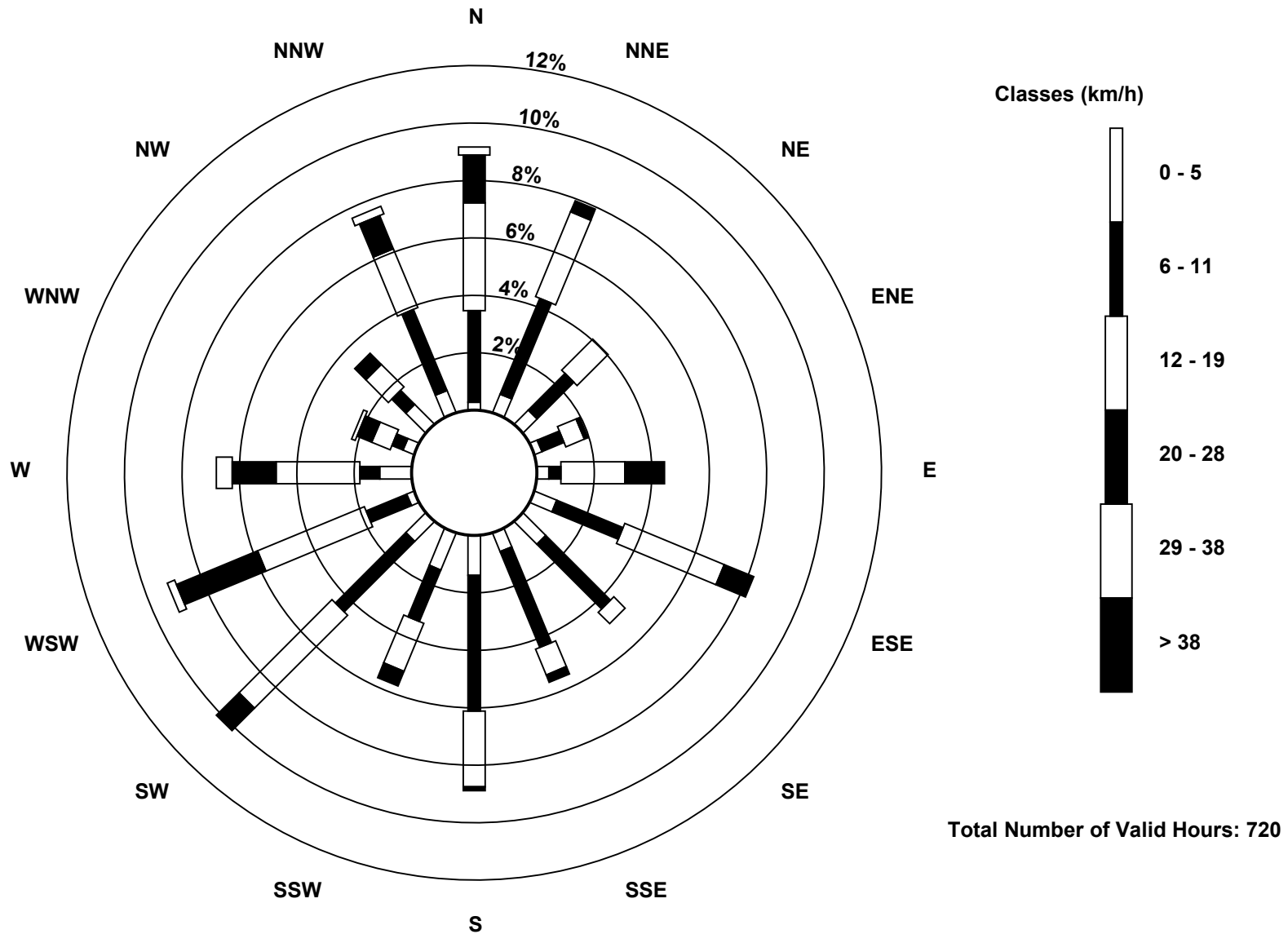
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	5	5	2	3	6	8	5	10	10	7	2	8	3	7	6	89
6 - 11	23	26	13	6	3	18	23	26	34	14	25	11	5	3	5	22	257
12 - 19	27	23	11	5	16	27	4	7	19	13	33	29	21	5	8	16	264
20 - 28	12	3	0	1	10	8	0	2	1	4	8	22	11	4	4	9	99
29 - 38	2	0	0	0	0	0	0	0	0	0	0	2	4	1	0	2	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	66	57	29	14	32	59	35	40	64	41	73	66	49	16	24	55	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

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







**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Patricia McInnes - April 2015**

Direction of Maximum Speed: 259 deg on Apr 11 20:00		Hours in Service:	720
Direction of Maximum Daily Speed Average: 352.0 deg on Apr 1		Hours of Data:	720
Direction of Minimum Speed: 72 deg on Apr 20 10:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.2 deg on Apr 8		Percent Operational Time:	100.0
Monthly Average Direction: 256.7 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-Apr	360	360	356	355	357	352	349	345	349	350	350	354	344	348	354	2	348	345	356	0	2	1	348	327	352.0
2-Apr	298	340	346	324	340	317	335	355	2	20	12	349	357	8	359	346	3	8	12	18	13	29	45	52	1.2
3-Apr	52	36	30	29	40	69	75	52	71	51	356	12	21	24	23	23	26	38	17	6	10	14	23	35	28.5
4-Apr	46	40	22	334	19	26	11	19	16	16	2	13	19	22	340	20	32	26	35	17	11	3	350	350	14.0
5-Apr	339	338	315	320	288	305	334	343	349	6	27	25	19	1	40	30	49	26	30	10	345	348	78	76	8.5
6-Apr	108	111	118	118	113	126	121	124	130	132	110	94	146	192	164	163	167	154	173	174	180	178	191	197	152.0
7-Apr	172	149	153	151	171	173	154	169	173	178	183	189	181	185	195	200	194	184	184	173	168	185	190	190	181.4
8-Apr	184	175	156	166	161	175	168	191	224	241	311	30	13	12	358	360	18	29	49	19	346	234	219	197	6.4
9-Apr	184	176	168	145	173	158	153	157	158	152	175	201	221	227	227	231	233	229	226	222	229	231	226	229	209.4
10-Apr	236	227	225	229	227	222	219	212	214	142	165	164	190	172	189	156	163	177	177	176	181	193	192	193	195.0
11-Apr	170	163	187	200	186	179	178	188	222	278	260	267	269	262	268	260	267	265	257	259	271	247	242	251	251.2
12-Apr	244	239	237	237	234	225	229	234	242	242	249	251	257	261	257	249	252	269	252	260	251	259	236	229	247.7
13-Apr	233	250	236	244	257	264	257	276	280	287	293	300	280	292	297	284	307	312	300	326	253	261	268	118	278.8
14-Apr	122	120	119	123	123	115	125	110	111	106	106	114	121	160	154	107	142	126	118	125	122	117	128	142	123.1
15-Apr	154	172	190	164	199	210	211	226	258	254	258	258	261	254	256	252	256	252	245	186	222	260	244	244	243.7
16-Apr	226	231	238	249	248	239	236	211	223	197	208	245	240	260	261	240	240	266	334	304	261	254	239	239	247.6
17-Apr	238	187	182	214	208	191	172	170	162	170	180	198	198	204	200	182	159	137	109	118	138	89	118	255	182.6
18-Apr	295	309	307	310	310	322	333	334	315	314	317	324	329	345	3	8	11	336	280	359	85	273	279	275	327.2
19-Apr	326	235	199	204	199	180	195	178	151	165	174	264	235	264	228	273	285	280	330	143	192	191	195	205	222.5
20-Apr	216	228	238	232	235	225	224	133	263	72	48	15	7	351	4	39	62	50	35	357	353	347	338	337	350.8
21-Apr	339	329	319	327	319	327	340	344	352	349	357	30	24	9	2	6	8	60	73	76	86	92	99	103	27.3
22-Apr	101	113	110	111	105	106	107	105	102	96	107	108	98	99	96	95	95	100	103	101	101	105	110	105	102.7
23-Apr	107	106	101	96	93	96	95	97	99	89	80	85	109	92	116	115	102	92	91	85	68	67	82	71	93.0
24-Apr	50	35	36	38	36	40	39	41	24	10	6	8	13	12	15	23	349	350	349	345	349	346	347	347	13.1
25-Apr	344	348	343	344	338	342	350	9	13	8	12	346	311	26	52	9	295	336	336	333	328	331	341	323	345.5
26-Apr	260	267	298	135	215	210	129	135	122	134	116	93	104	48	30	66	12	99	107	107	102	116	123	123	106.8
27-Apr	129	138	151	154	152	139	136	136	143	142	175	207	211	205	227	203	226	246	240	219	231	225	231	228	199.6
28-Apr	221	209	215	187	144	163	136	130	138	162	127	172	166	173	160	165	174	171	146	123	127	179	177	267	168.8
29-Apr	282	273	268	236	240	261	283	281	276	212	244	261	263	265	264	264	256	249	239	234	226	232	231	228	256.3
30-Apr	234	233	236	226	227	228	227	237	237	234	233	242	251	238	253	243	240	262	345	18	201	209	230	217	240.0

224.9 221.7 228.4 229.8 232.9 231.0 253.2 250.1 269.5 260.1 272.3 275.6 271.3 274.7 278.6 270.5 270.1 282.5 333.8 1.1 7.4 279.0 184.7 215.6

Diurnal Average

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

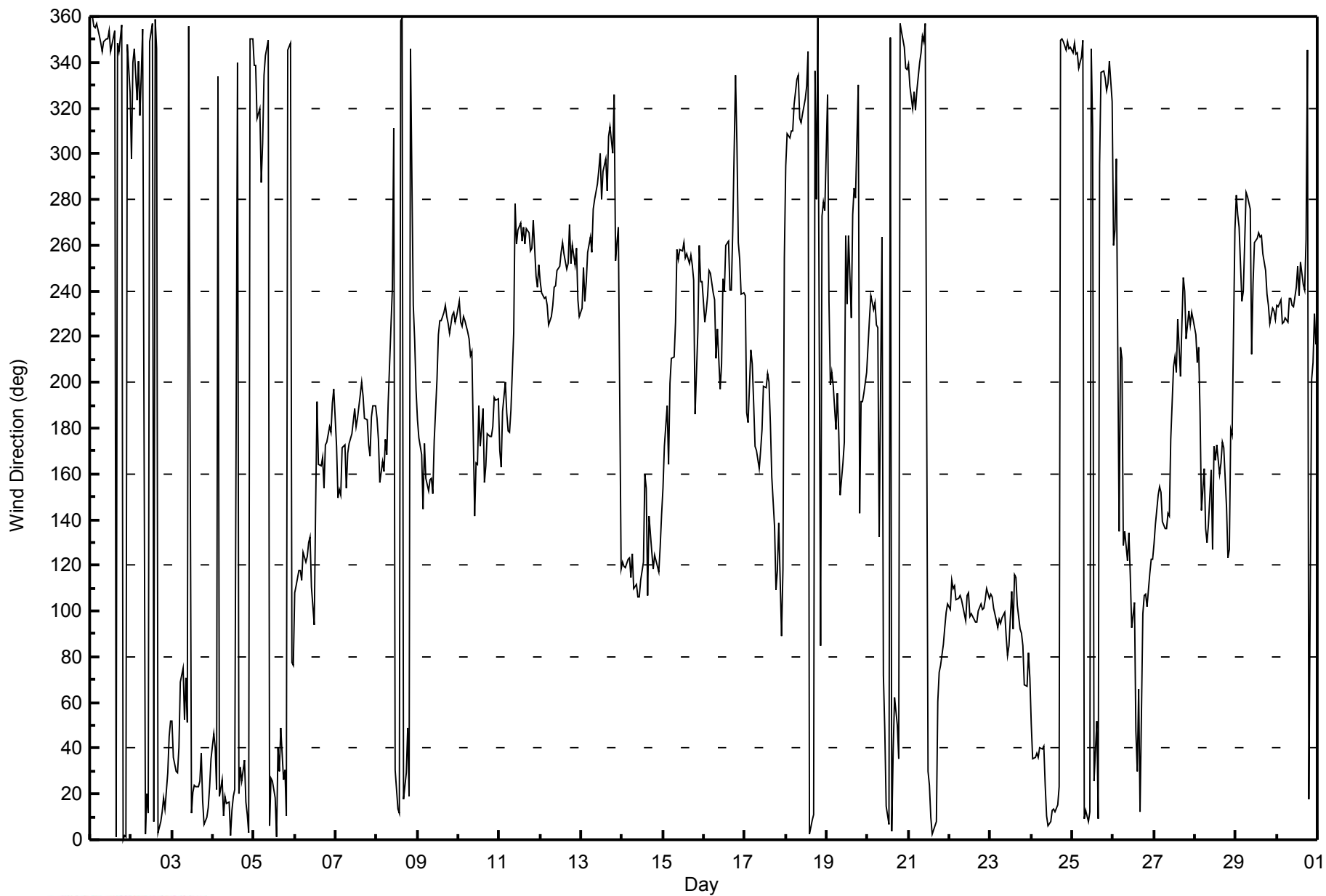
**Wind Direction (WD) - deg**  
**Patricia McInnes - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 108 deg on Apr 20 10:00 Minimum Value: 5 deg on Apr 10 01:00 Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 16 Q <sub>3</sub> = 22 P <sub>90</sub> = 33 P <sub>99</sub> = 84																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	15	13	14	16	14	15	14	12	15	14	14	15	12	16	17	17	15	14	14	13	15	14	12	26	26
2-Apr	10	14	13	13	11	13	11	20	18	26	26	24	34	30	33	21	25	19	16	13	11	13	14	17	34
3-Apr	14	13	14	15	20	16	19	20	23	54	26	29	27	20	21	23	17	19	12	15	16	11	15	12	54
4-Apr	15	16	10	25	16	13	19	17	20	23	38	40	31	39	21	24	16	22	22	15	12	16	10	12	40
5-Apr	8	11	13	13	32	10	12	13	16	18	23	24	26	24	21	17	22	31	22	13	12	18	16	25	32
6-Apr	38	13	12	13	14	13	14	14	25	28	38	48	46	27	23	27	24	16	16	11	10	11	14	11	48
7-Apr	18	7	5	16	16	11	19	15	13	16	17	17	23	24	26	25	21	13	12	10	10	13	11	11	26
8-Apr	9	11	6	6	16	6	8	29	14	19	30	22	25	20	21	22	18	25	14	22	39	23	11	10	39
9-Apr	10	12	17	11	15	11	9	12	14	14	22	17	19	21	18	16	17	15	11	10	6	7	7	5	22
10-Apr	5	10	8	7	8	8	9	11	16	18	16	25	37	59	37	28	21	18	14	8	11	11	11	11	59
11-Apr	22	14	20	11	22	18	19	24	39	19	12	20	23	17	22	19	14	13	11	12	19	31	15	10	39
12-Apr	9	7	8	8	11	10	12	15	14	16	17	18	17	16	18	15	16	16	13	15	11	20	13	11	20
13-Apr	11	11	12	13	13	13	12	15	14	14	17	14	19	27	23	26	17	13	29	30	45	28	62	39	62
14-Apr	13	12	12	13	14	15	16	13	14	13	12	14	34	26	32	26	23	14	14	12	13	13	14	13	34
15-Apr	15	24	45	61	15	10	12	17	15	27	16	19	21	19	21	22	22	18	20	11	21	15	19	18	61
16-Apr	10	9	9	19	10	9	27	21	18	20	23	21	19	15	13	17	17	19	16	19	18	50	18	15	50
17-Apr	12	19	27	10	12	13	15	14	16	19	28	22	21	16	17	19	13	15	13	14	21	92	49	30	92
18-Apr	11	10	11	10	12	12	11	12	12	13	13	14	24	17	24	25	17	29	16	72	24	31	16	23	72
19-Apr	63	31	34	27	14	15	22	17	24	20	31	47	40	32	34	43	20	46	82	10	19	9	10	10	82
20-Apr	12	11	13	11	7	14	15	51	86	108	62	44	44	36	31	25	33	24	15	15	14	11	8	8	108
21-Apr	10	13	13	10	9	17	15	18	16	19	24	24	25	22	21	24	20	25	12	11	12	12	13	14	25
22-Apr	15	14	12	13	12	13	13	14	14	15	16	17	17	16	17	15	13	15	14	13	13	13	13	13	17
23-Apr	14	15	16	16	14	15	14	14	17	17	17	21	20	21	18	17	14	13	13	14	16	14	13	18	21
24-Apr	15	14	11	11	11	12	15	15	22	18	21	21	19	20	18	20	19	18	16	13	12	13	11	12	22
25-Apr	11	13	9	9	7	9	13	18	24	27	34	47	51	78	95	89	83	39	14	7	6	7	11	42	95
26-Apr	51	31	7	28	28	27	22	25	56	47	54	91	79	93	60	53	54	35	16	11	8	10	12	13	93
27-Apr	12	12	19	9	20	11	16	16	24	28	35	18	28	20	22	19	22	17	14	12	7	8	7	7	35
28-Apr	11	11	10	16	8	17	19	36	73	33	20	23	19	17	17	16	14	13	14	10	11	33	18	22	73
29-Apr	14	16	23	10	11	10	10	14	24	13	22	17	17	18	21	17	17	14	18	15	9	7	7	8	24
30-Apr	8	9	11	8	9	9	10	12	19	17	22	16	20	26	40	18	14	46	15	64	82	29	53	47	82
	63	31	45	61	32	27	27	51	86	108	62	91	79	93	95	89	83	46	82	72	82	92	62	47	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Patricia McInnes - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 9, 2015	Last Calibration	March 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:47
Gas Cert Reference	SA130110A	Station temp.	22 Deg C
Cal Gas Concentration	47 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	14300410
ZAG Make/Model	API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9036

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-677	-677
Analyzer IP address	192.168.1.43		Lamp voltage	773	775
Calculated slope	0.996073	0.993106	Chamber temp	45.2	45.1
Calculated intercept	0.834298	0.938086	Pressure	694.0	691.3
Analyzer Background	5.1	5.1	Flow	0.444	0.444
Analyzer Coefficient	1.003	1.003	Intensity	90	90
Analyzer make			Analyzer serial #		
Termo 43i			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	0.1	----
as found span	5000	73.5	690.9	688.8	1.003
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	73.5	690.9	695.5	0.993
second point	5000	36.8	345.9	346.3	0.999
third point	5000	18.4	173.0	172.4	1.003
as left zero					
as left span					
Average Correction Factor					0.998

Corrected As found      688.7      Previous response      692.8      % change      0.6%

**Notes:**

No adjustments. Filter changed after As Finds. No As Lefts due to NH3 calibration to follow

Calibration Performed By:

Ryan Power



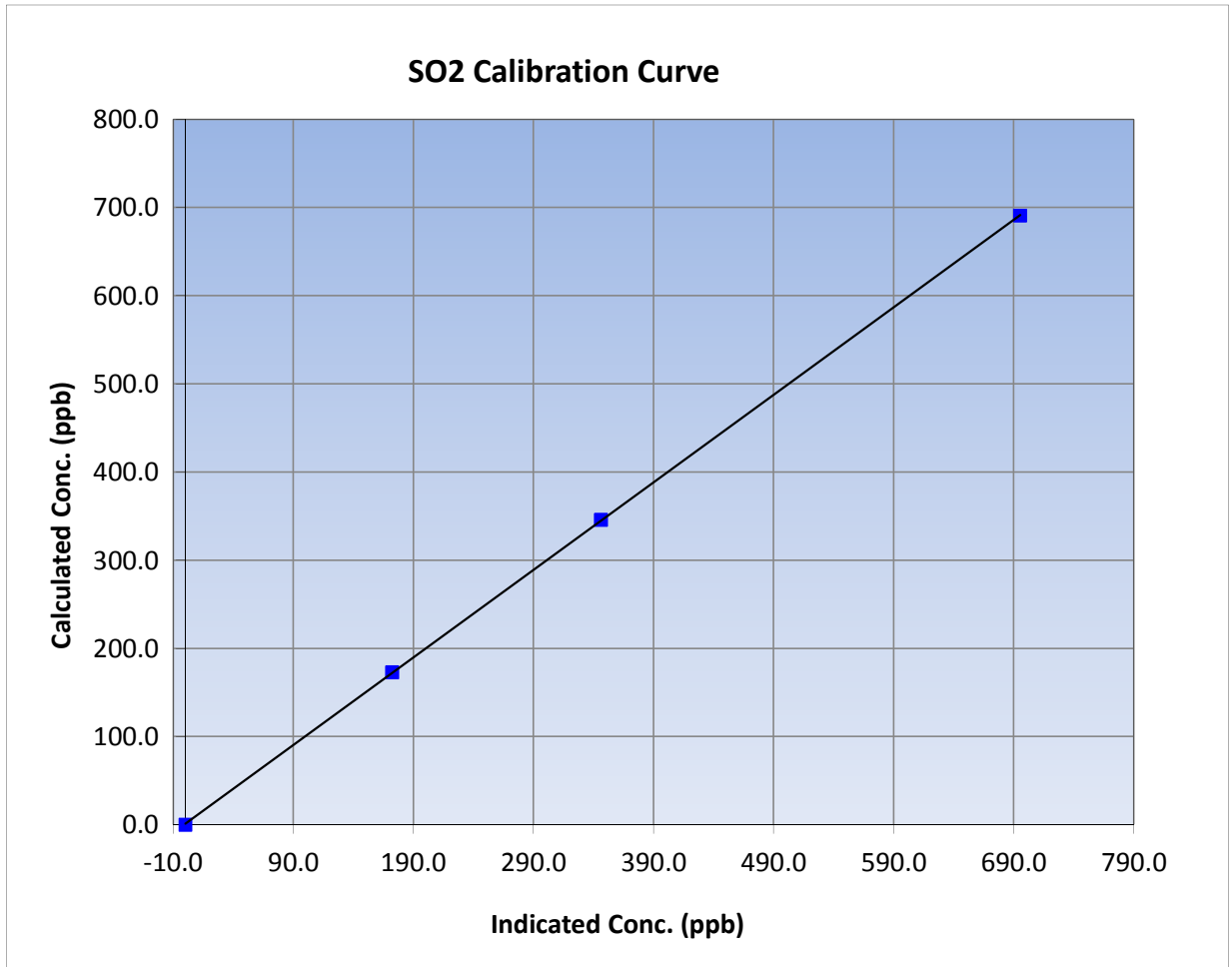
## Wood Buffalo Environmental Association SO2 Calibration Report

### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	12:47
Analyzer make	Termo 43i	Analyzer serial #	1008841397

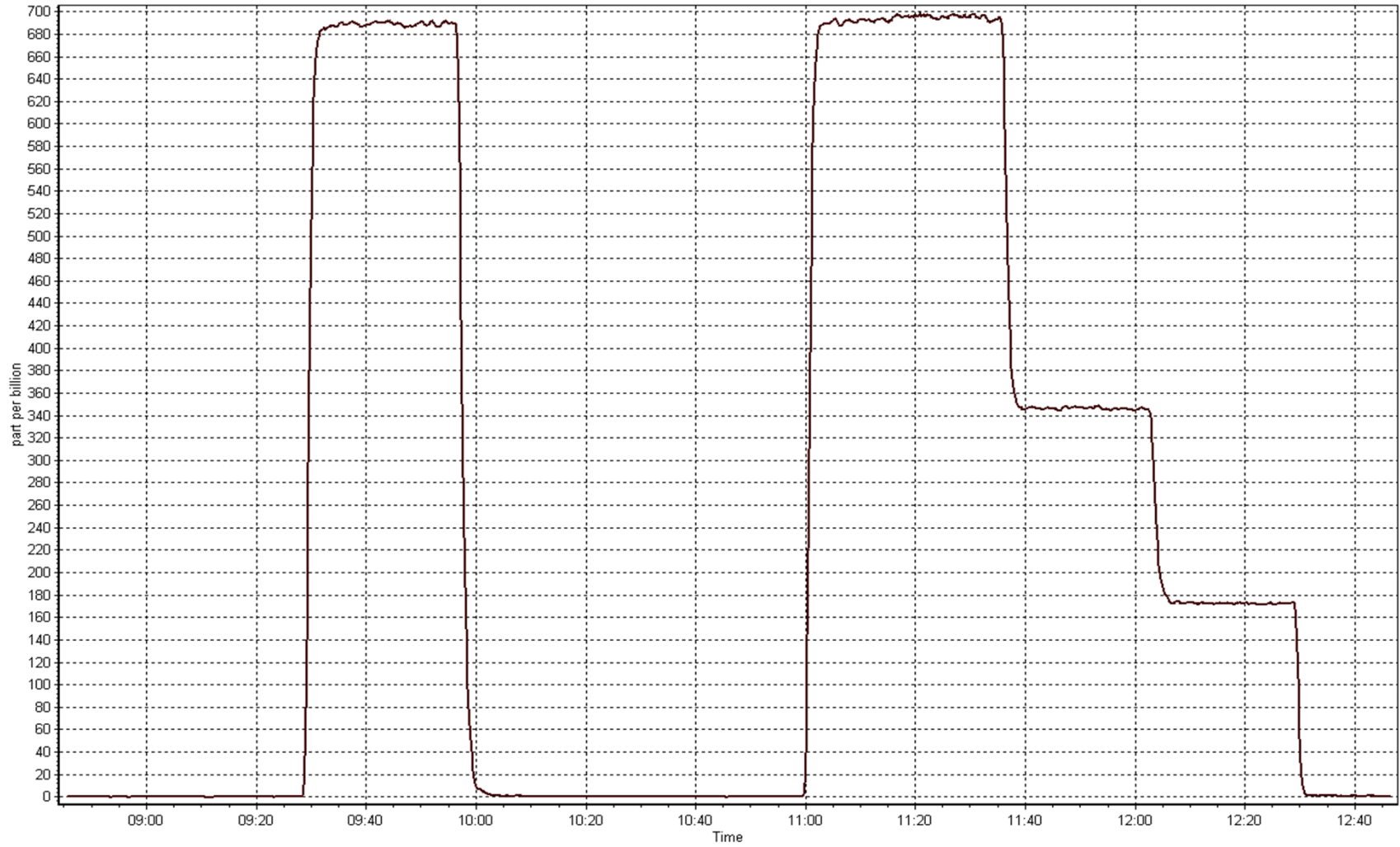
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999987
690.9	695.5	0.9934		
345.9	346.3	0.9989	Slope	0.993106
173.0	172.4	1.0030	Intercept	0.938086



SO2 Calibration Plot

Date: April 9, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	April 2, 2015	Previous Calibration	March 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Other: repair - pump		
Start Time (MST)	11:25	End Time (MST)	15:10
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	SABIO 4010	Serial number	14300410
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	1022	1012
Calculated slope	0.991993	0.989621	Chamber temp.	45	45
Calculated intercept	0.065925	0.364478	Pressure	689.4	704.9
Analyzer Background	2.26	2.26	Flow	0.426	0.449
Analyzer Coefficient	1.213	1.213	Intensity	90	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	0.1	NA
as found span	5000	72.3	70.0	69.5	1.007
SO2 scrubber check	5000	13.8	129.7	0.7	NA
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	72.3	70.0	70.6	0.991
second point	5000	36.2	35.0	34.7	1.010
third point	5000	18.6	18.0	17.5	1.029
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	72.3	70.0	70.0	1.000
Average Correction Factor					1.010

Corrected As found	69.4	Previous response	70.5	% change	1.5%
--------------------	------	-------------------	------	----------	------

#### Notes:

Replaced pump after as founds; low flow alarm was noticed while at station (0.29 LPM). No adjustments to zero or span. Scrubber check done before span, with new pump.

Calibration Performed By:

Michael Martineau





# Wood Buffalo Environmental Association

## TRS Calibration Summary

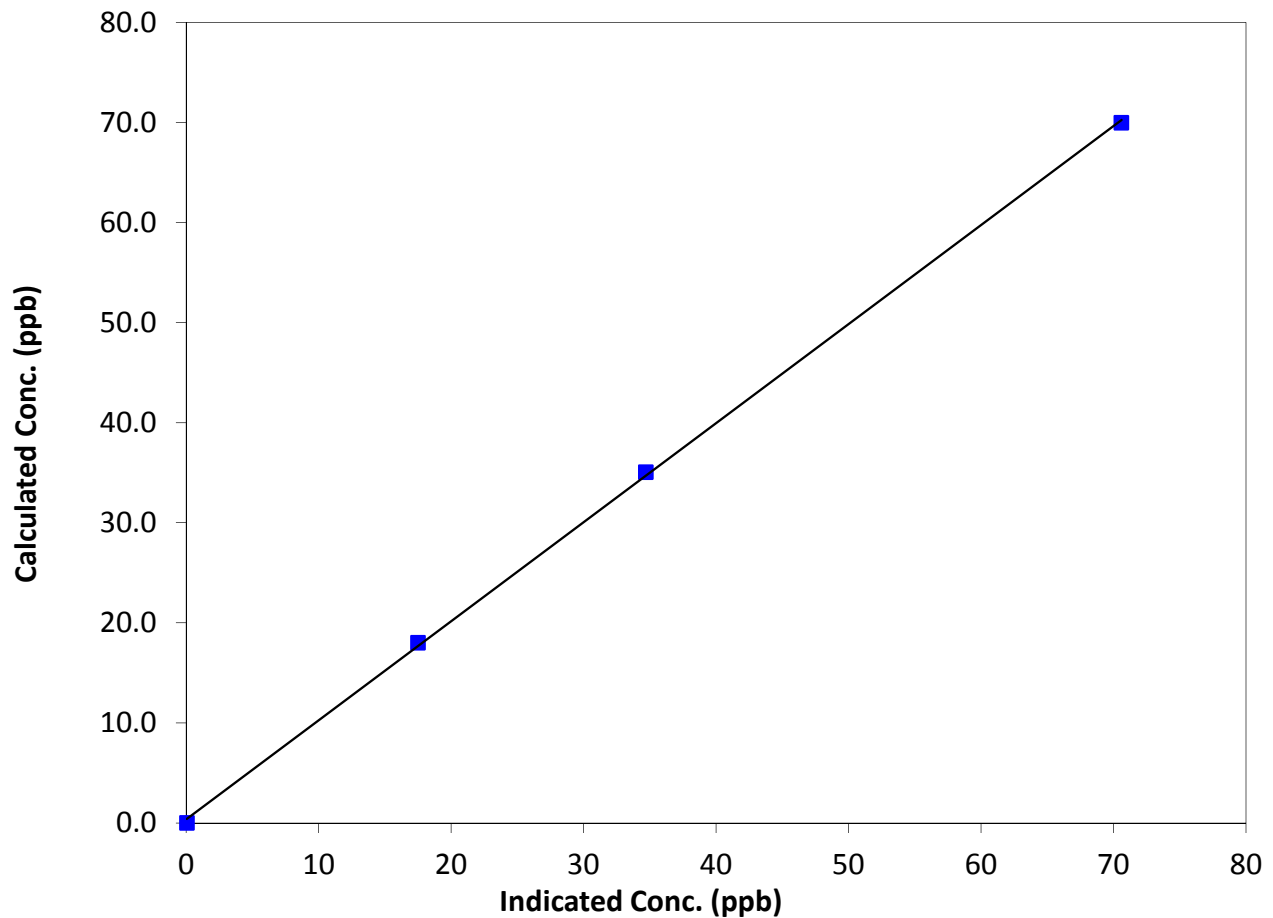
### Station Information

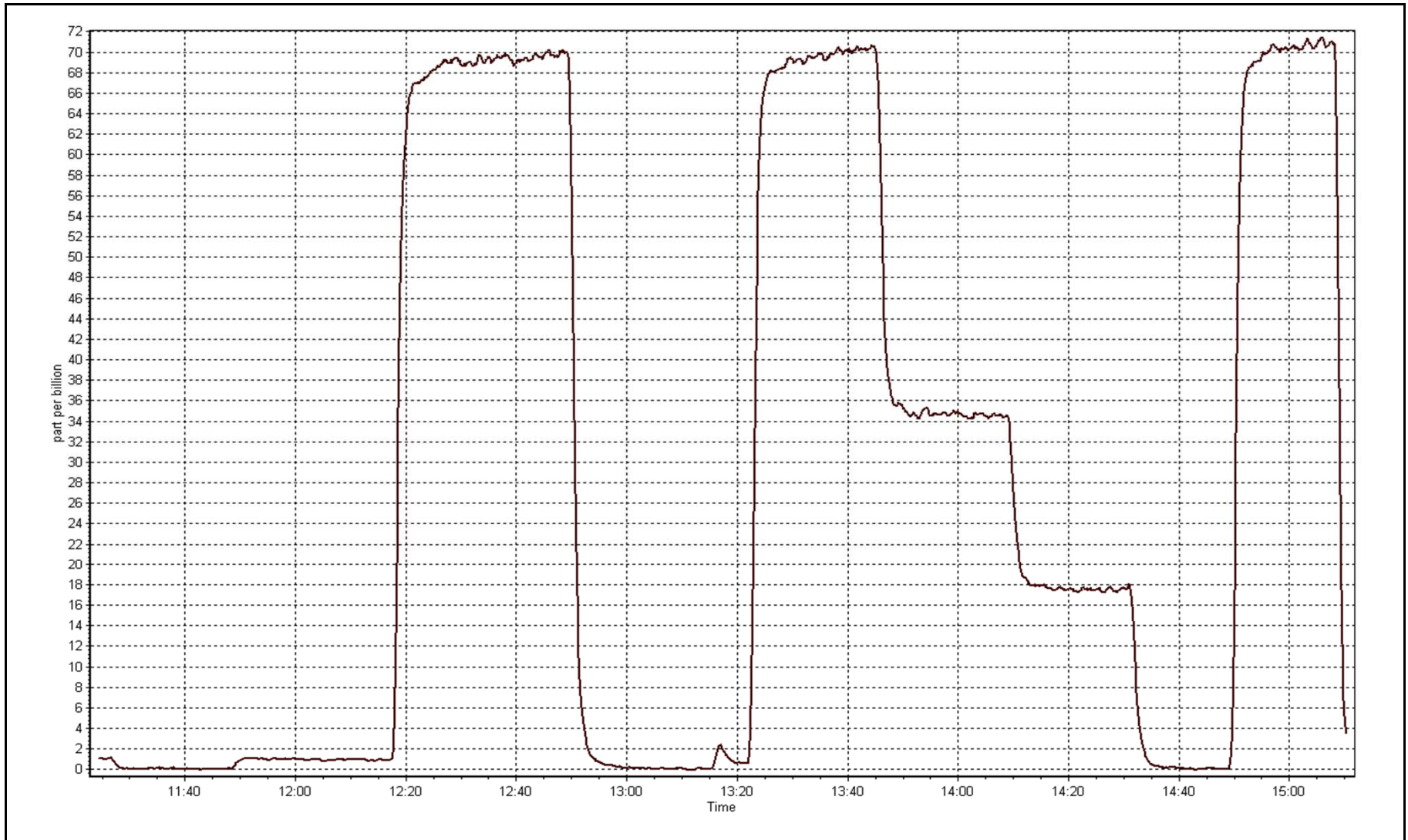
Calibration Date	April 2, 2015	Previous Calibration	March 9, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:25	End Time (MST)	15:10
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999832
70.0	70.6	0.9913		
35.0	34.7	1.0098	Slope	0.989621
18.0	17.5	1.0288		
			Intercept	0.364478

**TRS Calibration Curve**







## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	Thursday, April 09, 2015	Last Calibration	Friday, March 06, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	12:47
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	Station temp.	22 Deg C
Calibrator Model	Sabio 4010	Serial Number	14300410
ZAG make/model	Teledyne API 701	Serial Number	60
DACS make/model	Campbell Scientific CR3000	Serial Number	9036

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.0	175.1
Analyzer IP address	192.168.1.55		Flame Temp	399.4	398.5
THC Calc slope	0.998164	0.997681	Carrier Pressure	34.5	34.5
THC Calc intercept	0.012749	0.022413	Fuel Pressure	42.3	42.3
NMHC Calc slope	1.000159	0.998016	Air Pressure	32.4	32.4
NMHC Calc intercept	-0.005338	-0.003661			

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	----
as found span	5000	73.5	16.06	16.04	1.001
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	73.5	16.06	16.09	0.998
second point	5000	36.8	8.04	8.00	1.005
third point	5000	18.4	4.02	4.00	1.005
as left zero					
as left span					
Average Correction Factor					1.003

Corrected As found 16.04 Previous response 16.07 % change 0.2%

**Notes:**

Filter changed after As Found. Long Calibrator Zero due to maintenance on the NH3 analyzer. No As Lefts due to NH3 calibration to follow

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	----
as found span	5000	73.5	8.53	8.44	1.011
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	73.5	8.53	8.55	0.998
second point	5000	36.8	4.27	4.28	0.998
third point	5000	18.4	2.14	2.15	0.993
as left zero					
as left span					
Average Correction Factor					0.996

Corrected As found      8.44      Previous response      8.53      % change      1.1%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	73.5	7.53	7.61	0.989
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	73.5	7.53	7.54	0.998
second point	5000	36.8	3.77	3.72	1.013
third point	5000	18.4	1.88	1.85	1.018
as left zero					
as left span					
Average Correction Factor					1.010

Corrected As found      7.61      Previous response      7.54      % change      -0.9%



# Wood Buffalo Environmental Association

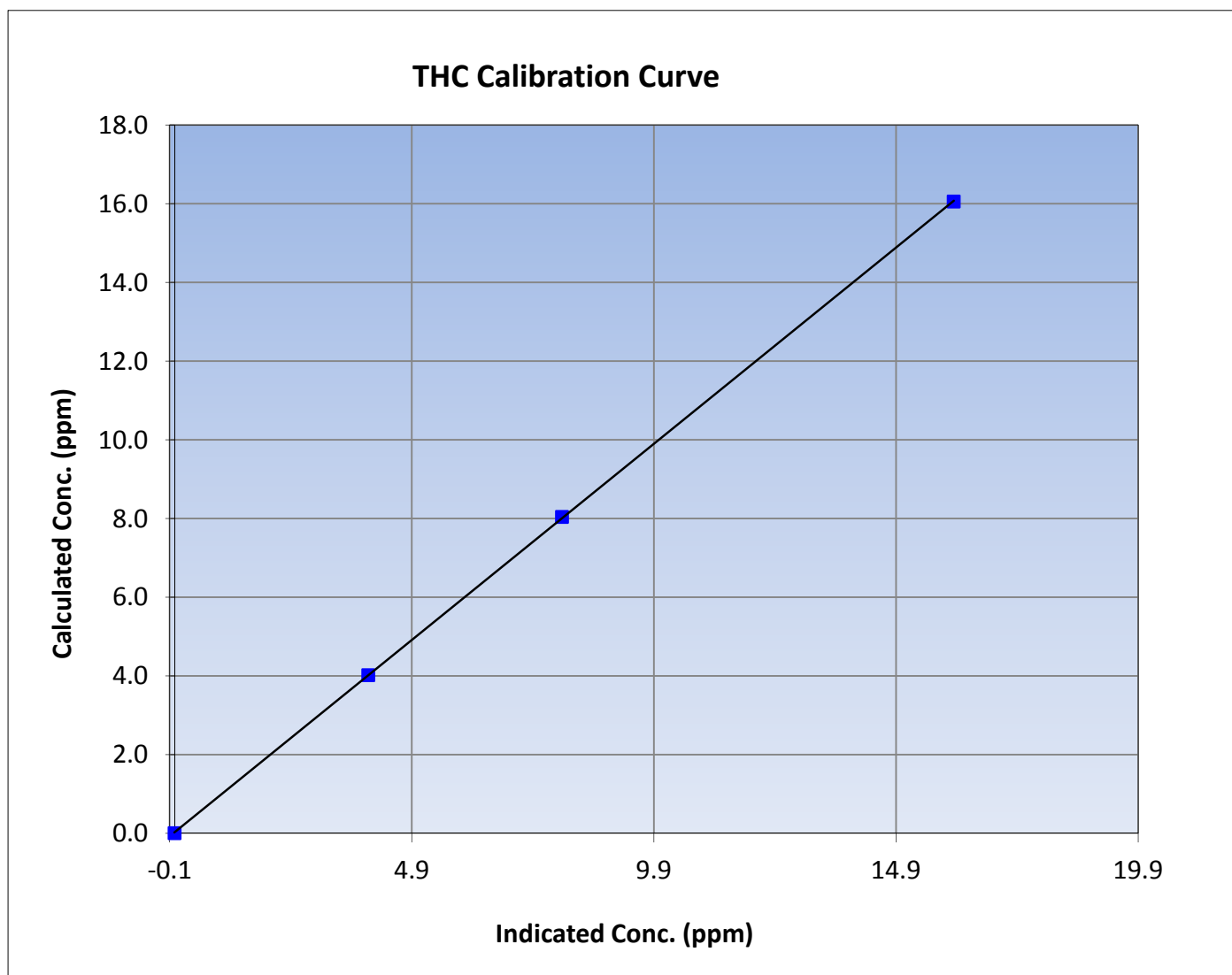
## THC Calibration Summary

### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	12:47
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999985
16.06	16.09	0.9979		
8.04	8.00	1.0049	Slope	0.997681
4.02	4.00	1.0049		
			Intercept	0.022413





# Wood Buffalo Environmental Association

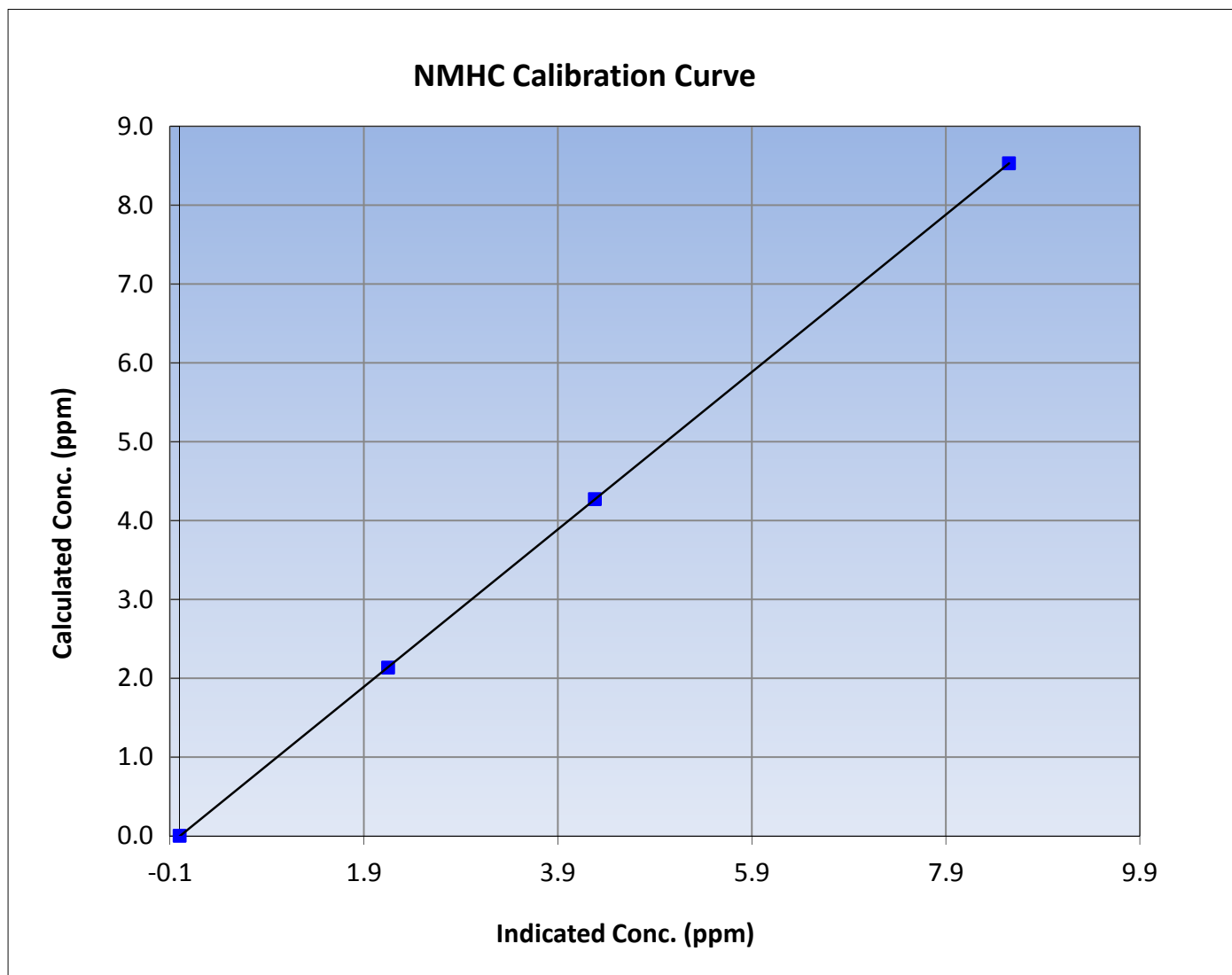
## NMHC Calibration Summary

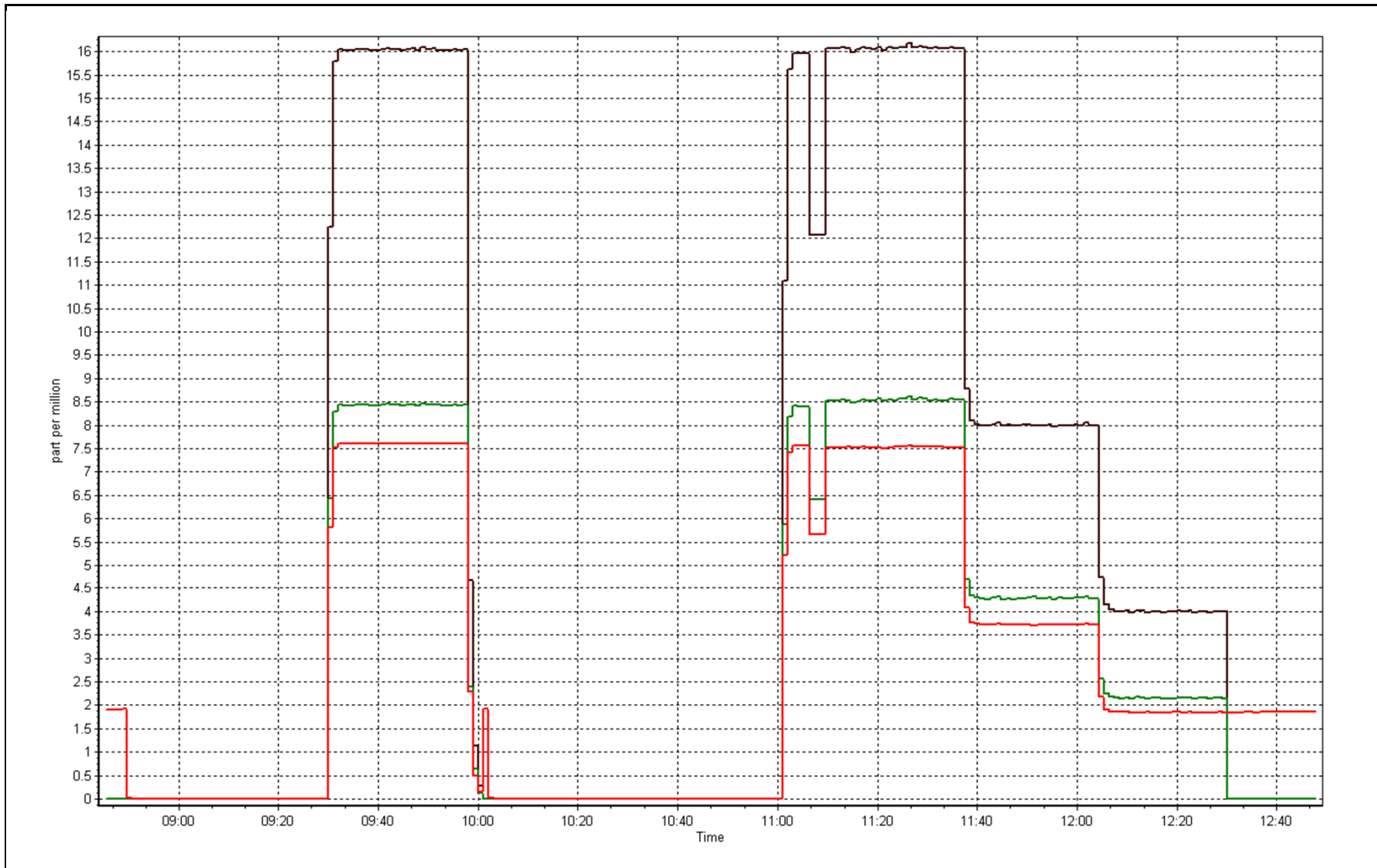
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	12:47
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999998
8.53	8.55	0.9976		
4.27	4.28	0.9978	Slope	0.998016
2.14	2.15	0.9932		
			Intercept	-0.003661







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 11, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	14:30
NO2 GPT Ref date	Thursday, April 09, 2015	Transfer Standard	NOX calibration
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	14300410
DACS make/model	Campbell Scientific CR3000	Serial Number	60
		Serial Number	9036

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.7	24.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.5	53.5
Calculated slope	0.997566	1.004332	Pressure	665.3	653.7
Calculated intercept	-0.690646	-0.886534	Flow cell A	0.702	0.697
Analyzer Background	-0.4	-0.4	Flow cell B	0.727	0.720
Analyzer Coefficient	0.951	0.917	Cell A Intensity	83860	83500
			Cell B Intensity	78475	78200

Analyzer make	Thermo 49i	Analyzer serial #	1300156234
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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	----
as found span	5000	0.652	326.6	330.2	0.989
calibrator zero	5000	0.00	0.0	-0.2	----
high point	6000	0.783	326.6	325.4	1.004
second point	6000	0.522	205.2	205.8	0.997
third point	6000	0.261	85.1	86.8	0.980
as left zero	6000	0.783	0.0	0.0	----
as left span	6000	0.00	326.6	327.1	0.998
Average Correction Factor					0.994

Corrected As found	330.4	Previous response	328.1	% change	-0.7%
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**Notes:**

As Found Zero used as Calibrator Zero. Span with a small adjustment. Filter changed after As Finds.

Calibration Performed By: Ryan Power





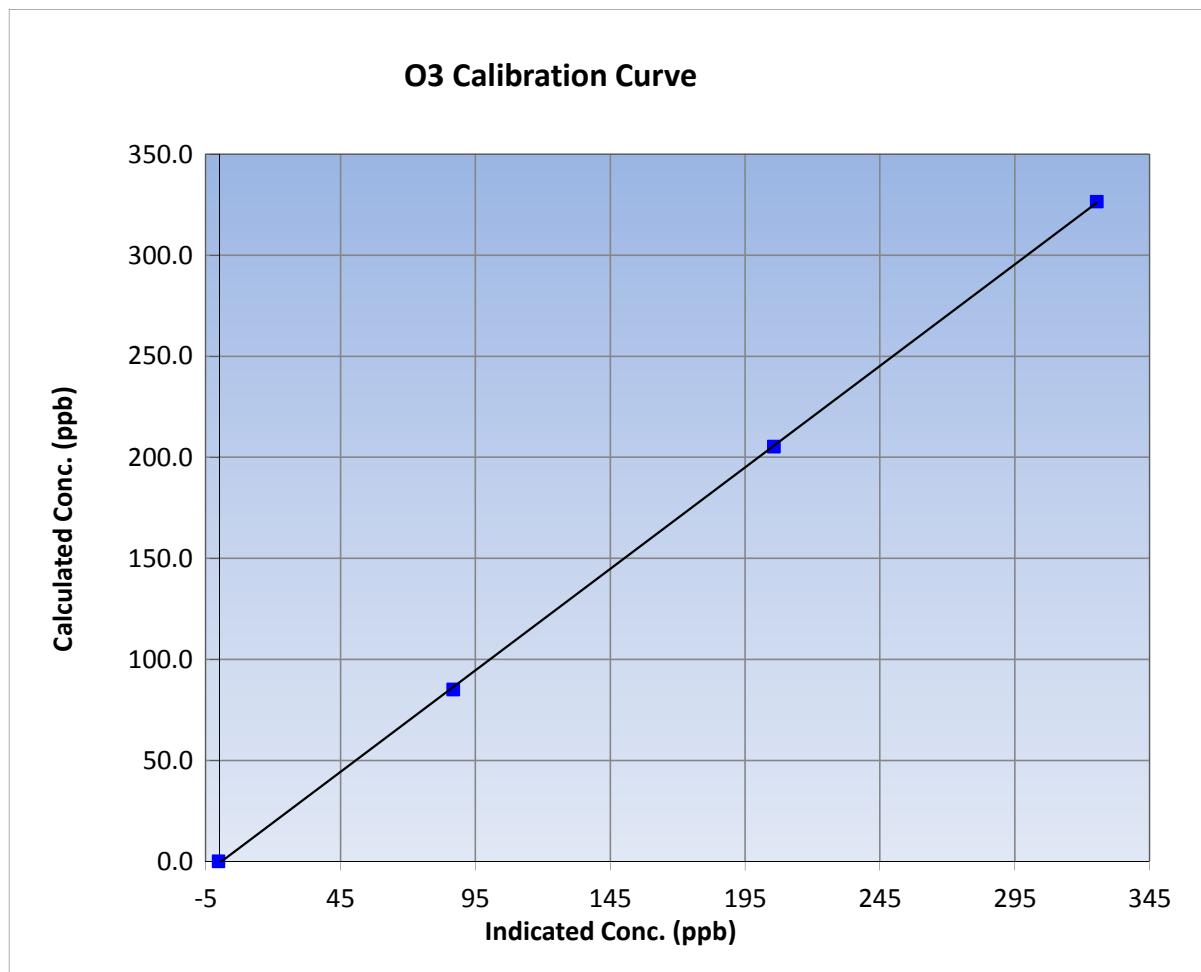
## Wood Buffalo Environmental Association O3 Calibration Report

### Station Information

Calibration Date	Friday, April 10, 2015	Previous Calibration	March 11, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	11:30	End Time (MST)	14:30
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

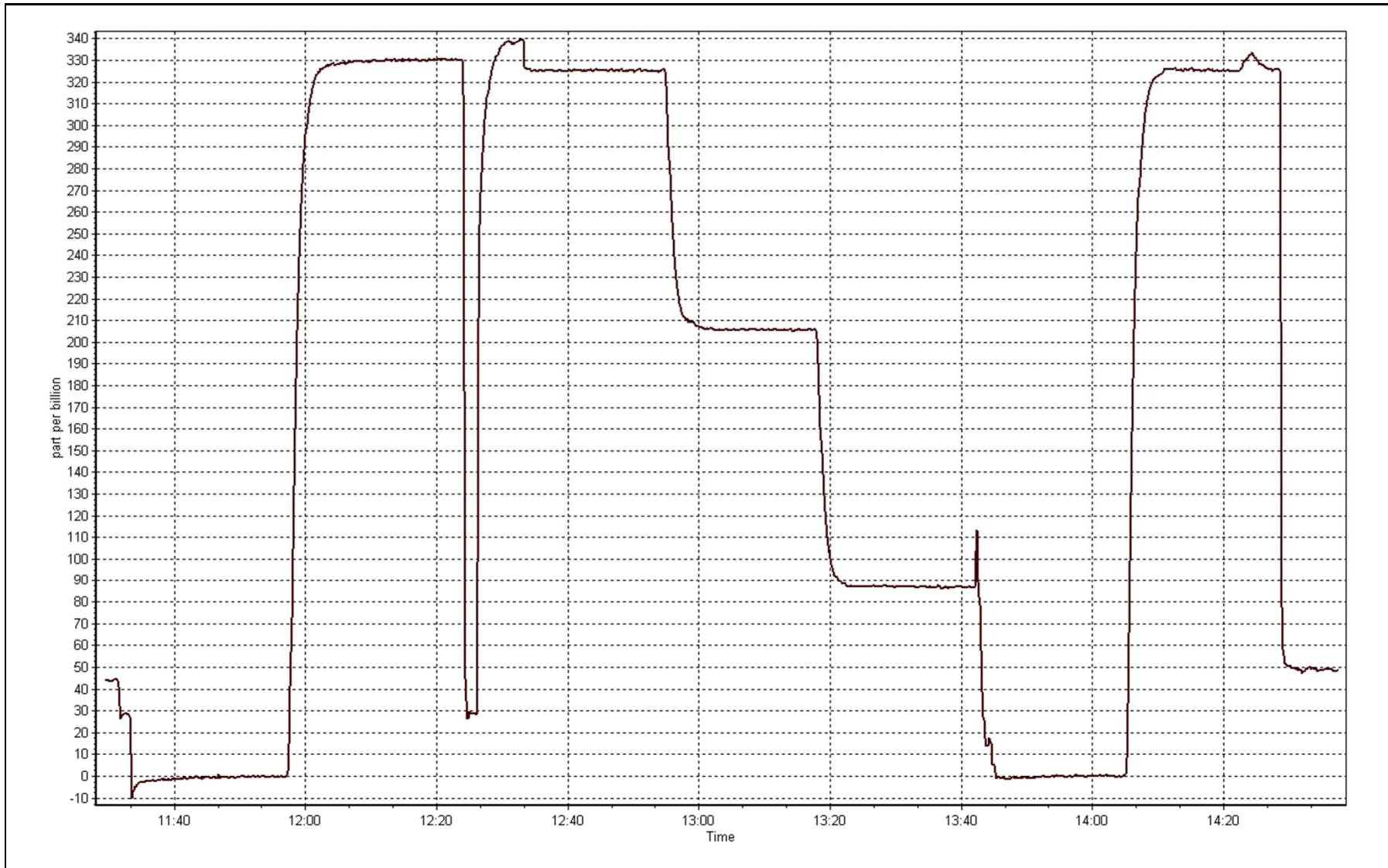
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999943
326.6	325.4	1.0037		
205.2	205.8	0.9973	Slope	1.004332
85.1	86.8	0.9801		
			Intercept	-0.886534



O3 Calibration Plot

Date: April 10, 2015





## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 10, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Install		
Start Time (MST)	8:45	End Time (MST)	14:30
NO Cal Gas Conc	54.4 ppm	Gas Cert Reference	SA130110A
NOx Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	14300410
Zero air Generator	Teledyne API T701	Serial Number	60

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9036
-------------------	----------------------------	-----------------	------

### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.994558	0.993611	1.000234
	Data Offset	1.059229	1.947178	-0.073800
Current Calibration	Data Slope	0.993657	0.995707	0.997055
	Data Offset	0.646925	1.188351	1.127237

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153460
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.943		0.935	
NOx coefficient	0.995		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.5		2.4	
NOx bkgrnd	2.7		3.1	
Chamber Temp	50.4	Deg C	50.4	Deg C
Moly Temp	327.4	Deg C	322.4	Deg C
PMT voltage	-761	V	-761	V
PMT Temp	-3	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	165.1	mmHg	163.2	mmHg
R Cell Press Nox	164.7	mmHg	163.5	mmHg
NO sample flow	0.859	lpm	0.837	lpm
Nox sample Flow	0.857	lpm	0.839	lpm

**Notes:**

Small adjustments to zero and span. Filter changed after As Finds. No As Lefts as NH3 calibration ongoing.





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

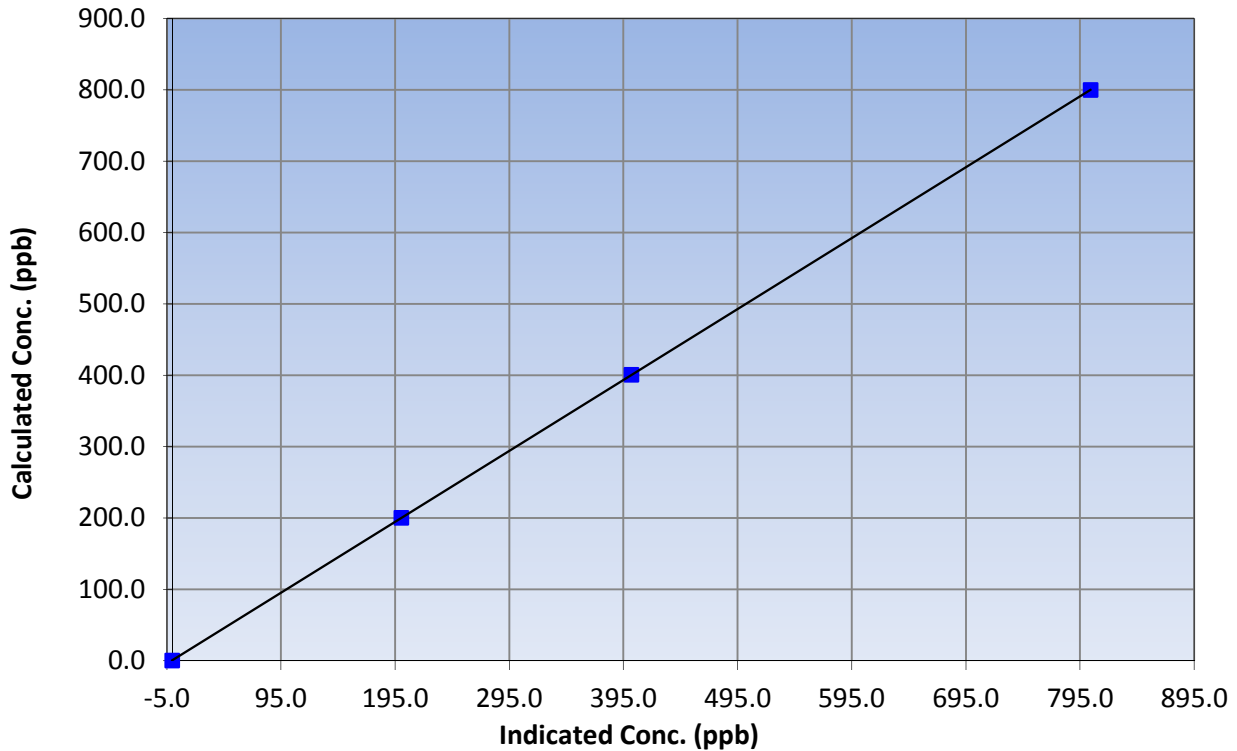
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 10, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999999
799.7	804.3	0.9943		
400.4	402.2	0.9956	Slope	0.993657
200.2	200.5	0.9984		
			Intercept	0.646925

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

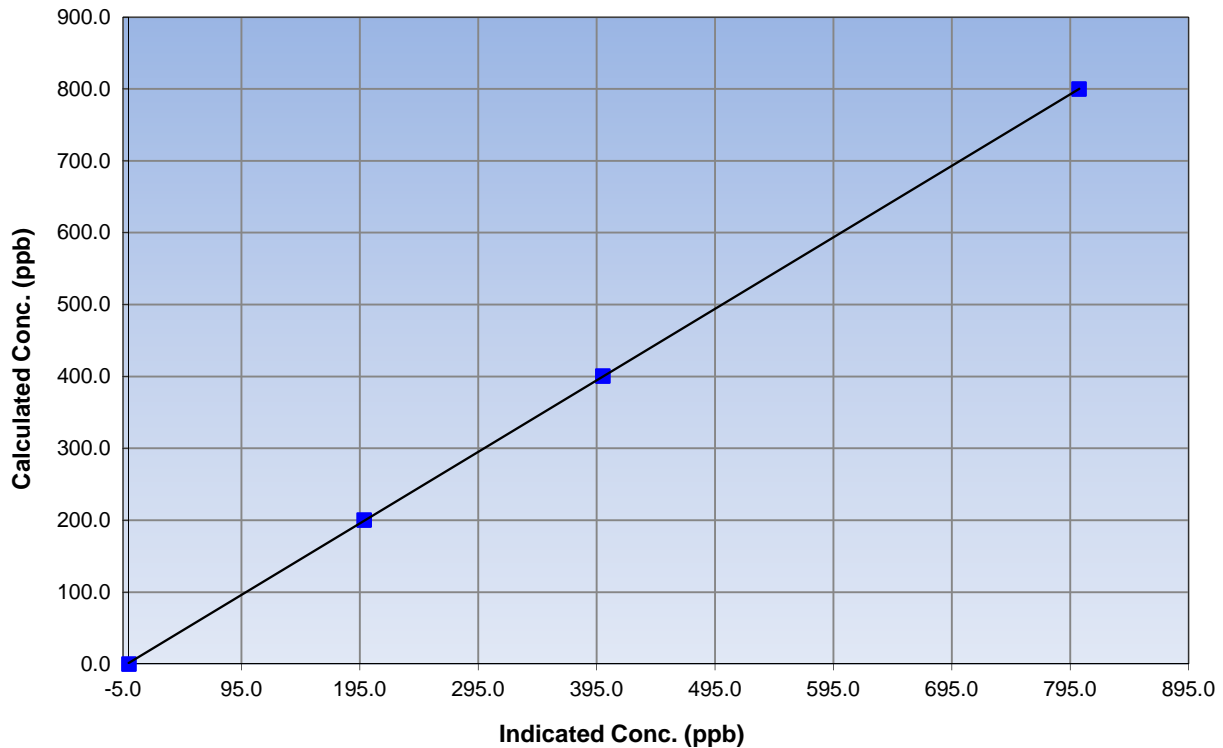
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 10, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999990
799.7	802.5	0.9964		
400.4	400.3	1.0002	Slope	0.995707
200.2	198.7	1.0077		
			Intercept	1.188351

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

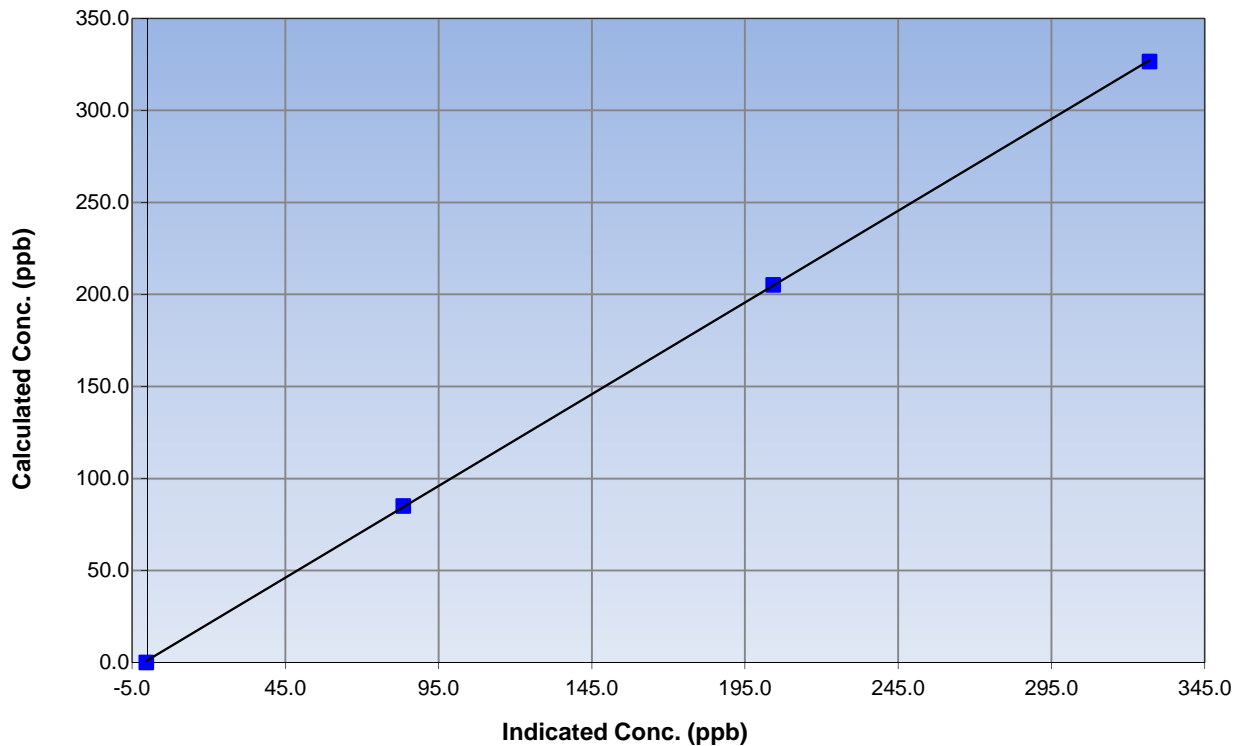
### Station Information

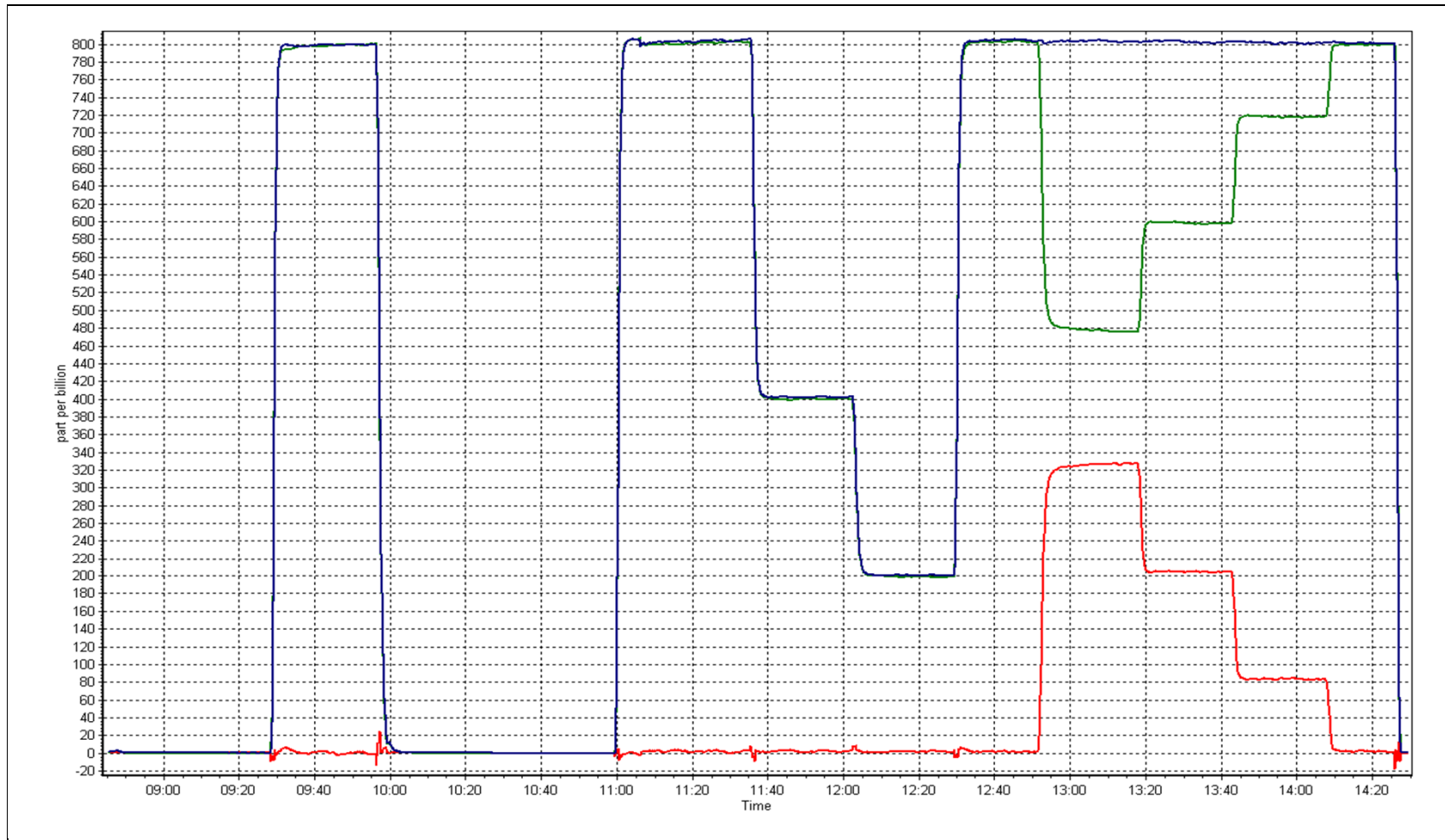
Calibration Date	April 9, 2015	Previous Calibration	March 10, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999972
326.6	326.9	0.9989		
205.2	204.2	1.0051	Slope	0.997055
85.1	83.5	1.0198		
			Intercept	1.127237

### NO<sub>2</sub> Calibration Curve









# Wood Buffalo Environmental Association

## N<sub>t</sub>-NO<sub>x</sub>-NH<sub>3</sub> Calibration Report

### Station Information

Station Name	Patricia McInnis	Station Number	AMS 6
NOX Calibration Date	April 9, 2015	NOX Previous Cal Date	March 12, 2015
NH3 Calibration Date	April 9, 2015	NH3 Previous Cal Date	March 12, 2015
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	18:00
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

Parameter		NH3	Nt	NOx	NO	NO2
Cal Stats As Found	Data Slope	0.995155	0.983213	1.001694	1.000082	1.010502
	Data Offset	0.124456	-0.030911	1.824499	2.262430	-0.228722
Cal Stats After	Data Slope	1.005123	0.997381	0.997090	1.005078	1.011172
	Data Offset	3.546684	3.893993	2.715383	3.912738	-4.081474
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	10.9	ppb	1.1	ppb
NOx BKG	10.0	ppb	0.8	ppb
Nt BKG	12.6		18.7	
NO coefficient	1.217		0.961	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	0.931		0.975	
NH3 coefficient	NA		NA	
Nt coefficient	0.992		0.970	
NH3 conv temp	825	DegC	825	Deg C
Chamber Temp	50.5	Deg C	49.5	Deg C
Moly Temp	327.4	Deg C	316.2	Deg C
PMT Temp	-8.8	Deg C	7.1	Deg C
O3 flow	ok	ccm	85.0	ccm
R Cell Press	4.5	mmHg	4.6	mmHg
PMT Voltage	NA	v	NA	v
Sample Flow 1 NO	533.0	ccm	541.0	ccm
Sample Flow 2 Nox	515.0	ccm	544.0	ccm
Sample Flow 3 Nt	486.0	ccm	545.0	ccm

**Notes:**

NO and Nt with adjustments. NH3 span adjusted. Filter changed after NO As Found. Lines from analyzer to converter shortened. Stainless steel line in converter replaced with teflon line





# Wood Buffalo Environmental Association

## NH3 Calibration Summary

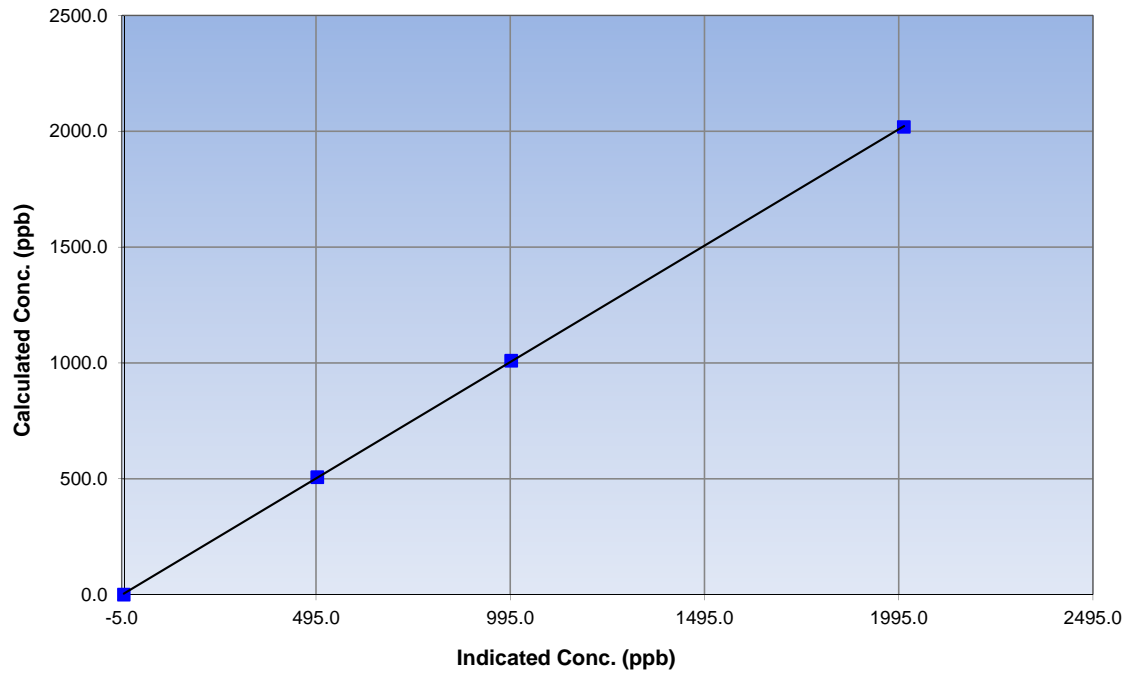
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 12, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999984
2019.8	2008.3	1.0057		
1009.9	997.9	1.0121	Slope	1.005123
506.9	498.2	1.0173		
			Intercept	3.546684

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

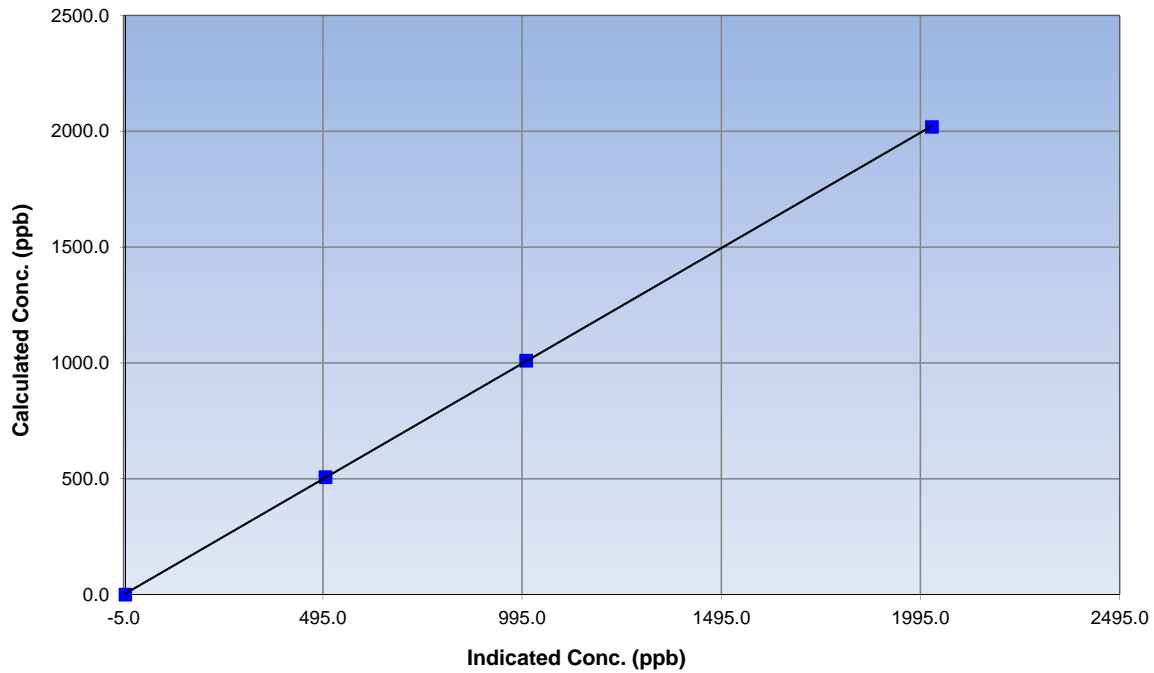
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 12, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

### Nt (NH<sub>3</sub>) Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999984
2019.8	2023.6	0.9982		
1009.9	1005.2	1.0047	Slope	0.997381
506.9	501.9	1.0099		
			Intercept	3.893993

### Nt Calibration Curve





# Wood Buffalo Environmental Association

## NOx Calibration Summary

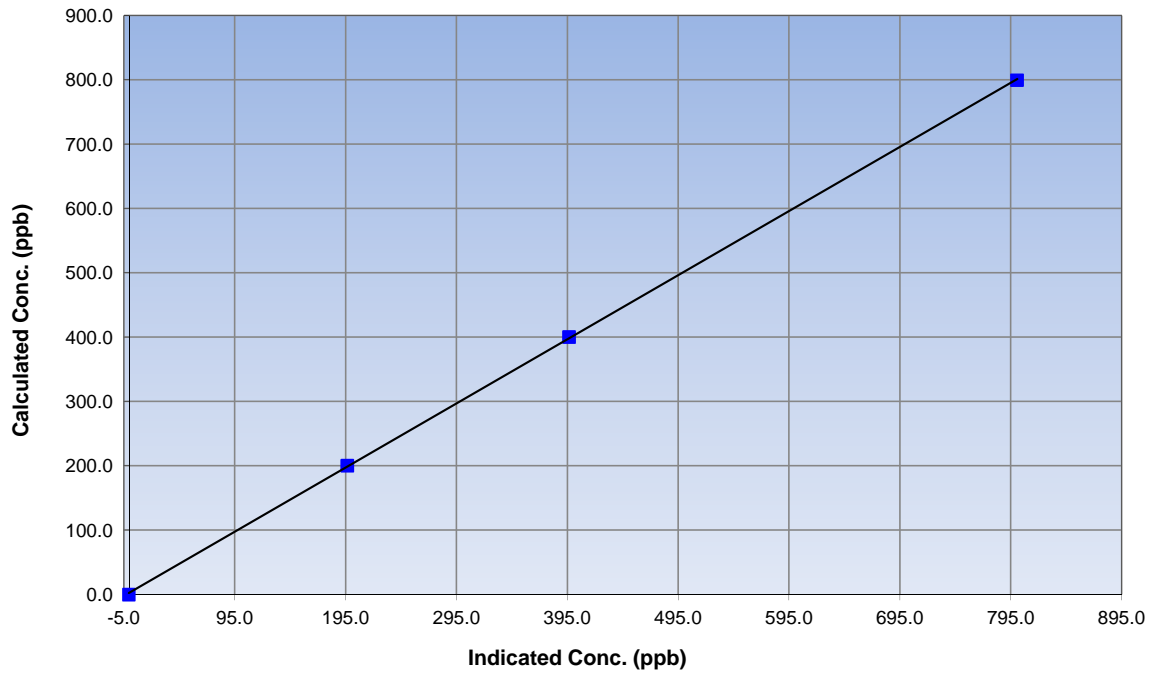
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 12, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

### NO<sub>x</sub> Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999958
799.7	800.8	0.9986		
400.4	396.6	1.0096	Slope	0.997090
200.2	196.6	1.0185		
			Intercept	2.715383

### NOx Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

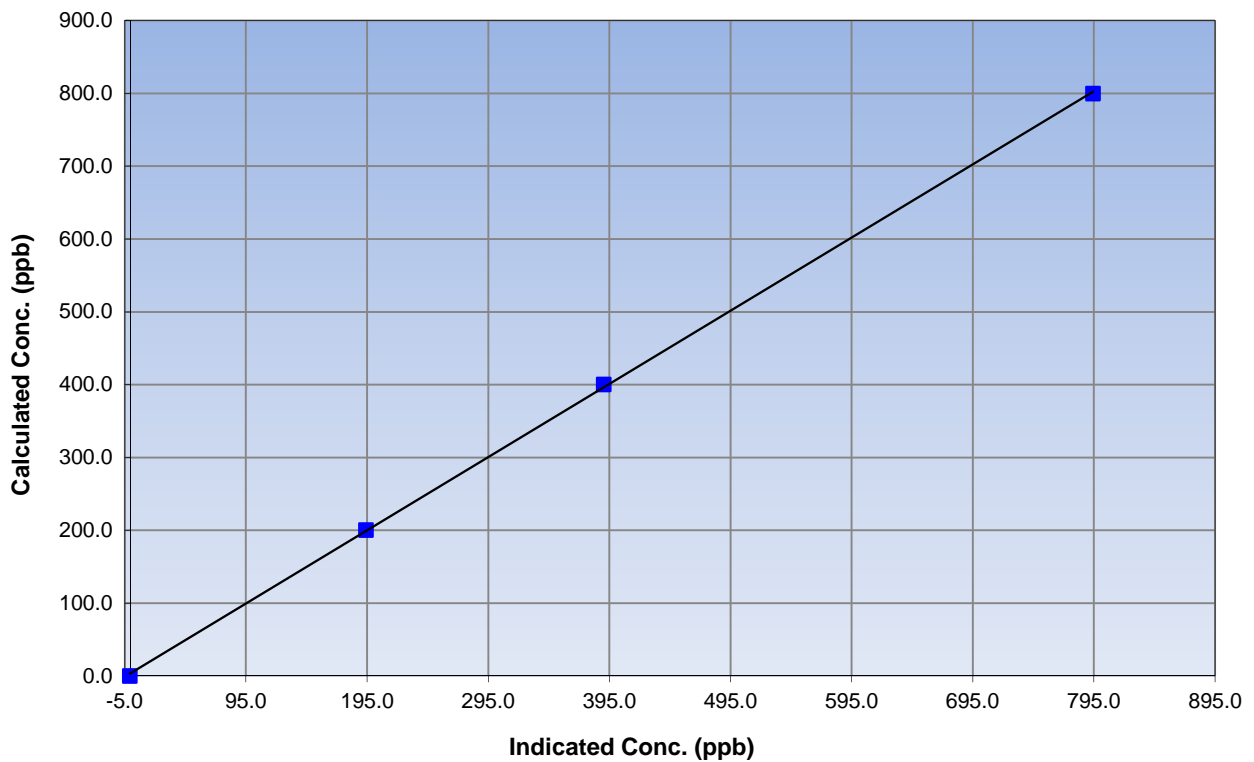
### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.8	----	Correlation Coefficient	0.999899
799.7	794.1	1.0070		
400.4	390.2	1.0260	Slope	1.005078
200.2	194.0	1.0319		
			Intercept	3.912738

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

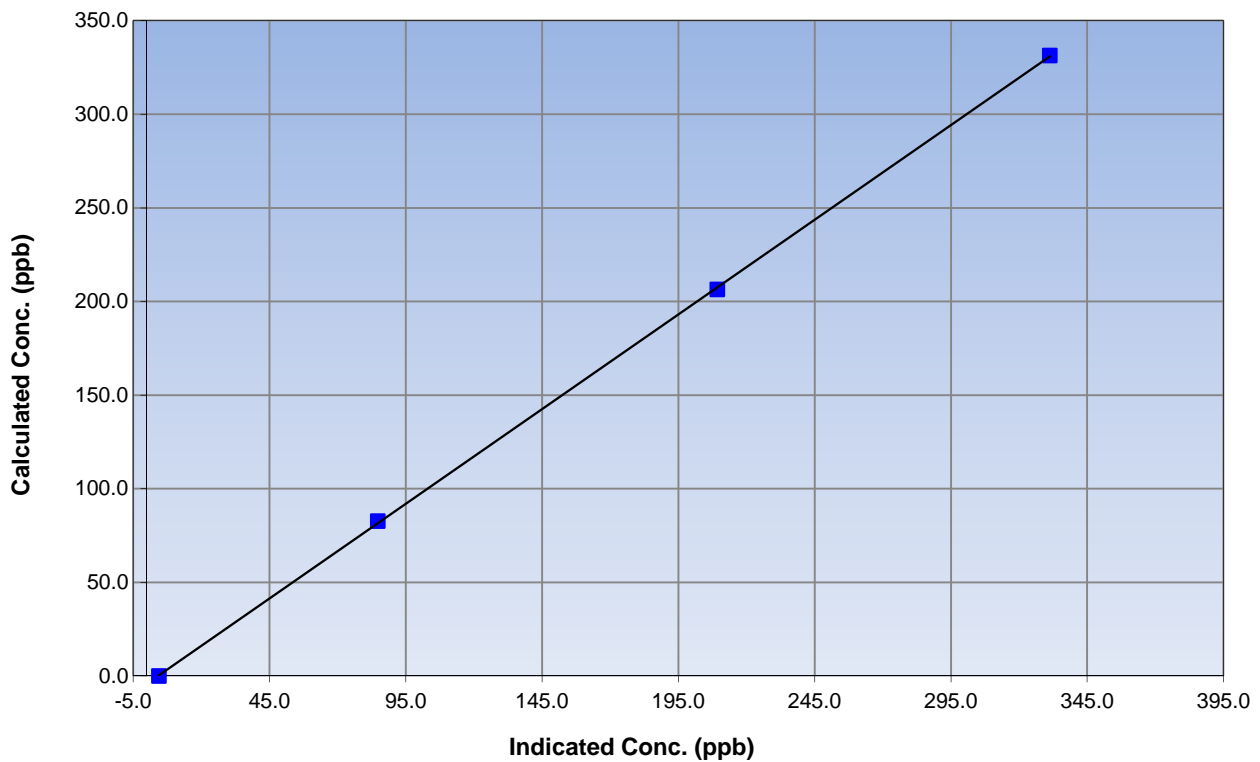
### Station Information

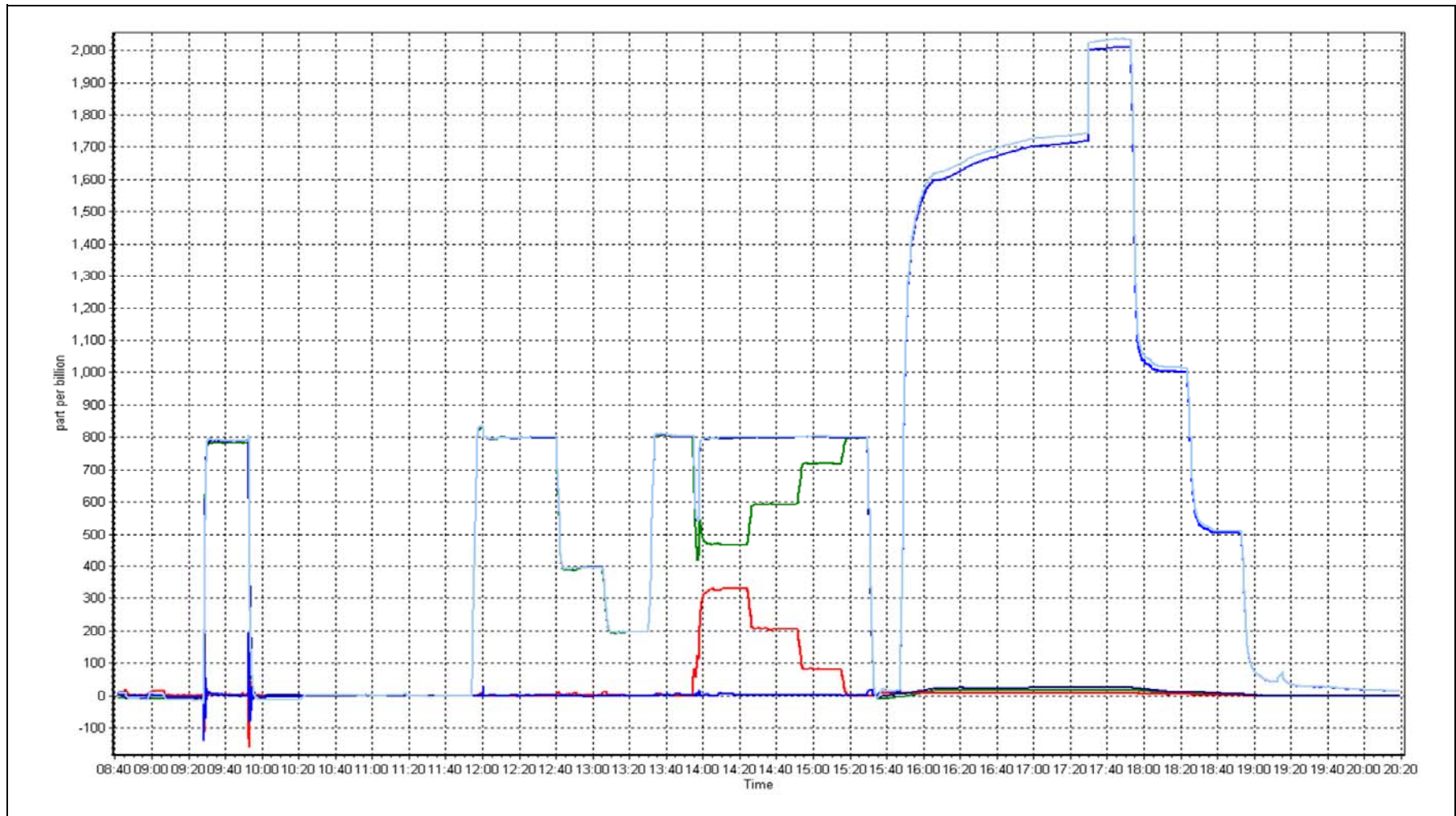
Calibration Date	April 9, 2015	Previous Calibration	March 12, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	8:45	End Time (MST)	18:00
Analyzer make	API T201	Analyzer serial #	215

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	4.5	----	Correlation Coefficient	0.999951
331.4	331.3	1.0002		
206.4	209.3	0.9862	Slope	1.011172
82.7	84.7	0.9769		
			Intercept	-4.081474

### NO<sub>2</sub> Calibration Curve







# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 7  
ATHABASCA VALLEY  
APRIL 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

May 29, 2015

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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)

APRIL 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	684	36	36	100.00	14	0	3	0
TRS (ppb) Average	686	34	34	100.00	1	0	0	0
THC (ppm) Average	679	38	41	99.58	2.9	-	2	-
NMHC (ppm) Average	679	38	41	99.58	0.94	-	0.041	-
CH4(ppm) Average	679	38	41	99.58	2.3	-	2	-
O3 (ppb) Average	684	36	36	100.00	51	0	42	-
NO2 (ppb) Average	684	36	36	100.00	30	0	11	-
NO (ppb) Average	684	36	36	100.00	17	-	3	-
NOX (ppb) Average	684	36	36	100.00	38	-	13	-
PM2.5 (ug/m3) Average	716	0	4	99.44	54.2	-	16.8	0
CO(ppm) Average	685	35	35	100.00	0.4	0	0.1	-
Temperature 2 m (C) Average	720	0	0	100.00	25.2	-	15.4	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.3	-	29.3	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	73	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	36	-	20	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
 APRIL 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	684	1	2	-	0	0	0	1	1	1	14
TRS (ppb) Average	686	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	679	1.87	0.1	-	1.8	1.8	1.8	1.8	1.9	2	2.9
NMHC (ppm) Average	679	0.005	0.041	-	0	0	0	0	0	0	0.94
CH4(ppm) Average	679	1.86	0.1	-	1.8	1.8	1.8	1.8	1.9	1.9	2.3
O3 (ppb) Average	684	31.5	11	-	3	15	24	34	39	44	51
NO2 (ppb) Average	684	4.9	5	-	0	1	2	3	7	11	30
NO (ppb) Average	684	1	2	-	0	0	0	0	1	3	17
NOX (ppb) Average	684	5.9	6	-	0	1	2	4	8	14	38
PM2.5 (ug/m3) Average	716	6.69	5.4	-	0.4	2.2	3.7	5.4	8.1	11.4	54.2
CO(ppm) Average	685	0.07	0	-	0	0	0	0.1	0.1	0.1	0.4
Temperature 2 m (C) Average	720	5.09	7.3	-	-12.5	-4.2	-0.7	5.4	10.4	14.1	25.2
Barometric Pressure (inHg) Average	720	28.93	0.2	-	28.2	28.7	28.8	28.9	29.1	29.2	29.3
Relative Humidity (%) Average	720	47.1	20	-	12	24	32	43	60	78	98
Wind Speed 10 m (km/h) Average	720	10.7	7	-	0	3	5	10	14	20	36
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	22 Apr 2015 10:00	22 Apr 2015 12:00	3	Maintenance - replaced carrier gas
PM2.5	15 Apr 2015 12:00	15 Apr 2015 15:00	4	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:	720
Maximum Value: 14 ppb on Apr 5 13:00	Maximum Daily Average: 3.2 ppb on Apr 2		Hours of Data:	684
Minimum Value: 0 ppb on Apr 12 14:00	Minimum Daily Average: 0.4 ppb on Apr 24		Hours of Missing Data:	36
Maximum Diurnal Average: 2.2 ppb at hour 14	Minimum Diurnal Average: 0.5 ppb at hour 3		Hours of Calibration:	36
Monthly Average: 1.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.4	1
2-Apr	0	1	Z	1	2	3	2	1	1	1	1	1	8	8	7	10	7	10	5	1	1	1	0	1	3.2	10
3-Apr	1	1	0	1	1	0	1	1	1	Z	1	1	1	5	5	2	3	3	1	0	1	1	1	0	1.3	5
4-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	1	8	12	6	5	5	6	5	1	0	0	0	2.4	12
5-Apr	0	1	1	0	0	Z	0	1	1	1	1	9	14	12	6	2	2	2	4	1	1	1	1	1	2.7	14
6-Apr	Z	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
7-Apr	0	Z	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	0	0	0.5	1
8-Apr	0	0	Z	0	1	0	0	0	1	1	1	2	12	9	5	4	3	2	2	2	1	1	1	1	2.2	12
9-Apr	1	1	0	Z	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0.5	1
10-Apr	0	0	0	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1
11-Apr	0	1	0	0	1	Z	0	1	1	1	1	1	1	0	1	0	1	1	1	0	0	1	0	0	0.5	1
12-Apr	Z	0	0	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Apr	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	0	1	1	1	1	0	1	0	0	--	1
14-Apr	1	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
15-Apr	0	1	0	Z	0	0	1	0	1	0	1	1	1	0	0	1	0	1	1	1	1	1	0	0	0.5	1
16-Apr	0	0	0	0	Z	0	1	1	1	1	0	0	0	1	0	0	1	9	2	1	0	0	0	0	0.9	9
17-Apr	0	0	0	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	0.5	1
18-Apr	Z	0	1	1	1	1	1	1	1	1	2	2	2	1	1	1	2	1	1	1	1	1	0	1	1.0	2
19-Apr	1	Z	0	1	0	1	1	1	1	1	0	0	1	1	0	1	0	1	1	1	0	1	1	0	0.5	1
20-Apr	1	0	Z	0	1	0	0	1	1	3	3	2	2	6	5	4	4	5	3	1	1	0	0	0	1.9	6
21-Apr	0	2	0	Z	0	0	1	1	5	12	7	4	1	1	1	1	1	1	1	1	1	1	0	1	1.8	12
22-Apr	0	0	0	0	Z	0	0	0	1	1	0	1	0	0	1	0	0	0	1	1	1	1	1	1	0.6	1
23-Apr	1	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
25-Apr	0	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	1	1	2	2	1	1	1	1	0.7	2
26-Apr	1	1	Z	0	1	1	1	0	1	1	0	0	1	0	0	0	1	1	1	1	1	1	1	1	0.5	1
27-Apr	1	1	1	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	0.6	1
28-Apr	0	1	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
29-Apr	1	0	0	0	1	Z	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0.5	1
30-Apr	Z	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	1	4	3	2	2	2	1	0.9	4

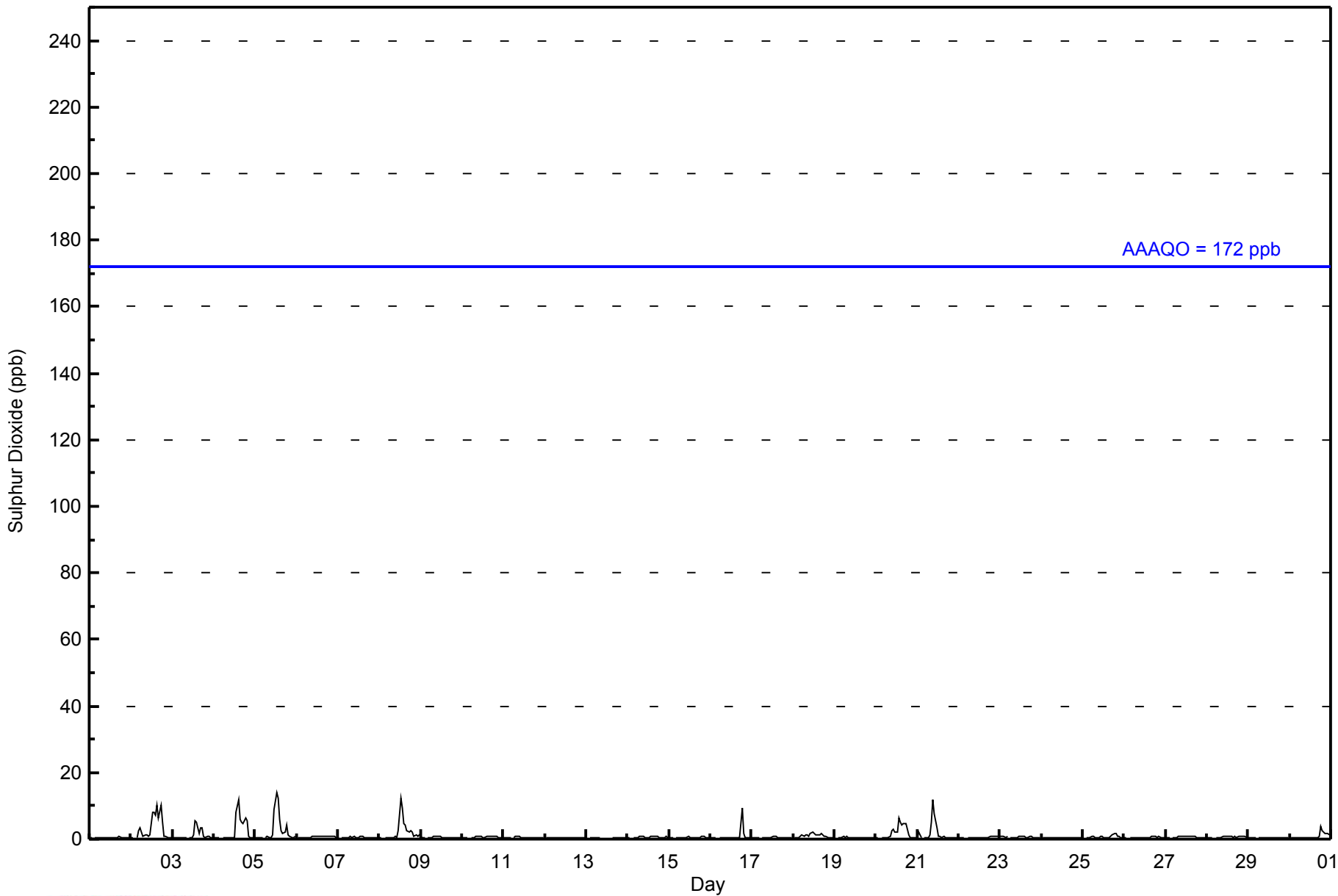
0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.8	1.1	1.0	1.1	1.8	2.2	1.9	1.4	1.3	1.4	1.6	1.0	0.6	0.6	0.5	0.5	Diurnal Average	
1	2	1	1	2	3	2	1	5	12	7	9	14	12	12	10	7	10	9	5	2	2	2	2	1	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	679	99.27	99.27
11 - 20	5	0.73	100.00
21 - 60	0	0.00	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - April 2015**

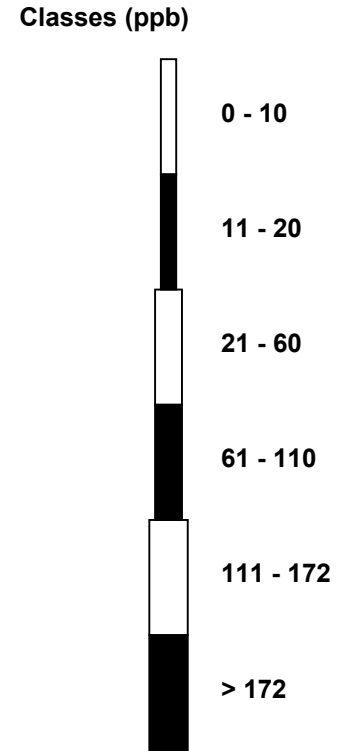
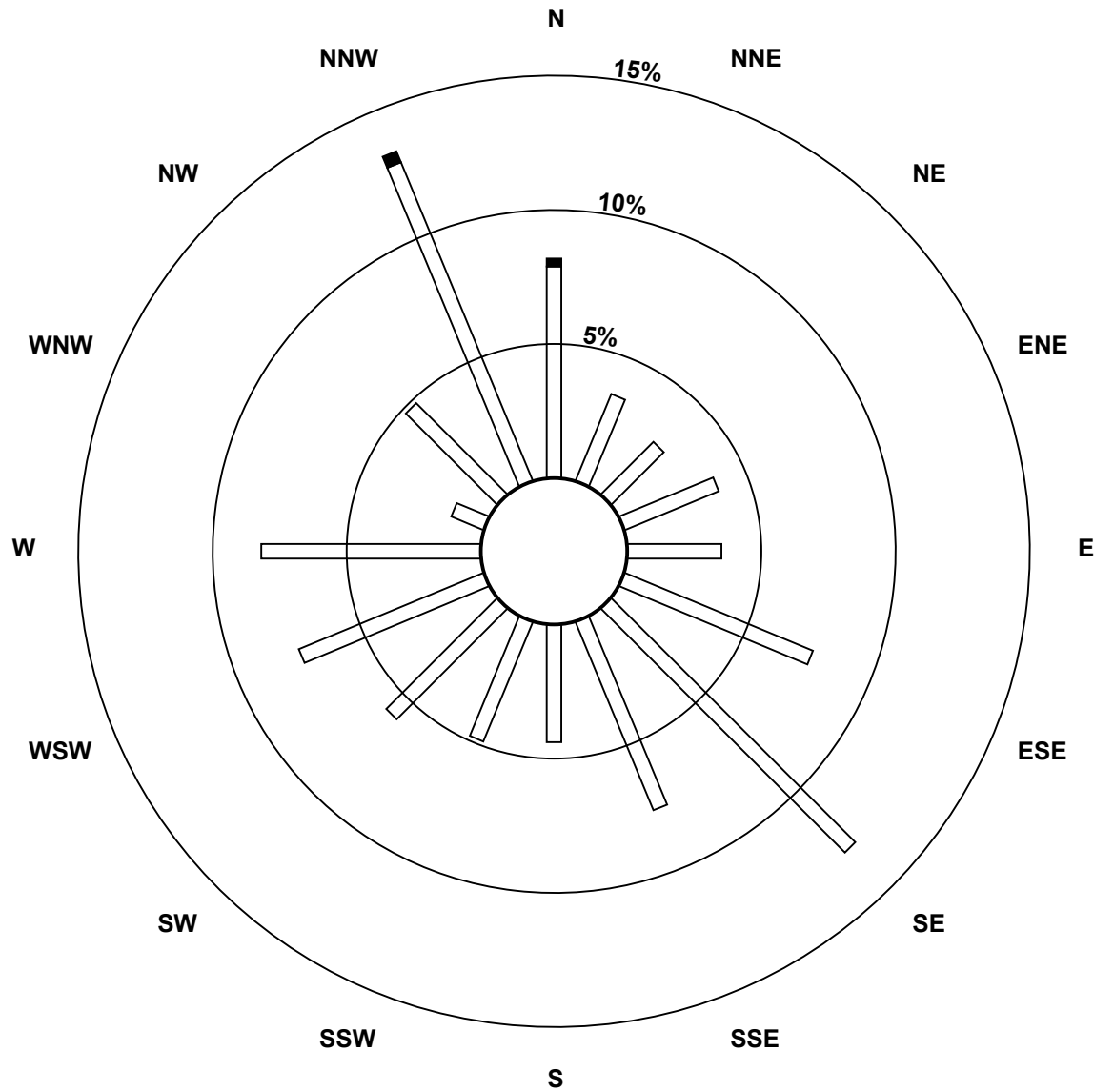
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	54	24	19	26	24	52	88	52	30	33	40	51	56	9	33	88	679
11 - 20	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	24	19	26	24	52	88	52	30	33	40	51	56	9	33	91	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)**

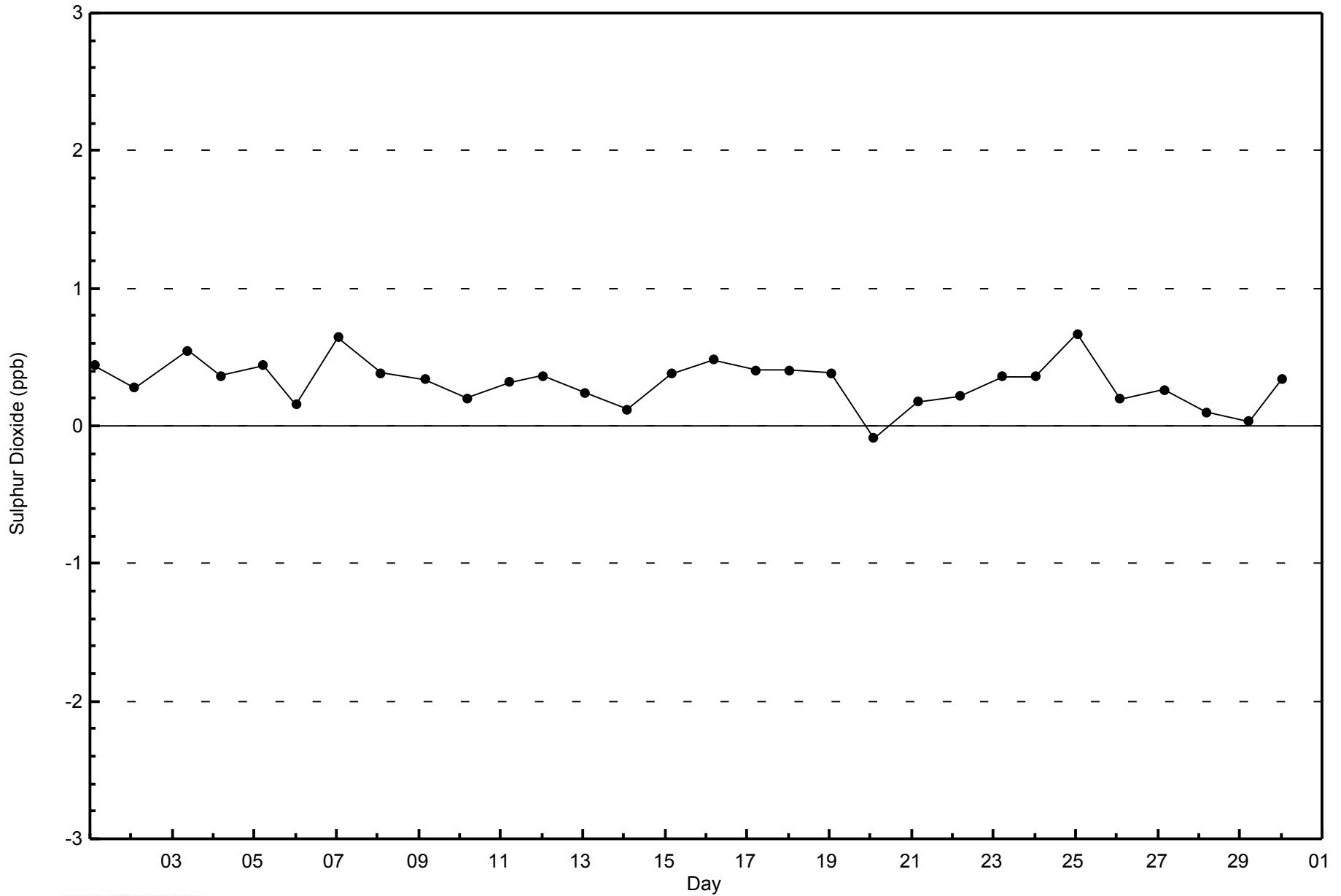


**Total Number of Valid Hours: 684**



WBEA  
Zero Responses

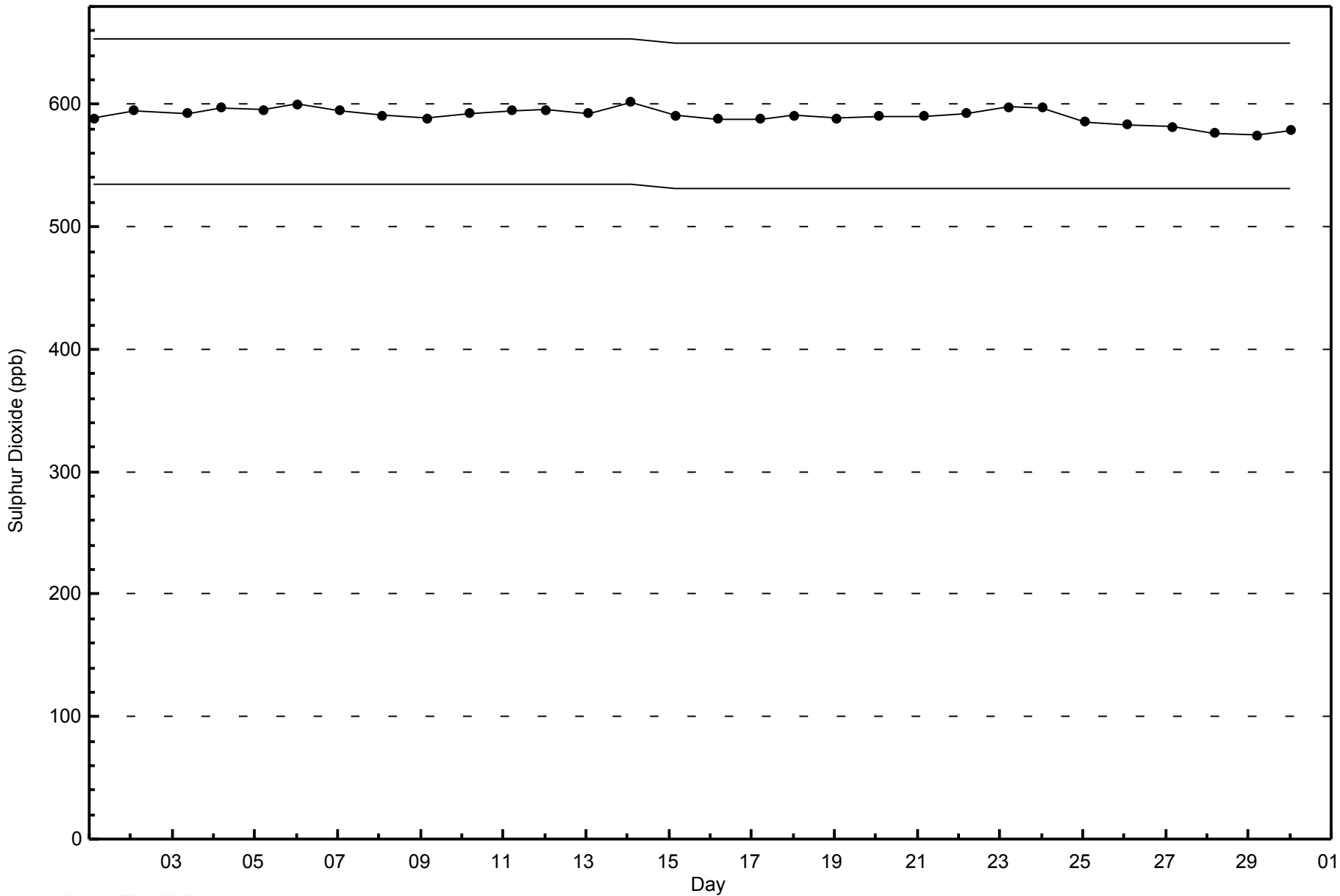
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Apr 16 19:00	Maximum Daily Average: 0.5 ppb on Apr 8		Hours of Data:	686
Minimum Value: 0 ppb on Apr 24 03:00	Minimum Daily Average: 0.1 ppb on Apr 12		Hours of Missing Data:	34
Maximum Diurnal Average: 0.3 ppb at hour 10	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 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-Apr	0	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
2-Apr	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Apr	0	0	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
5-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Apr	0	0	Z	0	0	0	0	0	1	1	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0.4	1
8-Apr	0	0	1	Z	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.5	1
9-Apr	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Apr	0	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
11-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
14-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
17-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Apr	0	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-Apr	0	1	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Apr	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
26-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
27-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0

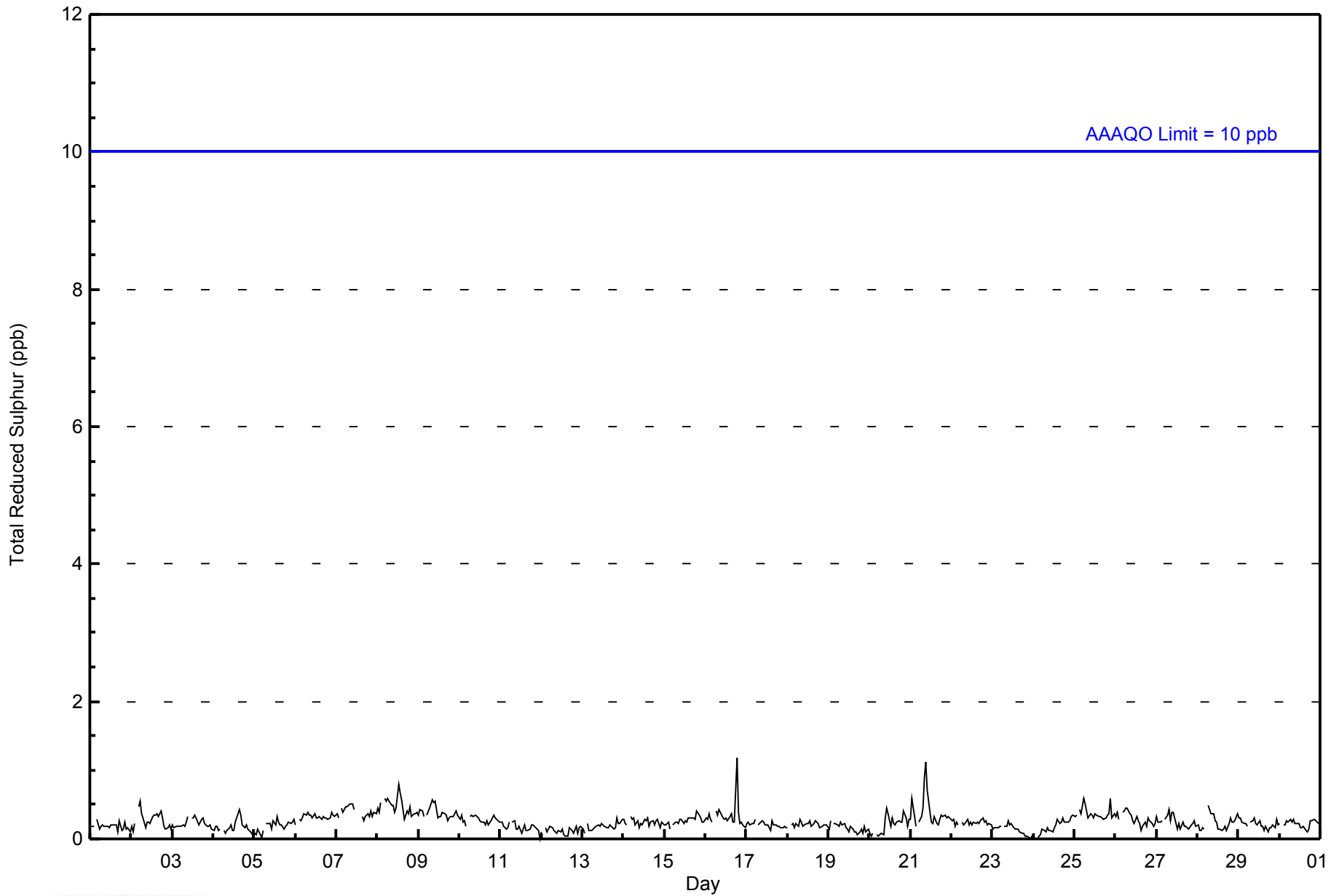
0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	Diurnal Average	
0	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0	0	1	0	0	Diurnal Maximum	

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**  
**Athabasca Valley - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	686	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - April 2015**

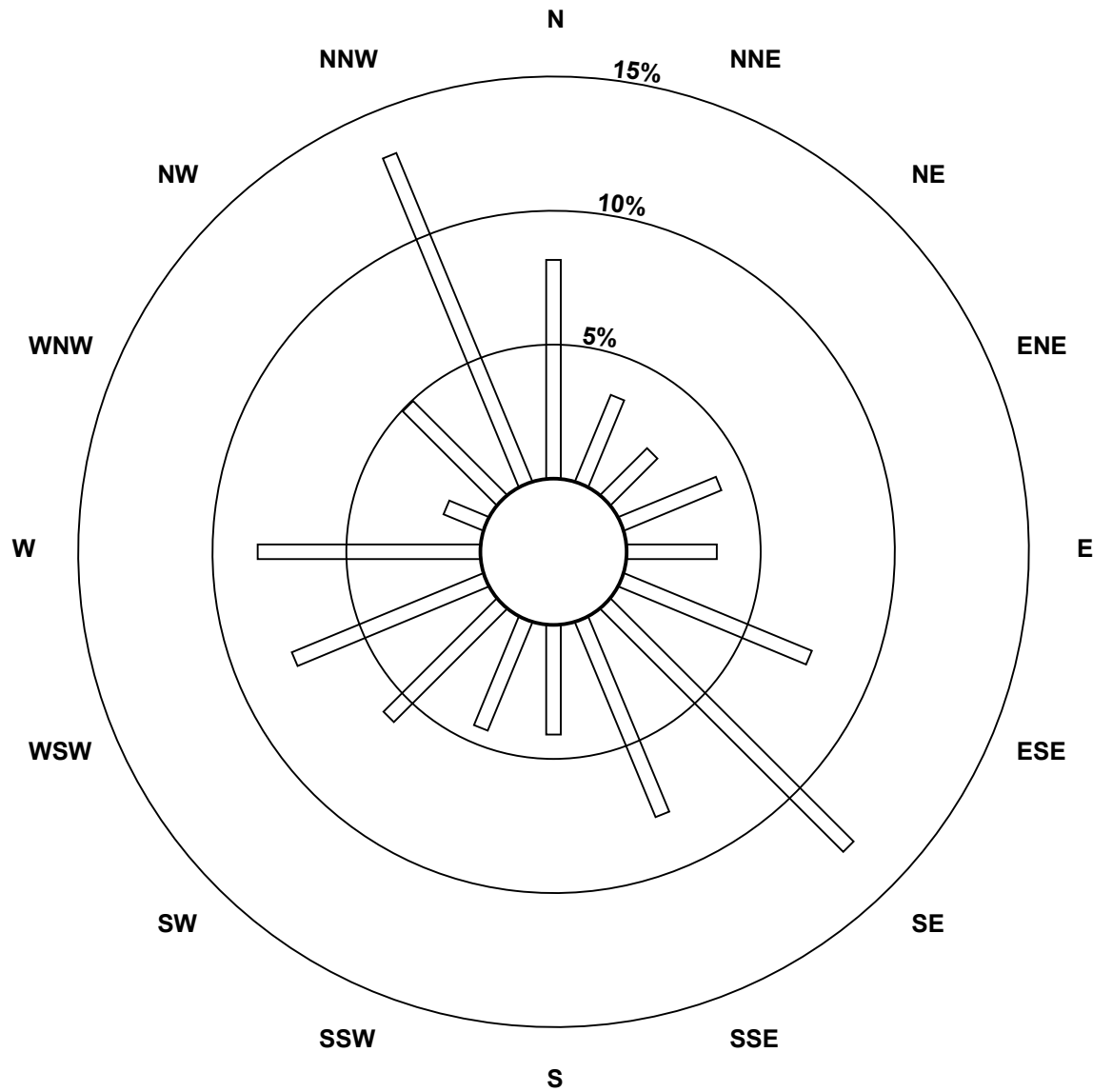
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	56	24	17	27	23	52	88	54	28	30	41	53	57	11	34	91	686
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	24	17	27	23	52	88	54	28	30	41	53	57	11	34	91	686

Total Number of Valid Hours: 686

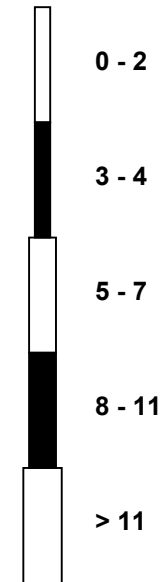
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley (AMS 7)**



Classes (ppb)

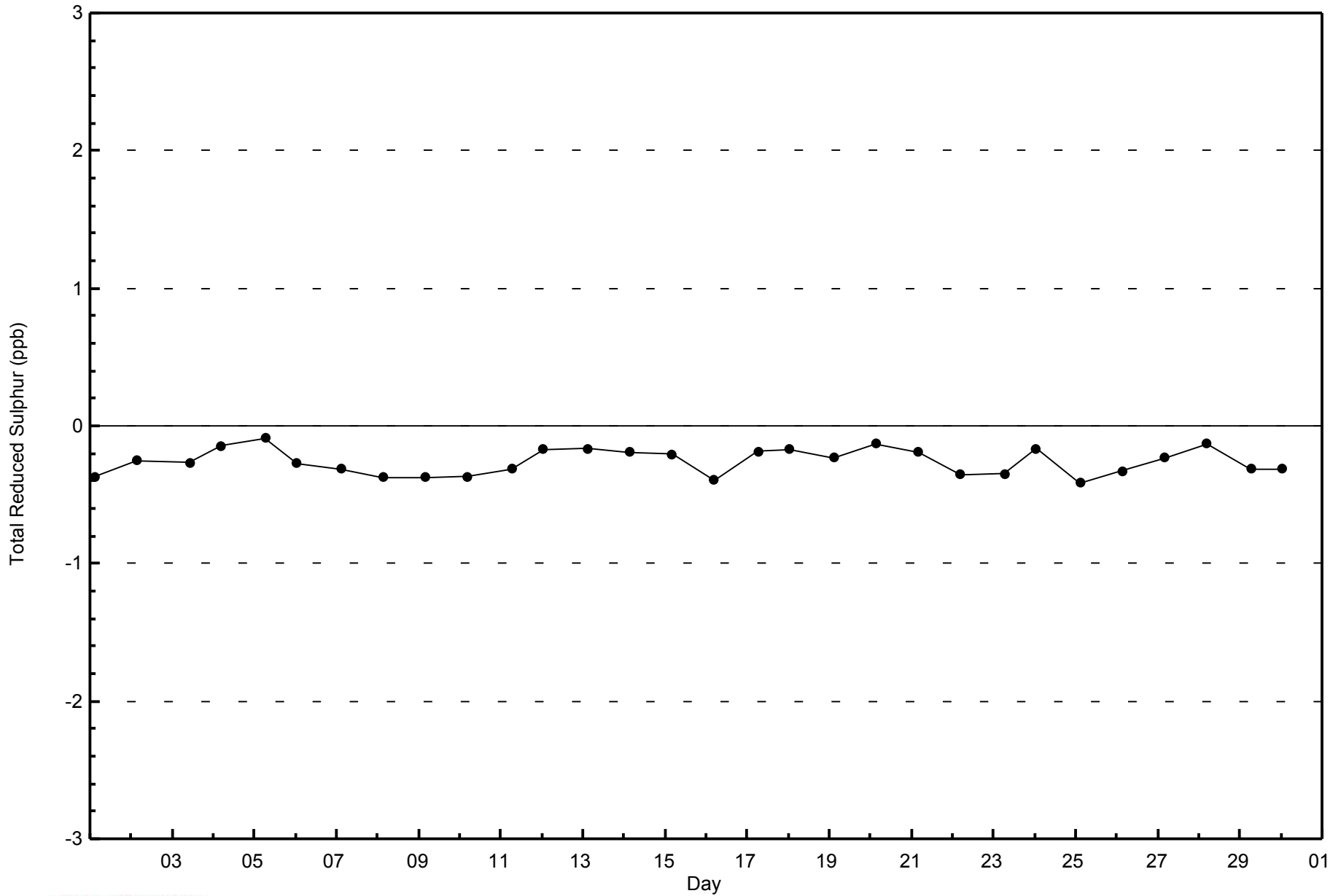


Total Number of Valid Hours: 686



WBEA  
Zero Responses

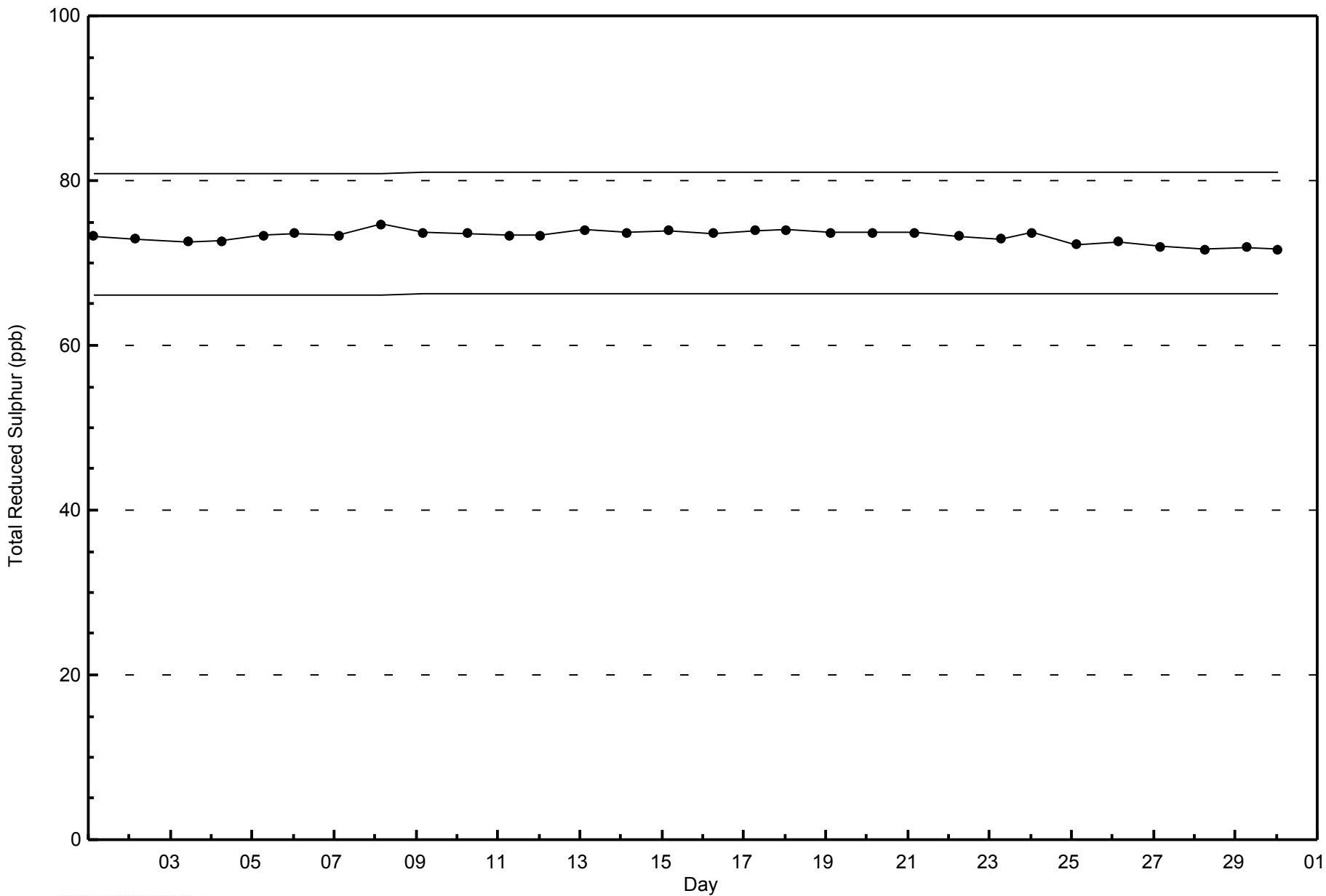
Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - April 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - April 2015**

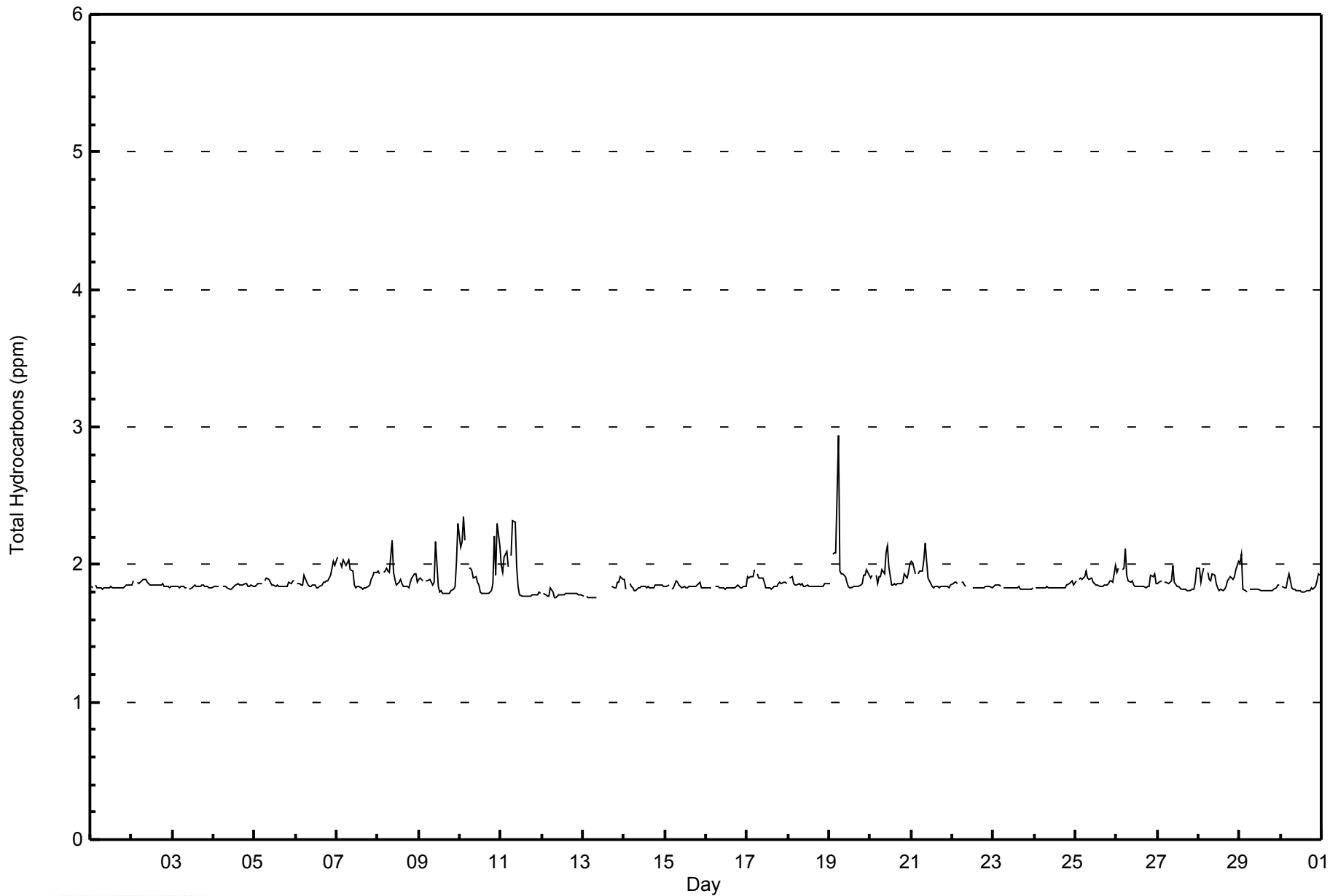






WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Athabasca Valley - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	654	96.32	96.32
2.1 - 3.0	25	3.68	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - April 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	55	24	19	26	24	49	80	49	23	32	39	49	56	9	30	90	654
2.1 - 3.0	1	0	0	0	0	0	8	3	7	1	1	2	0	0	1	1	25
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
<b>Totals</b>	56	24	19	26	24	49	88	52	30	33	40	51	56	9	31	91	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

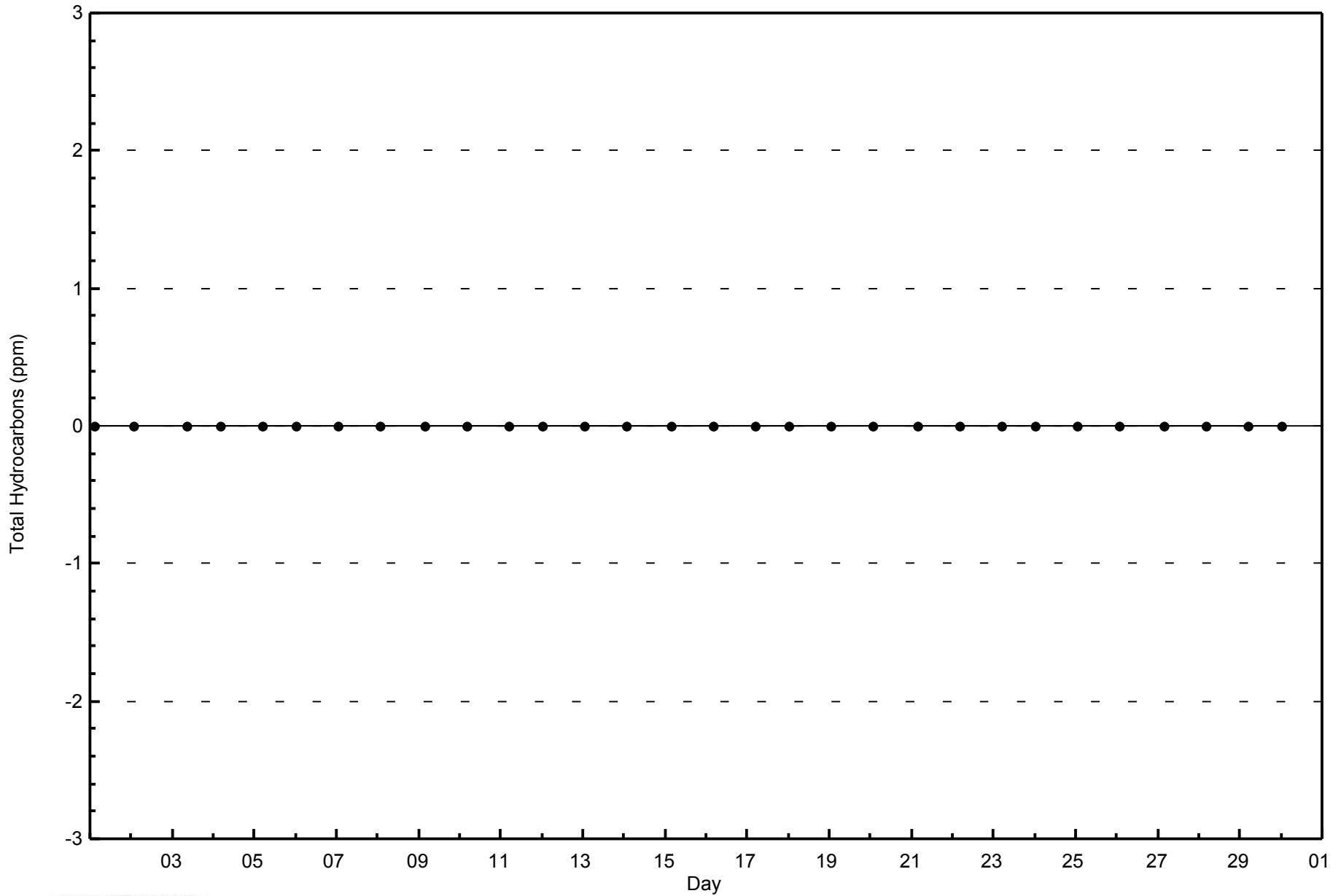






WBEA  
Zero Responses

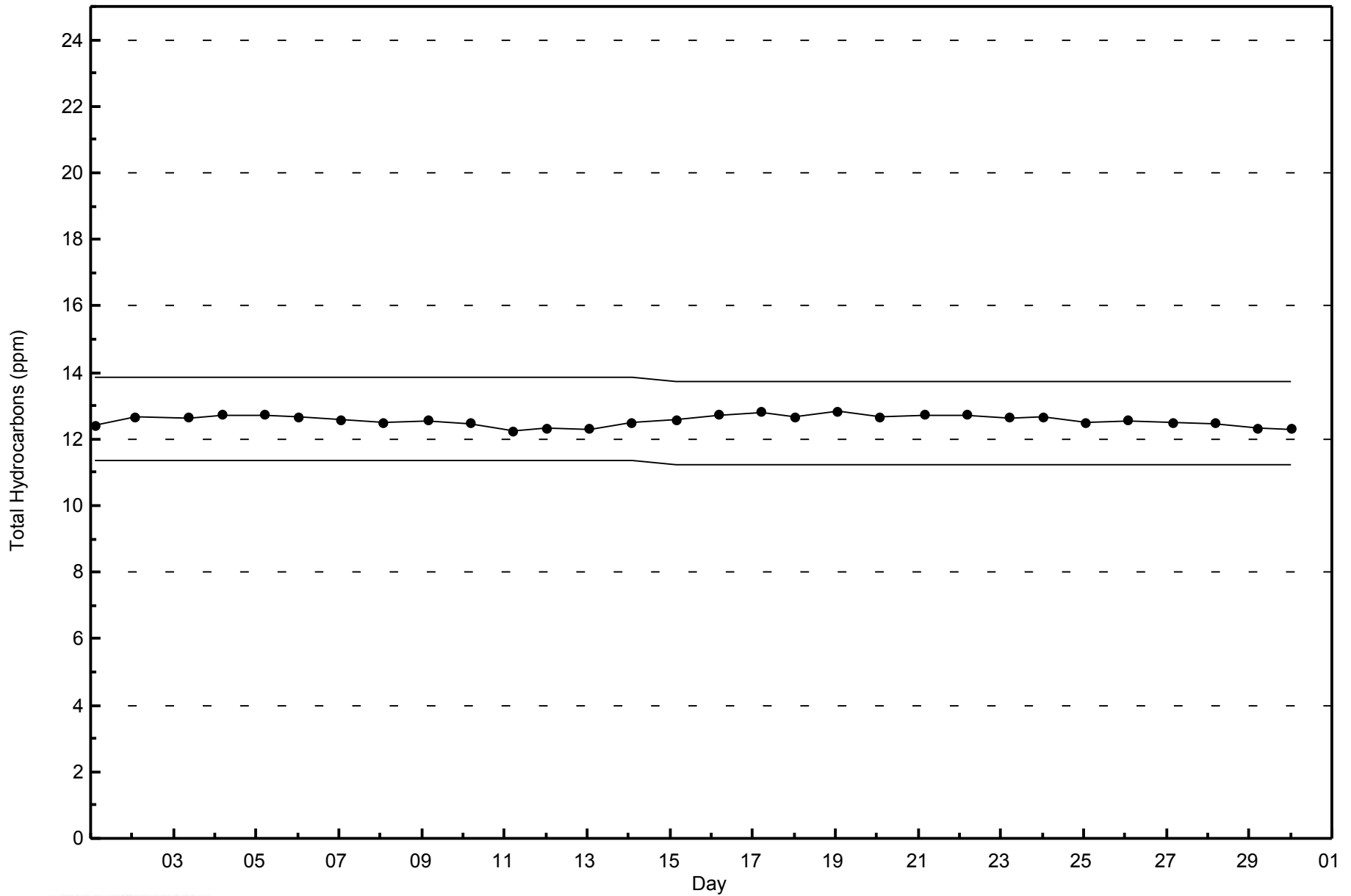
Total Hydrocarbons (THC) - ppm  
Athabasca Valley - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Athabasca Valley - April 2015





Maximum Value: 0.940 ppm on Apr 19 06:00	Maximum Daily Average: 0.041 ppm on Apr 19	Hours in Service: 720
Minimum Value: 0.000 ppm on Apr 1 01:00	Minimum Daily Average: 0.000 ppm on Apr 22	Hours of Data: 679
Maximum Diurnal Average: 0.040 ppm at hour 6	Minimum Diurnal Average: 0.000 ppm at hour 17	Hours of Missing Data: 41
Monthly Average: 0.005 ppm	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.1	Hours of Calibration: 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-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2-Apr	0.000	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3-Apr	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4-Apr	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
6-Apr	Z	0.001	0.000	0.000	0.000	0.055	0.010	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	0.001	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
7-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
8-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.197	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
9-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.295	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10-Apr	0.000	0.003	0.007	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.263	0.000	0.004	0.000	0.000	0.000	0.000
11-Apr	0.000	0.005	0.098	0.043	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
13-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	C	C	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	--
14-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
15-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.001
16-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
17-Apr	0.000	0.000	0.000	0.000	0.024	Z	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
18-Apr	Z	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19-Apr	0.000	Z	0.001	0.000	0.006	0.940	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
20-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.006	0.092	0.122	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
21-Apr	0.077	0.064	0.000	Z	0.000	0.000	0.000	0.056	0.141	0.074	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
22-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	M	M	M	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
23-Apr	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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
24-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
25-Apr	0.001	Z	0.000	0.002	0.001	0.006	0.031	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
26-Apr	0.000	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
27-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.117	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
28-Apr	0.000	0.000	0.002	0.001	Z	0.000	0.001	0.000	0.068	0.049	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
29-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
30-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

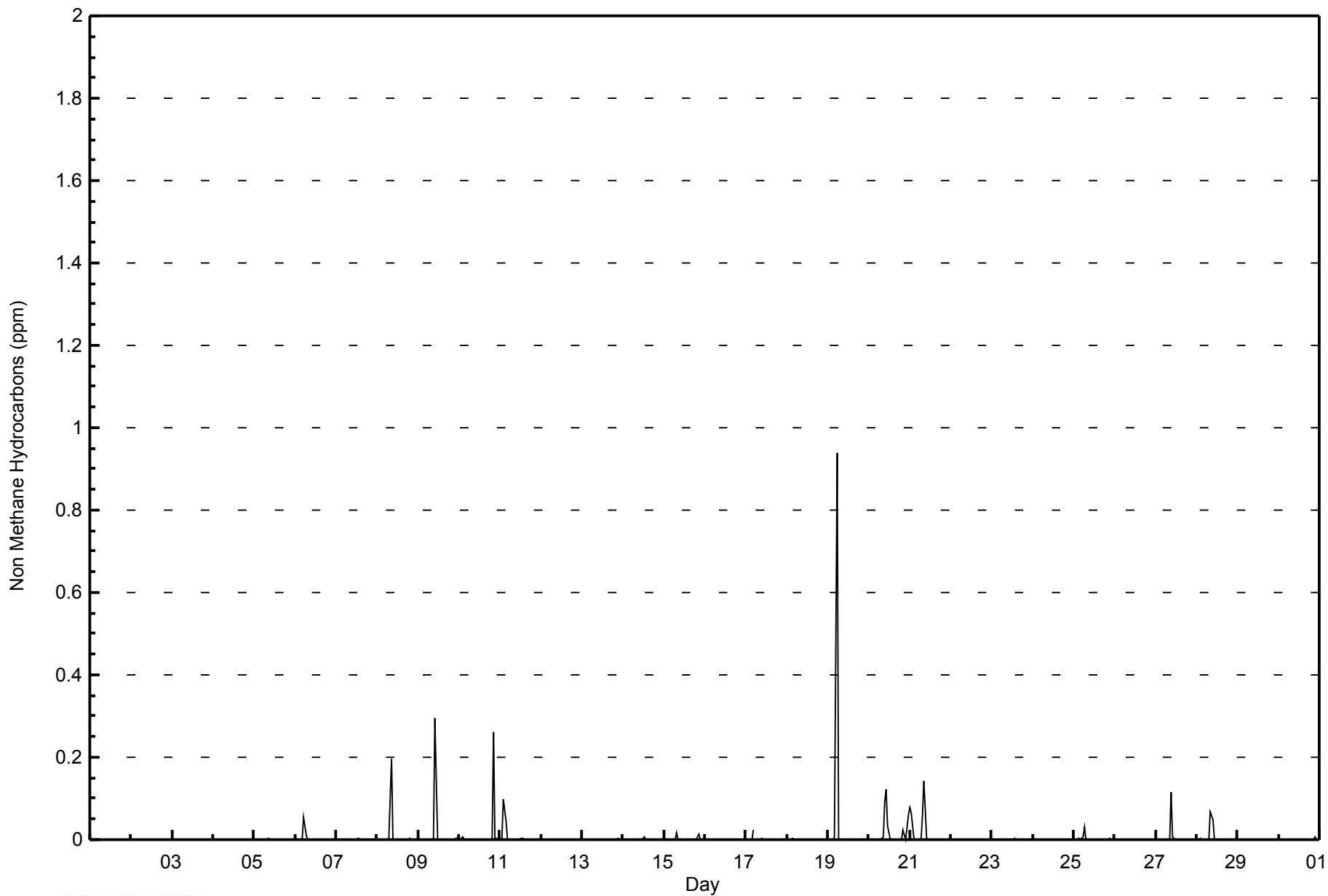
0.003	0.003	0.005	0.002	0.001	0.040	0.001	0.003	0.014	0.013	0.015	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.001	0.001	0.002	Diurnal Average				
0.077	0.064	0.098	0.043	0.024	0.940	0.031	0.056	0.197	0.117	0.295	0.033	0.006	0.005	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.004	0.263	0.008	0.032	0.062	Diurnal Maximum			

Z - zerospan      C - Calibration      M - Maintenance



WBEA  
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	647	95.29	95.29
0.006 - 0.05	16	2.36	97.64
0.06 - 0.1	12	1.77	99.41
> 0.1	4	0.59	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - April 2015**

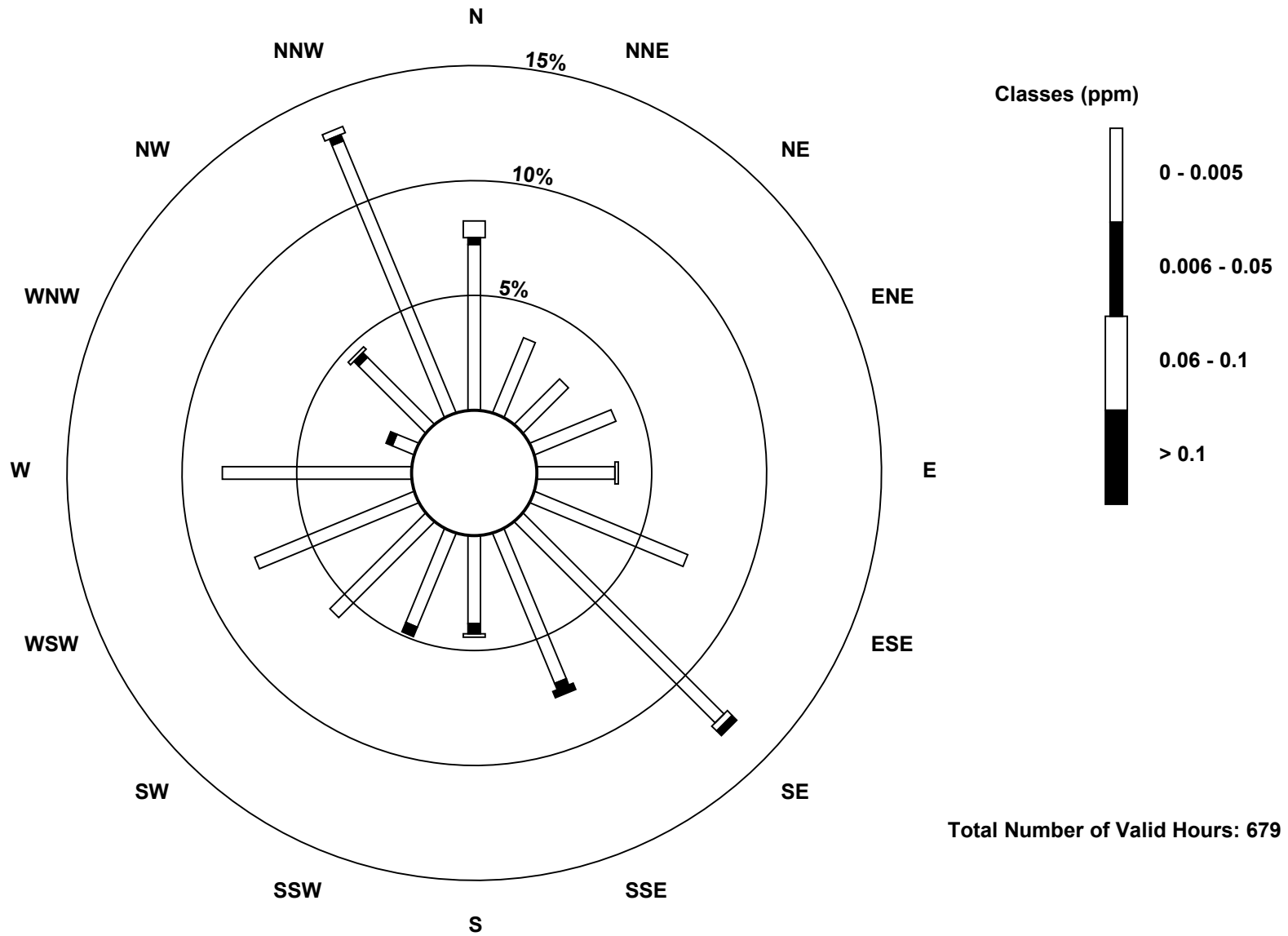
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	49	24	19	26	23	49	84	48	26	30	40	51	56	7	28	87	647
0.006 - 0.05	2	0	0	0	0	0	0	2	3	3	0	0	0	2	2	2	16
0.06 - 0.1	5	0	0	0	1	0	2	0	1	0	0	0	0	0	1	2	12
> 0.1	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	4
<b>Totals</b>	56	24	19	26	24	49	88	52	30	33	40	51	56	9	31	91	679

Total Number of Valid Hours: 679

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley (AMS 7)

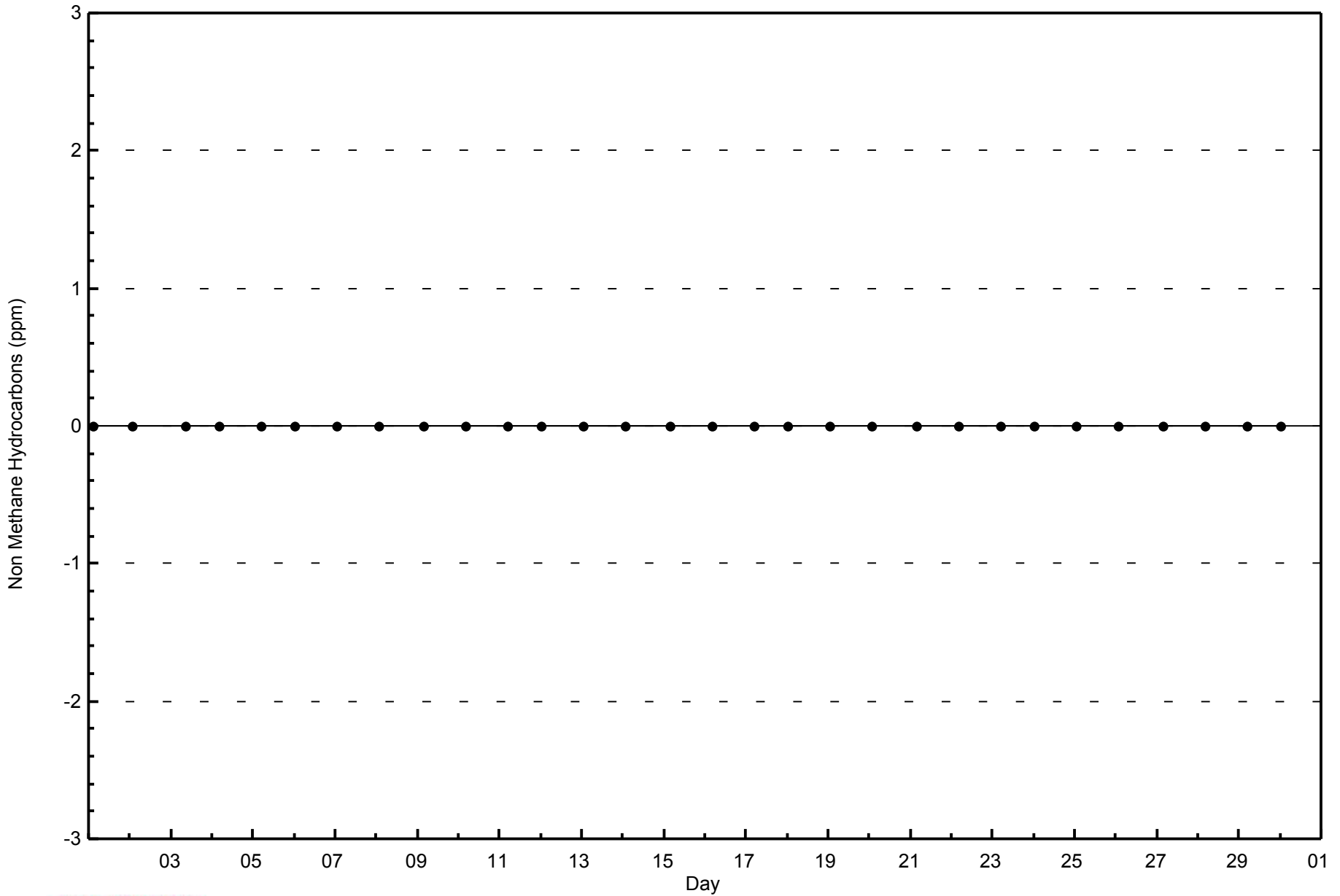






WBEA  
Zero Responses

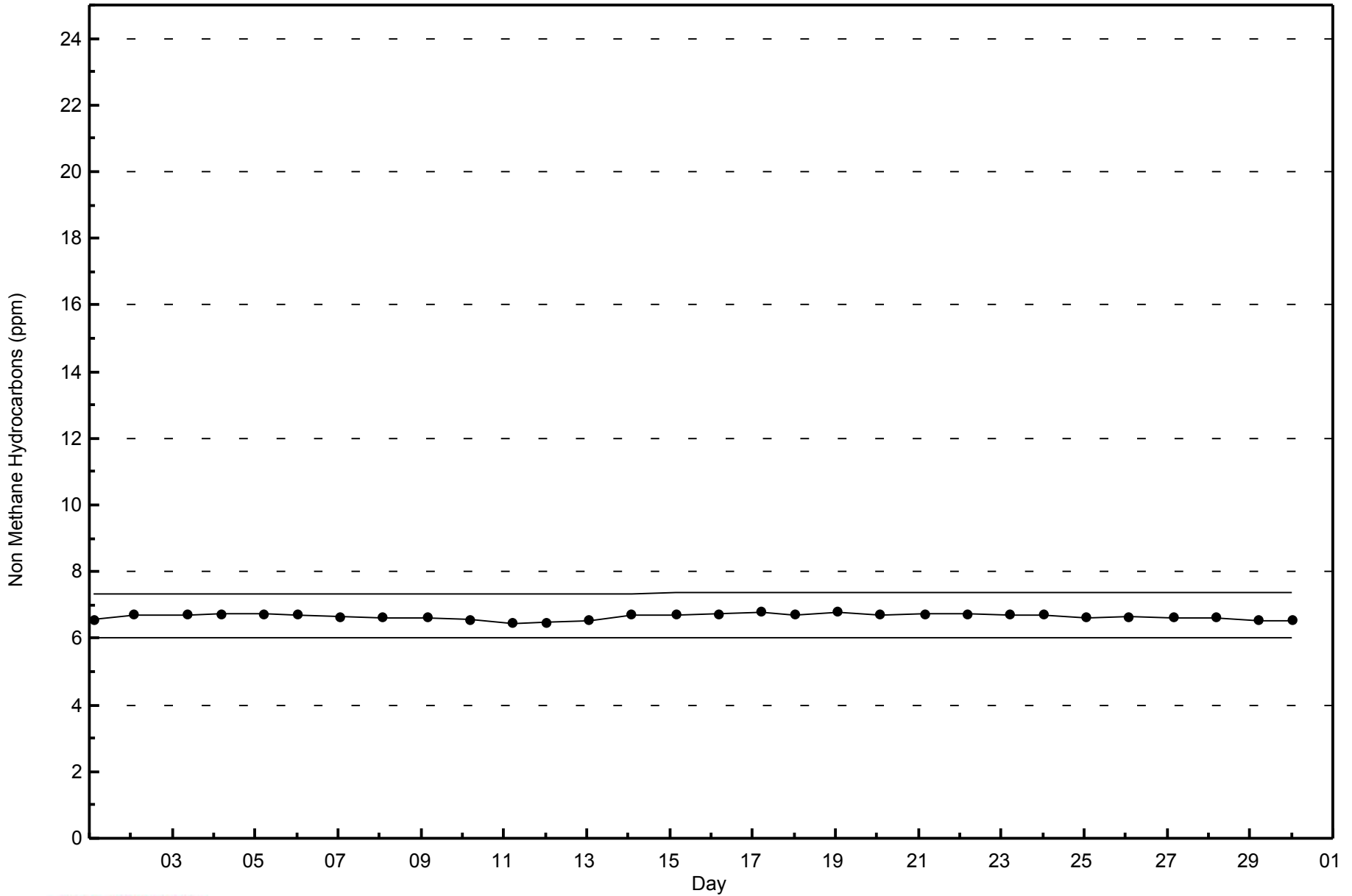
Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - April 2015





WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - April 2015

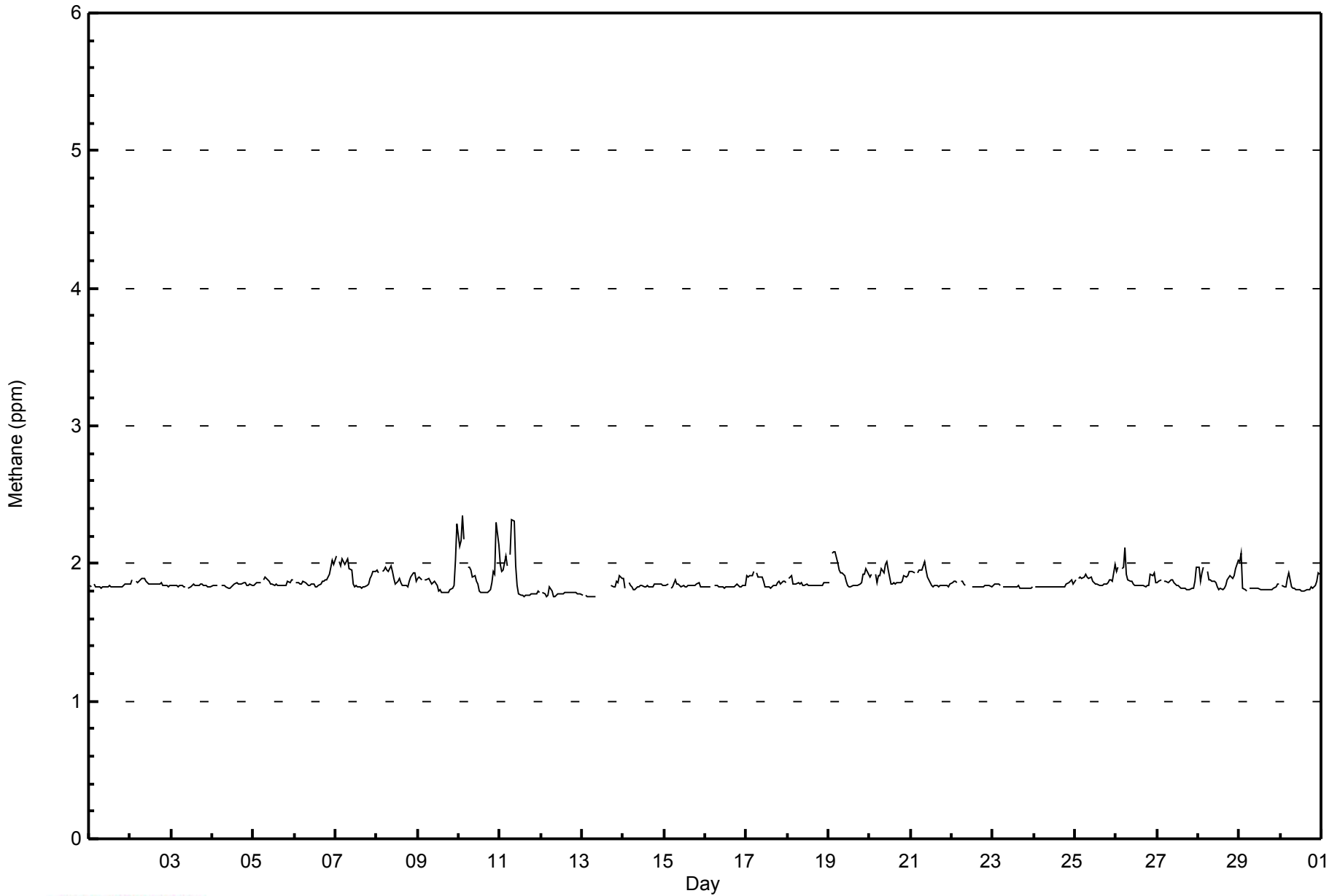






WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	662	97.50	97.50
2.1 - 3.0	17	2.50	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 679

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - April 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	56	24	19	26	24	49	82	51	24	32	39	49	56	9	31	91	662
2.1 - 3.0	0	0	0	0	0	0	6	1	6	1	1	2	0	0	0	0	17
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
<b>Totals</b>	56	24	19	26	24	49	88	52	30	33	40	51	56	9	31	91	679

Total Number of Valid Hours: 679

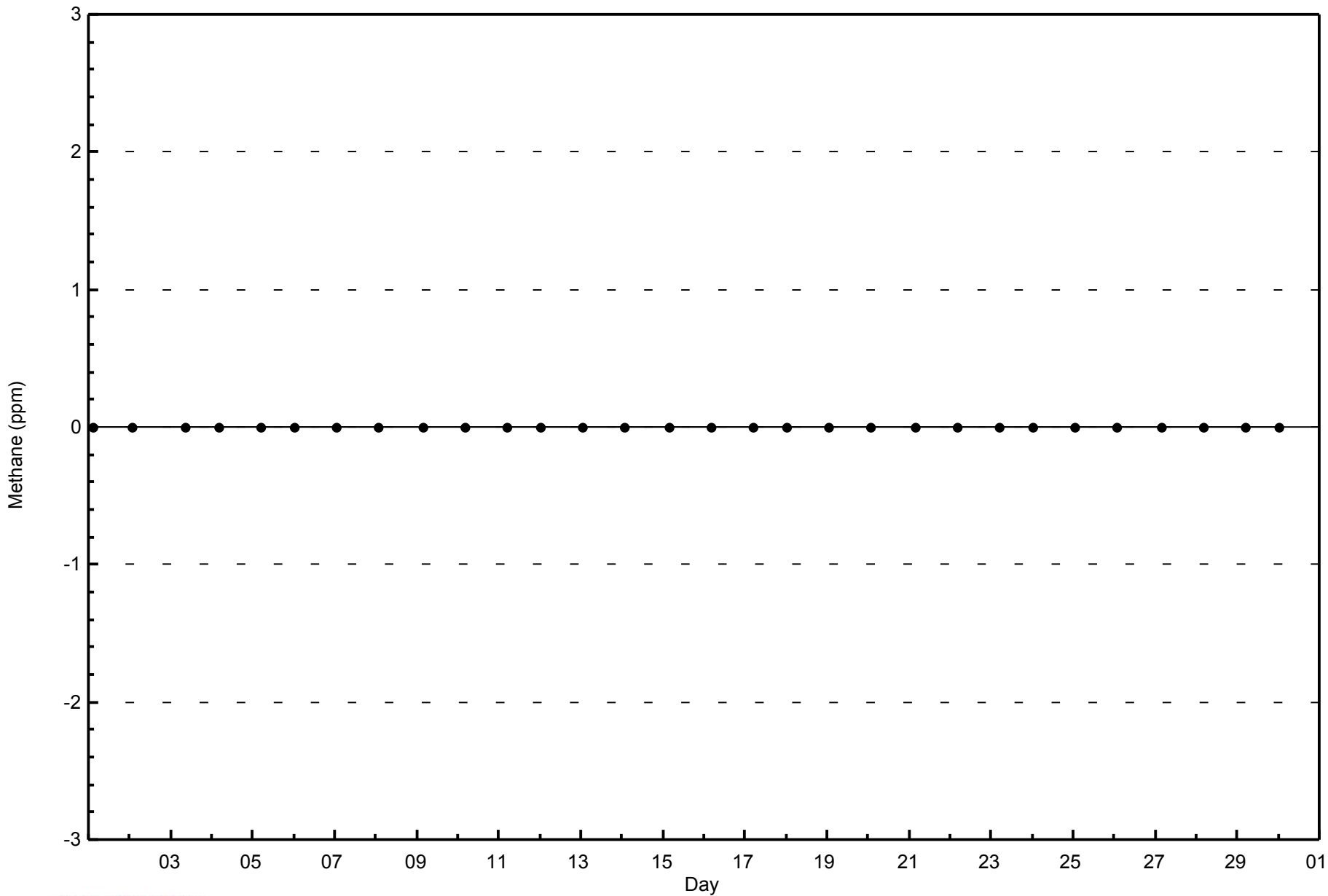
Total Number of Hours: 720





WBEA  
Zero Responses

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - April 2015

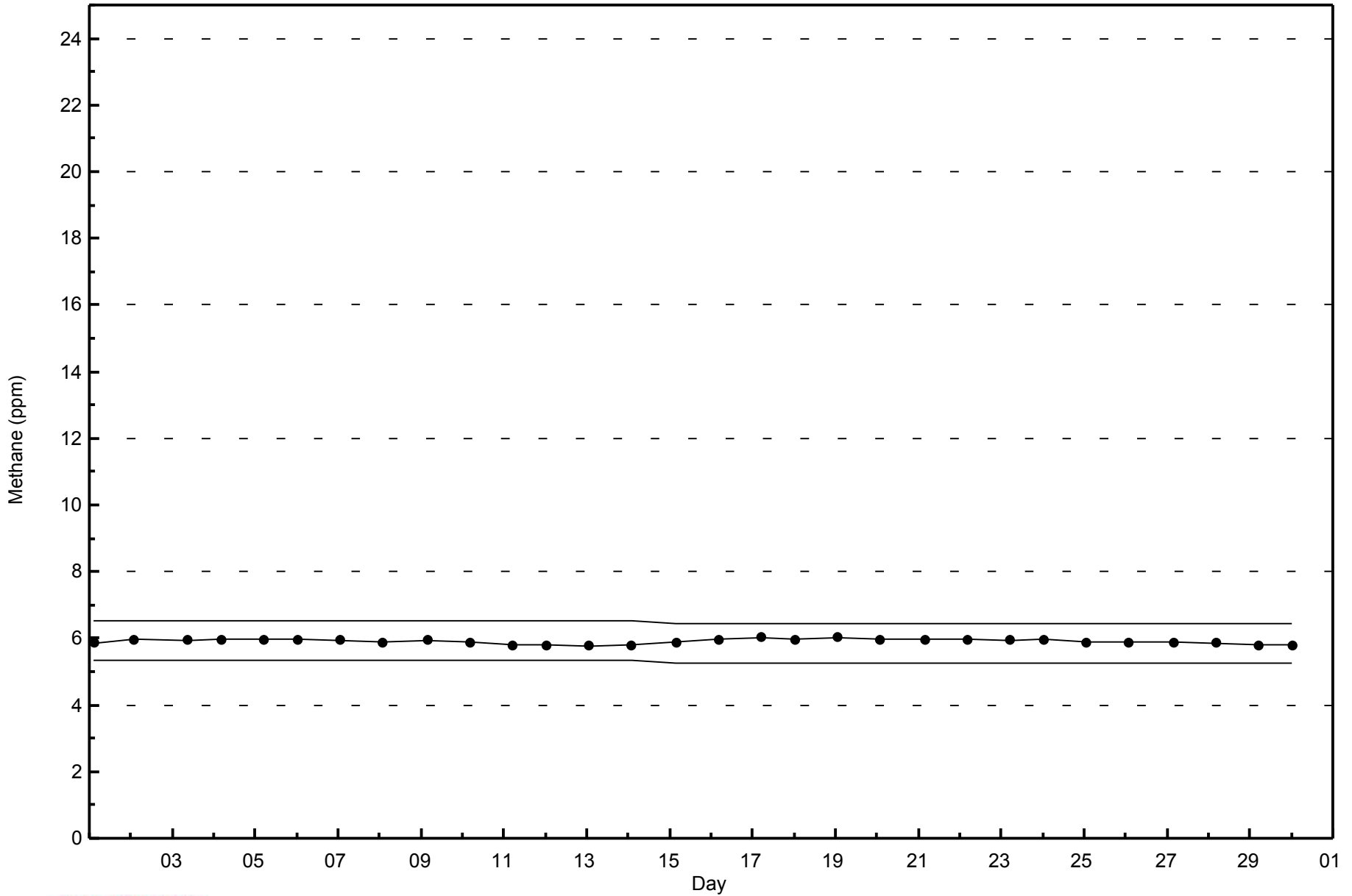






WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 51 ppb on Apr 28 15:00	Maximum Daily Average: 41.8 ppb on Apr 16		Hours of Data:	684
Minimum Value: 3 ppb on Apr 19 05:00	Minimum Daily Average: 22.6 ppb on Apr 8		Hours of Missing Data:	36
Maximum Diurnal Average: 42.4 ppb at hour 16	Minimum Diurnal Average: 20.8 ppb at hour 6		Hours of Calibration:	36
Monthly Average: 31.5 ppb	Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 15 Q <sub>1</sub> = 24 Median = 34 Q <sub>3</sub> = 39 P <sub>90</sub> = 44 P <sub>99</sub> = 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-Apr	26	29	24	23	Z	27	27	27	27	27	28	29	29	30	32	33	34	34	36	34	32	30	30	29	29.5	36
2-Apr	27	25	26	25	Z	25	25	25	26	29	30	32	32	33	34	35	36	34	33	34	35	40	41	40	31.4	41
3-Apr	41	41	40	40	40	39	36	36	38	39	40	Z	38	38	37	39	36	35	35	35	36	37	36	37.8	41	
4-Apr	34	34	34	32	32	30	Z	31	33	33	35	35	34	34	33	35	34	33	29	26	30	33	32	31	32.5	35
5-Apr	29	25	21	18	17	13	15	Z	26	29	31	32	35	36	40	41	41	39	37	34	20	25	33	23	28.8	41
6-Apr	20	22	Z	21	17	23	25	28	29	31	30	31	36	37	37	36	36	34	33	34	28	14	20	23	28.0	37
7-Apr	12	14	20	Z	7	7	12	20	25	25	35	38	39	40	41	41	40	40	38	33	23	19	17	19	26.4	41
8-Apr	19	19	18	16	Z	10	11	15	15	18	26	30	31	34	35	37	37	37	37	19	14	13	15	13	22.6	37
9-Apr	12	12	12	10	9	Z	11	22	26	28	30	34	38	38	40	42	43	43	41	24	14	18	12	13	24.9	43
10-Apr	16	11	9	11	11	5	Z	17	22	23	30	36	45	47	50	49	50	47	42	24	12	19	19	20	26.7	50
11-Apr	15	13	14	17	17	9	11	Z	20	29	36	39	42	43	43	43	43	42	41	43	42	39	36	38	31.1	43
12-Apr	37	36	Z	34	31	19	26	32	34	36	36	37	38	39	39	38	38	38	37	36	36	36	35	36	35.0	39
13-Apr	36	34	32	Z	32	31	31	33	35	36	37	38	C	C	C	C	C	C	45	36	24	23	18	18	--	45
14-Apr	17	18	18	21	Z	21	24	25	26	32	32	28	34	43	45	44	41	39	37	34	29	33	32	29	30.5	45
15-Apr	26	23	20	18	13	Z	5	14	29	35	41	43	43	45	46	48	48	45	43	22	17	43	41	40	32.6	48
16-Apr	42	40	40	40	38	37	Z	35	37	38	39	43	46	50	49	49	47	48	40	43	44	42	37	39	41.8	50
17-Apr	25	25	21	15	7	5	13	Z	24	27	33	46	48	45	46	43	39	34	34	33	31	28	26	21	29.1	48
18-Apr	17	16	Z	29	31	34	35	36	35	36	35	39	41	41	43	44	42	41	40	37	36	25	21	17	33.4	44
19-Apr	14	10	4	Z	3	4	8	14	17	20	33	42	43	44	44	46	47	44	37	27	22	15	16	25	25.1	47
20-Apr	27	23	18	22	Z	15	14	13	21	25	27	34	45	44	45	46	46	45	43	34	23	26	22	22	29.6	46
21-Apr	22	18	12	12	11	Z	10	16	19	26	32	37	42	45	44	47	48	46	45	44	42	41	39	37	32.0	48
22-Apr	36	35	34	32	31	27	Z	32	33	34	35	36	37	38	39	39	39	39	38	38	36	36	37	37	35.4	39
23-Apr	37	37	36	35	35	34	35	Z	36	36	37	38	39	40	38	39	40	39	39	39	38	36	35	36	37.2	40
24-Apr	36	35	Z	38	38	37	36	36	36	37	37	40	42	43	42	43	42	43	42	33	30	22	20	22	36.1	43
25-Apr	16	14	12	Z	9	9	12	19	22	20	26	30	34	36	37	38	38	36	34	31	25	24	20	9	23.9	38
26-Apr	13	12	12	11	Z	6	17	21	24	29	38	40	40	42	44	44	44	44	43	40	27	29	28	32	29.6	44
27-Apr	30	29	28	25	23	Z	25	26	28	32	41	44	44	44	46	45	45	47	49	47	29	28	24	15	34.5	49
28-Apr	13	20	14	14	10	14	Z	22	26	28	34	43	49	50	51	50	49	47	39	36	38	36	19	25	31.6	51
29-Apr	22	20	39	40	43	43	41	Z	39	33	31	33	41	46	46	48	46	46	44	42	33	38	37	40	38.8	48
30-Apr	40	39	Z	36	25	16	33	35	37	40	42	42	48	47	47	47	48	47	43	40	22	25	20	19	36.4	48

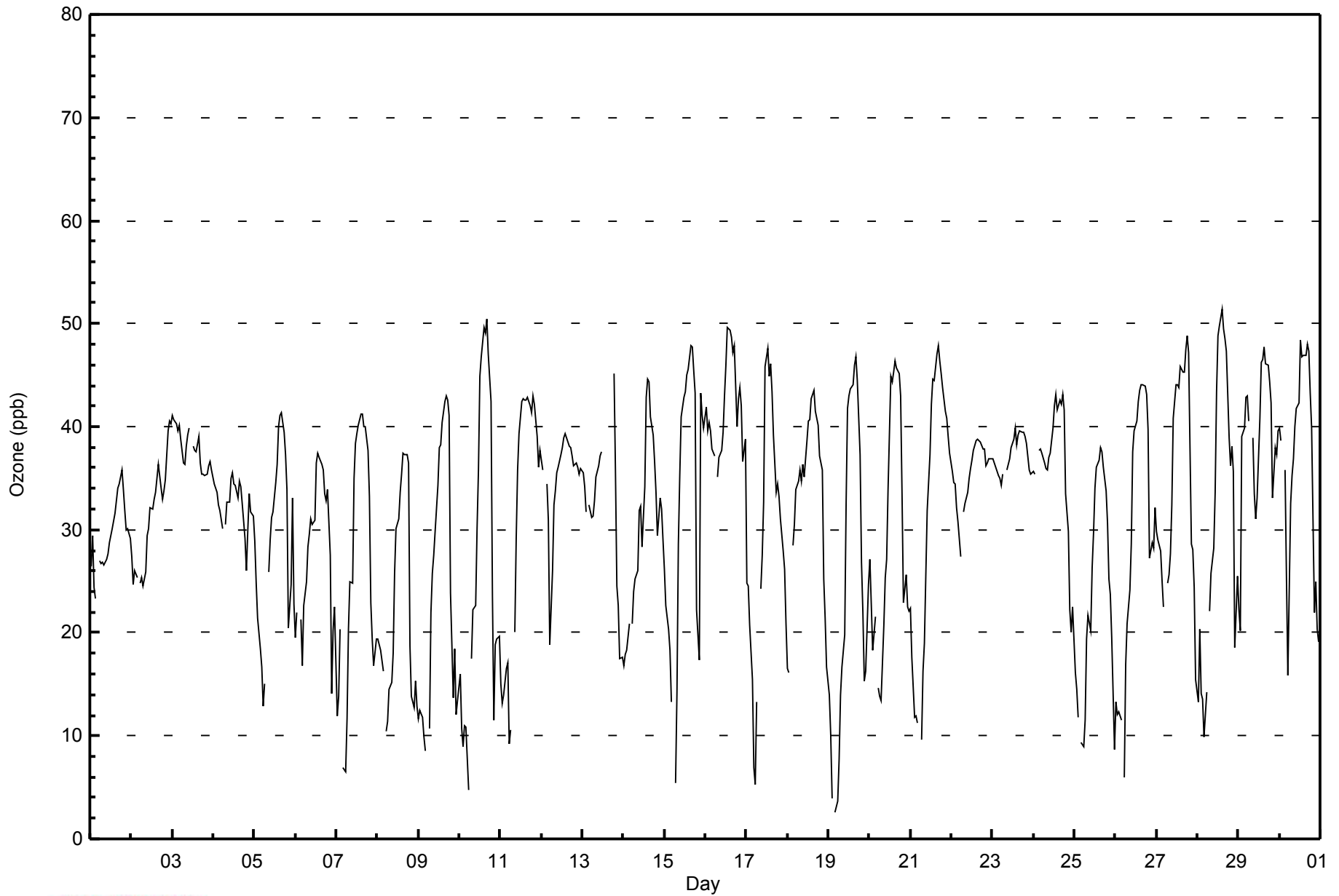
25.2	24.2	22.4	24.4	22.0	20.8	21.5	25.2	28.1	30.4	33.9	36.9	39.8	41.1	41.8	42.4	42.0	41.0	39.2	34.3	28.9	29.1	27.4	26.8	Diurnal Average	
42	41	40	40	43	43	41	36	39	40	42	46	49	50	51	50	50	48	49	47	44	43	41	40	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	132	19.30	19.30
21 - 50	551	80.56	99.85
51 - 82	1	0.15	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - April 2015**

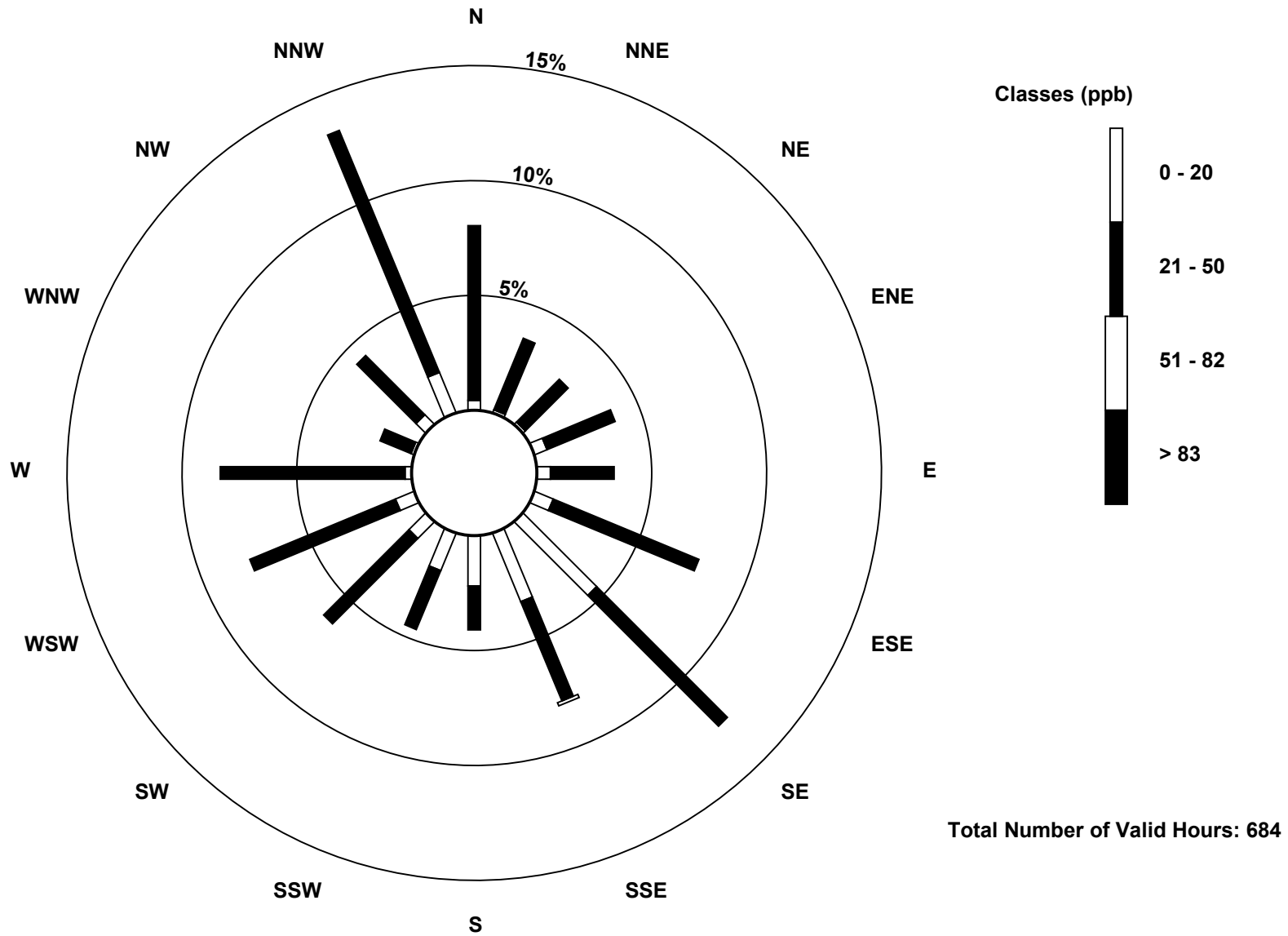
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	3	1	1	4	4	6	31	22	15	12	7	6	2	1	4	13	132
21 - 50	52	23	18	22	19	47	55	32	13	19	36	47	55	10	25	78	551
51 - 82	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	55	24	19	26	23	53	86	55	28	31	43	53	57	11	29	91	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

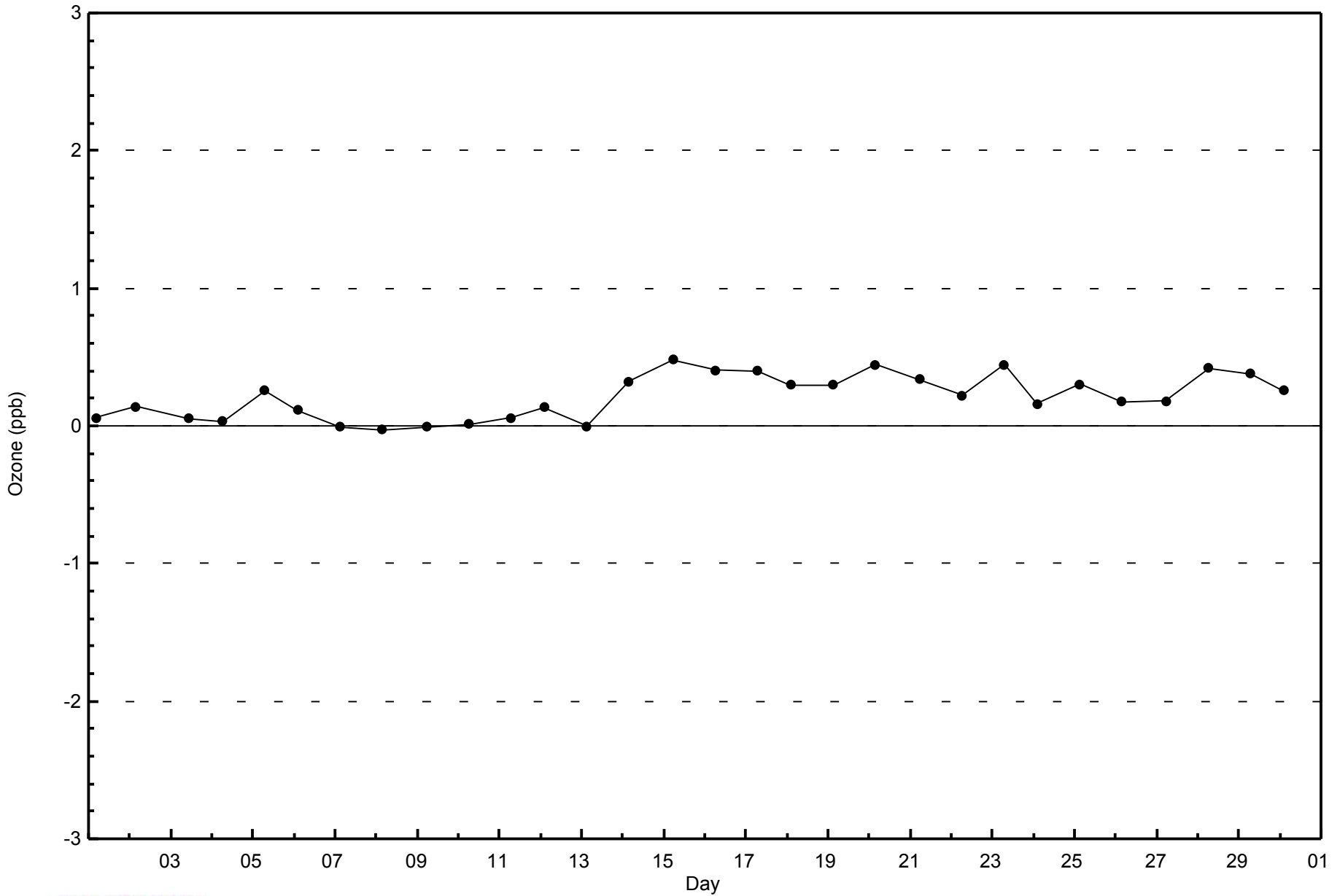
Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley (AMS 7)





WBEA  
Zero Responses

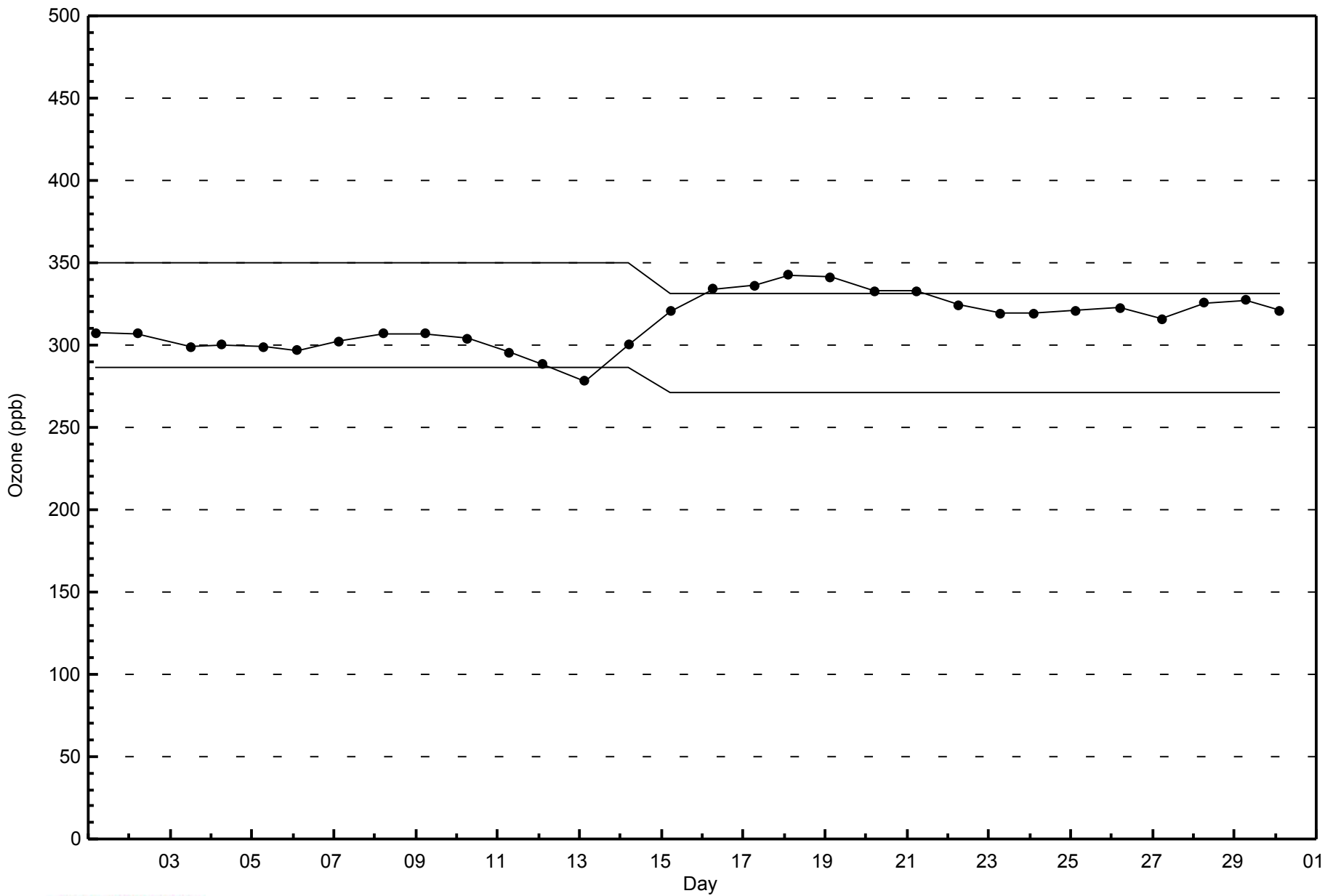
Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley - April 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley - April 2015







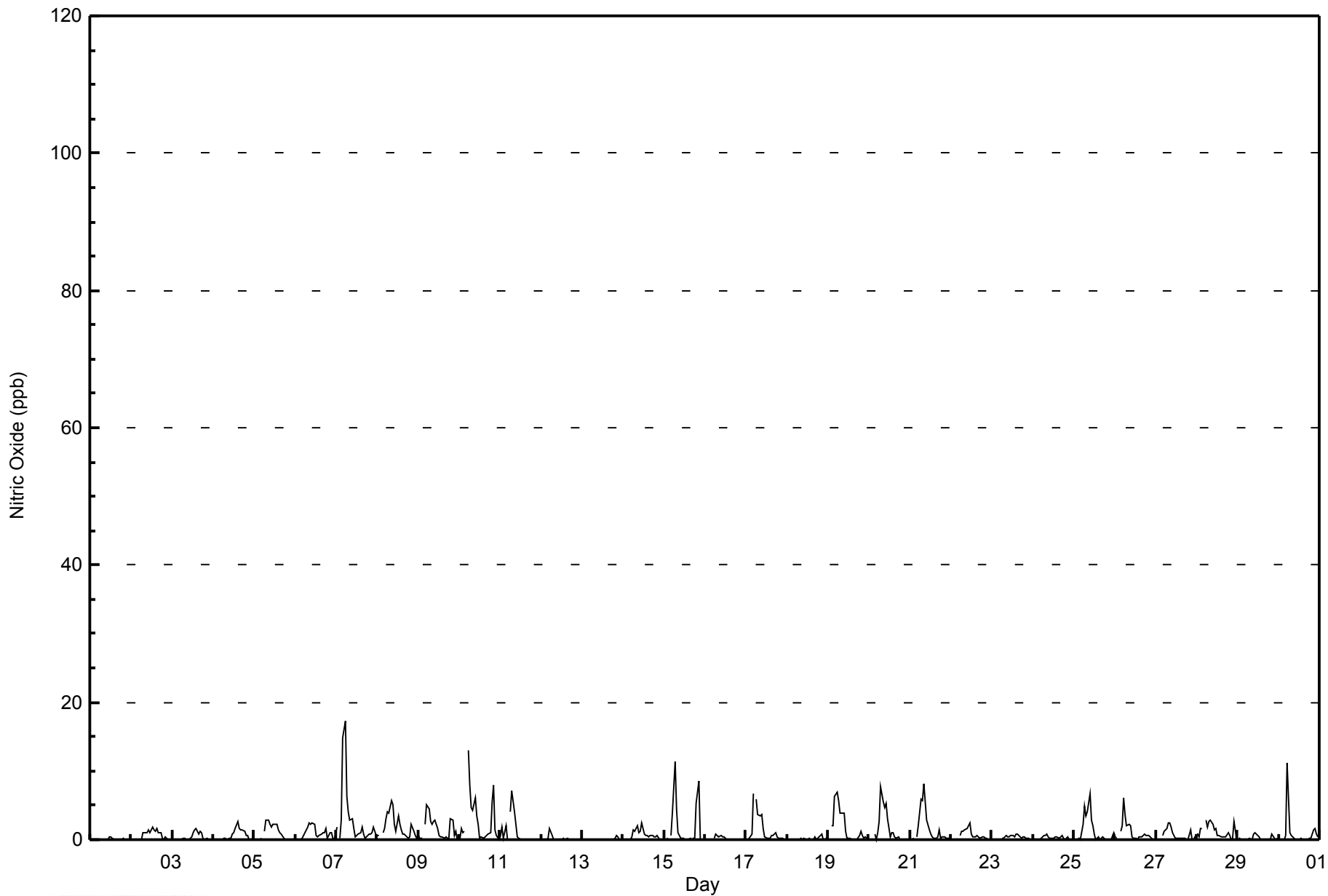
Maximum Value: 17 ppb on Apr 7 06:00																	Maximum Daily Average: 2.9 ppb on Apr 7							Hours in Service: 720		
Minimum Value: 0 ppb on Apr 1 05:00																	Minimum Daily Average: 0.1 ppb on Apr 1							Hours of Data: 684		
Maximum Diurnal Average: 3.2 ppb at hour 6																	Minimum Diurnal Average: 0.1 ppb at hour 24							Hours of Missing Data: 36		
Monthly Average: 1.0 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 8							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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	0	Z	0	0	0	0	1	1	1	1	1	2	2	1	2	1	1	0	0	0	0	0	0	0.6	2
3-Apr	0	0	0	0	0	0	0	0	0	Z	0	0	1	1	2	1	1	1	0	0	0	0	0	0	0.4	2
4-Apr	0	0	0	0	Z	0	0	0	0	0	0	1	1	2	3	2	1	1	1	1	1	0	0	0	0.6	3
5-Apr	0	0	0	0	0	Z	1	3	3	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0.9	3
6-Apr	Z	0	0	0	0	1	1	2	3	2	3	2	1	0	1	1	1	1	2	0	1	1	0	0	1.0	3
7-Apr	2	Z	0	3	15	17	6	4	3	3	2	1	1	1	1	2	1	0	1	1	1	1	2	1	2.9	17
8-Apr	1	1	Z	1	2	3	4	4	6	5	2	1	3	2	1	1	1	0	0	0	2	1	1	0	1.9	6
9-Apr	1	0	0	Z	2	5	4	3	2	3	3	2	1	0	0	0	0	0	0	3	3	1	1	0	1.5	5
10-Apr	0	2	1	1	Z	13	8	5	4	6	3	2	0	0	0	0	1	1	1	5	8	1	1	0	2.8	13
11-Apr	1	2	0	2	0	Z	4	7	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7
12-Apr	Z	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	2
13-Apr	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	1	0	0	0	--	1
14-Apr	0	0	Z	0	0	0	1	1	2	1	1	2	1	1	1	0	1	1	0	1	1	0	0	0	0.7	2
15-Apr	0	0	0	Z	1	4	11	4	1	1	0	0	0	0	0	0	0	0	0	5	9	0	0	0	1.6	11
16-Apr	0	0	0	0	Z	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
17-Apr	0	0	0	1	7	Z	6	4	3	4	2	0	0	0	0	1	1	1	0	0	0	0	0	0	1.3	7
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.1	1
19-Apr	0	Z	2	2	6	7	6	4	4	4	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1.7	7
20-Apr	0	0	Z	1	0	1	3	8	6	5	5	3	0	1	1	0	0	0	0	0	0	0	0	0	1.5	8
21-Apr	0	0	0	Z	0	2	6	6	8	5	3	1	1	0	0	0	0	1	0	0	0	0	0	0	1.6	8
22-Apr	0	0	0	0	Z	1	1	1	1	2	2	2	1	0	0	1	0	0	0	0	0	0	0	0	0.6	2
23-Apr	0	0	0	0	0	Z	0	0	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0.3	1
24-Apr	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
25-Apr	0	Z	0	0	0	2	5	3	4	7	3	2	1	0	0	0	0	0	0	0	0	0	0	1	1.3	7
26-Apr	0	0	Z	1	2	6	4	2	2	2	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1.1	6
27-Apr	0	0	0	Z	1	1	2	3	3	2	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.6	3
28-Apr	1	0	2	2	Z	3	2	3	3	2	1	2	1	1	0	0	0	0	1	1	0	0	3	0	1.2	3
29-Apr	0	0	0	0	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
30-Apr	Z	0	0	0	1	11	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0.8	11
																	Diurnal Average		Diurnal Maximum							
																	0.2		2							
																	0.2		2							
																	0.3		2							
																	0.5		3							
																	1.5		15							
																	3.2		17							
																	2.6		11							
																	2.3		8							
																	2.2		8							
																	2.2		7							
																	1.4		5							
																	1.0		3							
																	0.6		3							
																	0.6		2							
																	0.5		3							
																	0.5		2							
																	0.4		1							
																	0.4		1							
																	0.3		2							
																	0.7		5							
																	1.1		9							
																	0.3		2							
																	0.3		3							
																	0.1		1							

Z - zerospan C - Calibration



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Athabasca Valley - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	684	100.00	100.00
21 - 40	0	0.00	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - April 2015**

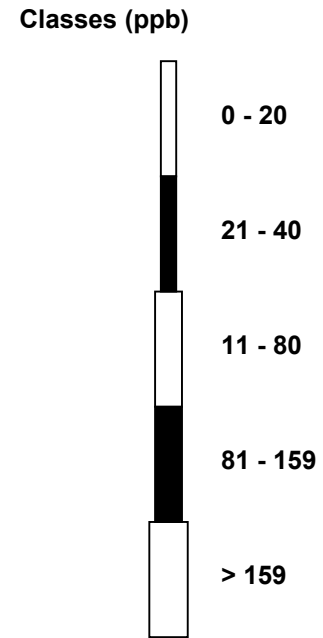
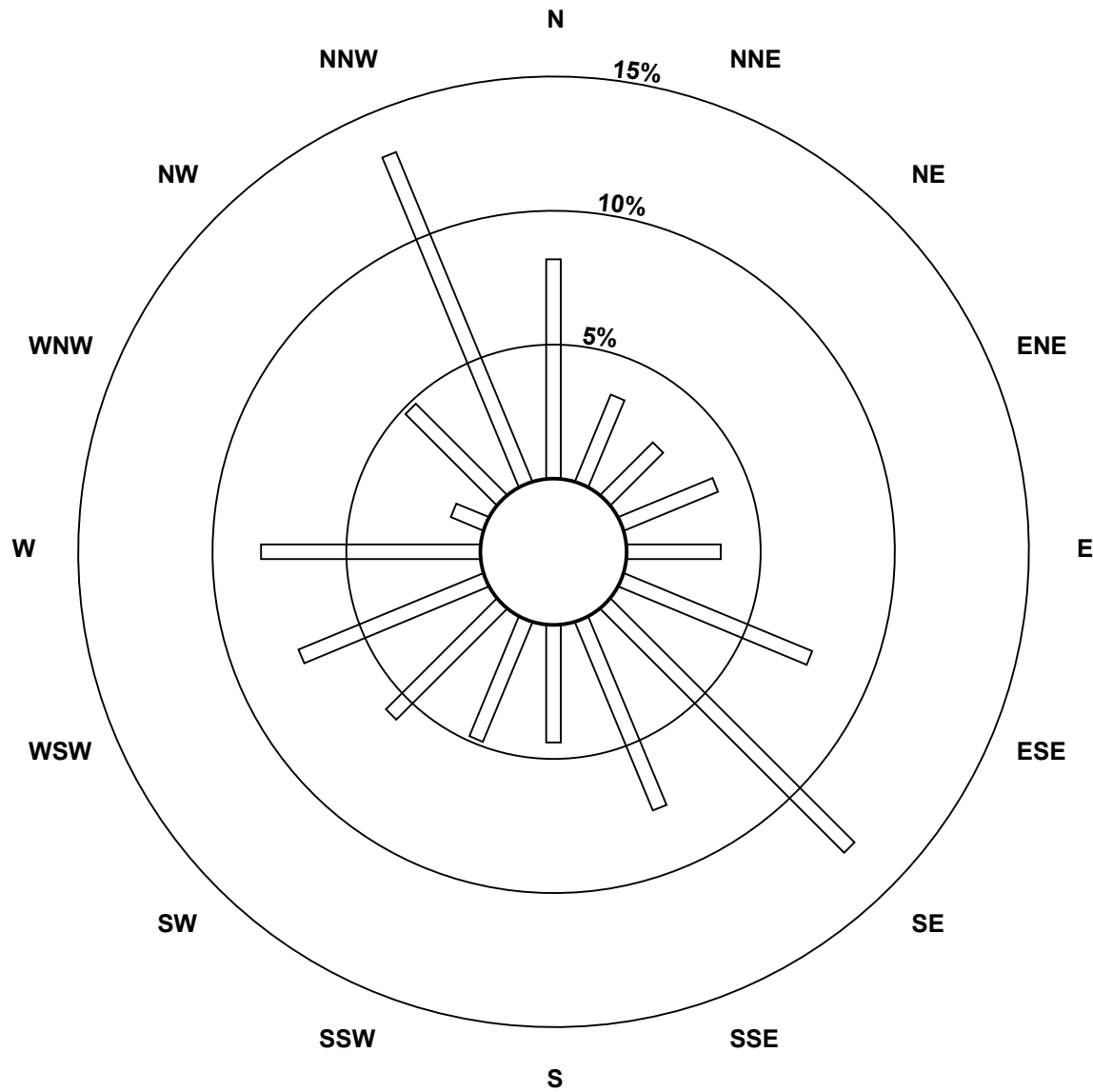
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	24	19	26	24	52	88	52	30	33	40	51	56	9	33	91	684
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	24	19	26	24	52	88	52	30	33	40	51	56	9	33	91	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb  
Athabasca Valley (AMS 7)**

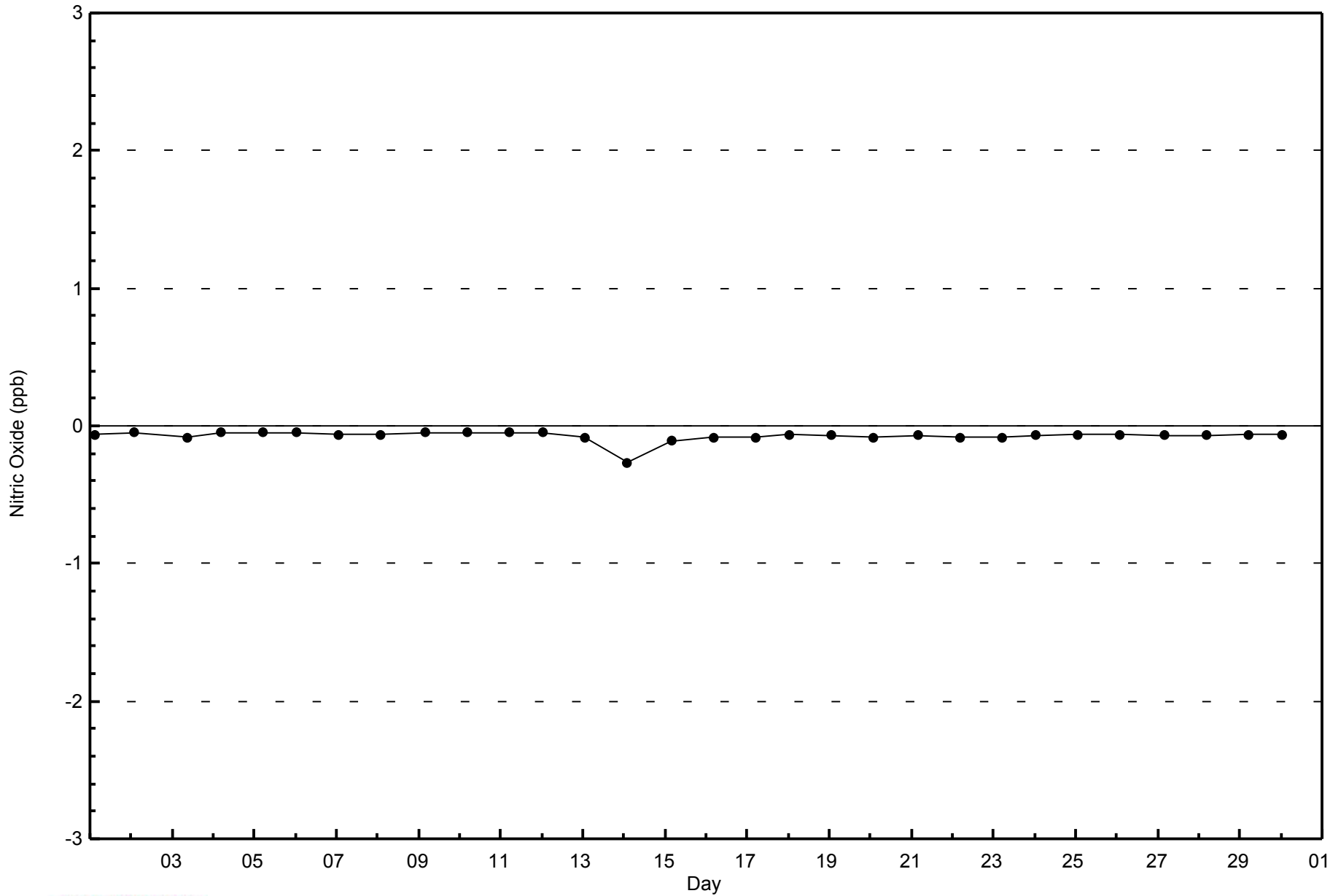


**Total Number of Valid Hours: 684**



WBEA  
Zero Responses

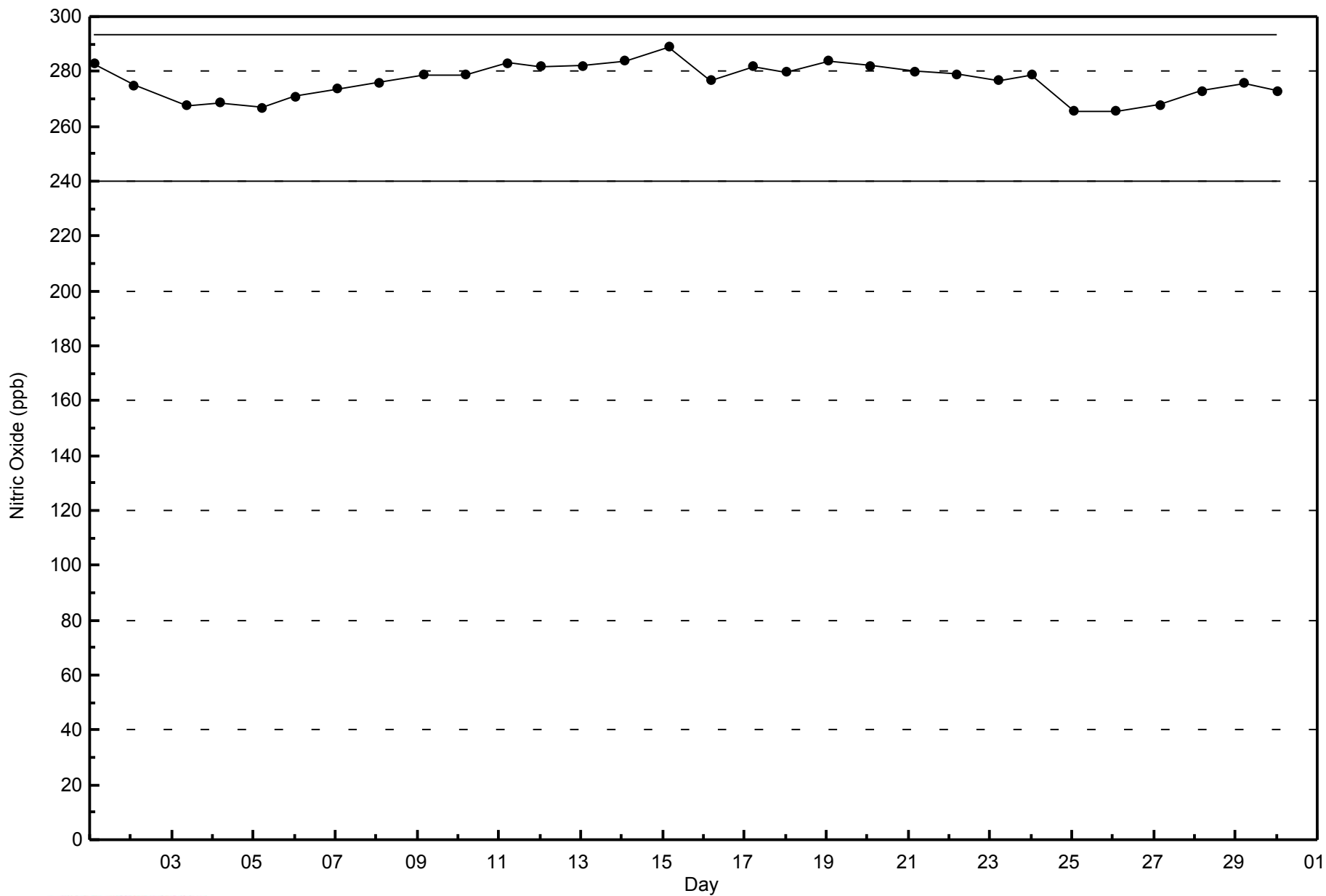
Nitric Oxide (NO) - ppb  
Athabasca Valley - April 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Athabasca Valley - April 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 30 ppb on Apr 10 21:00	Maximum Daily Average: 10.6 ppb on Apr 10
Minimum Value: 0 ppb on Apr 4 00:00	Hours of Data: 684
Maximum Diurnal Average: 9.4 ppb at hour 21	Hours of Missing Data: 36
Monthly Average: 4.9 ppb	Hours of Calibration: 36
Minimum Daily Average: 1.4 ppb on Apr 23	Percent Operational Time: 100.0
Minimum Diurnal Average: 2.1 ppb at hour 14	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 7 P <sub>90</sub> = 11 P <sub>99</sub> = 21	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	5	4	Z	6	4	3	2	2	2	2	2	1	2	1	1	1	2	2	1	2	2	5	4	3	2.4	6
2-Apr	5	6	Z	7	5	8	8	9	7	5	4	3	5	4	4	5	4	6	6	4	3	1	0	0	4.7	9
3-Apr	0	0	0	0	0	0	0	1	0	Z	1	1	3	3	4	2	5	5	5	3	2	1	0	0	1.6	5
4-Apr	1	0	0	0	Z	0	1	1	0	1	2	3	4	6	4	5	6	9	10	5	2	3	3	3	2.9	10
5-Apr	3	3	5	6	6	Z	8	8	6	4	3	4	5	5	4	2	3	4	5	7	17	10	6	7	5.7	17
6-Apr	Z	4	3	4	8	10	9	5	5	4	5	5	2	2	3	4	5	7	8	8	13	24	15	11	7.1	24
7-Apr	18	Z	11	15	22	21	16	11	6	6	4	2	2	3	3	3	5	3	4	8	17	18	19	15	10.0	22
8-Apr	12	11	Z	11	12	14	13	10	9	7	4	3	7	6	5	4	4	5	4	18	14	12	8	8	8.6	18
9-Apr	8	5	3	Z	6	10	9	7	5	5	6	4	2	2	2	2	3	3	4	19	19	10	14	10	6.9	19
10-Apr	6	12	13	13	Z	19	14	10	8	10	7	6	2	3	2	3	4	7	9	27	30	19	14	6	10.6	30
11-Apr	6	7	7	10	5	Z	9	9	8	6	3	2	1	1	1	1	1	1	1	1	1	2	2	0	3.6	10
12-Apr	Z	0	0	0	3	15	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1.6	15
13-Apr	0	Z	1	0	1	3	2	1	0	C	C	C	C	C	C	1	1	1	1	7	9	4	7	6	--	9
14-Apr	5	2	Z	5	6	8	7	7	7	4	4	8	4	3	3	3	5	5	6	7	4	3	3	3	4.9	8
15-Apr	3	4	3	Z	5	8	10	6	2	2	1	1	1	1	1	1	1	2	3	21	24	1	1	1	4.4	24
16-Apr	0	0	0	1	Z	2	6	4	2	2	2	2	1	1	1	1	2	2	6	3	2	2	3	1	2.0	6
17-Apr	9	10	10	14	21	Z	14	7	5	6	4	2	2	2	1	4	6	9	5	6	6	6	3	3	6.7	21
18-Apr	Z	4	4	2	2	3	4	3	4	1	2	2	2	2	1	1	2	2	3	3	3	5	3	3	2.6	5
19-Apr	2	Z	12	12	13	13	8	5	5	5	2	1	1	1	1	1	1	1	6	12	9	11	10	10	6.1	13
20-Apr	5	7	Z	8	3	9	6	12	10	9	10	8	2	3	3	3	3	4	4	9	14	9	11	11	7.1	14
21-Apr	9	9	8	Z	8	8	10	10	12	10	6	4	2	2	2	2	1	2	0	1	1	1	2	2	4.9	12
22-Apr	3	3	2	3	Z	6	4	2	2	2	2	3	1	1	1	1	1	2	2	2	1	1	1	1	2.0	6
23-Apr	1	1	1	2	2	Z	2	2	1	1	1	1	1	1	3	3	2	2	1	1	1	0	0	0	1.4	3
24-Apr	Z	0	0	0	0	1	1	1	2	0	1	1	0	1	1	1	1	1	1	3	5	6	7	4	1.6	7
25-Apr	8	Z	10	14	12	12	10	6	5	8	5	3	2	1	2	1	2	3	4	5	8	8	5	16	6.5	16
26-Apr	12	12	Z	12	15	17	7	4	4	3	2	1	1	0	1	1	1	1	2	4	15	10	8	3	6.0	17
27-Apr	3	3	4	Z	8	7	6	7	6	5	3	2	2	2	2	2	2	2	2	3	18	6	6	16	5.0	18
28-Apr	16	11	16	18	Z	12	6	6	6	6	6	6	4	4	3	4	5	6	12	13	10	9	15	6	8.5	18
29-Apr	6	6	1	2	2	Z	3	5	3	6	4	3	3	1	1	1	2	3	3	4	10	3	4	2	3.4	10
30-Apr	Z	1	0	3	9	20	4	2	2	1	1	1	1	2	1	1	1	2	4	6	16	13	16	14	5.2	20

5.8	4.9	4.8	6.4	7.0	9.1	6.8	5.3	4.5	4.4	3.3	2.8	2.1	2.1	2.1	2.2	2.6	3.2	4.1	7.2	9.4	6.7	6.4	5.5	Diurnal Average	
18	12	16	18	22	21	16	12	12	10	10	8	7	6	6	5	6	9	12	27	30	24	19	16	Diurnal Maximum	

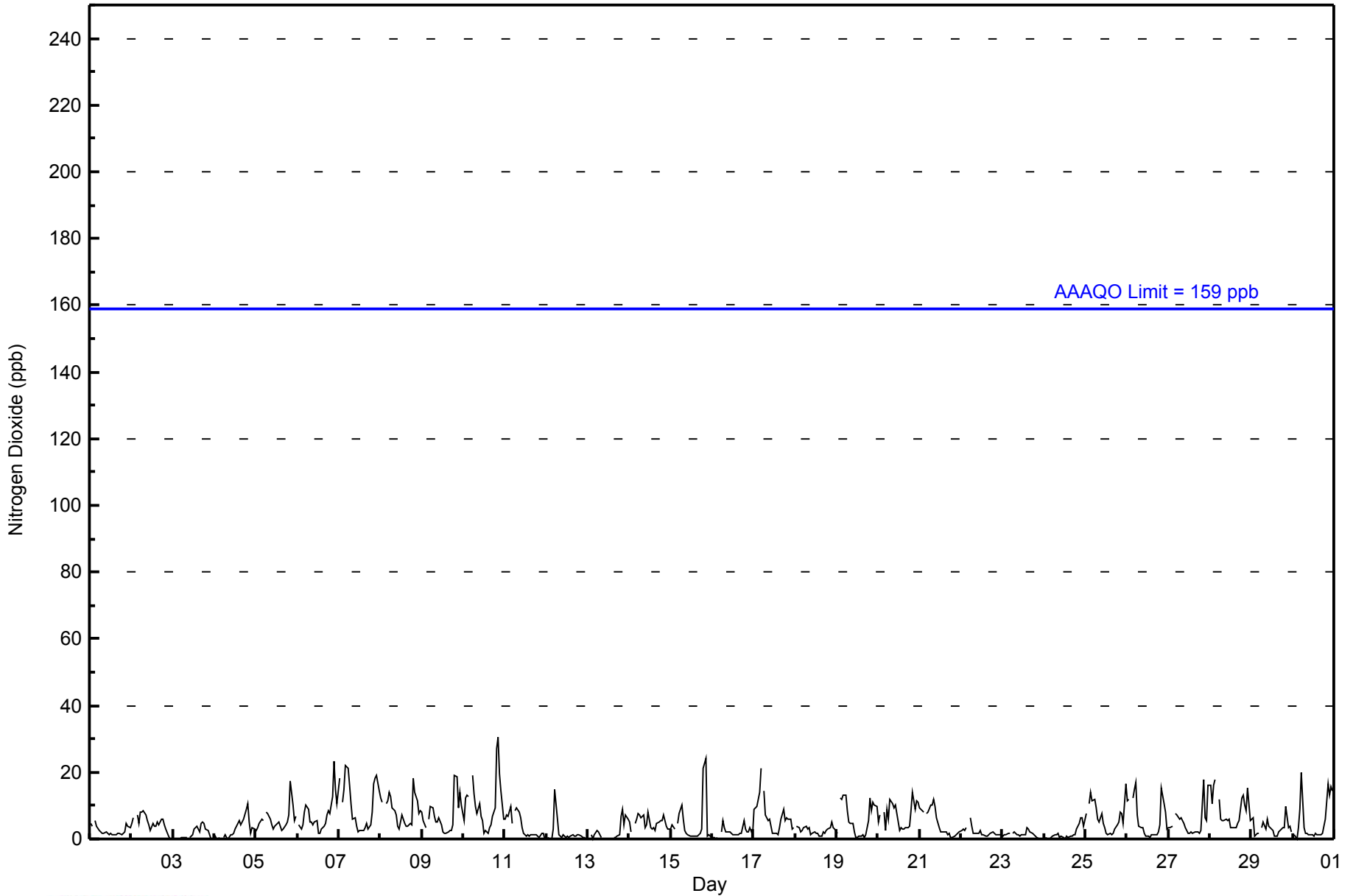
Z - zerospan C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb





WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	676	98.83	98.83
21 - 40	8	1.17	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - April 2015**

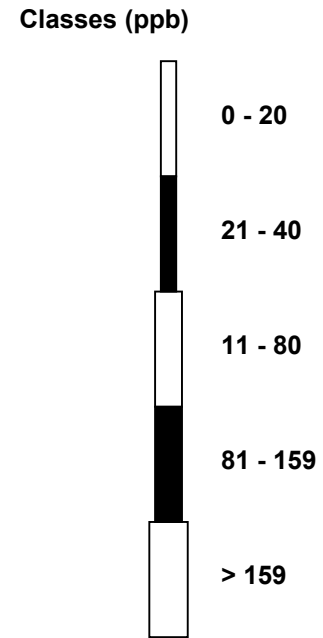
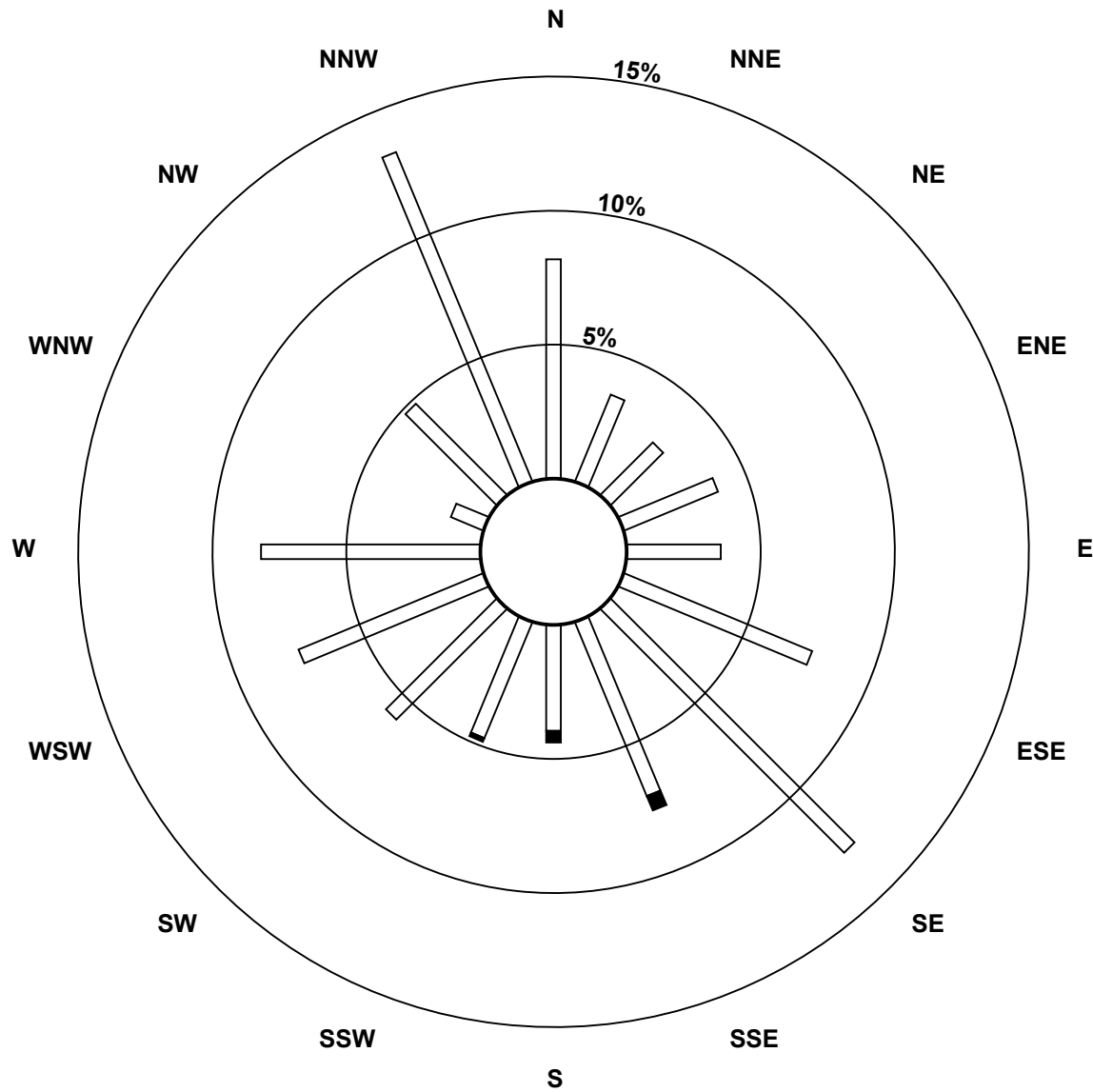
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	24	19	26	24	52	88	48	27	32	40	51	56	9	33	91	676
21 - 40	0	0	0	0	0	0	0	4	3	1	0	0	0	0	0	0	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	24	19	26	24	52	88	52	30	33	40	51	56	9	33	91	684

Total Number of Valid Hours: 684

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)**

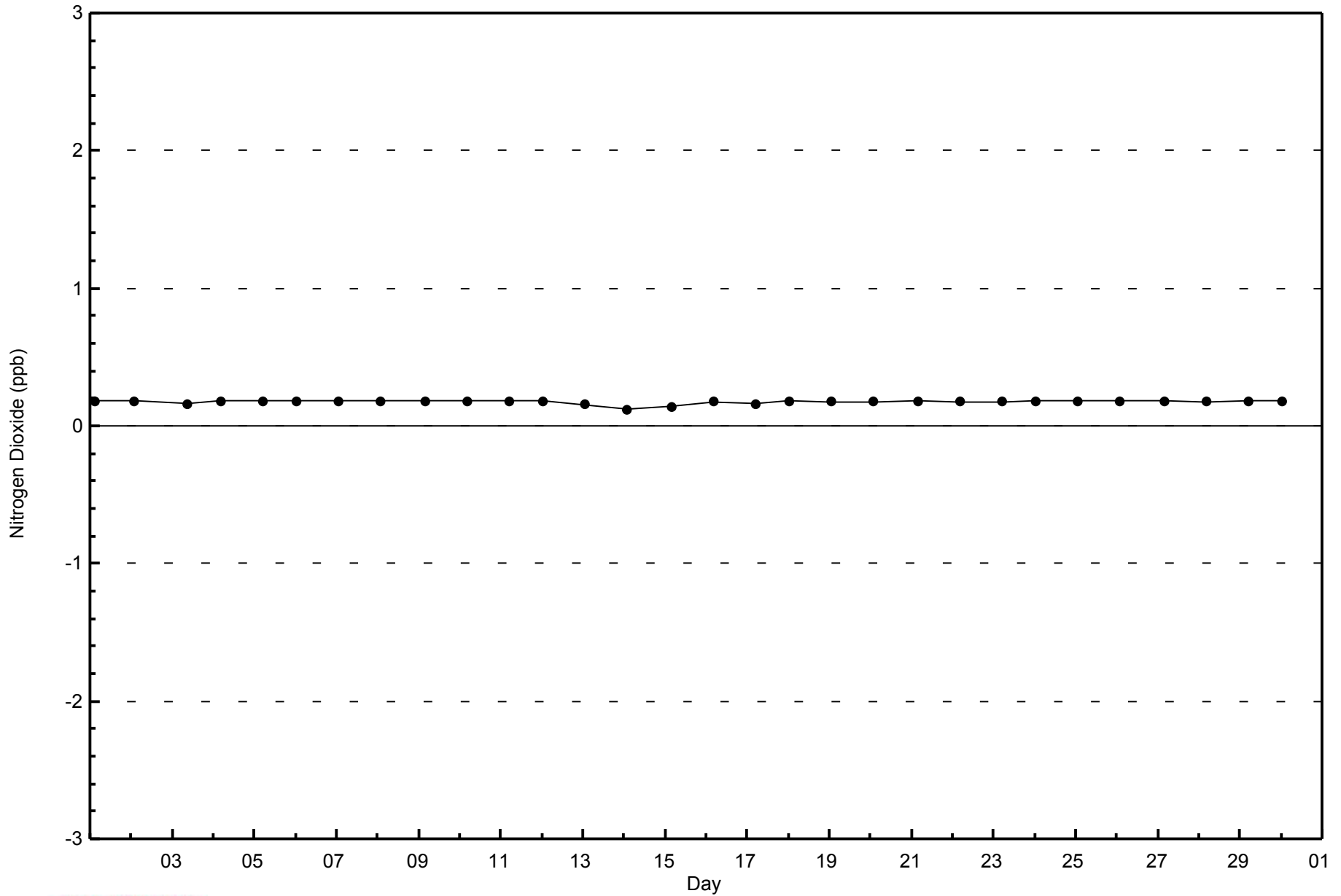


**Total Number of Valid Hours: 684**



WBEA  
Zero Responses

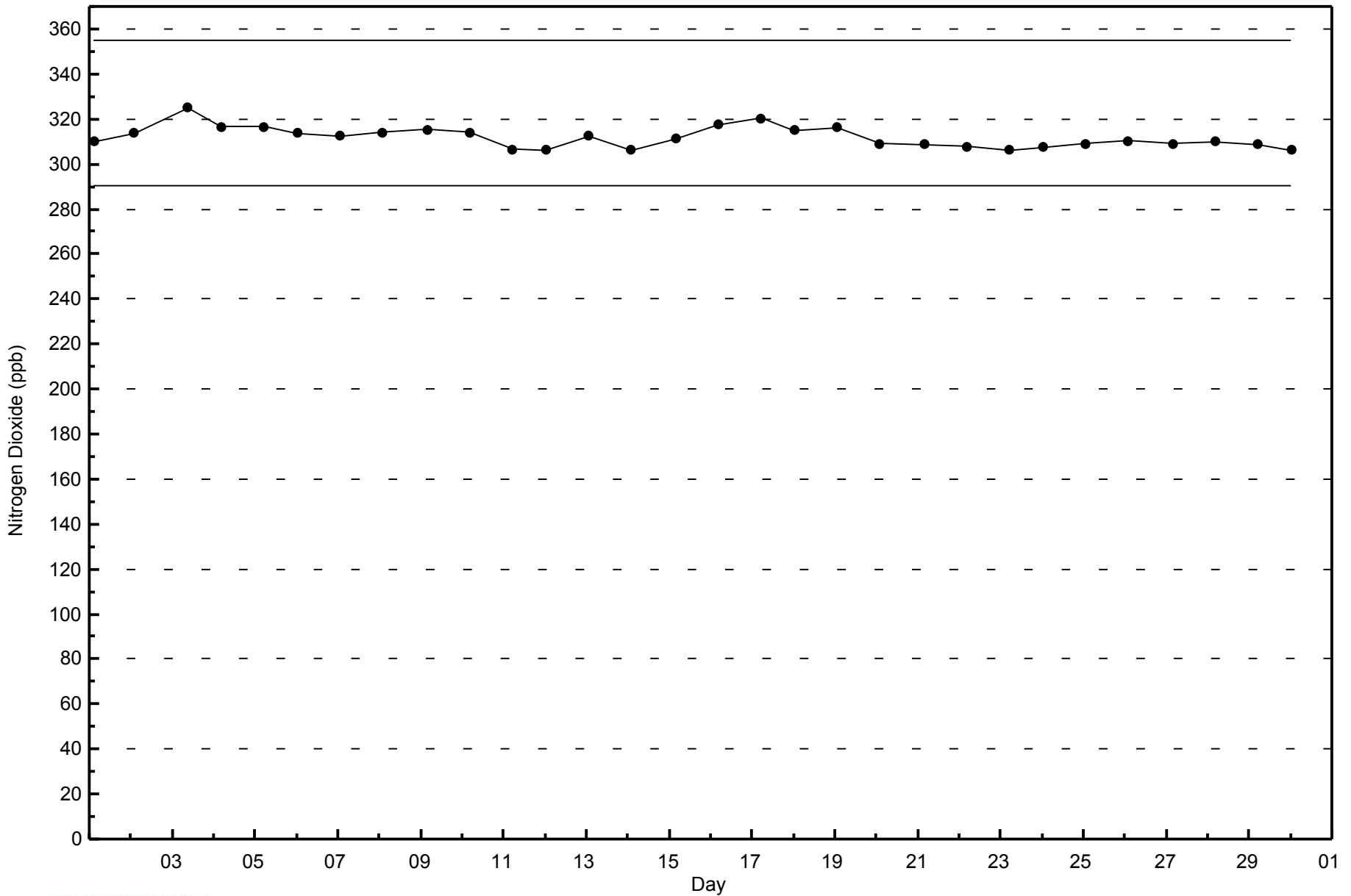
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - April 2015





Maximum Value: 38 ppb on Apr 7 06:00	Maximum Daily Average: 13.4 ppb on Apr 10	Hours in Service: 720
Minimum Value: 0 ppb on Apr 13 01:00	Minimum Daily Average: 1.7 ppb on Apr 23	Hours of Data: 684
Maximum Diurnal Average: 12.3 ppb at hour 6	Minimum Diurnal Average: 2.6 ppb at hour 16	Hours of Missing Data: 36
Monthly Average: 5.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 4 Q <sub>3</sub> = 8 P <sub>90</sub> = 14 P <sub>99</sub> = 31	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-Apr	5	4	Z	6	4	2	2	2	2	2	2	2	2	1	1	2	2	1	2	2	5	4	3	2.5	6	
2-Apr	5	6	Z	7	5	8	8	9	8	6	6	4	6	5	5	7	5	7	6	4	4	1	0	0	5.3	9
3-Apr	0	0	0	0	0	0	1	1	0	Z	0	2	4	5	5	3	6	6	5	3	3	1	0	0	2.0	6
4-Apr	1	0	0	0	Z	0	1	1	0	1	2	2	4	6	8	6	6	7	10	11	6	2	3	3	3.5	11
5-Apr	2	3	5	6	6	Z	9	11	9	7	5	6	7	7	5	3	4	5	5	7	17	10	6	7	6.6	17
6-Apr	Z	4	3	4	8	11	10	7	8	7	7	8	3	2	3	5	6	8	10	8	14	25	15	11	8.1	25
7-Apr	20	Z	11	18	37	38	22	15	9	9	5	2	3	3	4	5	5	3	5	9	17	19	21	15	12.9	38
8-Apr	13	12	Z	11	13	17	17	13	14	12	6	4	11	8	6	5	4	5	4	19	16	13	8	9	10.5	19
9-Apr	9	5	4	Z	8	15	14	10	7	8	9	6	3	2	2	2	3	3	4	22	22	10	15	10	8.4	22
10-Apr	6	14	14	14	Z	32	22	14	12	16	10	8	2	3	2	4	5	8	10	32	38	21	15	6	13.4	38
11-Apr	6	9	7	12	5	Z	13	16	12	9	4	2	1	1	1	1	1	1	1	1	1	2	2	0	4.7	16
12-Apr	Z	0	0	0	3	16	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1.8	16
13-Apr	0	Z	1	0	1	2	2	1	0	C	C	C	C	C	C	1	1	1	1	7	9	5	7	6	--	9
14-Apr	5	2	Z	5	6	8	8	8	9	4	6	11	4	4	4	3	5	5	6	6	8	4	3	3	5.6	11
15-Apr	3	4	3	Z	5	11	21	10	3	3	2	1	1	1	1	1	1	2	3	26	33	1	1	1	6.1	33
16-Apr	0	0	0	1	Z	2	6	4	3	3	3	2	1	1	1	1	2	2	6	3	2	2	3	1	2.2	6
17-Apr	9	10	10	15	28	Z	20	11	9	10	6	2	2	2	2	4	7	10	6	6	6	6	3	3	8.1	28
18-Apr	Z	4	4	2	2	3	4	3	4	1	2	2	2	2	1	1	2	1	3	3	4	5	3	3	2.7	5
19-Apr	2	Z	14	14	19	20	14	9	8	9	4	1	1	1	1	1	1	1	6	14	9	11	10	10	7.8	20
20-Apr	5	7	Z	9	2	10	9	20	16	14	16	11	3	4	4	3	3	4	4	9	14	9	11	11	8.6	20
21-Apr	9	9	8	Z	8	10	16	16	20	15	9	5	3	3	2	2	1	3	0	1	1	1	2	2	6.4	20
22-Apr	3	3	3	3	Z	7	5	3	3	3	4	5	2	2	1	1	1	2	3	2	2	1	1	1	2.6	7
23-Apr	1	1	1	2	2	Z	2	2	2	2	1	2	2	2	4	4	3	2	2	1	1	0	0	0	1.7	4
24-Apr	Z	0	0	0	0	1	2	2	2	1	1	0	1	1	1	1	1	2	2	3	5	6	6	4	1.9	6
25-Apr	8	Z	10	14	12	14	14	9	9	14	7	5	3	1	2	1	2	3	4	5	8	8	5	17	7.7	17
26-Apr	12	12	Z	14	17	23	11	6	6	5	2	1	1	0	1	2	2	2	3	5	16	11	8	3	7.0	23
27-Apr	3	3	4	Z	8	8	8	9	8	6	4	2	2	2	2	2	2	2	2	3	19	6	6	17	5.6	19
28-Apr	17	11	18	19	Z	15	8	8	9	8	7	7	4	4	4	4	5	6	13	14	10	9	18	6	9.8	19
29-Apr	6	6	1	2	2	Z	3	5	3	7	5	4	3	1	1	1	2	3	3	4	10	4	4	2	3.6	10
30-Apr	Z	1	0	3	9	31	5	2	2	1	1	1	1	2	1	1	1	2	4	6	18	15	16	15	6.1	31

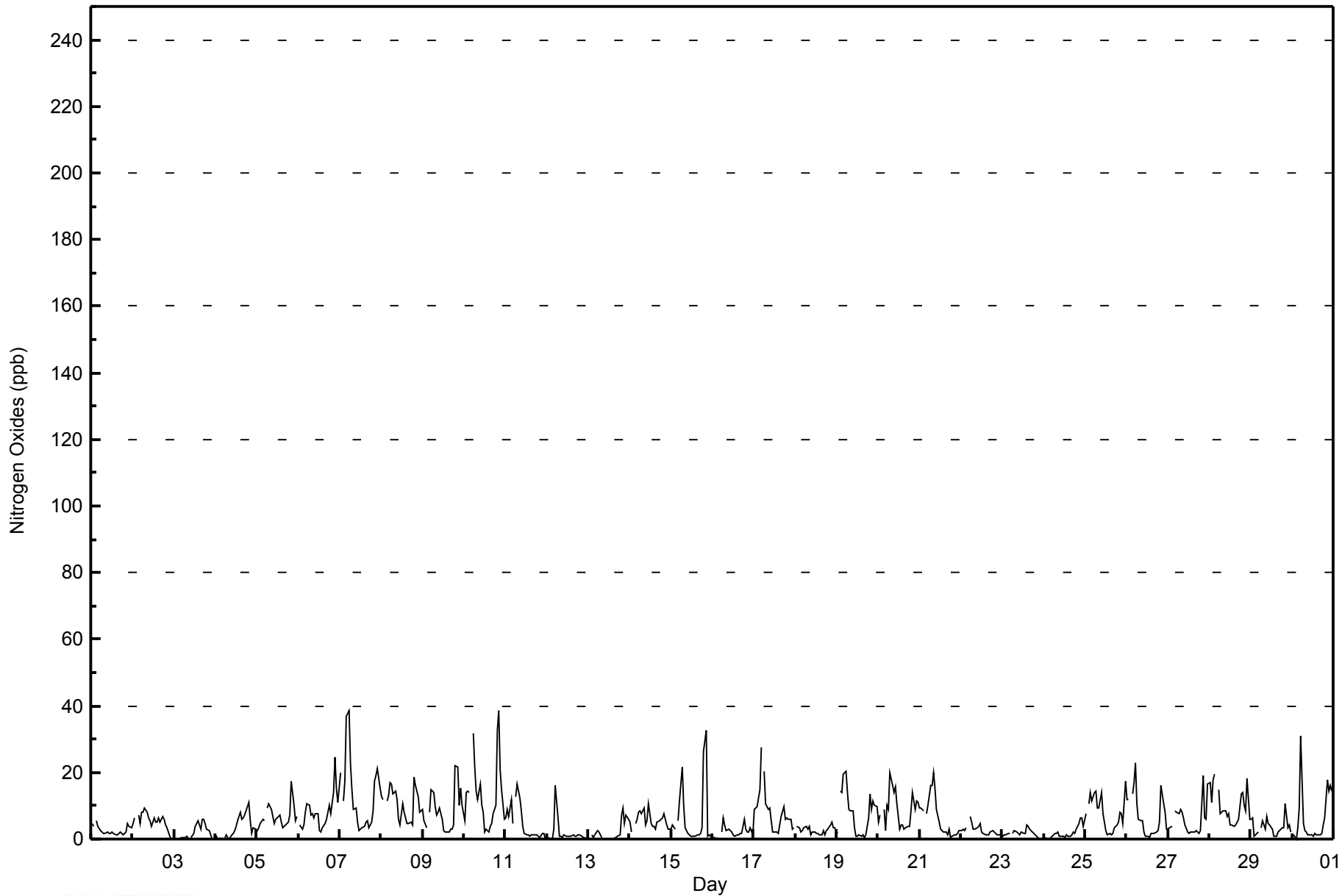
6.0	5.1	5.1	7.0	8.4	12.3	9.5	7.6	6.6	6.6	4.7	3.7	2.8	2.7	2.7	2.6	3.1	3.6	4.5	7.9	10.5	7.1	6.6	5.6	Diurnal Average	
20	14	18	19	37	38	22	20	20	16	16	11	11	8	8	7	7	10	13	32	38	25	21	17	Diurnal Maximum	

Z - zerospan      C - Calibration



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	666	97.37	97.37
21 - 40	18	2.63	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: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - April 2015**

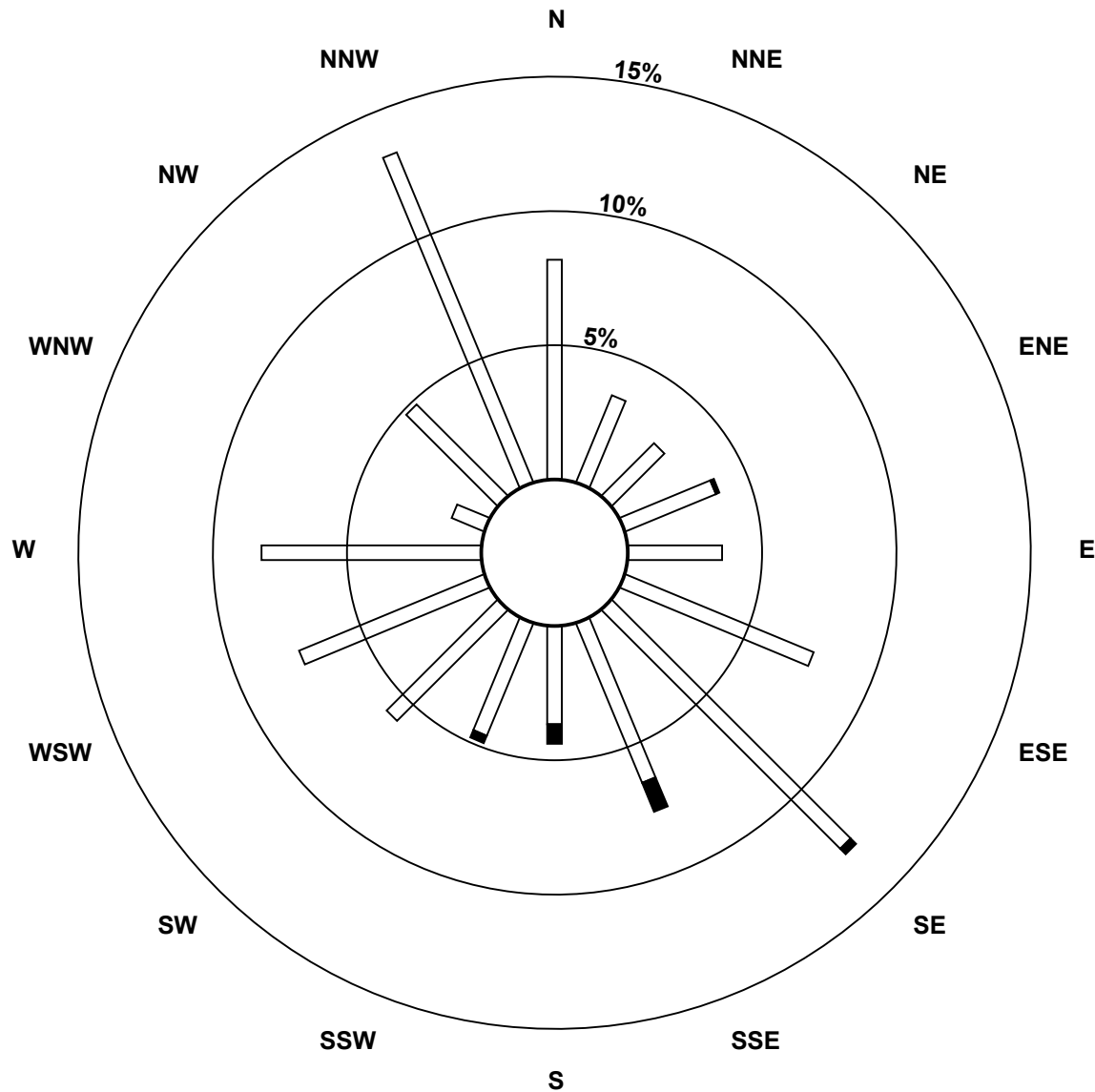
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	56	24	19	25	24	52	86	44	25	31	40	51	56	9	33	91	666
21 - 40	0	0	0	1	0	0	2	8	5	2	0	0	0	0	0	0	18
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	56	24	19	26	24	52	88	52	30	33	40	51	56	9	33	91	684

Total Number of Valid Hours: 684

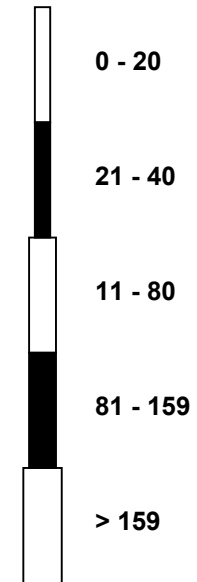
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

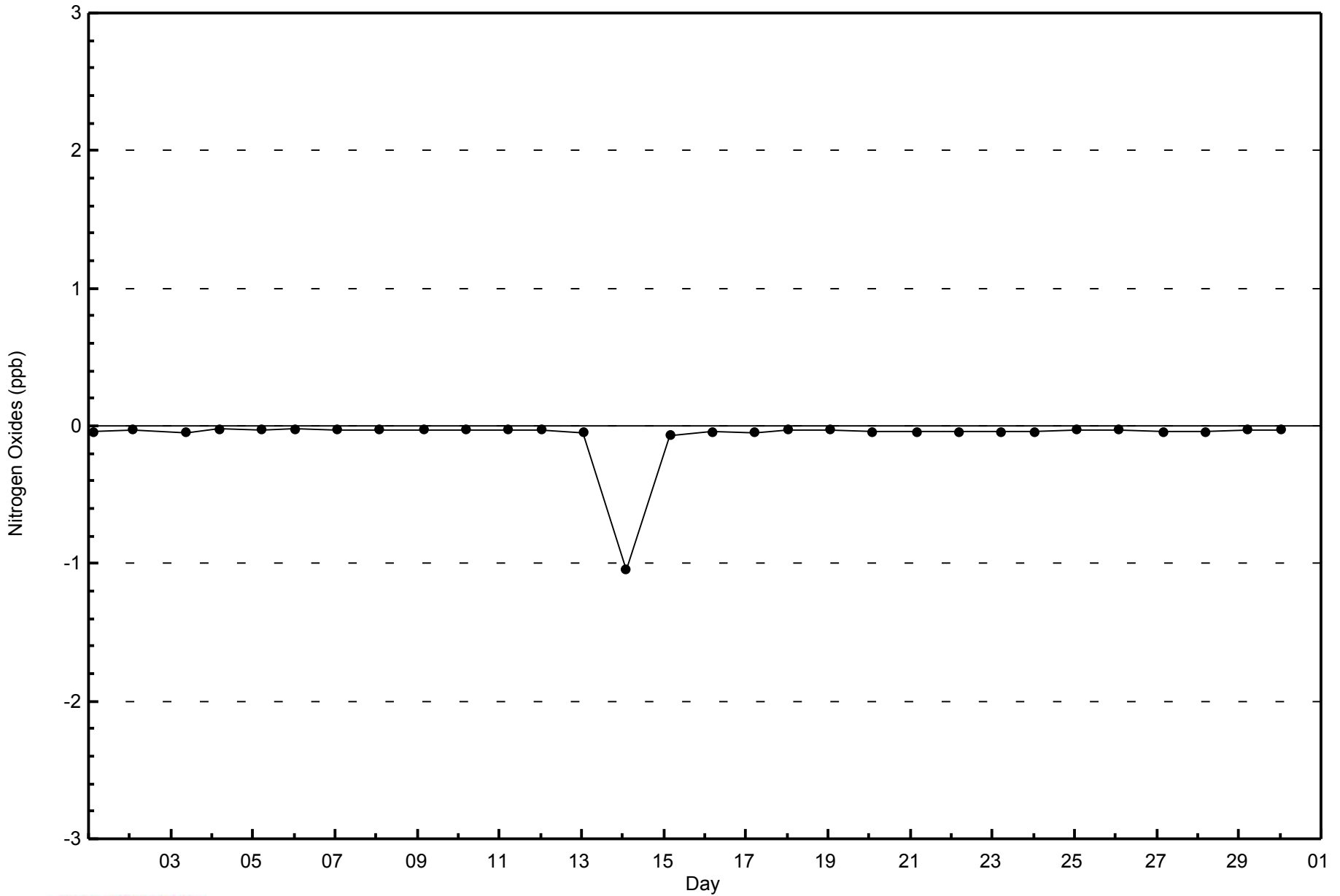
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley (AMS 7)



Classes (ppb)



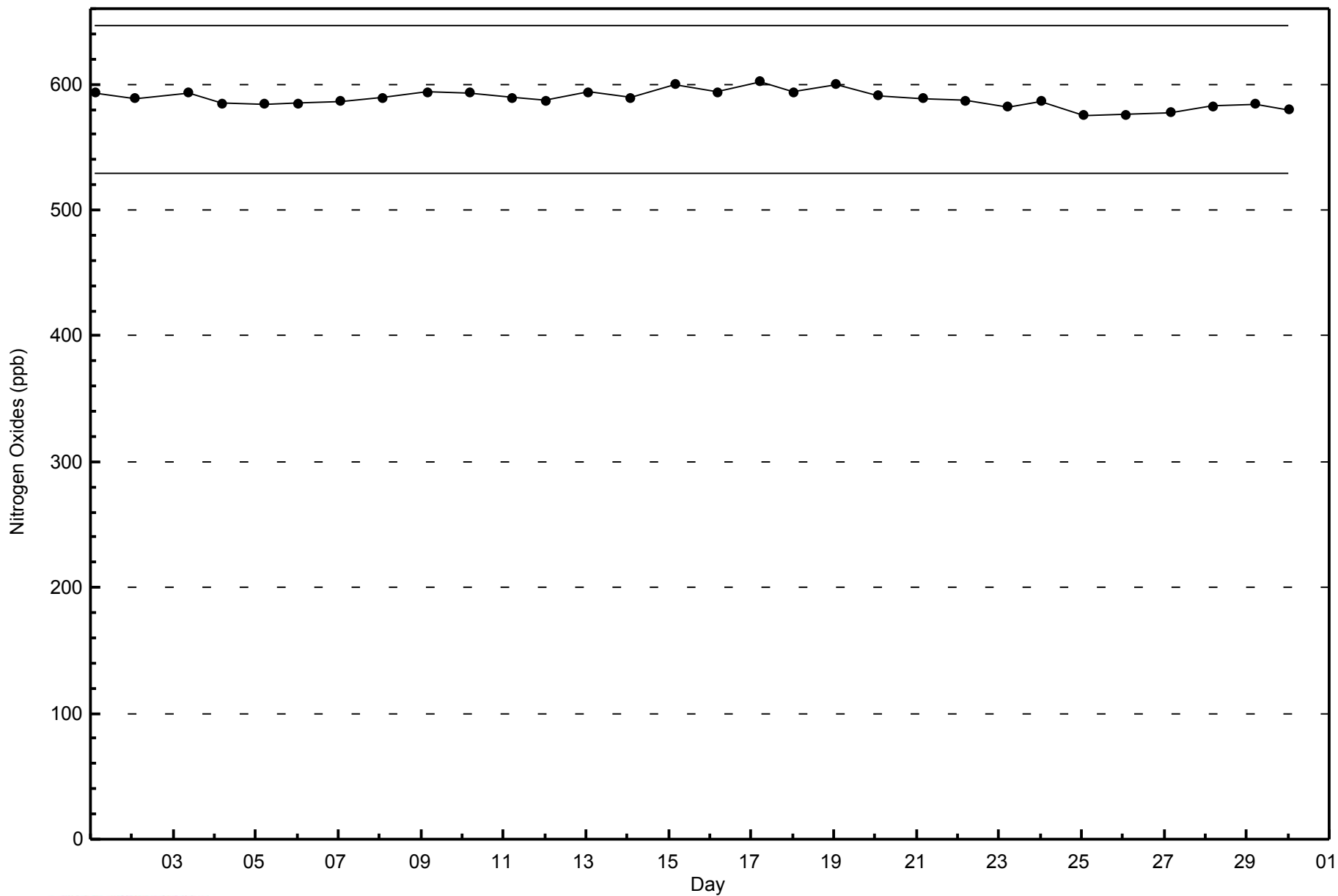
Total Number of Valid Hours: 684





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley - April 2015





Summary of Hour Averages

Athabasca Valley - April 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 54.2 µg/m <sup>3</sup> on Apr 11 01:00	Maximum Daily Average: 16.8 µg/m <sup>3</sup> on Apr 10	Hours of Data:	716
Minimum Value: 0.4 µg/m <sup>3</sup> on Apr 11 16:00	Minimum Daily Average: 3.1 µg/m <sup>3</sup> on Apr 18	Hours of Missing Data:	4
Maximum Diurnal Average: 11.7 µg/m <sup>3</sup> at hour 21	Minimum Diurnal Average: 4.7 µg/m <sup>3</sup> at hour 13	Hours of Calibration:	0
Monthly Average: 6.69 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.7 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 3.7 Median = 5.4 Q <sub>3</sub> = 8.1 P <sub>90</sub> = 11.4 P <sub>99</sub> = 27.1	Percent Operational Time:	99.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	4.0	3.8	4.5	4.2	4.0	5.1	5.5	5.1	4.8	4.7	4.3	3.6	3.1	3.0	3.0	3.0	2.9	2.8	3.5	4.6	4.3	4.6	3.8	3.5	4.0	5.5
2-Apr	4.4	5.4	5.4	5.6	4.8	5.4	5.4	5.7	5.2	4.6	4.4	4.3	4.2	4.2	4.3	4.6	4.6	5.0	6.8	7.7	6.4	4.7	4.8	5.1	5.1	7.7
3-Apr	6.2	6.5	6.2	6.1	5.9	5.7	5.6	5.7	4.6	4.0	3.0	3.3	3.8	4.0	5.5	5.0	6.4	9.0	8.5	6.8	5.6	3.4	3.0	2.9	5.3	9.0
4-Apr	2.1	1.8	1.9	1.9	1.9	2.0	2.5	2.2	2.0	2.3	2.3	2.8	3.0	3.1	3.2	3.7	6.0	6.5	11.5	12.7	9.0	5.5	6.8	5.2	4.3	12.7
5-Apr	4.8	5.4	6.4	6.9	5.9	5.7	5.2	6.5	7.9	7.3	5.4	4.6	4.4	5.0	5.5	5.7	6.3	7.1	8.4	10.2	14.0	9.2	4.9	7.2	6.7	14.0
6-Apr	7.3	5.7	4.7	4.9	5.7	5.9	6.1	5.2	5.0	5.0	4.4	4.4	3.1	3.7	6.5	9.1	9.3	10.5	11.6	9.7	15.8	17.5	13.1	7.8	7.6	17.5
7-Apr	10.9	8.1	6.2	6.9	8.5	7.6	7.3	8.3	7.9	7.9	5.5	5.0	5.4	5.9	7.7	7.8	10.2	7.3	14.6	15.6	17.6	15.4	10.1	8.5	9.0	17.6
8-Apr	8.8	8.6	7.2	6.8	6.5	6.6	6.1	6.2	8.4	8.6	6.8	4.4	5.2	6.1	5.7	7.1	7.4	6.9	8.0	15.6	21.4	22.5	11.7	13.0	9.0	22.5
9-Apr	10.7	8.9	6.7	6.1	6.1	6.6	6.7	6.0	5.5	5.7	6.4	5.2	2.8	3.7	4.7	6.8	8.5	8.4	10.2	35.3	40.3	20.2	24.9	17.9	11.0	40.3
10-Apr	13.6	14.9	13.0	11.0	11.6	17.6	12.5	11.2	9.8	12.0	10.7	10.9	7.3	7.5	9.2	14.0	14.1	16.8	18.2	33.2	42.9	21.2	19.0	51.6	16.8	51.6
11-Apr	54.2	29.5	18.2	11.1	8.5	9.8	8.8	10.6	9.7	8.2	4.4	2.8	1.6	0.7	0.8	0.4	0.7	1.5	6.0	4.6	1.3	1.3	1.6	1.4	8.2	54.2
12-Apr	1.4	1.9	3.0	1.8	0.8	1.1	0.5	0.6	1.4	2.9	5.3	7.7	9.0	9.6	8.7	10.2	7.7	7.9	7.1	7.1	6.6	5.7	4.6	3.2	4.8	10.2
13-Apr	2.8	2.4	1.9	1.6	1.5	1.3	1.1	1.0	1.4	1.8	2.8	3.9	5.8	6.8	7.6	7.1	6.8	7.0	8.1	17.0	21.1	15.3	8.5	2.4	5.7	21.1
14-Apr	1.1	0.4	0.5	0.5	0.6	1.1	1.1	1.6	1.8	1.9	3.6	9.9	12.2	17.4	21.8	23.4	26.6	21.1	20.7	19.1	13.7	8.6	5.4	3.6	9.1	26.6
15-Apr	3.2	2.8	2.7	2.1	1.4	1.2	1.4	2.2	3.2	7.7	13.3	M	M	M	M	1.8	1.8	2.2	2.5	8.3	11.9	2.9	3.3	4.6	4.0	13.3
16-Apr	3.6	3.7	3.0	2.7	3.1	2.7	4.7	4.4	4.0	3.8	4.3	4.0	4.3	4.4	4.2	6.8	6.4	6.0	22.7	8.8	5.5	6.3	5.9	3.8	5.4	22.7
17-Apr	8.8	7.3	5.2	5.0	8.6	8.8	6.4	5.0	5.1	4.7	3.3	2.0	2.0	2.4	2.9	2.9	3.2	4.5	4.1	3.7	3.6	3.7	3.9	3.5	4.6	8.8
18-Apr	3.2	9.0	13.6	5.8	2.9	2.0	1.9	2.2	2.2	1.7	1.7	1.5	1.4	1.5	1.5	1.5	1.9	1.6	2.3	2.5	2.7	3.8	3.6	3.6	3.1	13.6
19-Apr	2.5	4.3	11.4	18.3	10.5	4.0	3.4	3.3	4.0	3.7	2.2	1.5	1.5	1.4	1.4	1.5	1.8	2.1	4.8	7.3	7.8	10.0	8.3	5.2	5.1	18.3
20-Apr	3.9	4.5	5.2	5.4	4.2	10.9	7.0	10.3	7.2	5.5	5.1	3.9	2.9	3.4	3.9	4.0	5.8	7.6	6.7	8.5	11.6	9.4	10.2	8.6	6.5	11.6
21-Apr	8.5	8.0	7.1	6.8	7.1	10.6	11.3	9.0	9.3	6.7	5.3	4.8	4.8	4.7	4.9	5.6	6.8	7.8	6.4	6.9	5.8	8.0	5.3	4.5	6.9	11.3
22-Apr	4.2	3.8	3.9	3.6	3.8	5.1	4.6	9.4	3.5	6.6	8.1	8.9	7.3	5.7	5.3	5.7	4.9	6.0	6.9	6.1	4.9	3.9	3.1	2.8	5.3	9.4
23-Apr	2.7	2.6	2.6	2.6	2.7	3.5	3.6	4.0	4.3	4.6	4.7	5.4	5.1	4.6	5.9	6.2	5.9	5.9	6.0	6.7	5.2	5.4	4.0	3.6	4.5	6.7
24-Apr	3.7	3.7	3.4	3.5	4.0	4.8	5.0	4.6	5.2	3.9	3.3	2.8	2.8	3.0	3.9	3.7	5.3	5.1	5.8	9.6	10.2	8.6	7.5	5.6	5.0	10.2
25-Apr	7.2	6.8	7.0	13.7	9.2	7.7	8.9	14.2	9.5	9.3	7.7	6.1	4.4	3.2	3.7	4.0	5.5	9.3	9.8	9.2	10.3	11.2	10.0	21.0	8.7	21.0
26-Apr	15.8	13.4	12.7	11.7	9.0	9.9	7.3	7.0	6.7	5.3	3.4	2.7	2.5	2.5	3.2	3.8	4.2	5.1	5.4	7.2	15.1	10.8	9.0	4.3	7.4	15.8
27-Apr	3.6	3.4	3.6	4.3	5.5	5.8	5.9	6.4	5.8	5.1	4.6	4.4	4.1	3.2	3.2	4.6	5.5	5.4	5.4	5.5	10.7	11.4	18.3	20.2	6.5	20.2
28-Apr	15.3	9.2	8.8	8.7	10.2	8.5	7.8	7.9	7.8	6.9	6.2	6.6	11.2	8.2	6.2	5.6	5.1	5.9	9.9	11.2	9.9	9.4	16.5	11.9	8.9	16.5
29-Apr	11.1	10.9	5.0	3.9	4.6	4.0	4.1	4.3	4.1	8.9	5.8	6.4	5.3	4.3	3.4	4.1	4.5	5.0	5.1	5.5	6.3	5.5	6.2	7.0	5.6	11.1
30-Apr	5.6	5.9	5.3	4.7	6.1	12.7	4.0	3.2	3.6	3.4	3.6	6.8	5.9	5.4	5.0	10.2	3.6	3.4	4.5	5.0	8.8	9.2	10.2	9.9	6.1	12.7

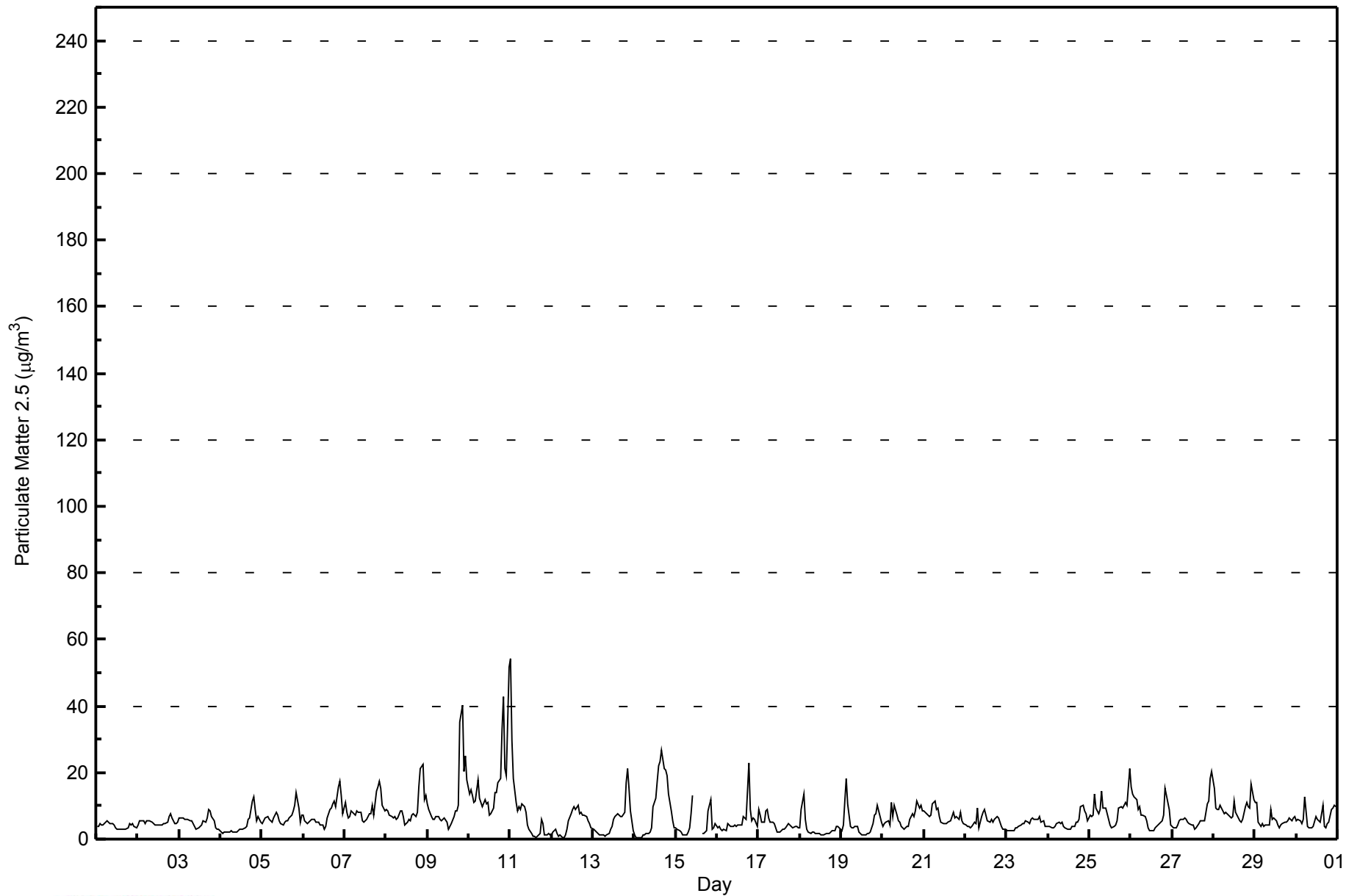
7.8	6.8	6.2	5.9	5.5	6.1	5.4	5.8	5.4	5.5	5.1	4.8	4.7	4.8	5.3	6.0	6.3	6.7	8.4	10.4	11.7	9.2	8.2	8.4	Diurnal Average	
54.2	29.5	18.2	18.3	11.6	17.6	12.5	14.2	9.8	12.0	13.3	10.9	12.2	17.4	21.8	23.4	26.6	21.1	22.7	35.3	42.9	22.5	24.9	51.6	Diurnal Maximum	

M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Athabasca Valley - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	355	49.58	49.58
6 - 15	311	43.44	93.02
16 - 25	31	4.33	97.35
26 - 80	8	1.12	98.46
> 81.0	0	0.00	98.46

Total Number of Valid Hours: 716

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Athabasca Valley - April 2015**

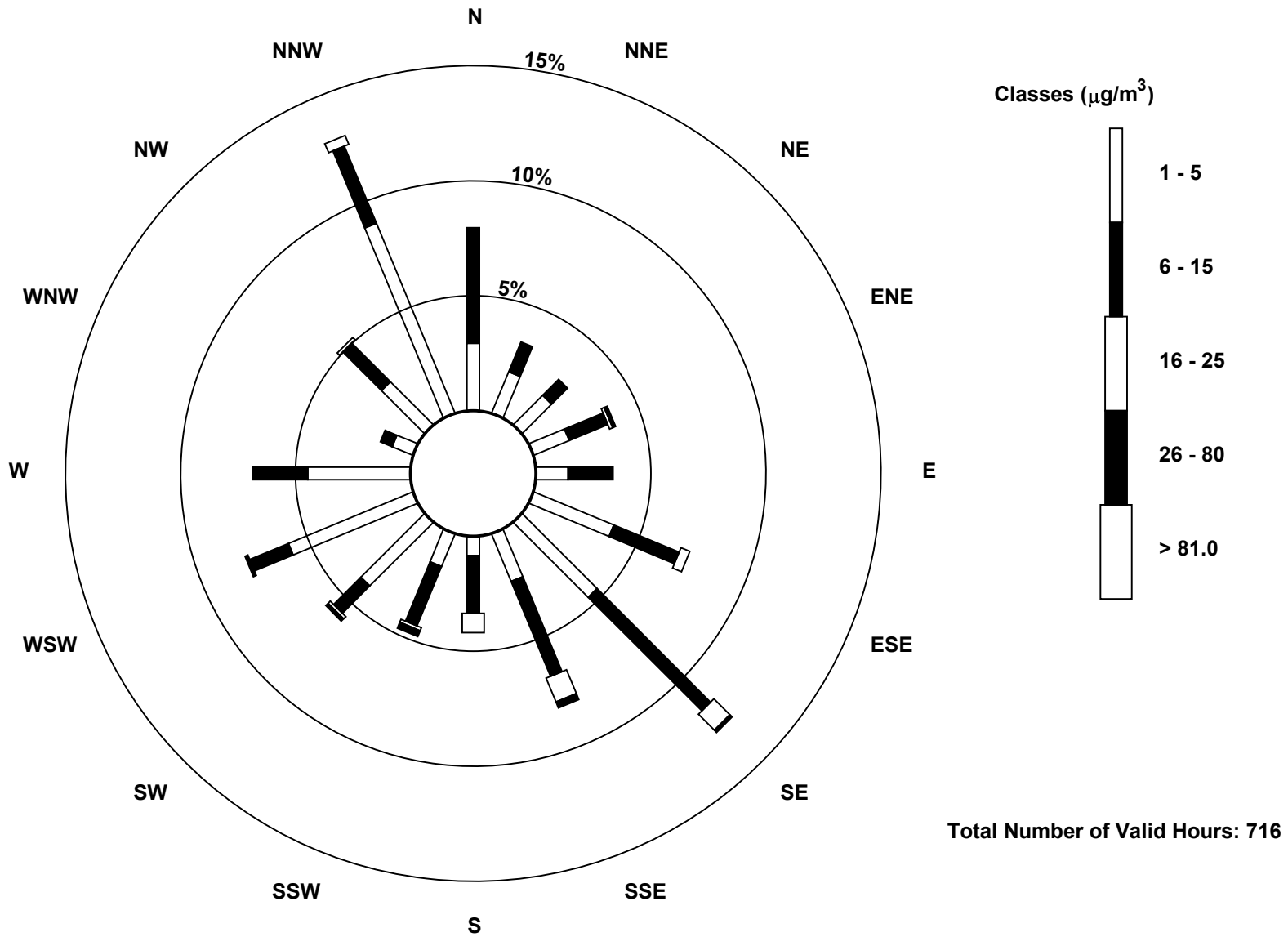
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	21	14	13	12	10	27	33	16	6	11	28	42	32	7	19	64	355
6 - 15	36	10	7	13	14	22	50	32	18	20	12	13	17	4	17	26	311
16 - 25	0	0	0	1	0	3	7	8	6	1	1	0	0	0	1	3	31
26 - 80	0	0	0	1	0	0	1	2	0	2	1	1	0	0	0	0	8
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>57</b>	<b>24</b>	<b>20</b>	<b>27</b>	<b>24</b>	<b>52</b>	<b>91</b>	<b>58</b>	<b>30</b>	<b>34</b>	<b>42</b>	<b>56</b>	<b>49</b>	<b>11</b>	<b>37</b>	<b>93</b>	<b>705</b>

Total Number of Valid Hours: 716

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
Athabasca Valley (AMS 7)

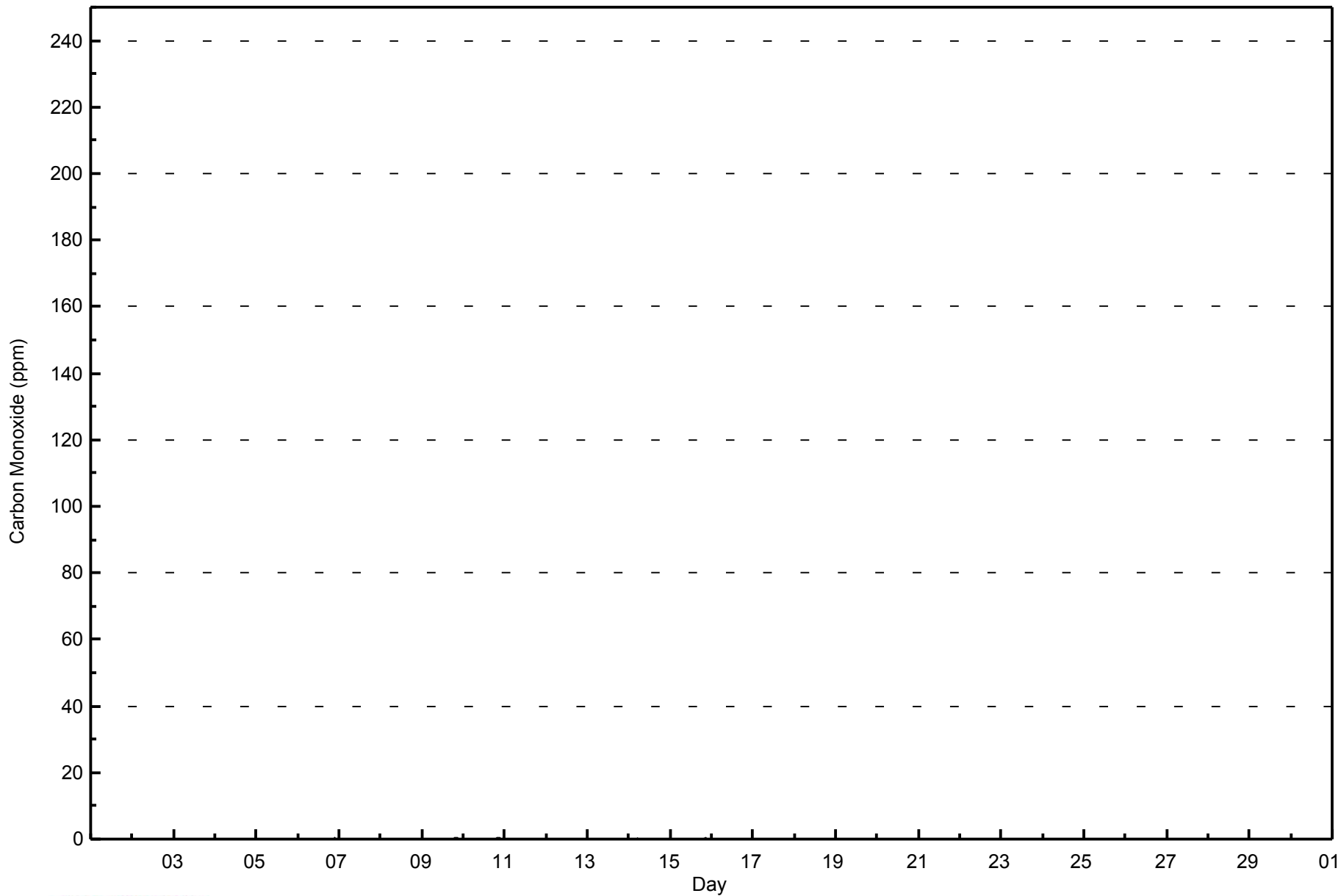






**WBEA**  
**Hourly Averages**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	684	99.85	99.85
0.4 - 0.5	1	0.15	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - April 2015**

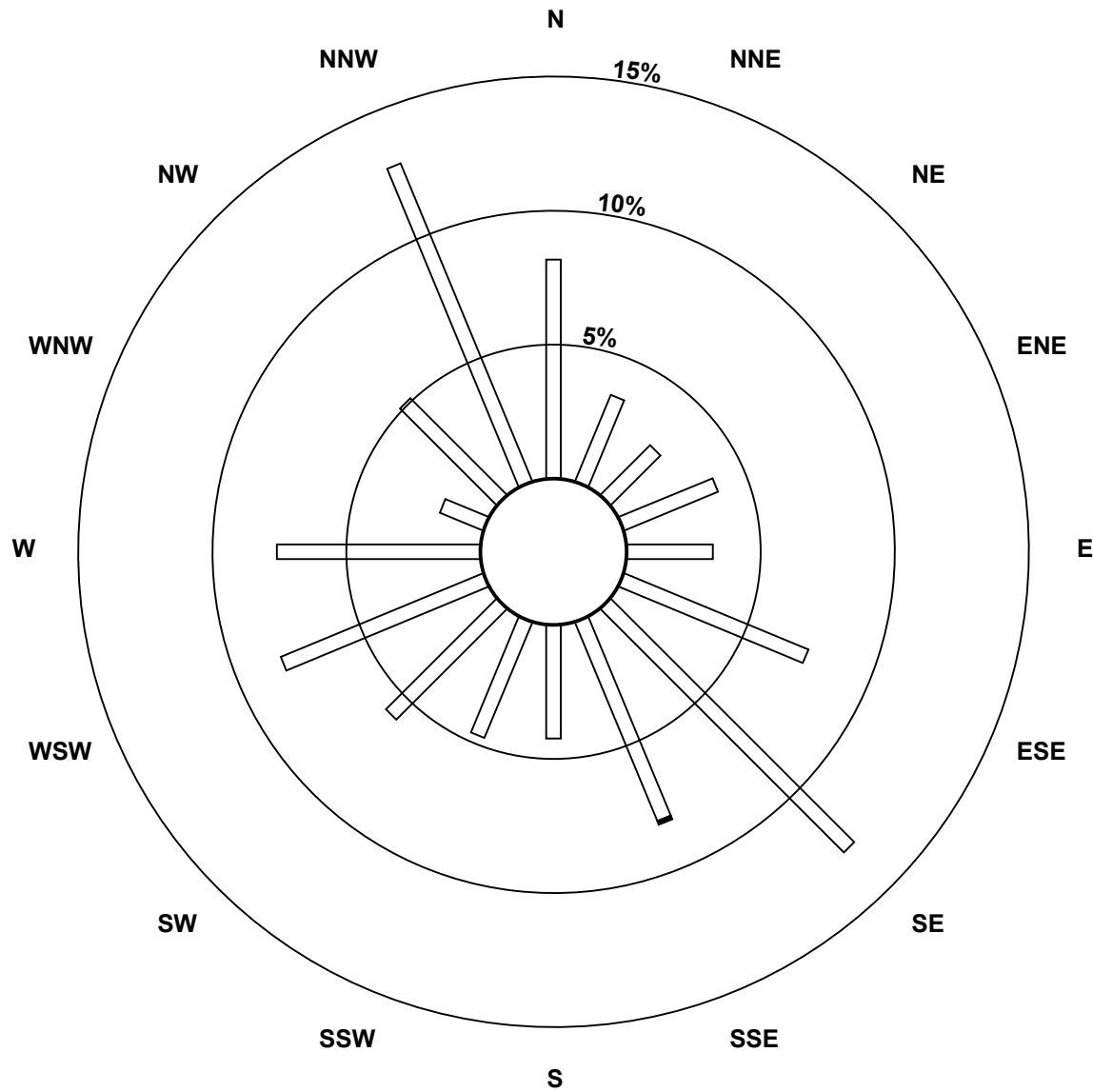
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	56	24	18	26	22	51	88	55	29	32	40	56	52	12	35	88	684
0.4 - 0.5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
0.6 - 0.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	56	24	18	26	22	51	88	56	29	32	40	56	52	12	35	88	685

Total Number of Valid Hours: 685

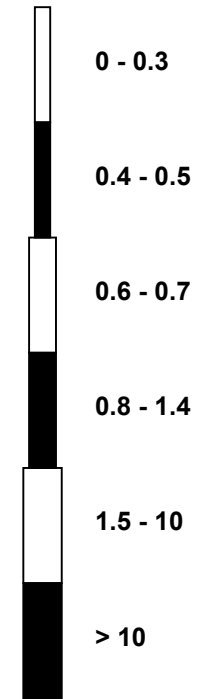
Total Number of Hours: 720

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

**Carbon Monoxide (CO) - ppm  
Athabasca Valley (AMS 7)**



**Classes (ppm)**

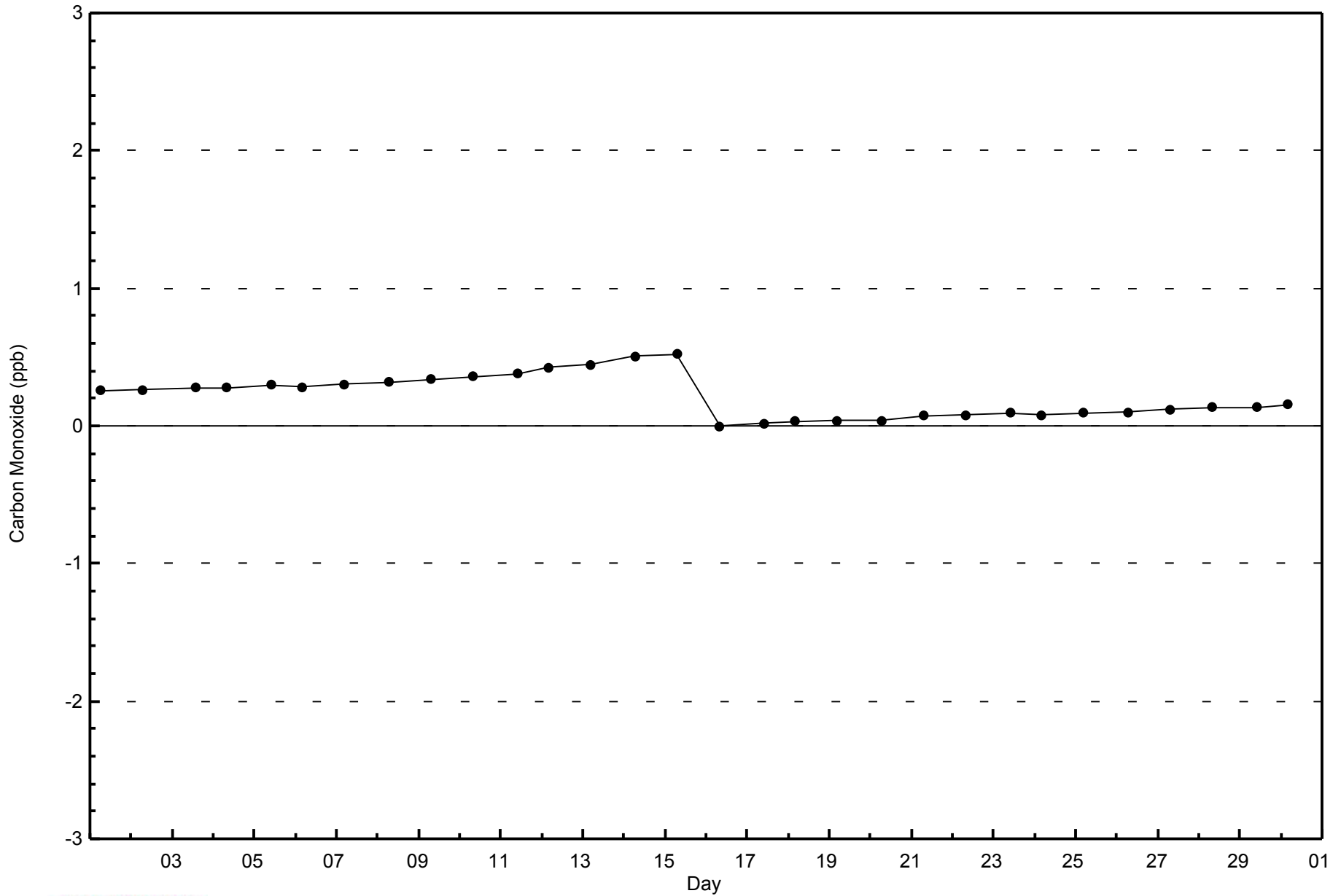


**Total Number of Valid Hours: 685**



WBEA  
Zero Responses

Carbon Monoxide (CO) - ppb  
Athabasca Valley - April 2015

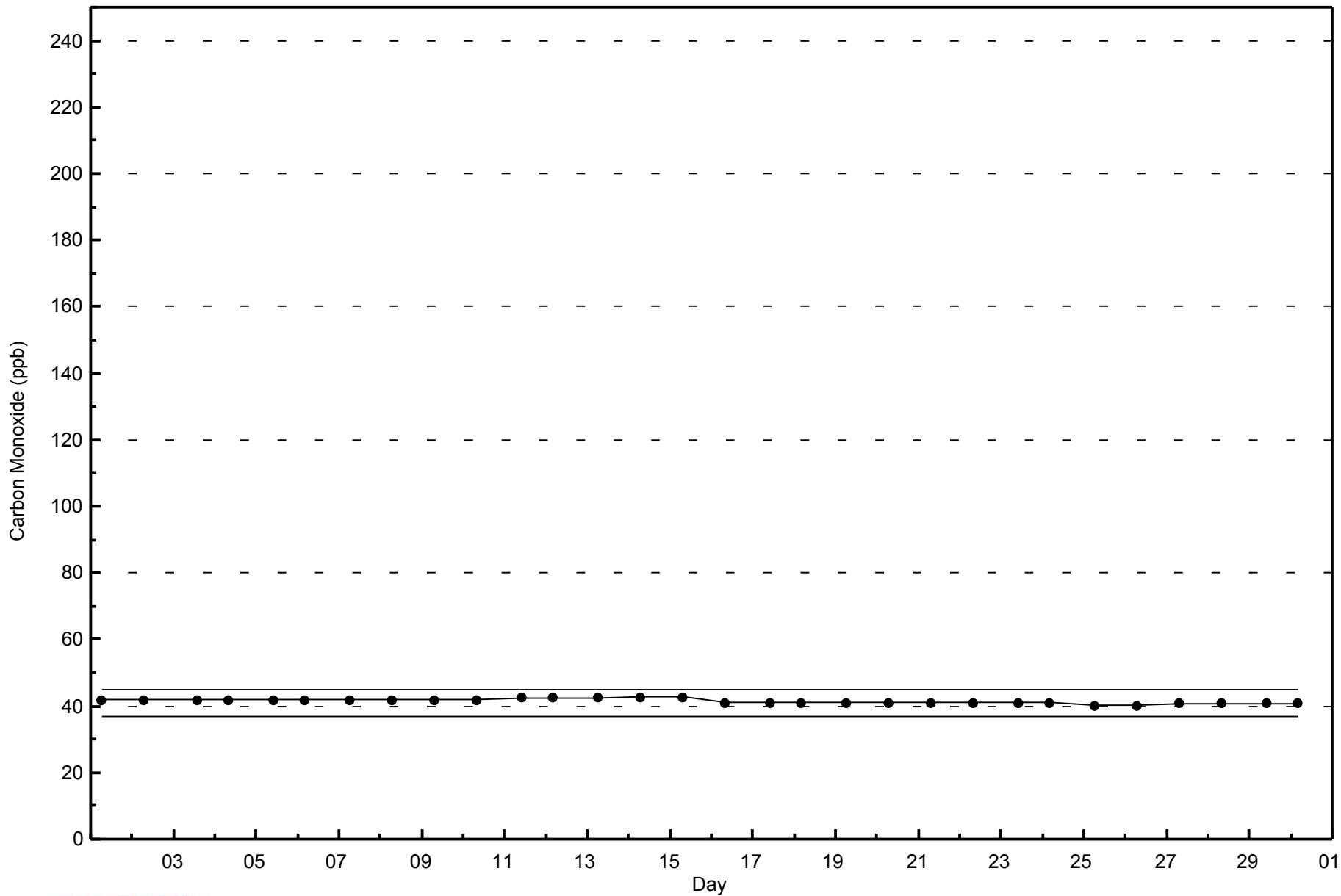






**WBEA**  
**Span Responses**

**Carbon Monoxide (CO) - ppb**  
**Athabasca Valley - April 2015**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

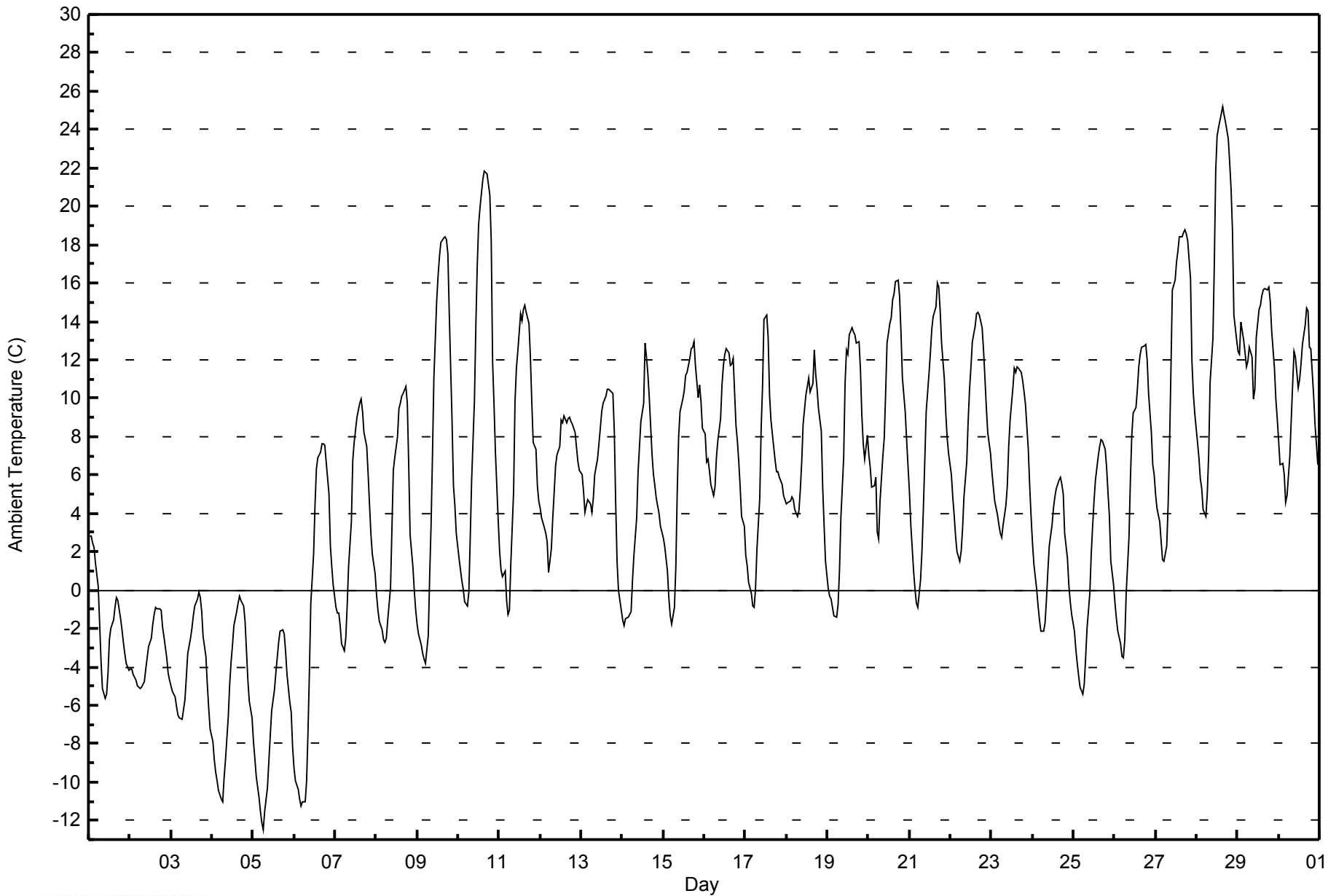
**Ambient Temperature (AT) - C**  
**Athabasca Valley - April 2015**

Maximum Value: 25.2 C on Apr 28 16:00																				Maximum Daily Average: 15.4 C on Apr 28					Hours in Service: 720																								
Minimum Value: -12.5 C on Apr 5 07:00																				Minimum Daily Average: -7.0 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 10.8 C at hour 17																				Minimum Diurnal Average: -1.0 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 5.09 C																				Percentiles: P <sub>1</sub> = -11.1 P <sub>10</sub> = -4.2 Q <sub>1</sub> = -0.7 Median = 5.4 Q <sub>3</sub> = 10.4 P <sub>90</sub> = 14.1 P <sub>99</sub> = 23.5					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-Apr	2.8	2.8	2.4	2.2	1.4	0.2	-1.7	-3.7	-5.1	-5.6	-5.4	-4.3	-2.6	-2.0	-1.5	-0.9	-0.4	-0.5	-1.5	-2.0	-2.7	-3.3	-3.8	-4.1	-1.6	2.8																							
2-Apr	-4.1	-4.1	-4.4	-4.7	-5.0	-5.1	-5.1	-5.0	-4.7	-4.1	-3.6	-2.9	-2.5	-1.7	-1.3	-0.9	-1.0	-1.0	-1.1	-1.9	-2.4	-3.5	-4.3	-4.7	-3.3	-0.9																							
3-Apr	-5.0	-5.3	-5.5	-6.1	-6.5	-6.7	-6.7	-6.2	-5.7	-4.6	-3.3	-2.5	-2.0	-1.3	-0.8	-0.4	-0.1	-0.4	-1.1	-2.5	-3.5	-4.9	-6.2	-7.2	-3.9	-0.1																							
4-Apr	-7.9	-8.9	-9.5	-9.9	-10.4	-10.9	-11.0	-9.8	-8.8	-6.6	-4.9	-3.8	-2.9	-1.9	-1.1	-0.7	-0.3	-0.5	-0.8	-1.7	-3.1	-4.7	-5.8	-6.6	-5.5	-0.3																							
5-Apr	-7.9	-8.8	-9.7	-10.8	-11.5	-12.2	-12.5	-11.6	-10.3	-8.9	-7.6	-6.3	-5.2	-4.3	-3.5	-2.7	-2.1	-2.0	-2.3	-3.2	-4.4	-5.9	-6.4	-8.2	-7.0	-2.0																							
6-Apr	-9.3	-10.0	-10.4	-10.9	-11.2	-11.0	-11.0	-9.9	-7.4	-4.3	-0.6	1.9	4.4	6.3	6.9	7.2	7.6	7.6	7.5	6.7	5.0	2.3	1.2	0.3	-1.3	7.6																							
7-Apr	-0.9	-1.2	-1.2	-1.8	-2.8	-3.2	-2.5	-0.8	1.2	3.5	6.8	7.7	8.4	9.0	9.7	10.0	9.3	8.2	7.5	6.0	4.4	2.9	1.9	0.9	3.5	10.0																							
8-Apr	-0.3	-1.0	-1.6	-2.0	-2.6	-2.8	-2.5	-1.6	0.1	3.2	6.2	6.9	8.0	9.4	9.7	10.1	10.3	10.6	9.7	6.6	2.9	1.2	0.0	-1.1	3.3	10.6																							
9-Apr	-1.7	-2.3	-2.9	-3.3	-3.6	-3.8	-2.4	0.8	3.4	7.0	11.0	15.1	16.4	17.4	18.1	18.4	18.4	18.3	17.6	14.4	8.8	5.5	4.4	2.9	7.4	18.4																							
10-Apr	1.7	1.1	0.5	0.0	-0.6	-0.8	-0.1	2.7	5.7	9.9	13.7	16.8	19.1	20.0	21.4	21.8	21.8	21.7	20.6	18.2	11.8	9.7	7.2	3.6	10.3	21.8																							
11-Apr	2.0	1.1	0.7	1.0	-0.5	-1.3	-1.1	1.3	5.2	9.8	11.5	12.4	14.4	14.1	14.6	14.9	14.4	13.9	12.2	9.8	7.7	7.3	5.5	4.6	7.3	14.9																							
12-Apr	4.3	3.8	3.3	3.0	2.5	0.9	2.2	3.7	5.1	6.5	7.0	7.5	8.9	8.7	9.1	8.8	8.9	9.0	8.8	8.7	8.2	7.4	6.7	6.2	6.2	9.1																							
13-Apr	6.0	5.2	4.1	4.4	4.7	4.5	4.1	4.8	6.0	6.8	7.6	8.4	9.3	9.7	10.1	10.5	10.5	10.4	10.2	8.3	4.5	1.4	0.0	-1.1	6.3	10.5																							
14-Apr	-1.5	-1.8	-1.5	-1.4	-1.3	-1.1	0.5	1.8	3.7	6.2	7.5	8.8	9.7	12.9	12.2	11.2	10.0	7.0	6.0	5.4	4.8	4.0	3.3	3.0	4.6	12.9																							
15-Apr	2.7	2.3	1.0	-0.4	-1.3	-1.8	-0.9	1.2	5.1	8.0	9.3	9.9	10.4	11.2	11.4	12.0	12.6	12.6	12.9	11.7	10.0	10.7	9.8	8.4	7.0	12.9																							
16-Apr	8.1	6.7	6.8	6.2	5.5	5.0	5.4	6.9	7.8	8.9	10.7	11.7	12.3	12.6	12.4	11.7	11.7	12.0	8.6	7.7	6.7	5.4	3.8	3.3	8.2	12.6																							
17-Apr	1.8	1.3	0.4	-0.2	-0.8	-0.9	0.1	2.1	4.8	8.4	10.6	14.1	14.3	13.1	10.2	8.8	8.1	6.8	6.2	5.8	5.5	4.9	4.7	5.7	5.7	14.3																							
18-Apr	4.5	4.6	4.6	4.9	4.7	4.2	3.8	4.1	5.2	6.7	8.6	10.1	10.6	11.0	10.3	10.7	12.5	11.3	10.4	9.4	8.3	5.4	3.4	1.5	7.1	12.5																							
19-Apr	0.0	-0.3	-0.5	-0.9	-1.4	-1.4	-0.8	1.0	3.8	6.9	10.8	12.5	12.3	13.3	13.7	13.5	13.3	12.8	12.9	11.5	9.0	7.6	6.8	8.1	6.9	13.7																							
20-Apr	7.0	6.4	5.4	5.5	5.9	3.0	2.6	4.7	7.0	7.9	10.2	12.9	13.9	14.2	15.1	15.4	16.1	16.1	15.3	13.4	11.0	9.3	7.8	6.4	9.7	16.1																							
21-Apr	5.2	3.4	1.0	0.0	-0.7	-0.9	0.5	2.1	4.3	6.8	9.3	11.2	12.3	13.6	14.2	14.7	16.0	15.8	14.5	12.9	11.0	9.2	7.9	7.1	8.0	16.0																							
22-Apr	6.0	4.9	3.9	2.8	2.0	1.5	2.0	3.2	4.9	6.7	8.8	10.5	11.6	12.9	13.8	14.4	14.5	14.3	13.7	12.5	11.1	9.5	8.2	7.1	8.4	14.5																							
23-Apr	6.2	5.4	4.6	3.9	3.4	3.0	2.7	3.4	4.4	5.5	7.4	8.9	10.5	11.6	11.4	11.7	11.6	11.3	10.9	10.3	9.7	7.3	5.5	3.9	7.3	11.7																							
24-Apr	2.4	1.4	0.0	-0.8	-1.5	-2.2	-2.1	-1.7	-0.5	1.0	2.3	3.4	4.3	4.9	5.3	5.8	5.9	5.5	5.0	2.9	1.6	0.3	-0.6	-1.3	1.7	5.9																							
25-Apr	-2.2	-3.1	-3.8	-4.5	-5.0	-5.4	-4.9	-3.5	-2.0	-0.2	1.9	3.3	4.6	5.7	7.0	7.5	7.8	7.7	7.4	6.4	5.1	3.8	1.5	0.3	1.5	7.8																							
26-Apr	-0.7	-1.5	-2.1	-2.8	-3.5	-3.5	-2.6	-0.2	2.8	5.7	8.0	9.2	9.5	10.5	11.7	12.3	12.6	12.7	12.8	12.0	10.3	8.2	6.5	6.0	5.6	12.8																							
27-Apr	5.0	4.3	3.5	2.5	1.6	1.5	2.3	4.5	7.6	11.5	15.7	16.1	17.1	17.6	18.4	18.4	18.6	18.8	18.6	18.2	16.2	11.9	10.3	9.3	11.2	18.8																							
28-Apr	7.7	6.9	5.8	5.3	4.2	3.8	5.1	7.1	10.8	13.1	17.0	21.8	23.7	24.1	24.8	25.2	24.8	24.4	23.5	22.3	20.9	18.7	14.3	13.0	15.4	25.2																							
29-Apr	12.4	12.3	14.0	13.0	12.3	11.6	12.0	12.6	12.2	10.0	10.5	13.1	14.6	14.9	15.3	15.6	15.7	15.7	15.8	15.0	13.5	11.6	10.0	9.0	13.0	15.8																							
30-Apr	7.8	6.5	6.6	6.0	4.6	4.9	7.0	8.9	10.7	12.5	12.1	10.5	11.0	11.7	12.8	13.8	14.7	14.6	12.6	12.6	10.2	8.7	7.7	6.5	9.8	14.7																							
																								1.7	1.1	0.5	0.0	-0.6	-1.0	-0.6	0.8	2.6	4.6	6.6	8.2	9.2	10.0	10.4	10.6	10.8	10.5	9.8	8.6	6.7	5.1	3.7	2.7	Diurnal Average	
																								12.4	12.3	14.0	13.0	12.3	11.6	12.0	12.6	12.2	13.1	17.0	21.8	23.7	24.1	24.8	25.2	24.8	24.4	23.5	22.3	20.9	18.7	14.3	13.0	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	205	28.47	28.47
0 - 10	321	44.58	73.06
10 - 20	179	24.86	97.92
> 20	15	2.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Barometric Pressure (BP) - %**

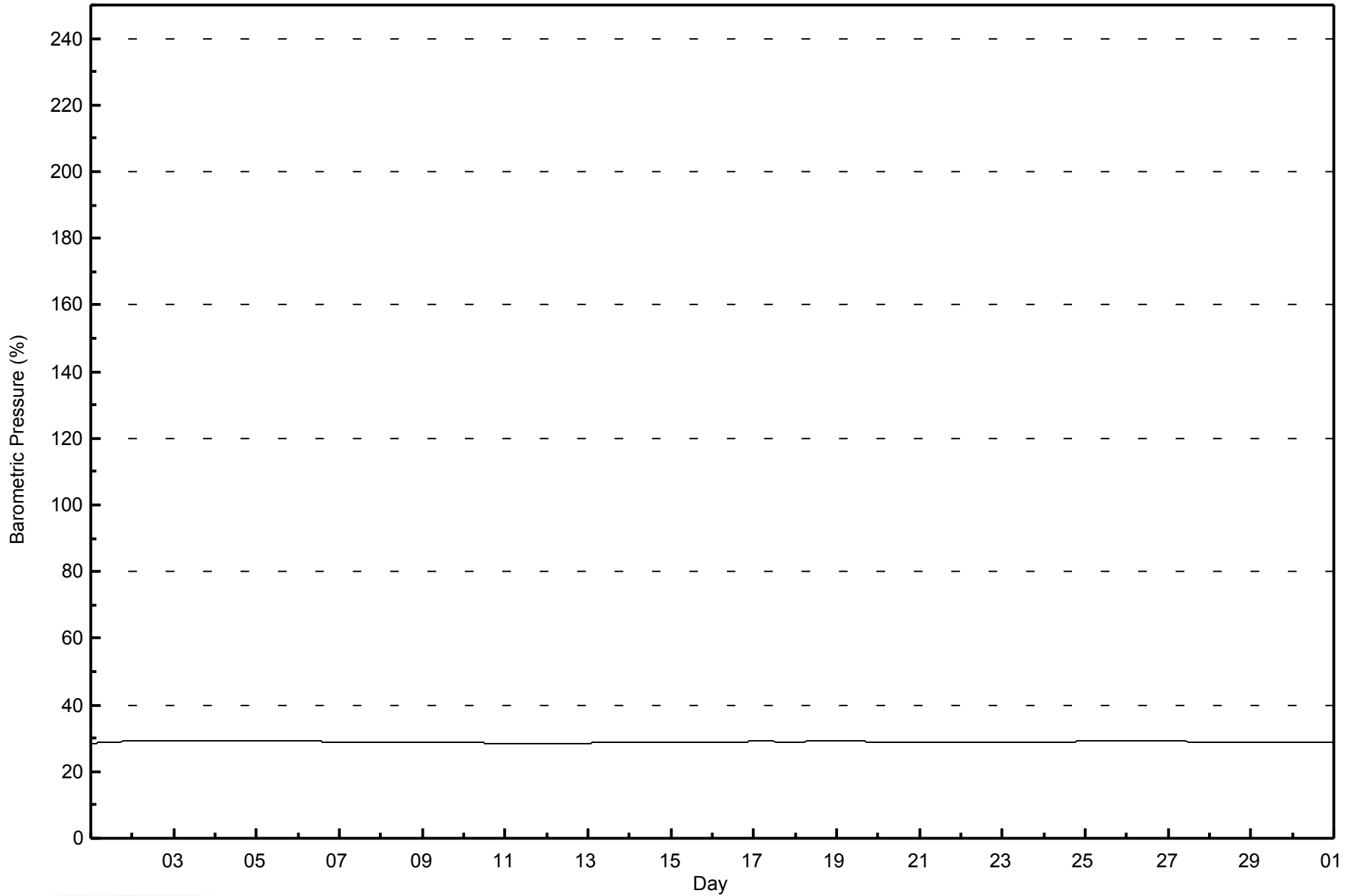
**Athabasca Valley - April 2015**

Maximum Value: 29.3 % on Apr 4 08:00		Maximum Daily Average: 29.3 % on Apr 4		Hours in Service: 720																																													
Minimum Value: 28.2 % on Apr 11 16:00		Minimum Daily Average: 28.3 % on Apr 11		Hours of Data: 720																																													
Maximum Diurnal Average: 29.0 % at hour 8		Minimum Diurnal Average: 28.9 % at hour 17		Hours of Missing Data: 0																																													
Monthly Average: 28.93 %		Percentiles: P <sub>1</sub> = 28.2 P <sub>10</sub> = 28.7 Q <sub>1</sub> = 28.8 Median = 28.9 Q <sub>3</sub> = 29.1 P <sub>90</sub> = 29.2 P <sub>99</sub> = 29.3		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-Apr	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	28.9	29.1																							
2-Apr	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.2	29.3																						
3-Apr	29.3	29.3	29.3	29.3	29.3	29.2	29.2	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	29.3	29.3	29.3	29.2	29.3																						
4-Apr	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3																						
5-Apr	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2																						
6-Apr	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	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.2																						
7-Apr	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																						
8-Apr	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																						
9-Apr	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	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9																						
10-Apr	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.5	28.5	28.5	28.5	28.4	28.4	28.4	28.4	28.4	28.3	28.3	28.6	28.8	28.8																						
11-Apr	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.4	28.3	28.4	28.4																						
12-Apr	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	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.6	28.5	28.6	28.6																						
13-Apr	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.7	28.9	28.9																						
14-Apr	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																						
15-Apr	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0																						
16-Apr	28.9	28.9	28.9	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	29.0	29.0	29.0	29.1	29.1	29.1	29.0	29.1	29.1																						
17-Apr	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.1																						
18-Apr	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.1	29.3	29.3																						
19-Apr	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	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	29.1	29.3																						
20-Apr	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																						
21-Apr	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9																						
22-Apr	28.9	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	29.0																						
23-Apr	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.8	28.9	28.9																						
24-Apr	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.0	29.1	29.1																						
25-Apr	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	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2																						
26-Apr	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2																						
27-Apr	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1																						
28-Apr	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	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	28.7	28.7	28.7	28.7	28.8	29.0																						
29-Apr	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8																						
30-Apr	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8																						
																								28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
																								29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3
																								Diurnal Average																									
																								Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

**Barometric Pressure (BP) - %**  
**Athabasca Valley - April 2015**



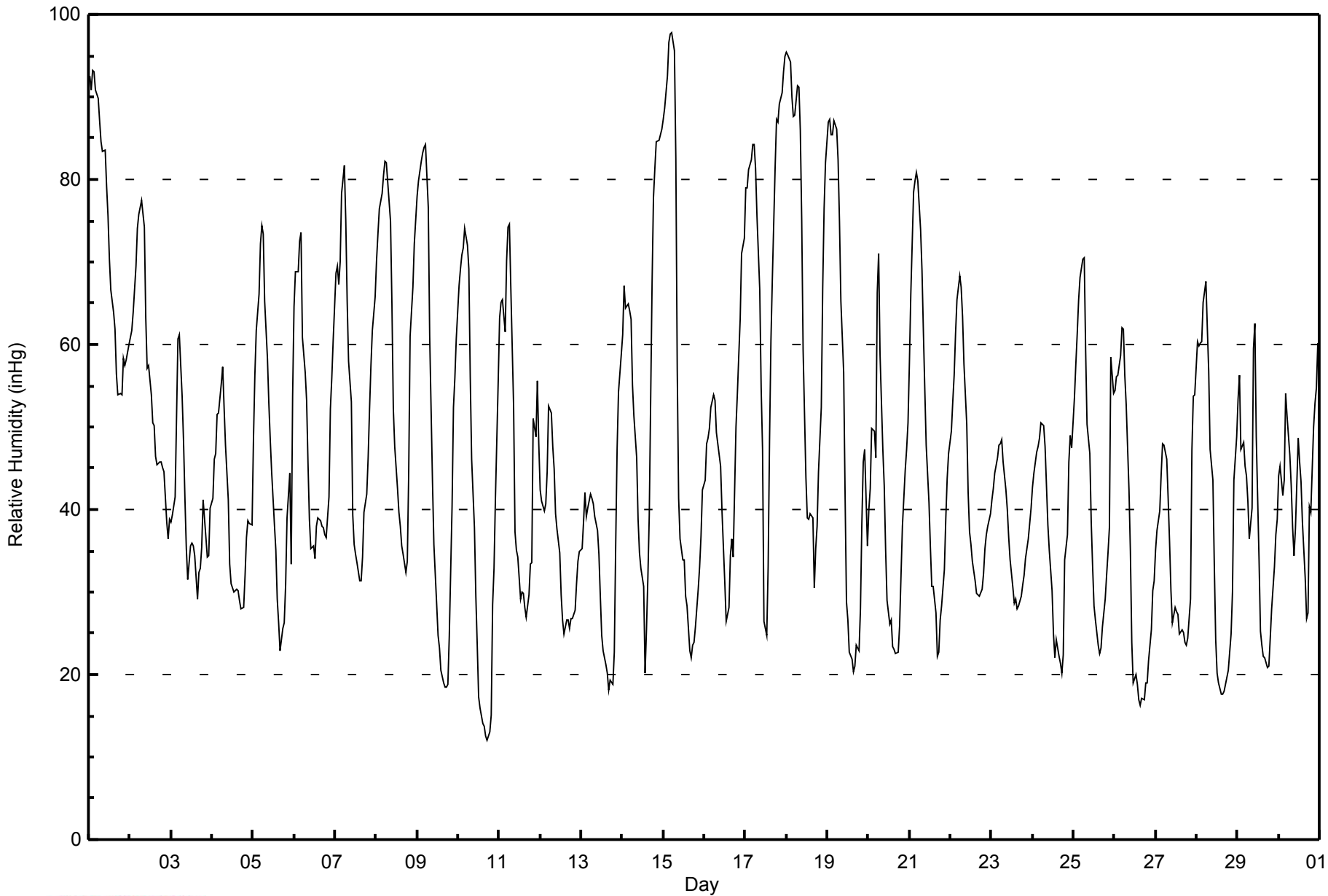


Maximum Value: 98 inHg on Apr 15 06:00																	Maximum Daily Average: 73.3 inHg on Apr 1																	Hours in Service: 720															
Minimum Value: 12 inHg on Apr 10 18:00																	Minimum Daily Average: 34.3 inHg on Apr 13																	Hours of Data: 720															
Maximum Diurnal Average: 67.8 inHg at hour 6																	Minimum Diurnal Average: 29.0 inHg at hour 17																	Hours of Missing Data: 0															
Monthly Average: 47.1 inHg																	Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 24 Q <sub>1</sub> = 32 Median = 43 Q <sub>3</sub> = 60 P <sub>90</sub> = 78 P <sub>99</sub> = 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-Apr	93	91	93	93	91	90	87	85	83	84	79	76	70	67	64	62	56	54	54	54	58	58	58	60	73.3	93																							
2-Apr	61	62	64	69	74	76	77	78	74	63	57	58	54	50	50	46	45	46	46	45	45	38	36	39	56.4	78																							
3-Apr	39	39	42	51	61	61	54	48	41	35	32	36	36	34	29	32	33	35	41	37	34	34	40	40.0	61																								
4-Apr	41	46	47	51	52	55	57	52	48	41	33	31	30	30	30	29	28	28	32	37	39	38	38	39.4	57																								
5-Apr	48	56	62	66	72	74	73	65	58	53	49	45	38	35	29	26	23	26	26	31	39	44	33	54	46.9	74																							
6-Apr	65	69	69	72	73	61	57	53	46	39	35	36	34	38	39	39	38	38	37	37	41	52	56	61	49.3	73																							
7-Apr	69	69	67	70	78	82	75	65	58	53	39	36	35	34	31	31	34	40	42	46	52	58	62	66	53.8	82																							
8-Apr	70	73	77	78	81	82	82	80	75	65	52	48	43	40	38	36	35	32	34	44	61	67	72	75	59.9	82																							
9-Apr	78	80	82	83	84	84	77	61	52	43	36	29	25	23	20	19	18	18	19	25	40	52	56	61	48.6	84																							
10-Apr	67	69	71	72	74	72	69	56	46	38	29	24	17	16	14	14	13	12	13	15	29	33	41	56	40.0	74																							
11-Apr	63	65	65	62	70	74	75	67	53	37	35	34	29	30	30	28	27	30	33	34	51	49	56	48	47.7	75																							
12-Apr	42	41	40	41	45	53	52	48	45	39	38	35	30	27	25	27	27	26	27	27	28	31	34	35	35.8	53																							
13-Apr	35	38	42	39	40	42	41	41	39	37	35	30	25	23	21	20	18	19	19	23	36	47	54	59	34.3	59																							
14-Apr	61	67	64	65	64	63	55	51	46	39	35	33	31	20	25	32	39	67	78	81	85	85	86	86	56.6	86																							
15-Apr	87	89	93	97	98	98	96	82	57	41	36	34	34	30	28	23	22	24	24	26	30	33	37	42	52.5	98																							
16-Apr	44	48	49	50	52	54	53	49	48	45	40	35	31	26	28	34	36	34	50	54	59	63	71	73	47.0	73																							
17-Apr	79	79	81	82	84	84	81	76	67	55	47	26	25	33	48	61	68	82	87	87	89	90	93	95	70.9	95																							
18-Apr	95	95	94	90	88	88	91	91	86	75	59	44	39	39	39	39	31	35	38	45	52	67	76	82	65.8	95																							
19-Apr	87	87	85	85	87	86	82	75	65	57	42	29	27	23	22	20	21	24	23	28	38	46	47	36	50.9	87																							
20-Apr	40	43	50	50	46	66	71	59	47	43	35	29	26	27	23	23	23	23	26	32	38	45	47	50	40.1	71																							
21-Apr	58	66	78	80	81	80	74	69	61	55	48	41	35	31	31	27	22	23	27	28	33	39	44	47	49.0	81																							
22-Apr	50	53	56	61	65	68	67	63	58	50	42	37	36	34	31	30	30	29	30	32	35	37	38	40	44.7	68																							
23-Apr	41	43	44	46	48	48	48	46	42	40	37	34	30	29	28	28	30	31	32	34	36	38	40	40	37.6	48																							
24-Apr	43	44	47	48	49	50	50	48	43	38	35	30	25	22	24	22	21	20	22	34	37	46	49	47	37.3	50																							
25-Apr	54	58	61	65	68	70	70	59	50	47	39	33	28	27	23	23	23	26	29	32	35	38	58	54	44.7	70																							
26-Apr	54	56	56	59	62	62	56	53	42	35	24	19	20	19	17	16	17	17	19	19	22	25	30	31	34.6	62																							
27-Apr	35	37	40	44	48	48	46	41	36	30	26	28	28	27	25	25	25	24	23	24	29	47	54	54	35.3	54																							
28-Apr	60	60	60	60	65	68	62	57	47	44	33	24	20	19	18	18	18	19	21	23	25	30	44	49	39.3	68																							
29-Apr	53	56	47	48	45	44	41	36	40	60	62	49	34	25	24	22	22	21	21	24	28	33	37	39	38.0	62																							
30-Apr	44	45	42	44	54	51	47	43	38	34	38	49	46	43	39	32	27	28	40	40	50	53	55	60	43.3	60																							
																								58.6	60.9	62.3	64.1	66.6	67.8	65.6	59.9	53.1	47.2	40.9	36.3	32.7	30.7	30.1	29.4	29.0	30.8	33.4	36.5	42.4	47.2	51.2	53.9	Diurnal Average	
																								95	95	94	97	98	98	96	91	86	84	79	76	70	67	64	62	68	82	87	87	89	90	93	95	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - inHg**  
**Athabasca Valley - April 2015**







Maximum Speed: 36 km/h on Apr 11 20:00	Maximum Daily Speed Average: 20.3 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 8 22:00	Minimum Daily Speed Average: 2.1 km/h on Apr 19	Hours of Data: 720
Maximum Diurnal Speed Average: 7.8 km/h at hour 14	Minimum Diurnal Speed Average: 0.1 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 1.7 km/h 283.0 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 10 Q <sub>3</sub> = 14 P <sub>90</sub> = 20 P <sub>99</sub> = 30	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	N11	N13	N12	N16	NNW19	NNW22	NNW29	NNW32	NNW31	NNW29	NNW27	NNW26	NNW27	NNW30	NNW27	NNW27	NNW27	NNW24	NNW20	N14	N10	N7	N6	NNE3	NNW20.3	NNW32
2-Apr	NNW3	NNW7	NNW11	NW8	N7	NNW8	NNW9	NNW7	NNW8	NNW8	NNW9	NNW11	NNW10	NNW12	NNW14	NNW14	NNW15	NNW11	N9	N6	NNE7	NNE6	NNE7	NNE6	NNW8.6	NNW15
3-Apr	ENE8	NE7	ENE5	NE7	NE5	E7	E8	E5	N5	NW6	NNW9	NNW14	NNW15	NNW15	NNW16	N13	N11	NNE10	N10	N9	NNE8	N7	N6	NNW7	N7.4	NNW16
4-Apr	E3	ENE2	NNE4	ENE5	NE5	NE6	ENE5	ENE3	NW4	NW5	NW9	NW14	NW12	NNW12	N14	N13	N9	ENE7	NNE7	NNE7	N8	N11	N8	NNE5	N6.0	N14
5-Apr	ENE2	NNE3	NNE2	NW2	NNE1	WSW4	NW3	N9	N13	NNW15	NNW15	NNW14	NNW15	NNW16	NNW14	NNW13	N9	NNW9	N6	N6	NNW5	NNE3	SE6	WSW2	NNW6.9	NNW16
6-Apr	WSW2	NE2	NW2	NW3	W3	SE5	SSE7	SE10	SE10	SE10	SSE7	N2	NW4	SW8	SSE7	SE9	SE10	SE9	SSE10	SSE10	SE8	SSE1	E3	E4	SE4.4	SE10
7-Apr	SE5	SSE5	SSE7	SSE6	S3	S3	SE6	SE9	SE9	NE2	SSW11	SSW13	SSW12	SSW13	S11	SSW8	S11	SW15	S13	SSE10	SSE7	SE7	SSE7	SE9	S7.3	SW15
8-Apr	SE10	SE9	SE8	SE8	SE9	SE10	SE11	SE9	SE8	SE4	NE5	N12	N12	N13	N12	N12	N9	N4	NE5	NW4	SW2	NW0	SSW1	W1	ENE2.5	N13
9-Apr	SSW3	S2	SSW3	SSW1	SSW3	SSW3	SSE4	SE10	SE12	SE11	SE9	SSW3	WSW14	SW16	SW16	SW16	WSW15	WSW13	WSW9	SSW3	ENE2	ESE1	S2	S1	SSW5.1	SW16
10-Apr	S1	S2	S2	S2	SSE2	SSE2	SSE4	SE6	SE8	SE7	ESE6	E7	ENE4	WSW8	SSW6	SSW11	S13	S11	SSE11	SSE8	SSE4	S3	SSE6	SW3	SSE4.7	S13
11-Apr	SSW2	SW5	S2	SSW5	SW2	SW2	WSW1	S1	SE1	ENE4	W13	W14	W14	W21	W19	W16	W22	W25	W32	W36	W23	WSW8	WSW9	WSW17	W11.3	W36
12-Apr	WSW17	WSW20	WSW22	WSW23	WSW13	SE3	ESE5	SW11	WSW16	W22	WSW19	W27	WSW25	W35	W29	W28	WSW23	W28	W21	W18	W18	W14	WSW14	WSW17	W18.5	W35
13-Apr	WSW20	W14	WSW11	WSW18	W18	W20	W19	NNW25	NNW29	NNW33	NNW31	NW31	NNW26	NW25	NW21	NW19	NW20	NW16	NW11	NNW2	SSW1	ESE1	ESE1	S2	NNW15.5	NNW33
14-Apr	WSW0	NNW2	SE3	ESE3	SE6	SE8	SE13	SE11	SE9	SE11	SE12	SSE6	NW2	SSE11	SE15	ESE12	SE18	SE17	SE12	SE12	SE11	SE13	SE12	SE12	SE9.2	SE18
15-Apr	SSE10	SSE6	SSW3	SW6	SW4	S4	S3	SSW4	SW11	SSW7	W18	W23	W22	W24	W22	W21	W17	WSW16	SW10	S4	SSW5	W17	W9	W13	WSW9.8	W24
16-Apr	WSW12	WSW12	WSW17	W15	WSW14	WSW18	SSW7	SSW8	SW11	SW12	WSW10	SW16	WSW19	W30	W25	WSW25	WSW18	W18	NNW19	NW19	WSW8	NNW5	SSW2	SW5	WSW12.5	W30
17-Apr	SSE4	SE8	SSE7	SSE6	SSE4	SSE6	SE8	SE10	SE8	E5	NNE4	SW9	SW16	SW20	SW25	S14	SSE12	SSE11	ESE11	SE12	SSE10	SE6	N2	SW5	S6.7	SW25
18-Apr	WSW5	NW6	NW11	NW18	NW21	NW23	NNW20	NNW19	NNW16	NNW19	NNW22	NNW21	NNW24	NNW21	NNW20	NNW9	N14	NNW16	WNW7	E1	E6	W4	W4	SSW1	NNW12.4	NNW24
19-Apr	E2	SE2	SE4	SE4	SE5	SE5	SE7	SE8	SE7	E6	SE3	ESE1	WSW5	SW13	WSW13	W11	NW13	NW9	NNE2	S1	SE2	NNW0	SSE4	SSE9	S2.1	SW13
20-Apr	SE10	SE7	SE4	S5	SW7	NNW3	NE1	ESE5	WNW1	NNW4	NW3	WNW4	NNW14	NNW15	NNW12	NNW11	N6	NNE7	N6	N7	N9	N10	N11	N7	N4.1	NNW15
21-Apr	N8	N5	ENE1	ESE3	E3	E4	ENE3	N6	N7	NNW11	NNW13	NNW14	NNW16	NNW16	NNW16	NNW18	ENE10	E15	E19	E17	E14	ESE12	ESE9	ESE9	NE6.1	E19
22-Apr	SE6	SE8	SE9	SE9	SE10	SE9	SE13	ESE15	ESE15	ESE17	SE19	ESE19	ESE20	ESE21	ESE22	ESE23	ESE22	ESE21	ESE18	ESE18	ESE19	ESE19	ESE19	ESE16	ESE15.8	ESE23
23-Apr	ESE16	SE14	ESE14	ESE12	ESE13	ESE11	ESE14	ESE13	ESE14	ESE14	ESE16	ESE19	ESE17	SE16	SE16	ESE15	ESE12	E12	E12	ENE13	E24	E18	E13	ESE14.4	E24	
24-Apr	ENE10	NE11	NE11	NE11	NE9	NE9	ENE12	ENE12	NE11	ENE12	NNE9	NNE12	NE13	NE14	NNE15	NNE14	NE14	NE14	NNE12	N18	N17	N18	NNW13	N11	NNE11.5	N18
25-Apr	NNW12	NNW14	NNW12	NNW12	NNW13	NNW12	NNW9	NNW8	NNW13	NNW13	NNW13	NNW7	NNW9	W5	NW6	WNW7	NW12	NW13	NNW13	NNW8	N6	ENE3	ESE6	NNW8.9	NNW14	
26-Apr	SE6	SE5	SSE4	SE5	SSE4	SE5	SE8	E6	ENE4	NNE4	W2	SSW5	NNW3	NNW4	ENE3	ESE6	NE5	ENE8	E7	ESE6	SE8	SE9	SE10	SE14	ESE4.1	SE14
27-Apr	SSE10	SSE8	SSE8	SSE8	SSE7	SE14	SE13	SSE12	SSE11	SE9	S8	SW18	SW14	SW16	SW19	SW19	SW18	WSW16	WSW13	WSW9	SSW4	N1	ENE2	SSE4	SSW7.9	SW19
28-Apr	SSE3	SSW4	S5	SSE5	SSE5	SSE6	SE9	ESE6	E4	NW2	NNW2	SSW10	SSE13	SSE18	SSE18	S17	SSE17	SSE12	SE8	SE12	SE12	SSE7	S3	S3	SSE7.5	SSE18
29-Apr	SSW4	SW2	WSW9	WSW11	WSW11	WSW12	WNW7	SSW3	W7	SW5	SSW8	SSW7	W13	W21	W21	W20	W15	W13	WSW9	WSW9	SW7	SW11	SW11	SW13	WSW9.5	W21
30-Apr	SW13	SW11	WSW21	SW11	ESE3	SSE3	SW15	SW16	SW16	SW19	WSW23	W26	W21	SW19	WSW11	W16	W24	W19	N15	N3	SE1	S6	ESE4	SSE5	WSW10.7	W26

S1.9	SSW1.0	SW1.6	SW2.1	WSW1.1	S0.5	ESE1.8	ESE1.7	N0.1	NNW1.7	NNW3.8	NNW6.4	NNW6.8	NNW7.8	NNW6.5	NNW5.1	NNW3.4	NNW3.5	NNW1.9	NNW0.8	E0.9	ENE0.9	ESE1.5	S2.0	Diurnal Average	
WSW20	WSW20	WSW22	WSW23	NW21	NW23	NNW29	NNW32	NNW31	NNW33	NNW31	NNW27	W35	W29	W28	NNW27	W28	W32	W36	W23	E24	ESE19	WSW17	Diurnal Maximum		

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



**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

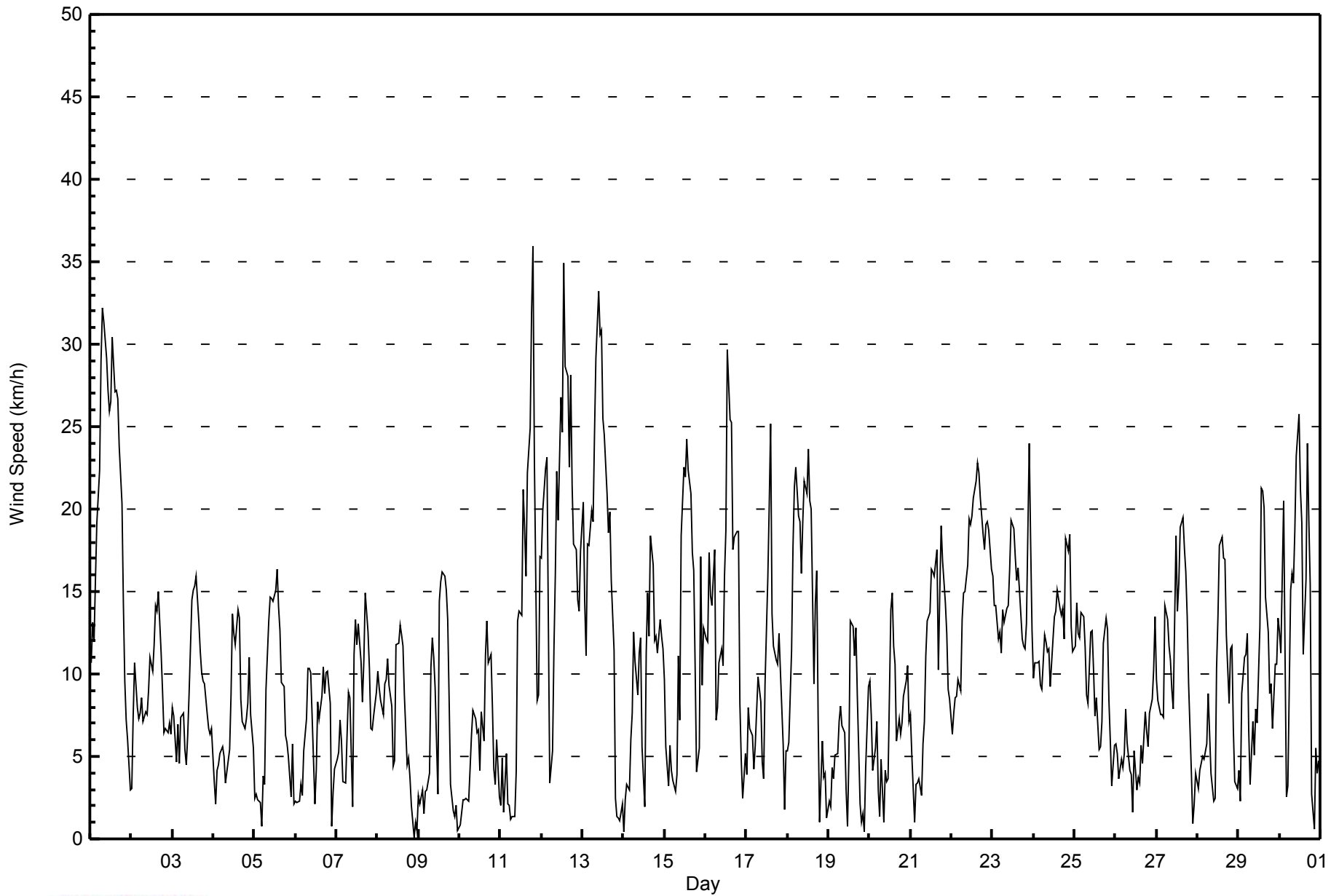
**Wind Speed (WS) - km/h**  
**Athabasca Valley - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 13 km/h on Apr 18 15:00														Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Apr 9 01:00																									
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 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-Apr	3	3	3	4	4	5	6	7	7	6	5	5	5	6	6	6	5	5	5	4	3	2	2	1	7
2-Apr	1	2	2	1	2	1	2	2	2	2	3	2	3	3	2	3	3	3	3	2	2	3	2	1	3
3-Apr	1	2	2	1	1	2	2	1	1	2	4	3	3	4	4	3	3	3	2	2	2	2	2	4	
4-Apr	2	2	1	1	1	1	1	1	1	2	3	3	3	3	3	3	3	3	2	2	2	3	2	2	3
5-Apr	1	1	1	1	1	1	1	2	3	2	2	3	3	3	3	3	3	2	1	1	2	2	2	1	3
6-Apr	1	1	1	1	1	2	2	2	2	2	3	1	2	4	3	3	3	3	3	2	3	2	1	1	4
7-Apr	1	2	2	3	1	1	3	1	2	1	4	4	4	5	4	3	3	4	3	2	2	2	2	1	5
8-Apr	1	1	2	2	3	2	2	2	2	2	2	3	3	3	3	2	2	3	1	1	1	1	2	1	3
9-Apr	1	1	1	1	1	1	2	3	3	2	3	2	4	3	4	4	4	3	2	2	1	1	1	1	4
10-Apr	1	1	1	1	2	1	2	2	2	1	1	1	2	3	4	5	5	3	3	2	2	3	2	1	5
11-Apr	1	2	1	2	1	2	1	1	1	1	7	4	9	5	6	5	5	6	9	8	11	2	4	3	11
12-Apr	3	3	3	4	7	1	2	3	6	5	7	7	7	8	8	8	7	9	8	5	5	5	2	3	9
13-Apr	4	3	4	3	4	4	4	5	8	7	7	6	7	6	5	6	5	5	4	2	1	2	1	1	8
14-Apr	1	1	2	2	2	2	3	2	3	3	3	2	2	5	5	5	6	4	4	3	3	4	3	3	6
15-Apr	2	2	3	3	3	1	2	3	3	3	5	5	6	6	6	6	5	5	2	1	3	5	3	5	6
16-Apr	3	3	4	4	3	5	3	3	2	3	3	4	6	8	7	9	7	6	6	7	4	3	2	2	9
17-Apr	2	2	3	1	2	2	2	2	2	1	1	7	5	7	7	4	3	3	3	3	4	3	1	2	7
18-Apr	3	1	6	3	4	4	4	5	4	5	5	7	6	6	13	11	5	5	7	2	3	1	1	2	13
19-Apr	1	2	1	1	1	1	2	1	2	1	2	3	4	5	5	4	4	3	2	2	1	1	2	1	5
20-Apr	2	2	1	3	3	1	1	1	1	1	1	2	4	3	3	2	3	3	2	1	2	2	2	2	4
21-Apr	2	2	1	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	3	4	4	3	3	4
22-Apr	3	3	2	2	2	2	4	4	4	4	6	6	6	6	7	6	6	6	5	6	6	5	5	5	7
23-Apr	5	4	4	4	4	4	4	4	4	4	4	6	5	5	4	5	4	3	3	2	5	6	6	4	6
24-Apr	3	3	2	2	2	3	3	3	3	5	4	5	5	5	6	5	5	4	4	4	4	4	4	3	6
25-Apr	3	2	3	2	2	2	2	2	2	3	3	4	3	3	2	3	4	4	3	2	2	2	1	2	4
26-Apr	1	1	1	1	2	1	2	1	1	2	3	2	3	2	2	3	3	3	1	2	2	2	2	3	3
27-Apr	3	2	2	3	3	3	3	3	2	3	6	5	4	4	5	5	5	5	4	2	2	1	1	1	6
28-Apr	2	1	1	1	2	2	3	2	2	1	2	5	5	5	5	5	5	4	3	2	2	3	2	2	5
29-Apr	2	2	2	2	2	4	4	2	5	3	3	3	8	4	4	5	4	5	2	4	2	3	2	4	8
30-Apr	2	2	5	6	1	3	5	3	3	4	6	8	6	8	9	6	8	6	5	3	2	3	2	2	9
Diurnal Maximum																									
5 4 6 6 7 5 6 7 8 7 7 8 9 8 13 11 8 9 9 8 11 6 6 5																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	186	25.83	25.83
6 - 11	241	33.47	59.31
12 - 19	217	30.14	89.44
20 - 28	62	8.61	98.06
29 - 38	14	1.94	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - April 2015**

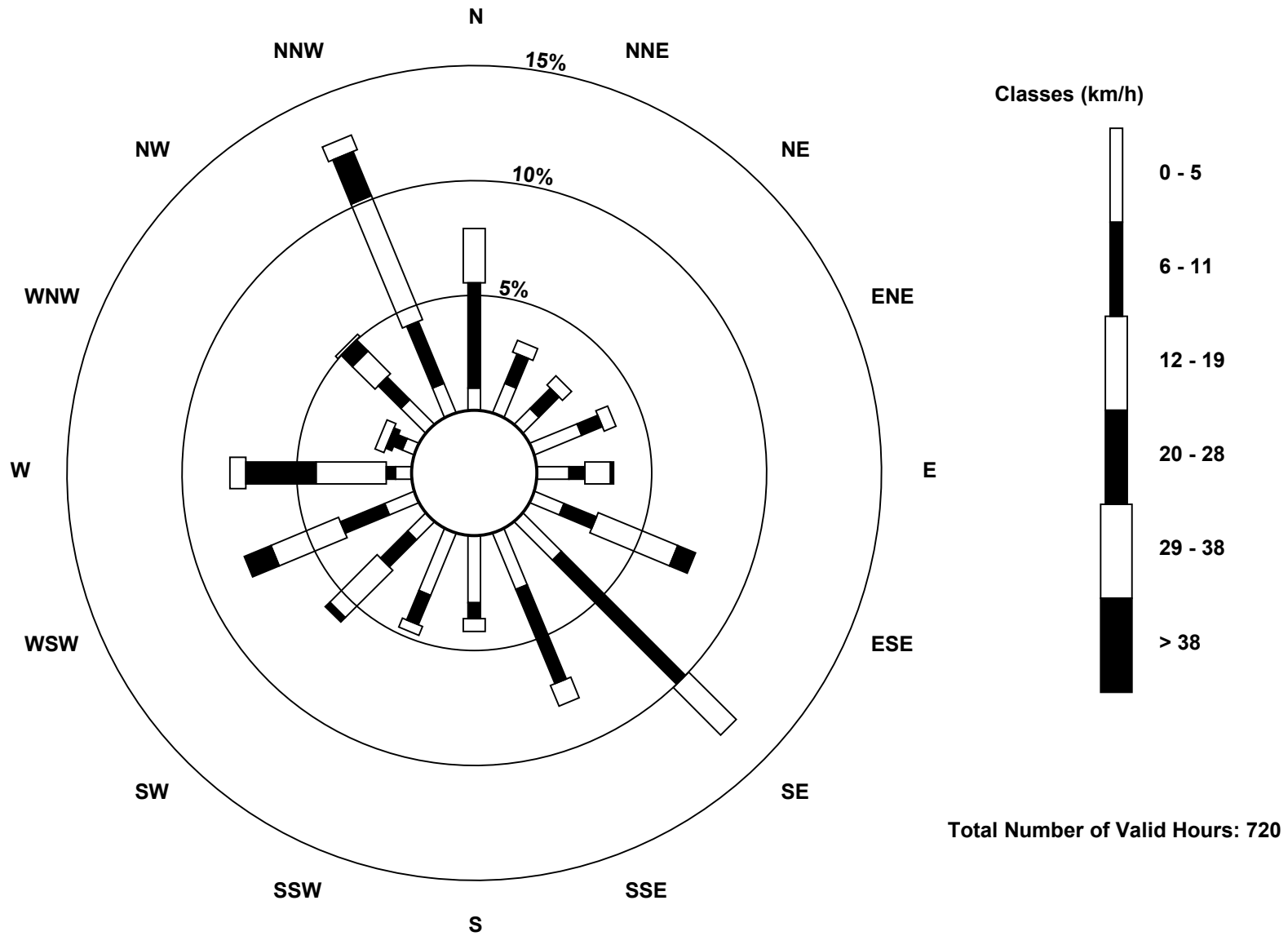
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	10	7	16	10	10	17	19	21	21	8	10	5	4	11	10	186
6 - 11	33	10	9	7	5	11	55	32	5	10	12	15	3	3	10	21	241
12 - 19	17	4	4	4	8	27	21	7	4	3	21	23	22	0	10	42	217
20 - 28	0	0	0	0	1	6	0	0	0	0	2	9	22	2	5	15	62
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	5	3	1	5	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	24	20	27	24	54	93	58	30	34	43	57	57	12	37	93	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
Athabasca Valley (AMS 7)**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Athabasca Valley - April 2015**

Direction of Maximum Speed: 270 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 347.4 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 326 deg on Apr 8 22:00	Direction of Minimum Daily Speed Average: 2.1 deg on Apr 19
Direction of Minimum Speed: 326 deg on Apr 8 22:00	Hours of Missing Data: 0
Monthly Average Direction: 284.1 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-Apr	355	6	1	354	347	346	345	345	345	344	345	343	343	344	346	345	342	342	348	359	355	4	359	20	347.4
2-Apr	338	347	334	323	352	336	341	345	339	335	335	344	333	343	343	345	341	345	2	9	23	20	18	22	346.9
3-Apr	70	50	58	37	56	79	79	82	353	323	330	336	338	341	346	357	1	15	3	356	20	6	7	336	6.4
4-Apr	86	71	29	73	50	40	72	61	317	315	315	320	318	338	349	350	9	57	31	13	9	349	359	24	0.6
5-Apr	67	21	21	324	23	255	307	349	351	343	338	337	341	336	337	346	355	344	8	2	344	26	124	237	345.1
6-Apr	249	35	322	309	273	143	147	137	133	136	149	9	307	223	163	138	133	139	151	156	145	165	84	95	146.2
7-Apr	137	151	149	150	183	182	145	138	131	54	196	213	201	209	185	194	187	218	174	150	152	139	151	143	173.9
8-Apr	143	140	139	143	138	139	139	135	133	131	52	349	349	1	358	358	8	4	52	322	214	326	210	259	75.4
9-Apr	193	186	207	201	213	198	156	143	135	132	127	213	241	227	227	235	238	242	243	205	68	107	184	176	206.0
10-Apr	173	186	174	177	167	157	147	138	140	130	113	79	76	244	201	193	171	173	168	153	165	170	147	236	161.2
11-Apr	210	225	176	213	220	217	243	188	137	76	268	273	276	273	275	281	277	278	272	270	279	246	243	252	267.7
12-Apr	248	250	249	249	241	130	108	217	255	260	258	275	250	273	267	268	258	278	272	272	266	266	254	250	259.8
13-Apr	253	270	254	249	266	274	263	283	295	293	297	304	303	316	324	316	317	321	326	331	211	122	117	179	292.0
14-Apr	239	292	140	115	129	128	140	134	137	124	131	164	308	148	133	115	143	137	131	138	138	131	135	139	135.4
15-Apr	151	159	194	222	220	189	187	208	220	198	263	276	272	265	278	271	270	251	228	181	209	276	278	261	253.3
16-Apr	248	239	249	261	255	240	211	201	219	229	238	233	257	269	270	248	245	270	345	316	258	302	213	236	256.4
17-Apr	159	143	151	155	152	150	135	131	130	97	18	221	214	222	229	178	161	151	121	130	151	141	4	230	170.4
18-Apr	241	315	312	309	310	322	334	341	331	328	331	331	336	339	333	335	6	337	302	84	98	280	266	194	328.3
19-Apr	99	142	143	144	137	146	136	131	125	81	141	123	241	223	240	259	311	313	32	187	142	332	151	149	183.1
20-Apr	131	143	125	191	236	337	43	102	300	327	309	287	342	342	345	341	353	16	359	350	352	354	353	1	350.8
21-Apr	357	350	75	105	91	82	74	5	357	345	344	339	338	341	342	342	60	82	85	89	98	102	108	120	33.8
22-Apr	146	135	132	140	130	131	129	122	112	114	124	119	111	105	105	107	107	117	120	123	120	121	122	121	118.4
23-Apr	122	125	121	120	116	120	112	115	110	106	102	113	120	115	136	126	117	105	96	93	78	81	97	90	109.7
24-Apr	58	41	35	38	36	52	61	60	54	66	24	22	40	45	12	25	34	52	24	353	354	349	347	9	28.7
25-Apr	340	336	339	324	338	343	340	336	341	336	330	327	323	305	274	307	299	304	318	328	341	357	65	123	330.3
26-Apr	131	130	158	141	147	130	131	89	65	32	259	212	342	328	74	103	46	74	85	114	132	132	127	141	116.4
27-Apr	157	155	148	152	148	143	144	149	156	136	191	234	233	231	229	228	228	249	252	240	213	3	77	159	199.9
28-Apr	162	208	178	159	163	153	132	102	99	318	347	199	161	153	154	170	167	164	143	140	142	159	180	188	157.6
29-Apr	197	222	258	240	243	249	291	212	271	214	213	212	266	277	279	280	267	262	245	255	229	225	216	230	252.3
30-Apr	232	227	243	226	106	147	223	228	215	223	254	262	267	236	256	267	264	279	358	351	126	189	108	162	246.4

180.6	199.7	228.6	235.7	249.0	184.1	120.4	114.2	8.7	328.8	298.6	293.1	295.4	286.6	288.5	287.7	283.7	290.1	338.2	334.8	99.1	64.0	115.7	172.0
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**  
**Athabasca Valley - April 2015**

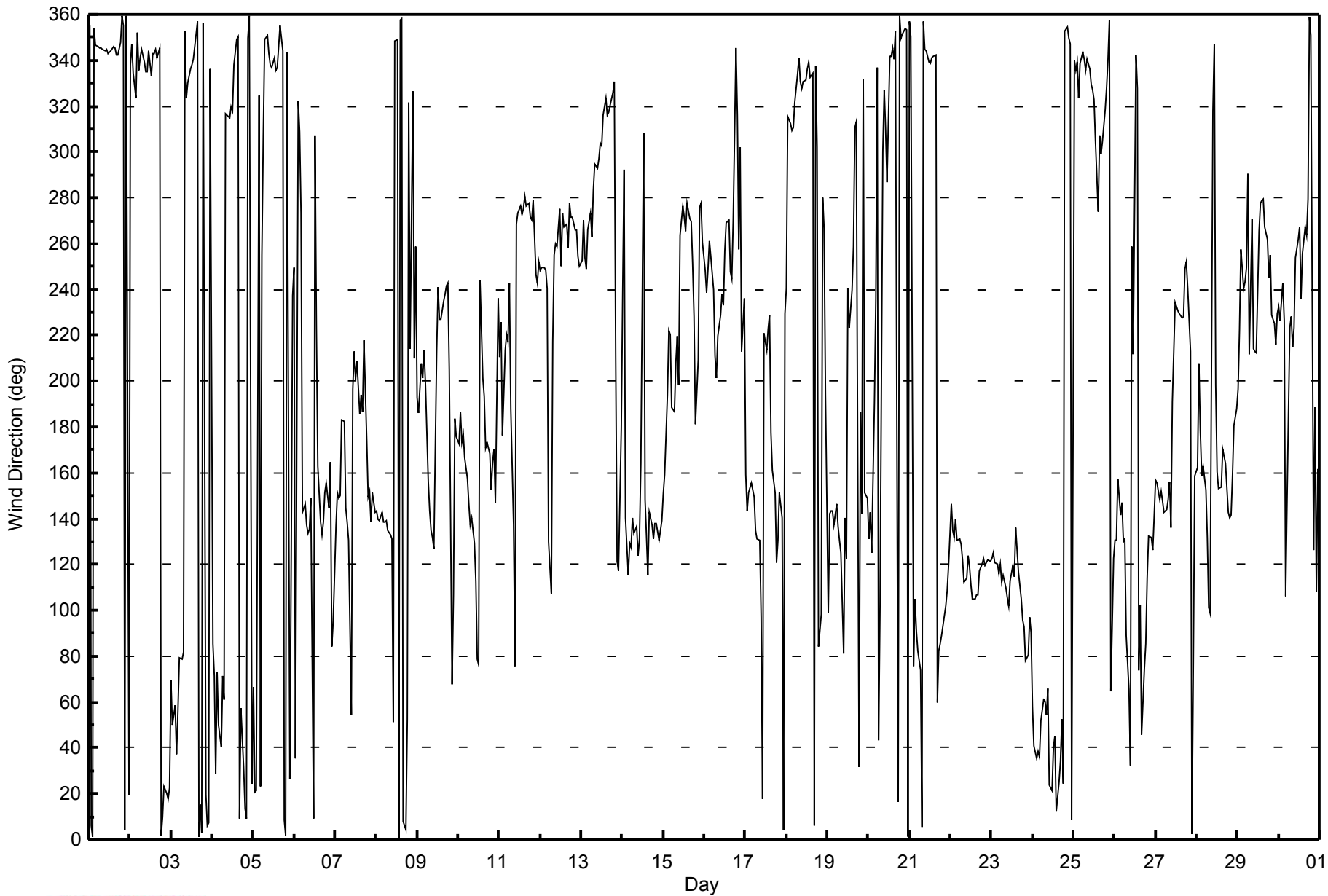
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Apr 19 12:00																			Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: 8 deg on Apr 21 11:00																									
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 20 Q <sub>3</sub> = 34 P <sub>90</sub> = 59 P <sub>99</sub> = 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-Apr	20	15	20	19	14	14	15	13	14	13	14	12	13	14	15	16	12	13	17	18	19	17	20	43	
2-Apr	33	15	11	11	16	14	12	17	15	19	20	18	16	16	12	14	11	12	25	18	23	37	21	23	37
3-Apr	16	20	33	13	27	13	13	21	46	22	32	16	13	15	18	26	26	19	19	15	22	19	23	19	46
4-Apr	59	72	29	26	20	21	24	52	20	36	23	18	21	17	17	18	31	30	20	12	19	16	16	26	72
5-Apr	37	32	35	50	78	26	34	16	16	11	12	14	16	11	16	21	31	16	19	12	27	71	25	64	78
6-Apr	33	42	35	19	32	31	16	13	13	19	30	77	68	44	43	36	19	30	24	17	18	91	50	20	91
7-Apr	12	24	15	17	29	33	34	11	14	78	34	26	36	30	31	41	32	17	20	16	24	15	9	10	78
8-Apr	9	10	13	15	15	12	12	13	15	67	51	13	14	19	18	19	22	40	32	27	69	98	87	78	98
9-Apr	25	33	28	74	40	41	48	16	14	12	22	81	15	15	14	15	15	14	14	61	48	86	46	70	86
10-Apr	82	48	48	37	35	37	27	19	16	16	27	13	68	36	58	35	28	20	15	14	51	53	25	55	82
11-Apr	50	37	66	25	78	87	81	82	75	54	48	22	36	15	17	21	13	13	10	12	21	25	23	10	87
12-Apr	11	10	10	10	52	47	50	20	22	18	28	18	18	11	14	15	19	14	15	13	14	26	14	11	52
13-Apr	11	27	35	13	12	11	12	14	16	15	16	17	17	20	17	27	15	14	23	59	71	82	83	61	83
14-Apr	92	38	55	59	29	25	15	16	23	20	16	38	73	38	22	22	22	14	16	15	14	16	15	13	92
15-Apr	16	32	69	39	59	39	59	64	19	38	20	21	18	17	19	21	22	19	14	35	35	19	19	16	69
16-Apr	12	11	11	16	17	12	34	32	14	16	17	19	21	16	19	15	15	16	15	22	25	67	70	30	70
17-Apr	52	16	26	14	44	16	11	10	15	38	49	79	25	25	17	26	19	21	17	14	31	50	35	30	79
18-Apr	28	29	21	9	9	11	13	11	16	15	14	20	14	20	37	54	23	18	87	92	52	52	39	75	92
19-Apr	40	67	28	38	22	14	10	10	18	14	68	103	75	25	27	31	24	21	77	83	71	93	30	10	103
20-Apr	18	13	46	41	29	31	63	28	86	12	22	28	20	11	17	14	66	37	19	11	12	14	16	18	86
21-Apr	18	18	75	32	14	16	43	20	19	11	8	10	11	13	12	14	44	18	11	10	18	18	21	22	75
22-Apr	32	24	21	18	16	17	17	20	22	20	21	23	21	23	21	21	20	19	18	18	18	18	18	18	32
23-Apr	19	18	18	19	21	21	20	23	22	25	22	24	22	22	22	21	20	20	16	15	12	12	21	23	25
24-Apr	21	19	14	15	15	21	23	22	28	35	52	43	33	36	39	38	33	23	30	18	19	17	17	18	52
25-Apr	15	11	13	12	11	12	11	14	20	13	15	34	42	28	44	56	52	21	14	10	14	18	45	21	56
26-Apr	14	15	21	20	26	12	13	26	37	44	93	56	71	58	75	61	70	21	24	22	14	13	15	14	93
27-Apr	17	18	20	27	34	11	12	15	22	21	63	15	21	16	16	19	17	21	14	13	34	83	84	34	84
28-Apr	44	20	15	18	24	37	22	23	82	55	42	41	32	20	19	21	17	17	17	12	13	49	58	71	82
29-Apr	45	92	16	10	11	12	52	72	43	55	29	53	86	18	15	14	20	19	14	19	18	13	19	16	92
30-Apr	10	13	11	41	77	72	24	12	11	21	18	17	18	20	50	22	19	33	20	90	101	42	57	60	101
																			92 92 75 74 78 87 81 82 86 78 93 103 86 58 75 61 70 40 87 92 101 98 87 78						
Diurnal Maximum																									





**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Athabasca Valley - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 13, 2015	Last Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:45
Gas Cert Reference	S970259A	Station temp.	18 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	9/26/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-681	-681
Analyzer IP address	192.168.1.103		Lamp voltage	817	817
Calculated slope	1.000207	1.005148	Chamber temp	43.6	43.6
Calculated intercept	0.945259	0.569282	Pressure	710.1	705.9
Analyzer Background	10.5	10.5	Flow	0.553	0.551
Analyzer Coefficient	0.829	0.829	Intensity	48500	48500

Analyzer make Thermo 43C Analyzer serial # 6074175781

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	60.7	607.0	603.7	1.005
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	60.7	607.0	603.7	1.005
second point	5000	30.4	304.0	301.5	1.008
third point	5000	15.2	152.0	149.9	1.014
as left zero	5000	0.0	0.0	0.7	----
as left span	5000	60.7	607.0	608.7	0.997
Average Correction Factor					1.009

Corrected As found 603.5 Previous response 605.9 % change 0.4%

**Notes:**

No adjustments or mainenance done

Calibration Performed By: Melissa Lemay



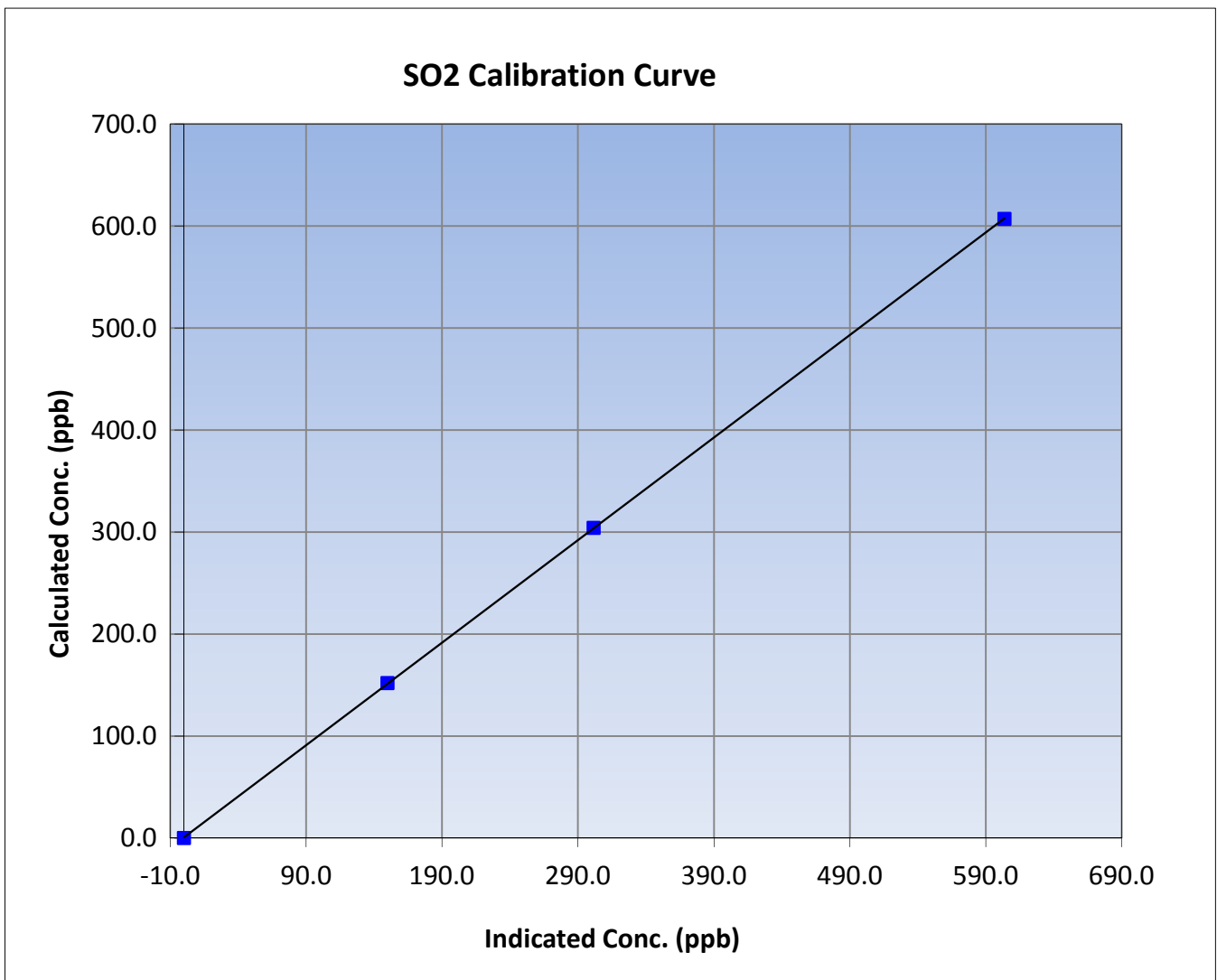
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	Thermo 43C	Analyzer serial #	6074175781

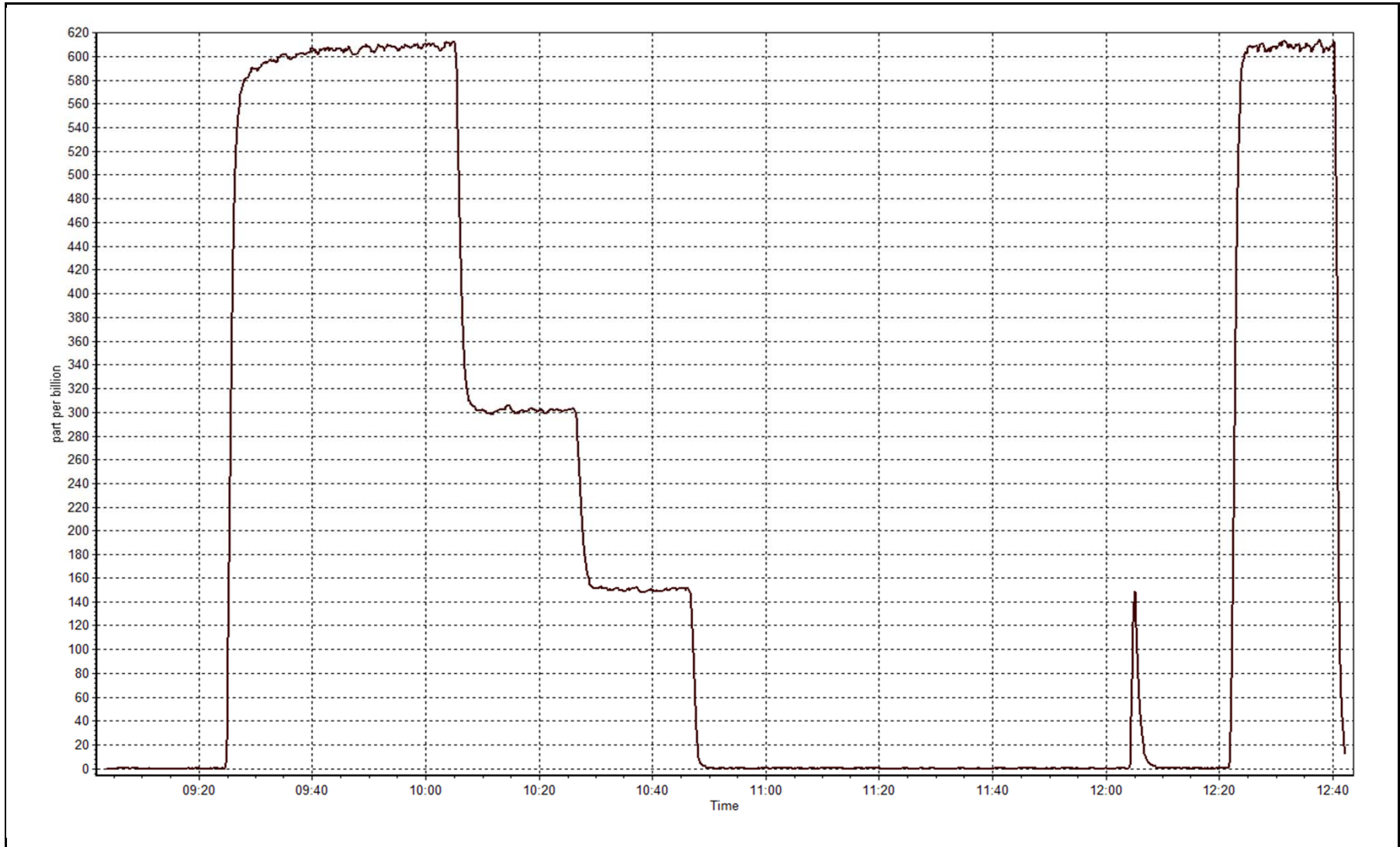
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999993
607.0	603.7	1.0055		
304.0	301.5	1.0083	Slope	1.005148
152.0	149.9	1.0140		
			Intercept	0.569282



SO2 Calibration Plot

Date: April 13, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	April 7, 2015	Last Calibration	March 4, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:40	End Time (MST)	14:02
Gas Cert Reference	ALMO52589	Station temp.	22 Deg C
Cal Gas Concentration	5.02 ppm	Cal Gas Exp Date	12/21/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
SO2 gas concentration	50.8 ppm	SO2 gas cert/exp	8400311 9/Sep/17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-619	-619
Analyzer IP address	192.168.1.42		Lamp voltage	806	806
Calculated slope	0.994132	0.999766	Chamber temp	44	44
Calculated intercept	0.116911	-0.146075	Pressure	689.6	676.6
Analyzer Background	18.6	18.6	Flow	0.477	0.407
Analyzer Coefficient	1.071	1.071	Intensity	43300	43500
			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	0.0	----
as found span	6000	89.6	75.0	74.9	1.000
SO2 scrubber check	5000	14.7	149.4	0.1	----
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	89.6	75.0	74.9	1.000
second point	6000	50.2	42.0	42.5	0.988
third point	6000	29.9	25.0	25.1	0.997
as left zero	6000	0.0	0.0	-0.1	----
as left span	6000	89.6	75.0	75.1	0.998
Average Correction Factor					0.995

Corrected As found	74.9	Previous response	75.3	% change	0.5%
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Notes:

No adjustments or maintenance done, filter changed out

Calibration Performed By:

Melissa Lemay



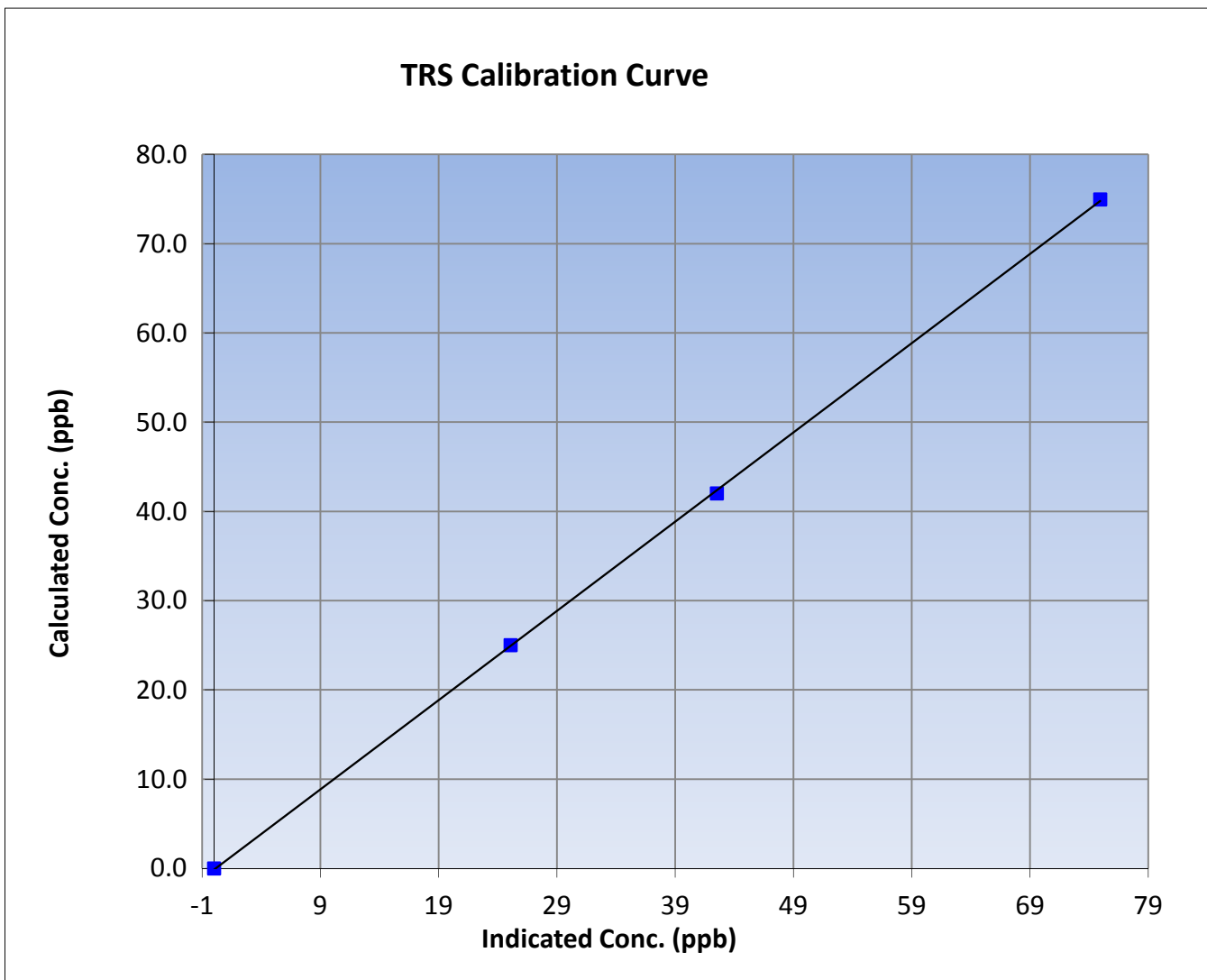
# Wood Buffalo Environmental Association TRS Calibration Report

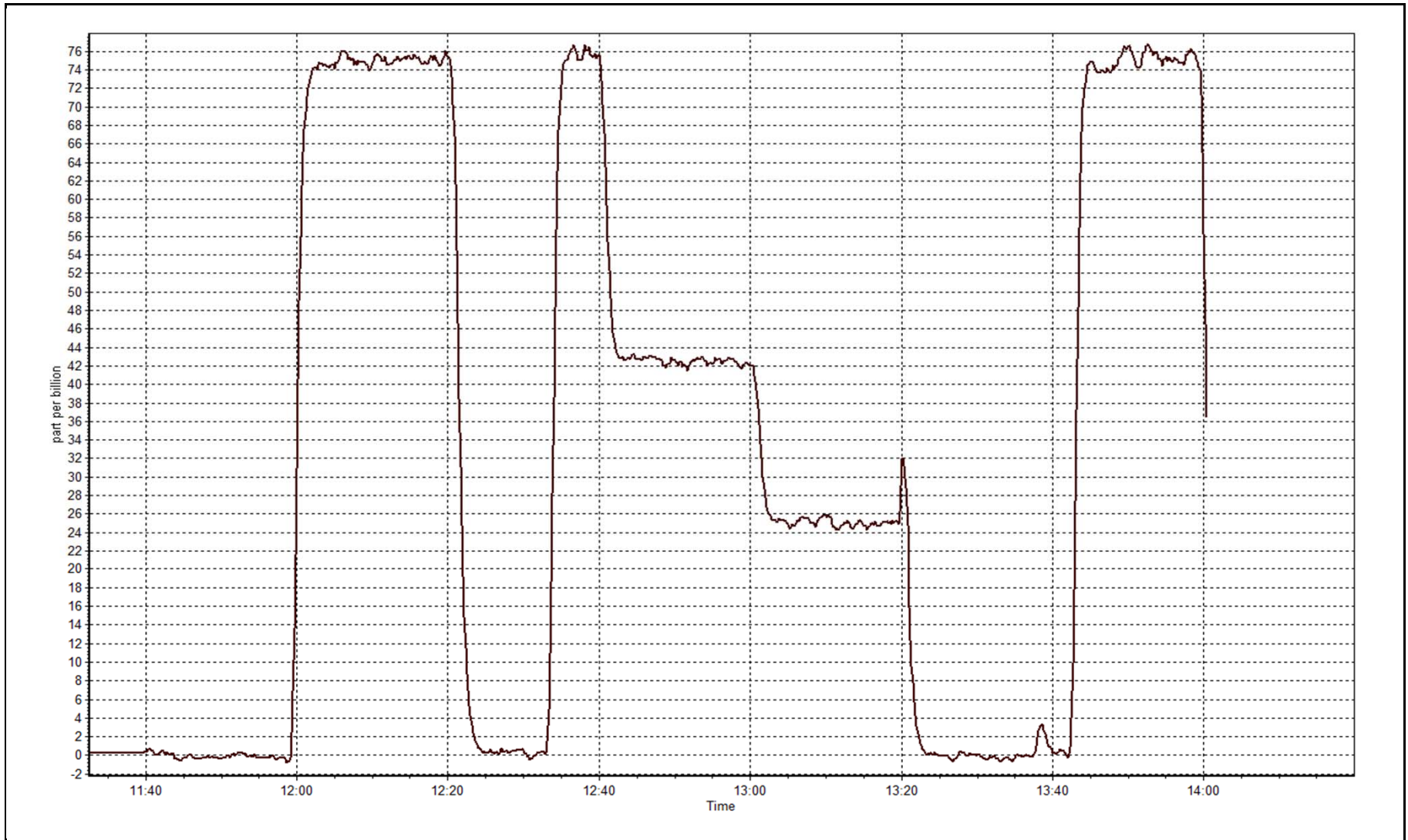
## Station Information

Calibration Date	April 7, 2015	Previous Calibration	March 4, 2015
Station Name	AMS 7	Station Number	AMS 7
Start Time (MST)	11:40	End Time (MST)	14:02
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	0.0	----	Correlation Coefficient	0.999935
75.0	74.9	1.0003		
42.0	42.5	0.9876	Slope	0.999766
25.0	25.1	0.9967		
			Intercept	-0.146075









## Wood Buffalo Environmental Association THC / NMHC Calibration Report

### Station Information

Calibration Date	Monday, April 13, 2015	Last Calibration	Friday, March 06, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:45
Gas Cert Reference	S970259A	Cal Gas Expiry Date	9/26/17
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm	Station temp.	18 Deg C
Calibrator Model	Sabio 4010	Serial Number	11021107
ZAG make/model	Teledyne API 701	Serial Number	1864
DACS make/model	Campbell Scientific CR3000	Serial Number	5564

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	75.0	74.9
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	175.1	175.1
Analyzer IP address	192.168.1.55		Flame Temp	309.2	312.5
THC Calc slope	0.999680	0.998260	Carrier Pressure	36.8	36.8
THC Calc intercept	0.013614	0.012216	Fuel Pressure	42.1	42.1
NMHC Calc slope	1.000179	1.000683	Air Pressure	32.2	32.2
NMHC Calc intercept	0.000226	-0.003749			

Analyzer make Thermo 55i Analyzer serial # 1426262594

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	60.7	12.63	12.39	1.019
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	12.63	12.65	0.998
second point	5000	30.4	6.32	6.29	1.005
third point	5000	15.2	3.16	3.16	1.001
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	12.63	12.72	0.993
Average Correction Factor					1.001

Corrected As found 12.39 Previous response 12.62 % change 1.8%

**Notes:**

Span adjusted, No maintenance done, Filter changed out

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	6.68	6.57	1.016
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	6.68	6.68	1.000
second point	5000	30.4	3.34	3.33	1.004
third point	5000	15.2	1.67	1.69	0.989
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	6.68	6.70	0.997
Average Correction Factor					0.998

Corrected As found      6.57      Previous response      6.68      % change      1.6%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	----
as found span	5000	60.7	5.95	5.82	1.022
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	60.7	5.95	5.97	0.996
second point	5000	30.4	2.98	2.96	1.006
third point	5000	15.2	1.49	1.47	1.013
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	60.7	5.95	6.02	0.988
Average Correction Factor					1.005

Corrected As found      5.82      Previous response      5.94      % change      2.1%



# Wood Buffalo Environmental Association

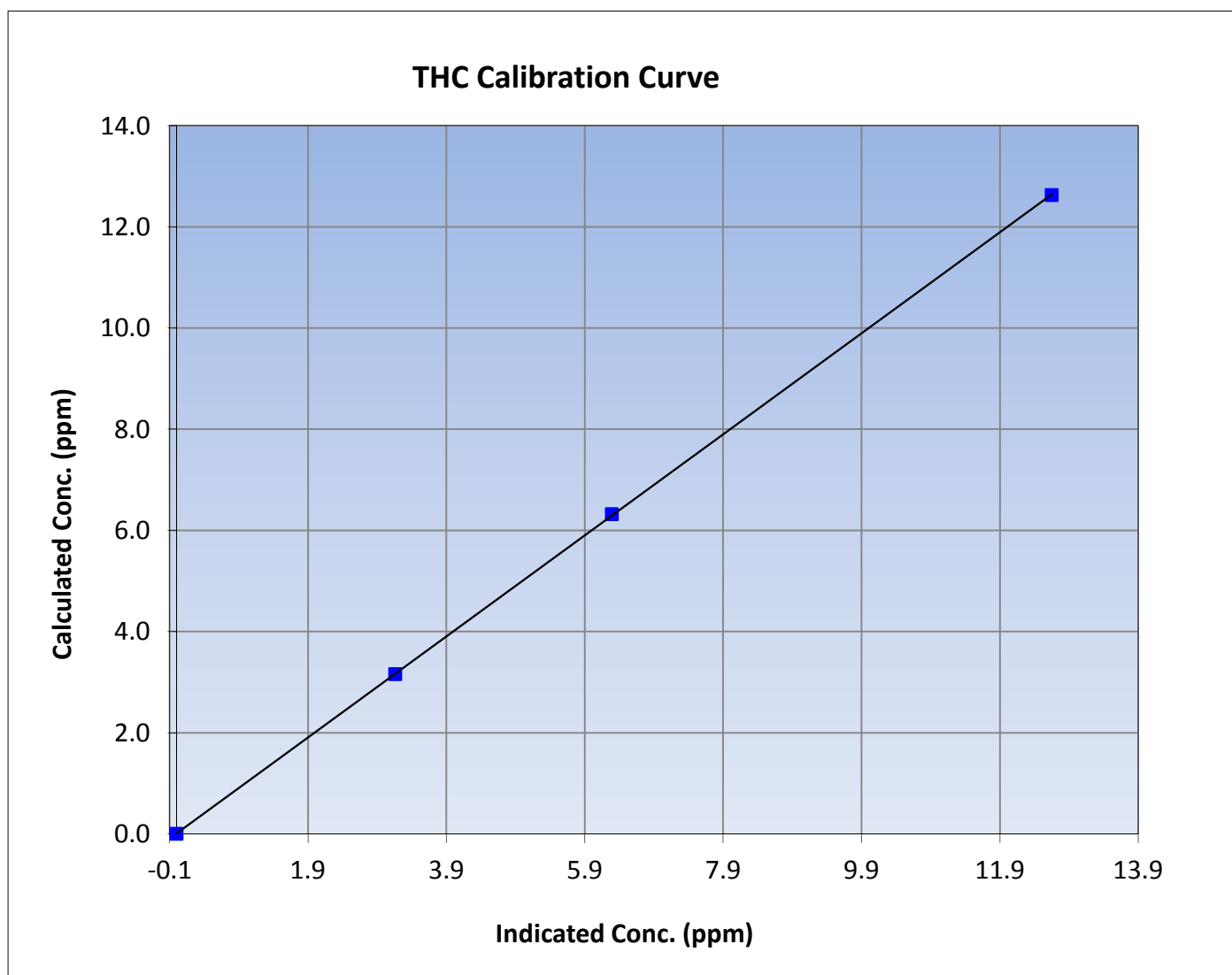
## THC Calibration Summary

### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 6, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999984
12.63	12.65	0.9981		
6.32	6.29	1.0053	Slope	0.998260
3.16	3.16	1.0005		
			Intercept	0.012216





# Wood Buffalo Environmental Association

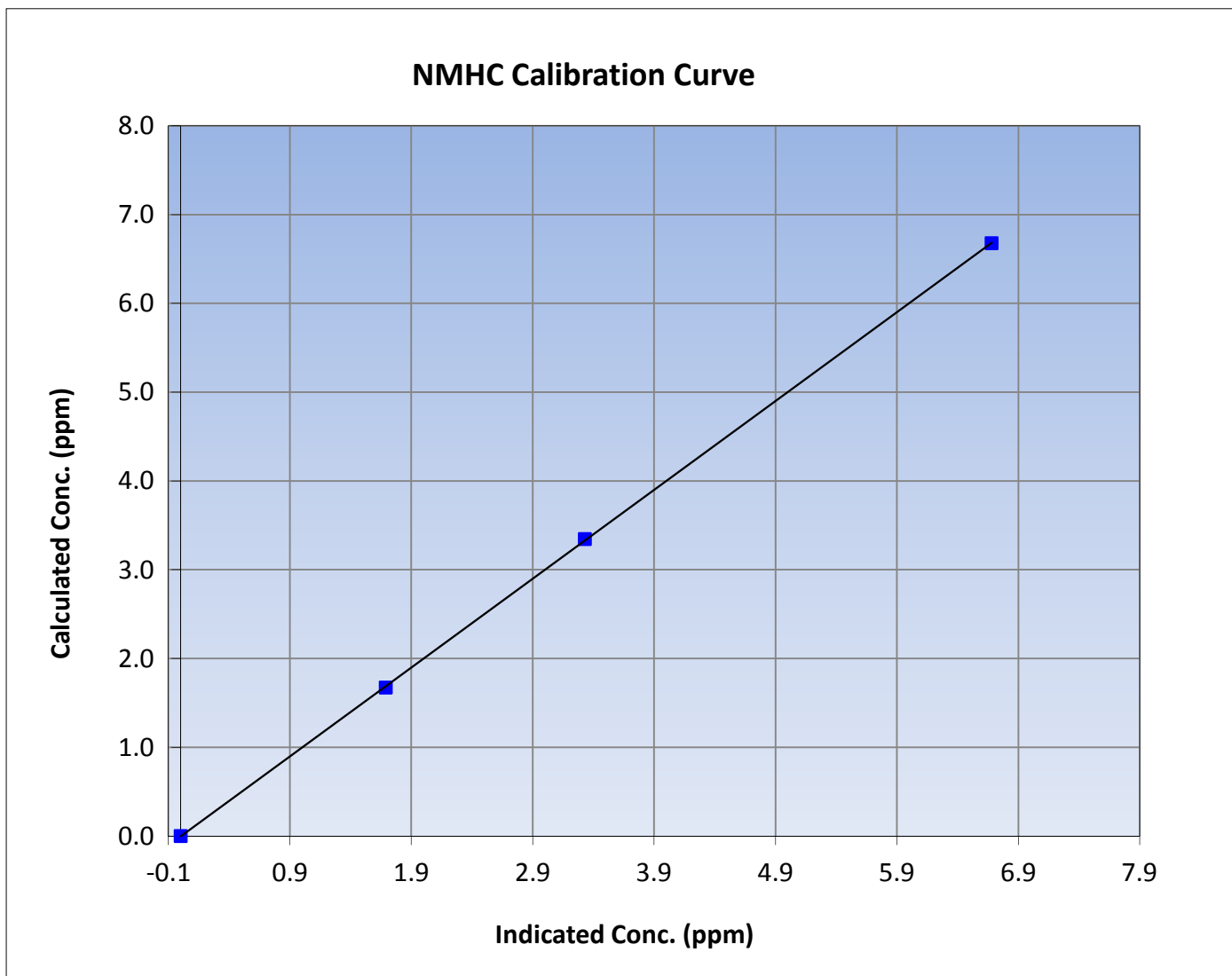
## NMHC Calibration Summary

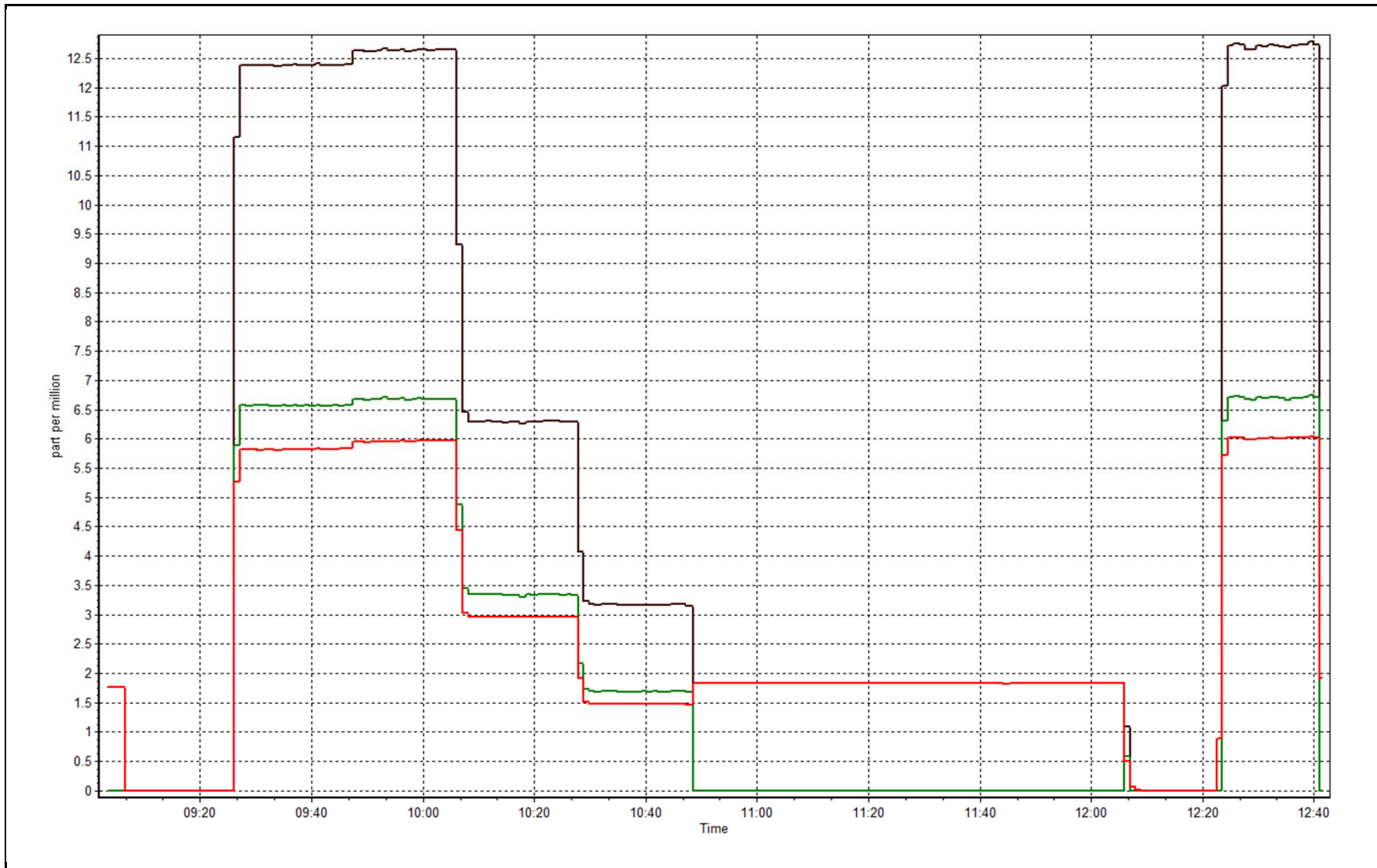
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 6, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	Thermo 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999979
6.68	6.68	0.9996		
3.34	3.33	1.0042		
1.67	1.69	0.9893		
			Slope	1.000683
			Intercept	-0.003749







# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	12:40	End Time (MST)	16:58
NO2 GPT Ref date	Monday, April 13, 2015	Transfer Standard	
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864
		Serial Number	5564

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	28.9	28.9
Analyzer IP address	192.168.1.103		Lamp temp.	70.8	70.8
Calculated slope	1.015586	1.000644	Pressure	723.1	729.0
Calculated intercept	-0.135834	-1.416971	Flow cell A	0.680	0.675
Analyzer Background	-0.2	0.0	Flow cell B	0.745	0.740
Analyzer Coefficient	1.008	1.113	Cell A Intensity	104345	111xxx
			Cell B Intensity	87847	94xxx

Analyzer make	TEI 49C	Analyzer serial #	607415760
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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		0.0	0.0	----
as found span	5000		318.5	292.0	1.091
calibrator zero	5000		0.0	-0.1	----
high point	5000		318.5	317.8	1.002
second point	5000		163.3	168.4	0.970
third point	5000		84.3	85.3	0.988
as left zero					
as left span					
Average Correction Factor					0.987

Corrected As found	292.0	Previous response	313.7	% change	7.4%
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**Notes:**

Negative drift present during as founds. Pump replaced and optics cleaned as part of routine maintenance, damaged solenoid valve replaced. Drift resolved after routine maintenance and valve repair. Span and zero adjusted.

Calibration Performed By:

Melissa Lemay and Zach Eastman



# Wood Buffalo Environmental Association O3 Calibration Report

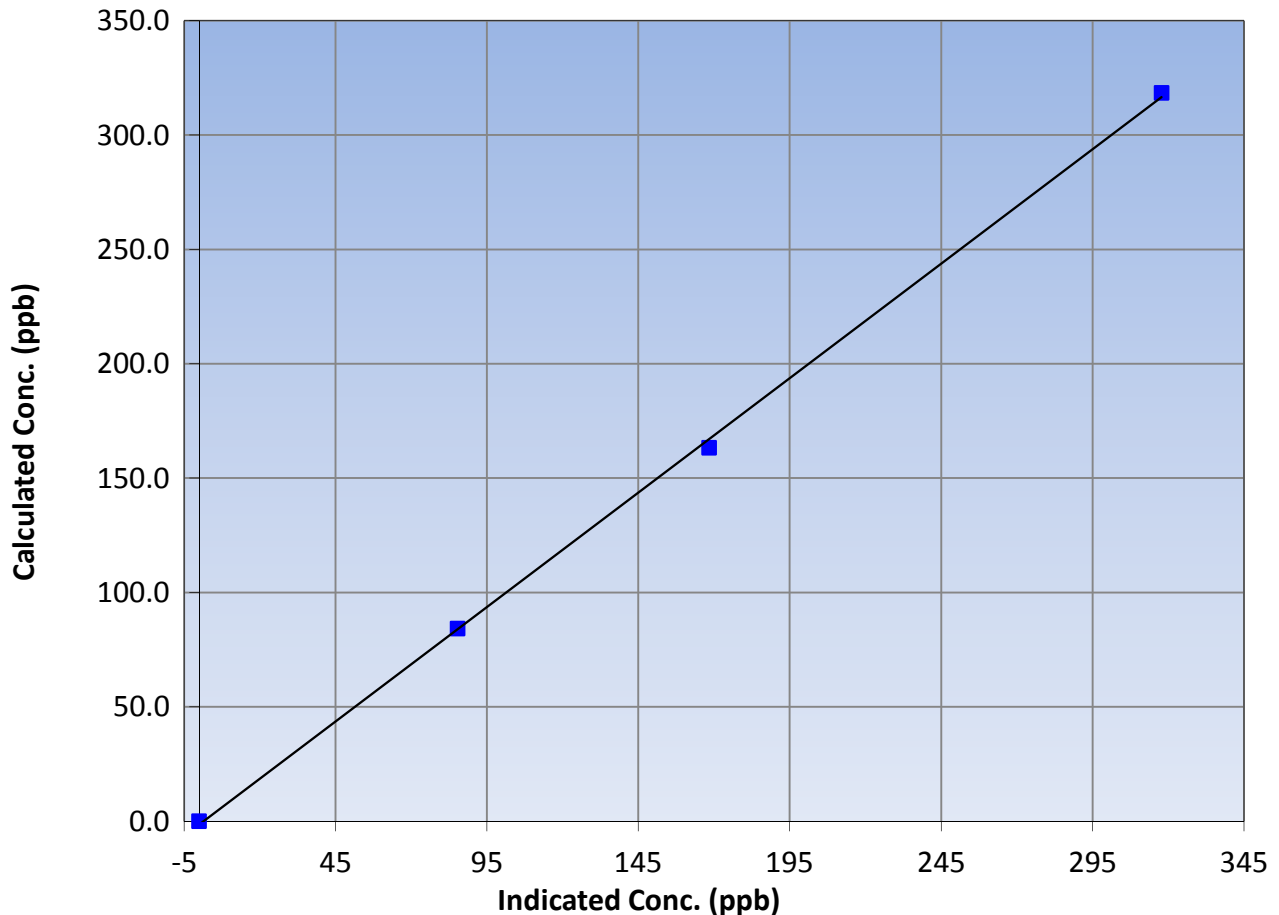
## Station Information

Calibration Date	Monday, April 13, 2015	Previous Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	12:40	End Time (MST)	16:58
Analyzer make	TEI 49C	Analyzer serial #	607415760

## Calibration Data

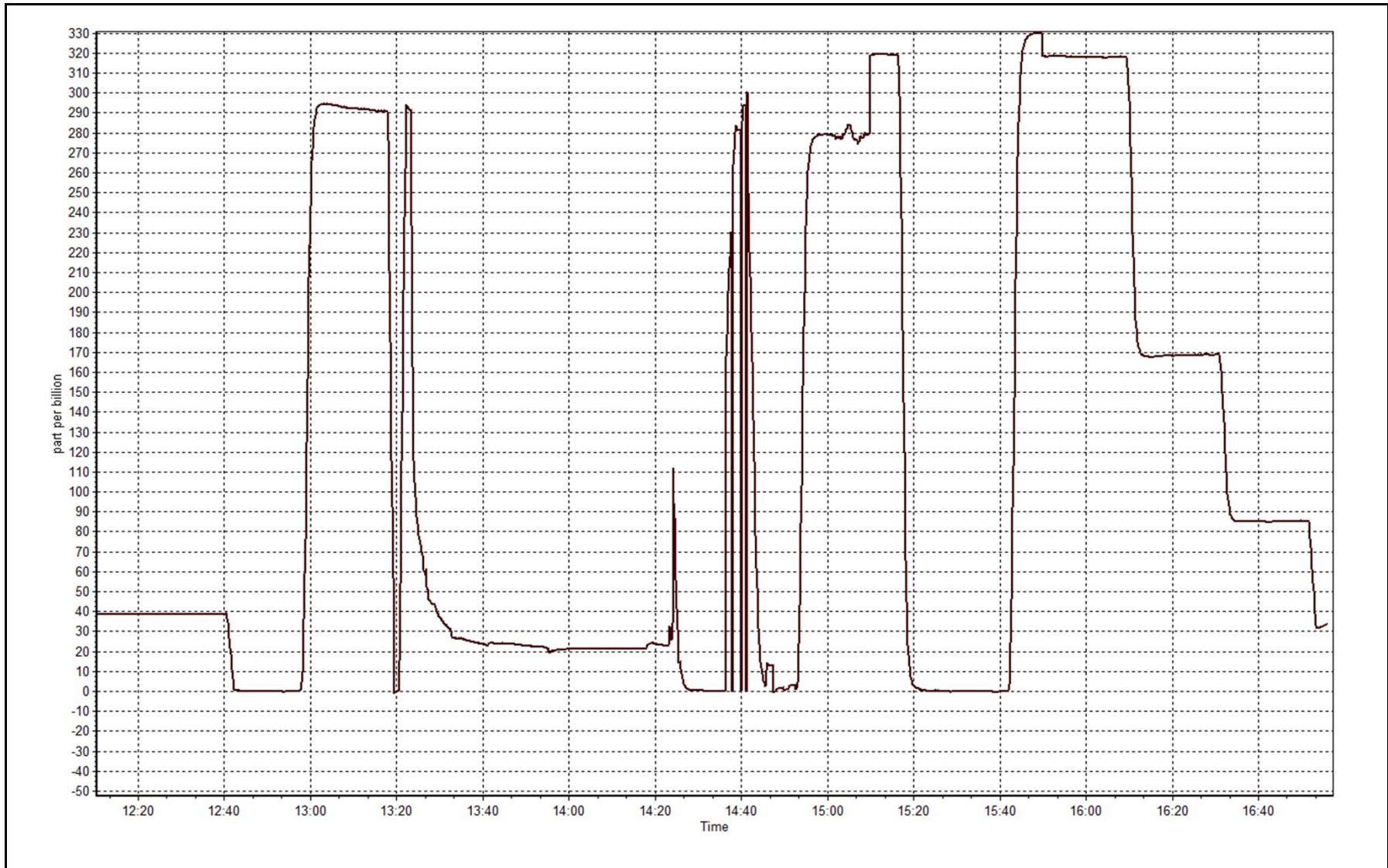
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999629
318.5	317.8	1.0022		
163.3	168.4	0.9697	Slope	1.000644
84.3	85.3	0.9883		
			Intercept	-1.416971

### O3 Calibration Curve



O3 Calibration Plot

Date: April 13, 2015







# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:00	End Time (MST)	12:45
NO Cal Gas Conc	49.4 ppm	Gas Cert Reference	S970259A
NOx Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	9/26/2017
Calibrator	Sabio 4010	Serial Number	11021107
Zero air Generator	Teledyne API T701	Serial Number	1864

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	5564
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.006069	1.006856	1.001078
	Data Offset	2.476996	2.432264	-0.798766
Current Calibration	Data Slope	0.992289	0.994462	1.001317
	Data Offset	3.789284	3.478761	0.977585

## Analyzer Information

Analyzer make/model	Thermo 42C	Analyzer serial #	601114773
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.783		0.783	
NOx coefficient	1.000		1.000	
NO2 coefficient	1.000		1.000	
NO bkgrnd	3.3		3.3	
NOx bkgrnd	3.5		3.5	
Chamber Temp	49.6	Deg C	49.5	Deg C
Moly Temp	324	Deg C	323	Deg C
PMT voltage	-827	V	-827	V
PMT Temp	-3.5	Deg C	-3.5	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	174.1	mmHg	171.4	mmHg
R Cell Press Nox	174.1	mmHg	171.4	mmHg
NO sample flow	0.787	lpm	0.775	lpm
Nox sample Flow	0.787	lpm	0.775	lpm

**Notes:**

No adjustments or maintenance done, filter changed out



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 13, 2015

Station Number:

AMS 7

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.1	0.2	----	----
as found span	5000	60.7	599.7	599.7	0.0	602.7	601.7	1.3	0.9950	0.9967
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.6	-0.1	0.2	----	----
high point	5000	60.7	599.7	599.7	0.0	602.7	601.7	1.3	0.9950	0.9967
second point	5000	30.4	300.4	300.4	0.0	295.5	295.3	0.4	1.0164	1.0171
third point	5000	15.2	150.2	150.2	0.0	145.5	145.2	0.4	1.0321	1.0343
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	----	----
as left span	5000	60.7	599.7	274.6	325.1	585.2	276.4	308.9	1.0248	0.9935
Average Correction Factor									1.0145	1.0160

Corrected As found

NO<sub>x</sub>= 603.3

NO= 601.8

Percent Change

NO<sub>x</sub>= -1.6%

NO= -1.4%

Previous Response

NO<sub>x</sub>= 593.6

NO= 593.2

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

60.70

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.2			N/A	
1st NO2 (300)	----	274.6	318.5	592.0	274.6	317.6	1.0009	1.0000	1.0028	99.7%
2nd NO2 (200)	----	429.8	163.3	591.5	429.8	161.8	1.0017	1.0000	1.0093	99.1%
3rd NO2 (100)	----	508.8	84.3	590.5	508.8	81.9	1.0034	1.0000	1.0293	97.2%
4th NO2 (0)	593.1	----	0.4	593.5	593.1	0.6	0.9984	1.0000	N/A	----
Average Correction Factor							1.0011	1.0000	1.0138	98.7%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

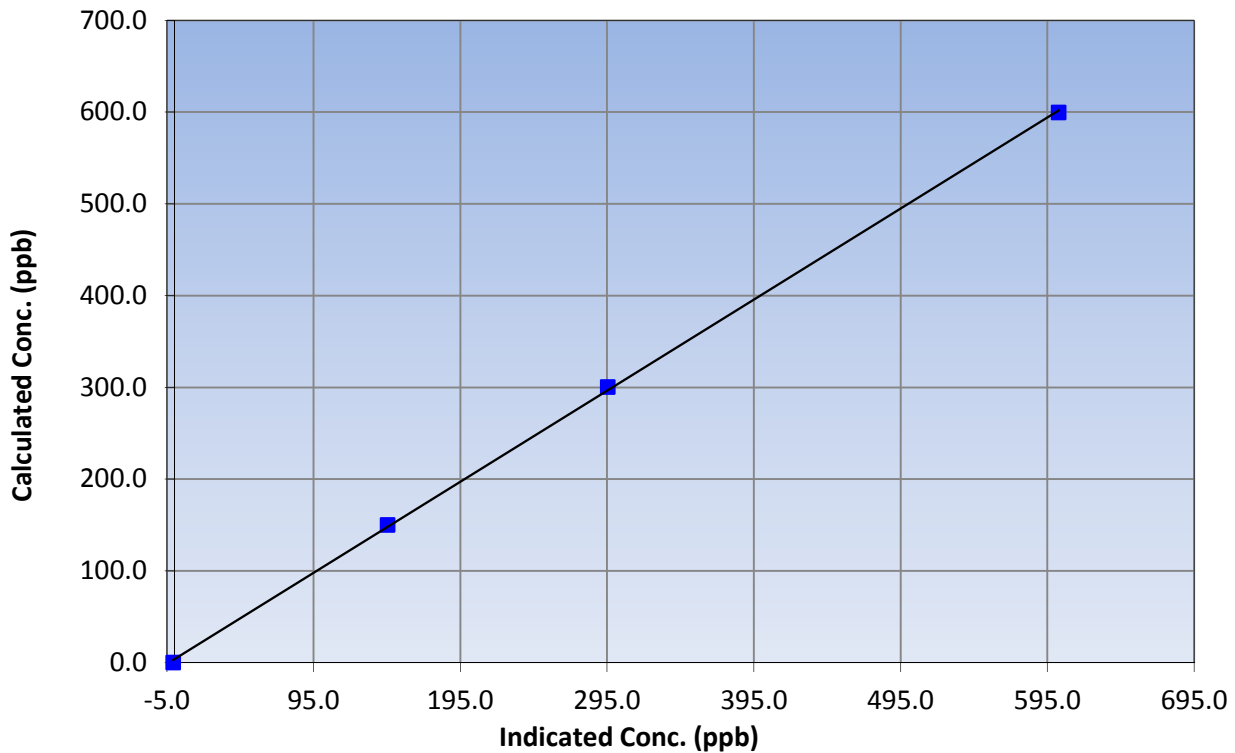
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	12:45
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	-0.6	----	Correlation Coefficient	0.999847
599.7	602.7	0.9950		
300.4	295.5	1.0164	Slope	0.992289
150.2	145.5	1.0321		
			Intercept	3.789284

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

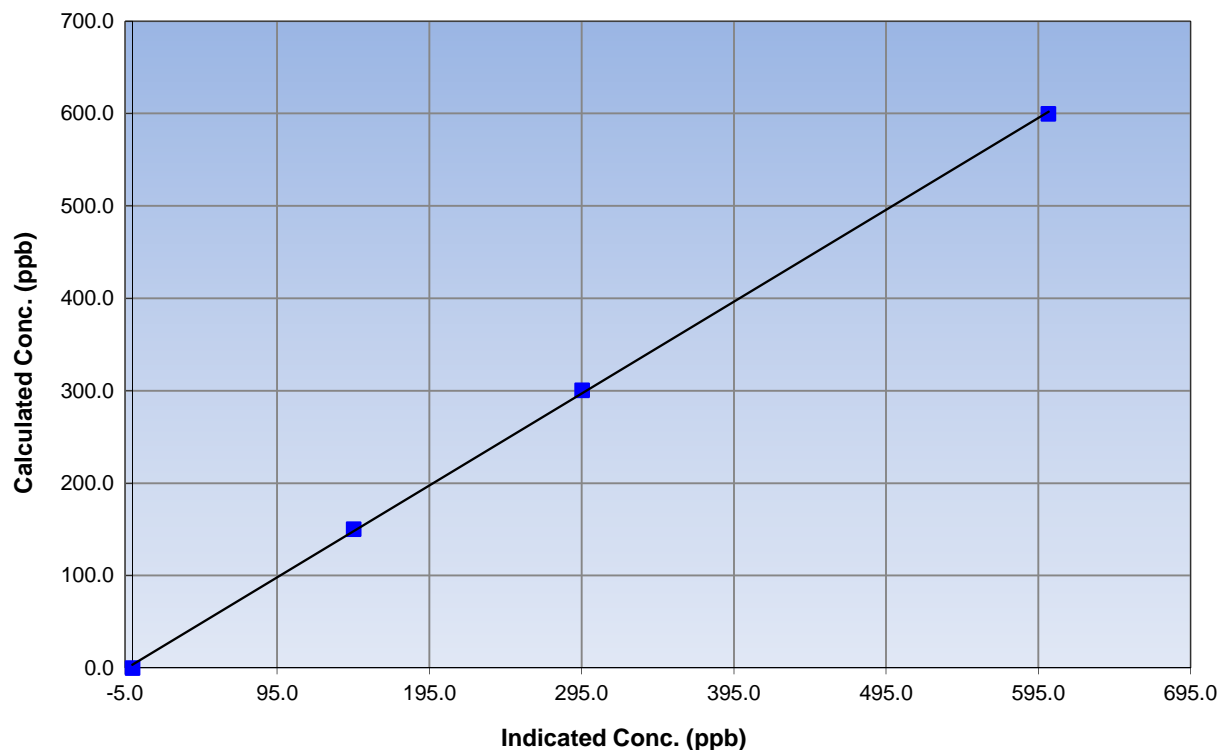
### Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 11, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	12:45
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	0.999840
599.7	601.7	0.9967		
300.4	295.3	1.0171	Slope	0.994462
150.2	145.2	1.0343		
			Intercept	3.478761

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

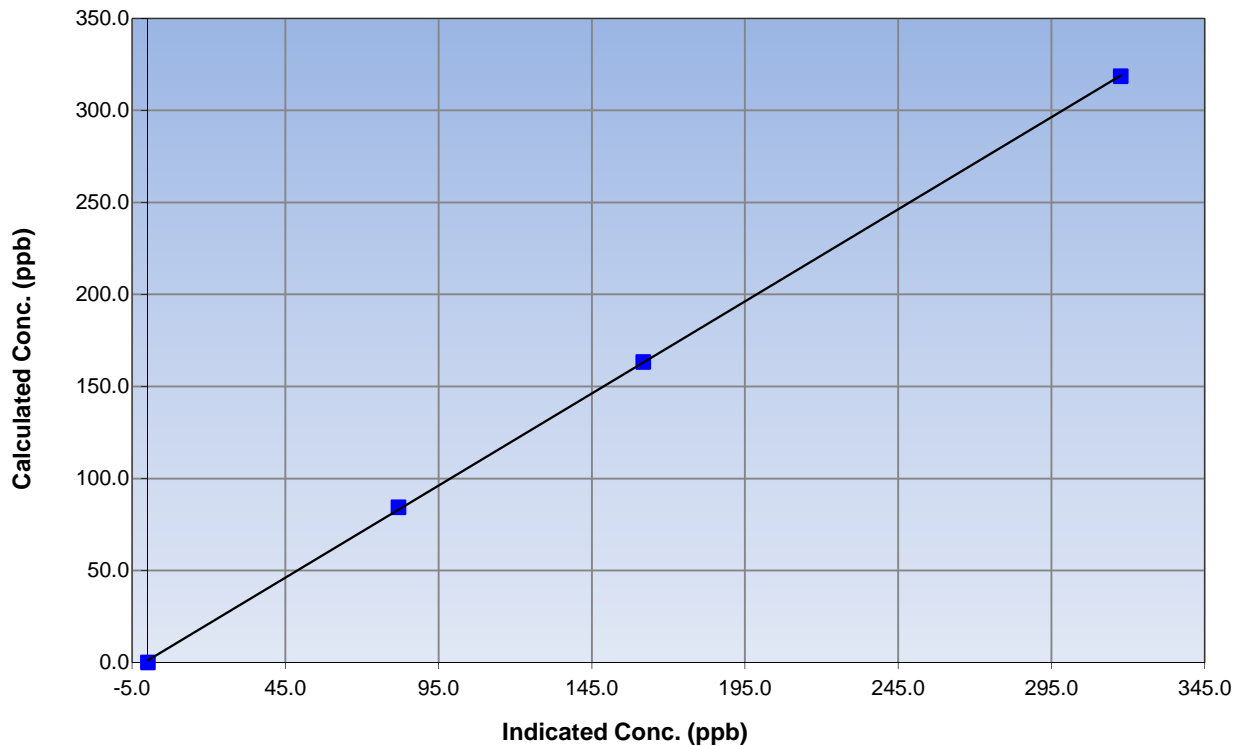
### Station Information

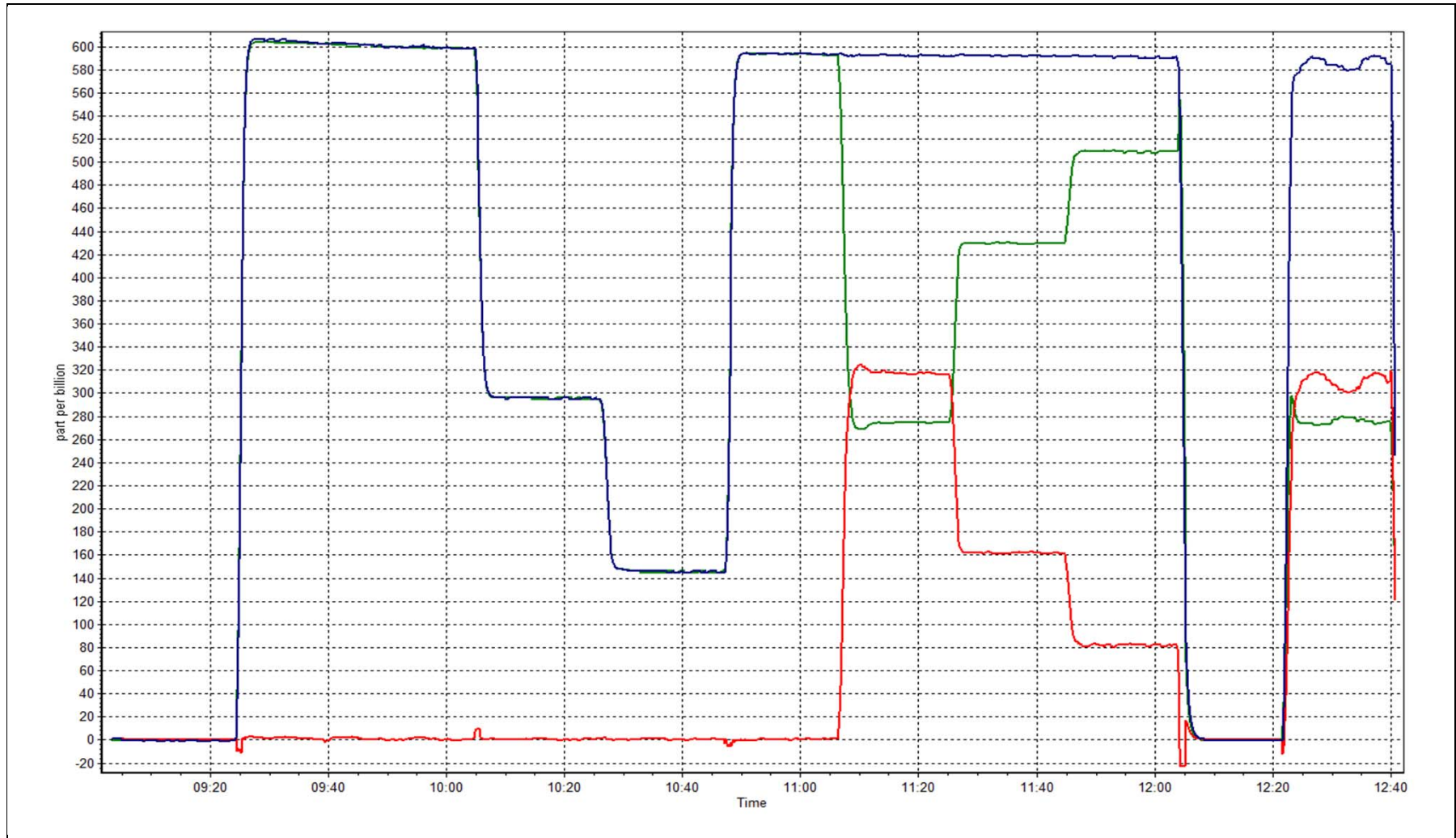
Calibration Date	April 13, 2015	Previous Calibration	March 11, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:00	End Time (MST)	12:45
Analyzer make	Thermo 42C	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999939
318.5	317.6	1.0028		
163.3	161.8	1.0093	Slope	1.001317
84.3	81.9	1.0293		
			Intercept	0.977585

### NO<sub>2</sub> Calibration Curve







# Wood Buffalo Environmental Association CO Calibration Report

## Station Information

Calibration Date	April 15, 2015	Last Calibration	March 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	11:01
Gas Cert Reference	LL85940	Station temp.	18 Deg C
Cal Gas Concentration	3060 ppm	Cal Gas Exp Date	4/27/2015
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
ZAG Make/Model	API 701	Serial Number	5564
DACS make/model	Campbell Scientific CR3000	Serial Number	1864

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		Chamber temp.	48.6	48.4
Analyzer IP address	192.168.1.48		Pressure	734.6	733.7
Calculated slope	1.005970	1.006356	Flow	0.485	0.485
Calculated intercept	0.094490	0.105092	Intensity	199559	199773
Analyzer Background	1.582	2.020	S/R ratio	1.179165	1.179835
Analyzer Coefficient	1.009	1.009			

Analyzer make Thermo 48i-TLE      Analyzer serial # 1408761381

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.5	----
as found span	5000	67.6	41.4	42.6	0.972
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	67.6	41.4	41.1	1.007
second point	5000	34.2	20.9	20.6	1.018
third point	5000	14.7	9.0	8.8	1.022
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	67.6	41.4	40.8	1.013
Average Correction Factor					1.016

Corrected As found    42.1      Previous response    41.0      % change    -2.5%

**Notes:**

Zero adjusted, filter changed out, no maintenance done

Calibration Performed By:

Melissa Lemay



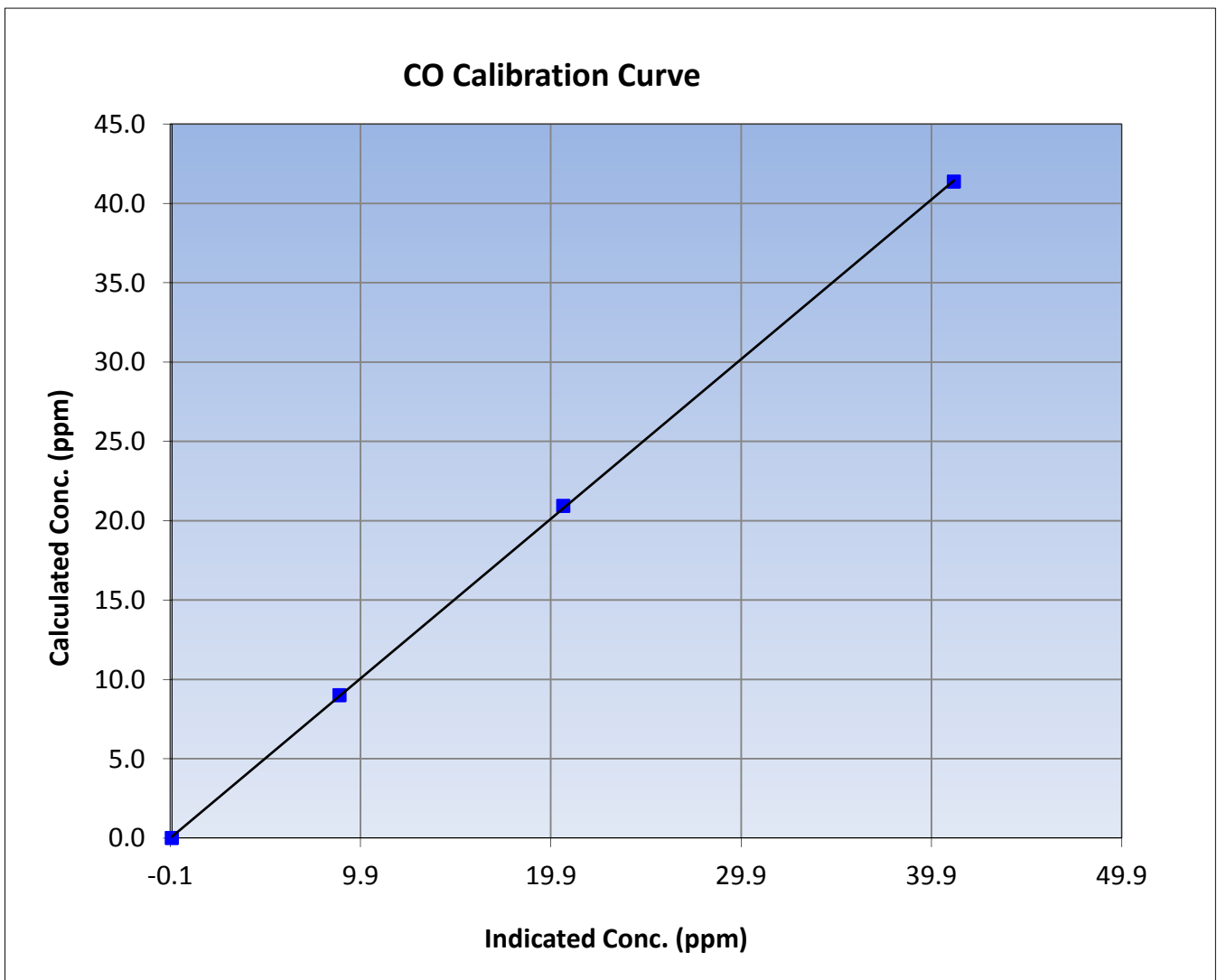
# Wood Buffalo Environmental Association CO Calibration Report

## Station Information

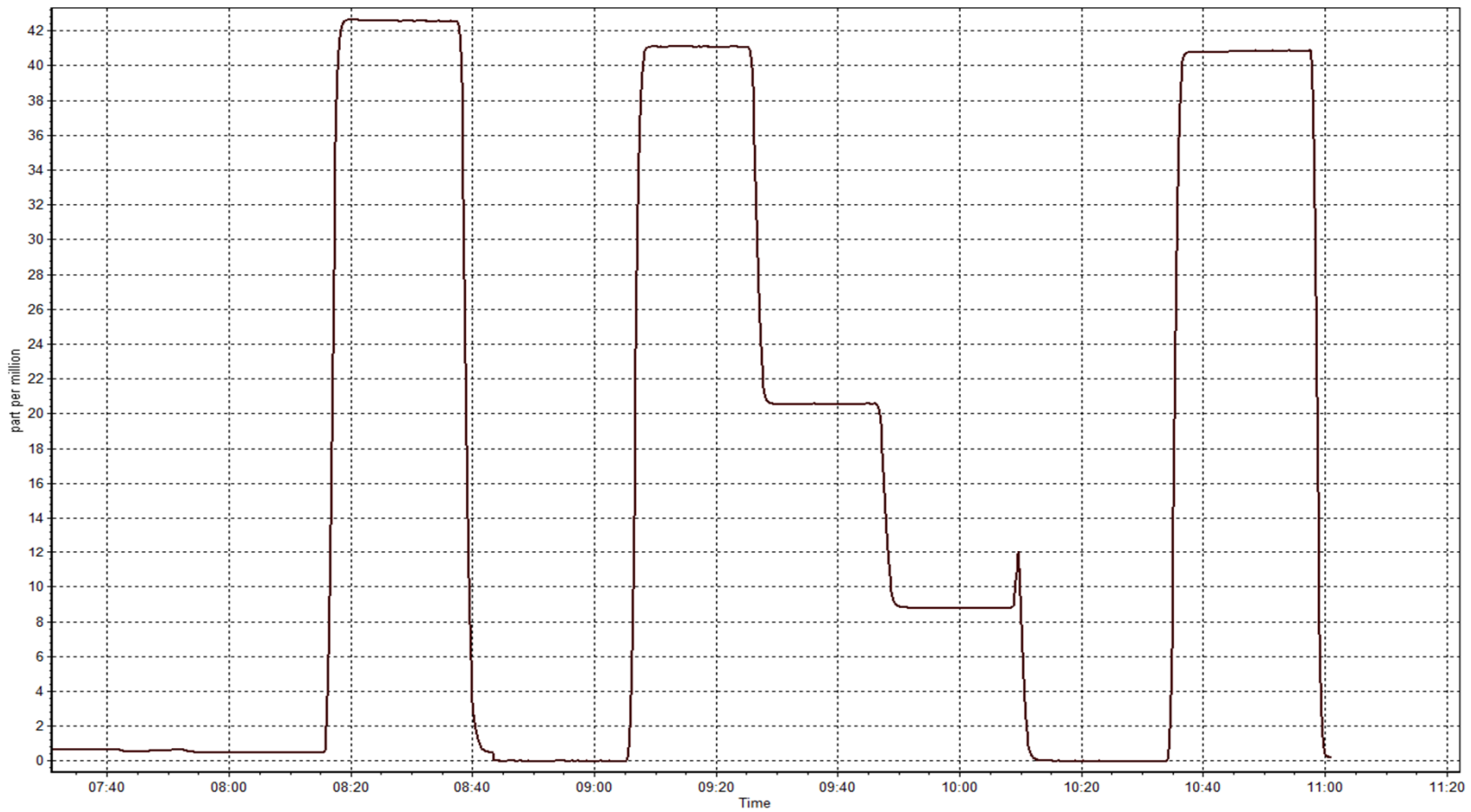
Calibration Date	April 15, 2015	Previous Calibration	March 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	7:50	End Time (MST)	11:01
Analyzer make	Thermo 48i-TLE	Analyzer serial #	1408761381

## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999965
41.4	41.1	1.0071		
20.9	20.6	1.0180	Slope	1.006356
9.0	8.8	1.0223		
			Intercept	0.105092







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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 8  
FORT CHIPEWYAN  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
 APRIL 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2(ppb) Average	684	36	36	100.00	4	0	1	0
O3(ppb) Average	686	34	34	100.00	52	0	47	-
NO2(ppb) Average	683	36	37	99.86	10	0	2	-
NO(ppb) Average	683	36	37	99.86	10	-	1	-
NOX(ppb) Average	683	36	37	99.86	20	-	2	-
PM2.5(ug/m3) Average	717	0	3	99.58	98	-	7.5	0
Wind Speed 10 m (km/h) Average	706	0	14	98.06	44	-	38	-
Wind Direction 10 m (deg) Average	706	0	14	98.06	-	-	-	-
Temperature 2 m (C) Average	720	0	0	100.00	18.1	-	12.9	-
Relative Humidity (%) Average	720	0	0	100.00	97	-	77	-
Precipitation (mm) Total	720	0	0	100.00	0.3	-	0.5	-
Global Solar Radiation (W/m2) Average	709	0	11	98.47	847	-	304	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
 APRIL 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile							
					Min	P10	Q1	Median	Q3	P90	Max	
SO2(ppb) Average	684	0.1	0	-	0	0	0	0	0	0	0	4
O3(ppb) Average	686	37.1	8	-	9	26	33	38	43	46	52	52
NO2(ppb) Average	683	0.5	1	-	0	0	0	0	0	1	10	10
NO(ppb) Average	683	0.1	0	-	0	0	0	0	0	0	10	10
NOX(ppb) Average	683	0.7	1	-	0	0	0	0	1	1	20	20
PM2.5(ug/m3) Average	717	3.34	3.9	-	1.1	1.6	2.1	2.8	3.9	5.3	98	98
Wind Speed 10 m (km/h) Average	706	17.6	8	-	1	8	11	17	23	30	44	44
Wind Direction 10 m (deg) Average	706	-	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	720	0.85	8.7	-	-21	-12.8	-4.5	2.2	7.1	11.3	18.1	18.1
Relative Humidity (%) Average	720	58.5	17	-	17	33	47	61	70	79	97	97
Precipitation (mm) Total	720	-	-	0.76	0	0	0	0	0	0	0.3	0.3
Global Solar Radiation (W/m2) Average	709	242.2	282	-	0	0	0	82	510	708	847	847

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	28 Apr 2015 08:00	28 Apr 2015 08:00	1	Unstable operation - excessive baseline drift
PM2.5	01 Apr 2015 17:00	01 Apr 2015 19:00	3	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	01 Apr 2015 19:00	02 Apr 2015 08:00	14	Flat line in sensor output signal - Sensor frozen
Solar Global Radiation	01 Apr 2015 09:00	01 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	02 Apr 2015 09:00	02 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	03 Apr 2015 09:00	03 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	04 Apr 2015 09:00	04 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	05 Apr 2015 09:00	05 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	06 Apr 2015 09:00	06 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	07 Apr 2015 09:00	07 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	09 Apr 2015 09:00	09 Apr 2015 09:00	1	Unstable operation - Shadow affected sensor readings
Solar Global Radiation	13 Apr 2015 10:00	13 Apr 2015 12:00	3	Unstable operation - Shadow affected sensor readings

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Apr 18 20:00	Maximum Daily Average: 0.7 ppb on Apr 9		Hours of Data:	684
Minimum Value: 0 ppb on Apr 25 19:00	Minimum Daily Average: 0.0 ppb on Apr 25		Hours of Missing Data:	36
Maximum Diurnal Average: 0.2 ppb at hour 20	Minimum Diurnal Average: 0.1 ppb at hour 23		Hours of Calibration:	36
Monthly Average: 0.1 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 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-Apr	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
2-Apr	0	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-Apr	0	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
4-Apr	0	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-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Apr	0	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Apr	0	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
9-Apr	0	0	0	0	Z	1	1	1	2	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0.7	2
10-Apr	0	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Apr	0	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-Apr	Z	0	0	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-Apr	0	Z	0	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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Apr	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0.2	4
19-Apr	0	Z	0	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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Apr	Z	0	0	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-Apr	0	Z	0	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-Apr	0	0	Z	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-Apr	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
28-Apr	0	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-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

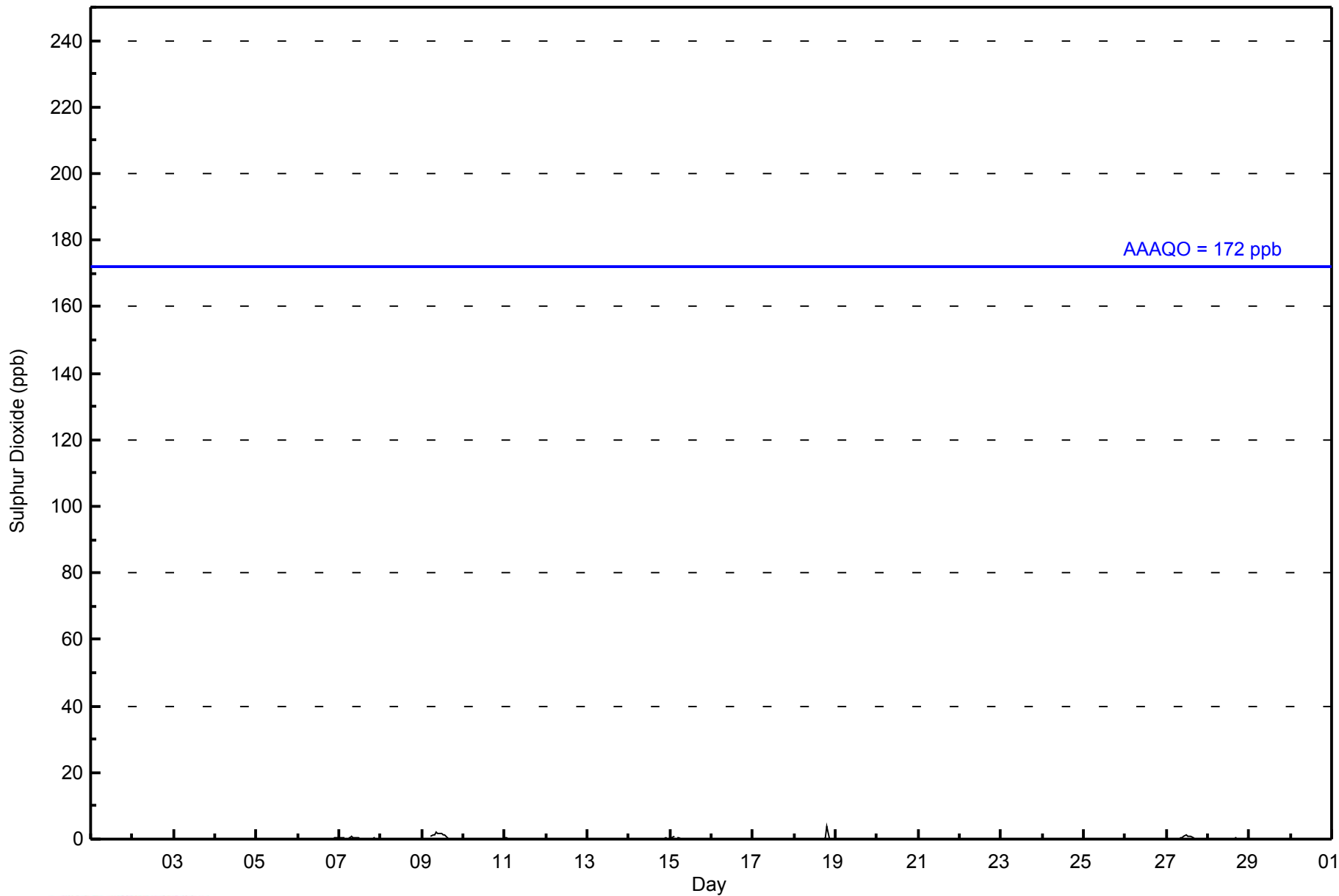
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	Diurnal Average
0	1	1	1	0	1	1	1	1	2	2	2	2	1	1	1	0	0	0	0	0	4	0	0	0	0	Diurnal Maximum

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	684	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: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - April 2015**

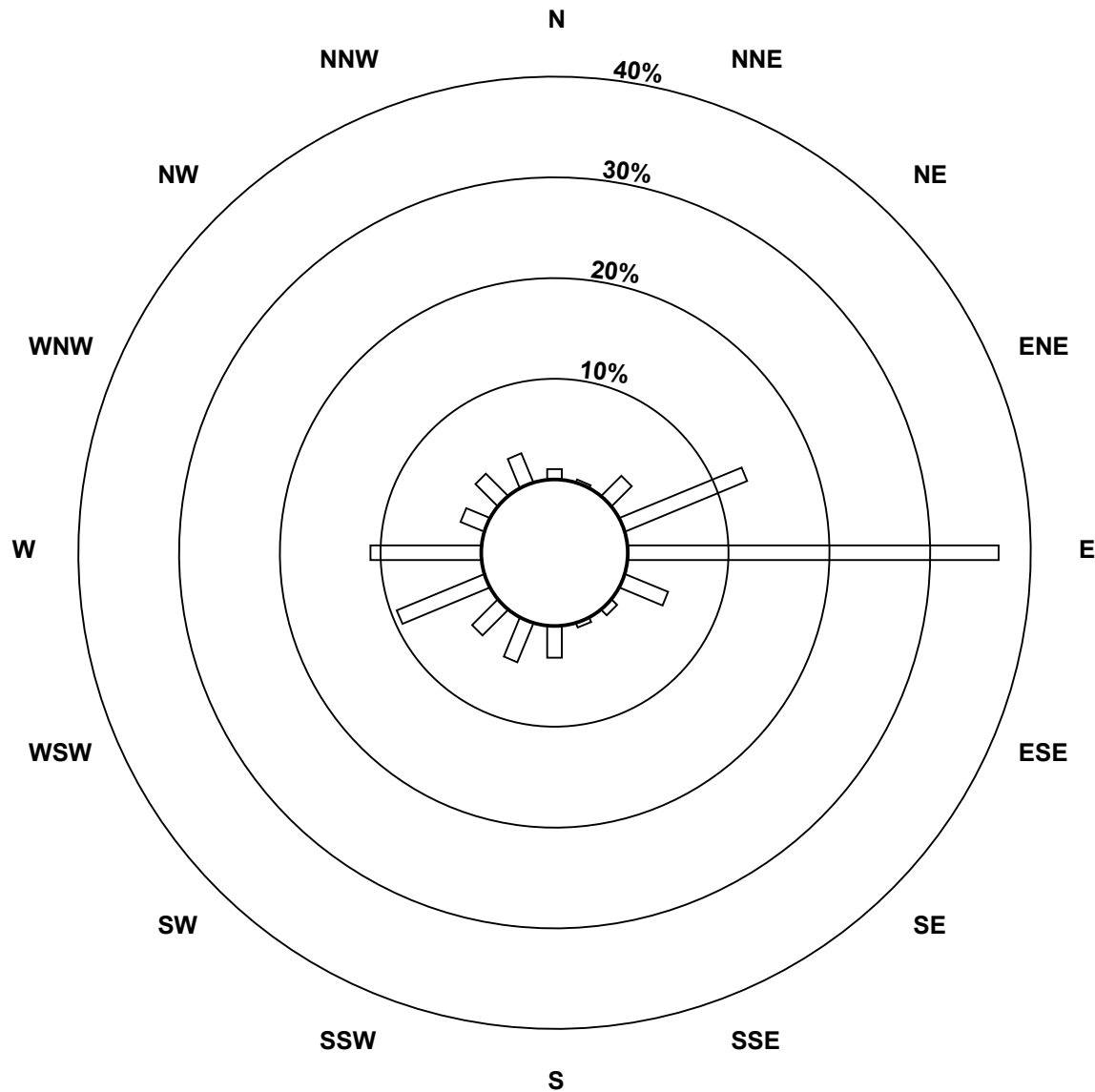
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	7	2	19	88	247	31	5	3	21	28	24	63	74	17	21	21	671
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	7	2	19	88	247	31	5	3	21	28	24	63	74	17	21	21	671

Total Number of Valid Hours: 671

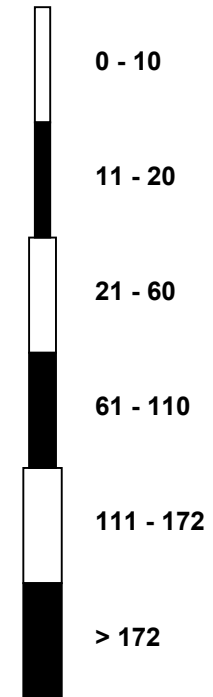
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)**



Classes (ppb)

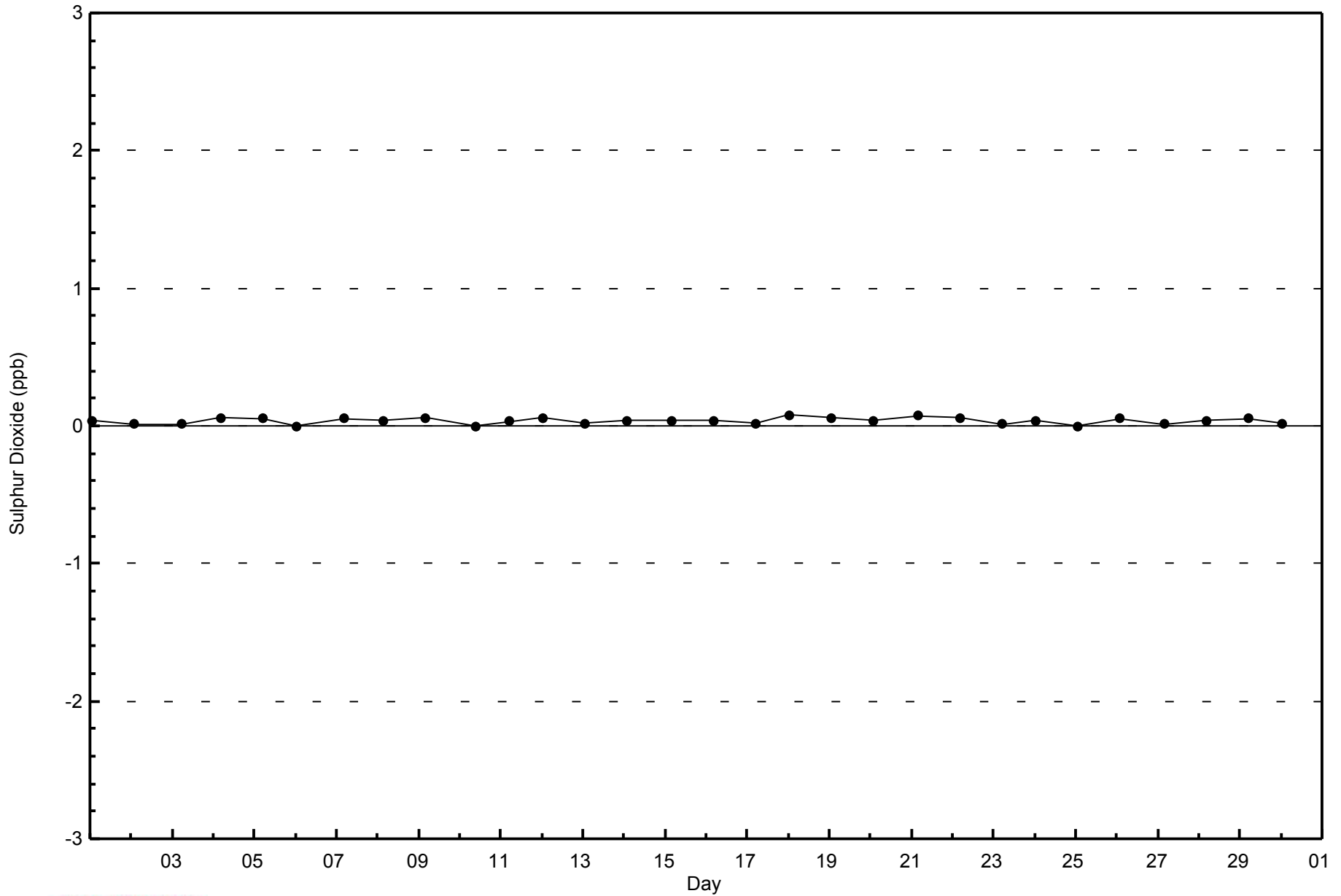


**Total Number of Valid Hours: 671**



WBEA  
Zero Responses

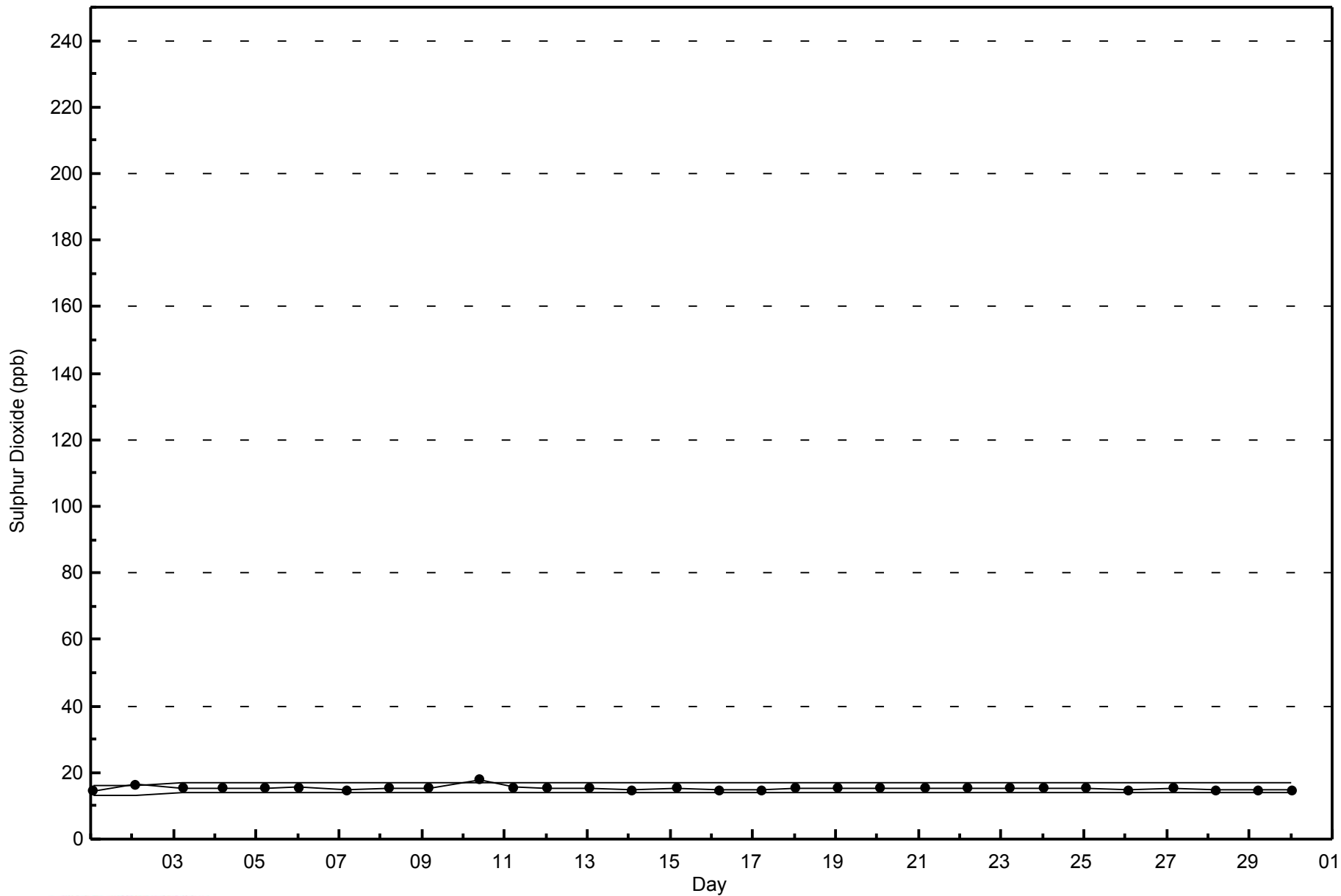
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - April 2015





**WBEA**  
**Span Responses**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - April 2015**





# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Nitric Oxide (NO) - ppb Fort Chipewyan - April 2015

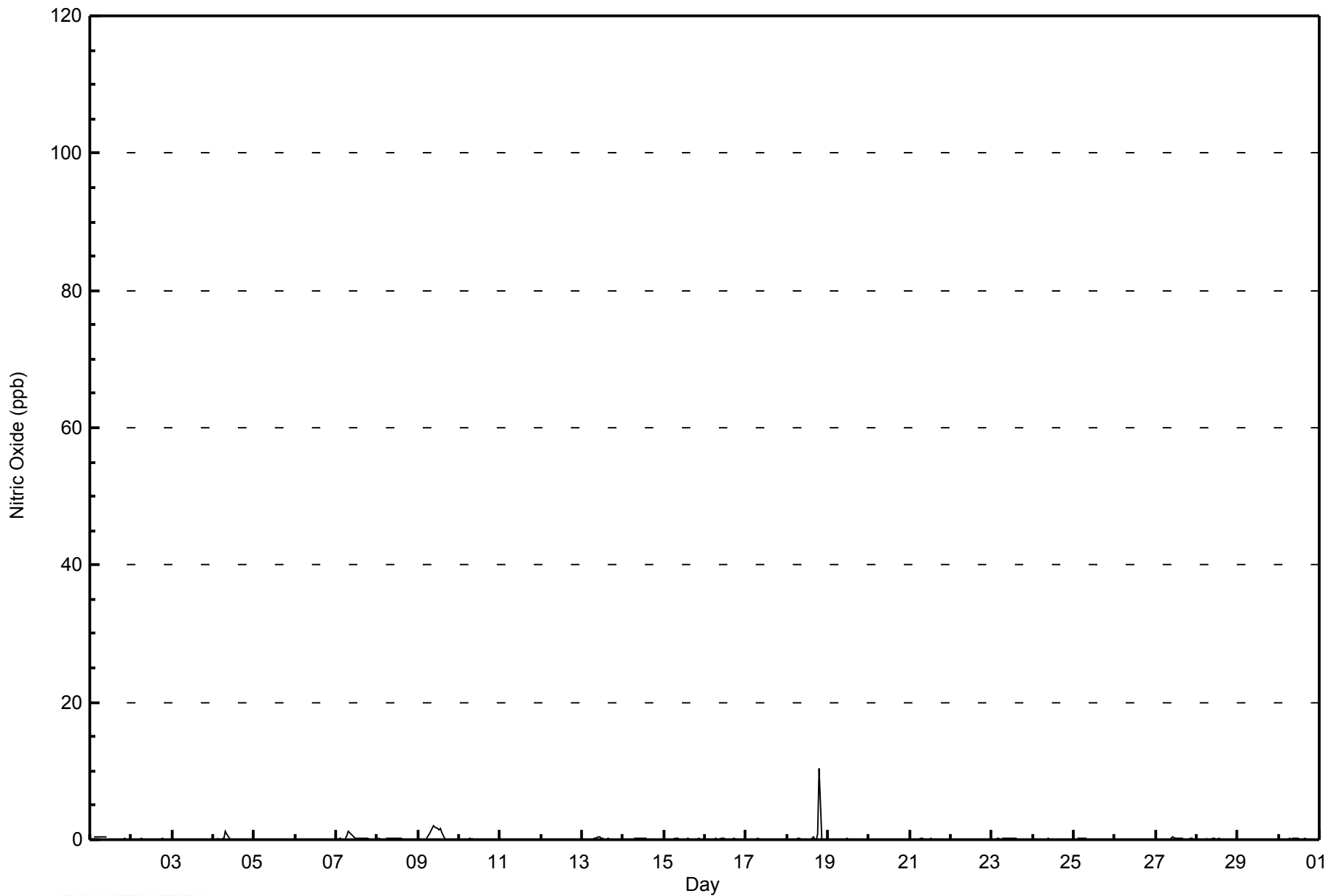
Maximum Value: 10 ppb on Apr 18 20:00										Maximum Daily Average: 0.6 ppb on Apr 9										Hours in Service: 720						
Minimum Value: 0 ppb on Apr 18 21:00										Minimum Daily Average: 0.0 ppb on Apr 19										Hours of Data: 683						
Maximum Diurnal Average: 0.4 ppb at hour 20										Minimum Diurnal Average: 0.0 ppb at hour 24										Hours of Missing Data: 37						
Monthly Average: 0.1 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1										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-Apr	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
2-Apr	0	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-Apr	0	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
4-Apr	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
6-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Apr	0	0	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Apr	0	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
9-Apr	0	0	0	0	Z	0	1	1	2	2	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0.6	2
10-Apr	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	0
11-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10	0	0	0	0	0.6	10
19-Apr	0	Z	0	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-Apr	0	0	Z	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-Apr	0	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-Apr	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Apr	0	0	0	0	Z	0	0	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
29-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Apr	Z	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
																				Diurnal Average						
																				Diurnal Maximum						
Z - zerospan										C - Calibration										UO - Unstable Operation						





**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	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: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - April 2015**

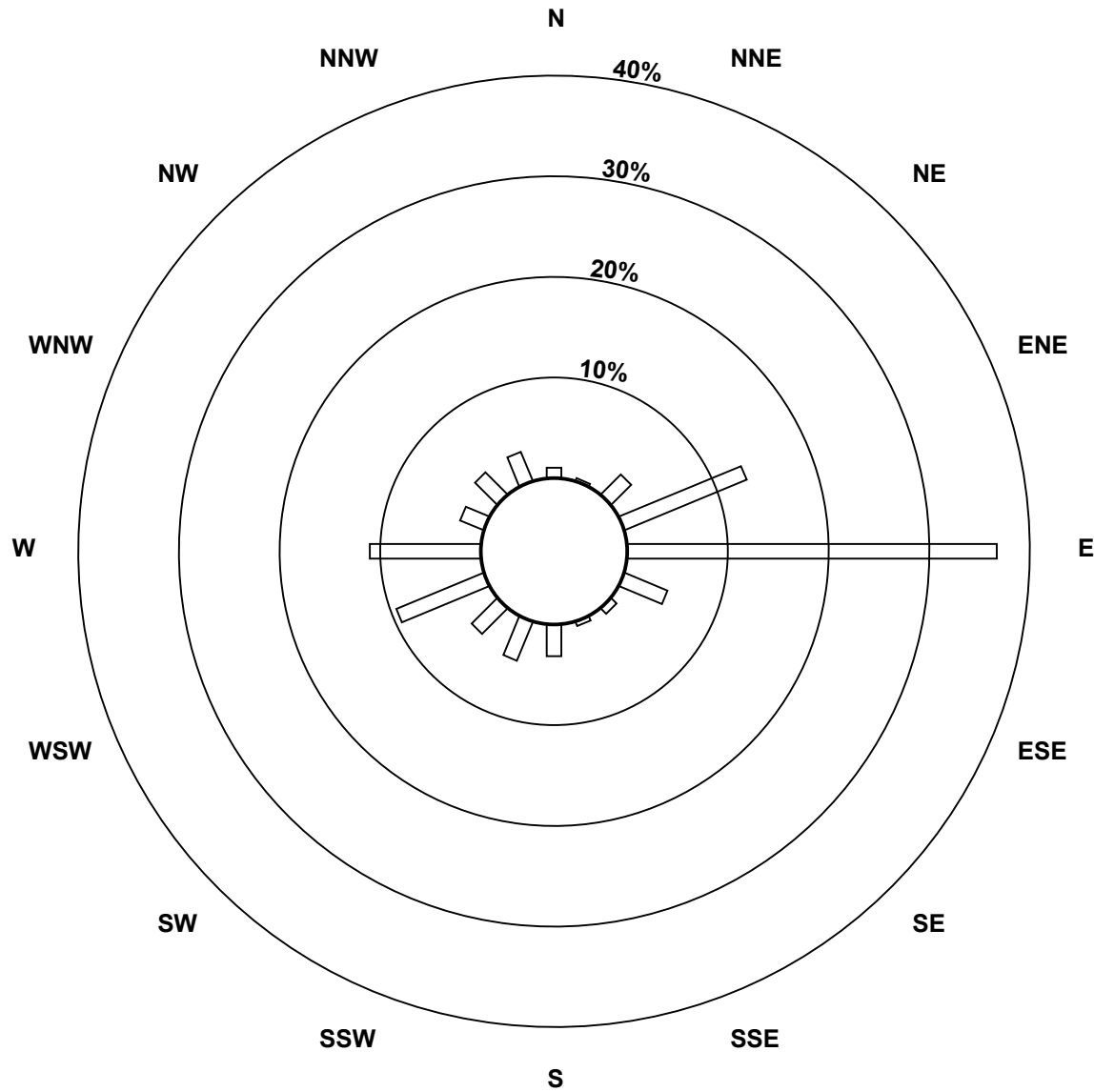
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	2	19	88	246	31	5	3	21	28	24	63	74	17	21	21	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	7	2	19	88	246	31	5	3	21	28	24	63	74	17	21	21	670

Total Number of Valid Hours: 670

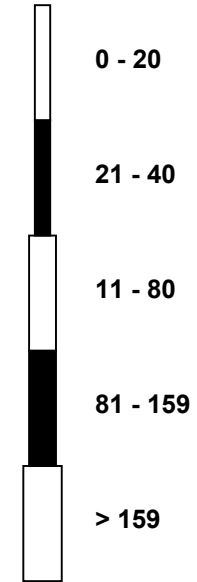
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitric Oxide (NO) - ppb  
Fort Chipewyan (AMS 8)



Classes (ppb)

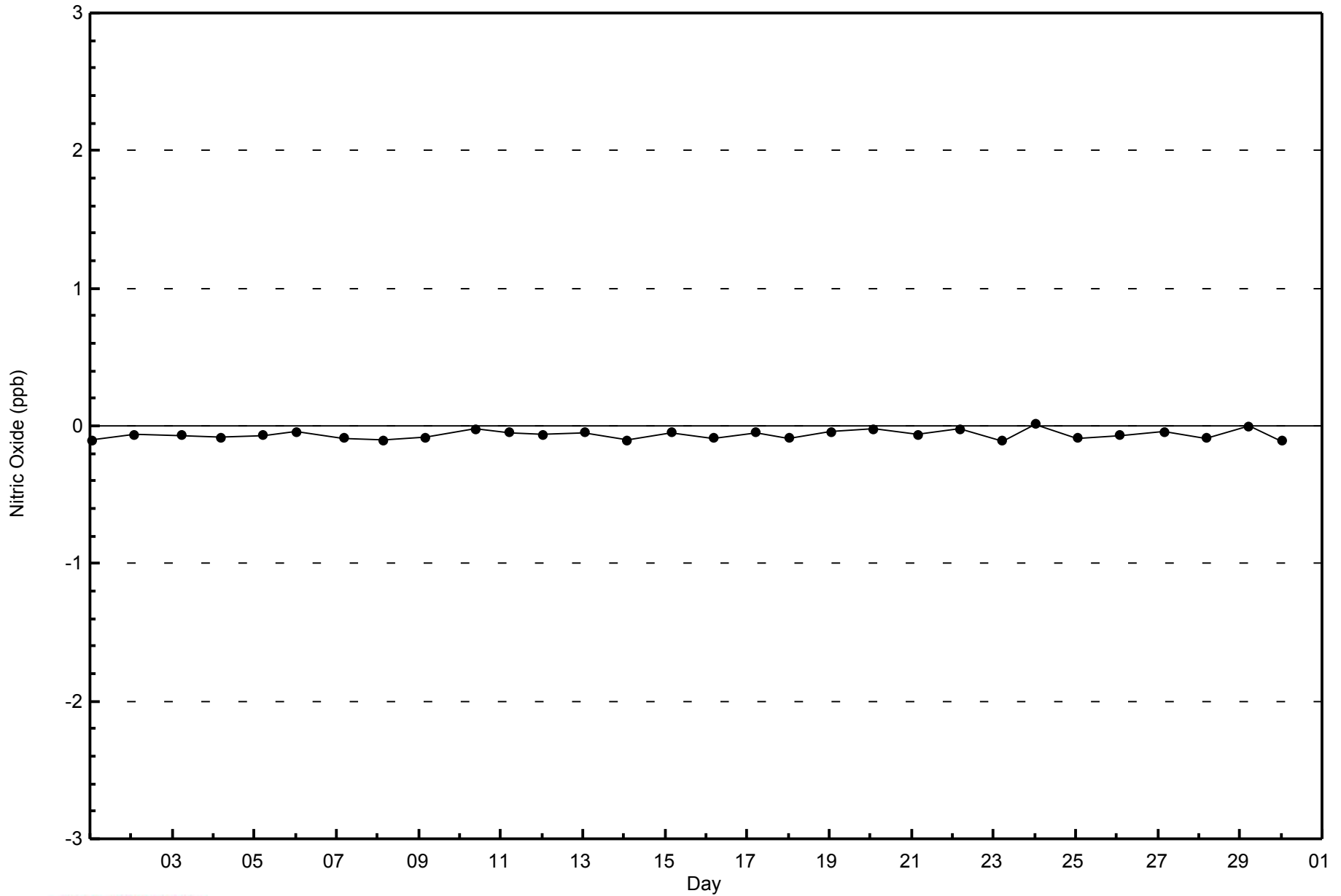


Total Number of Valid Hours: 670



WBEA  
Zero Responses

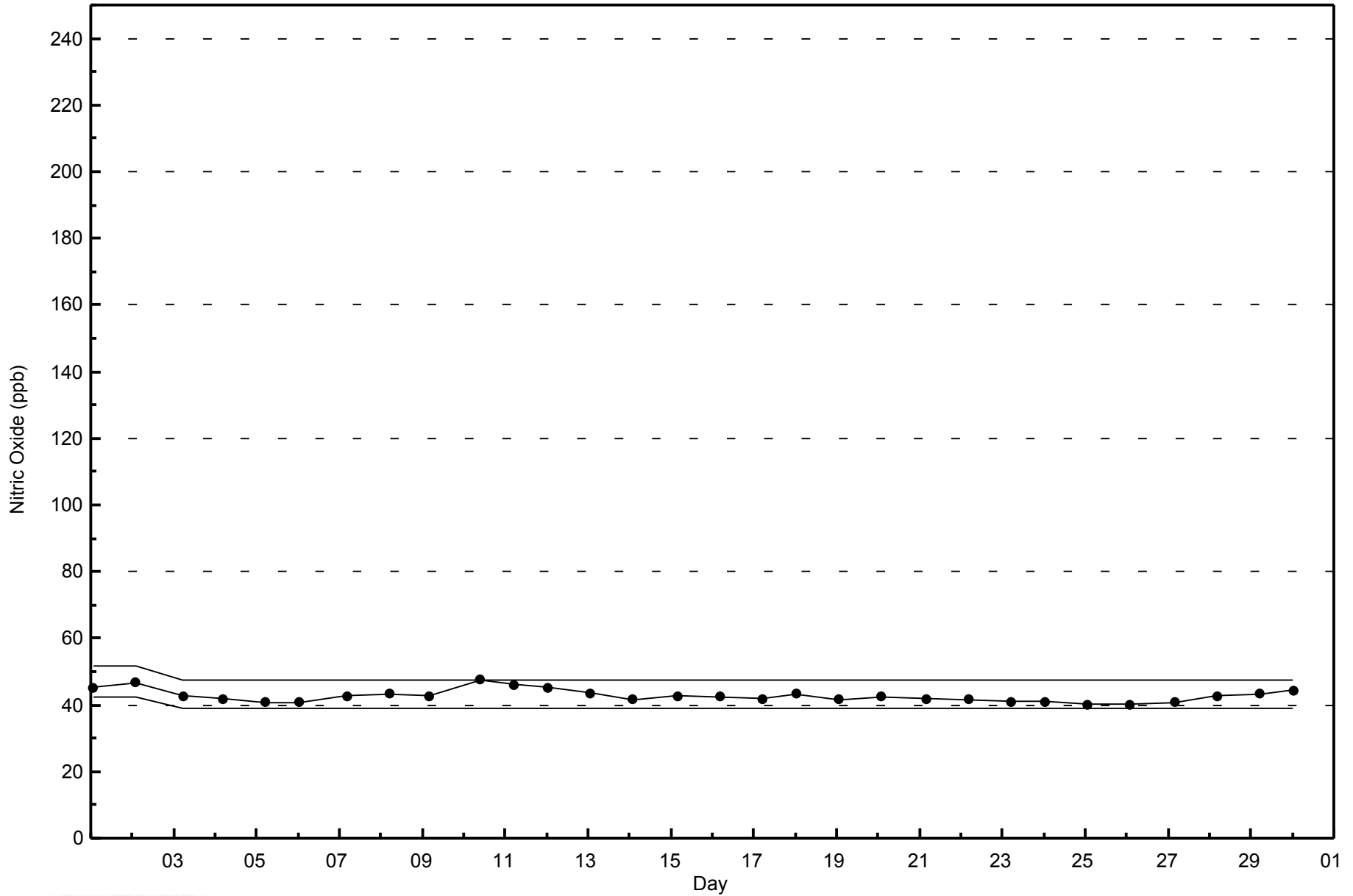
Nitric Oxide (NO) - ppb  
Fort Chipewyan - April 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort Chipewyan - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 10 ppb on Apr 18 20:00	Maximum Daily Average: 1.9 ppb on Apr 9		Hours of Data:	683
Minimum Value: 0 ppb on Apr 25 17:00	Minimum Daily Average: 0.2 ppb on Apr 19		Hours of Missing Data:	37
Maximum Diurnal Average: 1.2 ppb at hour 6	Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 5		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-Apr	3	Z	3	4	5	4	5	5	6	6	C	C	C	C	C	C	0	0	0	0	3	1	1	1	--	6
2-Apr	1	3	Z	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0.7	3
3-Apr	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.4	1
4-Apr	0	0	0	5	Z	2	2	3	1	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0.9	5
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.3	1
7-Apr	1	2	3	3	Z	5	4	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.5	5
8-Apr	0	1	0	1	Z	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1
9-Apr	0	0	0	0	Z	7	6	4	3	3	3	3	3	4	3	1	1	1	0	1	0	0	0	0	1.9	7
10-Apr	0	0	0	0	0	2	1	1	1	Z	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0.5	2
11-Apr	1	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.4	1
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0.3	1
15-Apr	0	1	2	Z	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0.6	2
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0.3	1
18-Apr	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	10	0	0	0	0	0.7	10
19-Apr	0	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-Apr	1	3	Z	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.6	3
21-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
22-Apr	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
25-Apr	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0.3	1
26-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
27-Apr	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	2	1	0	0	0	0	2	3	2	0	0.8	3
28-Apr	1	1	1	1	Z	1	0	UO	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.4	1
29-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1

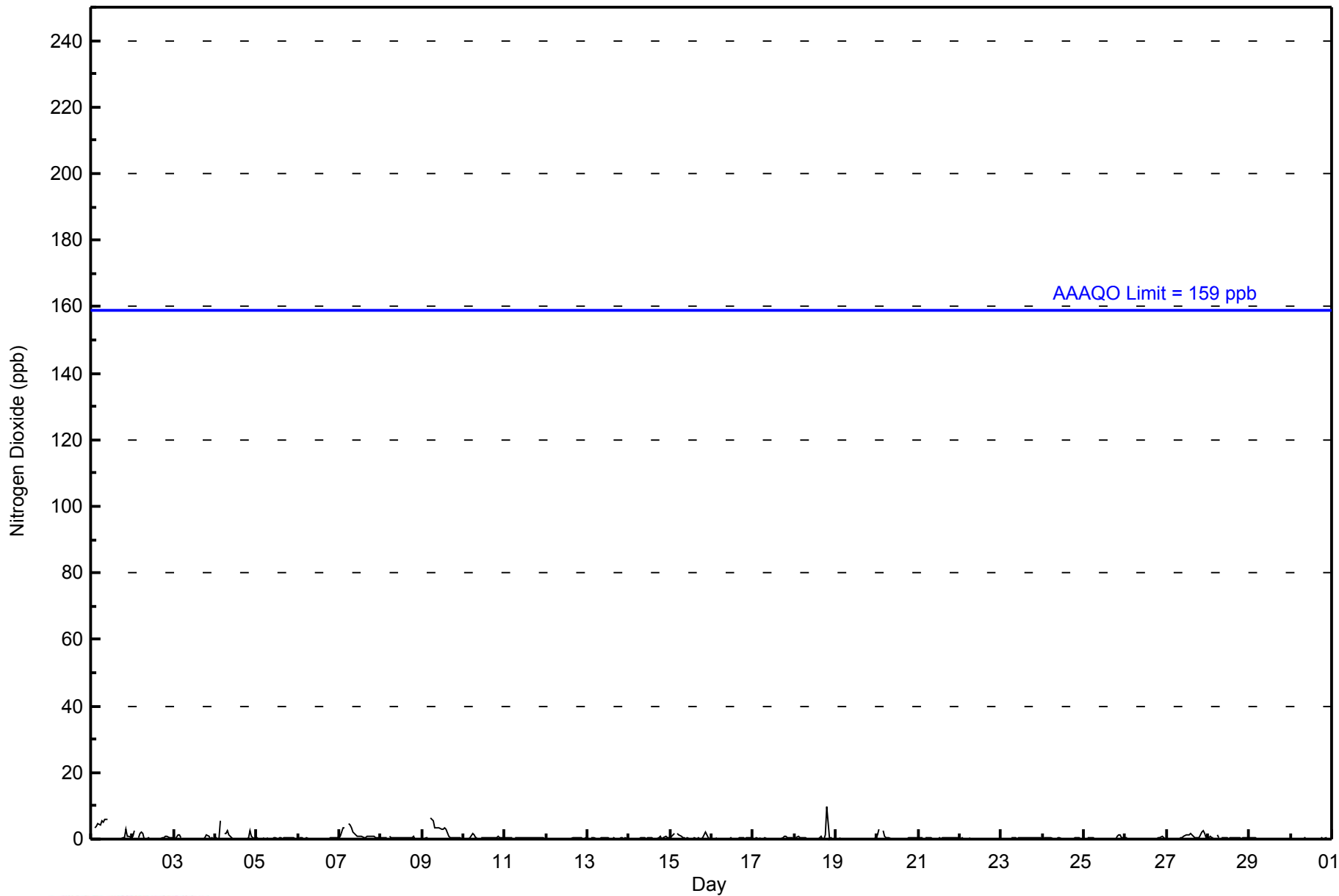
0.5	0.6	0.6	0.9	0.6	1.2	0.9	0.7	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.8	0.7	0.5	0.4	0.3	Diurnal Average		
3	3	3	5	5	7	6	5	6	6	3	3	3	3	4	3	1	1	1	1	10	3	3	2	1	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	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: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - April 2015**

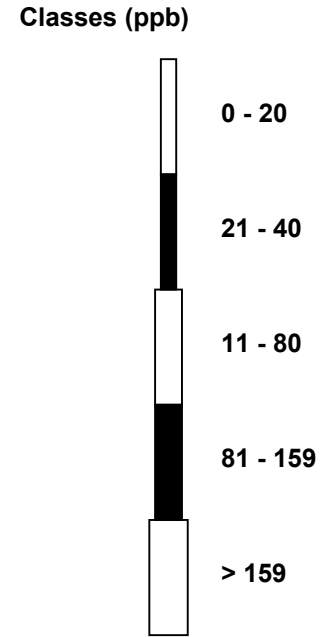
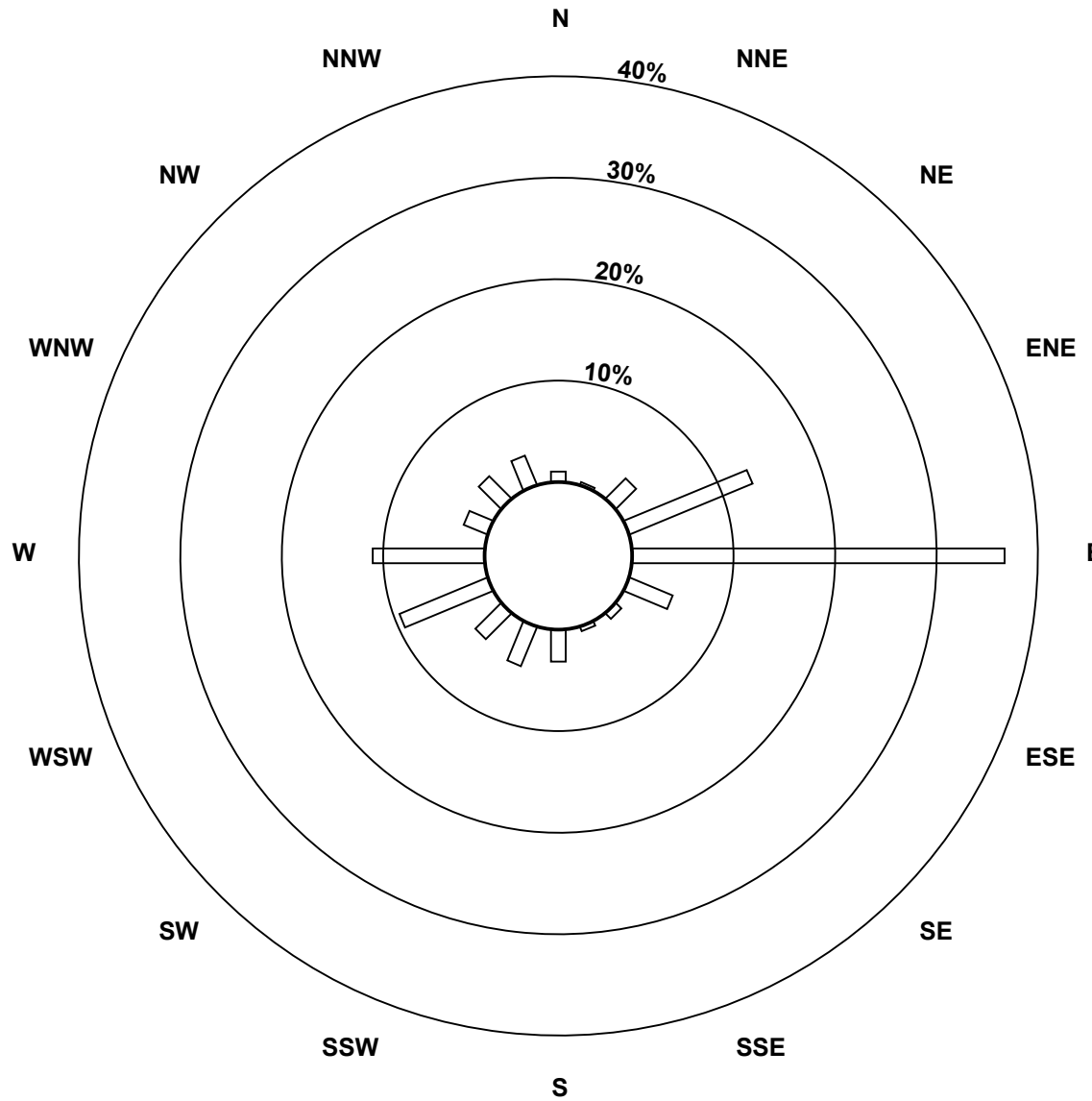
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	2	19	88	246	31	5	3	21	28	24	63	74	17	21	21	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	7	2	19	88	246	31	5	3	21	28	24	63	74	17	21	21	670

Total Number of Valid Hours: 670

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)

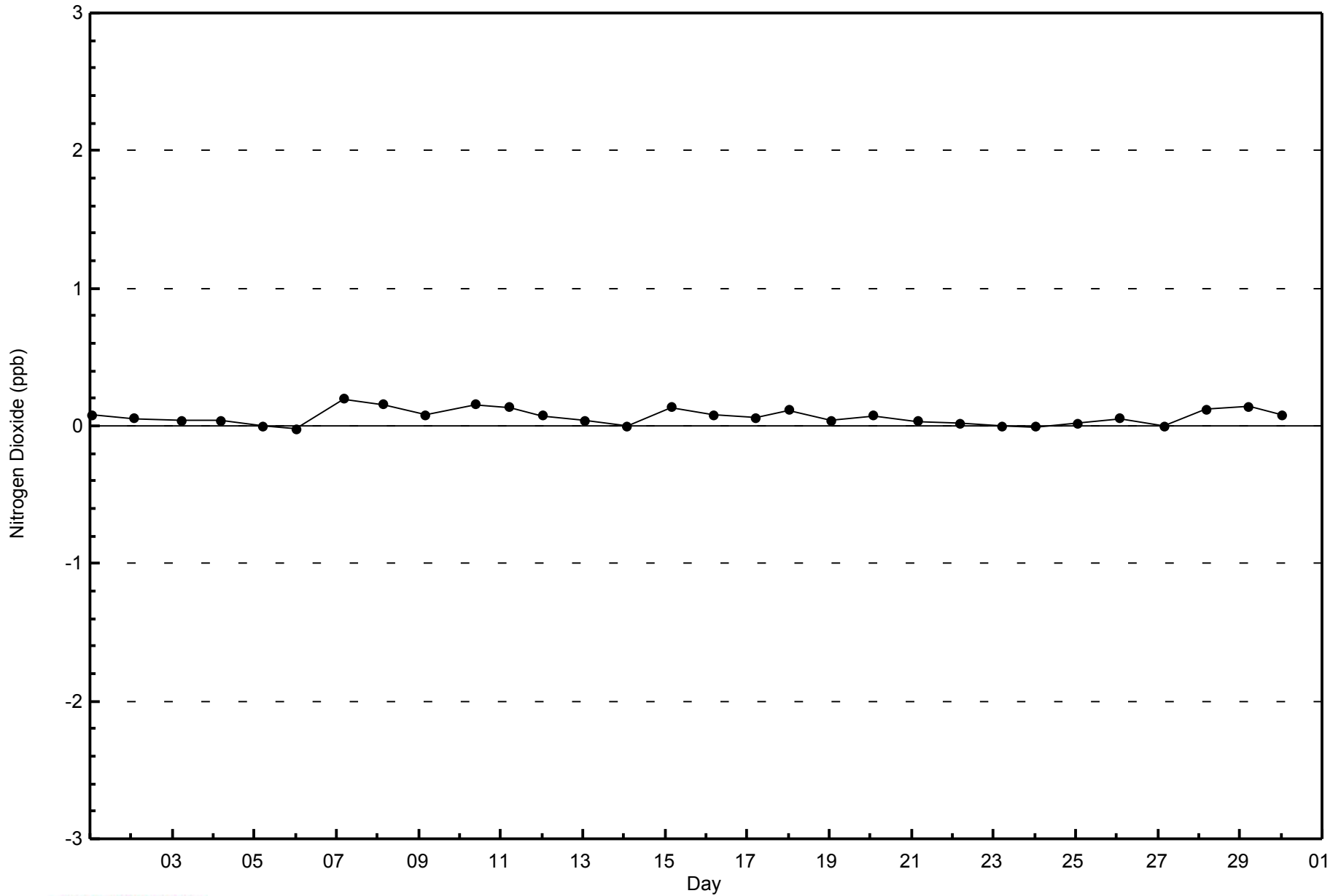


Total Number of Valid Hours: 670



WBEA  
Zero Responses

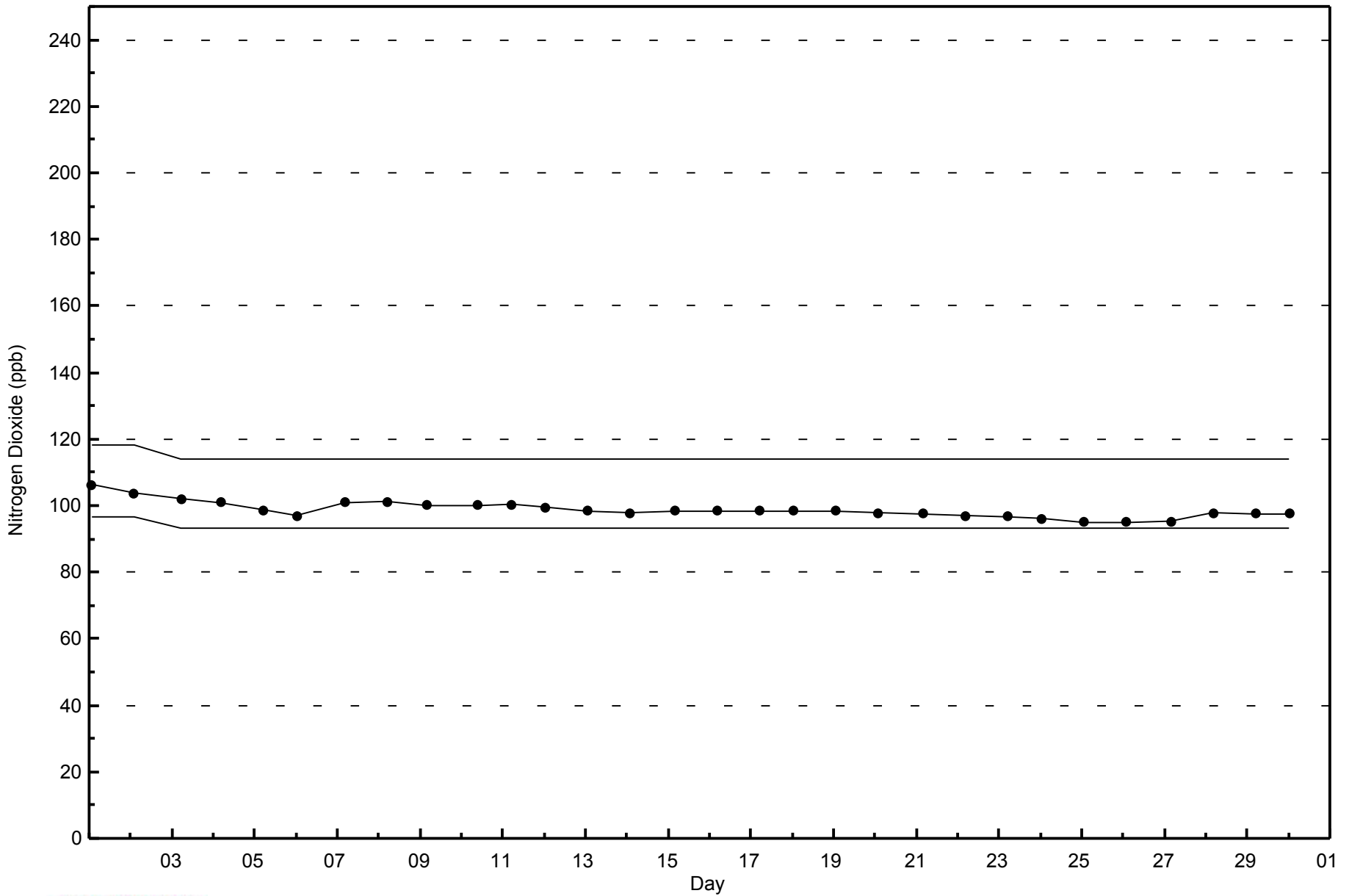
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - April 2015





**WBEA**  
**Span Responses**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - April 2015**



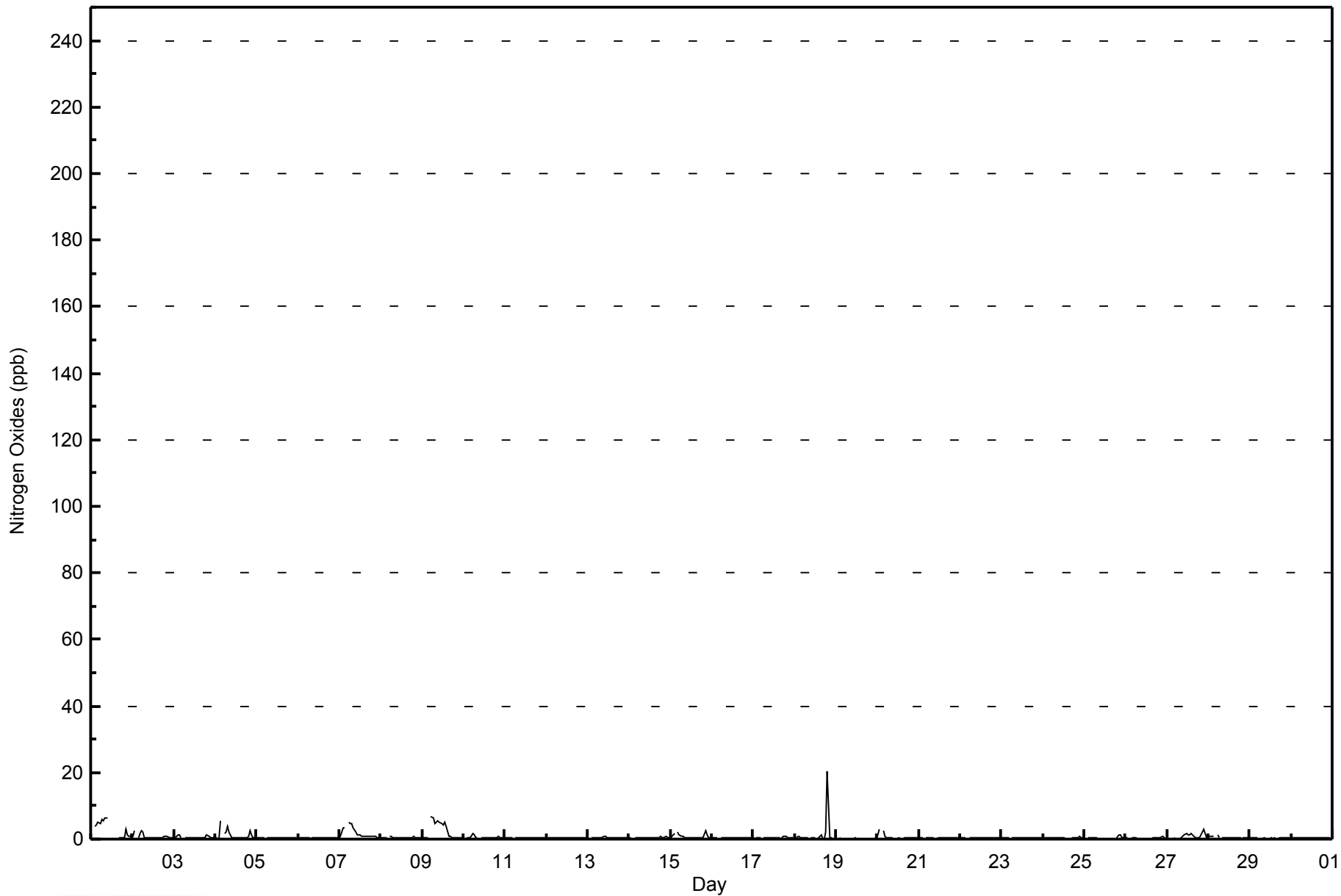


Maximum Value: 20 ppb on Apr 18 20:00		Maximum Daily Average: 2.5 ppb on Apr 9		Hours in Service: 720																																													
Minimum Value: 0 ppb on Apr 19 22:00		Minimum Daily Average: 0.2 ppb on Apr 19		Hours of Data: 683																																													
Maximum Diurnal Average: 1.3 ppb at hour 6		Minimum Diurnal Average: 0.3 ppb at hour 17		Hours of Missing Data: 37																																													
Monthly Average: 0.7 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 6		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-Apr	3	Z	4	4	5	5	6	6	6	6	C	C	C	C	C	C	0	0	0	0	3	1	1	1	--	6																							
2-Apr	1	3	Z	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.8	3																							
3-Apr	0	0	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.5	1																								
4-Apr	0	0	0	6	Z	2	2	4	2	1	0	0	0	0	0	0	0	0	0	1	2	1	1	0	1.1	6																							
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
6-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1																							
7-Apr	1	2	3	4	Z	5	5	5	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.8	5																							
8-Apr	1	1	1	1	Z	1	1	0	0	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0.5	1																							
9-Apr	0	0	0	0	Z	7	6	5	5	5	5	5	4	5	4	1	1	1	0	0	0	0	0	0	2.5	7																							
10-Apr	0	0	0	0	0	2	1	1	1	Z	1	0	0	0	0	0	1	0	0	0	1	0	1	1	0.5	2																							
11-Apr	1	1	1	1	1	Z	1	1	1	0	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0.5	1																							
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
13-Apr	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0.4	1																							
15-Apr	0	1	2	Z	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0.7	2																							
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0.4	1																							
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0.4	1																							
18-Apr	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2	20	0	0	0	0	1.3	20																							
19-Apr	0	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-Apr	1	3	Z	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.6	3																							
21-Apr	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-Apr	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1																							
25-Apr	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0.4	1																							
26-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1																							
27-Apr	0	0	0	Z	0	0	0	0	0	1	1	2	1	1	2	1	0	0	0	0	2	3	2	1	0.9	3																							
28-Apr	1	1	1	1	Z	1	0	UO	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1																							
29-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1																							
																								Diurnal Average	Diurnal Maximum																								
																								0.5	0.6	0.7	0.9	0.7	1.3	1.0	1.0	0.8	0.8	0.6	0.5	0.5	0.5	0.5	0.4	0.3	0.4	0.5	1.2	0.8	0.6	0.4	0.4		
																								3	3	4	6	5	7	6	6	6	6	5	5	4	5	4	1	1	1	2	20	3	3	2	1		
Z - zerospan																								C - Calibration				UO - Unstable Operation																					



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	683	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: 683

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - April 2015**

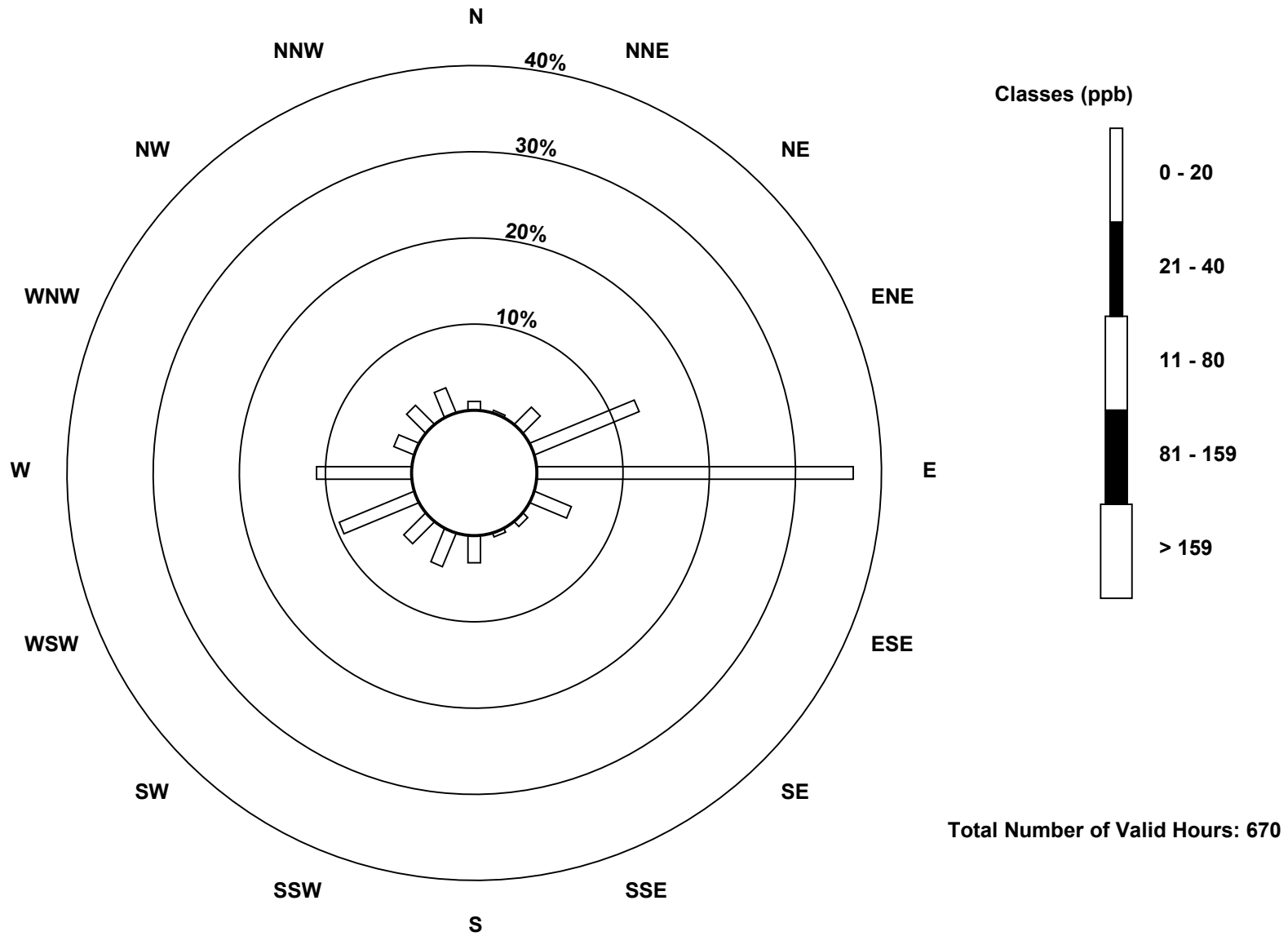
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	7	2	19	88	246	31	5	3	21	28	24	63	74	17	21	21	670
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	7	2	19	88	246	31	5	3	21	28	24	63	74	17	21	21	670

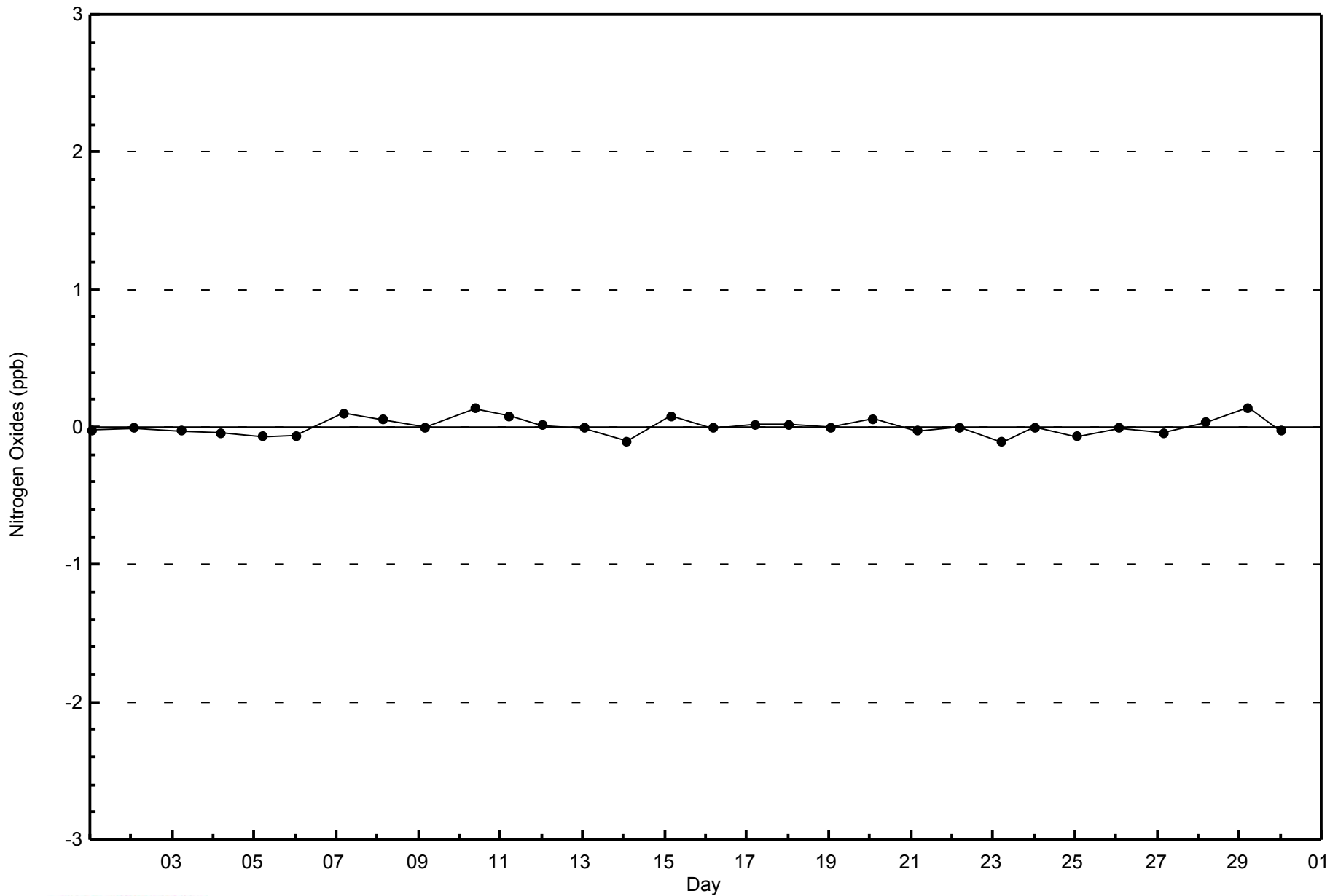
Total Number of Valid Hours: 670

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan (AMS 8)

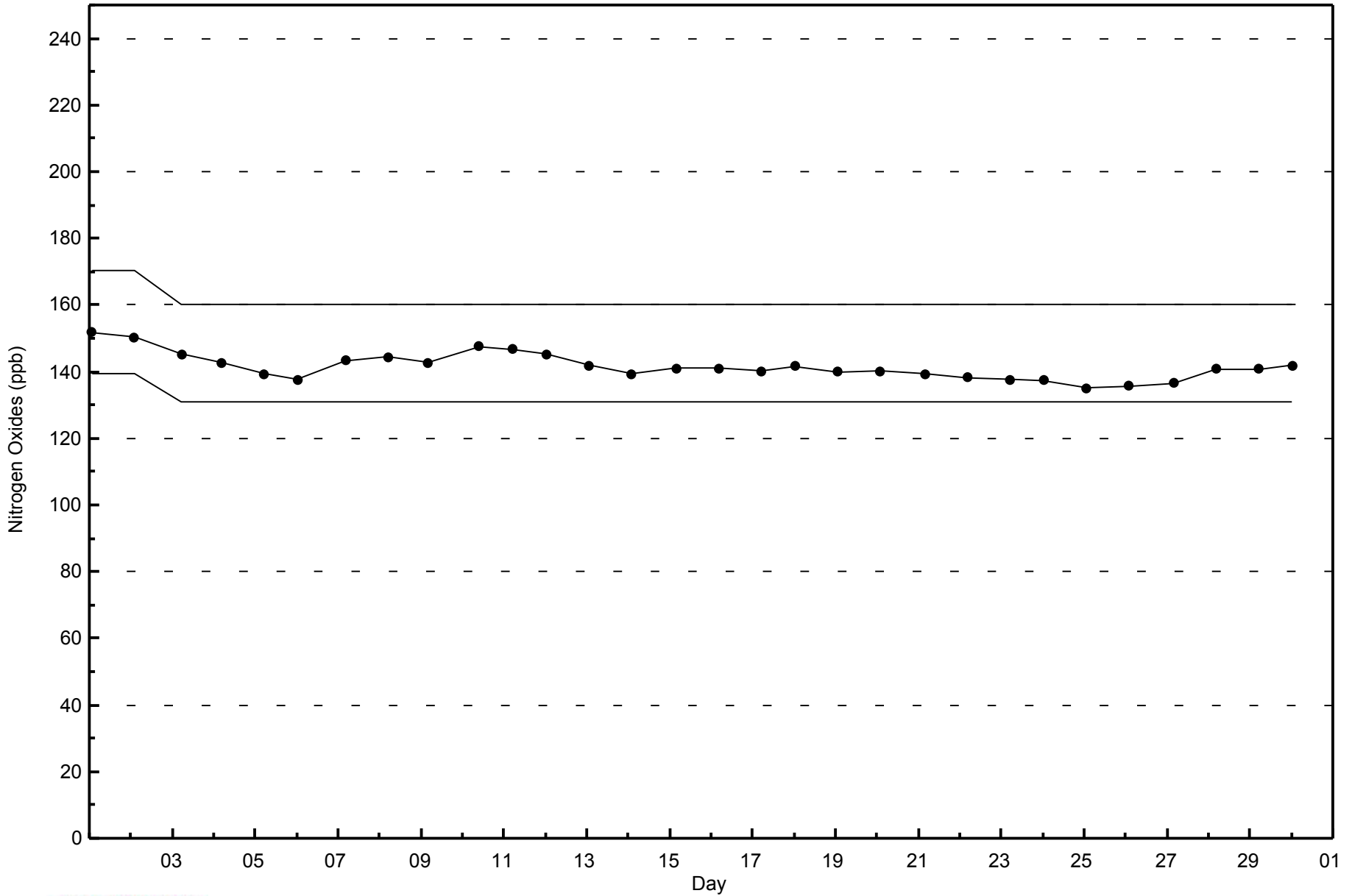






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan - April 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 52 ppb on Apr 10 17:00	Maximum Daily Average: 47.4 ppb on Apr 11
Minimum Value: 9 ppb on Apr 24 09:00	Hours of Data: 686
Maximum Diurnal Average: 41.4 ppb at hour 17	Hours of Missing Data: 34
Monthly Average: 37.1 ppb	Hours of Calibration: 34
Minimum Daily Average: 20.6 ppb on Apr 24	Percent Operational Time: 100.0
Minimum Diurnal Average: 31.9 ppb at hour 8	
Percentiles: P <sub>1</sub> = 13 P <sub>10</sub> = 26 Q <sub>1</sub> = 33 Median = 38 Q <sub>3</sub> = 43 P <sub>90</sub> = 46 P <sub>99</sub> = 51	

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	26	26	24	Z	22	22	22	22	20	20	17	18	23	23	C	C	C	C	33	33	31	32	32	32	25.1	33	
2-Apr	33	35	36	40	Z	38	39	41	41	42	41	41	41	42	42	42	43	43	42	41	41	41	41	40	40.3	43	
3-Apr	40	39	36	36	35	34	34	Z	31	30	30	31	32	32	32	34	35	36	36	34	33	35	36	36	34.2	40	
4-Apr	36	35	34	27	30	33	Z	29	32	35	35	36	36	37	38	39	39	40	41	38	35	37	37	38	35.5	41	
5-Apr	39	38	38	37	36	34	33	Z	33	33	33	33	33	34	33	33	38	37	39	36	35	33	35	38	35.2	39	
6-Apr	38	38	Z	37	37	36	37	37	38	38	39	40	40	40	40	40	41	42	42	42	43	42	43	42	39.6	43	
7-Apr	40	37	35	34	33	31	Z	34	37	40	42	43	44	44	45	45	47	48	47	46	45	44	42	41	41.0	48	
8-Apr	39	39	38	37	37	36	Z	36	40	41	41	42	43	43	44	41	41	44	45	44	45	43	41	39	40.9	45	
9-Apr	39	39	39	39	34	29	Z	35	36	36	37	39	40	42	45	47	46	44	42	41	41	41	40	41	39.6	47	
10-Apr	41	43	47	46	44	39	38	40	40	46	47	Z	49	51	51	52	52	51	50	51	50	50	51	52	47.0	52	
11-Apr	51	51	51	50	51	50	50	Z	47	44	43	45	46	47	48	47	48	48	47	46	45	46	45	45	47.4	51	
12-Apr	44	43	Z	42	42	40	40	40	40	39	40	41	42	43	43	43	42	41	41	40	37	31	29	27	39.6	44	
13-Apr	26	26	25	Z	24	23	23	23	23	24	24	25	31	35	35	36	35	34	30	30	30	31	31	30	28.4	36	
14-Apr	27	27	26	26	Z	28	29	32	32	33	34	34	35	35	35	36	36	37	39	38	43	43	43	43	34.0	43	
15-Apr	41	38	34	31	30	Z	30	31	35	38	40	41	42	42	43	44	45	44	43	43	39	39	40	42	38.9	45	
16-Apr	41	40	37	34	34	33	Z	36	38	38	39	41	44	44	45	47	46	45	45	44	43	43	42	41	40.9	47	
17-Apr	40	40	40	39	38	37	37	Z	40	40	42	43	44	43	41	43	43	46	47	46	44	42	41	42	41.7	47	
18-Apr	38	40	Z	40	41	39	37	35	33	32	33	37	38	37	40	40	41	40	38	35	38	38	39	38	37.7	41	
19-Apr	37	37	36	Z	35	34	33	34	33	32	32	30	32	32	34	37	44	44	36	35	35	35	34	34	34.9	44	
20-Apr	32	31	27	26	Z	37	36	36	35	35	35	39	41	42	43	43	44	43	43	42	41	41	41	40	38.0	44	
21-Apr	38	36	35	34	33	Z	33	33	34	34	35	36	36	37	36	36	38	37	37	35	35	35	34	33	35.3	38	
22-Apr	33	32	32	32	32	32	Z	33	34	35	36	36	37	38	39	40	41	41	41	41	40	39	38	37	36.5	41	
23-Apr	38	38	37	37	37	37	Z	35	35	34	34	34	34	35	36	40	42	43	44	43	41	40	39	38.0	44		
24-Apr	35	33	Z	25	17	12	10	9	9	10	15	23	26	24	25	26	27	26	25	24	19	18	17	17	20.6	35	
25-Apr	16	16	16	Z	14	13	13	13	13	13	13	14	15	18	23	27	24	28	31	34	34	30	28	27	27	21.1	34
26-Apr	28	28	26	25	Z	23	23	22	23	24	24	24	26	29	30	32	34	32	30	29	27	27	31	31	27.3	34	
27-Apr	32	32	31	31	32	Z	32	32	32	34	40	47	47	49	47	47	48	47	47	46	43	39	40	43	39.9	49	
28-Apr	43	42	39	37	35	33	Z	38	40	40	41	39	39	43	47	47	48	45	43	46	48	49	47	48	42.4	49	
29-Apr	44	45	45	47	47	45	43	Z	42	41	42	42	44	44	47	47	48	48	48	47	46	45	46	45	45.1	48	
30-Apr	46	45	Z	43	42	41	42	44	44	44	44	45	46	48	49	49	47	47	46	47	45	45	44	43	45.3	50	

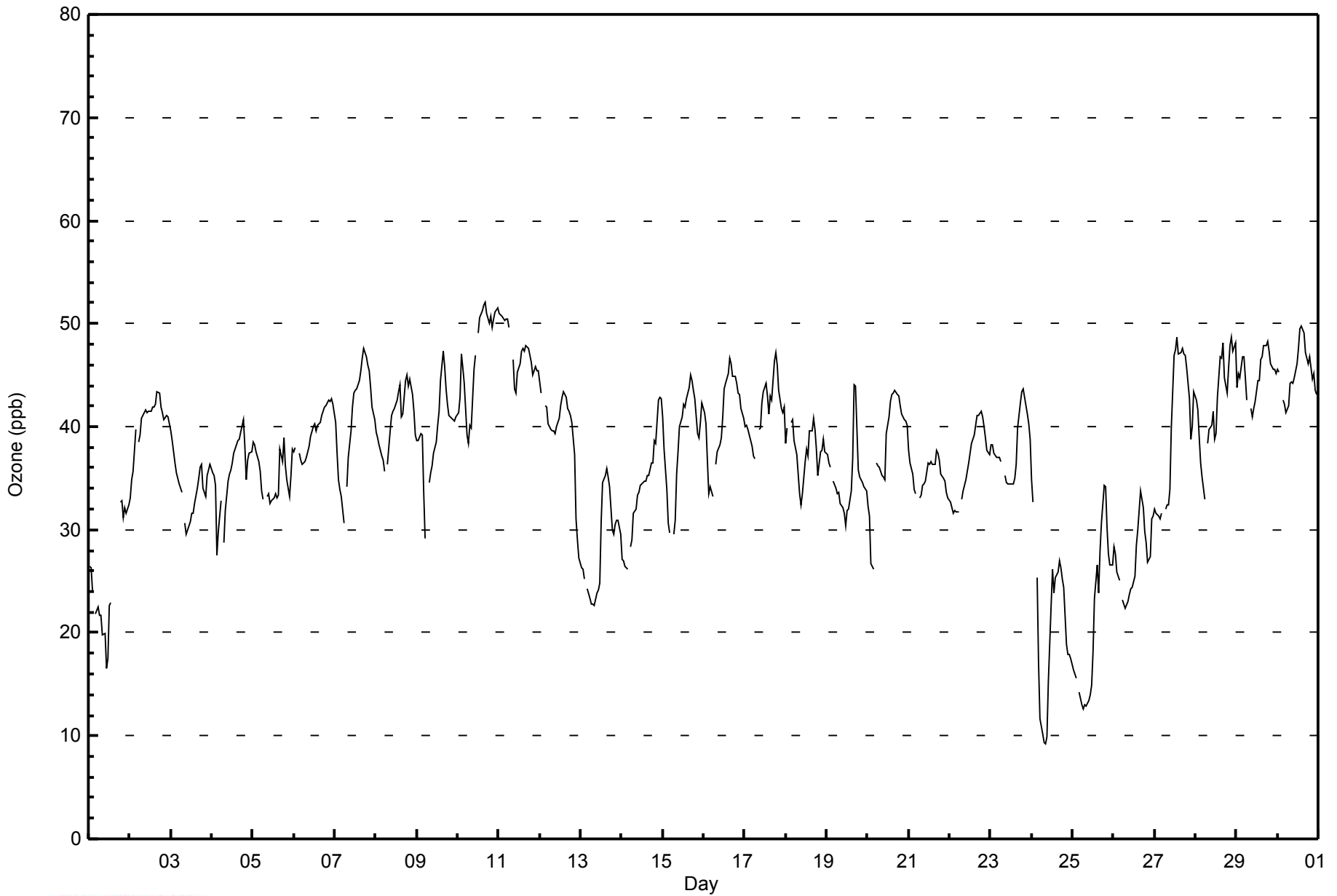
36.7	36.3	34.6	35.8	34.2	33.0	32.6	31.9	33.6	34.2	35.0	35.9	37.7	38.6	40.0	40.4	41.4	41.4	40.6	40.0	38.8	38.4	38.2	38.1	Diurnal Average	
51	51	51	50	51	50	50	44	47	46	47	47	49	51	51	52	52	51	50	51	50	50	51	52	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	27	3.94	3.94
21 - 50	647	94.31	98.25
51 - 82	12	1.75	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - April 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	0	0	4	15	7	1	0	0	0	0	0	0	0	0	0	0	27
21 - 50	6	2	15	75	235	28	5	2	21	28	24	59	75	18	21	20	634
51 - 82	0	0	0	0	7	1	0	0	0	0	0	3	1	0	0	0	12
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	6	2	19	90	249	30	5	2	21	28	24	62	76	18	21	20	673

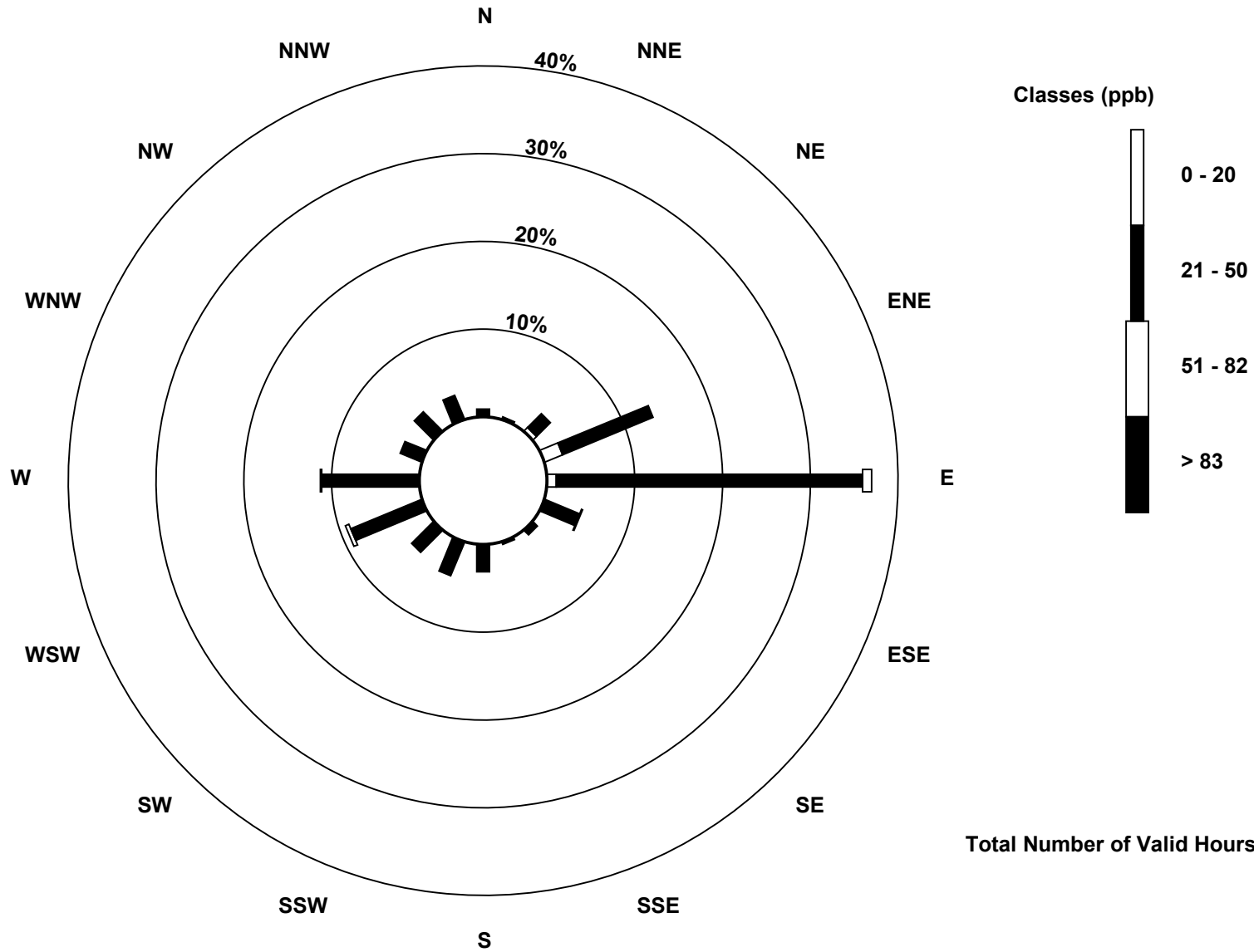
Total Number of Valid Hours: 673

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan (AMS 8)

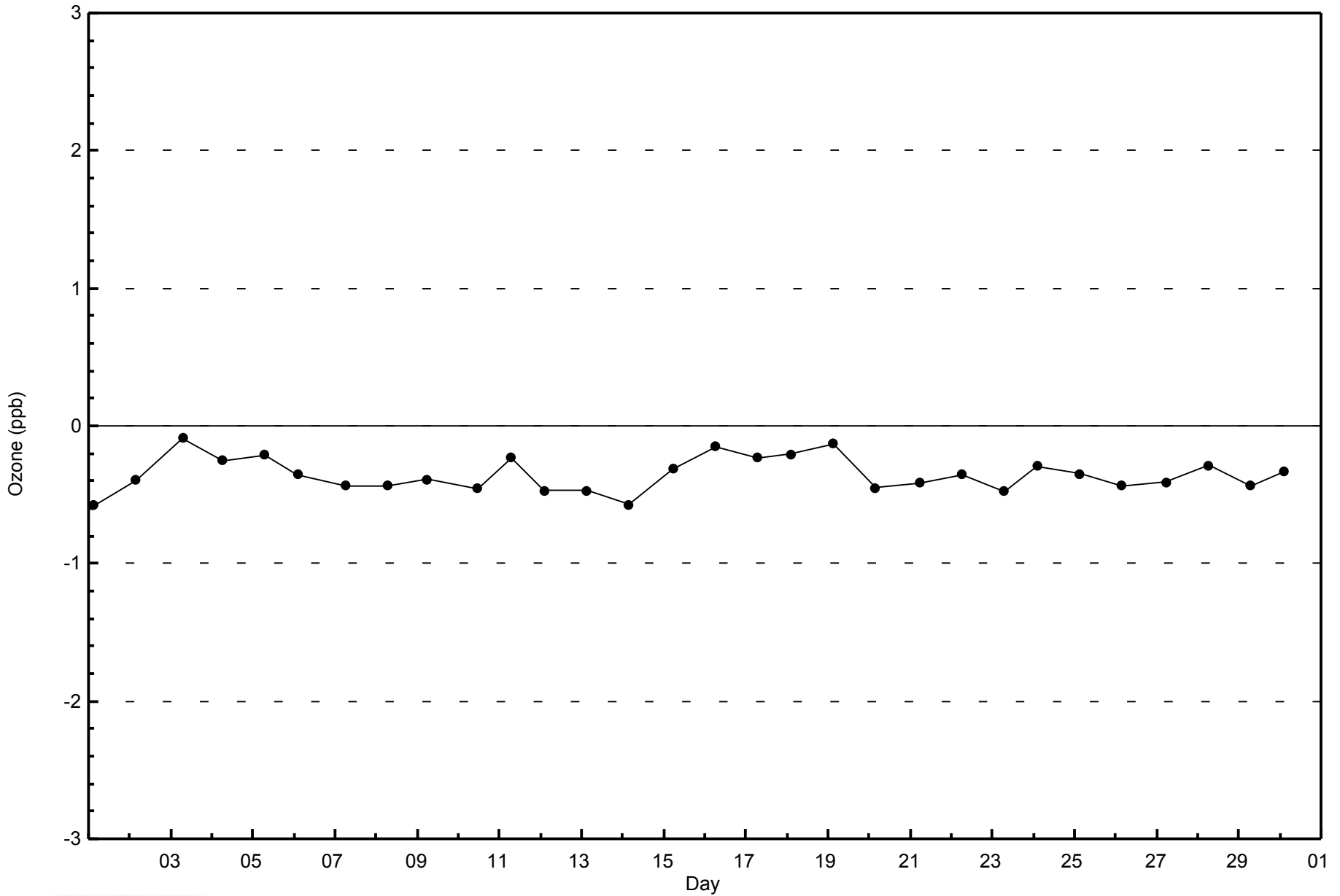


Total Number of Valid Hours: 673



WBEA  
Zero Responses

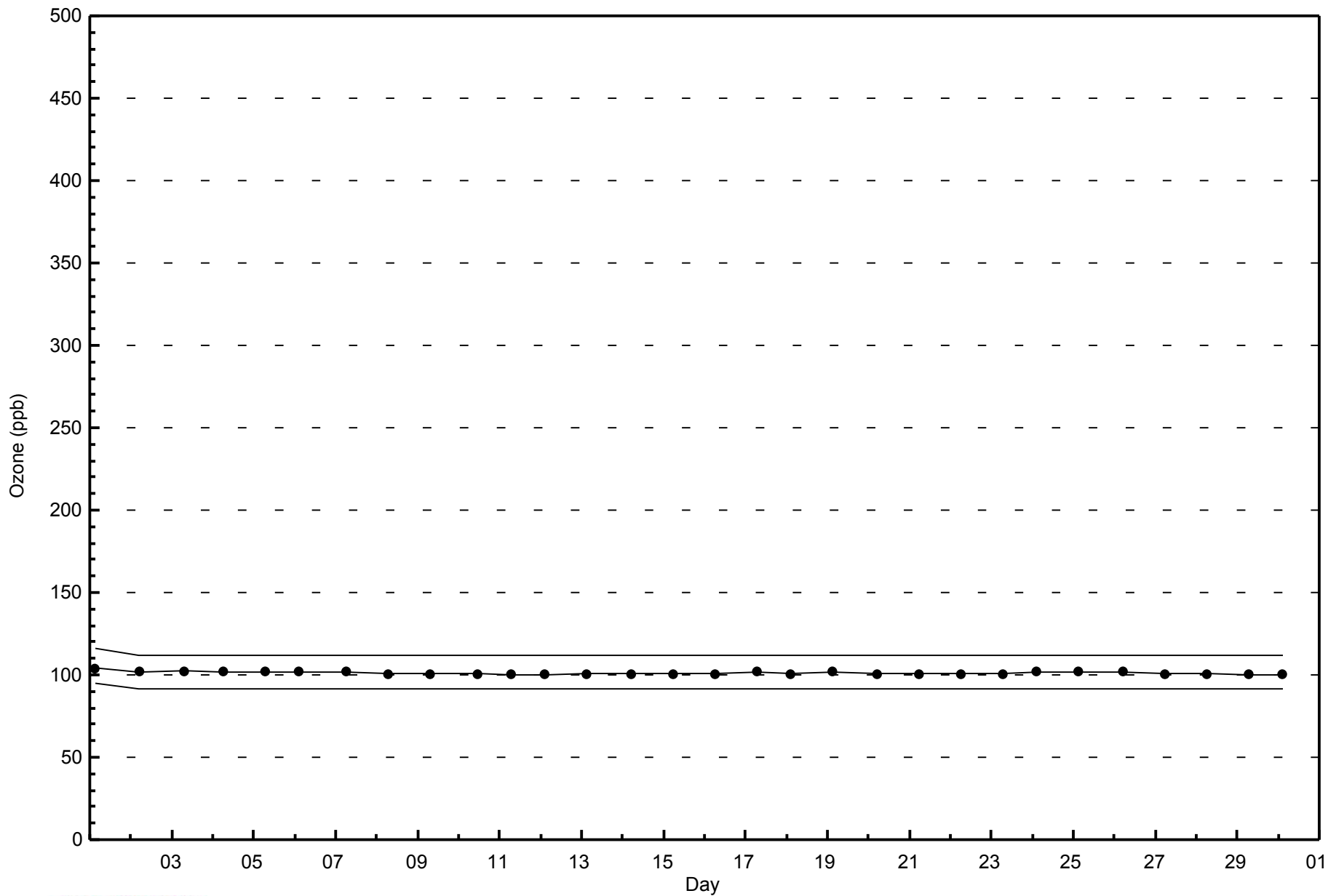
Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan - April 2015





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - April 2015**





Summary of Hour Averages

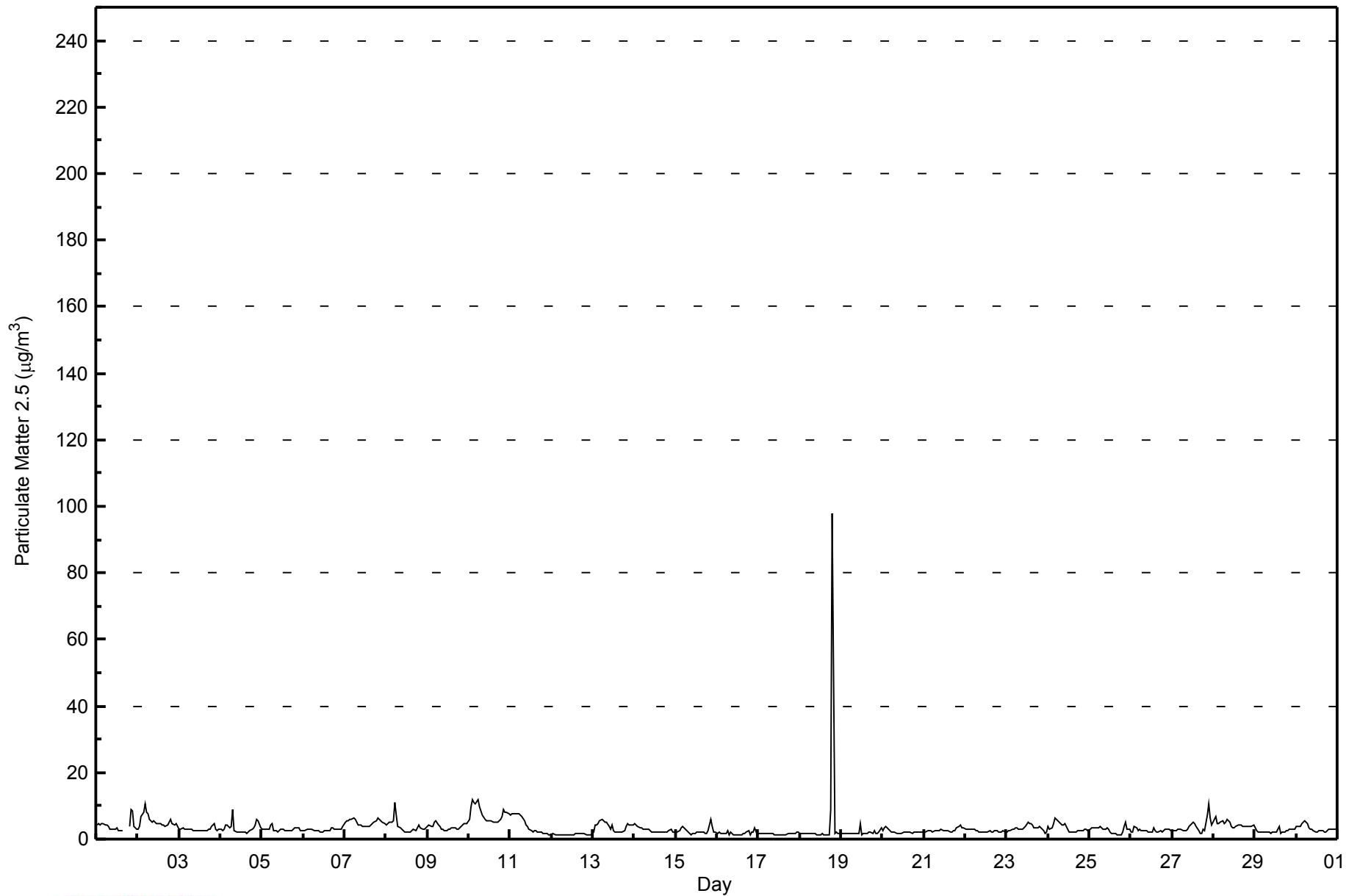
Fort Chipewyan - April 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 98.0 µg/m <sup>3</sup> on Apr 18 20:00 Maximum Daily Average: 7.5 µg/m <sup>3</sup> on Apr 10		Hours in Service: 720 Hours of Data: 717 Hours of Missing Data: 3 Hours of Calibration: 0 Percent Operational Time: 99.6																								
Minimum Value: 1.1 µg/m <sup>3</sup> on Apr 12 22:00 Maximum Diurnal Average: 6.3 µg/m <sup>3</sup> at hour 20 Monthly Average: 3.34 µg/m <sup>3</sup>		Minimum Daily Average: 1.4 µg/m <sup>3</sup> on Apr 12 Minimum Diurnal Average: 2.5 µg/m <sup>3</sup> at hour 16 Percentiles: P <sub>1</sub> = 1.2 P <sub>10</sub> = 1.6 Q <sub>1</sub> = 2.1 Median = 2.8 Q <sub>3</sub> = 3.9 P <sub>90</sub> = 5.3 P <sub>99</sub> = 10.6																								
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-Apr	4.2	4.5	4.3	4.5	4.7	4.3	4.2	3.8	3.2	2.8	3.0	3.1	3.3	2.6	2.6	2.4	M	M	M	3.6	8.8	8.4	4.0	3.1	4.1	8.8
2-Apr	3.0	3.6	6.9	7.8	10.8	8.2	7.6	5.9	5.1	5.3	5.0	4.8	4.6	4.7	4.4	4.2	3.9	4.2	5.0	6.0	4.5	4.2	4.8	3.7	5.3	10.8
3-Apr	2.9	3.1	3.6	3.1	3.0	3.0	3.0	2.9	2.7	2.7	2.7	2.7	2.7	2.6	2.6	2.7	3.0	3.2	3.8	4.7	2.8	2.7	3.1	3.0	3.3	4.7
4-Apr	2.8	2.7	2.8	4.4	4.3	3.6	3.7	9.0	2.6	2.2	2.2	2.2	1.9	1.9	1.9	2.1	2.5	3.0	3.5	4.1	5.8	5.5	3.3	3.3	3.3	9.0
5-Apr	2.9	2.9	2.8	2.9	3.1	4.1	4.8	2.7	2.4	2.2	2.6	2.8	2.9	2.7	2.6	2.5	2.7	2.7	3.0	3.6	3.3	3.5	2.4	2.3	2.9	4.8
6-Apr	2.4	2.6	2.8	2.8	2.8	2.8	2.7	2.5	2.4	2.3	2.2	2.2	2.4	2.4	2.4	2.5	3.6	3.3	2.9	3.0	3.1	2.9	3.2	3.7	2.8	3.7
7-Apr	5.0	5.7	5.6	5.8	5.9	6.4	5.9	5.0	4.3	4.2	3.9	3.8	4.0	3.9	3.9	4.2	4.7	5.1	5.7	6.2	5.9	5.5	5.0	4.8	5.0	6.4
8-Apr	4.3	4.8	5.0	5.3	5.7	10.9	7.3	4.0	3.3	3.1	2.6	2.2	2.1	2.0	1.9	2.4	2.8	2.6	3.2	4.1	3.3	3.1	3.1	3.3	3.8	10.9
9-Apr	3.6	4.0	3.8	3.8	4.9	5.4	4.1	3.6	3.0	2.8	2.7	2.7	2.9	3.1	3.2	3.3	3.4	2.9	2.8	3.3	4.2	4.7	4.5	4.7	3.7	5.4
10-Apr	5.9	9.8	12.1	10.9	10.5	12.0	9.6	8.5	7.4	6.0	5.4	5.4	5.6	5.4	5.1	5.0	5.3	5.0	5.9	6.8	9.0	8.2	8.2	7.8	7.5	12.1
11-Apr	7.2	7.5	7.6	7.6	7.6	7.7	7.1	6.6	5.7	4.3	3.9	3.1	2.3	2.2	2.4	2.4	2.2	2.3	2.1	1.9	1.8	1.5	1.5	1.3	4.2	7.7
12-Apr	1.3	1.6	1.3	1.3	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.3	1.4	1.4	1.6	1.6	1.7	1.5	1.5	1.7	1.2	1.1	1.4	1.4	1.4	1.7
13-Apr	2.2	4.1	4.3	4.5	5.3	5.8	5.3	5.1	5.2	3.8	3.0	4.2	2.5	1.9	2.1	2.0	2.2	2.1	2.4	3.7	4.6	4.3	4.3	4.3	3.7	5.8
14-Apr	4.5	4.0	3.6	3.5	3.4	3.1	2.9	3.0	2.8	2.5	2.3	2.1	2.0	2.0	2.0	2.1	2.2	2.1	2.3	2.1	2.5	3.1	2.3	1.9	2.7	4.5
15-Apr	1.7	2.0	2.7	3.4	3.6	3.4	2.6	2.0	1.5	1.5	1.7	1.7	1.9	2.0	2.1	2.0	2.0	1.9	1.8	2.3	6.0	3.9	2.1	2.1	2.4	6.0
16-Apr	1.6	2.3	1.6	1.6	1.7	1.6	2.7	1.5	2.1	1.4	1.3	1.4	1.4	1.4	1.4	1.8	1.7	2.0	2.4	1.5	2.0	2.1	3.4	1.5	1.8	3.4
17-Apr	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.3	1.3	1.3	1.4	1.3	1.8	1.9	1.9	1.6	1.7	2.2	2.0	1.6	2.2
18-Apr	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.6	1.5	1.3	1.2	1.4	8.8	98.0	1.8	2.1	1.7	1.7	5.9	98.0
19-Apr	1.8	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.6	1.7	1.7	4.8	1.5	1.5	1.5	1.5	2.0	2.1	1.8	2.3	1.9	1.9	2.0	3.3	2.0	4.8
20-Apr	2.5	3.6	3.9	3.1	2.5	2.2	1.9	2.1	1.8	1.7	1.7	1.8	2.1	2.0	2.1	2.0	1.9	1.9	2.0	2.2	2.3	2.2	2.2	2.1	2.2	3.9
21-Apr	2.2	2.3	2.7	2.6	2.5	2.0	2.5	2.5	2.6	2.7	3.0	2.6	2.4	2.7	2.4	2.3	2.3	2.5	2.6	3.4	3.7	4.3	3.5	3.5	2.7	4.3
22-Apr	3.1	3.1	2.9	3.0	3.0	2.8	2.6	2.4	2.1	2.0	2.0	2.1	2.1	2.0	2.4	2.2	2.3	2.5	2.7	2.0	2.0	2.2	2.4	2.2	2.4	3.1
23-Apr	2.1	2.5	2.6	3.0	3.1	3.3	3.2	2.9	2.9	3.3	3.8	4.9	4.6	4.6	4.1	3.5	3.6	3.5	3.8	3.5	3.5	2.6	1.8	2.1	3.3	4.9
24-Apr	4.0	3.0	3.6	4.5	6.2	6.1	5.2	4.5	4.1	4.0	4.8	2.8	2.1	2.1	2.0	2.0	1.9	2.7	2.6	2.6	2.5	3.1	2.9	2.7	3.4	6.2
25-Apr	3.0	3.4	3.3	3.4	3.2	3.2	3.8	3.3	3.2	3.0	3.3	3.1	2.1	1.7	1.6	1.6	1.4	1.3	1.3	2.3	3.7	5.1	2.9	3.0	2.8	5.1
26-Apr	2.3	2.3	4.0	3.2	2.7	2.8	2.6	2.4	2.4	2.4	2.3	2.3	2.2	3.2	2.4	2.2	2.2	2.5	2.3	2.4	3.0	3.1	2.9	2.5	2.6	4.0
27-Apr	2.5	2.6	2.7	2.8	3.1	2.9	2.7	2.7	2.7	3.1	3.7	4.9	4.9	4.6	3.8	2.4	1.8	1.8	2.8	2.4	7.1	10.7	6.3	4.4	3.7	10.7
28-Apr	5.8	6.7	4.7	4.6	5.2	5.6	4.6	5.2	5.9	5.2	3.9	3.6	3.4	3.9	4.3	4.4	4.3	3.7	3.7	3.8	3.9	3.9	3.9	4.1	4.5	6.7
29-Apr	3.4	2.4	2.1	2.0	2.1	2.1	2.1	2.0	2.0	1.9	2.1	1.9	2.0	3.2	3.8	1.7	1.9	2.1	2.4	2.5	2.8	3.0	2.9	2.8	2.4	3.8
30-Apr	4.0	3.9	3.9	4.6	5.1	5.3	4.5	3.3	3.0	2.8	2.4	2.0	2.1	2.4	2.6	2.5	2.1	2.2	2.5	2.8	3.1	3.1	2.8	2.8	3.2	5.3
																								Diurnal Average		
																								Diurnal Maximum		
3.2 3.5 3.7 3.8 4.1 4.2 3.8 3.5 3.1 2.8 2.8 2.8 2.6 2.6 2.6 2.5 2.5 2.6 3.0 6.3 3.7 3.8 3.3 3.0 7.2 9.8 12.1 10.9 10.8 12.0 9.6 9.0 7.4 6.0 5.4 5.4 5.6 5.4 5.1 5.0 5.3 5.1 8.8 98.0 9.0 10.7 8.2 7.8																										
M - Maintenance Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort Chipewyan - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	654	91.21	91.21
6 - 15	62	8.65	99.86
16 - 25	0	0.00	99.86
26 - 80	0	0.00	99.86
> 81.0	1	0.14	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - April 2015**

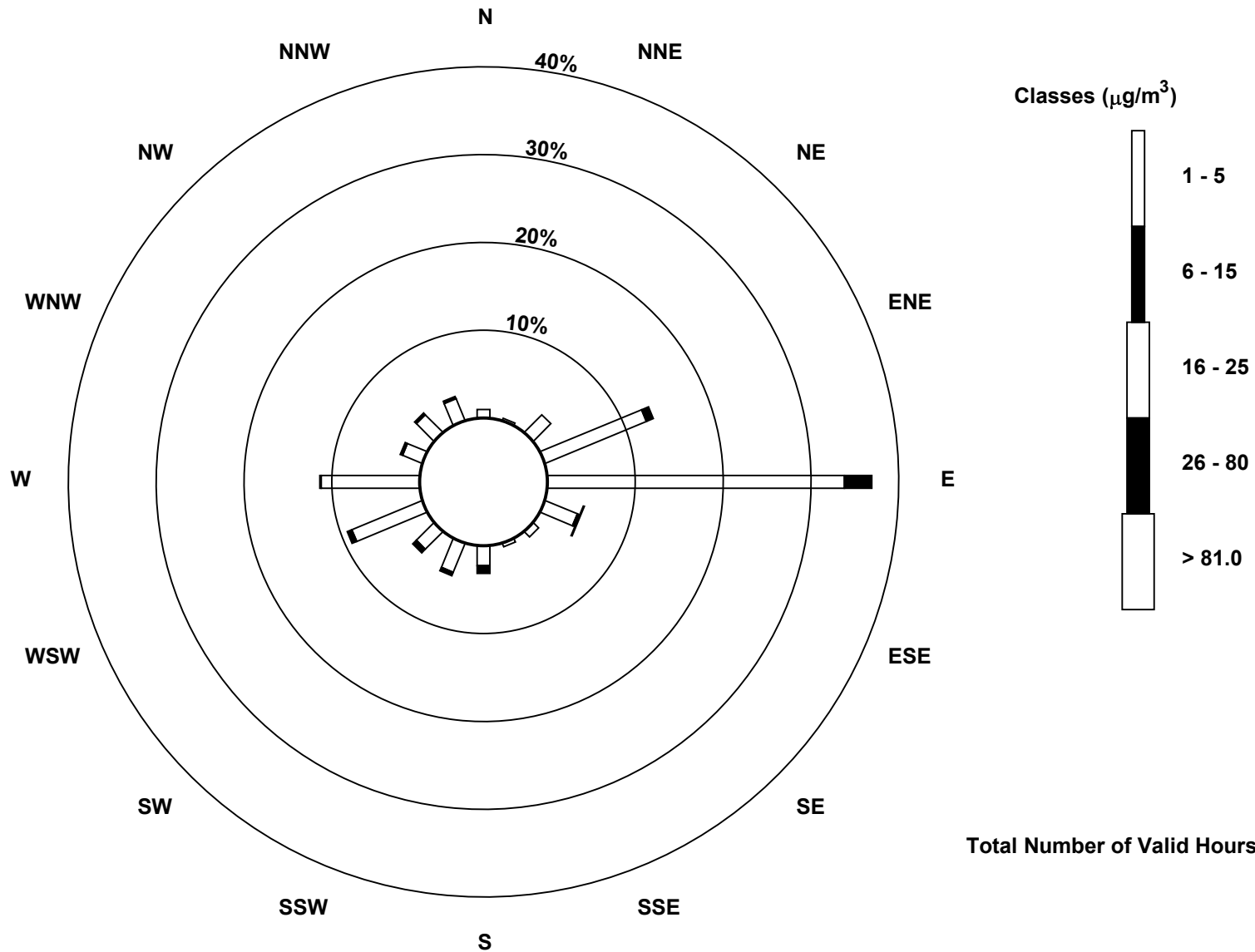
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	7	2	20	88	238	28	6	3	16	25	20	61	79	17	20	19	649
6 - 15	0	0	0	6	22	2	0	0	6	3	4	4	1	2	2	2	54
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<b>Totals</b>	7	2	20	94	260	31	6	3	22	28	24	65	80	19	22	21	704

Total Number of Valid Hours: 704

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 704



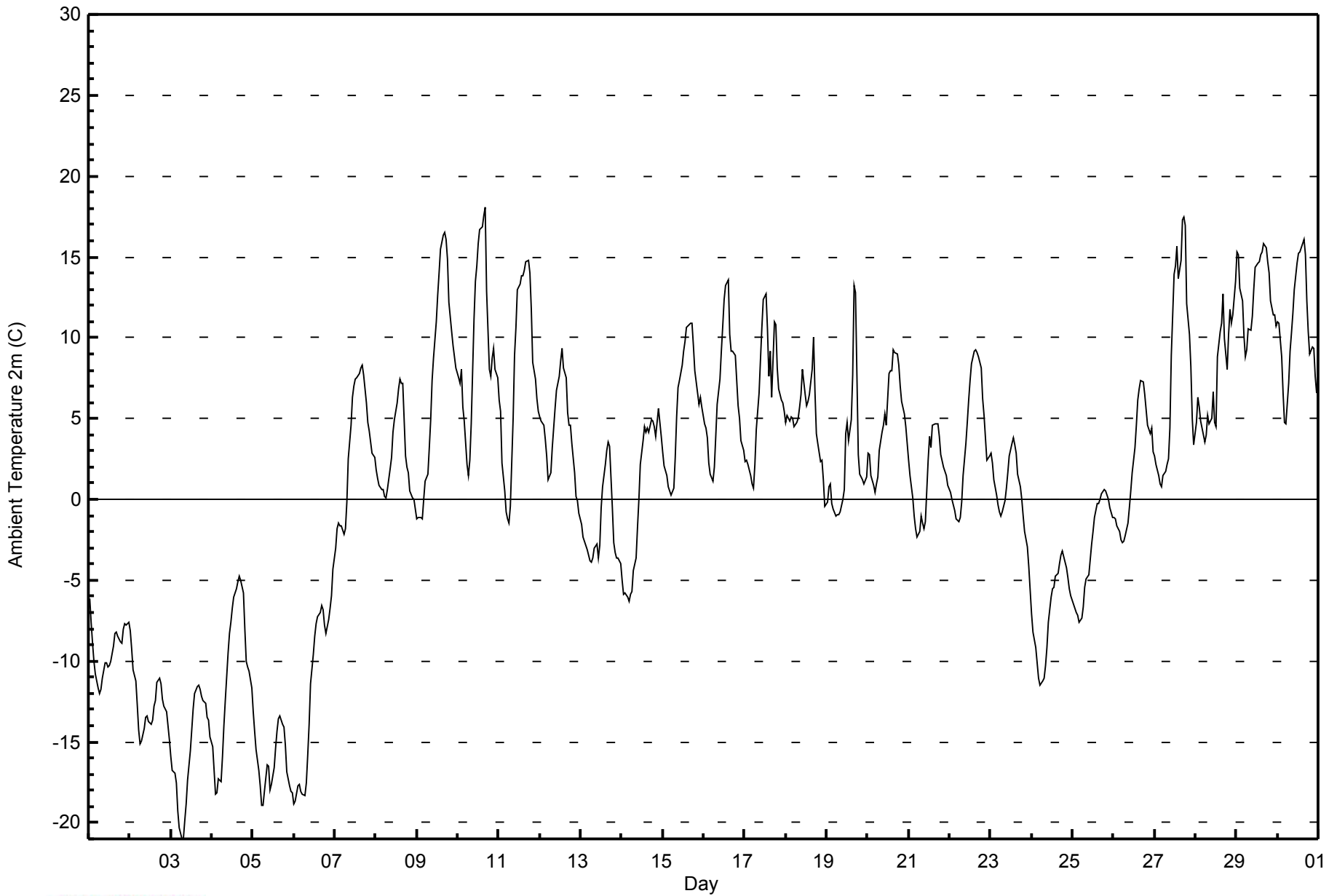


Maximum Value: 18.1 C on Apr 10 17:00																				Maximum Daily Average: 12.9 C on Apr 29					Hours in Service: 720	
Minimum Value: -21.0 C on Apr 3 08:00																				Minimum Daily Average: -16.2 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 5.3 C at hour 17																				Minimum Diurnal Average: -3.7 C at hour 6					Hours of Missing Data: 0	
Monthly Average: 0.85 C																				Percentiles: P <sub>1</sub> = -18.9 P <sub>10</sub> = -12.8 Q <sub>1</sub> = -4.5 Median = 2.2 Q <sub>3</sub> = 7.1 P <sub>90</sub> = 11.3 P <sub>99</sub> = 16.5					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-Apr	-6.1	-7.6	-8.9	-10.0	-10.8	-11.7	-12.0	-11.7	-11.1	-10.1	-10.1	-10.3	-10.3	-10.0	-9.1	-8.3	-8.2	-8.5	-8.8	-8.9	-8.0	-7.7	-7.7	-7.6	-9.3	-6.1
2-Apr	-8.1	-9.2	-10.5	-11.2	-12.7	-14.3	-15.1	-14.9	-14.2	-13.4	-13.4	-13.8	-13.9	-13.6	-12.8	-12.4	-11.3	-11.0	-11.4	-12.4	-12.8	-13.1	-14.0	-14.9	-12.7	-8.1
3-Apr	-15.9	-16.8	-16.9	-17.6	-19.3	-20.3	-21.0	-21.0	-19.9	-18.9	-17.3	-15.5	-14.3	-13.0	-12.0	-11.5	-11.7	-12.2	-12.4	-12.7	-13.5	-13.7	-14.7	-15.6	-11.5	-4.8
4-Apr	-15.3	-16.8	-18.2	-18.2	-17.3	-17.5	-15.9	-14.0	-12.5	-9.5	-8.3	-7.6	-6.7	-6.1	-5.5	-5.1	-4.8	-5.0	-5.7	-8.0	-10.0	-10.3	-10.6	-11.7	-10.9	-4.8
5-Apr	-13.2	-14.3	-15.5	-16.8	-17.7	-18.9	-18.9	-18.1	-16.4	-16.5	-18.0	-17.6	-16.6	-15.4	-14.3	-13.6	-13.4	-13.9	-14.1	-15.2	-16.9	-17.7	-18.0	-18.1	-16.2	-13.2
6-Apr	-18.8	-18.6	-17.7	-17.6	-18.1	-18.2	-18.3	-17.5	-15.8	-13.9	-11.4	-9.6	-8.5	-7.7	-7.3	-7.0	-6.6	-6.8	-7.8	-8.3	-7.5	-6.8	-6.0	-4.3	-11.7	-4.3
7-Apr	-3.0	-1.8	-1.5	-1.7	-1.7	-2.2	-1.8	-0.2	2.5	4.6	6.3	7.0	7.5	7.6	7.8	8.2	8.3	7.7	5.9	4.7	4.2	3.6	2.9	2.6	3.2	8.3
8-Apr	1.8	1.3	0.9	0.6	0.6	0.2	0.1	0.6	1.9	2.6	4.1	4.9	6.0	6.8	7.4	7.2	7.2	2.7	2.0	1.7	0.5	0.1	0.0	-0.6	2.5	7.4
9-Apr	-1.2	-1.1	-1.1	-1.2	0.0	1.1	1.6	3.2	5.0	7.3	8.8	11.0	12.6	14.0	15.4	16.3	16.5	16.1	14.9	12.2	10.4	9.5	8.8	8.2	7.8	16.5
10-Apr	7.6	7.2	8.0	5.7	4.8	2.2	1.5	2.4	4.7	11.2	13.5	14.4	15.8	16.7	16.9	17.6	18.1	12.9	8.0	7.6	8.8	9.3	8.1	7.5	9.6	18.1
11-Apr	6.2	5.4	2.2	0.5	-0.8	-1.2	-1.4	-0.4	5.0	8.9	10.7	13.0	13.3	13.8	13.9	14.2	14.7	14.8	14.1	11.8	8.5	7.4	6.2	5.5	7.8	14.8
12-Apr	5.1	4.9	4.6	3.7	2.7	1.2	1.7	3.2	4.4	5.6	6.7	7.6	8.6	9.3	8.1	7.5	5.4	4.6	4.6	3.5	1.6	0.2	-0.1	-0.8	4.3	9.3
13-Apr	-1.6	-2.3	-2.6	-2.9	-3.1	-3.8	-3.9	-3.7	-3.1	-2.8	-3.6	-2.9	-0.5	0.8	2.1	3.1	3.5	3.3	-0.5	-2.7	-3.3	-3.6	-3.6	-4.0	-1.7	3.5
14-Apr	-5.0	-5.8	-5.8	-6.1	-6.3	-5.9	-5.7	-4.4	-3.6	-1.7	0.0	2.2	3.6	4.5	4.1	4.4	4.1	4.9	4.8	4.5	3.9	5.6	4.7	3.9	0.2	5.6
15-Apr	3.0	2.1	1.5	0.8	0.5	0.3	0.7	2.6	5.1	7.0	7.4	8.3	9.2	9.8	10.6	10.8	10.9	10.9	9.5	8.0	6.6	5.8	6.4	5.8	6.0	10.9
16-Apr	4.7	4.4	3.8	2.2	1.5	1.1	2.0	3.9	5.9	7.4	9.2	10.8	12.4	13.2	13.6	10.2	9.1	9.2	8.9	7.3	5.8	5.0	3.6	3.0	6.6	13.6
17-Apr	2.4	2.4	2.2	1.5	1.0	0.7	2.2	4.3	6.6	8.7	10.6	12.4	12.7	10.5	7.6	9.1	6.3	11.0	10.8	8.1	6.8	6.2	6.0	5.5	6.5	12.7
18-Apr	4.7	5.2	4.8	5.1	5.0	4.5	4.7	5.0	5.7	6.5	8.0	6.5	5.8	6.0	6.5	8.1	10.1	6.6	4.1	3.5	2.3	2.5	1.2	-0.4	5.1	10.1
19-Apr	-0.2	0.8	1.0	-0.3	-0.6	-1.0	-0.9	-1.0	-0.8	0.0	0.6	4.0	4.7	3.6	5.0	7.7	13.2	12.8	2.8	1.5	1.3	1.2	1.0	1.4	2.4	13.2
20-Apr	2.8	2.8	1.5	0.8	0.4	0.9	1.4	3.0	4.2	4.6	5.3	4.6	7.7	7.9	8.0	9.3	9.1	9.0	8.3	7.0	6.1	5.3	4.5	3.5	4.9	9.3
21-Apr	2.4	1.5	0.1	-1.1	-1.8	-2.3	-2.0	-1.1	-1.4	-1.8	-1.4	2.5	3.9	3.2	4.6	4.7	4.6	4.6	3.9	2.8	2.0	1.8	1.5	0.9	1.3	4.7
22-Apr	0.4	0.0	-0.3	-0.7	-1.2	-1.4	-1.1	-0.2	1.5	3.4	4.8	6.2	7.3	8.4	9.1	9.2	9.1	8.8	8.1	6.2	5.2	3.8	2.4	2.7	3.8	9.2
23-Apr	2.9	2.2	1.3	0.3	-0.3	-0.7	-1.0	-0.7	-0.1	0.7	1.6	2.7	3.5	3.8	3.3	2.8	1.5	0.7	0.0	-1.1	-2.0	-2.9	-4.1	-5.6	0.4	3.8
24-Apr	-7.1	-8.2	-9.1	-10.1	-11.0	-11.5	-11.2	-11.0	-10.3	-9.2	-7.6	-6.1	-5.6	-5.4	-4.8	-4.6	-4.0	-3.5	-3.2	-3.5	-4.2	-4.8	-5.5	-5.9	-7.0	-3.2
25-Apr	-6.4	-6.7	-7.0	-7.2	-7.6	-7.4	-6.6	-5.4	-4.9	-4.7	-3.7	-2.7	-2.0	-1.1	-0.3	-0.2	0.0	0.3	0.6	0.5	0.2	0.0	-0.5	-1.1	-3.1	0.6
26-Apr	-1.1	-1.2	-1.6	-1.9	-2.5	-2.7	-2.6	-2.2	-1.4	-0.5	0.5	1.6	3.2	4.6	6.1	6.8	7.4	7.3	6.5	5.5	4.6	4.1	4.4	2.9	2.0	7.4
27-Apr	2.7	2.2	1.4	0.9	0.7	1.5	1.7	2.2	2.5	4.4	8.9	13.9	14.4	15.6	13.6	14.8	17.3	17.4	16.9	12.1	10.2	8.2	5.0	3.4	8.0	17.4
28-Apr	4.7	6.3	5.7	4.9	4.4	3.5	4.0	5.2	4.7	5.0	6.7	4.8	4.5	8.8	10.4	10.9	12.7	9.9	8.0	10.2	11.8	10.9	11.4	13.5	7.6	13.5
29-Apr	15.3	15.1	13.0	12.3	10.1	8.8	9.2	10.6	10.5	11.3	12.9	14.3	14.6	14.7	15.2	15.3	15.8	15.6	14.7	14.0	12.3	11.4	11.4	10.7	12.9	15.8
30-Apr	11.0	10.9	8.8	6.6	4.7	4.7	7.1	9.2	10.3	11.5	13.0	14.6	15.2	15.3	15.6	16.1	15.2	12.2	10.4	9.0	9.4	9.3	7.6	6.6	10.6	16.1
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	3	0.42	0.42
-20 - 0	278	38.61	39.03
0 - 10	339	47.08	86.11
10 - 20	100	13.89	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

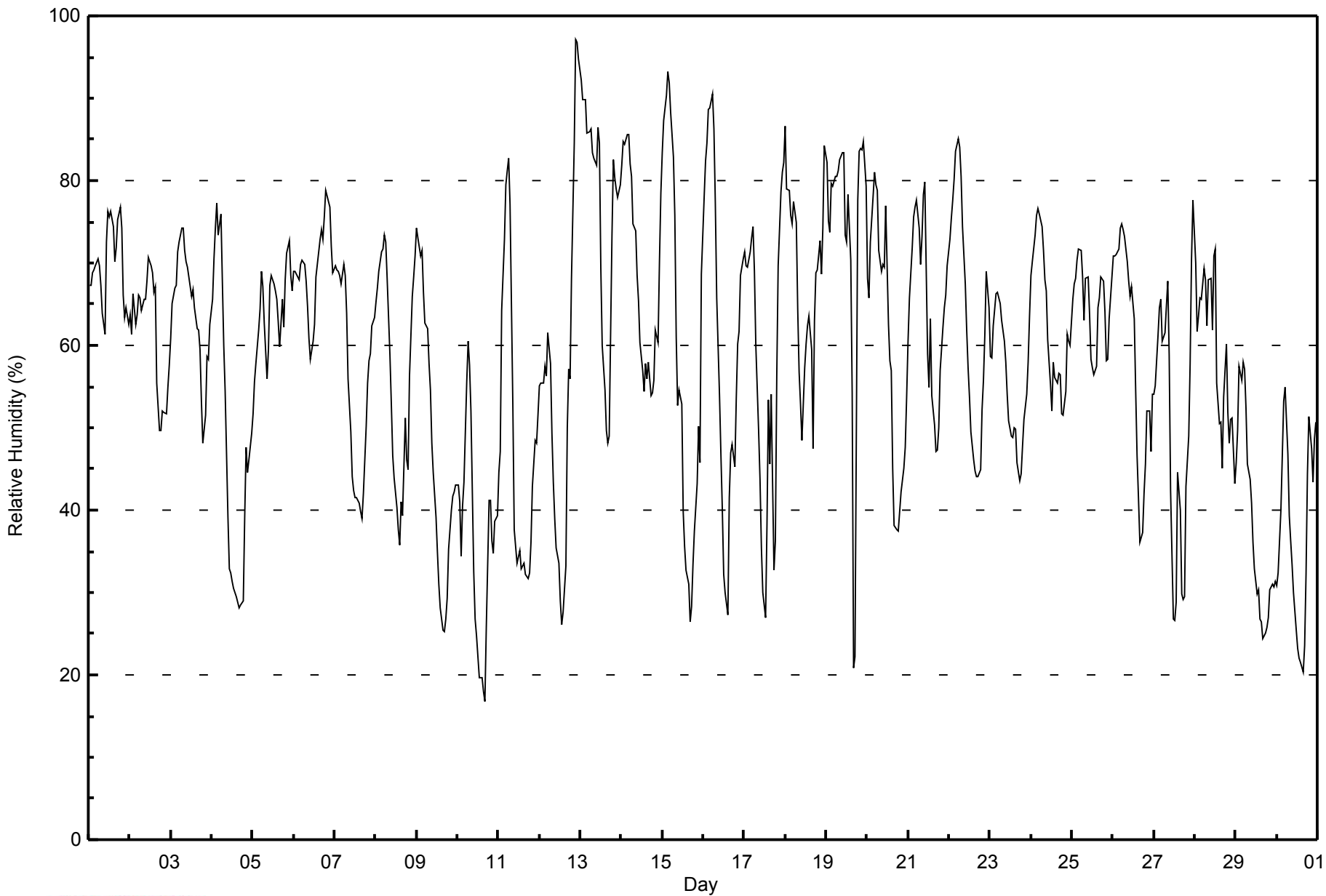


Maximum Value: 97 % on Apr 12 22:00														Maximum Daily Average: 76.8 % on Apr 13														Hours in Service: 720																					
Minimum Value: 17 % on Apr 10 17:00														Minimum Daily Average: 36.1 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 72.7 % at hour 6														Minimum Diurnal Average: 43.7 % at hour 17														Hours of Missing Data: 0																					
Monthly Average: 58.5 %														Percentiles: P <sub>1</sub> = 22 P <sub>10</sub> = 33 Q <sub>1</sub> = 47 Median = 61 Q <sub>3</sub> = 70 P <sub>90</sub> = 79 P <sub>99</sub> = 89														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-Apr	67	67	69	69	70	71	70	67	64	61	73	76	76	76	74	70	72	75	77	74	66	63	65	62	69.8	77																							
2-Apr	64	61	66	63	64	66	66	64	66	66	68	71	70	69	67	67	55	50	50	52	52	52	55	58	61.6	71																							
3-Apr	61	65	67	67	71	73	74	74	71	70	70	67	66	67	65	62	62	60	53	48	52	59	58	62	64.3	74																							
4-Apr	66	71	74	77	73	76	68	60	54	39	33	32	31	30	30	29	28	28	29	39	48	45	46	49	48.2	77																							
5-Apr	52	56	58	62	64	69	67	63	56	59	67	69	67	66	63	60	66	62	68	71	73	68	67	64.1	73																								
6-Apr	69	69	68	68	70	70	70	68	65	61	58	61	63	68	70	73	74	73	76	79	77	77	72	69	69.4	79																							
7-Apr	70	69	69	68	67	70	68	64	56	49	44	42	42	41	40	39	42	50	55	58	59	62	63	55.4	70																								
8-Apr	65	67	69	71	72	73	73	68	59	53	47	44	40	38	36	41	39	51	46	45	56	66	68	71	56.6	73																							
9-Apr	74	73	71	72	67	63	62	58	54	48	45	39	35	31	28	25	25	27	29	35	40	42	42	43	47.0	74																							
10-Apr	43	41	34	41	43	56	60	58	52	32	27	25	22	20	20	18	17	26	41	41	36	35	39	39	36.1	60																							
11-Apr	45	47	64	73	80	81	83	77	53	38	36	34	35	33	33	34	32	32	32	36	43	48	48	51	48.6	83																							
12-Apr	55	56	55	57	56	61	58	49	43	39	35	34	29	26	28	33	50	57	56	68	85	97	97	95	55.0	97																							
13-Apr	92	90	90	90	86	86	86	83	83	82	86	85	70	60	55	50	48	49	73	83	80	79	78	79	76.8	92																							
14-Apr	82	85	84	86	86	82	81	75	74	68	65	60	57	54	58	56	58	54	54	56	62	60	70	78	68.6	86																							
15-Apr	83	87	90	93	92	88	83	76	61	53	55	53	40	36	33	31	26	28	33	37	43	50	46	69	57.8	93																							
16-Apr	78	82	85	89	89	90	86	77	66	54	47	40	32	30	27	41	47	48	45	54	60	62	69	71	61.2	90																							
17-Apr	71	70	69	71	73	74	69	60	50	44	35	30	27	38	53	46	54	33	36	56	70	79	81	82	57.2	82																							
18-Apr	87	79	79	76	75	78	75	64	57	53	48	57	60	62	64	59	47	63	69	69	73	69	74	84	67.6	87																							
19-Apr	82	75	74	80	79	81	80	81	83	83	83	73	72	78	70	54	21	22	78	84	84	84	85	79	73.6	85																							
20-Apr	68	66	72	78	81	80	79	72	69	70	70	77	63	58	57	45	38	38	37	40	42	45	48	54	60.2	81																							
21-Apr	61	66	72	76	77	78	74	70	73	78	80	59	55	63	54	50	47	47	50	57	62	65	66	70	64.5	80																							
22-Apr	73	75	78	80	83	85	84	81	74	67	62	57	54	50	46	45	44	44	45	52	56	61	69	65	63.8	85																							
23-Apr	59	58	62	66	66	66	65	63	60	58	54	51	49	49	50	50	46	44	44	48	51	54	58	64	55.6	66																							
24-Apr	68	70	73	76	77	76	74	72	68	67	61	55	52	58	56	55	57	56	52	51	54	61	61	60	62.9	77																							
25-Apr	66	67	68	70	72	72	68	63	68	68	64	58	57	57	57	65	66	68	68	64	58	58	63	68	64.8	72																							
26-Apr	71	71	71	72	74	75	74	73	70	68	66	67	63	55	47	42	36	37	42	46	52	52	47	54	59.3	75																							
27-Apr	54	55	61	65	66	60	61	65	68	59	42	27	27	29	45	40	30	29	30	43	49	58	71	78	50.4	78																							
28-Apr	70	62	64	66	66	69	68	62	68	68	62	71	72	55	51	51	45	54	60	52	48	51	51	43	59.5	72																							
29-Apr	46	50	58	56	58	57	52	46	44	41	36	33	30	30	27	26	24	25	26	27	30	31	31	31	38.1	58																							
30-Apr	31	32	40	47	53	55	47	39	36	33	30	25	23	22	22	20	24	32	44	51	47	43	49	51	37.4	55																							
																								65.7	66.1	68.5	70.8	71.6	72.7	70.9	66.4	62.2	57.7	54.9	52.4	49.3	48.3	47.5	46.0	43.7	45.3	49.6	53.7	56.9	59.2	61.2	63.7	Diurnal Average	
																								92	90	90	93	92	90	86	83	83	83	86	85	76	78	74	73	74	75	78	84	85	97	97	95	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	4	0.56	0.56
20 - 40	114	15.83	16.39
40 - 60	226	31.39	47.78
60 - 80	315	43.75	91.53
80 - 100	61	8.47	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

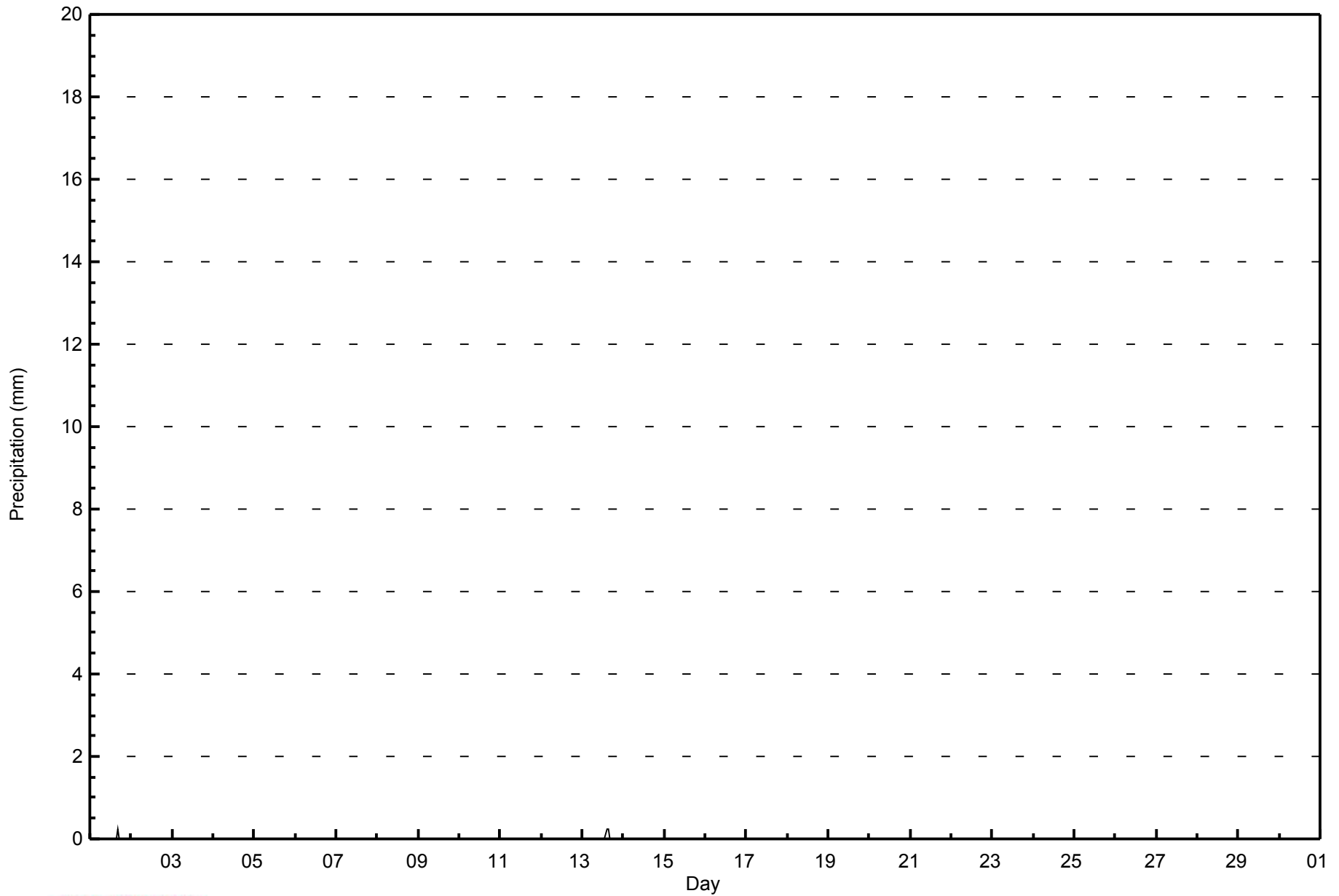


Maximum Value: 0.3 mm on Apr 1 17:00																			Maximum Daily Total: 0.5 mm on Apr 13						Hours in Service: 720			
Minimum Value: 0.0 mm on Apr 1 01:00																			Minimum Daily Total: 0.0 mm on Apr 2						Hours of Data: 720			
Maximum Diurnal Total: 0.3 mm at hour 15																			Minimum Diurnal Total: 0.0 mm at hour 1						Hours of Missing Data: 0			
Monthly Total: 0.76 mm																			Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0						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-Apr	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	
2-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.3	
14-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																								Diurnal Average				
																								Diurnal Maximum				



**Wood Buffalo Environmental Association**  
**Hourly Averages**

**Precipitation (PC) - mm**  
**Fort Chipewyan - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Precipitation (PC) - mm**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	720	100.00	100.00
0.4 - 0.5	0	0.00	100.00
0.6 - 0.7	0	0.00	100.00
0.8 - 1.4	0	0.00	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

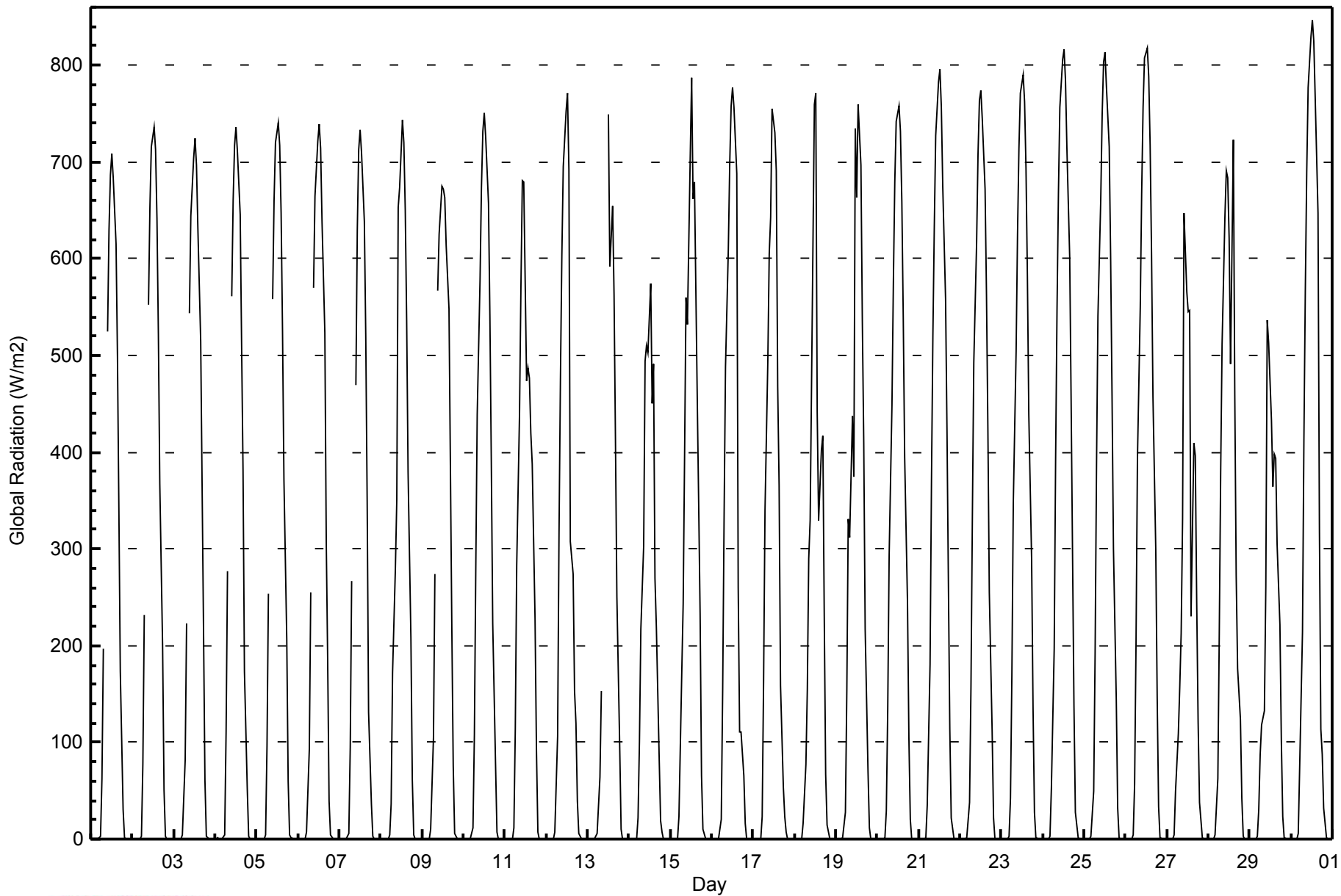


Maximum Value: 847 W/m2 on Apr 30 13:00		Maximum Daily Average: 304.3 W/m2 on Apr 26		Hours in Service: 720																							
Minimum Value: 0 W/m2 on Apr 4 22:00		Minimum Daily Average: 163.5 W/m2 on Apr 29		Hours of Data: 709																							
Maximum Diurnal Average: 719.6 W/m2 at hour 13		Minimum Diurnal Average: 0.1 W/m2 at hour 23		Hours of Missing Data: 11																							
Monthly Average: 242.2 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 82 Q <sub>3</sub> = 510 P <sub>90</sub> = 708 P <sub>99</sub> = 805		Hours of Calibration: 0																							
				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-Apr	0	0	0	0	0	3	62	197	UO	525	630	687	709	684	615	498	341	174	30	2	0	0	0	0	224.2	709	
2-Apr	0	0	0	0	0	3	78	232	UO	553	654	716	736	713	642	522	367	199	51	2	0	0	0	0	237.7	736	
3-Apr	1	1	0	0	1	4	82	223	UO	543	644	704	725	696	631	515	364	218	61	3	0	0	0	1	235.5	725	
4-Apr	1	1	1	0	0	5	111	277	UO	562	660	717	736	712	646	511	381	173	52	3	1	0	0	0	241.2	736	
5-Apr	0	0	0	0	0	5	96	254	UO	559	660	720	740	717	647	525	371	207	60	4	1	1	1	1	242.1	740	
6-Apr	1	1	0	0	0	7	93	255	UO	570	665	721	738	714	638	524	308	185	39	4	0	0	0	0	237.6	738	
7-Apr	0	0	0	0	0	6	95	267	UO	469	630	713	733	709	638	520	349	131	37	3	0	0	0	0	230.6	733	
8-Apr	0	0	0	0	0	5	36	172	279	351	653	673	743	720	650	535	379	209	61	5	0	0	0	0	228.1	743	
9-Apr	0	0	0	0	0	10	105	274	UO	568	625	675	671	663	614	548	384	221	76	6	0	0	0	0	236.6	675	
10-Apr	0	0	0	1	0	12	108	281	439	578	673	732	750	725	657	539	389	223	77	8	0	0	0	0	258.1	750	
11-Apr	0	0	0	0	1	12	114	283	441	571	681	680	473	486	477	420	387	228	92	7	0	0	0	0	223.1	681	
12-Apr	0	0	0	0	0	7	106	318	477	603	696	752	771	692	308	273	153	120	40	7	0	0	0	0	221.8	771	
13-Apr	0	0	0	0	0	5	35	64	153	UO	UO	UO	750	592	655	562	413	251	96	10	0	0	0	0	170.8	750	
14-Apr	0	0	0	0	0	21	101	217	303	495	510	502	575	451	491	270	218	83	19	7	0	0	0	0	177.7	575	
15-Apr	0	0	1	0	0	23	172	244	397	560	532	705	787	661	680	453	345	233	66	11	0	0	0	0	244.6	787	
16-Apr	0	0	0	0	0	20	154	332	488	609	698	758	777	757	689	261	111	111	66	16	0	0	0	0	243.6	777	
17-Apr	0	0	0	0	1	24	163	340	494	604	642	754	730	690	468	366	160	53	24	8	0	0	0	0	230.0	754	
18-Apr	0	0	0	0	0	17	78	155	290	329	471	759	771	441	330	402	417	230	67	15	1	1	0	0	198.9	771	
19-Apr	0	0	0	1	1	28	152	330	312	437	375	735	663	759	697	535	409	218	71	12	0	0	0	0	239.0	759	
20-Apr	0	0	0	0	1	29	135	292	449	576	679	741	758	732	659	539	395	244	105	21	0	0	0	0	264.9	758	
21-Apr	0	0	0	0	2	35	180	369	521	632	727	783	795	757	675	559	423	265	114	22	0	0	0	0	285.9	795	
22-Apr	0	0	0	0	2	38	158	333	492	617	708	764	774	745	671	563	422	255	112	21	1	0	0	0	278.3	774	
23-Apr	0	0	0	0	2	43	169	347	504	625	715	770	789	763	693	582	439	288	136	28	1	0	0	0	287.3	789	
24-Apr	0	0	0	0	3	52	197	392	548	668	756	806	817	784	714	600	452	295	138	27	1	0	0	0	302.1	817	
25-Apr	0	0	0	0	4	50	193	387	541	662	749	803	813	779	715	602	457	300	145	32	1	0	0	0	301.3	813	
26-Apr	0	0	0	0	4	56	202	392	550	667	757	808	818	789	717	605	458	299	146	34	2	0	0	0	304.3	818	
27-Apr	0	0	0	0	4	49	109	158	212	331	647	565	545	547	231	409	396	247	122	37	2	0	1	0	192.2	647	
28-Apr	0	0	0	0	4	63	211	380	511	643	690	683	620	492	723	460	272	176	124	42	3	0	0	0	254.1	723	
29-Apr	0	0	0	0	4	31	87	118	133	262	536	514	432	364	398	393	304	221	103	23	1	0	0	0	163.5	536	
30-Apr	0	0	0	0	6	74	214	413	567	690	777	829	847	825	766	648	321	113	88	33	2	0	0	0	300.5	847	
		0.1	0.1	0.1	0.1	1.4	24.6	126.5	276.6	413.7	546.8	649.7	716.3	719.6	672.0	604.5	491.2	352.9	205.7	80.6	15.1	0.6	0.1	0.1	0.1	Diurnal Average	
		1	1	1	1	6	74	214	413	567	690	777	829	847	825	766	648	458	300	146	42	3	1	1	1	Diurnal Maximum	
UO - Unstable Operation																											



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Global Radiation (GR) - W/m2**  
**Fort Chipewyan - April 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	305	43.02	43.02
21 - 100	58	8.18	51.20
101 - 300	90	12.69	63.89
301 - 600	120	16.93	80.82
601 - 900	136	19.18	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 720



Maximum Speed: 44 km/h on Apr 23 15:00	Maximum Daily Speed Average: 37.3 km/h on Apr 23	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 4 07:00	Minimum Daily Speed Average: 1.5 km/h on Apr 8	Hours of Data: 706
Maximum Diurnal Speed Average: 8.9 km/h at hour 20	Minimum Diurnal Speed Average: 5.2 km/h at hour 9	Hours of Missing Data: 14
Monthly Average Velocity: 6.4 km/h 88.7 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 8 Q <sub>1</sub> = 11 Median = 17 Q <sub>3</sub> = 23 P <sub>90</sub> = 30 P <sub>99</sub> = 40	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-Apr	NE28	NE27	NE18	NE18	NE17	NE15	NE17	NE16	NE15	NE14	E17	E23	E25	E23	E24	E25	E18	ESE12	AF	AF	AF	AF	AF	AF	ENE17.6	NE28
2-Apr	AF	AF	AF	AF	AF	AF	AF	AF	ESE11	E19	E23	E25	E27	E28	E24	E20	E20	E19	ENE16	ENE16	ENE18	E20	E19	E19	---	E28
3-Apr	E12	E11	E12	E11	E9	E12	E11	ESE16	ESE15	ESE15	ESE15	ESE11	E15	E15	E18	E20	E19	E17	E17	ENE11	E11	E13	E11	E10	E13.5	E20
4-Apr	E8	E6	E5	E5	ENE5	ENE2	SE1	NW2	NNE2	N8	N9	NNW9	NW9	NW11	NW9	NW10	NNW10	NNW11	NNW9	NE6	E3	WNW5	NNW9	NNW10	N4.5	NNW11
5-Apr	NNW11	N11	NNW10	NNW9	NW7	NW8	NNW8	N8	NNW7	E11	E18	E17	E18	E18	E19	E17	E18	E17	E15	E10	E11	E11	ESE9	E9	ENE8.3	E19
6-Apr	E10	E10	E12	E15	E17	E20	E21	E21	E21	E21	E20	E20	E21	ESE20	ESE22	E22	E22	E23	ESE20	E17	E15	E12	E13	ESE12	E17.8	E23
7-Apr	ESE9	S9	SSW9	SSW8	S8	S12	S14	SSW18	SSW22	SSW27	SSW30	SSW30	SSW30	S32	SSW29	SSW28	SSW27	SSW25	S17	S16	SSW17	SSW18	SW15	SW13	SSW18.7	S32
8-Apr	SW11	SW9	SW6	SSW6	SW7	NW4	NNW8	N10	NNW13	NNW11	NNW11	NW11	NW11	NW11	WNW9	WSW13	WSW11	E16	E14	E11	E16	E14	ESE11	ESE12	N1.5	E16
9-Apr	E13	E13	E13	ESE13	SE10	SSE12	SSE12	S14	S16	S13	S13	S8	SSW9	SW12	SW13	WSW17	WSW15	W14	WSW14	W10	W10	W12	W11	WSW6	SSW7.0	WSW17
10-Apr	SW9	SW9	WSW10	SW8	SW9	E5	E7	ENE6	ENE6	W11	WSW16	WSW21	WSW19	WSW18	WSW17	WSW12	W7	E10	E14	E17	E13	E18	E20	E25	S2.5	E25
11-Apr	E24	E20	E17	E19	ESE13	ESE12	E10	E8	WSW10	W21	W22	W20	W17	WSW19	WSW21	WSW16	WSW16	WSW14	WSW10	W10	W17	W18	W25	W28	WSW6.9	W28
12-Apr	W23	W20	W18	W17	W17	W15	W17	W23	W25	W23	W25	WSW28	WSW30	WSW30	W28	W30	W33	WSW25	WSW20	WSW23	W19	W13	WNW13	WNW17	W21.7	W33
13-Apr	WNW21	WNW23	WNW23	WNW22	WNW22	WNW23	WNW20	WNW20	WNW17	NW22	NW22	NW16	NW17	NW18	NW18	NW16	NNW10	N8	ENE14	E15	ENE16	E18	E18	E22	NW10.4	WNW23
14-Apr	E23	E24	E24	E24	E27	E30	E32	E31	E29	E30	E31	E29	E32	E29	E31	E29	E25	E20	E12	E19	ESE15	S28	S31	S31	E22.8	E32
15-Apr	S27	S21	SSW13	WSW11	WSW9	WSW9	WSW7	WSW7	W12	W14	W13	WSW22	WSW21	WSW23	WSW26	WSW20	W18	WSW14	WSW8	S2	E6	E6	WSW5	W15	WSW11.4	S27
16-Apr	W12	W13	W13	W10	W12	W12	W16	W20	W16	WSW19	WSW20	WSW21	WSW23	WSW21	NNW20	NW11	NNW8	NNW10	W11	W11	W12	W13	W12	W13.8	WSW23	
17-Apr	W11	W15	W14	W9	W9	W9	WSW7	WSW8	W11	SW11	SW11	SSW9	SSW6	ESE9	E15	E15	E14	SSW2	S15	SSW19	SSW17	SW11	WNW10	WSW5	SW6.0	SSW19
18-Apr	WNW6	NNW9	NW8	NW10	WNW8	WNW11	WNW11	NW15	NNW14	N10	NNE6	ESE11	ESE10	E17	ESE15	SSW13	SSW8	ESE8	E6	ESE8	E7	E6	E10	E10	NE2.2	E17
19-Apr	E9	E10	E13	E13	E14	E13	E13	E14	E12	E10	E11	E9	E15	E16	E12	SSE5	WSW18	WSW14	E10	E9	E9	E7	E7	E8	E8.8	WSW18
20-Apr	E9	E7	E8	ENE8	E10	E12	E8	E13	E16	E19	E19	E18	E20	E25	E26	E24	ENE25	ENE20	ENE21	ENE21	ENE20	ENE20	ENE21	ENE24	E16.9	E26
21-Apr	ENE24	ENE23	ENE24	ENE20	ENE18	ENE22	ENE21	ENE18	E23	E28	E29	ENE25	ENE22	E26	ENE24	ENE26	ENE27	NE25	NE24	NE25	ENE30	ENE34	ENE34	ENE31	ENE24.6	ENE34
22-Apr	E28	E26	E26	ENE25	ENE27	E25	E26	E27	E27	E28	E31	E35	E36	E34	E34	E32	E31	E32	E33	E37	E37	E33	E29	E26	E30.2	E37
23-Apr	E31	ENE33	ENE35	ENE38	ENE40	ENE42	ENE38	ENE36	ENE34	ENE35	ENE35	ENE36	ENE40	ENE40	ENE44	ENE41	NE42	NE40	NE37	NE36	ENE38	ENE38	ENE37	ENE36	ENE37.3	ENE44
24-Apr	ENE38	ENE35	ENE33	ENE33	ENE34	ENE34	ENE34	ENE34	ENE30	ENE25	E24	ENE24	ENE26	E30	E31	E35	E28	ENE25	ENE25	ENE20	ENE20	ENE18	NE15	NE19	ENE27.4	ENE38
25-Apr	ENE17	ENE17	ENE16	ENE17	ENE14	ENE12	ENE14	ENE15	E19	E23	E21	ESE17	E17	E16	E14	E18	ESE16	E14	E11	ENE9	ENE12	ENE10	E15	E11	E14.5	E23
26-Apr	E12	E17	E16	E18	E18	E18	E22	E24	E22	E22	E22	E23	E24	E26	E27	E27	E27	ENE26	ENE26	ENE25	ENE22	ENE17	E20	E19	E21.4	E27
27-Apr	E17	E17	E17	E18	E20	E22	E22	E22	E19	E19	SE21	S37	S32	S27	SSW11	SSW10	WSW14	WSW12	W8	SE2	E6	E8	E9	E9	SE10.6	S37
28-Apr	E10	E8	E9	E8	E8	E10	E14	E13	E13	E11	E19	ESE21	ESE23	E24	E26	E26	E22	E20	E19	E22	E24	ESE19	SE16	SSW19	E15.8	E26
29-Apr	W20	W14	WSW12	WSW14	W11	W12	W16	W15	W17	W17	W18	WSW16	W19	W17	W19	WSW19	WSW21	SW18	SW15	SW12	SW9	SW11	SW11	WSW11	WSW14.6	WSW21
30-Apr	W14	W12	W12	WSW13	W13	W14	W15	W21	W20	WSW22	W21	WSW20	WSW22	SW23	SW23	WSW19	N7	NE12	ESE12	SE17	SW9	WSW9	SW9	SSW4	WSW11.5	SW23

E6.3	ENE6.1	ENE5.9	ENE6.1	ENE6.0	ENE6.4	ENE6.5	ENE6.0	E5.2	E5.2	E5.8	ESE6.2	ESE6.8	ESE7.3	ESE7.0	E6.4	E5.6	E7.4	E8.4	E8.9	E8.5	E7.4	E6.7	E6.4	Diurnal Average
ENE38	ENE35	ENE35	ENE38	ENE40	ENE42	ENE38	ENE36	ENE34	ENE35	ENE35	S37	ENE40	ENE40	ENE44	ENE41	NE42	NE40	NE37	E37	ENE38	ENE38	ENE37	ENE36	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 - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 11 km/h on Apr 27 15:00	Hours in Service: 720 Hours of Data: 706 Hours of Missing Data: 14 Hours of Calibration: 0 Percent Operational Time: 98.1
Minimum Value: 1 km/h on Apr 4 03:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7	

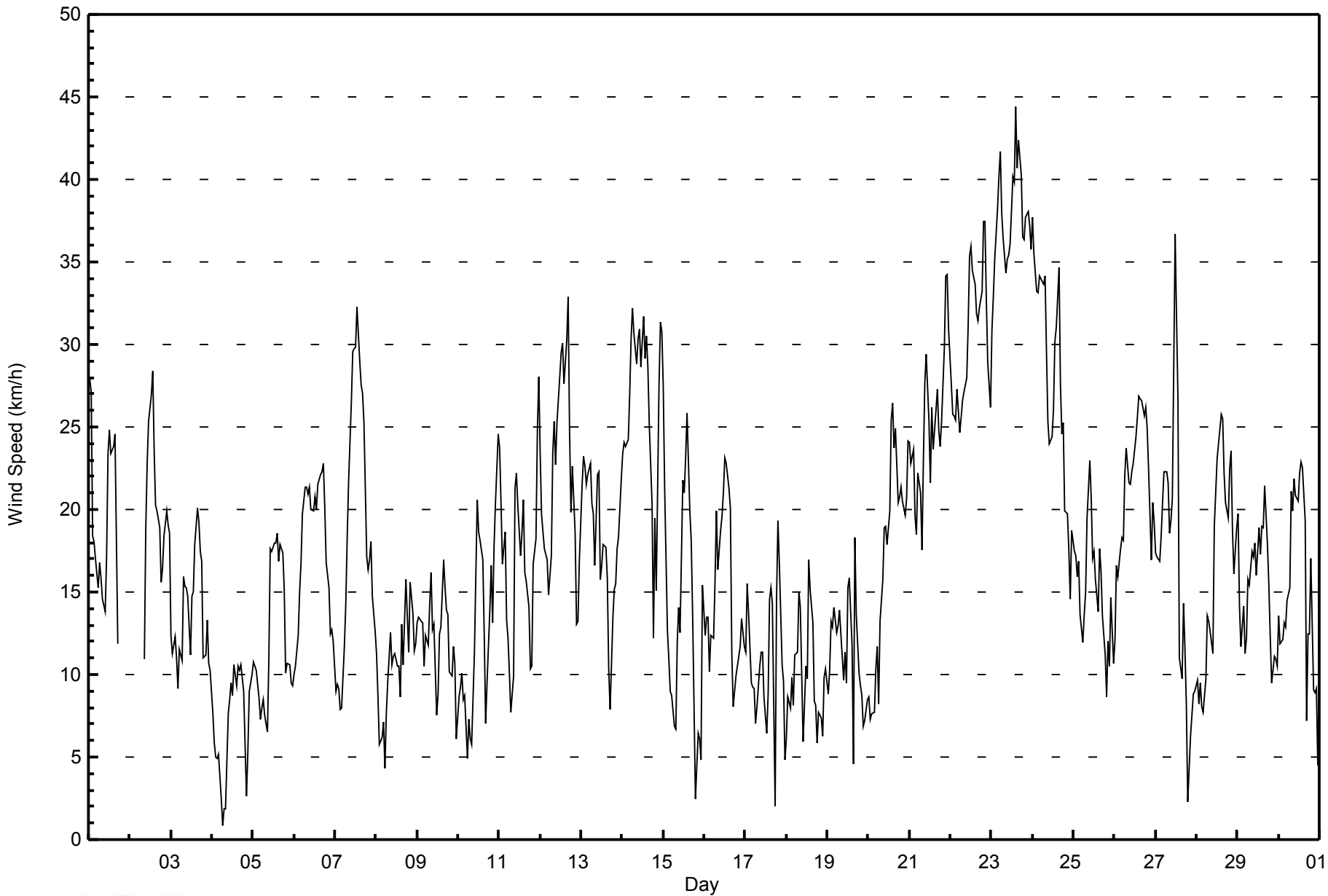
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	6	6	5	5	4	4	4	3	3	4	5	2	3	2	2	3	2	2	AF	AF	AF	AF	AF	AF	6
2-Apr	AF	AF	AF	AF	AF	AF	AF	AF	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
3-Apr	3	2	2	2	2	2	2	2	2	2	1	1	1	1	2	2	1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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	18	2.55	2.55
6 - 11	179	25.35	27.90
12 - 19	249	35.27	63.17
20 - 28	182	25.78	88.95
29 - 38	70	9.92	98.87
> 38	8	1.13	100.00

Total Number of Valid Hours: 706

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - April 2015**

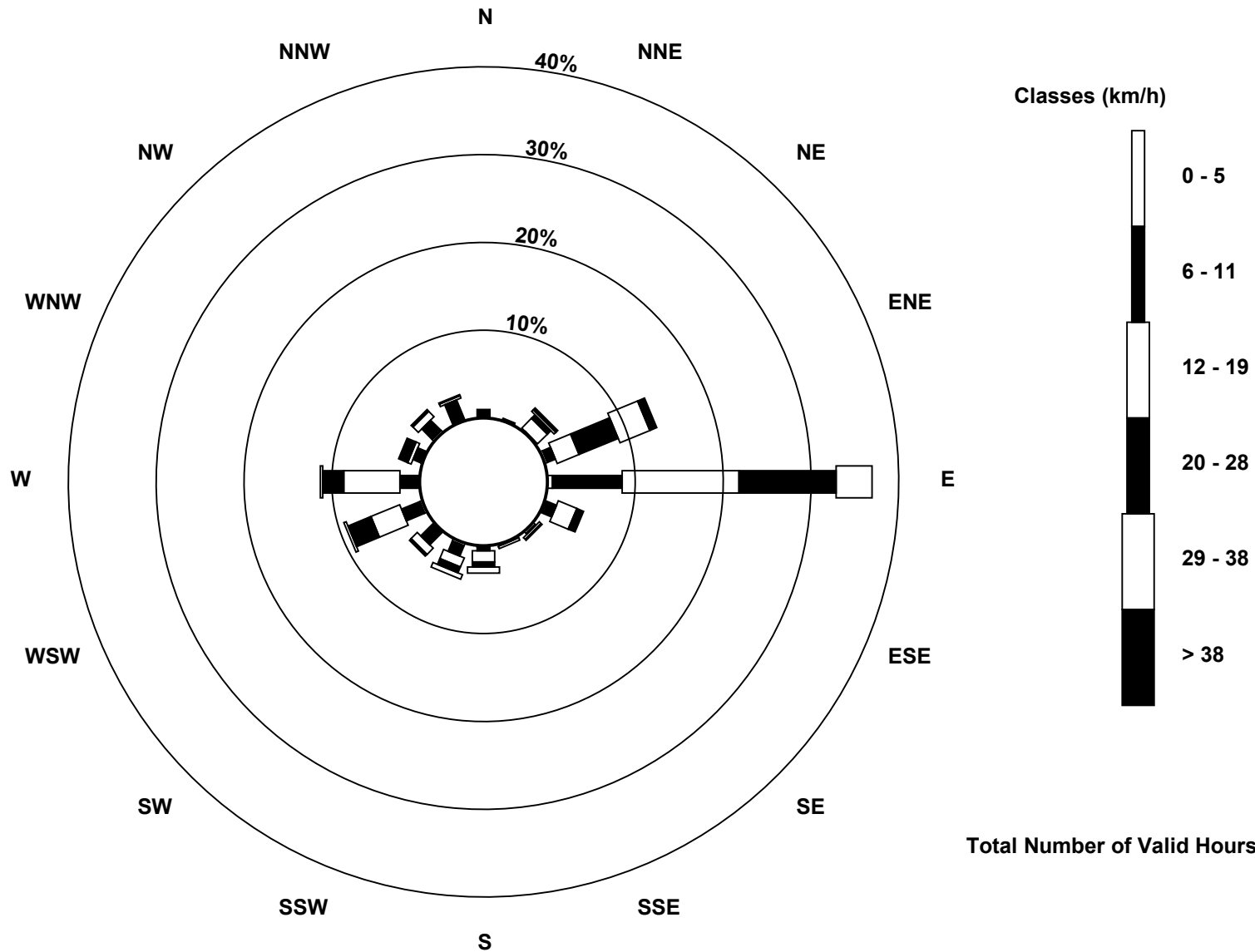
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	0	1	0	2	4	0	2	1	1	2	0	2	0	1	2	0	18
6 - 11	7	1	1	7	56	10	1	0	3	9	15	16	16	7	12	18	179
12 - 19	0	0	11	19	94	16	2	2	9	8	7	25	45	3	6	2	249
20 - 28	0	0	4	34	78	6	1	0	4	5	2	20	17	8	2	1	182
29 - 38	0	0	2	26	29	0	0	0	5	4	0	2	2	0	0	0	70
> 38	0	0	2	6	0	0	0	0	0	0	0	0	0	0	0	0	8
<b>Totals</b>	7	2	20	94	261	32	6	3	22	28	24	65	80	19	22	21	706

Total Number of Valid Hours: 706

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
Fort Chipewyan (AMS 8)**



**Total Number of Valid Hours: 706**



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Fort Chipewyan - April 2015**

Direction of Maximum Speed: 58 deg on Apr 23 15:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 63.1 deg on Apr 23	Hours of Data: 706
Direction of Minimum Speed: 133 deg on Apr 4 07:00	Hours of Missing Data: 14
Direction of Minimum Daily Speed Average: 1.5 deg on Apr 8	Percent Operational Time: 98.1
Monthly Average Direction: 257.8 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-Apr	51	52	45	42	44	41	42	49	39	53	100	96	96	99	98	90	101	102	AF	AF	AF	AF	AF	AF	70.5
2-Apr	AF	AF	AF	AF	AF	AF	AF	AF	102	99	94	97	93	90	92	92	88	82	71	72	75	83	82	81	--
3-Apr	87	93	82	88	85	96	99	103	106	102	103	102	99	93	89	91	91	84	82	68	80	93	88	92	92.0
4-Apr	94	100	89	90	67	70	133	320	32	7	351	337	319	313	310	323	335	339	337	40	84	284	334	344	350.7
5-Apr	343	350	345	337	321	313	329	349	348	79	98	95	94	95	93	91	89	88	86	93	97	97	102	91	72.1
6-Apr	94	91	89	91	91	88	96	92	92	91	90	94	101	104	102	96	95	97	103	99	100	97	88	102	95.4
7-Apr	117	171	209	198	179	191	191	195	200	204	211	199	197	191	195	194	199	197	188	189	206	213	220	217	197.5
8-Apr	220	228	219	197	236	310	341	350	348	344	334	323	315	304	294	239	254	85	83	81	93	93	104	106	355.1
9-Apr	100	92	94	104	135	163	162	181	188	181	181	184	196	215	226	238	248	261	258	261	261	264	264	242	200.6
10-Apr	224	232	246	225	220	94	79	71	76	261	254	244	246	250	240	256	260	101	91	89	82	86	84	84	187.7
11-Apr	85	86	95	94	104	107	101	97	256	266	274	271	266	257	258	249	242	249	253	263	270	260	264	267	252.2
12-Apr	268	272	274	268	265	262	262	265	263	261	260	243	244	244	261	264	263	252	249	258	270	274	294	293	261.6
13-Apr	282	286	287	290	290	285	288	290	293	307	312	311	317	314	319	315	336	6	77	86	78	84	84	84	315.1
14-Apr	83	87	85	86	88	85	87	85	82	82	84	81	82	82	87	84	86	85	79	87	122	177	178	177	94.8
15-Apr	180	191	207	237	240	244	244	255	265	272	270	241	243	238	240	253	259	257	244	184	81	87	249	263	237.9
16-Apr	264	259	280	280	263	266	264	267	262	257	241	238	245	244	256	329	304	329	287	278	279	270	275	260	266.4
17-Apr	266	270	268	266	271	265	244	246	262	217	218	198	204	120	100	92	94	209	183	194	201	228	285	247	220.9
18-Apr	295	327	313	308	300	298	301	319	333	349	20	103	104	82	113	194	197	104	94	103	94	95	97	88	39.4
19-Apr	95	88	91	96	91	92	92	96	97	98	91	91	99	101	91	152	246	240	95	96	98	83	85	87	98.9
20-Apr	84	86	82	74	91	81	86	80	84	93	92	97	86	92	91	82	70	69	68	65	64	65	65	66	78.8
21-Apr	67	72	66	58	60	64	62	68	87	92	95	66	75	84	71	63	57	56	54	55	62	69	73	78	69.4
22-Apr	79	79	80	78	77	81	84	86	82	80	80	81	82	83	82	81	81	80	80	84	84	85	84	82	81.6
23-Apr	81	74	77	75	74	74	69	68	68	64	59	57	59	58	59	54	52	55	56	58	58	58	58	59	63.1
24-Apr	59	58	57	57	59	61	62	63	63	76	79	77	76	79	81	85	79	78	71	63	62	65	50	55	67.4
25-Apr	61	60	62	65	61	67	65	75	101	97	98	104	98	97	100	98	103	94	95	70	61	69	79	81	83.1
26-Apr	88	86	82	83	85	83	89	88	90	91	95	94	92	91	88	86	81	70	67	66	66	72	86	92	83.7
27-Apr	91	90	95	98	97	94	93	96	97	94	127	180	177	191	196	212	237	251	266	125	85	96	95	94	128.0
28-Apr	88	97	94	94	93	92	91	92	98	99	98	104	103	89	87	87	85	90	92	92	96	109	130	192	98.2
29-Apr	273	276	243	258	259	275	265	269	274	271	261	251	262	264	262	239	237	234	223	230	227	232	234	245	253.9
30-Apr	266	262	261	256	261	264	263	264	264	252	265	249	240	229	233	239	351	48	108	140	230	240	219	205	247.5
	79.1	74.4	71.7	73.3	76.4	75.0	76.5	75.3	80.8	88.9	100.9	118.5	114.5	112.8	104.3	97.2	89.1	82.0	84.7	86.8	84.3	92.2	89.6	93.0	

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 (WD) - deg**  
**Fort Chipewyan - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 89 deg on Apr 17 18:00	Hours of Data: 706
Minimum Value: 3 deg on Apr 28 08:00	Hours of Missing Data: 14
Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 15 P <sub>90</sub> = 25 P <sub>99</sub> = 63	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-Apr	12	11	13	14	12	13	13	16	18	15	19	5	6	7	5	5	6	9	AF	AF	AF	AF	AF	AF	19
2-Apr	AF	AF	AF	AF	AF	AF	AF	AF	12	5	4	5	5	5	5	6	5	7	7	7	7	5	5	4	12
3-Apr	9	8	7	8	9	6	8	5	4	5	6	8	7	9	6	4	4	5	5	9	13	7	8	4	13
4-Apr	11	11	6	14	4	63	69	53	73	33	39	37	41	35	47	37	33	24	22	41	7	26	22	17	73
5-Apr	16	16	17	17	23	10	20	28	42	48	6	7	6	5	7	8	5	5	6	7	8	9	5	6	48
6-Apr	6	5	8	5	5	6	6	6	7	6	4	4	5	4	4	5	4	4	6	5	6	7	6	12	12
7-Apr	17	19	13	19	18	8	7	6	7	7	8	9	8	8	7	8	7	5	5	5	9	6	7	7	19
8-Apr	9	30	13	12	25	30	25	25	23	27	30	29	37	36	42	16	24	25	5	8	5	5	8	9	42
9-Apr	9	6	6	7	25	10	12	12	5	8	8	22	19	10	12	12	14	14	11	13	9	9	10	19	25
10-Apr	8	10	9	9	7	41	14	14	27	33	18	13	13	15	14	24	39	19	7	5	8	4	7	5	41
11-Apr	5	8	14	8	9	5	5	14	75	13	14	15	16	16	16	16	13	15	13	13	17	14	14	13	75
12-Apr	14	16	14	14	14	15	15	14	14	16	17	14	15	14	16	15	15	15	17	17	14	13	20	15	20
13-Apr	14	14	14	14	15	13	14	14	15	16	14	18	21	21	21	23	30	29	21	8	7	6	7	5	30
14-Apr	6	5	5	5	5	5	6	7	7	6	6	6	5	6	5	5	6	19	5	38	6	8	7	38	
15-Apr	7	8	14	13	13	14	19	22	15	19	33	13	16	13	13	17	17	17	13	53	12	14	68	17	68
16-Apr	13	13	17	17	13	10	12	14	15	17	15	14	15	16	19	27	29	28	16	11	9	14	14	12	29
17-Apr	12	12	13	18	14	13	20	25	23	11	12	36	61	37	12	9	9	89	35	10	6	28	17	45	89
18-Apr	48	16	14	18	29	21	11	17	21	32	46	41	10	14	32	16	31	35	37	14	17	24	7	7	48
19-Apr	9	8	5	4	6	8	7	5	5	8	7	16	8	10	14	67	17	13	20	9	5	9	5	5	67
20-Apr	4	7	10	6	13	22	14	13	11	6	6	8	11	5	4	11	10	9	8	6	6	6	6	7	22
21-Apr	6	6	9	10	11	9	10	11	11	4	5	11	11	10	10	11	9	9	9	9	8	8	7	6	11
22-Apr	6	6	6	6	7	7	6	6	5	6	6	6	6	6	6	6	6	6	6	5	5	5	4	5	7
23-Apr	8	7	6	6	6	6	8	8	8	8	9	9	9	10	9	9	10	9	9	9	9	9	9	9	10
24-Apr	9	8	9	9	9	9	9	9	11	10	11	11	11	17	14	7	9	8	9	9	8	8	10	8	17
25-Apr	9	8	8	8	10	12	10	15	5	5	8	6	7	7	6	4	4	7	8	11	5	10	7	9	15
26-Apr	6	5	6	5	5	8	6	6	5	5	4	3	3	4	6	6	7	8	7	7	6	6	6	4	8
27-Apr	5	6	7	7	6	6	5	5	3	4	32	10	9	25	55	47	16	19	16	64	10	9	6	7	64
28-Apr	6	11	6	8	6	5	4	3	6	11	5	7	7	5	4	4	6	5	6	4	4	9	10	25	25
29-Apr	20	20	18	13	11	13	13	14	13	13	16	18	17	17	17	13	11	11	7	11	12	12	7	14	20
30-Apr	16	18	12	11	11	10	14	14	16	16	16	21	15	13	15	18	55	39	53	14	22	8	10	25	55
	48	30	18	19	29	63	69	53	75	48	46	41	61	37	55	67	55	89	53	64	38	28	68	45	

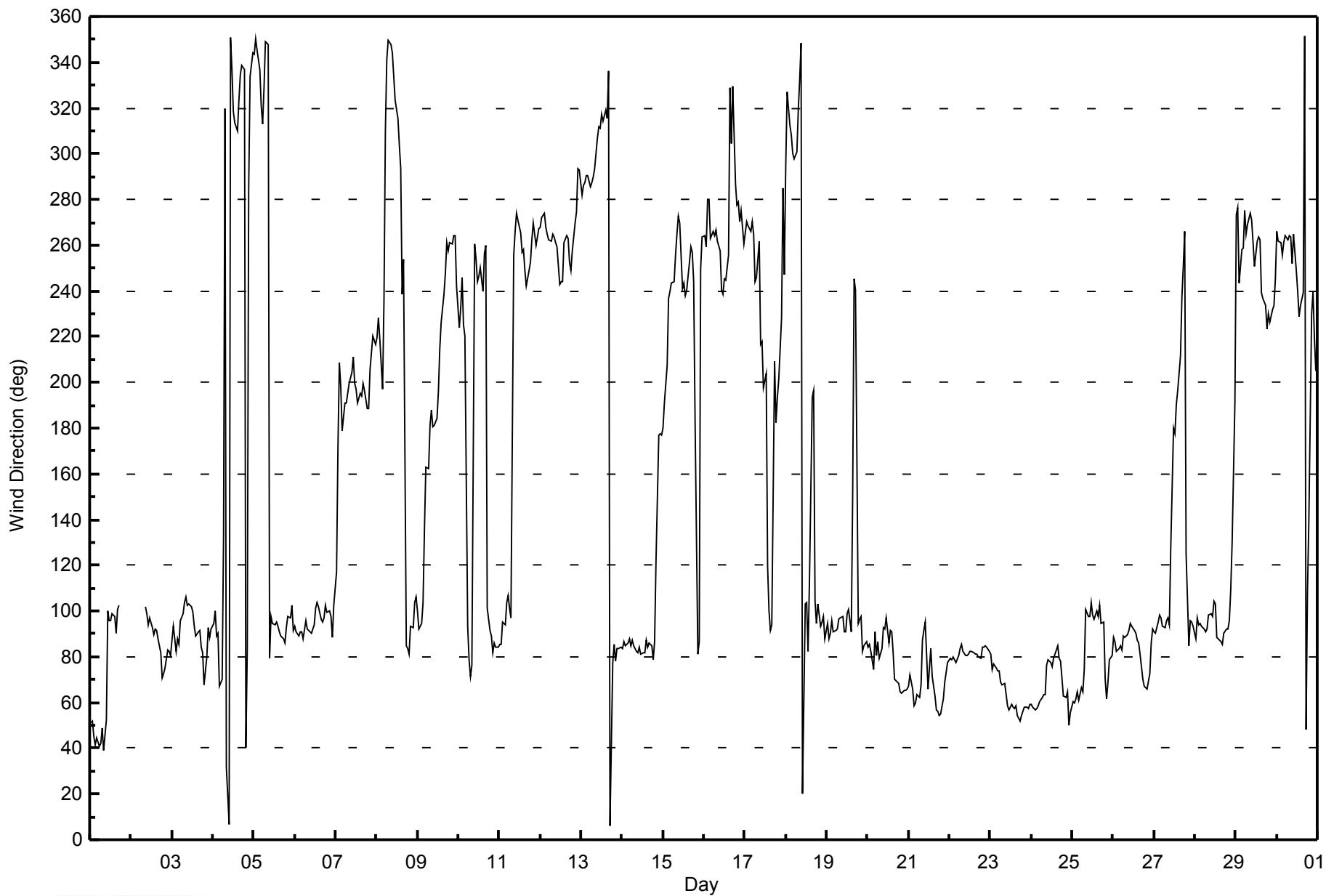
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort Chipewyan - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 1, 2015	Last Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	15:09
Gas Cert Reference	LL103809	Station temp.	22 Deg C
Cal Gas Concentration	2.45 ppm	Cal Gas Exp Date	16-Sep-16
Calibrator Make/Model	Teledyne API T700	Serial Number	747
ZAG Make/Model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 20 ppb		PMT voltage	-826	-826
Analyzer IP address	192.168.1.43		Lamp voltage	1012	1011
Calculated slope	0.997198	0.990586	Chamber temp	45.2	45.2
Calculated intercept	-0.053851	-0.045119	Pressure	704.0	711.0
Analyzer Background	1.2	1.2	Flow	0.428	0.433
Analyzer Coefficient	1.038	1.035	Intensity	91	91

Analyzer make Thermo 43i-TLE      Analyzer serial # 1136451241

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.0	----
as found span	6000	44.6	18.2	18.3	0.992
calibrator zero	6000	0.0	0.0	0.0	----
high point	6000	44.6	18.2	18.4	0.990
second point	6000	23.8	9.7	9.9	0.979
third point	6000	11.9	4.9	4.9	0.983
as left zero	6000	0.0	0.0	0.0	----
as left span	6000	44.6	18.2	18.0	1.009
Average Correction Factor					0.984

Corrected As found    18.3      Previous response    18.3      % change    -0.1%

Notes:

Span with a slight adjustment.

Calibration Performed By:

Ryan Power



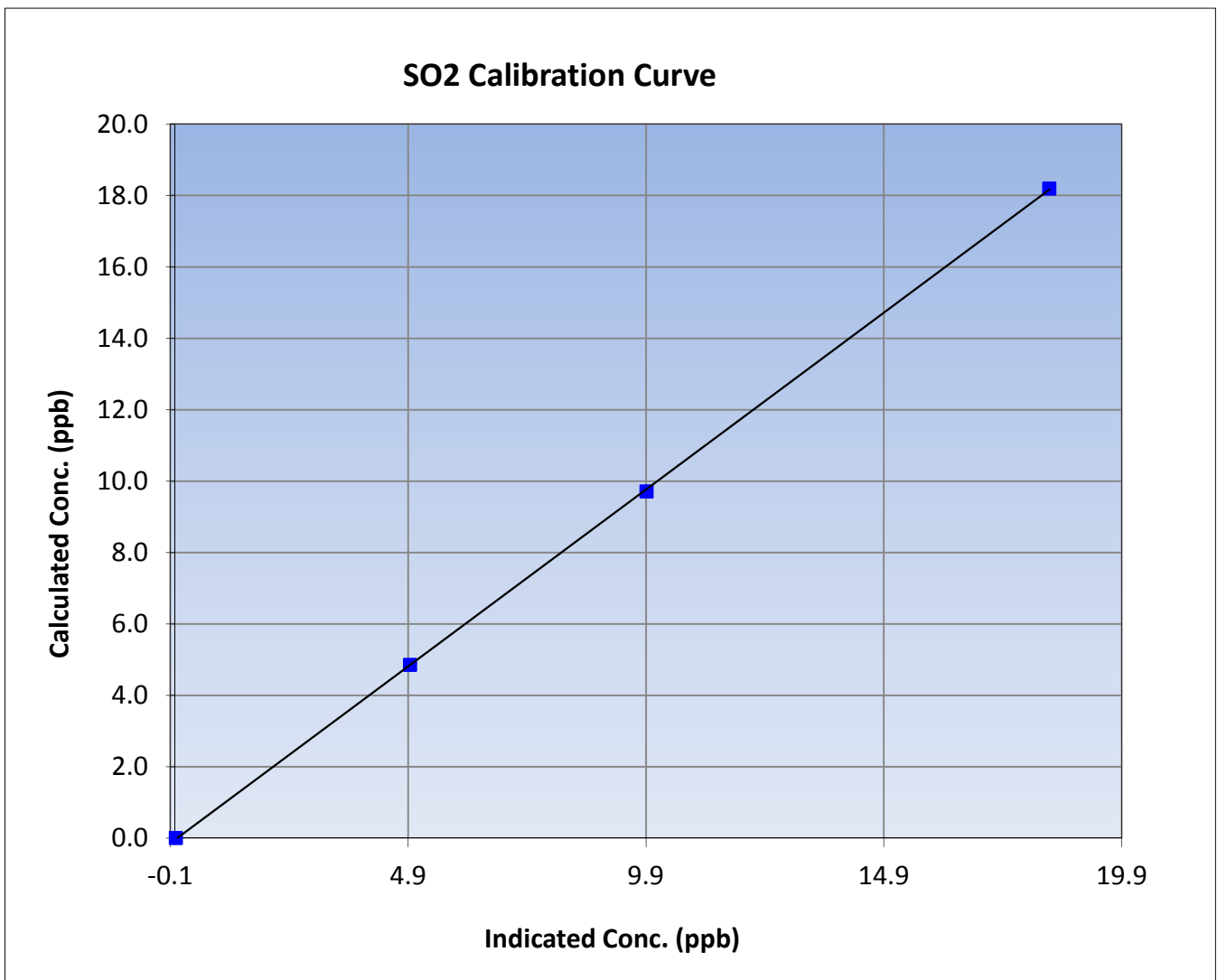
# Wood Buffalo Environmental Association SO<sub>2</sub> Calibration Report

## Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	15:09
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	----	Correlation Coefficient	0.999966
18.2	18.4	0.9900		
9.7	9.9	0.9794	Slope	0.990586
4.9	4.9	0.9828		
			Intercept	-0.045119









# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	15:05	End Time (MST)	17:56
NO2 GPT Ref date	Wednesday, April 01, 2015	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	735
ZAG make/model	Teledyne API 701	Serial Number	4698
DACS make/model	Campbell Scientific CR3000	Serial Number	8205

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	27.5	25.6
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.999469	0.999850	Pressure	27.1	27.2
Calculated intercept	-0.158837	0.286118	Flow cell A	0.755	0.770
Analyzer Background	0.0	0.0	Flow cell B	NA	NA
Analyzer Coefficient	1.014	0.987	Cell A Intensity	NA	NA
			Cell B Intensity	NA	NA

Analyzer make	Teledyne API T400	Analyzer serial #	1020
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA) GenRef-GenDrv (mv)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.00	0.0	-0.3	----
as found span	6000	237.0 - 829.6	101.6	104.0	0.977
calibrator zero	6000	0.00	0.0	-0.3	----
high point	6000	237.0 - 829.6	101.6	101.2	1.004
second point	6000	177.9 - 789.4	77.3	77.1	1.002
third point	6000	114.1 - 732.9	51.7	51.4	1.005
as left zero	6000	0.00	0.0	0.0	----
as left span	6000	237.0 - 829.6	101.6	101.3	1.003
Average Correction Factor					1.004

Corrected As found	104.3	Previous response	101.8	% change	-2.4%
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Notes:

Span with a small adjustment

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association O3 Calibration Report

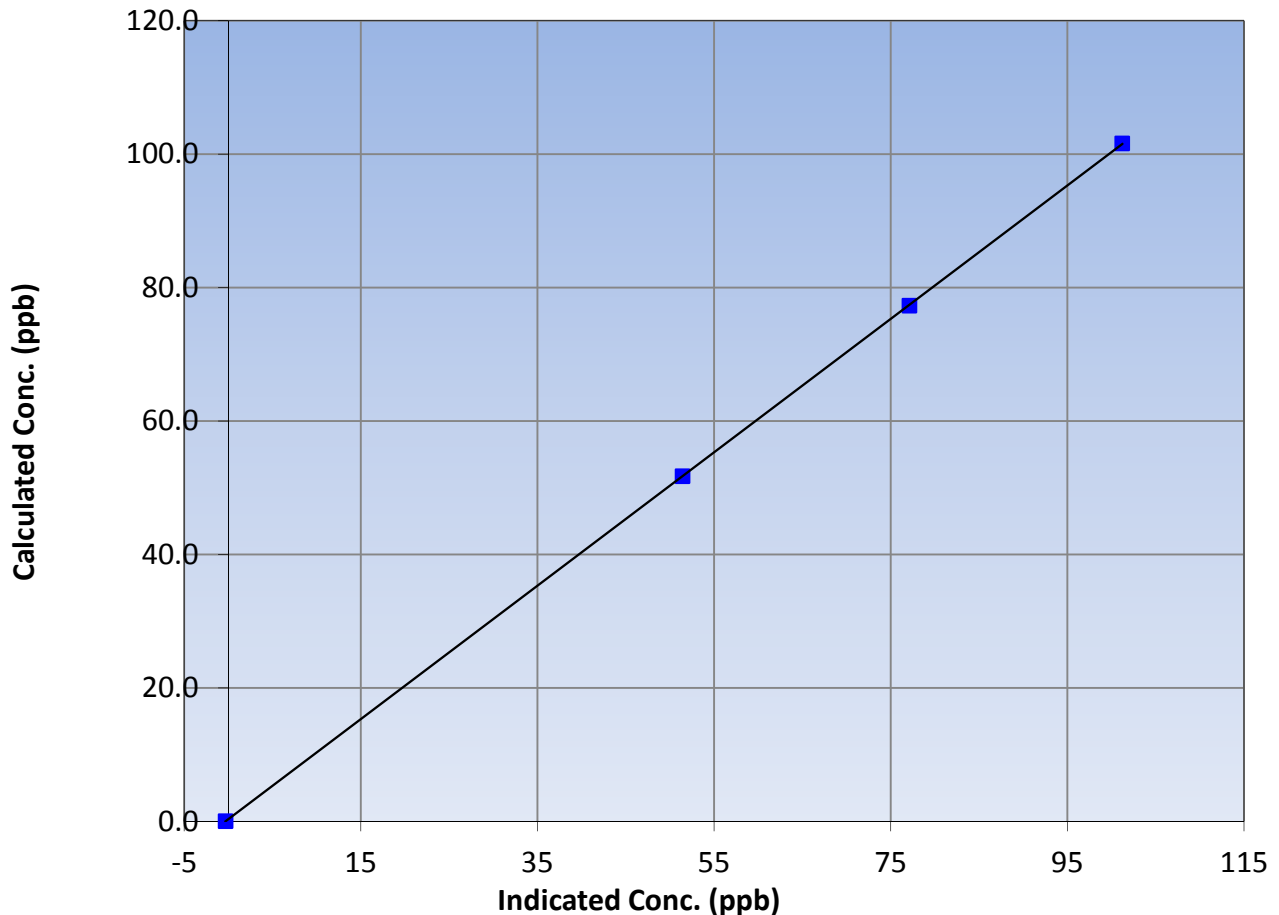
## Station Information

Calibration Date	Wednesday, April 01, 2015	Previous Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	15:05	End Time (MST)	17:56
Analyzer make	Teledyne API T400	Analyzer serial #	1020

## Calibration Data

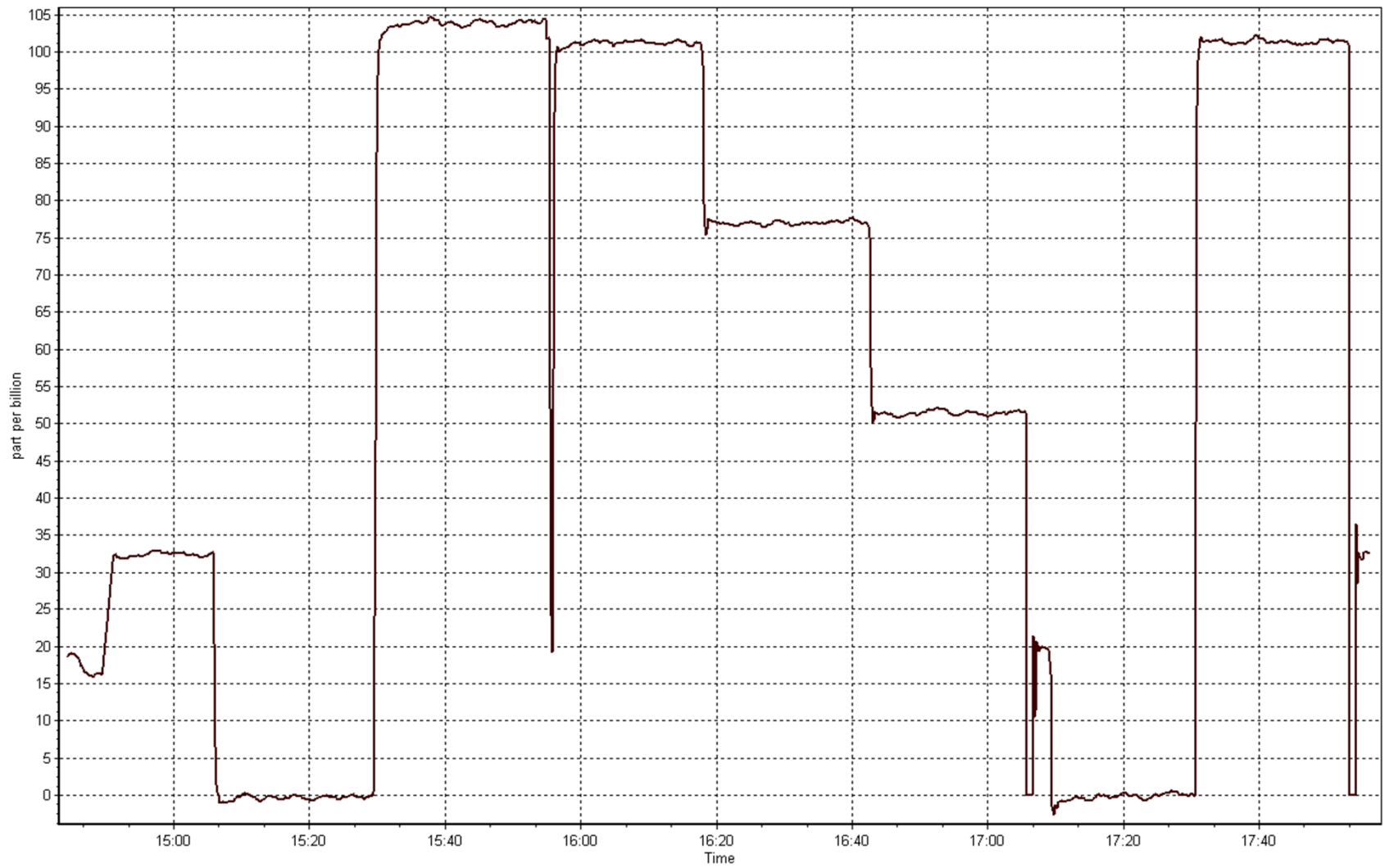
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999996
101.6	101.2	1.0036		
77.3	77.1	1.0022	Slope	0.999850
51.7	51.4	1.0051		
			Intercept	0.286118

### O3 Calibration Curve



O3 Calibration Plot

Date: April 1, 2015





# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	10:15	End Time (MST)	15:09
NO Cal Gas Conc	20.2 ppm	Gas Cert Reference	LL103809
NOx Cal Gas Conc	20.3 ppm	Cal Gas Expiry Date	16-Sep-16
Calibrator	Teledyne API T700	Serial Number	747
Zero air Generator	Teledyne API T701	Serial Number	4698

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.001249	0.999719	0.997238
	Data Offset	-0.010097	0.049464	-0.117578
Current Calibration	Data Slope	1.003781	1.002249	0.991534
	Data Offset	0.140207	0.250050	-0.146581

### Analyzer Information

Analyzer make/model	Teledyne API T200u	Analyzer serial #	172
---------------------	--------------------	-------------------	-----

Test Point	before		after	
Concentration range	0-200	ppb	0-200	ppb
NO coefficient	1.110		1.095	
NOx coefficient	1.121		1.111	
NO2 coefficient	NA		1.000	
NO bkgnd	0.1		0.1	
NOx bkgnd	0.2		0.2	
Chamber Temp	40	Deg C	40	Deg C
Moly Temp	314.9	Deg C	316.6	Deg C
HVPS	NA	V	502	V
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	88	ccm	88	ccm
R Cell press NO	3.8	"Hg	3.8	"Hg
R Cell Press Nox	NA	"Hg	NA	"Hg
NO sample flow	1121	ccm	1110	ccm
Nox sample Flow	1121	ccm	1133	ccm

Notes:



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 1, 2015

Station Number:

AMS 8

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	----	----
as found span	6000	44.6	150.8	150.0	0.7	152.5	152.3	0.2	0.9885	0.9848
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	----	----
high point	6000	44.6	150.8	150.0	0.7	150.2	149.6	0.6	1.0035	1.0025
second point	6000	23.8	80.4	80.0	0.4	79.6	79.2	0.4	1.0101	1.0103
third point	6000	11.9	40.2	40.0	0.2	40.0	39.7	0.3	1.0059	1.0088
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	----	----
as left span	6000	44.6	150.8	47.5	103.3	151.3	47.7	103.6	0.9965	0.9958
Average Correction Factor									1.0065	1.0072

Corrected As found

NO<sub>x</sub>= 152.5

NO= 152.4

Percent Change

NO<sub>x</sub>= -1.3%

NO= -1.6%

Previous Response

NO<sub>x</sub>= 150.6

NO= 150.0

### GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

44.6

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	47.5	101.6	149.9	47.5	102.4	0.9984	1.0000	0.9913	100.9%
2nd NO2 (200)	----	71.7	77.3	149.8	71.7	78.1	0.9988	1.0000	0.9894	101.1%
3rd NO2 (100)	----	97.3	51.7	149.8	97.3	52.5	0.9989	1.0000	0.9848	101.5%
4th NO2 (0)	149.0	----	0.6	149.6	149.0	0.6	1.0006	1.0000	N/A	----
Average Correction Factor							0.9992	1.0000	0.9885	101.2%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

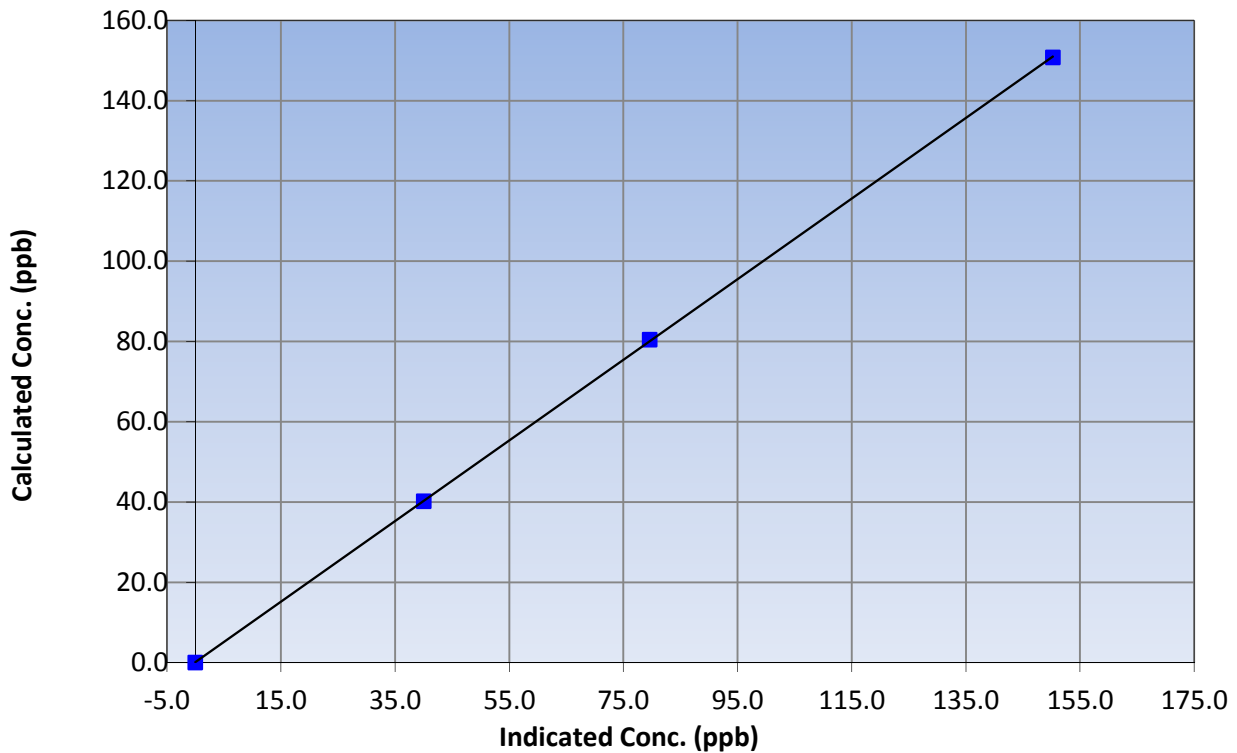
### Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	15:09
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999985
150.8	150.2	1.0035		
80.4	79.6	1.0101	Slope	1.003781
40.2	40.0	1.0059		
			Intercept	0.140207

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

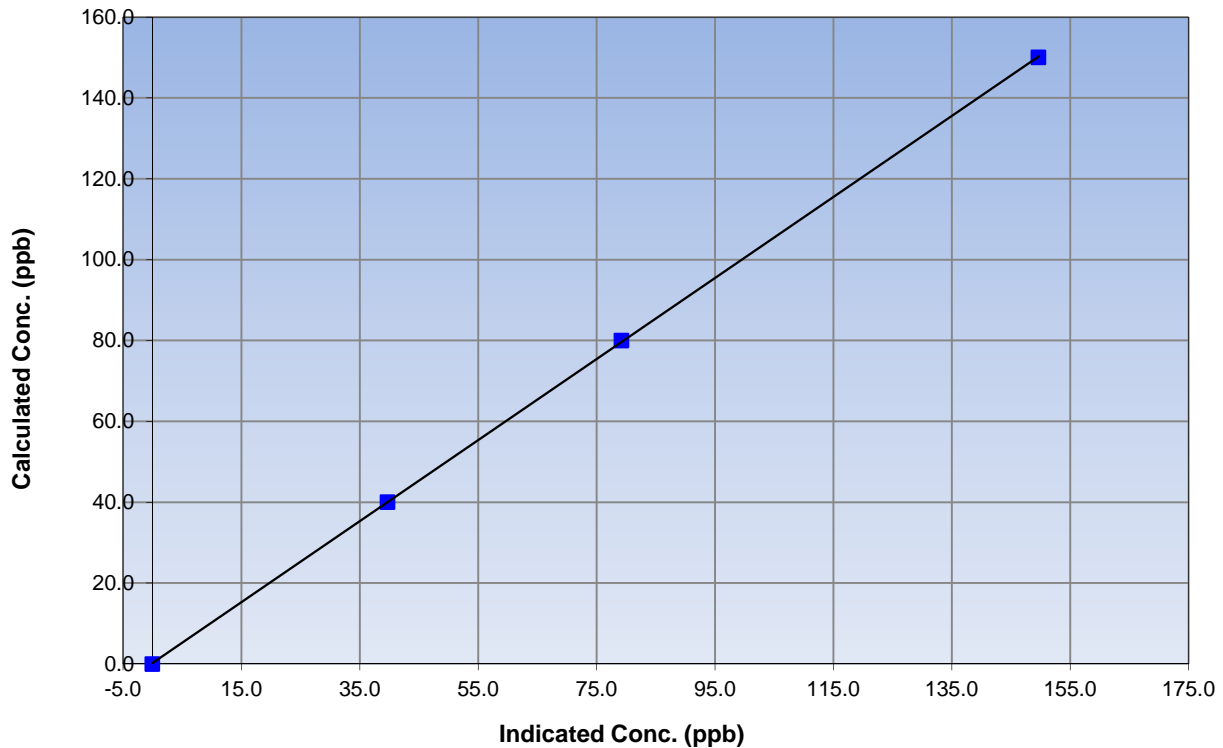
### Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 4, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	15:09
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999981
150.0	149.6	1.0025		
80.0	79.2	1.0103	Slope	1.002249
40.0	39.7	1.0088		
			Intercept	0.250050

### NO Calibration Curve







# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

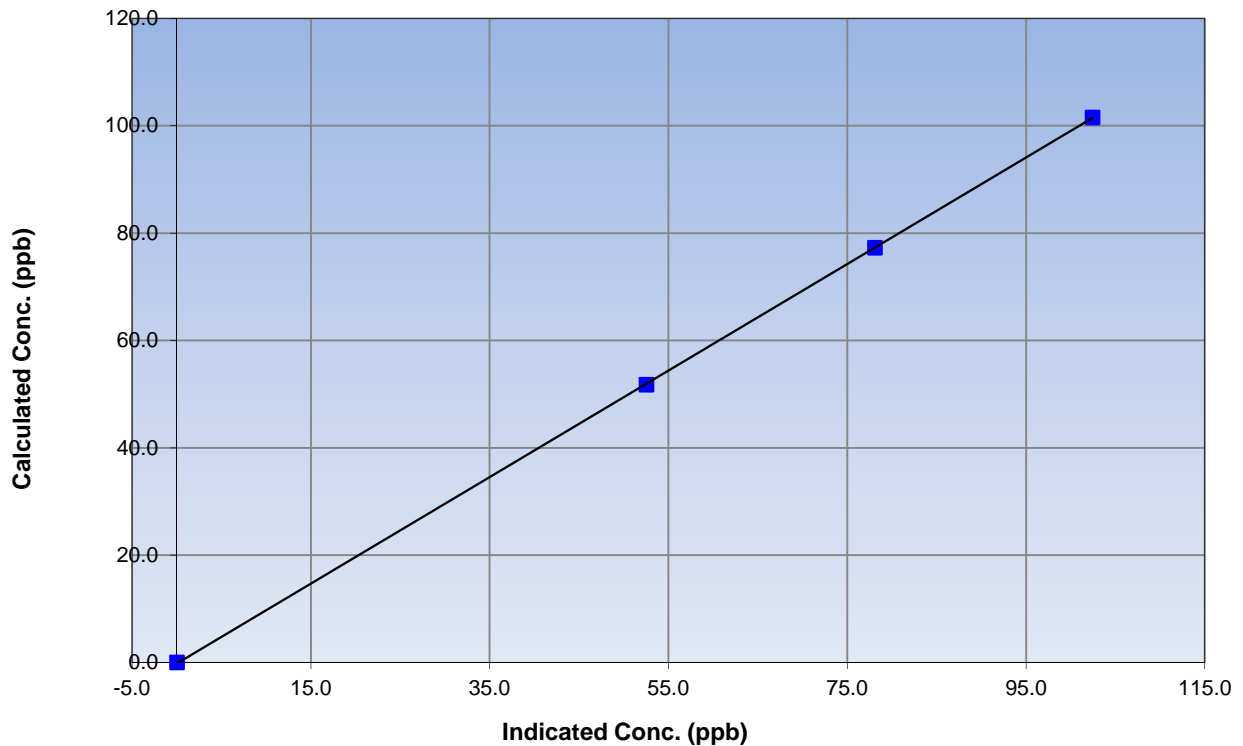
### Station Information

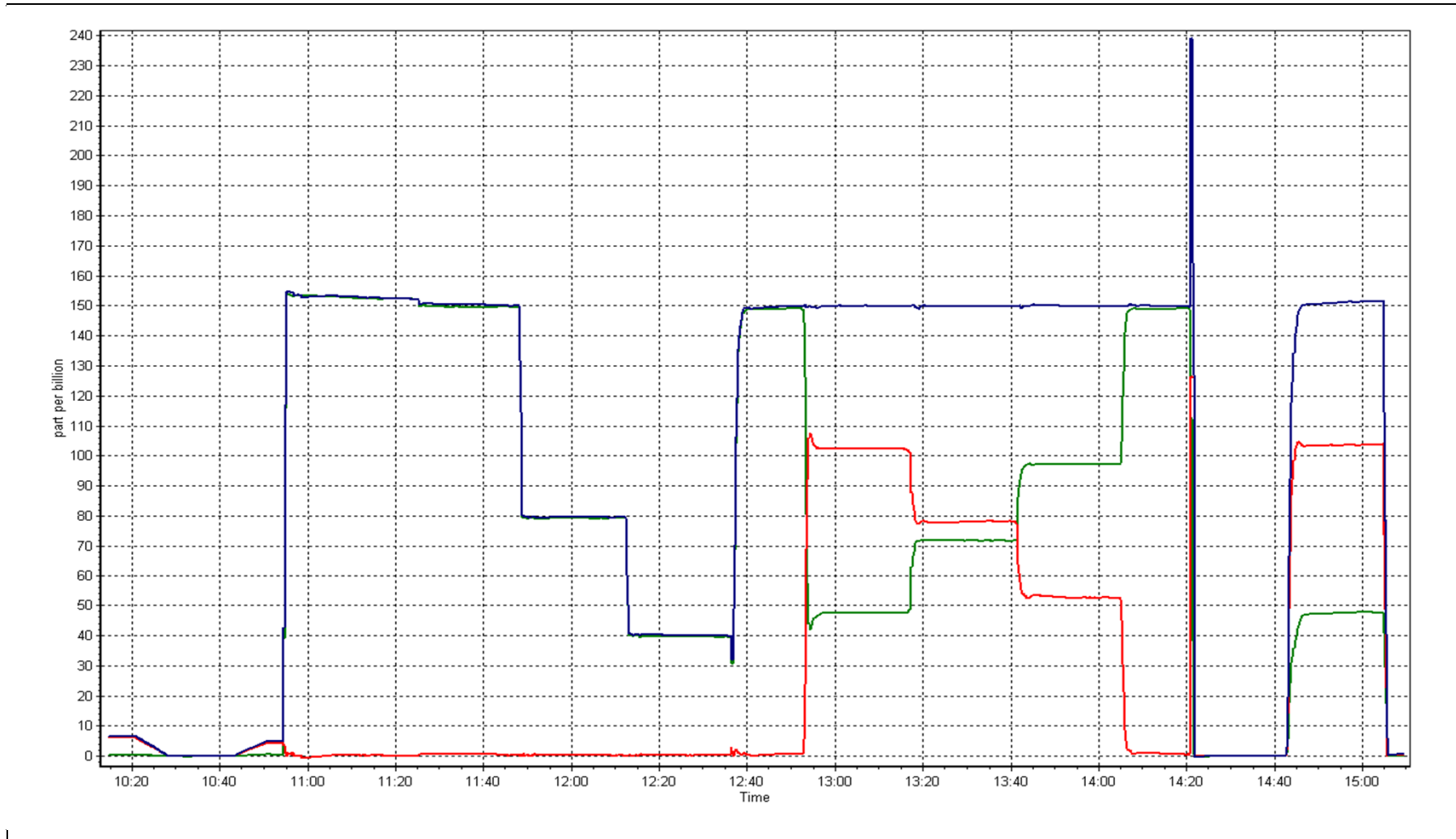
Calibration Date	April 1, 2015	Previous Calibration	March 4, 2015
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	10:15	End Time (MST)	15:09
Analyzer make	Teledyne API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999988
101.6	102.4	0.9913		
77.3	78.1	0.9894	Slope	0.991534
51.7	52.5	0.9848		
			Intercept	-0.146581

### NO<sub>2</sub> Calibration Curve





# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

### **AMS 9 BARGE LANDING APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 APRIL 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	685	34	35	99.86	2	0	0	0
THC(ppm) Average	675	42	45	99.58	3.3	-	2.5	-
Temperature (C) Average	720	0	0	100.00	24.6	-	16	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	73	-
Wind Speed 10 m (km/h) Average	708	0	12	98.33	21	-	14	-
Wind Direction 10 m (deg) Average	708	0	12	98.33	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 APRIL 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	685	0.1	0	-	0	0	0	0	0	0	0	2
THC(ppm) Average	675	2.18	0.2	-	1.9	2	2	2.1	2.3	2.4	2.4	3.3
Temperature (C) Average	720	5.05	8	-	-14.6	-5.2	-0.9	5.1	11.3	14.9	14.9	24.6
Relative Humidity (%) Average	720	46.6	20	-	13	23	31	43	60	78	78	98
Wind Speed 10 m (km/h) Average	708	7.9	4	-	0	3	5	7	10	14	14	21
Wind Direction 10 m (deg) Average	708	-	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	19 Apr 2015 16:00	19 Apr 2015 16:00	1	Station power spike
THC	09 Apr 2015 14:00	09 Apr 2015 14:00	1	Maintenance - sample manifold cleaned
THC	19 Apr 2015 16:00	19 Apr 2015 17:00	2	Station power spike
Wind Speed, Wind Direction	01 Apr 2015 04:00	01 Apr 2015 14:00	11	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	06 Apr 2015 05:00	06 Apr 2015 05:00	1	Flat line in sensor output signal -sensor frozen

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# Wood Buffalo Environmental Association

## Summary of Hour Averages

# Total Reduced Sulphur (TRS) - ppb

## Barge Landing - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Apr 28 10:00	Maximum Daily Average: 0.4 ppb on Apr 9		Hours of Data:	685
Minimum Value: 0 ppb on Apr 1 05:00	Minimum Daily Average: 0.0 ppb on Apr 1		Hours of Missing Data:	35
Maximum Diurnal Average: 0.3 ppb at hour 8	Minimum Diurnal Average: 0.1 ppb at hour 19		Hours of Calibration:	34
Monthly Average: 0.1 ppb	Percentiles: $P_1 = 0$ $P_{10} = 0$ $Q_1 = 0$ Median = 0 $Q_3 = 0$ $P_{90} = 0$ $P_{99} = 1$		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-Apr	0	0	Z	0	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-Apr	0	0	0	Z	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Apr	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
7-Apr	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	0.2	1
8-Apr	0	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Apr	0	0	0	0	Z	1	0	1	1	1	1	1	C	C	C	C	0	0	0	0	0	0	0	0	0.4	1	
10-Apr	0	0	0	0	0	Z	1	1	1	1	0	0	0	0	C	0	0	0	0	0	0	0	1	0	0	0.3	1
11-Apr	0	0	1	1	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Apr	0	Z	0	0	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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Apr	0	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
17-Apr	0	0	0	0	1	1	Z	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Apr	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	PF	0	0	0	0	0	0	0	0	0	0.2	1
20-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
21-Apr	0	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
24-Apr	0	Z	0	0	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-Apr	0	0	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-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
27-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Apr	0	0	0	0	0	Z	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
29-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
30-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

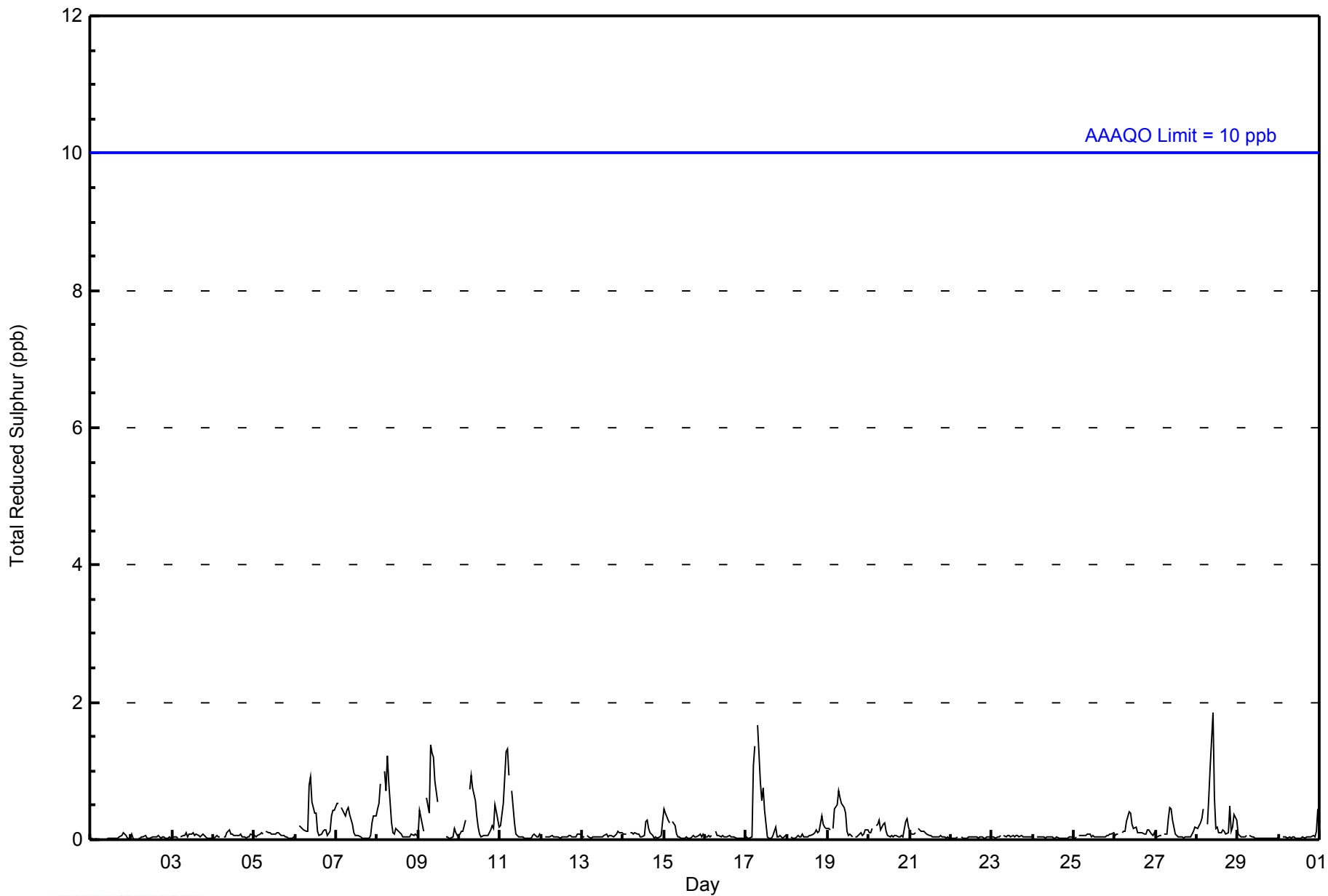
0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	Diurnal Average
1	1	1	1	1	1	1	1	2	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	685	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: 685

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - April 2015**

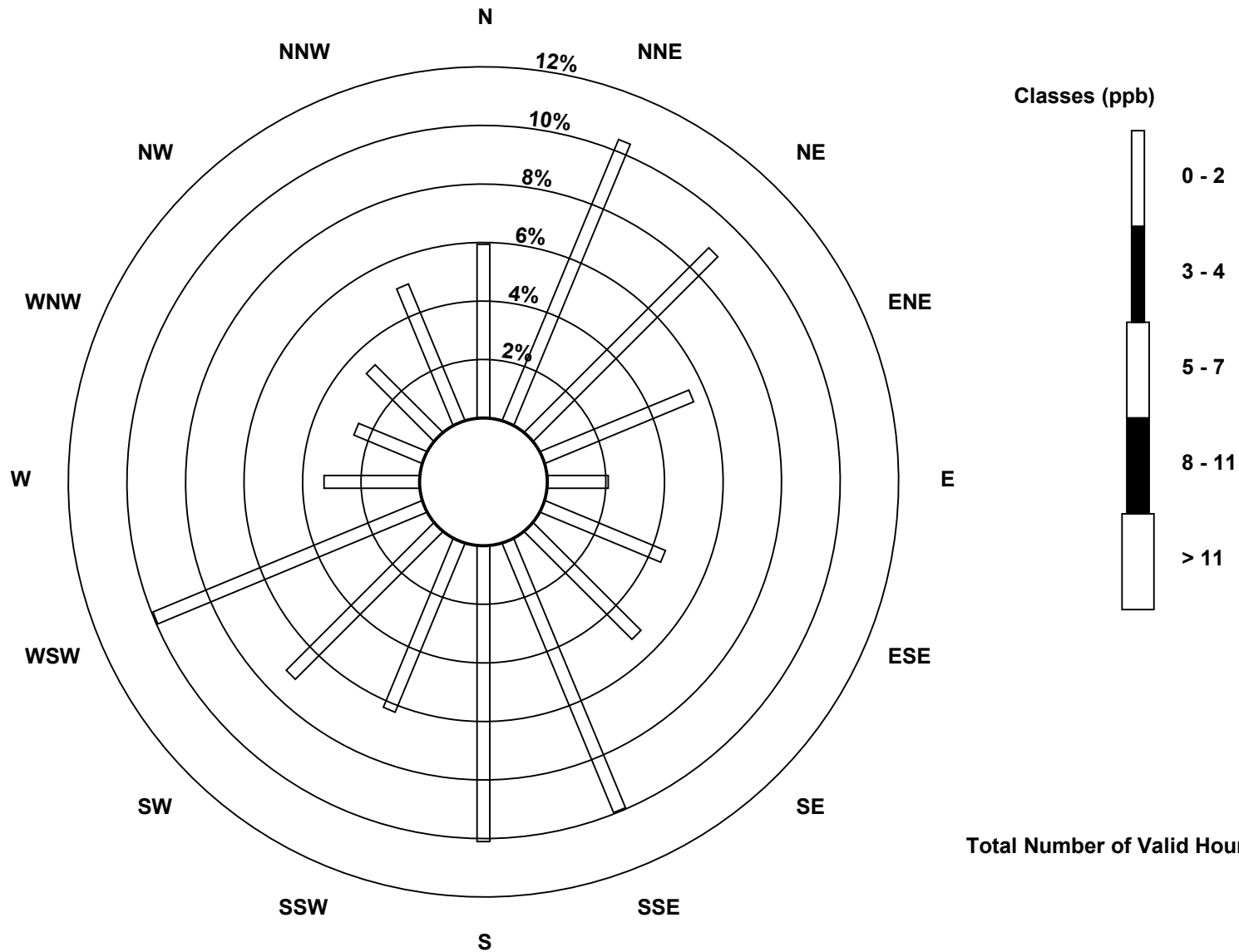
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	40	70	60	37	14	30	35	67	68	42	48	67	22	17	22	34	673
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	70	60	37	14	30	35	67	68	42	48	67	22	17	22	34	673

Total Number of Valid Hours: 673

Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb  
Barge Landing (AMS 9)**

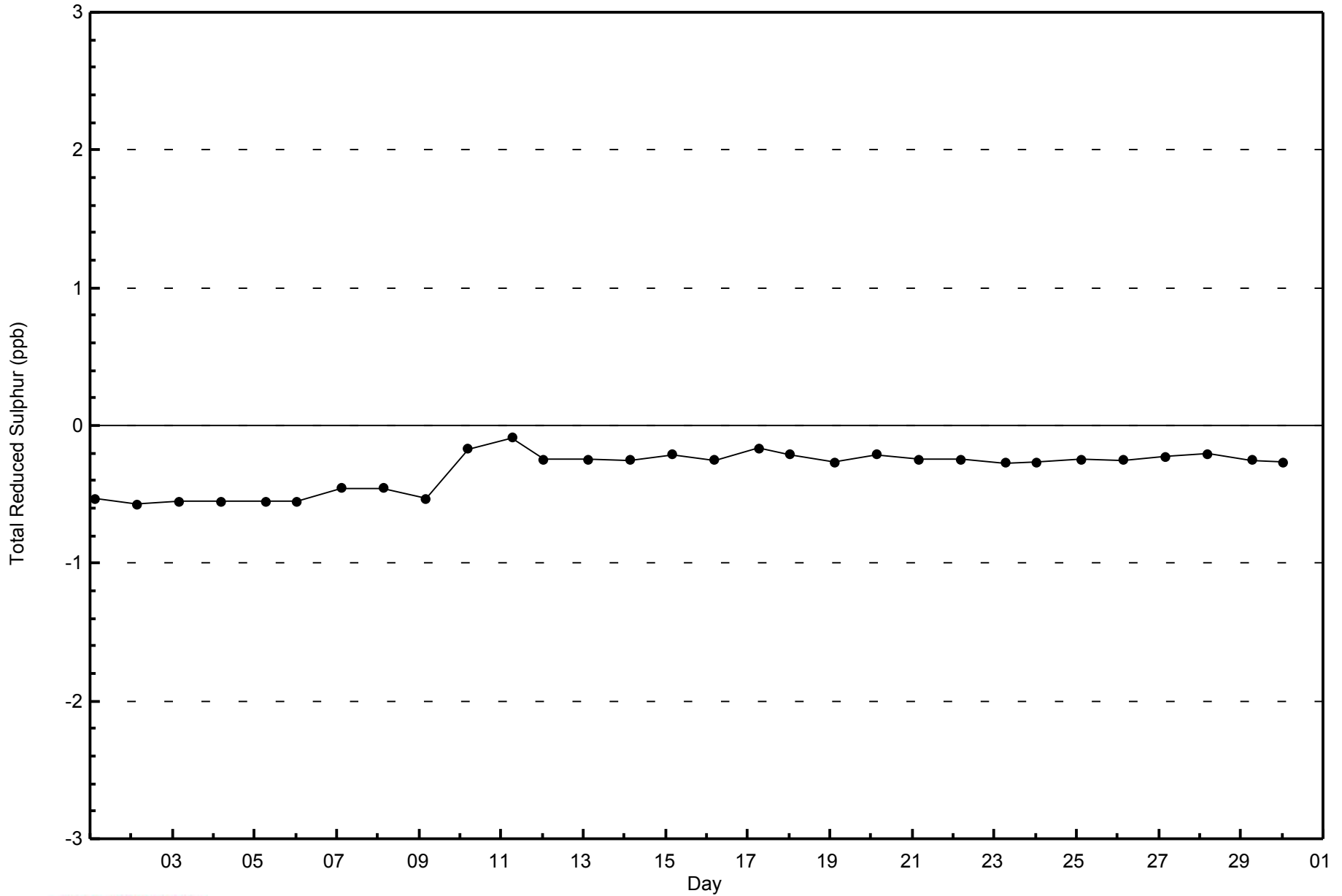


**Total Number of Valid Hours: 673**



WBEA  
Zero Responses

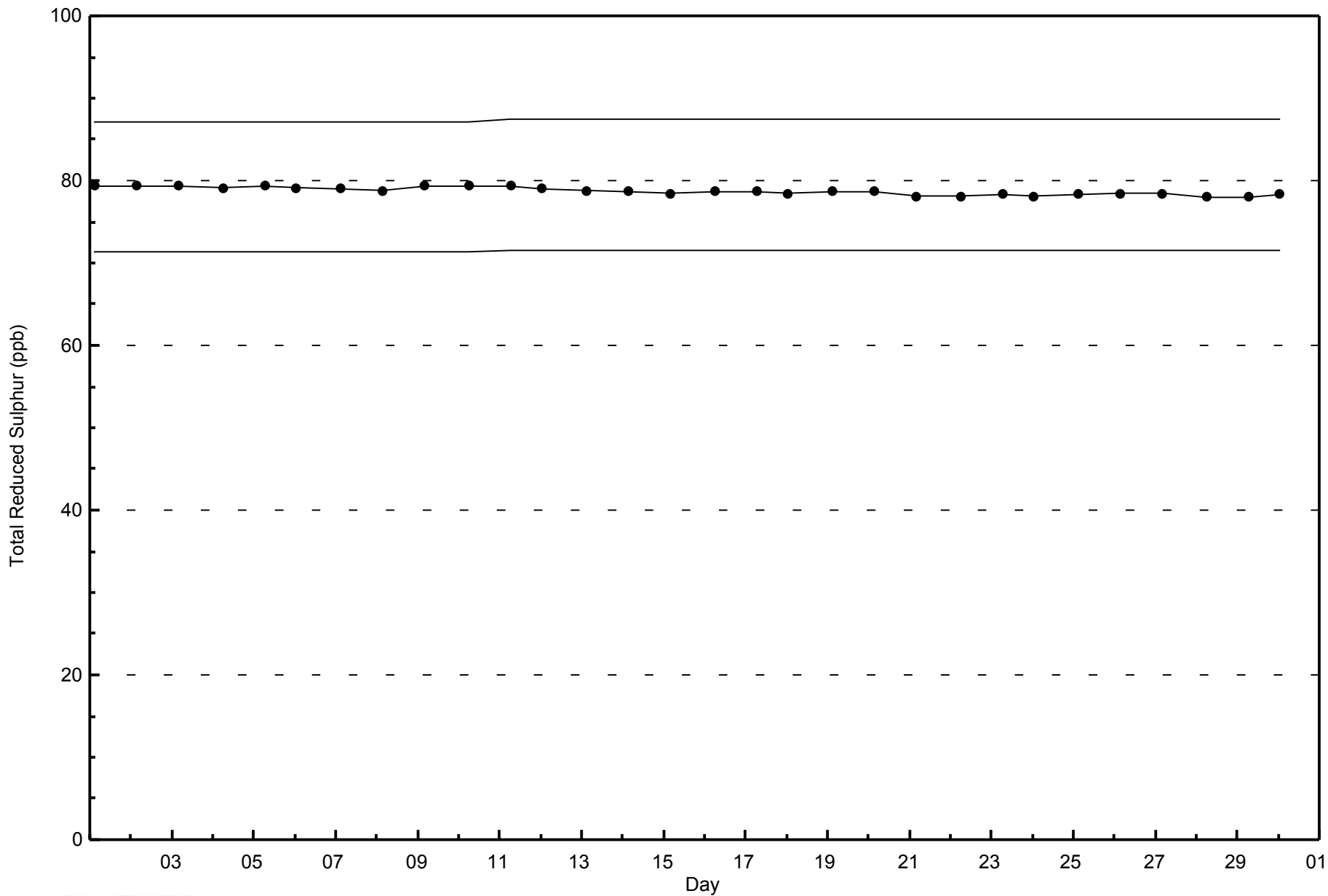
Total Reduced Sulphur (TRS) - ppb  
Barge Landing - April 2015





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Barge Landing - April 2015





Maximum Value: 3.3 ppm on Apr 11 07:00	Maximum Daily Average: 2.5 ppm on Apr 10	Hours in Service: 720
Minimum Value: 1.9 ppm on Apr 19 19:00	Minimum Daily Average: 2.0 ppm on Apr 16	Hours of Data: 675
Maximum Diurnal Average: 2.3 ppm at hour 8	Minimum Diurnal Average: 2.1 ppm at hour 18	Hours of Missing Data: 45
Monthly Average: 2.18 ppm	Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.3 P <sub>90</sub> = 2.4 P <sub>99</sub> = 2.8	Hours of Calibration: 42
		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-Apr	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	C	C	C	C	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.3			
2-Apr	2.3	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.3	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1		
3-Apr	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.2	2.4	2.1	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1		
4-Apr	2.2	2.2	2.2	2.2	Z	2.2	2.1	2.2	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
5-Apr	2.1	2.1	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.2	2.4		
6-Apr	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.2	2.3	2.3		
7-Apr	2.4	Z	2.4	2.4	2.4	2.3	2.4	2.5	2.8	2.7	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.5	2.4	2.5	2.3	2.3	2.3	2.3	2.8		
8-Apr	2.4	2.4	Z	2.5	2.5	2.5	2.6	2.6	2.4	2.2	2.3	2.7	2.3	2.3	2.4	2.3	2.2	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.7	
9-Apr	2.2	2.4	2.4	Z	2.4	2.5	2.6	2.4	2.3	2.2	2.2	2.3	2.1	M	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.6	2.3	2.2	2.2	2.2	2.2	2.6	2.6		
10-Apr	2.4	2.5	2.7	2.9	Z	2.7	2.8	2.9	2.7	2.8	2.6	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5	2.5	2.6	2.5	2.5	2.6	2.5	2.9		
11-Apr	2.6	2.8	2.7	2.8	3.0	Z	3.3	3.2	2.4	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	3.3	
12-Apr	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
13-Apr	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.3	
14-Apr	2.1	2.1	Z	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1	2.2	
15-Apr	2.0	2.0	2.1	Z	2.1	2.4	2.4	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.4	
16-Apr	2.0	2.0	2.0	2.0	Z	2.1	2.2	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	
17-Apr	2.0	2.0	2.0	2.0	2.1	Z	2.5	2.6	2.5	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.1	2.6	
18-Apr	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	1.9	2.1	2.4	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.4	2.4	
19-Apr	2.1	Z	2.1	2.1	2.3	2.4	2.7	2.7	2.7	2.7	2.3	2.2	2.0	1.9	2.0	1.9	PF	PF	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.3	2.1	2.7	
20-Apr	2.2	2.0	Z	2.3	2.3	2.3	2.4	2.4	C	C	C	C	C	C	C	C	C	C	2.2	2.3	2.4	2.7	2.6	2.4	2.3	2.3	--	--	--	2.7		
21-Apr	2.3	2.2	2.3	Z	2.4	2.4	2.4	2.4	2.3	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.4	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
22-Apr	2.1	2.1	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
23-Apr	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
24-Apr	Z	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.4	
25-Apr	2.3	Z	2.4	2.4	2.4	2.4	2.5	2.4	2.5	2.6	2.6	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.9
26-Apr	2.4	2.3	Z	2.2	2.3	2.3	2.3	2.4	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4
27-Apr	2.1	2.1	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
28-Apr	2.3	2.5	2.6	2.6	Z	2.7	2.4	2.5	2.5	2.3	2.1	2.1	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.2	2.2	2.2	2.4	2.2	2.3	2.3	2.3	2.3	2.3	2.7	
29-Apr	2.0	2.0	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
30-Apr	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	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	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	Diurnal Average	
2.6	2.8	2.7	2.9	3.0	2.7	3.3	3.2	2.8	2.8	2.8	2.6	2.7	2.4	2.4	2.4	2.4	2.4	2.4	2.2	2.4	2.4	2.7	2.6	2.6	2.9	2.8	2.1	2.1	2.1	2.1	2.1	2.1	Diurnal Maximum

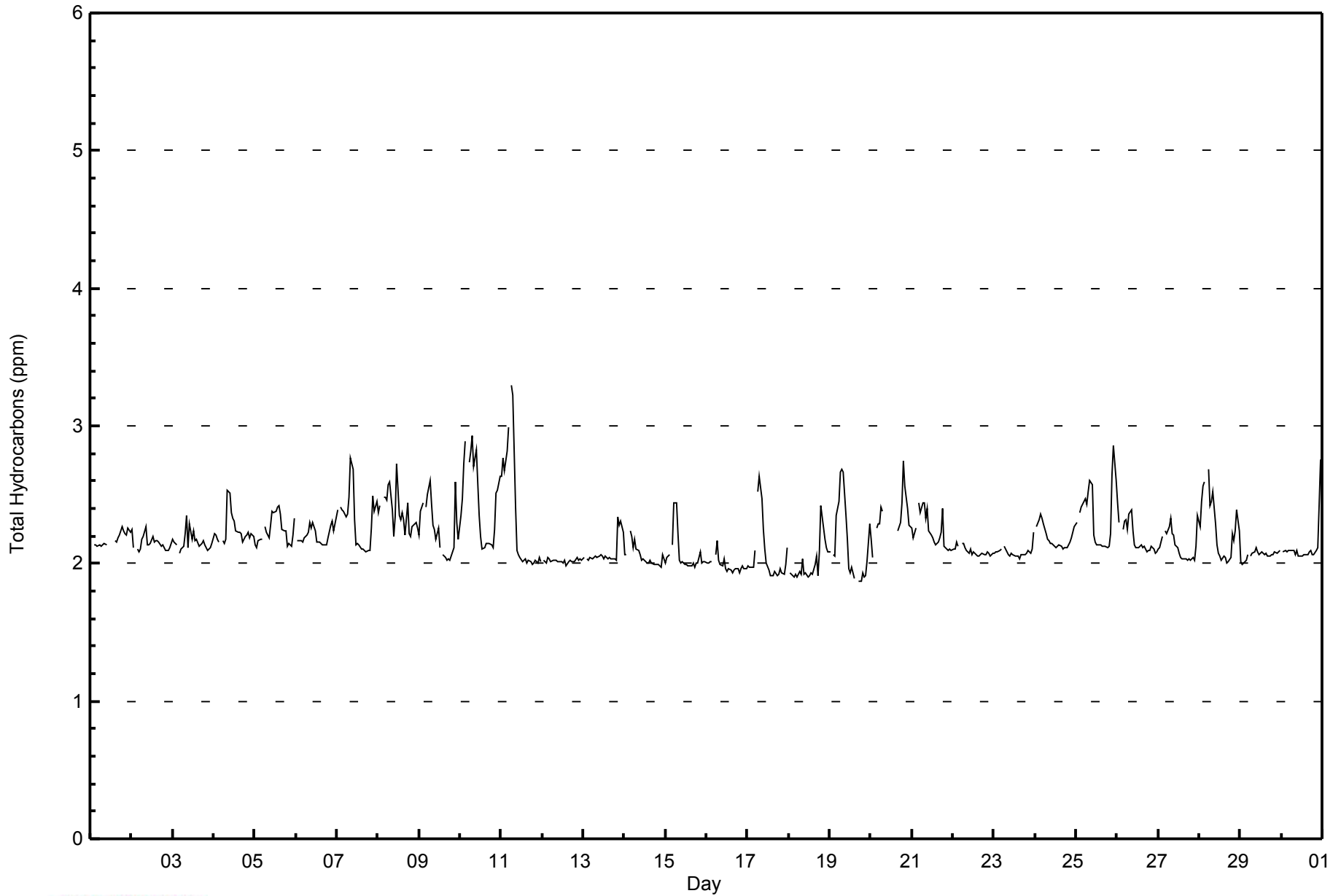
Z - zerospan      C - Calibration      M - Maintenance      PF - Power Failure





**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	171	25.33	25.33
2.1 - 3.0	502	74.37	99.70
3.1 - 10.0	2	0.30	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 675

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - April 2015**

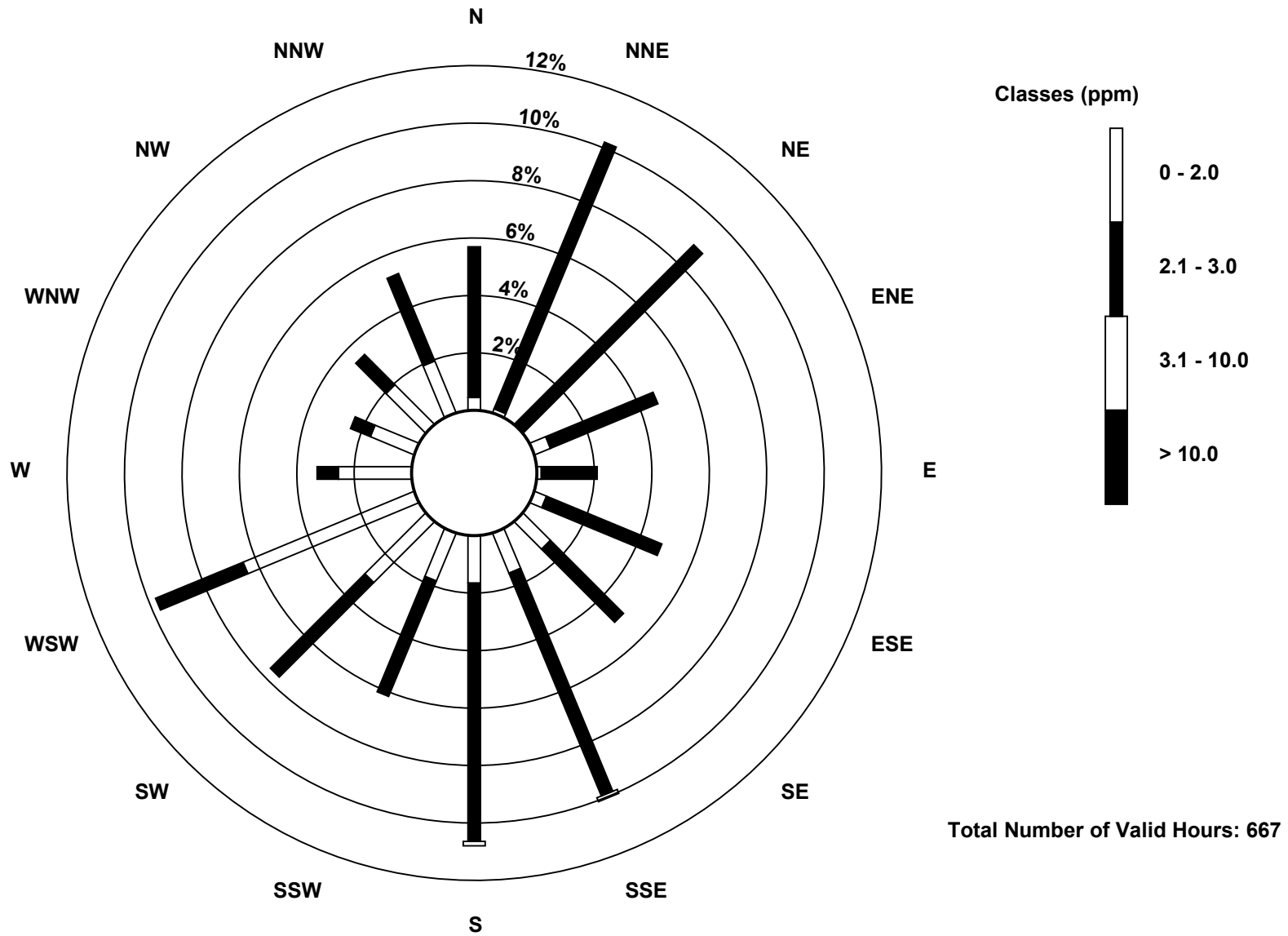
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	3	1	0	4	1	3	9	10	11	12	20	43	17	11	13	13	171
2.1 - 3.0	35	67	59	27	13	29	24	56	60	29	31	22	5	5	10	22	494
3.1 - 10.0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>38</b>	<b>68</b>	<b>59</b>	<b>31</b>	<b>14</b>	<b>32</b>	<b>33</b>	<b>67</b>	<b>72</b>	<b>41</b>	<b>51</b>	<b>65</b>	<b>22</b>	<b>16</b>	<b>23</b>	<b>35</b>	<b>667</b>

Total Number of Valid Hours: 667

Total Number of Hours: 720

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

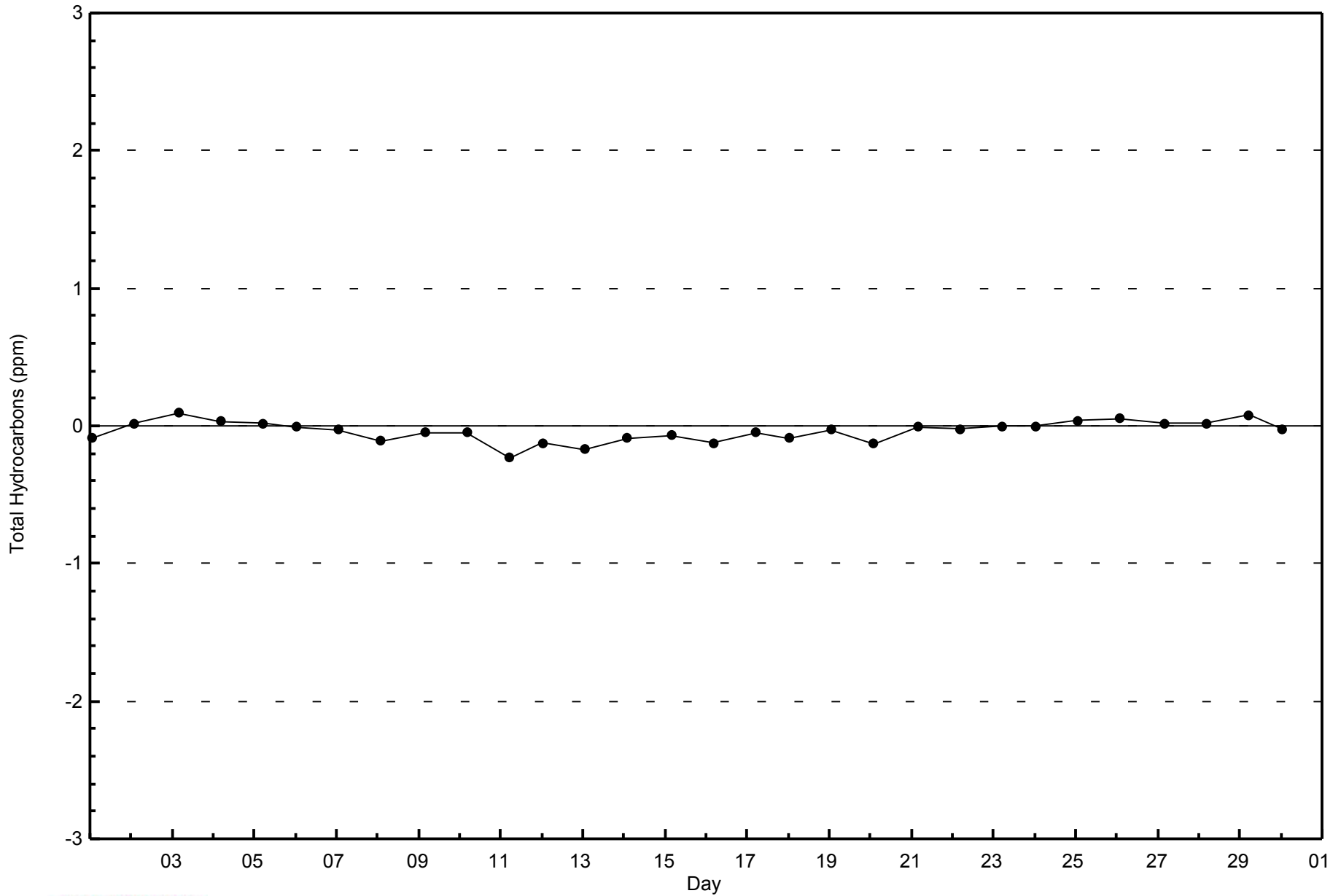
**Total Hydrocarbons (THC) - ppm  
Barge Landing (AMS 9)**





WBEA  
Zero Responses

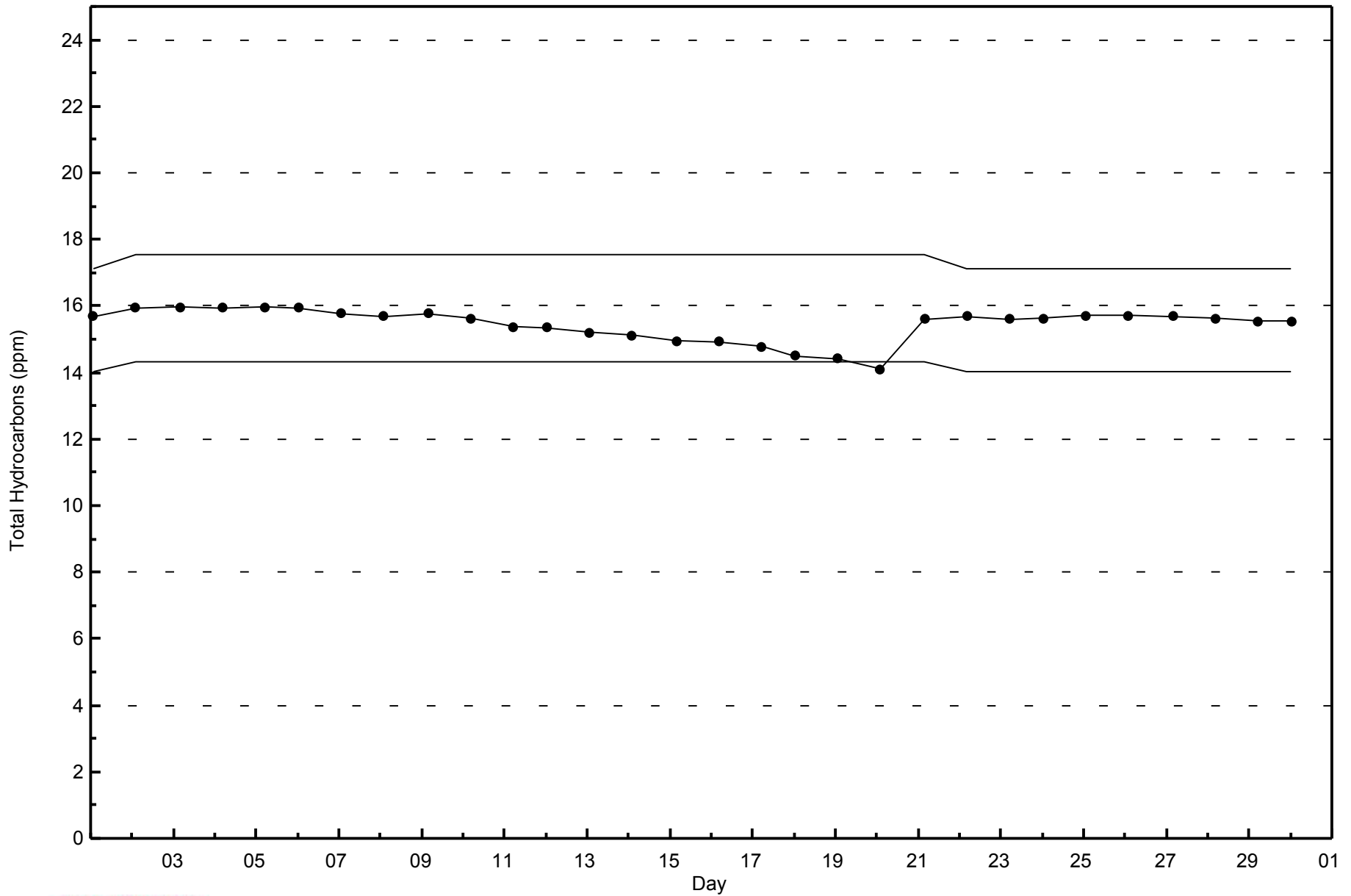
Total Hydrocarbons (THC) - ppm  
Barge Landing - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Barge Landing - April 2015



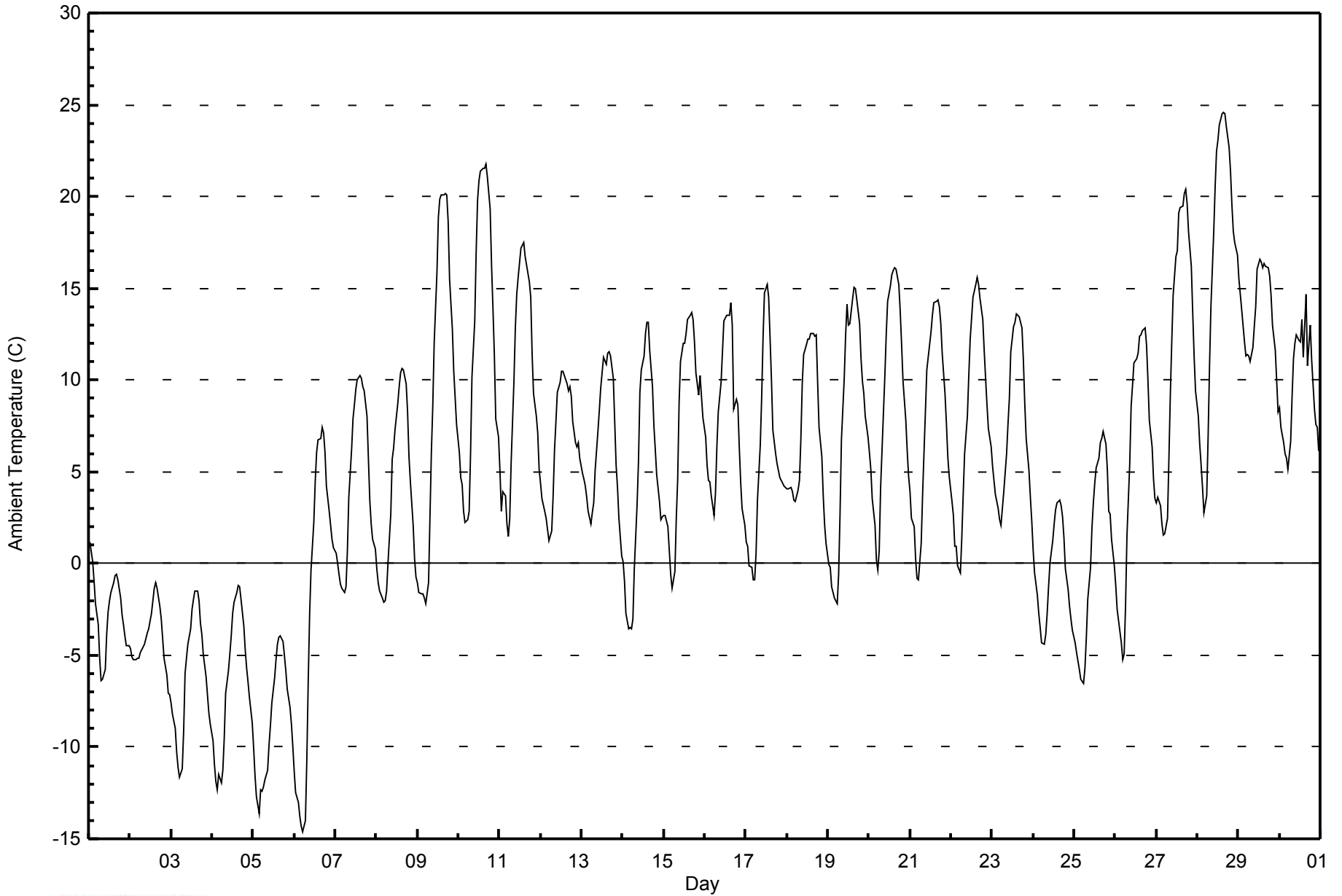


Maximum Value: 24.6 C on Apr 28 16:00																				Maximum Daily Average: 16.0 C on Apr 28					Hours in Service: 720	
Minimum Value: -14.6 C on Apr 6 06:00																				Minimum Daily Average: -8.6 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 11.1 C at hour 16																				Minimum Diurnal Average: -1.8 C at hour 6					Hours of Missing Data: 0	
Monthly Average: 5.05 C																				Percentiles: P <sub>1</sub> = -12.5 P <sub>10</sub> = -5.2 Q <sub>1</sub> = -0.9 Median = 5.1 Q <sub>3</sub> = 11.3 P <sub>90</sub> = 14.9 P <sub>99</sub> = 22.4					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-Apr	1.2	0.6	0.1	-1.0	-2.2	-3.3	-5.2	-6.4	-6.3	-5.8	-3.9	-2.6	-2.0	-1.5	-1.0	-0.7	-0.6	-0.9	-1.9	-2.8	-3.3	-4.0	-4.5	-4.5	-2.6	1.2
2-Apr	-4.6	-5.1	-5.2	-5.2	-5.2	-5.2	-4.9	-4.7	-4.4	-4.1	-3.8	-3.6	-2.7	-2.1	-1.3	-1.0	-1.3	-2.3	-3.0	-4.1	-5.2	-6.1	-7.0	-7.2	-4.1	-1.0
3-Apr	-7.6	-8.2	-9.0	-10.3	-11.1	-11.7	-11.2	-9.1	-6.0	-5.1	-4.4	-3.5	-2.5	-2.0	-1.5	-1.5	-2.0	-3.2	-3.9	-5.0	-6.2	-7.1	-8.1	-8.8	-6.2	-1.5
4-Apr	-9.7	-11.0	-11.9	-12.3	-11.5	-12.0	-11.2	-9.5	-7.0	-5.9	-4.9	-4.0	-2.7	-2.1	-1.6	-1.2	-1.3	-2.0	-3.4	-4.7	-5.7	-6.5	-7.3	-8.7	-6.6	-1.2
5-Apr	-10.1	-11.6	-12.7	-13.7	-12.4	-12.4	-12.2	-11.8	-11.2	-9.9	-8.8	-7.6	-6.3	-5.2	-4.4	-4.0	-3.9	-4.2	-5.0	-5.9	-6.8	-7.9	-8.8	-9.9	-8.6	-3.9
6-Apr	-11.3	-12.4	-13.0	-13.8	-14.3	-14.6	-14.0	-10.7	-6.4	-2.8	-0.3	2.2	4.4	6.0	6.7	6.8	7.4	7.1	6.1	4.2	2.9	2.1	1.3	0.9	-2.3	7.4
7-Apr	0.6	0.1	-0.6	-1.1	-1.3	-1.6	-1.2	0.7	3.6	6.2	7.9	8.7	9.5	10.0	10.2	10.1	9.6	9.4	8.0	5.7	3.5	2.2	1.3	0.8	4.3	10.2
8-Apr	-0.3	-1.0	-1.5	-1.9	-2.1	-2.0	-1.5	0.0	2.7	5.7	6.3	7.3	8.7	9.7	10.4	10.6	10.5	9.8	8.3	5.8	4.4	2.1	0.3	-0.7	3.8	10.6
9-Apr	-1.1	-1.5	-1.7	-1.6	-1.9	-2.2	-1.1	2.5	6.0	8.6	12.0	15.9	18.8	19.9	20.1	20.0	20.1	20.1	18.6	15.5	12.8	10.4	9.1	7.6	9.5	20.1
10-Apr	6.1	4.7	4.3	2.8	2.3	2.4	2.9	6.0	10.2	13.2	17.0	19.8	20.8	21.4	21.5	21.5	21.7	21.1	19.3	16.3	13.9	11.4	7.9	6.9	12.3	21.7
11-Apr	5.0	2.9	3.9	3.7	2.2	1.4	2.4	5.5	9.9	12.9	14.7	15.6	17.2	17.3	17.5	16.7	16.3	15.3	14.5	11.4	9.3	8.0	7.1	5.2	9.8	17.5
12-Apr	4.4	3.5	2.8	2.5	1.8	1.3	1.8	3.7	6.2	7.7	9.3	9.8	10.5	10.4	10.3	9.8	9.4	9.6	9.1	7.8	6.6	6.4	6.6	5.8	6.5	10.5
13-Apr	4.9	4.6	4.2	3.6	2.8	2.2	2.8	3.3	5.1	7.2	8.3	9.6	10.4	11.2	10.8	11.5	11.5	11.3	10.1	7.7	5.3	4.2	2.5	0.4	6.5	11.5
14-Apr	0.1	-0.9	-2.7	-3.5	-3.5	-3.5	-3.0	-0.3	3.2	5.6	9.3	10.5	11.3	12.5	13.1	13.2	11.6	9.6	7.5	6.2	4.9	3.4	2.4	2.5	4.6	13.2
15-Apr	2.6	2.6	2.0	0.7	-0.6	-1.4	-0.4	2.5	4.6	8.7	11.0	12.0	12.0	12.5	13.3	13.5	13.7	13.3	12.1	10.4	9.2	10.3	9.1	8.0	7.6	13.7
16-Apr	6.9	5.4	4.5	4.4	3.7	2.7	3.8	6.4	8.3	9.9	11.5	13.2	13.4	13.6	13.6	14.2	13.0	8.4	9.0	8.6	6.4	4.5	3.0	2.1	7.9	14.2
17-Apr	1.1	1.0	-0.1	-0.2	-0.9	-0.9	0.6	3.4	6.4	9.0	12.3	14.7	15.2	14.5	12.3	10.0	7.2	6.0	5.5	5.1	4.7	4.3	4.2	4.1	5.8	15.2
18-Apr	4.1	4.1	4.1	3.9	3.5	3.4	4.0	4.5	6.7	9.8	11.4	11.9	12.3	12.2	12.5	12.6	12.4	12.5	9.9	7.5	5.8	3.7	2.1	1.1	7.3	12.6
19-Apr	-0.1	-0.2	-1.3	-1.6	-1.8	-2.2	-0.6	2.7	6.7	10.1	12.5	14.2	13.0	13.0	14.5	15.1	15.0	14.3	13.1	11.1	10.0	9.3	8.0	6.9	7.6	15.1
20-Apr	6.1	5.1	3.6	2.1	0.2	-0.4	0.7	4.1	8.2	10.2	12.5	14.3	15.1	15.7	16.0	16.1	16.0	15.2	13.7	11.9	10.0	7.8	6.1	4.8	9.0	16.1
21-Apr	3.9	2.4	2.0	0.3	-0.8	-0.9	1.1	3.7	6.0	8.2	10.5	12.0	12.6	13.6	14.2	14.3	14.4	14.0	13.1	11.5	9.2	7.6	5.9	4.7	7.6	14.4
22-Apr	3.4	2.6	0.9	1.0	-0.1	-0.5	1.4	3.7	5.9	8.1	10.3	12.2	13.4	14.6	15.2	15.6	15.2	14.5	13.3	11.6	10.1	8.6	7.4	6.3	8.1	15.6
23-Apr	5.3	4.6	3.7	3.0	2.4	2.1	3.0	3.9	6.0	7.6	9.1	11.5	12.9	13.1	13.6	13.5	13.4	12.9	11.1	8.7	6.8	5.0	3.6	2.3	7.5	13.6
24-Apr	0.7	-0.5	-1.8	-2.7	-3.5	-4.3	-4.4	-3.9	-2.8	-1.3	0.0	1.2	2.2	2.9	3.3	3.4	3.2	2.6	1.4	-0.3	-1.4	-2.3	-3.0	-3.6	-0.6	3.4
25-Apr	-4.3	-4.8	-5.3	-5.8	-6.3	-6.5	-5.7	-4.0	-2.0	-0.2	1.9	3.3	4.4	5.2	5.7	6.6	6.8	7.2	6.5	5.1	2.9	2.7	1.3	-0.1	0.6	7.2
26-Apr	-1.2	-2.5	-3.1	-4.3	-5.2	-4.9	-2.3	1.5	5.4	8.5	9.7	10.9	11.2	11.5	12.4	12.4	12.7	12.8	11.9	10.0	7.8	6.4	4.6	3.5	5.4	12.8
27-Apr	3.3	3.6	3.2	2.2	1.5	1.6	2.5	5.8	9.2	12.0	14.6	16.7	17.0	19.1	19.4	19.5	20.2	20.4	19.6	18.1	16.2	13.7	11.3	9.4	11.7	20.4
28-Apr	8.0	6.5	5.3	4.1	2.8	3.7	6.9	10.7	14.0	18.1	20.5	22.4	23.1	23.9	24.5	24.6	24.5	23.8	22.7	21.4	19.6	18.1	17.5	16.8	16.0	24.6
29-Apr	15.5	14.7	13.9	12.1	11.3	11.4	11.3	11.0	11.7	12.9	14.0	16.1	16.5	16.5	16.1	16.3	16.2	16.1	15.7	14.6	13.0	11.7	9.9	8.3	13.6	16.5
30-Apr	8.5	7.4	6.6	6.0	5.7	5.1	6.7	9.1	11.1	12.0	12.5	12.2	12.1	13.3	11.2	14.7	10.8	11.9	13.0	11.1	8.4	7.6	7.4	6.1	9.6	14.7
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Barge Landing - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Barge Landing - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	206	28.61	28.61
0 - 10	298	41.39	70.00
10 - 20	194	26.94	96.94
> 20	22	3.06	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

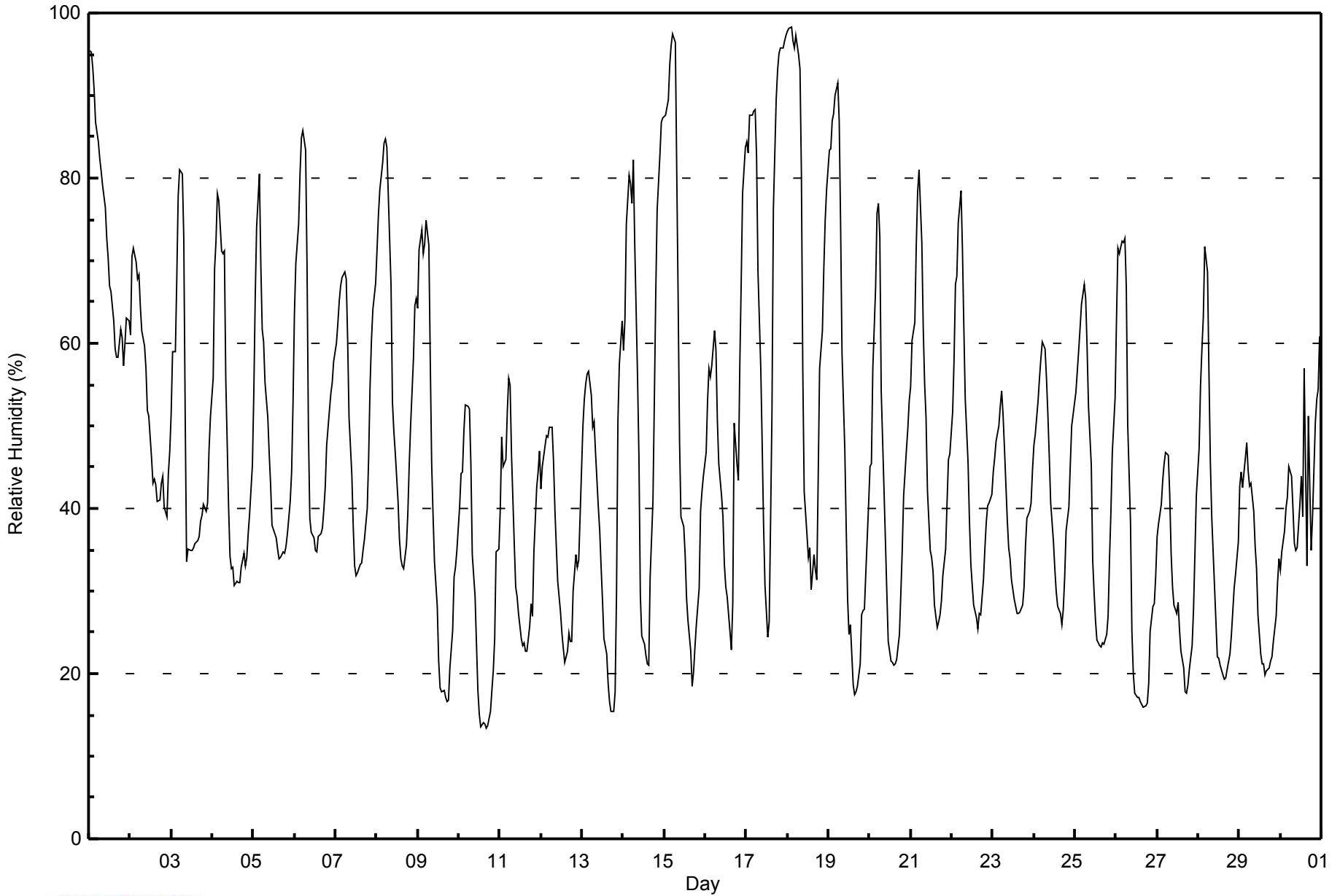
**Barge Landing - April 2015**

Maximum Value: 98 % on Apr 18 03:00														Maximum Daily Average: 72.7 % on Apr 1														Hours in Service: 720																					
Minimum Value: 13 % on Apr 10 17:00														Minimum Daily Average: 29.9 % on Apr 10														Hours of Data: 720																					
Maximum Diurnal Average: 70.0 % at hour 6														Minimum Diurnal Average: 27.7 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 46.6 %														Percentiles: P <sub>1</sub> = 15 P <sub>10</sub> = 23 Q <sub>1</sub> = 31 Median = 43 Q <sub>3</sub> = 60 P <sub>90</sub> = 78 P <sub>99</sub> = 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-Apr	95	95	93	91	87	84	82	81	79	76	73	70	67	66	63	59	58	58	62	61	57	60	63	63	72.7	95																							
2-Apr	61	71	72	70	68	68	64	61	60	57	52	51	46	43	44	43	41	41	43	44	40	39	44	47	52.9	72																							
3-Apr	52	59	59	68	78	81	81	73	52	34	35	35	35	35	36	36	37	39	39	41	40	41	47	51	49.1	81																							
4-Apr	56	69	72	78	77	71	71	71	56	40	34	33	33	31	31	31	31	33	35	33	34	37	39	45	47.6	78																							
5-Apr	54	65	74	80	70	62	60	55	51	47	43	38	37	36	35	34	34	35	35	35	37	41	44	53	48.1	80																							
6-Apr	64	70	74	80	85	86	83	70	49	39	37	36	35	35	37	37	38	40	43	48	52	54	55	58	54.3	86																							
7-Apr	60	62	65	67	68	69	68	60	51	44	38	33	32	32	33	33	35	36	40	46	55	60	64	67	50.8	69																							
8-Apr	71	76	79	82	84	85	84	78	67	53	49	47	41	36	34	33	33	36	40	45	50	58	65	65	57.9	85																							
9-Apr	64	71	74	71	72	75	72	58	45	39	33	28	22	18	18	18	17	17	17	21	25	32	33	35	40.6	75																							
10-Apr	40	44	44	49	52	52	52	45	34	29	24	18	15	14	14	14	13	14	15	18	20	24	35	35	29.9	52																							
11-Apr	40	49	45	46	52	56	55	47	36	31	29	27	24	23	24	23	23	26	28	27	35	43	44	47	36.6	56																							
12-Apr	42	45	48	49	49	50	50	46	40	35	31	28	25	23	21	23	25	24	24	30	34	33	34	39	35.3	50																							
13-Apr	50	53	55	56	57	54	50	50	47	40	37	33	29	24	22	19	17	15	15	18	30	51	57	63	39.3	63																							
14-Apr	59	63	74	80	79	77	82	72	56	46	29	25	24	22	21	21	32	41	53	66	76	83	87	87	56.5	87																							
15-Apr	88	88	90	94	96	97	96	81	65	48	39	38	34	29	26	23	18	20	23	26	30	40	42	44	53.2	97																							
16-Apr	47	53	57	56	57	61	59	51	45	42	39	33	31	29	25	23	29	50	45	43	57	67	78	84	48.4	84																							
17-Apr	84	83	88	88	88	88	82	69	57	48	38	31	24	26	38	52	76	90	93	95	96	96	97	97	71.8	97																							
18-Apr	98	98	98	97	96	97	95	93	81	57	42	37	34	35	30	34	33	31	44	57	61	69	75	79	65.5	98																							
19-Apr	83	84	87	88	90	92	87	74	59	47	38	29	25	26	19	17	18	19	21	27	28	28	32	40	48.2	92																							
20-Apr	45	45	57	67	76	77	73	54	42	36	30	24	22	21	21	21	22	25	30	35	42	47	50	53	42.2	77																							
21-Apr	55	60	63	72	78	81	72	62	55	51	42	35	34	32	28	26	26	27	29	32	35	41	46	47	47.0	81																							
22-Apr	52	58	67	68	75	79	71	62	53	46	38	33	31	28	27	26	27	27	31	35	38	40	41	42	45.6	79																							
23-Apr	44	46	48	50	52	54	51	47	39	35	34	31	29	28	27	27	27	28	30	35	39	40	41	45	38.8	54																							
24-Apr	48	49	53	56	58	60	59	56	51	46	41	36	33	30	28	27	26	28	32	37	40	45	50	51	43.4	60																							
25-Apr	54	57	59	62	65	67	65	59	52	45	34	30	26	24	23	23	24	24	25	27	34	39	47	53	42.5	67																							
26-Apr	63	72	71	72	72	73	67	50	38	25	20	18	17	17	16	16	16	16	16	19	25	28	28	32	37.0	73																							
27-Apr	37	38	40	43	45	47	46	42	35	30	28	27	29	25	23	21	18	18	19	21	23	28	35	42	31.6	47																							
28-Apr	47	55	59	63	72	69	57	46	39	30	26	22	22	21	20	19	20	20	22	25	27	30	32	36	36.7	72																							
29-Apr	43	44	43	46	48	45	43	43	40	35	33	27	22	21	21	20	20	21	22	22	24	27	31	34	32.3	48																							
30-Apr	33	35	37	40	41	45	44	40	36	35	35	35	41	44	39	57	33	51	43	35	39	50	53	61	42.6	61																							
																								57.6	61.9	64.8	67.6	69.6	70.0	67.4	59.9	50.3	42.2	36.7	33.1	30.7	29.1	28.8	27.7	29.4	31.3	33.5	36.9	41.2	45.8	49.7	53.1	Diurnal Average	
																								98	98	98	97	96	97	96	93	81	76	73	70	67	66	63	59	76	90	93	95	96	96	97	97	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Barge Landing - April 2015**





Maximum Speed: 21 km/h on Apr 12 16:00	Maximum Daily Speed Average: 13.6 km/h on Apr 12	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 11 01:00	Minimum Daily Speed Average: 2.9 km/h on Apr 19	Hours of Data: 708
Maximum Diurnal Speed Average: 2.4 km/h at hour 13	Minimum Diurnal Speed Average: 0.5 km/h at hour 19	Hours of Missing Data: 12
Monthly Average Velocity: 1.0 km/h 212.3 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 7 Q <sub>3</sub> = 10 P <sub>90</sub> = 14 P <sub>99</sub> = 17	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-Apr	N12	N13	N14	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE13	NNE13	NNE9	NNE9	NNE8	NE8	NNE8	NE6	NE4	NE4	----	N14	
2-Apr	NNW4	NW4	WNW4	WNW4	NW4	NNW4	N4	N5	NNE6	N8	N8	NNE8	NE8	NE7	NE8	NE8	NE9	NE8	NE7	NE9	NE9	ENE10	ENE7	NNE4	NNE5.5	ENE10	
3-Apr	NNE3	NE2	NE3	NNE2	NNW3	NNW3	NNW2	NNW3	N3	NE5	NNE7	NNE8	NE8	NE9	NE8	NE9	NE9	NNE8	NNE9	NE8	ENE9	NE9	ENE6	NE4	NE5.3	NE9	
4-Apr	N3	NNW3	NNW2	NW2	W1	ESE2	NNW1	WSW1	NNW1	NE4	NE6	ENE6	ENE7	ENE7	NE8	ENE7	NE7	NE8	NNE9	NNE11	NE9	NE8	N6	NNW5	NE4.4	NNE11	
5-Apr	NW3	NW3	WSW3	WNW2	N5	NNW3	NE6	NE7	NNE8	NE8	NNE7	NNE7	NE7	NNE8	NE9	NNE8	NNE8	NNE8	NE7	NE8	NE7	NE6	NE5	N2	NNE5.3	NE9	
6-Apr	NNW3	NNW3	NNW3	NNW2	AF	WSW2	SSE2	SSW3	S6	SSW7	S7	SSW7	S8	S8	S8	SSE8	SSE9	SSE9	SSE8	SE9	SSE8	SSE8	SSE7	SSE8	S4.9	SE9	
7-Apr	SSE9	SSE8	S6	S6	S7	S7	S7	S8	S9	S11	SSW13	SSW16	SSW13	SSW13	SW14	SW13	SW12	SW10	SW9	SSW6	SSE6	SSE7	SSE7	SSE6	S8.7	SSW16	
8-Apr	SSE5	S6	SSE6	SSE6	SSE7	SSE8	S6	S8	SSW7	WSW4	NE6	NE7	NE8	NE8	ENE7	ENE7	NE7	NE6	ENE5	ESE4	E4	ESE3	ESE4	SSE3	ESE2.9	NE8	
9-Apr	S2	SSE3	SSE4	SSE5	S4	S5	S6	S9	S10	S11	S10	S11	SW14	SW15	SW16	SW15	SW15	WSW12	SW8	SSW5	SSW6	S6	SSW6	SSW6	SSW7.6	SW16	
10-Apr	S4	SSE4	SSE5	SSE5	SSE6	SSE6	SSE5	S6	S8	S9	SSW8	SSW8	SSW9	SSW10	S9	S8	SW5	SE4	SSE8	SE6	SSE6	SSE5	ESE7	SE5	SSE6.0	SSW10	
11-Apr	SSE0	SE4	SSE6	SSE6	SSE5	SSE5	SSE6	S8	SW8	SW7	SW10	W8	SW7	W12	W9	W8	WNW9	WSW11	WSW14	WSW20	WSW21	WNW13	WNW7	SW4	WSW6.7	WSW21	
12-Apr	WSW9	WSW10	WSW12	WSW14	WSW13	SW12	SW9	SW9	WSW12	WSW13	SW15	SW19	WSW20	W18	WSW20	WSW21	WSW17	WSW16	W14	WNW12	W9	WSW14	W17	WNW12	WSW13.6	WSW21	
13-Apr	WNW14	W17	W17	WNW16	NW13	NW7	WNW6	W11	WNW11	NW15	NW16	NW15	NW15	NW15	NW12	NW12	NW9	NW7	NNW3	NE4	NE5	NNE3	NE2	WNW9.7	W17		
14-Apr	SE5	ESE4	NE2	ENE2	ESE3	SE3	NW2	N2	NNW3	N2	SSE7	SSE8	SSE10	S11	S10	SSW8	S15	SE17	SSE13	SE12	SSE8	SSE7	SSE9	SSE6.1	SE17		
15-Apr	S7	S6	S6	SSW5	S6	SSE5	S6	SSW7	SW7	SW8	SW8	WSW12	WSW11	WSW14	WSW10	W10	WSW13	WSW14	WSW14	WSW11	S5	SSW7	WSW13	WSW9	WSW10	SW7.6	WSW14
16-Apr	WSW10	SW6	WSW8	WSW9	SW5	S5	S5	SW8	SW9	SSW10	SSW11	SW15	WSW16	W12	WSW16	WSW18	WNW15	NNW14	WNW10	W9	NW5	WSW7	SW6	SSW5	WSW8.0	WSW18	
17-Apr	SW6	WSW5	SSE3	S4	SSE6	SSE6	SSE6	S8	SSE9	SSE9	S8	S9	SSW13	SSW14	SSW13	SSW14	S10	SE8	SE7	ESE4	SE6	E4	NNW3	NNW4	S6.0	SSW14	
18-Apr	NNW5	NNW7	NNW7	NNW9	NNW9	NNW9	N9	NW6	NW8	NNW12	NNW14	NNW14	NNW12	N11	N9	NNE11	NNE7	NNW11	NNE9	N2	W2	S3	SE3	SSW1	NNW6.7	NNW14	
19-Apr	S2	SE3	SSE4	SSW4	S4	S3	SSE5	S5	S6	S7	SSW7	SSW11	WSW3	ENE6	W8	W8	WNW8	W7	ENE1	ESE4	SE6	SE6	SE4	E3	S2.9	SSW11	
20-Apr	E4	ESE1	N2	NW4	W2	NNE0	SE3	NNW3	NNE3	NNE5	NE5	ENE5	ENE5	ENE6	ENE5	ENE6	NE7	NNE8	NNE9	NNE9	NNE10	N7	NNW6	NNW6	NNE4.0	NNE10	
21-Apr	N7	NW4	N2	ENE1	NNW3	NE1	NNE3	NNW4	N6	NNE8	NNE9	NNE10	NNE9	NNE10	NNE10	NNE10	NNE9	NNE10	NE9	ENE7	ENE7	ESE7	SE4	SE4	NNE5.3	NNE10	
22-Apr	E1	ENE2	E3	E4	ENE2	ENE3	E4	ESE9	ESE7	ESE10	ESE10	ESE12	SE15	SE15	ESE14	SE15	ESE14	ESE15	ESE12	ESE12	ESE9	ESE8	ESE9	ESE7	ESE8.8	SE15	
23-Apr	E5	E5	E5	E5	ENE5	ENE3	ENE4	E5	ESE9	E8	ENE9	ENE11	ENE14	ENE14	ENE13	ENE12	ENE13	ENE13	ENE15	ENE14	ENE12	NE11	NE10	NNE10	ENE9.1	ENE15	
24-Apr	NE10	NE10	NNE8	NNE8	NNE8	NNE8	NNE11	NNE11	NNE11	NNE12	NNE11	NNE12	NNE12	NNE12	NNE12	NNE13	NNE13	NNE13	NNE13	N13	N12	N11	N9	N8	NNE10.7	NNE13	
25-Apr	N6	N7	NNE6	N6	N5	N5	N5	N6	NNE6	NE7	NNE7	NNE8	NNE8	NNE7	N7	NNE7	N6	N6	N6	N5	N4	NE6	NE3	NNW3	NNE5.8	NNE8	
26-Apr	NNW3	N2	ENE1	ESE2	SE3	SE3	SSE2	SSW4	WSW4	S6	SSW5	S6	S8	SSW6	SW7	SW4	S6	S5	ESE7	ESE6	ESE5	ESE6	SE6	SE6	SSE3.2	S8	
27-Apr	SE7	SSE7	SE3	SE4	S5	SSE5	SSE5	S8	SSE9	S8	S10	SSW14	SSW11	SSW16	WSW17	WSW17	WSW17	WSW16	WSW14	WSW10	WSW7	SSW5	S5	SSE5	SSW7.4	WSW17	
28-Apr	SSE4	SE4	S4	SE6	ESE6	ESE6	SE7	SSE7	SW5	SSW6	S9	SSE12	SSE14	S12	SSE14	SSE14	SSE13	S13	SSE10	SE9	SSE8	S7	S8	WSW8	SSE7.8	SSE14	
29-Apr	WSW4	W6	W4	SW7	WSW8	WSW9	W7	WSW9	WSW9	WSW9	WSW7	WSW9	WSW13	WSW12	WSW10	WSW10	SW7	SW10	SW8	SW9	WSW9	SW6	SW7	SW7	WSW8.1	WSW13	
30-Apr	WSW11	SW11	SW10	WSW11	SW13	SW10	SW10	SW12	WSW14	SW17	SW16	SW16	WSW14	WSW14	SW6	SW11	WNW9	WNW6	W6	SSW2	SSE4	SSW5	S8	S7	SW9.3	WSW17	

W0.8WSW1.0WSW1.0 SW1.6SSW1.4SSW1.3 S1.3SSW2.3SSW2.3SSW1.7SSW1.7 SW2.4 SW2.4 SW2.2WSW1.8WSW1.9 W1.3 NW0.9 NE0.5 E1.3 E1.7 ESE1.3 SSE1.3 S0.9	Diurnal Average
WNW14 W17 W17WNW16 NW13 SW12 NNE11 SW12WSW14WSW17 SW16 SW19WSW20 W18WSW20WSW21WSW17 SE17 SE15WSW20WSW21WSW14 W17WNW12	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 - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 7 km/h on Apr 12 17:00	Hours of Data: 708
Minimum Value: 0 km/h on Apr 14 03:00	Hours of Missing Data: 12
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7	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-Apr	3	4	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	4	3	3	3	3	2	2	1	1	4
2-Apr	1	1	1	1	1	1	2	2	2	3	3	2	3	2	2	3	3	3	2	3	3	3	3	2	3
3-Apr	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3	2	2	3	3	3	2	2	3
4-Apr	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	2	2	2	3	3	2	2	1	3
5-Apr	1	1	1	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	1	3
6-Apr	1	1	1	0	AF	1	1	1	2	2	2	3	4	3	3	3	3	3	3	2	2	2	2	2	4
7-Apr	2	2	2	2	2	2	2	3	3	3	5	5	5	4	5	4	4	3	3	1	1	1	2	2	5
8-Apr	1	2	1	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	3
9-Apr	1	1	1	1	1	1	2	3	3	3	3	4	4	4	4	5	4	4	3	1	1	1	1	1	5
10-Apr	1	2	1	1	1	1	1	2	2	3	3	3	4	4	4	3	2	2	3	2	1	1	1	1	4
11-Apr	1	2	1	1	2	1	2	2	2	2	3	3	5	4	4	3	4	7	5	7	7	6	5	2	7
12-Apr	2	2	3	4	3	4	4	3	4	3	5	6	6	7	7	7	7	6	6	5	4	5	6	6	7
13-Apr	6	7	6	7	5	2	3	4	4	6	6	5	5	5	4	4	5	4	2	1	2	2	1	1	7
14-Apr	1	1	0	1	1	1	1	1	1	2	3	3	4	4	3	3	6	5	4	4	4	2	3	3	6
15-Apr	3	2	2	1	1	1	2	2	2	2	4	5	5	5	5	4	5	5	4	1	6	6	4	3	6
16-Apr	3	2	3	2	2	2	1	2	3	3	4	5	5	5	6	6	7	6	4	4	2	2	2	1	7
17-Apr	1	2	1	1	2	2	2	2	3	3	3	3	5	5	6	5	4	2	3	1	2	2	1	1	6
18-Apr	1	2	2	3	3	3	3	2	3	4	4	4	5	5	3	4	3	4	4	2	1	1	1	1	5
19-Apr	1	1	1	1	1	1	1	1	2	2	2	4	3	2	4	3	4	3	1	1	1	1	1	1	4
20-Apr	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	3	2	2	2	3	2	1	2	3
21-Apr	2	1	1	1	1	1	2	1	2	2	3	3	3	3	3	3	3	3	3	2	2	2	2	2	3
22-Apr	1	1	2	2	1	1	2	3	3	3	3	4	5	5	5	5	4	5	4	4	3	3	3	2	5
23-Apr	1	1	2	2	1	1	1	2	3	3	3	4	5	5	5	4	4	4	5	5	4	4	3	3	5
24-Apr	3	3	2	2	2	2	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	3	3	3	4
25-Apr	2	1	1	1	1	1	1	2	2	2	2	2	3	2	2	2	2	2	2	2	1	2	2	1	3
26-Apr	1	1	1	1	1	1	1	1	2	2	3	3	4	4	3	3	3	3	2	1	1	1	1	1	4
27-Apr	1	2	1	1	1	1	2	3	3	3	3	5	5	6	7	5	7	6	5	3	2	1	1	1	7
28-Apr	1	1	1	1	1	1	2	2	2	3	3	4	5	5	5	5	4	5	3	2	2	2	2	3	5
29-Apr	2	3	1	2	2	3	3	3	3	3	3	3	4	4	4	4	3	3	3	3	2	2	2	3	4
30-Apr	2	3	3	4	4	3	3	4	4	4	5	5	5	5	3	4	5	2	2	1	1	2	2	2	5

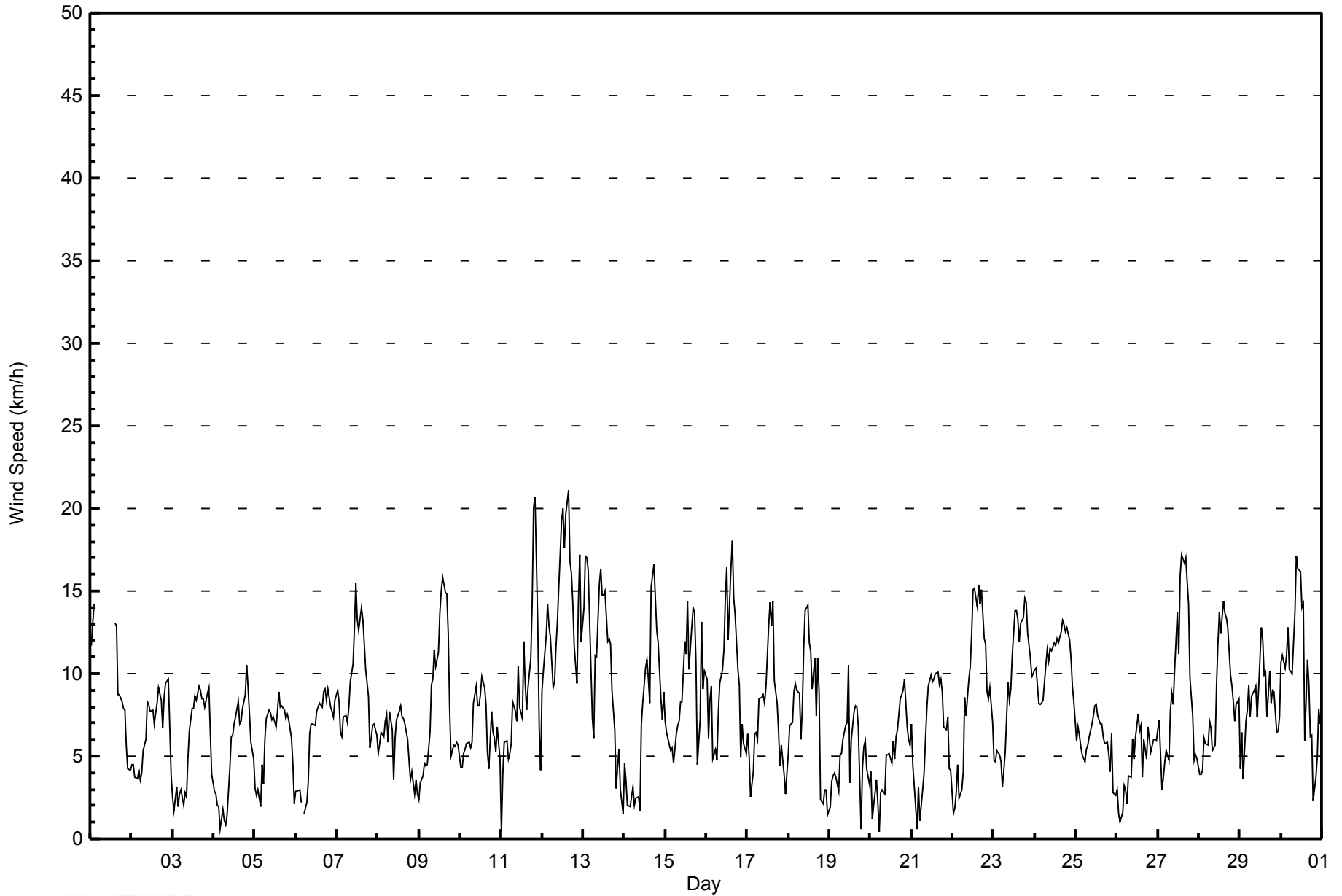
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Barge Landing - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Barge Landing - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	201	28.39	28.39
6 - 11	373	52.68	81.07
12 - 19	129	18.22	99.29
20 - 28	5	0.71	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 708

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Barge Landing - April 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	17	8	15	14	13	11	16	26	15	11	5	8	4	4	9	25	201
6 - 11	19	52	47	17	1	16	13	41	54	21	32	25	14	8	5	8	373
12 - 19	5	11	0	9	0	6	6	6	3	10	16	30	7	6	9	5	129
20 - 28	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	5
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
<b>Totals</b>	41	71	62	40	14	33	35	73	72	42	53	68	25	18	23	38	708

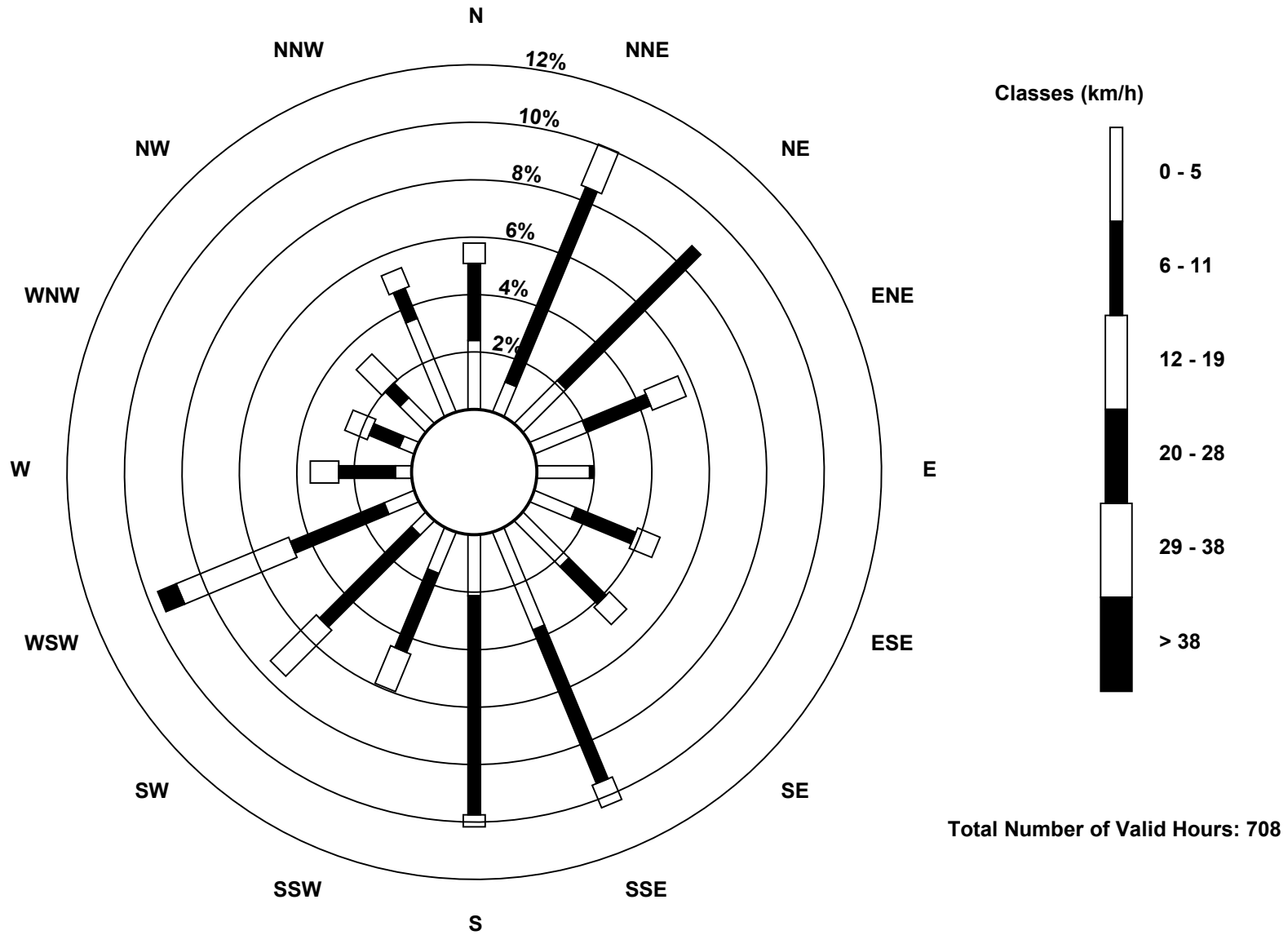
Total Number of Valid Hours: 708

Total Number of Hours: 720



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

**Wind Speed (WS) - km/h  
Barge Landing (AMS 9)**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Barge Landing - April 2015**

Direction of Maximum Speed: 256 deg on Apr 12 16:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 249.7 deg on Apr 12	Hours of Data: 708
Direction of Minimum Speed: 150 deg on Apr 11 01:00	Hours of Missing Data: 12
Direction of Minimum Daily Speed Average: 2.9 deg on Apr 19	Percent Operational Time: 98.3
Monthly Average Direction: 234.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	6	5	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	16	21	28	33	40	31	48	50	51	--
2-Apr	345	319	297	300	314	331	1	5	29	7	11	26	41	41	43	44	49	53	44	50	56	61	66	24	28.9
3-Apr	27	42	52	26	336	333	336	333	9	47	26	22	55	38	50	51	44	29	28	54	64	56	63	54	39.5
4-Apr	1	343	347	318	279	115	335	245	341	44	47	57	69	58	56	61	54	39	31	29	35	43	352	332	36.2
5-Apr	310	307	253	294	0	347	35	34	28	36	31	22	45	30	38	26	24	24	37	54	56	45	40	1	28.2
6-Apr	347	335	341	342	AF	238	156	197	184	202	183	210	186	182	185	159	155	157	149	142	148	157	157	157	170.0
7-Apr	160	161	183	177	175	174	169	174	174	187	205	192	197	205	220	219	221	220	226	196	164	161	161	165	191.2
8-Apr	156	175	164	165	162	166	169	189	211	248	56	43	38	49	60	57	55	45	73	103	80	105	123	147	110.6
9-Apr	175	167	151	163	179	187	176	173	174	180	175	186	217	232	234	236	235	237	230	206	198	183	199	204	204.8
10-Apr	176	166	154	149	154	153	154	179	176	173	194	200	196	199	171	177	222	143	148	132	149	157	121	127	167.9
11-Apr	150	140	159	162	158	168	159	183	221	223	228	266	231	262	269	269	286	256	258	253	253	286	298	234	242.8
12-Apr	244	242	243	244	238	236	226	231	239	239	226	234	241	259	251	256	253	255	270	289	277	256	260	286	249.7
13-Apr	283	268	271	289	304	307	283	273	294	313	315	313	318	308	316	313	312	309	308	327	43	38	18	53	303.3
14-Apr	135	120	36	72	114	132	315	358	297	2	148	159	167	170	176	203	172	144	135	151	143	147	159	166	154.5
15-Apr	171	172	173	194	171	167	179	207	221	235	232	253	274	247	275	250	243	252	240	188	209	254	240	244	232.1
16-Apr	238	235	242	239	220	173	176	228	223	204	192	215	240	259	249	255	290	333	284	280	307	237	220	208	243.5
17-Apr	234	237	151	178	156	163	157	175	167	166	181	186	193	212	209	207	187	133	135	119	139	101	346	327	181.1
18-Apr	327	327	332	335	337	340	349	322	316	331	331	330	335	3	11	30	25	330	27	358	264	174	140	193	343.4
19-Apr	180	142	151	193	175	188	168	175	175	179	198	207	242	74	269	272	283	279	67	122	134	139	130	93	188.9
20-Apr	101	105	3	320	278	13	134	344	31	28	37	60	66	58	62	63	44	32	30	23	18	350	338	342	29.6
21-Apr	349	324	352	59	339	53	24	345	10	26	23	29	21	21	22	22	30	29	34	70	77	107	124	141	30.3
22-Apr	89	58	88	98	78	71	93	121	105	105	108	114	128	129	118	127	111	113	105	108	108	113	116	113	112.5
23-Apr	91	85	87	86	76	65	68	85	109	81	59	57	60	66	65	64	63	68	64	65	66	51	38	33	65.9
24-Apr	40	36	16	21	24	20	22	26	24	33	31	24	18	24	28	25	21	21	12	2	5	4	11	9	20.7
25-Apr	352	8	13	9	10	2	349	10	29	39	18	13	17	18	9	16	10	3	353	352	360	34	39	345	11.4
26-Apr	332	359	69	117	131	124	164	208	239	173	212	188	189	192	228	221	188	169	122	117	103	108	141	131	165.3
27-Apr	134	151	140	139	169	148	148	175	159	177	190	205	203	209	237	242	245	255	247	240	237	208	182	168	208.6
28-Apr	153	138	171	143	117	111	136	167	236	196	172	161	159	172	160	155	168	173	164	143	147	170	173	248	163.3
29-Apr	243	262	263	232	239	255	261	248	246	251	254	251	254	248	258	249	228	236	221	227	241	220	225	236	244.1
30-Apr	245	235	233	237	236	231	224	235	237	236	233	227	241	251	222	236	303	297	262	210	162	209	186	170	235.0

260.2 247.8 246.9 226.8 213.7 192.3 170.2 205.0 211.4 209.7 209.2 217.8 217.8 232.9 247.5 251.3 270.7 313.4 39.7 89.8 100.9 117.2 148.1 184.9

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**  
**Barge Landing - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 90 deg on Apr 20 02:00	Hours of Data: 708
Minimum Value: 7 deg on Apr 11 00:00	Hours of Missing Data: 12
	Hours of Calibration: 0
	Percent Operational Time: 98.3
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 16 Q <sub>1</sub> = 19 Median = 24 Q <sub>3</sub> = 32 P <sub>90</sub> = 43 P <sub>99</sub> = 79	

Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	22	21	21	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	22	22	27	22	17	18	18	25	27	26	27	
2-Apr	24	24	23	27	15	25	30	29	25	26	27	25	27	37	27	26	25	21	22	21	20	20	24	41	
3-Apr	35	58	16	36	17	10	32	39	66	45	28	29	29	24	28	24	24	20	17	25	21	20	19	42	
4-Apr	32	16	25	29	75	63	48	89	80	61	37	41	32	31	27	29	25	20	18	17	18	21	21	15	
5-Apr	11	36	14	40	47	51	34	22	21	27	33	33	34	29	26	27	21	21	20	20	19	22	19	53	
6-Apr	21	11	12	8	AF	17	22	35	34	33	38	48	45	43	42	34	31	23	19	14	14	16	16	16	
7-Apr	18	19	22	20	21	20	23	24	25	28	31	29	30	34	24	22	21	21	17	21	16	15	17	20	
8-Apr	15	17	17	19	18	20	32	26	28	67	28	22	28	24	28	24	23	20	23	16	9	44	15	33	
9-Apr	30	18	17	15	15	23	21	24	27	23	29	32	27	20	20	20	20	17	17	18	18	17	15	17	
10-Apr	37	42	21	18	15	12	21	28	24	23	35	38	43	45	35	38	47	34	23	10	11	18	13	7	
11-Apr	89	53	11	14	25	34	27	25	20	19	21	35	48	29	33	38	31	47	25	23	21	34	56	62	
12-Apr	14	15	17	16	17	18	24	25	21	18	21	20	23	30	22	25	24	27	29	29	32	23	24	30	
13-Apr	31	28	28	27	23	25	34	27	32	24	21	23	25	28	26	28	28	28	26	11	29	28	58	61	
14-Apr	22	18	25	28	35	27	56	49	79	65	37	32	30	32	30	37	25	21	17	21	17	19	22	25	
15-Apr	25	27	24	18	24	33	27	23	22	23	46	32	33	25	35	27	26	23	17	26	38	23	18	18	
16-Apr	15	19	17	16	36	26	34	23	20	25	27	27	22	29	22	25	41	20	35	32	45	12	19	21	
17-Apr	13	31	35	23	16	17	23	21	27	29	35	36	35	29	29	25	32	17	19	12	25	27	34	13	
18-Apr	18	16	20	21	20	21	23	20	24	24	23	20	27	34	28	25	27	22	33	39	16	45	43	63	
19-Apr	30	13	33	25	21	25	20	28	34	32	43	35	79	40	51	39	39	36	71	13	12	12	9	27	
20-Apr	17	90	44	12	38	69	46	53	68	35	44	43	60	44	48	34	29	19	16	18	18	21	19	20	
21-Apr	21	21	70	57	18	66	70	42	30	24	25	25	27	24	23	20	21	19	18	25	19	22	34	24	
22-Apr	41	27	59	19	14	16	22	19	26	24	23	22	21	23	21	20	19	18	18	16	17	16	15	17	
23-Apr	21	20	22	26	18	29	23	26	24	37	25	23	22	22	22	22	21	20	21	19	19	21	19	18	
24-Apr	19	19	18	19	18	19	20	20	21	22	23	26	25	24	22	23	22	22	23	23	22	22	22	22	
25-Apr	24	20	16	17	15	20	20	29	32	27	30	31	34	37	40	41	36	35	28	18	17	17	41	31	
26-Apr	18	25	46	59	46	39	45	42	54	50	63	62	50	60	71	86	60	56	21	10	13	13	13	12	
27-Apr	12	18	37	17	22	15	21	30	29	35	33	29	30	28	26	20	23	26	21	17	13	19	15	17	
28-Apr	14	19	24	15	8	11	22	28	40	61	30	27	29	29	26	26	25	26	24	16	15	33	26	40	
29-Apr	40	36	37	12	16	24	25	19	17	22	29	30	24	24	27	25	24	18	24	23	16	19	18	18	
30-Apr	16	17	17	19	19	22	23	20	19	18	20	25	30	32	43	39	41	40	30	61	36	28	20	18	
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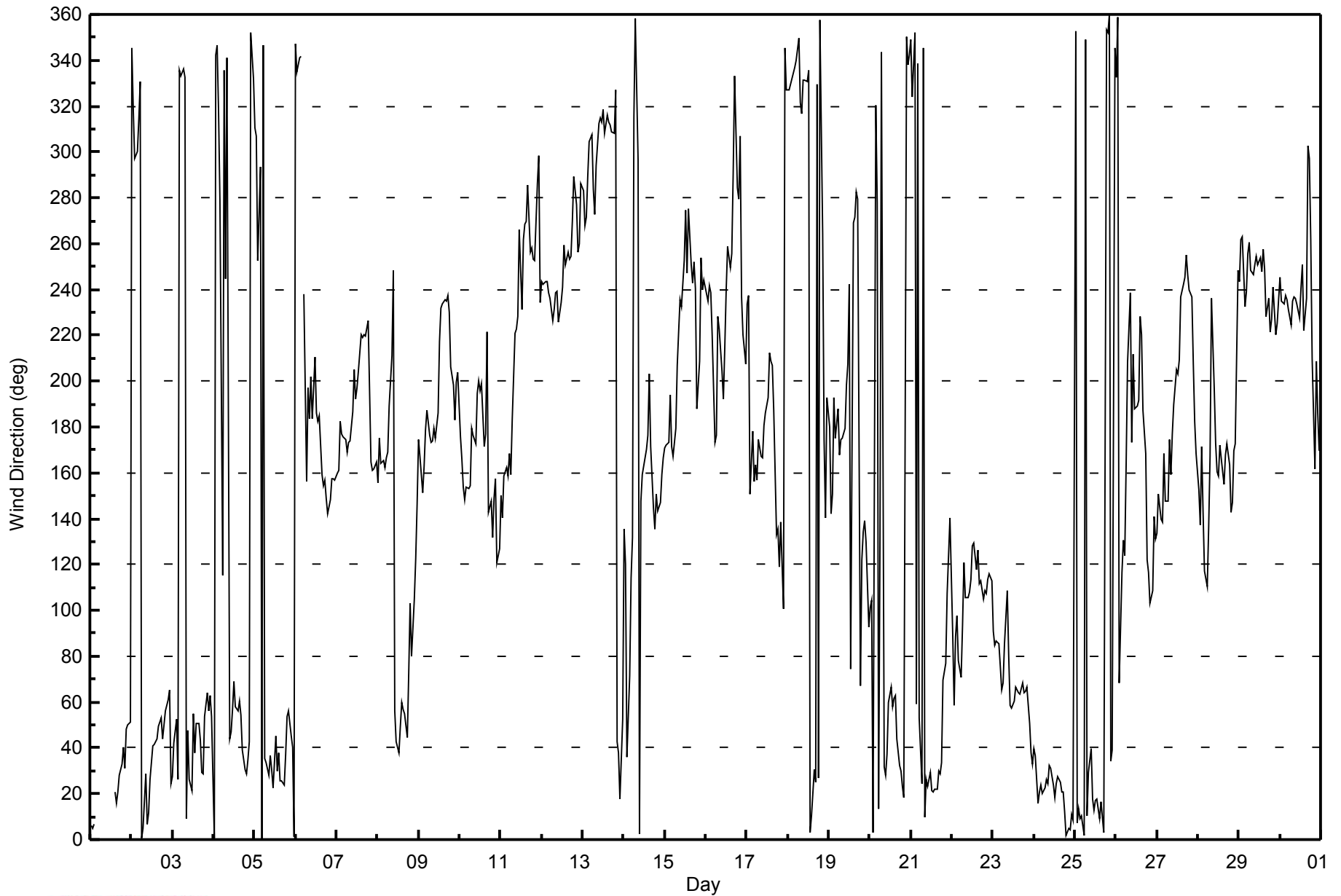
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Barge Landing - April 2015**





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	April 9, 2015	Last Calibration	March 19, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	15:15
Gas Cert Reference	CC62993	Station temp.	22 Deg C
Cal Gas Concentration	4.77 ppm	Cal Gas Exp Date	6/10/2014
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Dil air Make/Model	API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
SO2 gas concentration	59 ppm	SO2 gas cert/exp	FF54535 7/6/14

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-690	-690
Analyzer IP address	192.168.1.42		Lamp voltage	1025	1017
Calculated slope	0.997283	1.000482	Chamber temp	45	45
Calculated intercept	0.103730	-0.037948	Pressure	692.1	681.8
Analyzer Background	2.44	2.11	Flow	0.437	0.431
Analyzer Coefficient	0.999	0.993	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153461	
Converter make/model	CDN-101		Converter serial #	519	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	83.7	79.8	79.6	1.004
SO2 scrubber check	6000	12.2	120.0	-0.1	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	83.7	79.8	79.8	1.001
second point	5000	41.9	40.0	40.1	0.998
third point	5000	20.8	19.8	20.0	0.994
as left zero	6000	0.0	0.0	-0.1	----
as left span	5000	83.7	79.8	79.6	1.003
Average Correction Factor					0.997

Corrected As found	80.1	Previous response	80.0	% change	-0.2%
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Notes:

Scrubber check done after as founds. Inlet filter changed after as founds. Adjusted zero and span.

Calibration Performed By:

Asad Hidayat



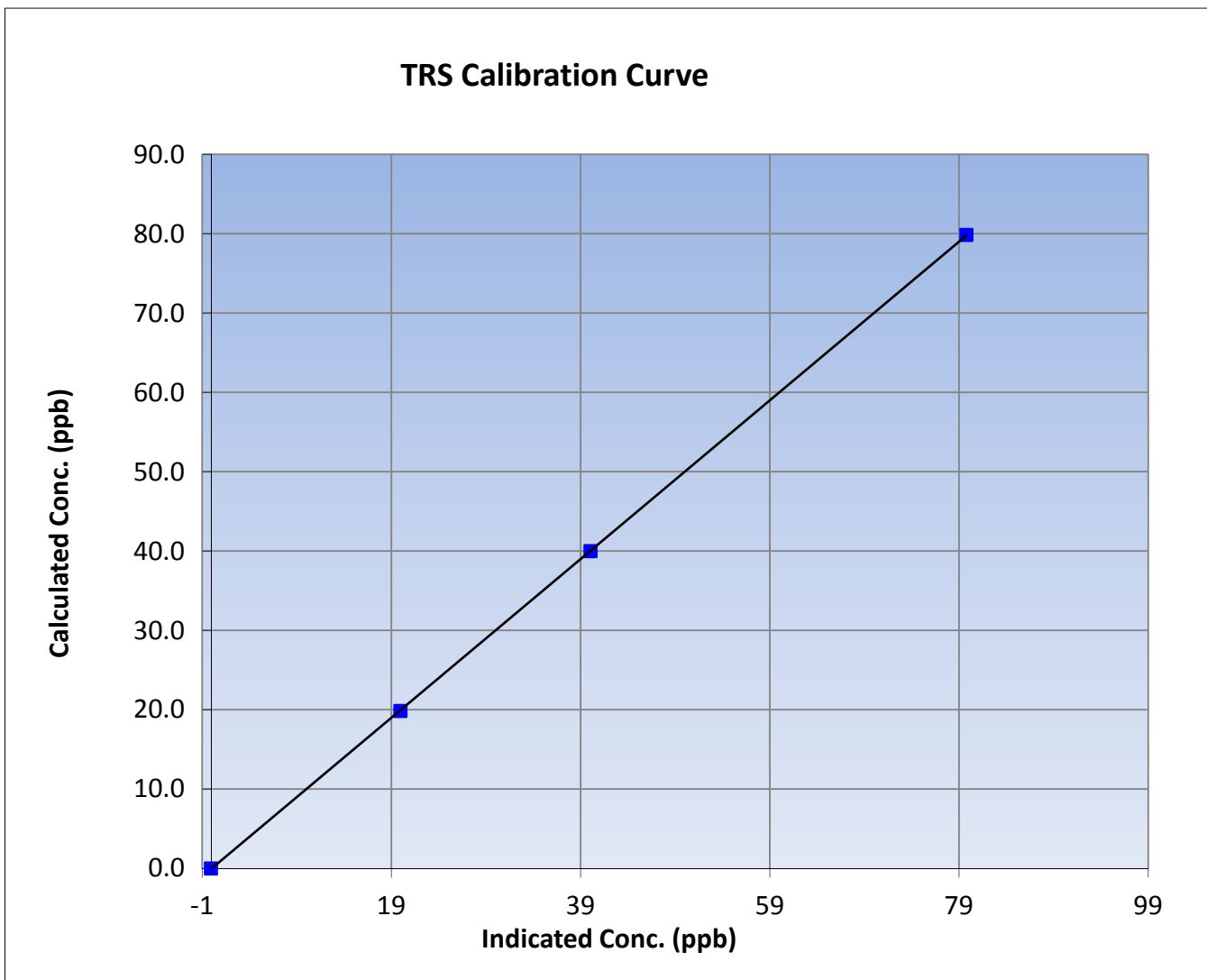
# Wood Buffalo Environmental Association TRS Calibration Report

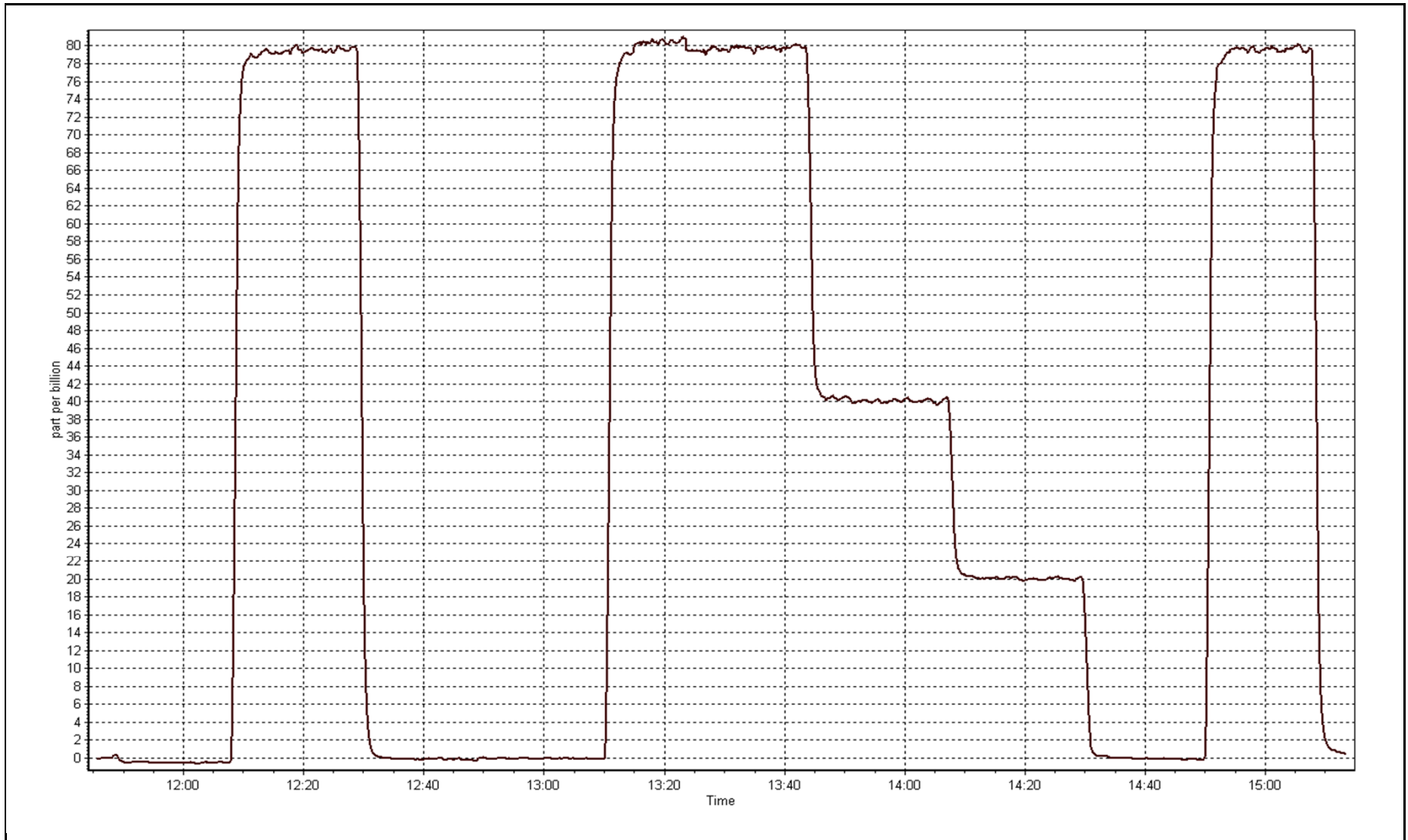
## Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 19, 2015
Station Name	AMS 9	Station Number	AMS 9
Start Time (MST)	11:45	End Time (MST)	15:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999992
79.8	79.8	1.0007		
40.0	40.1	0.9978	Slope	1.000482
19.8	20.0	0.9937		
			Intercept	-0.037948







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Wednesday, April 01, 2015	Last Calibration	Wednesday, March 18, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:58	End Time (MST)	12:35
Gas Cert Reference	LL104180	Cal Gas Expiry Date	2/12/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	0.996014	0.992601	Fuel Pressure	24.1	24.1
Calculated intercept	0.037647	0.033554	Analyzer Coeff	4.4	4.4
			Analyzer BKG	6.000	6.000

Analyzer make Thermo 51i-LT Analyzer serial # 1327059296

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	-0.05	----
as found span	6000	92.0	15.69	15.77	0.995
calibrator zero	6000	0.0	0.00	-0.03	----
high point	6000	92.0	15.69	15.77	0.995
second point	6000	49.2	8.39	8.44	0.994
third point	6000	18.5	3.16	3.13	1.008
as left zero	6000	0.0	0.00	0.01	----
as left span	6000	92.0	15.69	15.80	0.993
Average Correction Factor					0.999

Corrected As found 15.82 Previous response 15.72 % change -0.6%

**Notes:**

Inlet filter changed after as founds. Hydrogen cylinder changed after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat





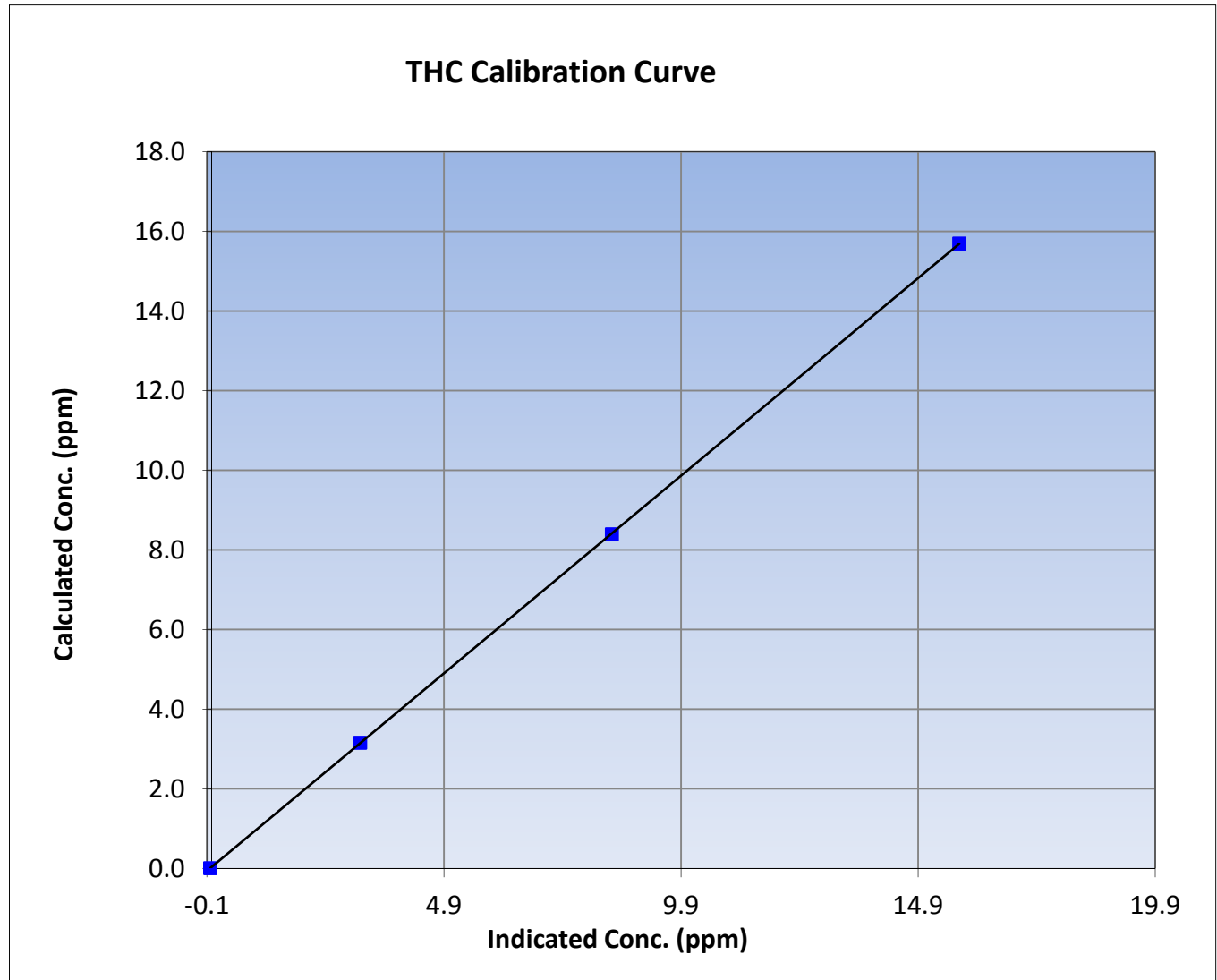
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 18, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:58	End Time (MST)	12:35
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

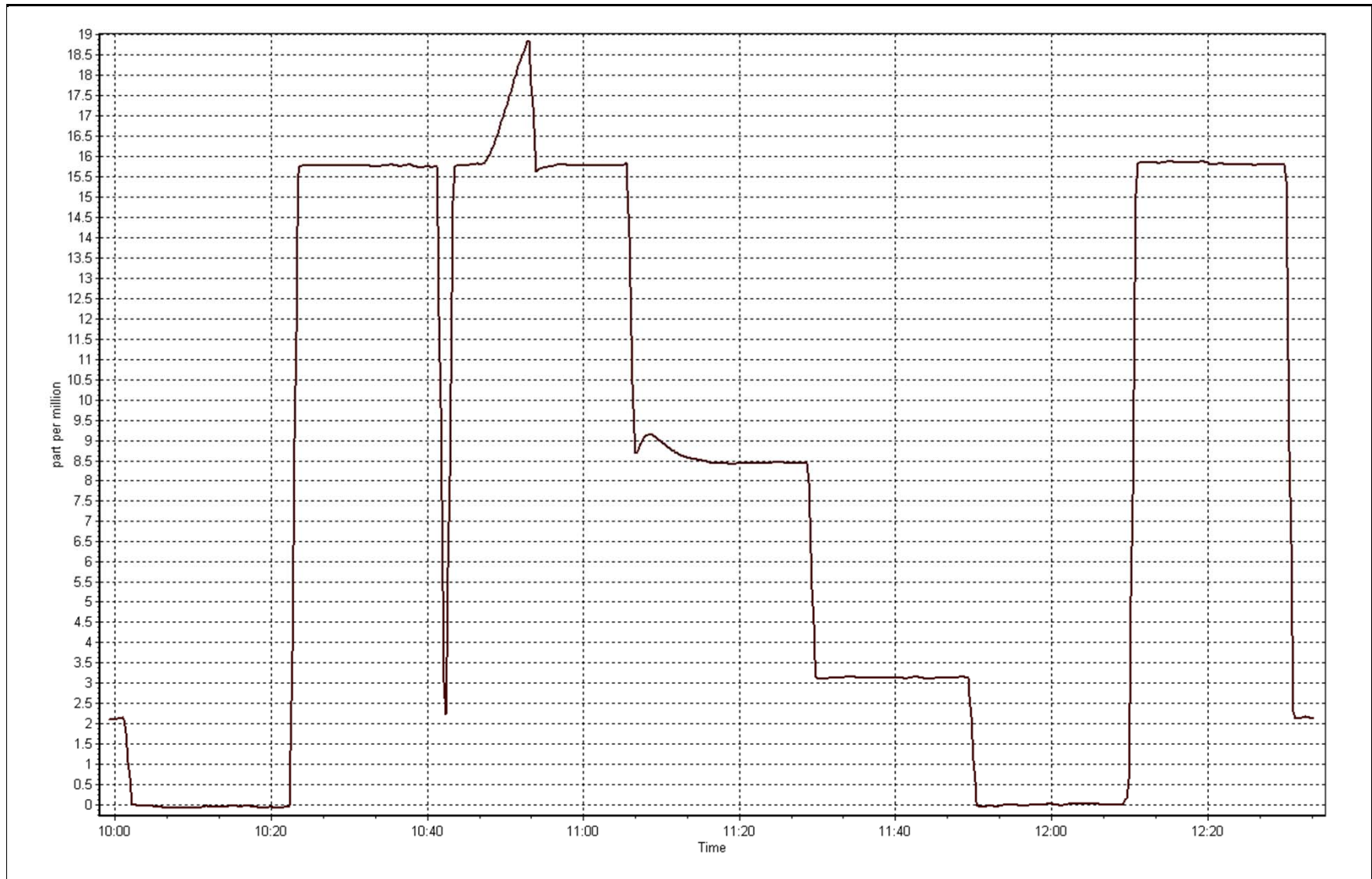
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999995
15.69	15.77	0.9952		
8.39	8.44	0.9944	Slope	0.992601
3.16	3.13	1.0082		
			Intercept	0.033554



THC Calibration Plot

Date: April 1, 2015





# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Monday, April 20, 2015	Last Calibration	Wednesday, April 01, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Other:	Repair	
Start Time (MST)	9:00	End Time (MST)	10:22
Gas Cert Reference	LL104180	Cal Gas Expiry Date	2/12/2018
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
ZAG make/model	Teledyne API 701	Serial Number	4888
DACS make/model	Campbell Scientific CR3000	Serial Number	6466

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	0.991651	1.121650	Fuel Pressure	24.1	24.1
Calculated intercept	0.044998	0.091859	Analyzer Coeff	4.4	4.4
			Analyzer BKG	6.000	6.000

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	-0.13	----
as found span	6000	92.0	15.69	13.95	1.125
calibrator zero	6000	0.0	0.00	0.00	----
high point	6000	92.0	15.69	13.95	1.125
second point	6000	49.2	8.39	7.35	1.142
third point	6000	18.5	3.16	2.66	1.186
as left zero					
as left span					
Average Correction Factor					1.151

Corrected As found	14.08	Previous response	15.78	% change	12.1%
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**Notes:**

No adjustments. As found calibration multi-point cal prior to replacing the pump.

Calibration Performed By: Asad Hidayat



# Wood Buffalo Environmental Association THC Calibration Report

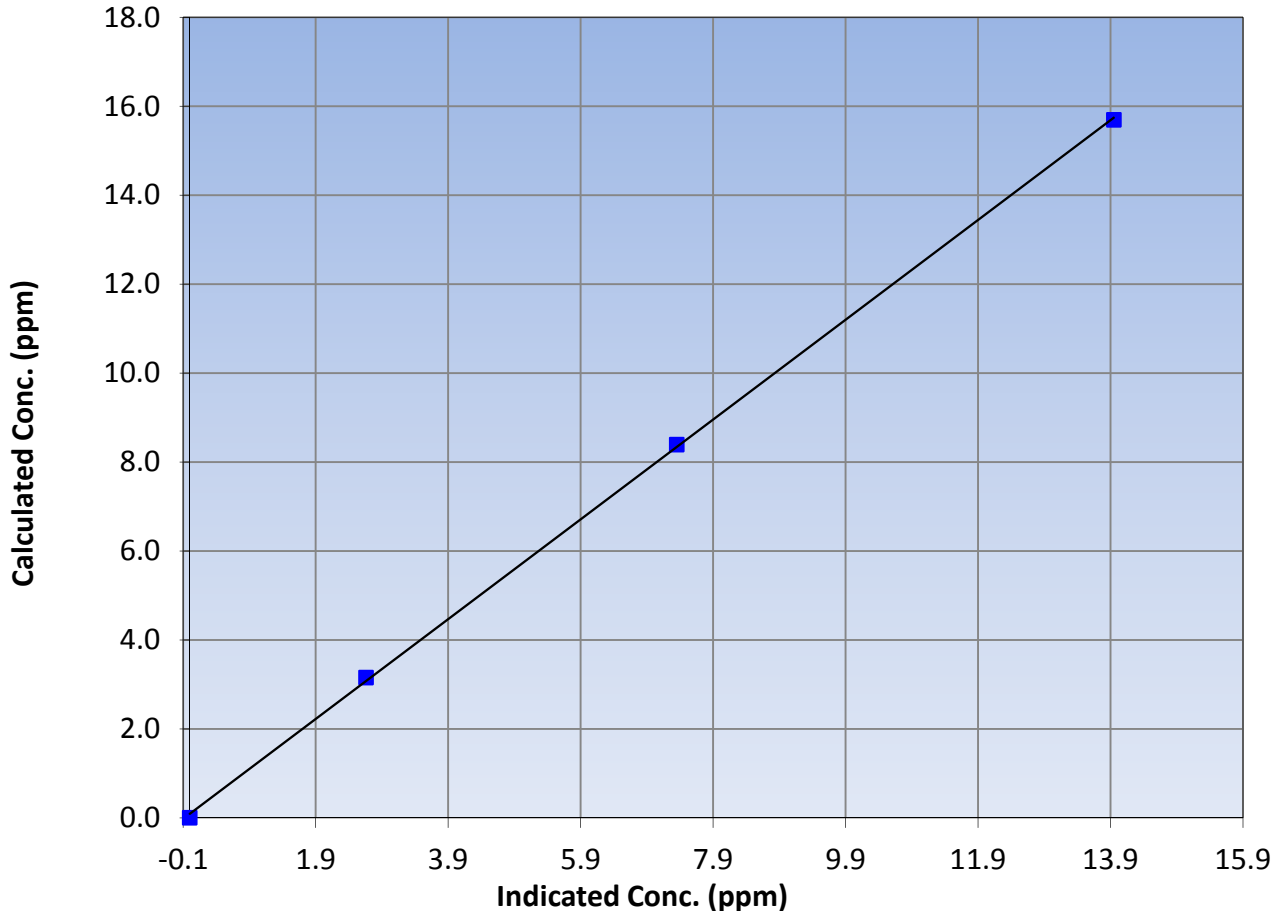
## Station Information

Calibration Date	April 20, 2015	Previous Calibration	April 1, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:00	End Time (MST)	10:22
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

## Calibration Data

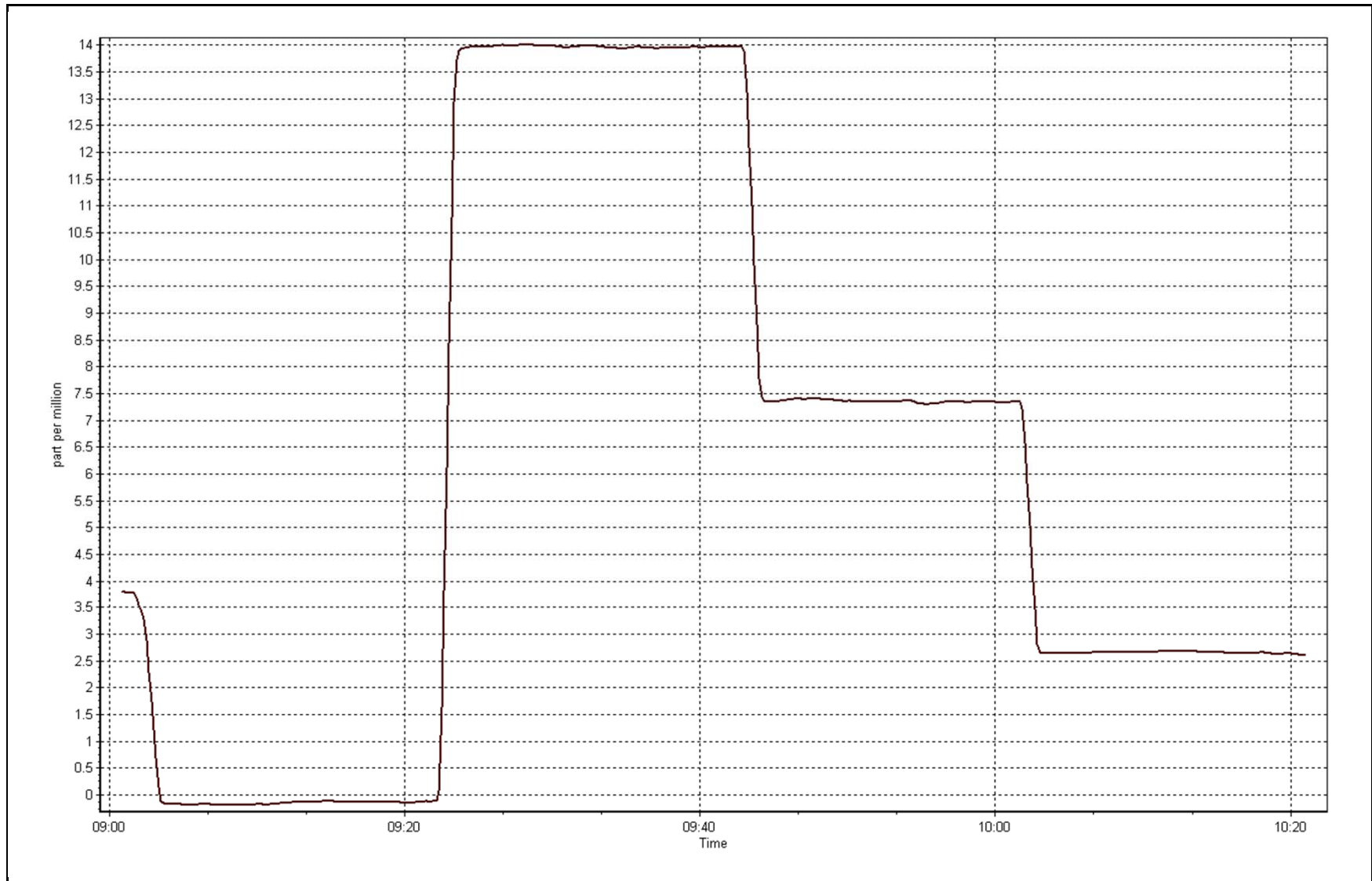
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999857
15.69	13.95	1.1250		
8.39	7.35	1.1419	Slope	1.121650
3.16	2.66	1.1864		
			Intercept	0.091859

### THC Calibration Curve



THC Calibration Plot

Date: April 20, 2015





# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Monday, April 20, 2015	Last Calibration	Wednesday, April 01, 2015		
Station Name	Barge Landing	Station Number	AMS 9		
Reason:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Other:</td> <td>REPAIR</td> </tr> </table>			Other:	REPAIR
Other:	REPAIR				
Start Time (MST)	13:40	End Time (MST)	15:45		
Gas Cert Reference	LL104180	Cal Gas Expiry Date	2/12/2018		
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1023.5 ppm		
C3H8 Cal Gas Conc.	194 ppm	Station temp.	22 Deg C		
Calibrator Make/Model	Sabio 4010	Serial Number	11071107		
ZAG make/model	Teledyne API 701	Serial Number	4888		
DACS make/model	Campbell Scientific CR3000	Serial Number	6466		

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.1	9.1
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.7	34.7
Calculated slope	0.992601	1.002934	Fuel Pressure	24.1	24.1
Calculated intercept	0.033554	-0.021951	Analyzer Coeff	4.4	4.3
			Analyzer BKG	6.000	5.580

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					
as found span					
calibrator zero	6000	0.0	0.00	0.03	----
high point	6000	92.0	15.69	15.68	1.001
second point	6000	49.2	8.39	8.37	1.003
third point	6000	18.5	3.16	3.17	0.996
as left zero	6000	0.0	0.00	0.04	----
as left span	6000	92.0	15.69	15.63	1.004
Average Correction Factor					1.000

Corrected As found	NA	Previous response	NA	% change	NA
--------------------	----	-------------------	----	----------	----

Notes:

Replaced rebuilt THC pump. Adjusted both zero and span.

Calibration Performed By:

\_\_\_\_\_  
Asad Hidayat



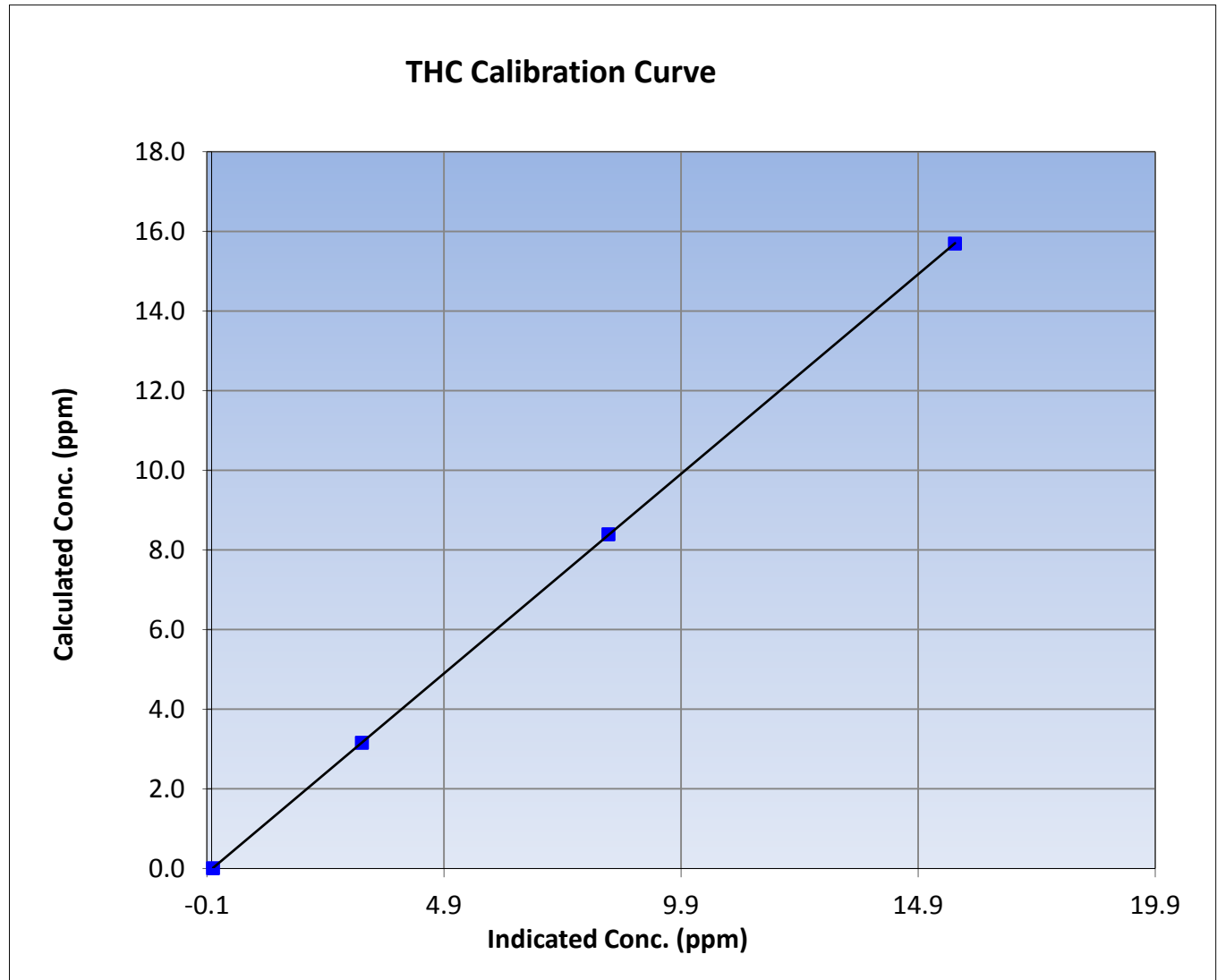
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 20, 2015	Previous Calibration	April 1, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	13:40	End Time (MST)	15:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

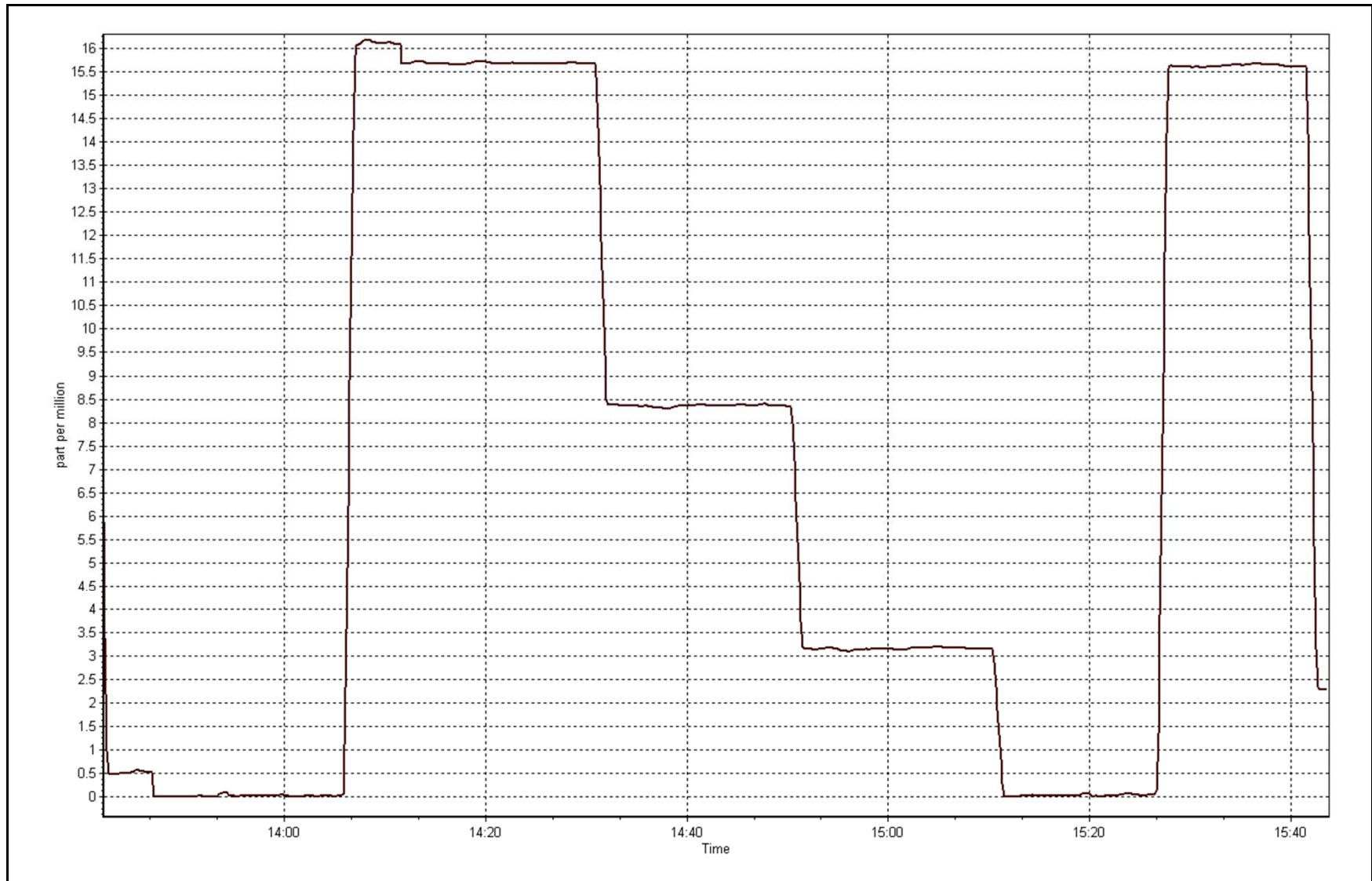
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999996
15.69	15.68	1.0009		
8.39	8.37	1.0027	Slope	1.002934
3.16	3.17	0.9955		
			Intercept	-0.021951



THC Calibration Plot

Date: April 20, 2015





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 11  
LOWER CAMP  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 APRIL 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	663	33	57	96.67	172	0	15	0
H2S (ppb) Average	632	34	88	92.50	19	1	2	0
THC (ppm) Average	664	33	56	96.81	4.5	-	2.8	-
Temperature (C) Average	709	0	11	98.47	25.1	-	16.3	-
Relative Humidity (%) Average	709	0	11	98.47	98	-	73	-
Wind Speed 10 m (km/h) Average	709	0	11	98.47	31	-	20	-
Wind Direction 10 m (deg) Average	709	0	11	98.47	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 APRIL 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	663	2.6	8	-	0	0	0	0	2	6	172
H2S (ppb) Average	632	0.9	1	-	0	0	0	1	1	2	19
THC (ppm) Average	664	2.28	0.3	-	2	2.1	2.1	2.2	2.3	2.6	4.5
Temperature 2 m (C) Average	709	5.13	7.7	-	-13.2	-4.8	-0.6	5.2	10.8	14.5	25.1
Relative Humidity (%) Average	709	49.4	20	-	14	25	34	46	63	81	98
Wind Speed 10 m (km/h) Average	709	11.9	6	-	0	3	7	11	16	20	31
Wind Direction 10 m (deg) Average	709	-	-	-	-	-	-	-	-	-	-

## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)

APRIL 2015

## OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	14 Apr 2015 13:00	14 Apr 2015 13:00	1	Maintenance - sample manifold cleaned
SO2	22 Apr 2015 19:00	23 Apr 2015 17:00	23	Station power interrupted - generator power
H2S	01 Apr 2015 01:00	01 Apr 2015 01:00	1	Intermittent unstable operation - excessive baseline drift
H2S	01 Apr 2015 12:00	01 Apr 2015 14:00	3	Intermittent unstable operation - excessive baseline drift
H2S	01 Apr 2015 19:00	01 Apr 2015 19:00	1	Intermittent unstable operation - excessive baseline drift
H2S	03 Apr 2015 02:00	03 Apr 2015 02:00	1	Intermittent unstable operation - excessive baseline drift
H2S	04 Apr 2015 02:00	04 Apr 2015 02:00	1	Intermittent unstable operation - excessive baseline drift
H2S	04 Apr 2015 12:00	04 Apr 2015 14:00	3	Intermittent unstable operation - excessive baseline drift
H2S	04 Apr 2015 17:00	04 Apr 2015 18:00	2	Intermittent unstable operation - excessive baseline drift
H2S	05 Apr 2015 11:00	05 Apr 2015 11:00	1	Intermittent unstable operation - excessive baseline drift
H2S	05 Apr 2015 19:00	05 Apr 2015 20:00	2	Intermittent unstable operation - excessive baseline drift
H2S	05 Apr 2015 22:00	05 Apr 2015 22:00	1	Intermittent unstable operation - excessive baseline drift
H2S	07 Apr 2015 05:00	07 Apr 2015 05:00	1	Intermittent unstable operation - excessive baseline drift
H2S	07 Apr 2015 10:00	07 Apr 2015 10:00	1	Intermittent unstable operation - excessive baseline drift
H2S	07 Apr 2015 17:00	07 Apr 2015 17:00	1	Intermittent unstable operation - excessive baseline drift
H2S	13 Apr 2015 04:00	13 Apr 2015 07:00	4	Intermittent unstable operation - excessive baseline drift
H2S	13 Apr 2015 12:00	13 Apr 2015 15:00	4	Intermittent unstable operation - excessive baseline drift
H2S	14 Apr 2015 08:00	14 Apr 2015 10:00	3	Intermittent unstable operation - excessive baseline drift
H2S	22 Apr 2015 18:00	23 Apr 2015 17:00	24	Station power interrupted - generator power
THC	14 Apr 2015 13:00	14 Apr 2015 13:00	1	Maintenance - sample manifold cleaned
THC	22 Apr 2015 19:00	23 Apr 2015 16:00	22	Station power interrupted - generator power
Temperature	22 Apr 2015 19:00	23 Apr 2015 05:00	11	DAS collection error - data not recorded
Relative Humidity	22 Apr 2015 19:00	23 Apr 2015 05:00	11	DAS collection error - data not recorded
Wind Speed, Wind Direction	22 Apr 2015 19:00	23 Apr 2015 05:00	11	DAS collection error - data not recorded

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Summary of Hour Averages

Lower Camp - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 172 ppb on Apr 27 21:00	Maximum Daily Average: 14.5 ppb on Apr 27		Hours of Data:	663
Minimum Value: 0 ppb on Apr 23 21:00	Minimum Daily Average: 0.1 ppb on Apr 1		Hours of Missing Data:	57
Maximum Diurnal Average: 8.1 ppb at hour 21	Minimum Diurnal Average: 1.1 ppb at hour 8		Hours of Calibration:	33
Monthly Average: 2.6 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 2 P <sub>90</sub> = 6 P <sub>99</sub> = 29		Percent Operational Time:	96.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
2-Apr	0	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-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
5-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	5	4	2	1	1	2	1	2	1	4	2	1	0	1	0	1.2	5	
7-Apr	0	Z	0	0	0	0	0	0	0	2	1	2	2	4	2	2	5	21	9	2	1	0	0	0	2.4	21	
8-Apr	1	10	Z	1	0	0	0	0	2	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	10	
9-Apr	0	0	0	Z	1	1	1	7	6	1	0	2	21	7	0	0	3	12	13	46	3	3	2	3	5.8	46	
10-Apr	1	0	0	0	Z	0	0	0	0	C	C	C	C	4	5	1	2	2	3	4	4	0	0	1.6	5		
11-Apr	0	2	2	1	1	Z	0	1	3	5	3	3	2	2	2	0	0	1	3	2	1	1	4	5	2.0	5	
12-Apr	Z	4	6	7	6	7	5	3	3	3	2	3	1	1	2	1	1	0	1	5	0	5	6	4	3.3	7	
13-Apr	1	Z	13	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	2	2	7	3	2	2	1.7	13	
14-Apr	1	0	Z	0	0	0	0	0	0	0	0	0	M	1	2	4	12	52	31	3	0	6	15	8	6.2	52	
15-Apr	3	1	0	Z	2	13	0	2	1	3	1	1	1	0	0	1	2	3	4	8	5	0	8	3	2.7	13	
16-Apr	6	2	4	4	Z	4	2	2	4	9	5	4	1	2	1	1	4	1	0	1	1	1	20	18	4.3	20	
17-Apr	8	19	12	1	0	Z	1	1	0	0	1	6	14	9	15	4	1	3	2	0	0	0	0	0	4.2	19	
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1	
19-Apr	0	Z	0	1	1	0	0	0	0	0	1	4	1	1	1	1	2	0	2	3	2	1	0	0	1.0	4	
20-Apr	1	13	Z	1	0	0	0	1	0	2	1	1	1	7	7	3	1	0	0	0	0	0	0	0	1.8	13	
21-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1	
22-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	AF	AF	AF	AF	AF	AF	--	0	
23-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	0	0	0	0	0	0	0	0	--	0
24-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
25-Apr	0	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-Apr	0	1	Z	4	6	6	1	0	0	0	1	1	3	4	2	12	9	2	0	0	0	0	0	0	2.4	12	
27-Apr	1	1	0	Z	1	0	0	0	3	5	1	4	7	15	8	15	5	5	3	9	172	9	56	12	14.5	172	
28-Apr	3	1	0	0	0	Z	0	1	0	13	3	2	4	7	7	3	0	1	0	2	4	1	0	16	3.1	16	
29-Apr	6	11	8	11	18	Z	14	10	5	6	4	4	2	1	1	2	4	5	24	28	31	30	17	24	11.5	31	
30-Apr	Z	2	5	8	9	7	4	2	4	1	2	3	3	2	2	1	1	0	0	21	4	5	2	2	3.9	21	

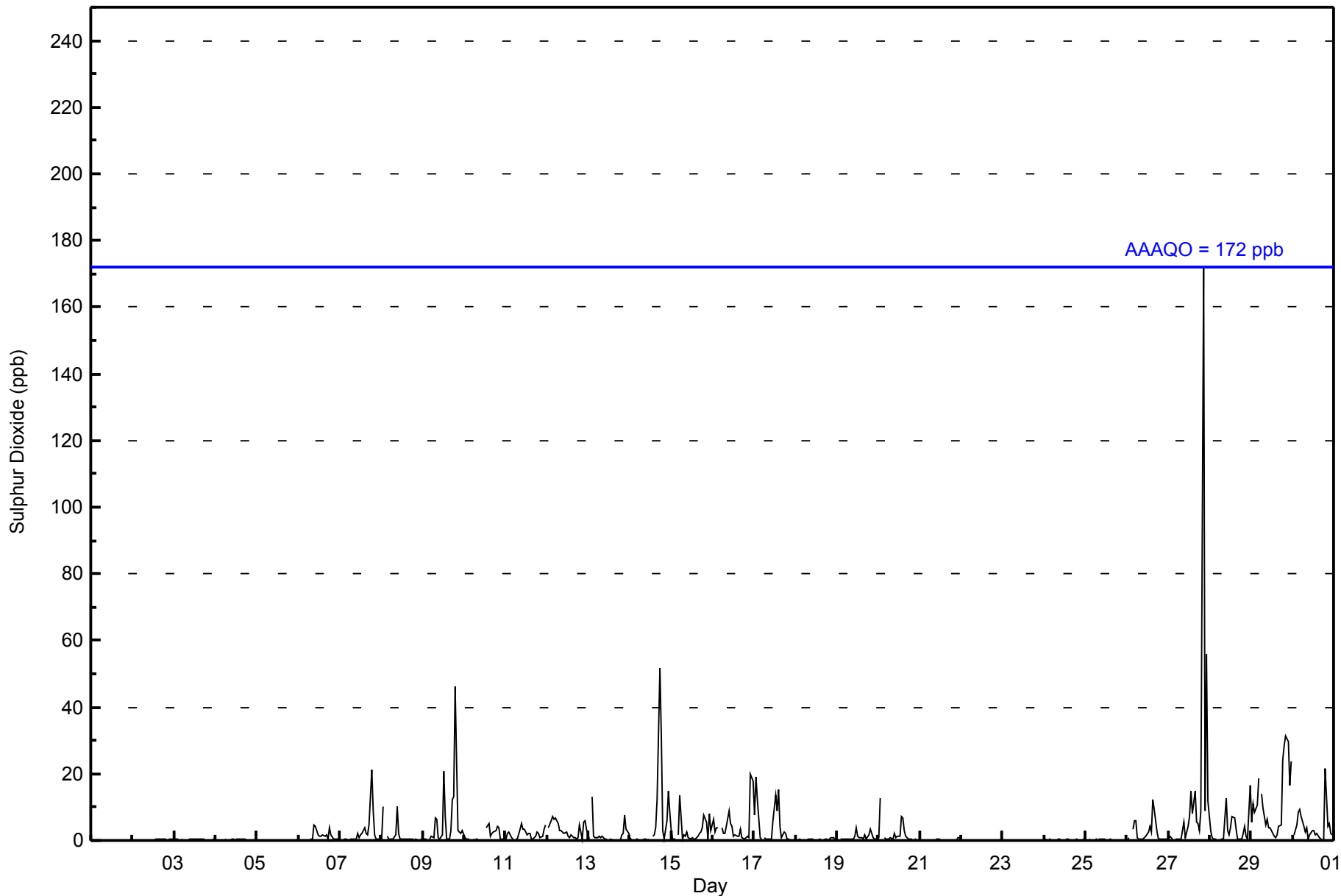
1.3	2.9	2.3	1.8	1.9	1.8	1.2	1.1	1.3	2.4	1.3	1.5	2.5	2.4	2.2	2.0	1.9	3.2	3.9	5.1	8.1	2.6	4.8	3.5	Diurnal Average	
8	19	13	11	18	13	14	10	6	13	5	6	21	15	15	15	12	52	31	46	172	30	56	24	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	626	94.42	94.42
11 - 20	24	3.62	98.04
21 - 60	12	1.81	99.85
61 - 110	0	0.00	99.85
111 - 172	1	0.15	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 663

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - April 2015**

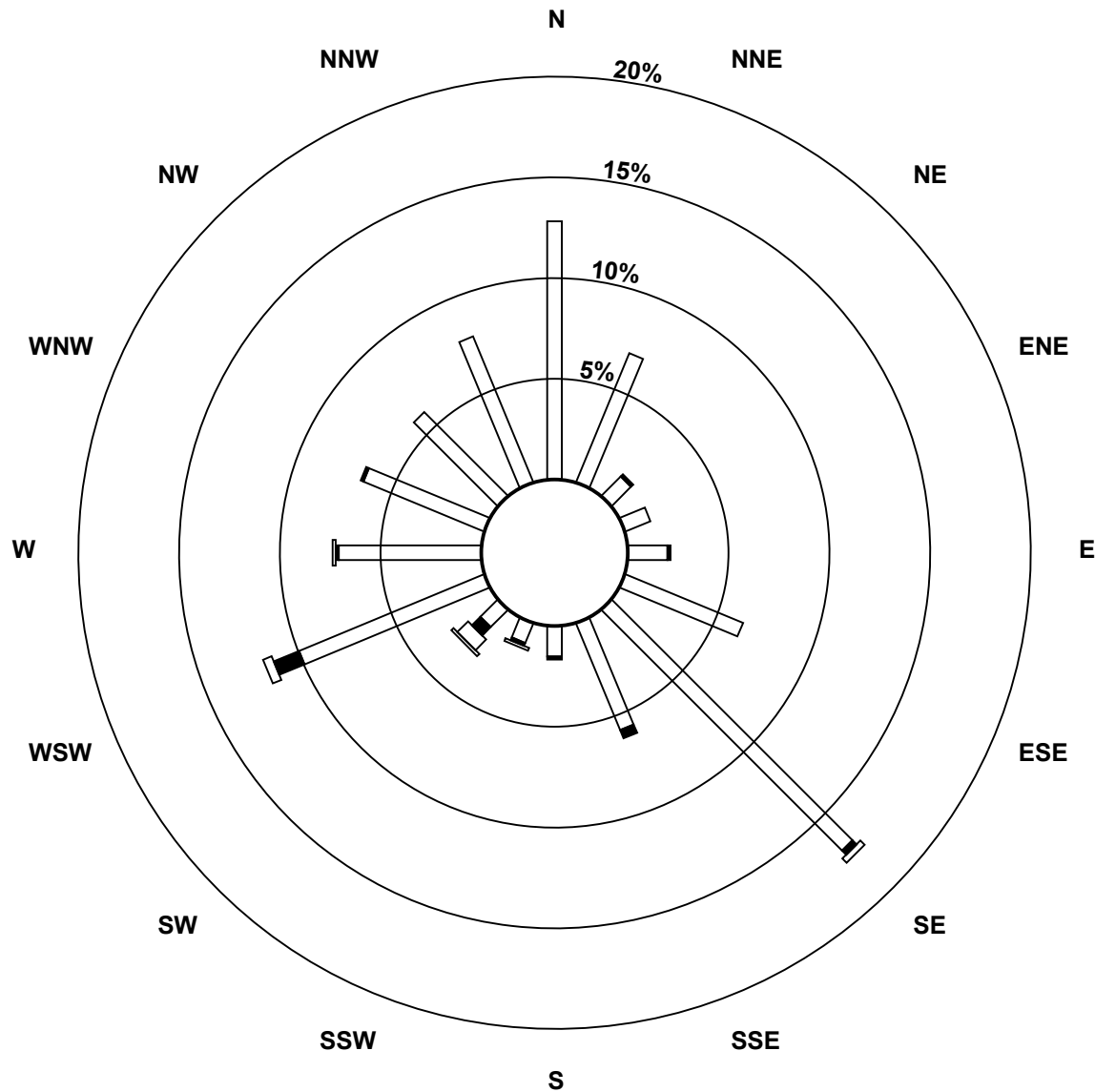
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	85	46	9	9	13	42	112	38	10	7	8	66	47	43	39	52	626
11 - 20	0	0	1	0	1	0	2	3	1	1	4	9	1	1	0	0	24
21 - 60	0	0	0	0	0	0	2	0	0	1	5	3	1	0	0	0	12
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	46	10	9	14	42	116	41	11	9	18	78	49	44	39	52	663

Total Number of Valid Hours: 663

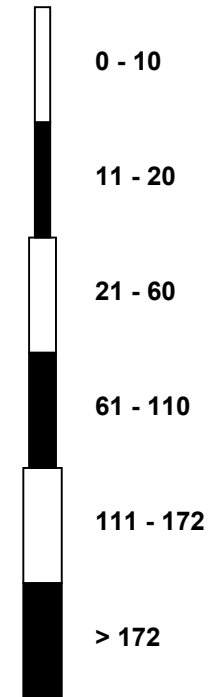
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp (AMS 11)



Classes (ppb)

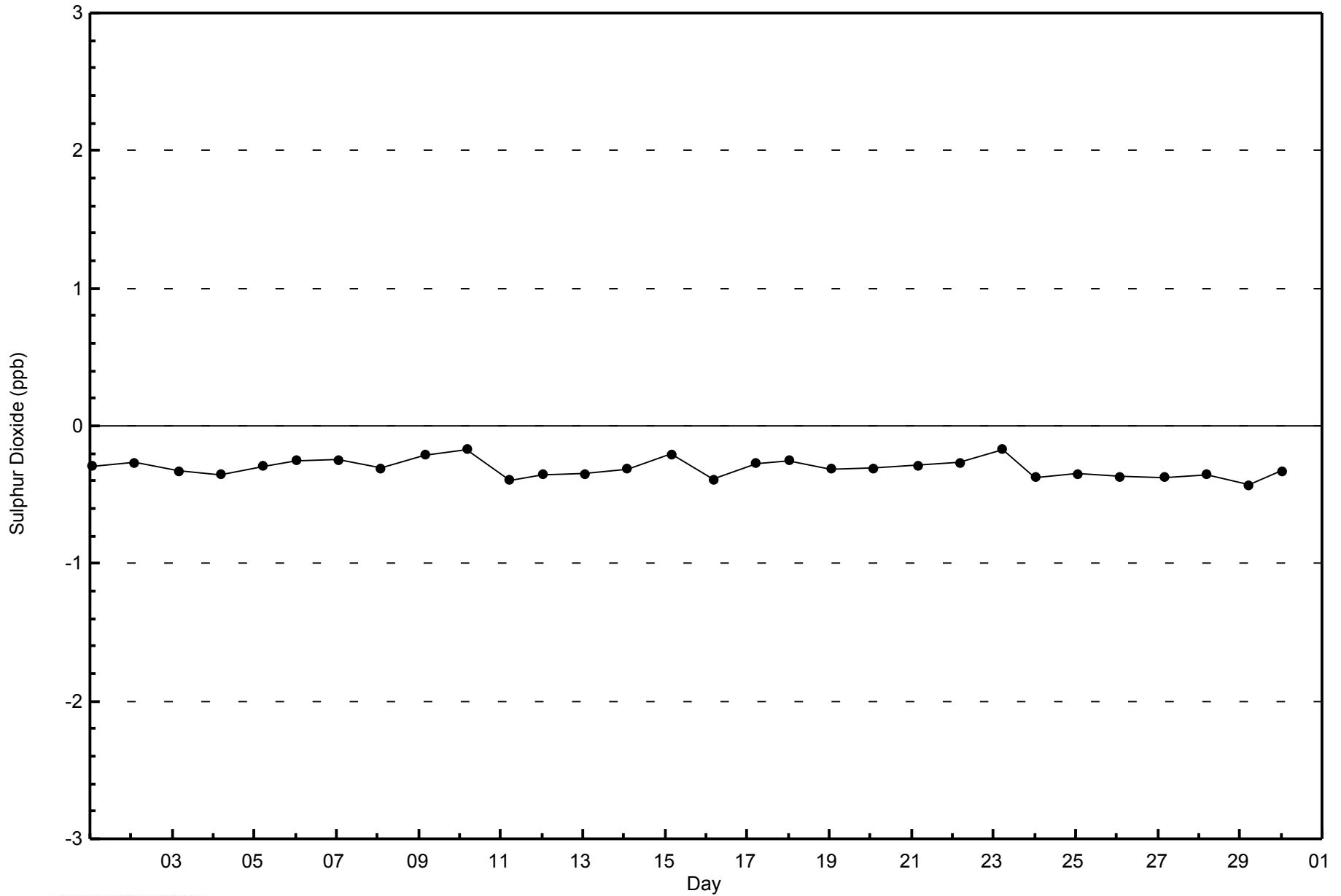


Total Number of Valid Hours: 663



WBEA  
Zero Responses

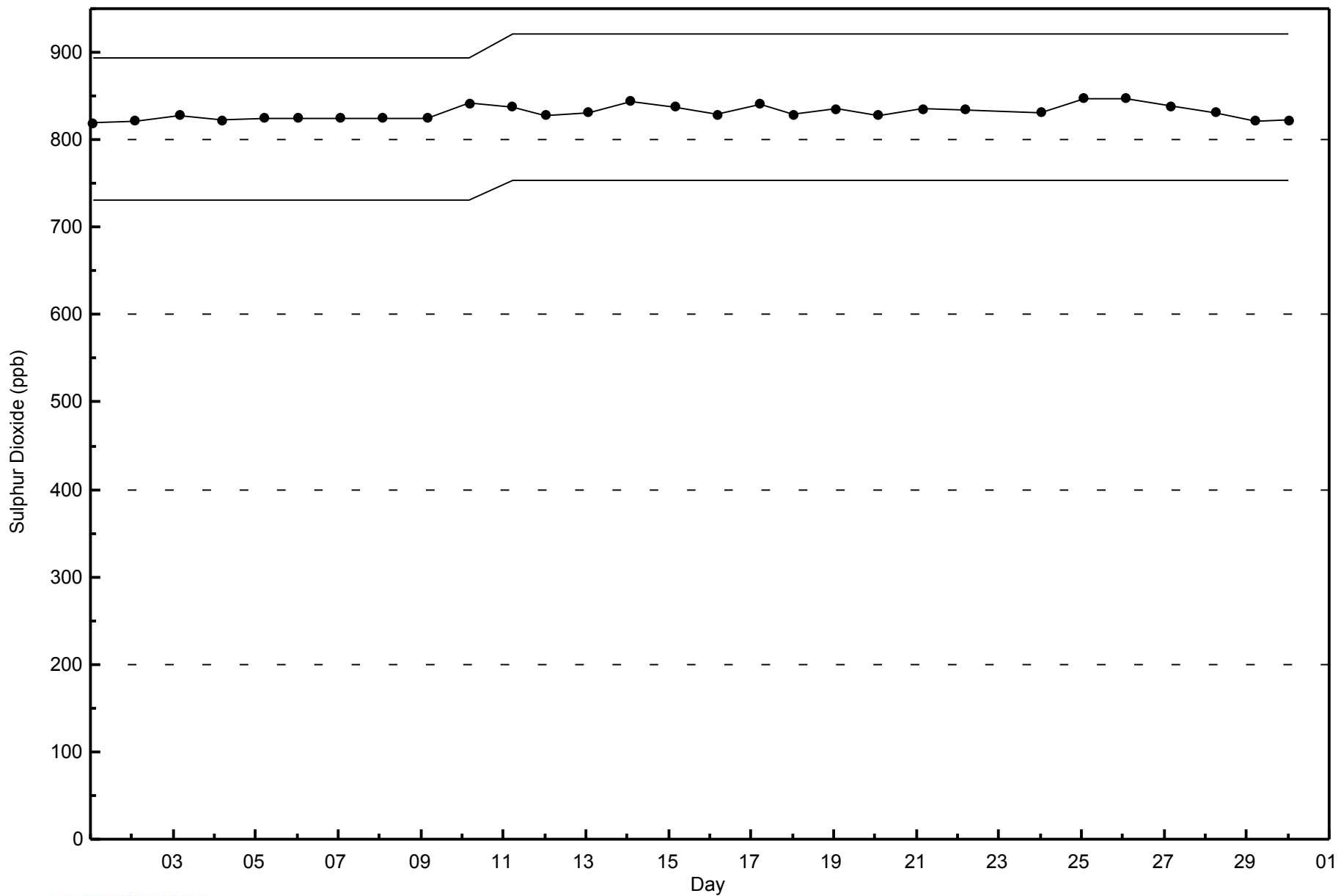
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - April 2015





Summary of Hour Averages

Lower Camp - April 2015

Number of Exceedences (AAAQO):	1-hr: 1	24-hr: 0	Hours in Service:	720
Maximum Value: 19 ppb on Apr 27 21:00	Maximum Daily Average: 2.1 ppb on Apr 27		Hours of Data:	632
Minimum Value: 0 ppb on Apr 13 16:00	Minimum Daily Average: 0.3 ppb on Apr 1		Hours of Missing Data:	88
Maximum Diurnal Average: 1.7 ppb at hour 21	Minimum Diurnal Average: 0.5 ppb at hour 17		Hours of Calibration:	34
Monthly Average: 0.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 4		Percent Operational Time:	92.5

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-Apr	UO	0	Z	0	0	0	0	0	0	0	UO	UO	UO	0	0	0	0	UO	0	0	0	0	0	0	0.3	0
2-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	UO	1	1	1	1	1	1	0.5	1
3-Apr	1	UO	0	0	Z	2	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0	1	1	1	0.6	2
4-Apr	1	UO	0	0	0	Z	1	1	0	1	1	UO	UO	UO	0	1	UO	UO	0	0	1	1	1	0	--	1
5-Apr	1	1	0	1	2	3	Z	1	1	0	UO	1	1	0	0	0	0	1	UO	UO	0	UO	0	1	0.8	3
6-Apr	1	Z	2	3	3	3	2	1	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0.9	3
7-Apr	0	0	Z	0	UO	0	0	1	1	UO	0	0	0	1	0	0	UO	1	2	1	1	1	1	1	0.7	2
8-Apr	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	2	0.9	2
9-Apr	1	1	1	1	Z	1	1	2	2	1	1	1	3	1	1	1	1	1	2	5	3	2	2	2	1.5	5
10-Apr	2	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	0	1.1	2
11-Apr	1	1	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1.2	2
12-Apr	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
13-Apr	1	2	Z	UO	UO	UO	UO	0	0	1	1	UO	UO	UO	UO	0	0	0	0	1	1	2	2	2	--	2
14-Apr	2	1	1	Z	1	1	1	UO	UO	UO	C	C	C	C	C	1	1	2	1	1	0	1	2	1	--	2
15-Apr	1	0	0	1	Z	3	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	1	1	0.8	3
16-Apr	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	3	2	1	4	2	2	2	1.2	4
17-Apr	1	3	2	1	1	0	Z	0	0	0	1	1	2	1	2	1	1	1	1	1	1	0	1	1	1.0	3
18-Apr	1	Z	0	0	1	1	1	1	0	0	1	1	1	0	0	1	0	0	1	0	1	2	2	1	0.7	2
19-Apr	1	1	Z	1	1	1	1	0	1	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	0.6	1
20-Apr	1	5	2	Z	1	1	1	1	1	1	1	1	0	1	0	1	1	0	0	0	0	0	1	1	0.9	5
21-Apr	1	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	AF	AF	AF	AF	AF	AF	--	0
23-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	0	0	0	0	0	0	0	--	0
24-Apr	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
25-Apr	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	1
26-Apr	0	1	1	Z	3	3	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0.7	3
27-Apr	0	0	1	1	Z	1	0	1	1	0	1	1	2	1	2	1	1	1	1	1	1	19	2	9	2.1	19
28-Apr	1	1	1	1	1	1	Z	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	2	0.7	2
29-Apr	1	1	1	2	1	1	Z	1	1	1	1	0	0	0	0	1	1	1	3	4	4	4	3	4	1.5	4
30-Apr	1	Z	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	2	1	2	1	1	0.7	2

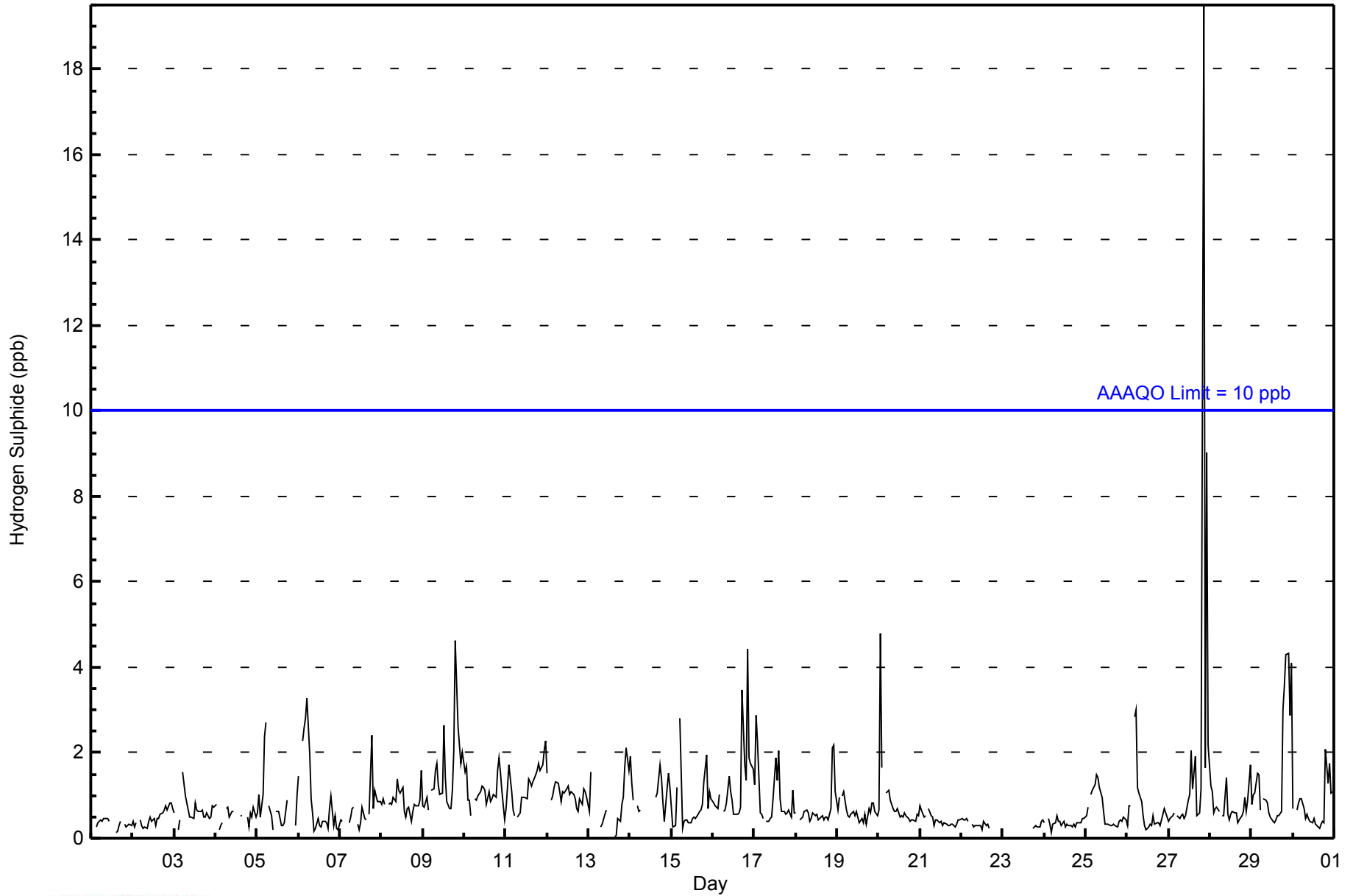
0.8	1.1	0.8	0.8	1.0	1.1	0.8	0.7	0.6	0.7	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.5	0.7	0.9	1.0	1.7	1.1	1.3	1.1	Diurnal Average	
2	5	2	3	3	3	2	2	2	1	1	1	1	3	2	2	2	1	3	3	5	19	4	9	4	Diurnal Maximum	

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



WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	610	96.52	96.52
3 - 4	18	2.85	99.37
5 - 7	2	0.32	99.68
8 - 11	1	0.16	99.84
> 11	1	0.16	100.00

Total Number of Valid Hours: 632

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - April 2015**

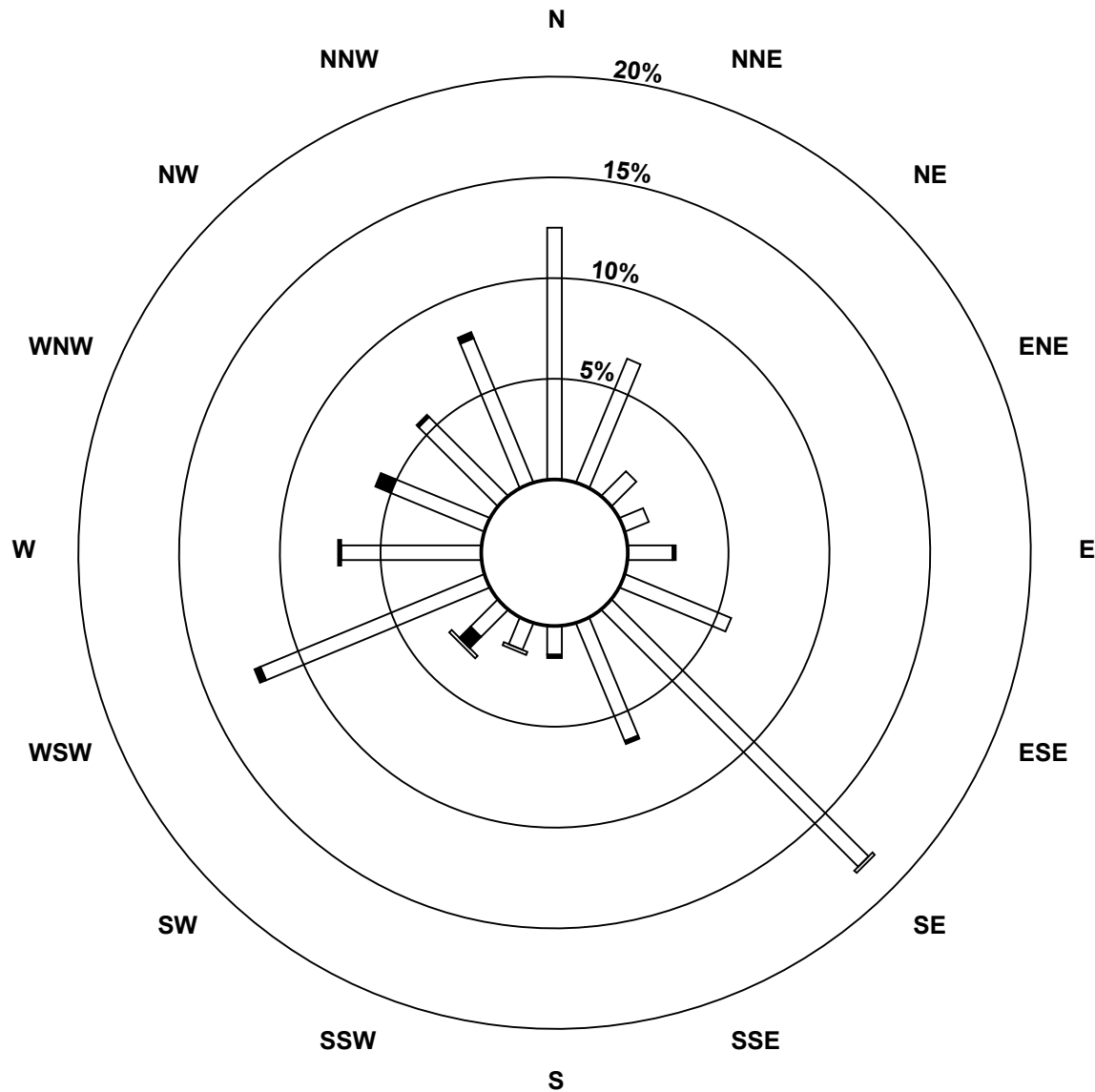
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	79	42	11	8	14	36	114	40	9	9	12	76	44	32	35	49	610
3 - 4	0	0	0	0	1	0	0	1	1	0	5	2	0	5	1	2	18
5 - 7	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
<b>Totals</b>	79	42	11	8	15	36	115	41	10	10	18	78	45	37	36	51	632

Total Number of Valid Hours: 632

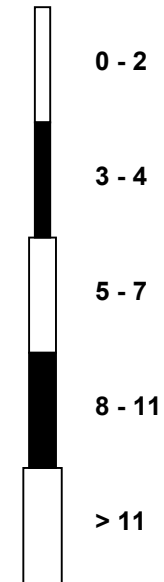
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp (AMS 11)



Classes (ppb)

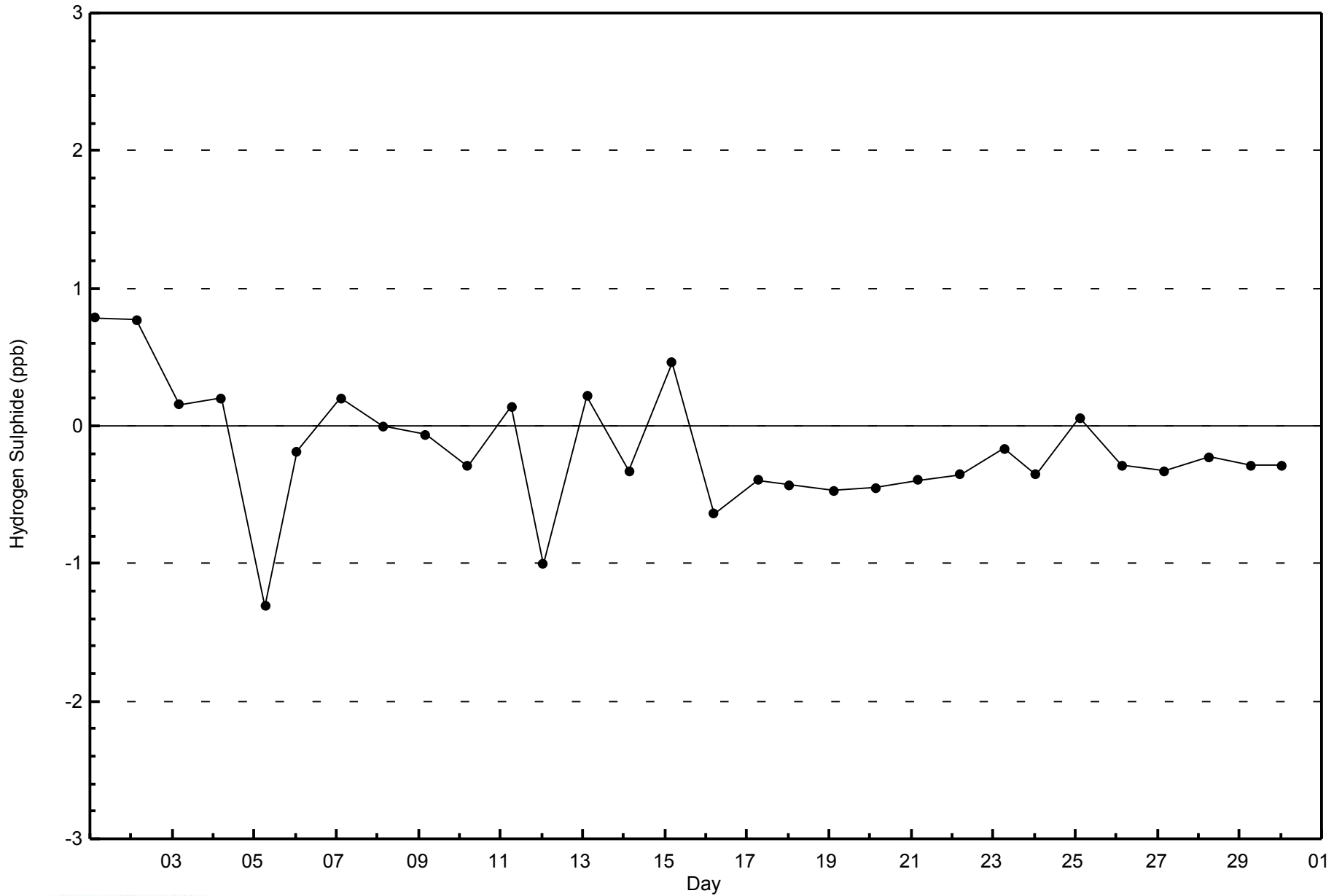


Total Number of Valid Hours: 632



WBEA  
Zero Responses

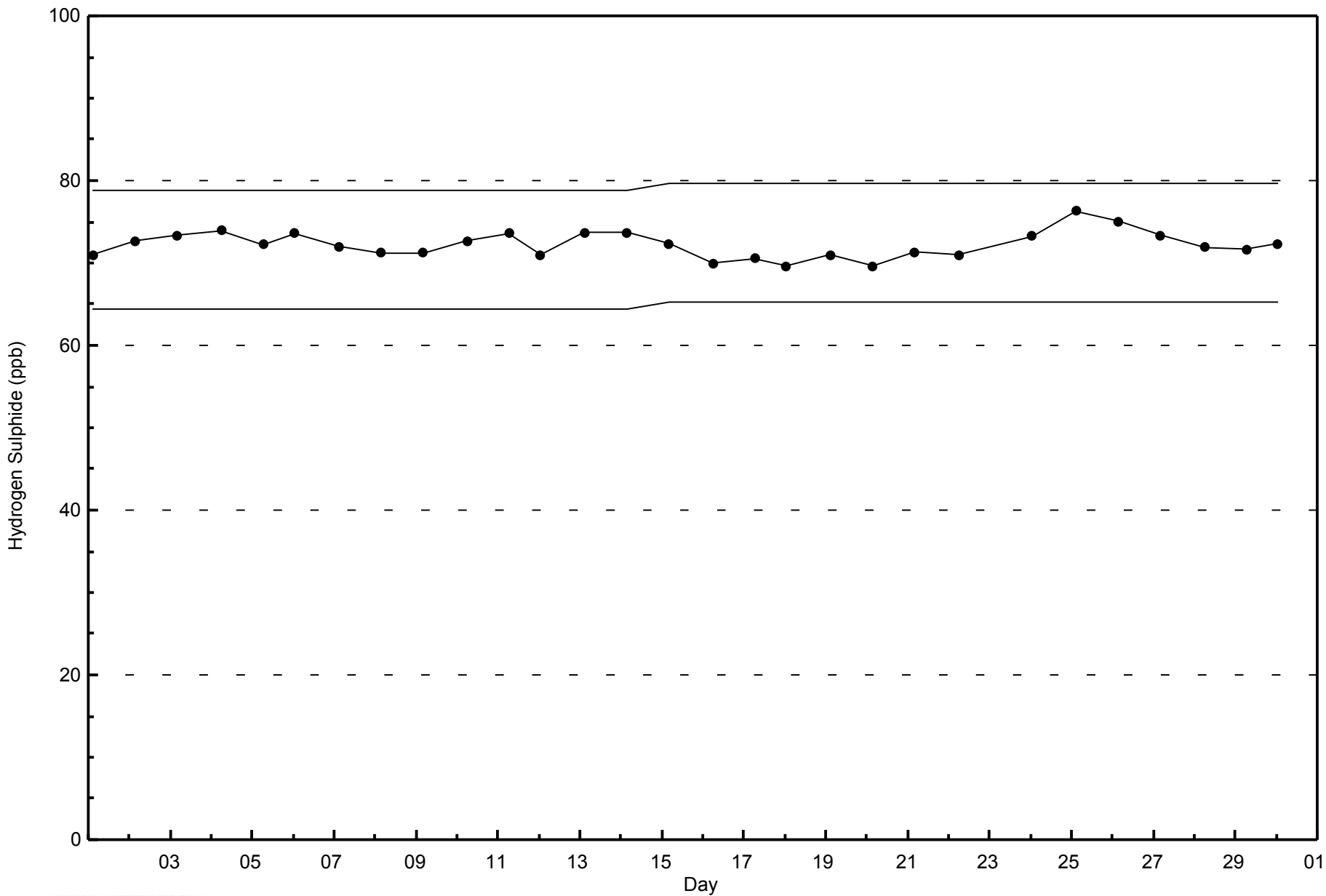
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - April 2015





Maximum Value: 4.5 ppm on Apr 10 22:00	Maximum Daily Average: 2.8 ppm on Apr 10	Hours in Service: 720
Minimum Value: 2.0 ppm on Apr 1 01:00	Minimum Daily Average: 2.0 ppm on Apr 1	Hours of Data: 664
Maximum Diurnal Average: 2.5 ppm at hour 21	Minimum Diurnal Average: 2.2 ppm at hour 16	Hours of Missing Data: 56
Monthly Average: 2.28 ppm	Percentiles: $P_1 = 2.0$ $P_{10} = 2.1$ $Q_1 = 2.1$ Median = 2.2 $Q_3 = 2.3$ $P_{90} = 2.6$ $P_{99} = 3.4$	Hours of Calibration: 33
		Percent Operational Time: 96.8

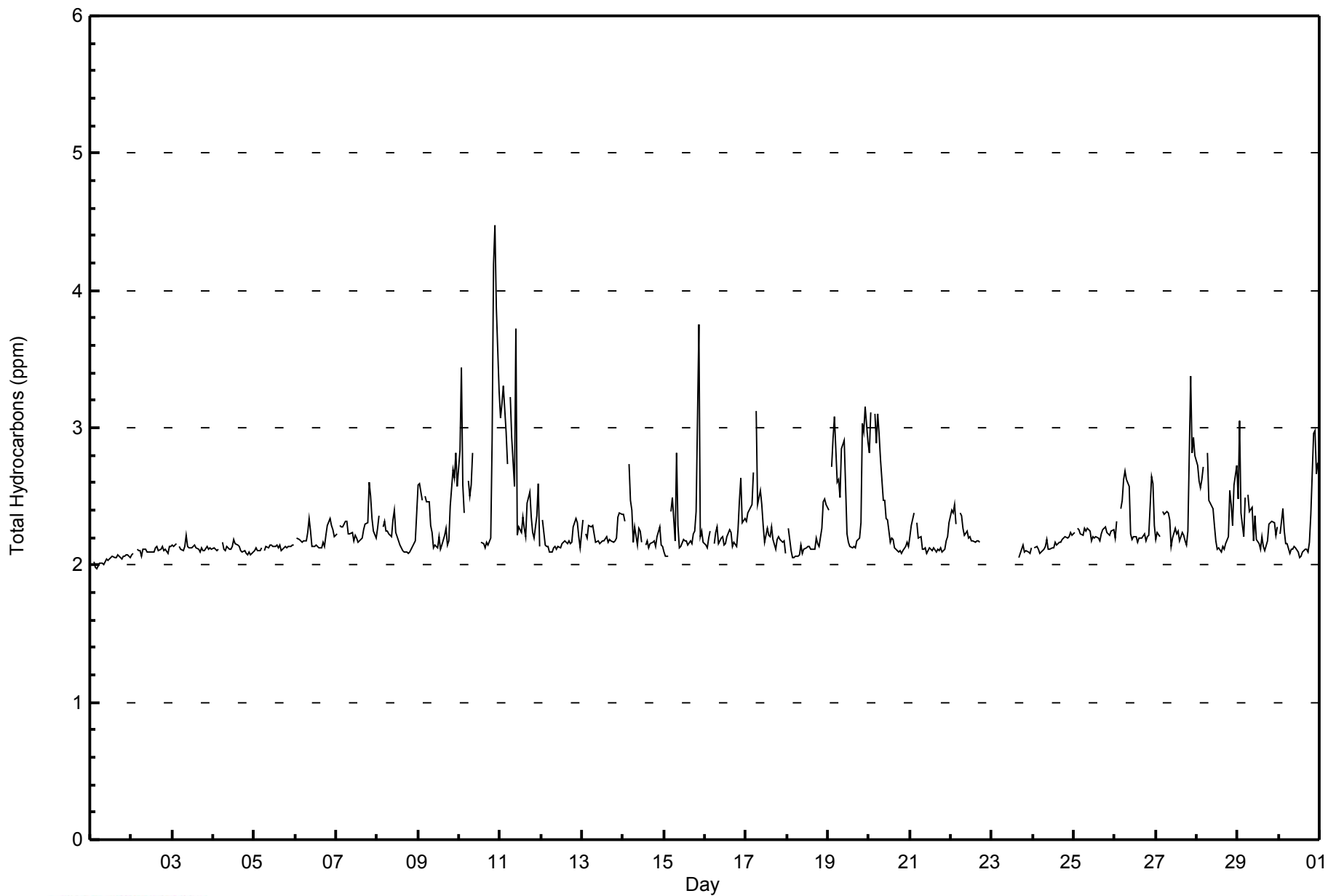
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Apr	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	
2-Apr	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
3-Apr	2.1	2.1	2.2	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
4-Apr	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
5-Apr	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	
6-Apr	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	
7-Apr	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.6	2.5	2.3	2.2	2.2	2.2	2.3	2.6	
8-Apr	2.3	2.4	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.3	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	2.4	2.2	2.2	2.4	
9-Apr	2.6	2.6	2.5	Z	2.5	2.5	2.5	2.3	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.3	2.1	2.2	2.4	2.7	2.6	2.8	2.6	2.4	2.4	2.8	
10-Apr	2.8	3.4	2.6	2.4	Z	2.6	2.5	2.6	2.8	C	C	C	C	2.2	2.2	2.1	2.2	2.1	2.2	2.9	4.2	4.5	3.9	3.3	2.8	4.5		
11-Apr	3.1	3.2	3.3	3.0	2.7	Z	3.2	2.9	2.6	3.7	2.2	2.3	2.2	2.3	2.3	2.2	2.5	2.5	2.4	2.2	2.2	2.4	2.6	2.1	2.6	3.7		
12-Apr	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.2	2.3		
13-Apr	2.3	Z	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.2	2.4		
14-Apr	2.4	2.3	Z	2.7	2.5	2.4	2.2	2.3	2.1	2.3	2.3	2.2	M	2.1	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.3	2.1	2.1	2.2	2.7		
15-Apr	2.1	2.1	2.1	Z	2.4	2.5	2.2	2.8	2.3	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.4	3.8	2.2	2.2	2.2	2.3	3.8	
16-Apr	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.1	2.2	2.1	2.3	2.5	2.6	2.3	2.3	2.2	2.6		
17-Apr	2.3	2.4	2.4	2.4	2.7	Z	3.1	2.4	2.5	2.4	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	3.1	
18-Apr	Z	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.3	2.5	2.5	2.4	2.2	2.5	
19-Apr	2.4	Z	2.7	2.9	3.1	2.6	2.6	2.5	2.8	2.9	2.6	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	3.0	3.0	3.2	2.9	2.6	3.2	
20-Apr	2.8	3.1	Z	3.1	2.9	3.1	2.9	2.8	2.5	2.5	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.4	3.1	
21-Apr	2.2	2.3	2.4	Z	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.2	2.4	
22-Apr	2.4	2.4	2.4	2.3	Z	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	AF	AF	AF	AF	AF	AF	--	2.4
23-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	--	2.1	
24-Apr	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	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
25-Apr	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	
26-Apr	2.2	2.3	Z	2.4	2.5	2.6	2.7	2.6	2.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	2.6	2.3	2.3	2.7	
27-Apr	2.2	2.2	2.2	Z	2.4	2.4	2.4	2.4	2.3	2.1	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	3.4	2.8	2.9	2.8	2.4	3.4	
28-Apr	2.7	2.6	2.6	2.6	2.7	Z	2.8	2.5	2.5	2.4	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.4	2.3	2.6	2.7	2.4	2.8	
29-Apr	2.5	3.0	2.4	2.2	2.5	Z	2.5	2.4	2.4	2.2	2.4	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	3.0	
30-Apr	Z	2.2	2.4	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	3.0	3.0	2.7	2.7	2.3	3.0	
	Diurnal Average																								Diurnal Maximum			
	2.3 2.4 2.3 2.3 2.4 2.3 2.4 2.3 2.3 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.5 2.4 2.4 2.3																								3.1 3.4 3.3 3.1 3.1 3.1 3.2 2.9 2.8 3.7 2.6 2.3 2.3 2.3 2.3 2.3 2.5 2.5 2.4 2.9 4.2 4.5 3.9 3.3			

Z - zerospan      C - Calibration      M - Maintenance      AF - Analyzer Failure



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Lower Camp - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	12	1.81	1.81
2.1 - 3.0	634	95.48	97.29
3.1 - 10.0	18	2.71	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 664

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - April 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	10	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
2.1 - 3.0	75	44	10	9	14	42	104	40	11	8	17	78	49	42	39	52	634
3.1 - 10.0	0	0	0	0	0	1	12	1	0	1	1	0	0	2	0	0	18
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	46	10	9	14	43	116	41	11	9	18	78	49	44	39	52	664

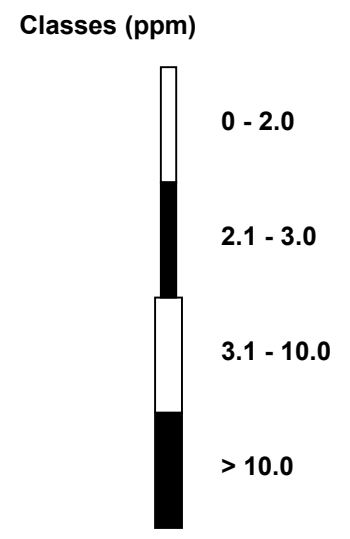
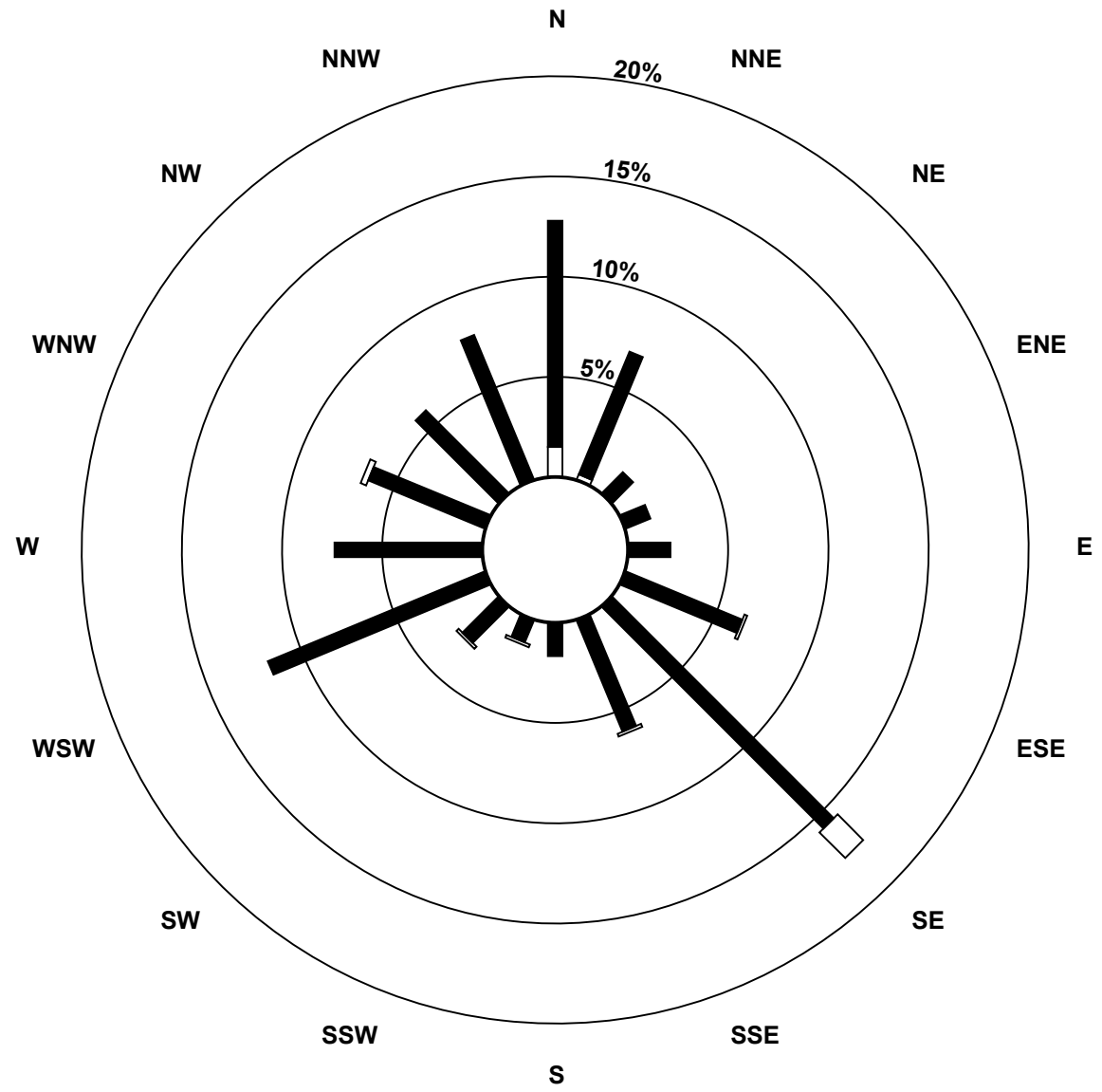
Total Number of Valid Hours: 664

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Total Hydrocarbons (THC) - ppm  
Lower Camp (AMS 11)

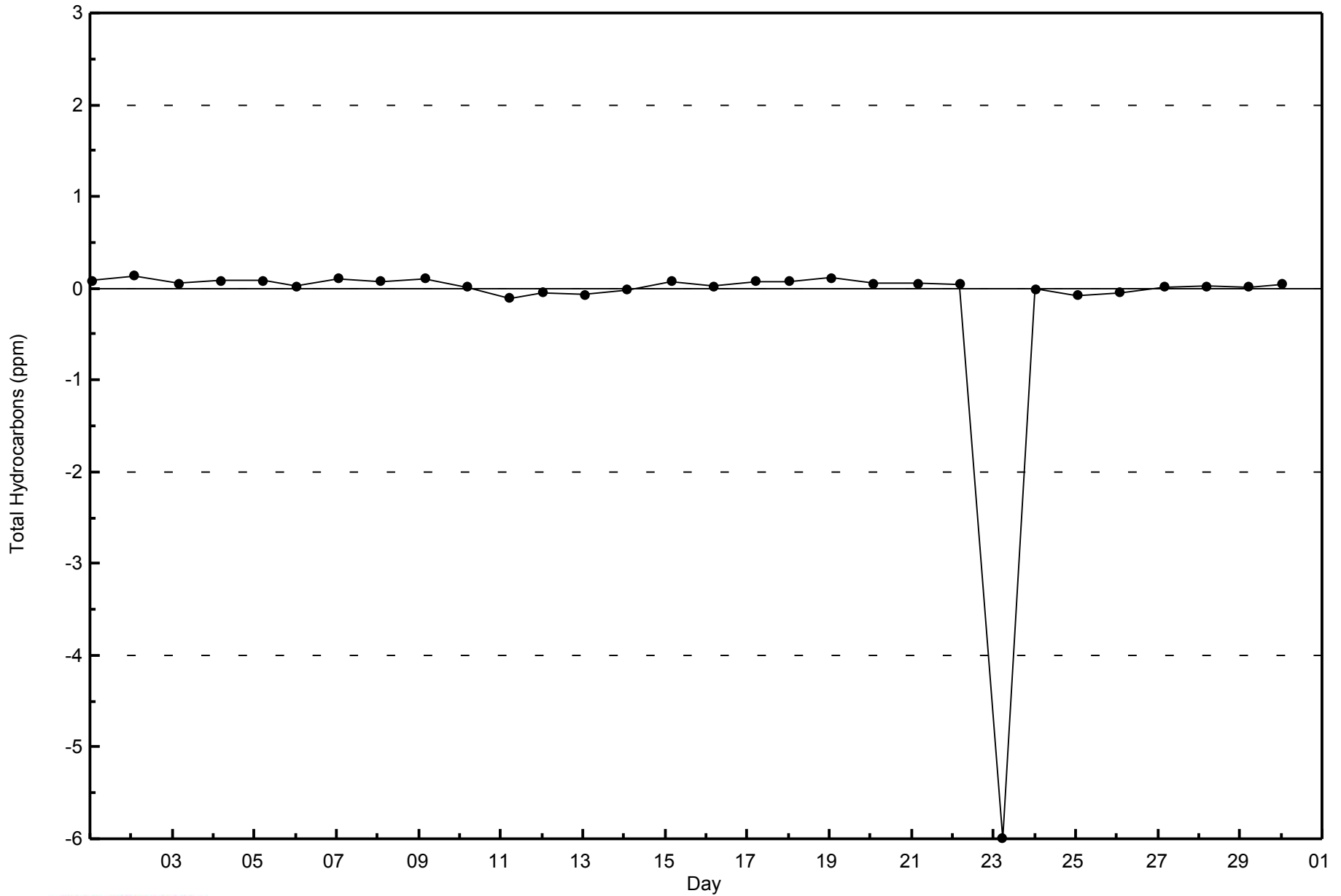


Total Number of Valid Hours: 664



WBEA  
Zero Responses

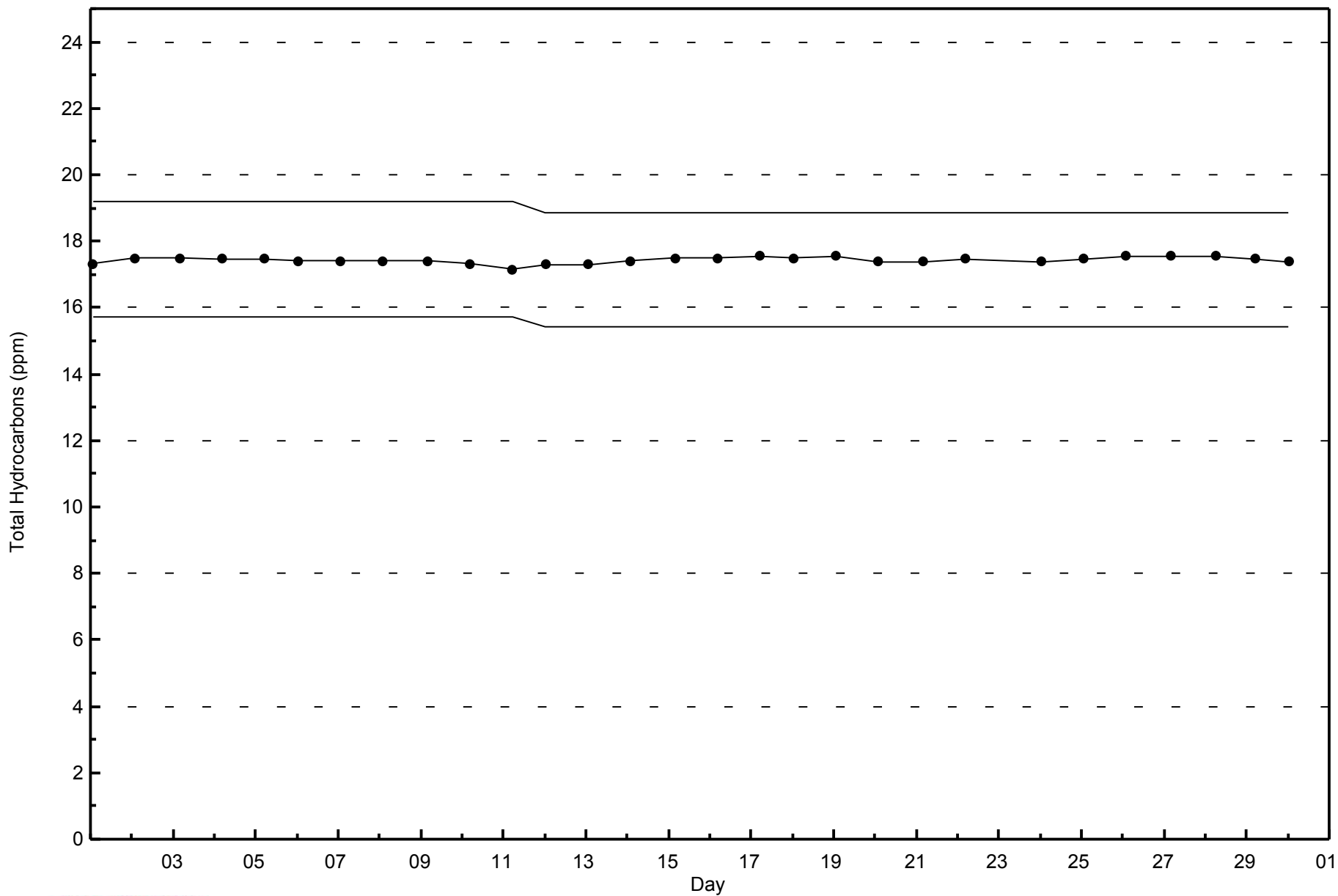
Total Hydrocarbons (THC) - ppm  
Lower Camp - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Lower Camp - April 2015



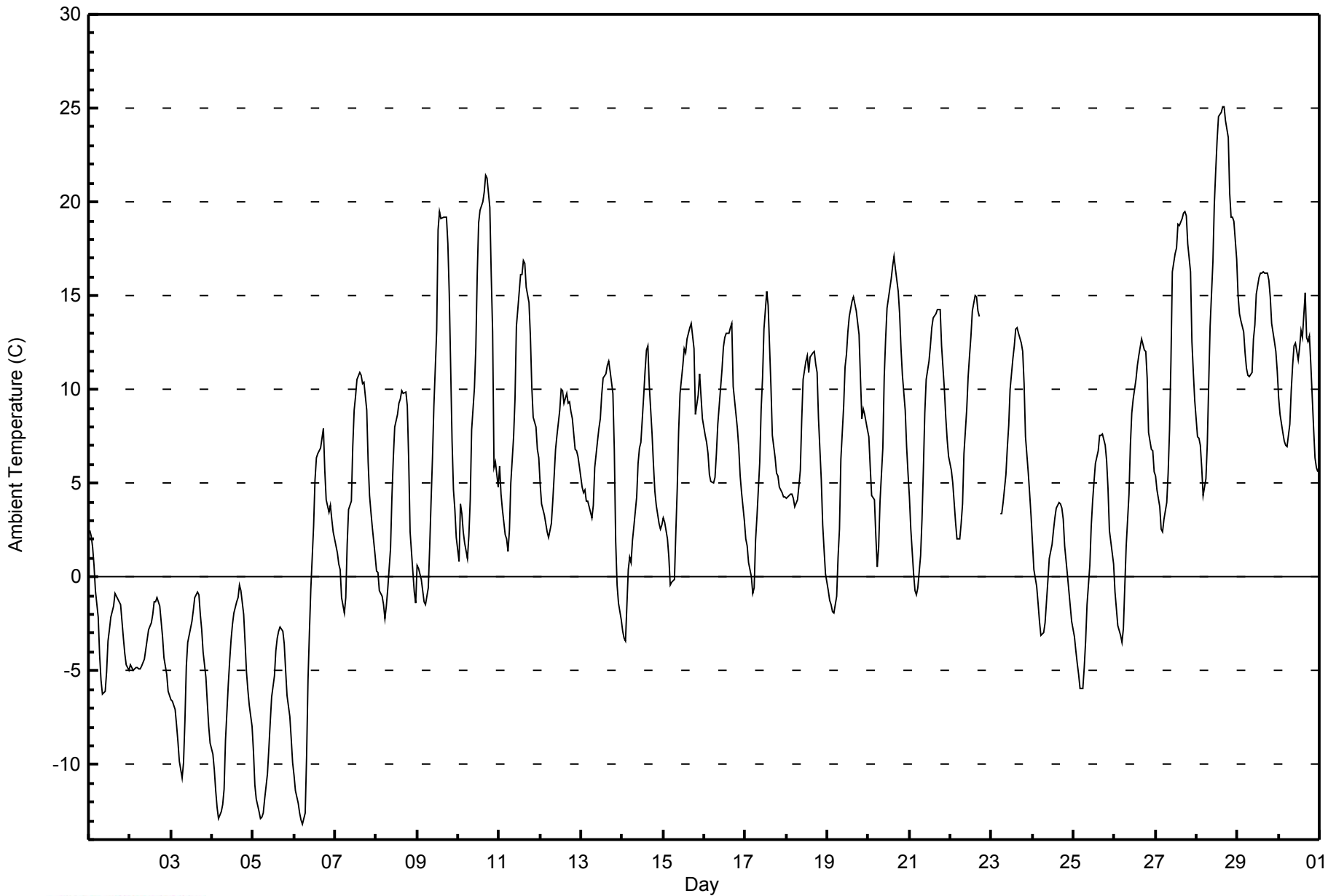


Maximum Value: 25.1 C on Apr 28 17:00		Maximum Daily Average: 16.3 C on Apr 28		Hours in Service: 720																																												
Minimum Value: -13.2 C on Apr 6 06:00		Minimum Daily Average: -7.9 C on Apr 5		Hours of Data: 709																																												
Maximum Diurnal Average: 11.1 C at hour 16		Minimum Diurnal Average: -0.9 C at hour 6		Hours of Missing Data: 11																																												
Monthly Average: 5.13 C		Percentiles: P <sub>1</sub> = -12.6 P <sub>10</sub> = -4.8 Q <sub>1</sub> = -0.6 Median = 5.2 Q <sub>3</sub> = 10.8 P <sub>90</sub> = 14.5 P <sub>99</sub> = 23.2		Hours of Calibration: 0																																												
				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-Apr	2.5	2.2	1.6	0.6	-0.7	-2.1	-4.2	-5.5	-6.2	-6.1	-5.0	-3.4	-2.8	-2.2	-1.5	-0.9	-1.0	-1.2	-1.5	-2.4	-3.3	-4.1	-4.7	-5.0	-2.4	2.5																						
2-Apr	-4.7	-4.9	-5.0	-4.9	-4.9	-4.9	-4.9	-4.7	-4.4	-3.9	-3.3	-2.8	-2.5	-2.0	-1.3	-1.3	-1.1	-1.6	-2.4	-3.2	-4.3	-5.2	-6.1	-6.3	-3.8	-1.1																						
3-Apr	-6.6	-6.6	-7.1	-7.9	-8.8	-9.8	-10.7	-9.9	-7.7	-4.8	-3.5	-2.7	-2.4	-1.8	-1.1	-0.8	-1.0	-2.0	-2.8	-4.0	-5.4	-6.7	-7.9	-8.8	-5.4	-0.8																						
4-Apr	-9.4	-10.3	-11.4	-12.3	-12.9	-12.5	-12.1	-11.3	-8.7	-5.8	-4.4	-3.3	-2.5	-1.9	-1.3	-1.1	-0.4	-0.7	-2.0	-3.5	-5.1	-6.0	-6.8	-8.0	-6.4	-0.4																						
5-Apr	-9.3	-11.1	-11.8	-12.5	-12.9	-12.8	-12.6	-11.9	-10.5	-9.2	-7.7	-6.4	-5.3	-3.9	-3.2	-2.9	-2.6	-2.9	-3.6	-4.9	-6.4	-7.4	-8.6	-9.9	-7.9	-2.6																						
6-Apr	-10.6	-11.4	-12.1	-12.6	-13.0	-13.2	-12.6	-9.5	-5.5	-3.0	-0.6	2.7	5.2	6.4	6.6	6.9	7.4	7.9	5.7	4.1	3.4	3.8	3.1	2.4	-1.6	7.9																						
7-Apr	1.7	1.3	0.7	0.4	-1.1	-1.9	-1.1	1.8	3.6	4.1	6.9	8.9	9.6	10.5	10.9	10.8	10.3	10.4	8.9	6.1	4.4	3.5	2.7	1.2	4.8	10.9																						
8-Apr	0.3	0.2	-0.7	-1.0	-1.4	-2.2	-1.6	-0.7	1.5	4.3	6.3	8.0	8.7	9.3	9.5	10.0	9.8	9.9	9.1	6.2	2.4	0.3	-0.8	-1.4	3.6	10.0																						
9-Apr	0.6	0.4	-0.2	-0.7	-1.3	-1.4	-0.6	1.6	4.0	6.3	9.1	13.2	18.5	19.5	19.1	19.2	19.2	19.2	17.8	15.1	7.2	4.7	3.6	2.1	8.2	19.5																						
10-Apr	0.8	3.9	3.3	2.4	1.8	1.0	2.2	4.1	7.9	10.1	12.2	16.1	18.9	19.6	20.0	20.5	21.4	21.3	19.7	16.1	13.1	5.8	6.1	4.8	10.5	21.4																						
11-Apr	5.9	4.4	3.6	2.2	2.0	1.4	2.5	5.0	7.5	9.5	13.4	14.3	16.2	16.1	16.9	16.7	15.5	14.6	12.8	10.2	8.5	8.0	6.8	6.3	9.2	16.9																						
12-Apr	4.9	3.9	3.3	2.9	2.4	2.1	2.8	4.1	5.4	6.8	7.6	8.9	10.0	10.0	9.3	9.8	9.3	9.4	8.8	8.4	6.8	6.7	6.5	5.9	6.5	10.0																						
13-Apr	4.8	4.5	4.6	4.0	4.1	3.4	3.2	3.8	5.8	7.2	8.0	8.4	9.7	10.6	10.8	11.3	11.5	11.0	9.8	6.8	1.9	-0.4	-1.4	-2.3	5.9	11.5																						
14-Apr	-2.9	-3.2	-3.4	0.4	1.0	0.7	2.0	2.7	4.2	6.0	6.9	7.2	9.7	10.9	12.1	12.4	10.2	7.7	6.0	4.6	3.8	2.8	2.6	2.8	4.5	12.4																						
15-Apr	3.1	2.9	2.0	1.0	-0.4	-0.3	-0.1	2.4	4.7	7.8	9.8	11.3	12.2	11.9	12.7	13.3	13.5	12.9	12.2	8.7	9.7	10.8	9.6	8.4	7.5	13.5																						
16-Apr	7.5	7.2	6.6	5.5	5.1	5.1	5.3	6.6	8.1	10.1	11.1	12.3	12.8	13.0	13.0	13.3	13.5	10.2	8.7	7.9	6.9	5.4	4.5	3.0	8.4	13.5																						
17-Apr	2.0	1.7	0.8	0.1	-0.9	-0.6	2.0	3.2	6.1	9.0	10.6	13.2	15.2	14.5	12.3	10.2	7.5	6.4	5.6	5.4	4.8	4.5	4.3	4.3	5.9	15.2																						
18-Apr	4.2	4.3	4.5	4.5	4.2	3.7	4.1	4.8	5.7	8.4	10.6	11.5	11.8	10.9	11.7	12.0	12.1	11.4	10.9	8.4	5.2	2.8	1.5	0.2	7.0	12.1																						
19-Apr	-0.7	-1.2	-1.4	-1.8	-1.9	-1.0	1.1	2.6	6.3	9.1	11.2	11.9	13.0	13.9	14.7	15.0	14.6	14.2	12.9	10.6	8.5	9.0	8.6	7.9	7.4	15.0																						
20-Apr	7.5	5.8	4.4	4.1	2.2	0.5	1.6	4.1	6.9	10.7	12.7	14.3	15.4	15.9	16.6	17.1	16.4	15.2	14.1	12.1	10.8	8.9	7.0	5.5	9.6	17.1																						
21-Apr	4.3	2.5	0.1	-0.7	-1.0	-0.6	1.1	3.1	5.8	8.8	10.5	11.5	12.3	13.3	13.8	14.1	14.3	14.3	14.2	12.3	10.0	8.5	7.4	6.4	7.8	14.3																						
22-Apr	5.7	5.0	4.0	2.9	2.0	2.0	2.9	3.9	6.6	9.0	10.7	11.8	12.8	14.2	15.0	14.9	14.2	13.9	MS	MS	MS	MS	MS	MS	8.4	15.0																						
23-Apr	MS	MS	MS	MS	MS	3.4	3.4	3.9	5.5	6.9	8.1	10.0	11.6	12.3	13.2	13.3	13.0	12.5	12.0	10.3	7.5	5.6	4.4	3.2	8.4	13.3																						
24-Apr	1.8	0.4	-0.5	-1.4	-2.4	-3.1	-2.9	-2.4	-1.3	-0.2	1.0	1.7	2.5	3.2	3.7	4.0	3.9	3.7	3.1	1.6	0.1	-0.8	-1.5	-2.3	0.5	4.0																						
25-Apr	-3.2	-3.9	-4.6	-5.2	-5.9	-6.0	-4.8	-3.4	-1.5	0.6	2.7	4.0	5.1	6.1	6.7	7.5	7.6	7.6	7.1	6.2	4.7	2.5	1.9	0.7	1.4	7.6																						
26-Apr	-0.8	-1.7	-2.6	-3.1	-3.5	-2.7	-0.5	1.6	4.4	7.1	8.8	9.5	10.6	11.3	11.8	12.2	12.7	12.1	12.0	10.6	7.7	6.8	6.7	5.6	5.7	12.7																						
27-Apr	5.4	4.7	3.8	2.6	2.4	3.1	4.0	5.5	7.8	11.5	16.2	17.3	17.5	18.8	18.7	19.1	19.4	19.5	19.2	17.7	16.3	12.5	10.9	9.4	11.8	19.5																						
28-Apr	7.5	7.4	7.0	5.9	4.3	5.2	7.1	10.3	13.4	16.8	19.9	21.6	23.3	24.6	24.8	25.1	25.1	24.3	23.5	20.5	19.2	19.2	19.0	17.0	16.3	25.1																						
29-Apr	15.0	14.0	13.7	13.1	11.9	11.2	10.8	10.7	10.9	12.7	13.5	15.1	16.0	16.2	16.2	16.3	16.2	16.2	15.8	15.0	13.5	12.6	12.0	11.0	13.7	16.3																						
30-Apr	9.6	8.7	7.7	7.3	7.0	7.0	8.2	9.9	11.3	12.3	12.5	11.6	12.3	13.1	12.8	15.1	12.8	12.6	12.9	11.4	7.9	6.4	5.9	5.6	10.1	15.1																						
																								1.6	1.1	0.4	-0.1	-0.8	-0.9	-0.2	1.2	3.3	5.4	7.2	8.6	9.8	10.5	10.8	11.1	10.8	10.3	9.3	7.5	5.5	4.2	3.3	2.4	Diurnal Average
																								15.0	14.0	13.7	13.1	11.9	11.2	10.8	10.7	13.4	16.8	19.9	21.6	23.3	24.6	24.8	25.1	25.1	24.3	23.5	20.5	19.2	19.2	19.0	17.0	Diurnal Maximum
MS - Missing																																																



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Lower Camp - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Lower Camp - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	190	26.80	26.80
0 - 10	317	44.71	71.51
10 - 20	190	26.80	98.31
> 20	12	1.69	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 720

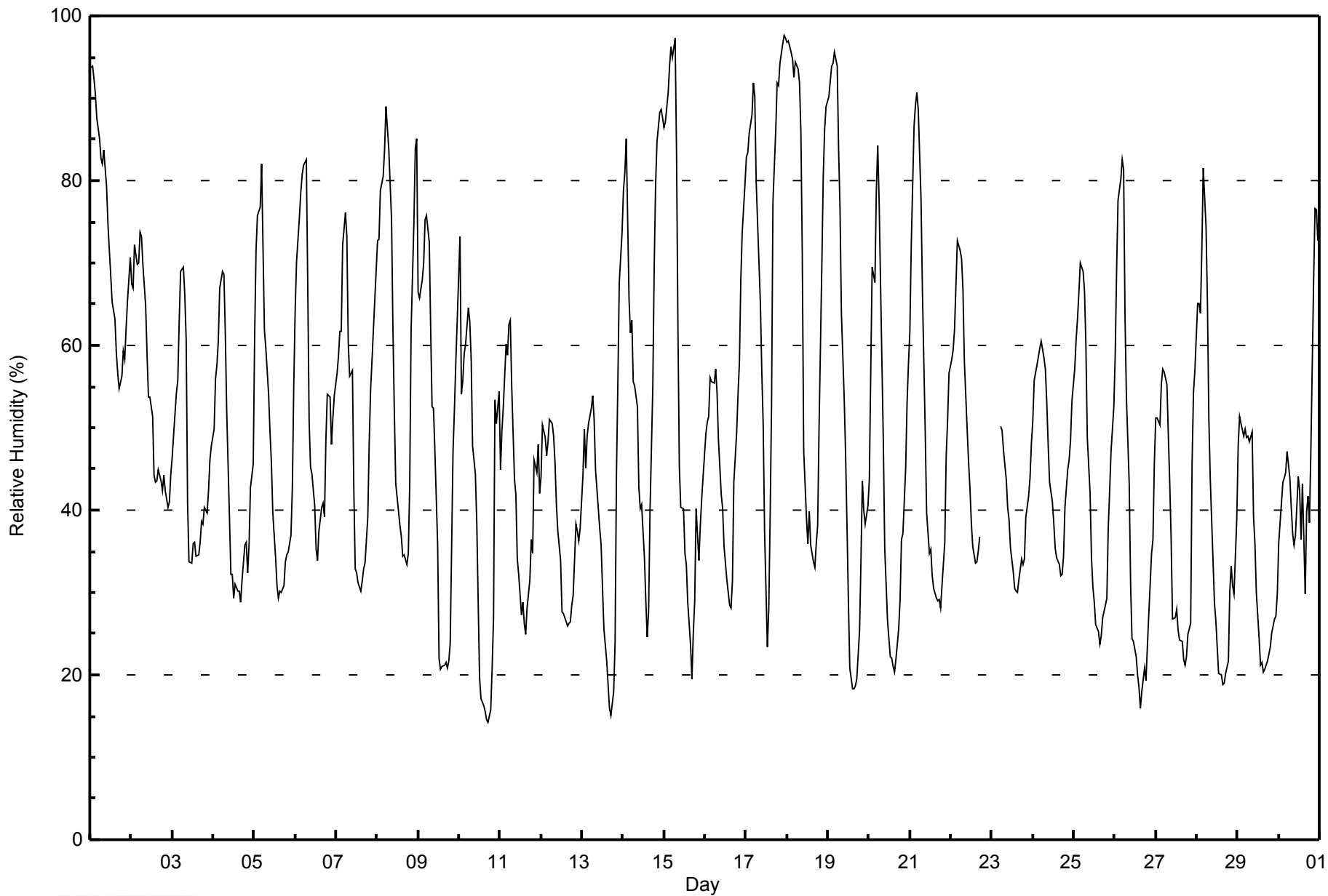


Maximum Value: 98 % on Apr 17 23:00																	Maximum Daily Average: 73.4 % on Apr 17																	Hours in Service: 720															
Minimum Value: 14 % on Apr 10 18:00																	Minimum Daily Average: 34.7 % on Apr 29																	Hours of Data: 709															
Maximum Diurnal Average: 71.7 % at hour 5																	Minimum Diurnal Average: 29.1 % at hour 16																	Hours of Missing Data: 11															
Monthly Average: 49.4 %																	Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 25 Q <sub>1</sub> = 34 Median = 46 Q <sub>3</sub> = 63 P <sub>90</sub> = 81 P <sub>99</sub> = 96																	Hours of Calibration: 0															
																																		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-Apr	94	94	92	91	88	85	83	82	84	79	75	71	69	65	63	59	57	55	56	59	58	62	65	71	73.2	94																							
2-Apr	67	67	72	70	70	74	73	70	65	59	54	54	51	44	43	44	45	44	42	44	42	40	41	44	55.0	74																							
3-Apr	46	49	54	56	63	69	69	66	61	41	34	34	36	36	34	35	36	39	38	40	40	42	46	48	46.3	69																							
4-Apr	50	56	58	60	67	69	69	61	52	39	32	32	29	31	30	30	29	32	36	36	32	36	43	46	43.9	69																							
5-Apr	61	71	76	77	82	72	62	60	54	50	46	40	34	31	29	30	30	31	34	35	35	37	43	55	48.9	82																							
6-Apr	64	70	75	78	81	82	83	68	51	45	44	40	35	34	38	40	41	39	48	54	54	48	51	54	54.9	83																							
7-Apr	57	59	62	62	72	76	73	60	56	57	42	33	32	31	30	31	33	34	39	48	55	58	62	69	51.3	76																							
8-Apr	73	73	79	80	84	89	86	84	75	62	52	43	40	38	37	34	35	33	35	43	62	75	84	85	61.7	89																							
9-Apr	66	66	68	70	75	76	73	62	53	52	47	36	22	21	21	21	22	21	22	24	47	52	58	63	47.4	76																							
10-Apr	73	54	56	59	60	65	63	58	48	44	38	29	20	17	16	16	14	14	16	21	27	53	51	54	40.3	73																							
11-Apr	45	50	53	60	59	62	63	55	44	42	34	32	27	29	26	25	28	32	36	35	46	45	48	42	42.4	63																							
12-Apr	44	50	49	47	48	51	51	49	46	41	37	34	28	28	27	26	26	26	28	30	38	38	36	38	38.1	51																							
13-Apr	44	50	45	49	51	52	54	51	45	40	38	36	30	26	22	19	16	15	18	24	44	56	68	74	40.2	74																							
14-Apr	79	81	85	66	61	63	56	55	52	43	40	41	34	29	25	28	40	55	69	79	85	88	89	88	59.6	89																							
15-Apr	86	87	91	94	96	95	97	83	62	45	40	40	35	33	29	24	20	25	29	40	34	38	41	44	54.6	97																							
16-Apr	49	51	51	56	56	55	57	54	49	42	40	36	33	31	29	28	31	43	49	54	58	68	74	80	49.0	80																							
17-Apr	83	83	86	88	92	90	80	75	65	57	50	37	23	28	39	53	78	86	92	91	94	97	98	97	73.4	98																							
18-Apr	97	97	96	95	92	94	93	92	86	71	47	39	36	40	36	34	33	36	38	50	70	81	86	89	67.8	97																							
19-Apr	90	92	94	94	96	94	84	77	64	54	47	38	29	21	18	18	19	19	25	34	44	40	38	41	52.9	96																							
20-Apr	44	57	70	68	79	84	77	68	48	35	31	27	22	22	21	20	22	26	29	36	37	45	53	58	45.0	84																							
21-Apr	62	72	87	89	91	89	78	66	58	50	40	35	35	32	30	29	29	29	28	31	36	47	51	57	52.1	91																							
22-Apr	58	59	62	68	73	72	71	67	58	50	46	43	38	36	33	34	35	37	MS	MS	MS	MS	MS	MS	52.1	73																							
23-Apr	MS	MS	MS	MS	MS	50	50	47	44	40	39	35	33	30	30	30	31	34	33	34	39	42	44	48	38.7	50																							
24-Apr	51	56	58	59	60	61	58	57	53	48	43	41	38	35	34	33	32	32	34	40	45	46	48	53	46.6	61																							
25-Apr	57	61	63	66	70	69	67	60	49	42	34	31	29	26	25	24	25	27	29	29	38	42	47	53	44.2	70																							
26-Apr	59	69	78	80	83	81	64	54	43	31	24	24	22	20	19	16	18	21	19	23	27	35	36	46	41.4	83																							
27-Apr	51	51	50	55	57	57	55	49	43	37	27	27	28	25	24	24	22	21	22	25	26	46	54	57	38.9	57																							
28-Apr	65	65	64	72	81	74	65	51	44	34	29	27	23	20	20	19	19	20	22	30	33	31	30	39	40.7	81																							
29-Apr	48	51	50	49	50	49	49	48	49	39	36	30	24	21	22	20	21	22	23	23	25	27	27	30	34.7	51																							
30-Apr	36	39	43	44	45	47	44	40	37	36	37	44	42	36	43	30	40	42	39	47	68	77	76	73	46.0	77																							
																								62.1	64.8	67.8	69.0	71.7	71.5	68.2	62.3	54.6	46.8	40.8	36.9	32.7	30.6	29.8	29.1	30.8	33.0	35.5	40.1	46.2	51.4	54.8	58.4	Diurnal Average	
																								97	97	96	95	96	95	97	92	86	79	75	71	69	65	63	59	78	86	92	91	94	97	98	97	Diurnal Maximum	
MS - Missing																																																	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Lower Camp - April 2015**







**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Speed (WS) - km/h**  
**Lower Camp - April 2015**

Maximum Speed: 31 km/h on Apr 11 20:00	Maximum Daily Speed Average: 20.1 km/h on Apr 22	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 13 22:00	Minimum Daily Speed Average: 3.3 km/h on Apr 8	Hours of Data: 709
Maximum Diurnal Speed Average: 4.3 km/h at hour 16	Minimum Diurnal Speed Average: 0.3 km/h at hour 1	Hours of Missing Data: 11
Monthly Average Velocity: 0.8 km/h 268.7 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 7 Median = 11 Q <sub>3</sub> = 16 P <sub>90</sub> = 20 P <sub>99</sub> = 27	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-Apr	N15	N18	N21	NNE23	N28	N27	N29	N26	N24	N26	N24	N25	N25	N25	NNE28	N24	N25	N21	NNE14	NNE11	N5	N4	NW4	N3	N19.6	N29	
2-Apr	NNW5	NNW7	WNW7	WNW6	NW5	NW5	NNE5	NE4	N8	N10	NNW12	NNW12	N12	NNW11	NNW10	NNW10	N12	NNE13	NNE13	NNE11	NE9	NNE8	N5	NE5	N7.5	NNE13	
3-Apr	NNE5	NNE6	NNW6	N6	NNW5	NW6	NNW6	NW4	NNW5	NW6	NNW8	NNW12	N10	N11	N11	NNE10	N13	NNE14	NNE14	NNE13	NNE12	NE10	NE7	N2	N7.6	NNE14	
4-Apr	NNE6	N5	N6	N5	NNW3	NW4	N5	NNE5	NW4	NNW6	NNW7	NW9	NW10	NNW11	NNW9	N7	NNW5	N10	NNE15	NNE14	NNE9	NNE8	N9	NW4	N6.7	NNE15	
5-Apr	NNW2	E2	NNE2	N2	WNW4	NNW5	N5	N7	N12	N11	NNW10	NNW9	NNW10	N10	N9	N10	NNE9	NNE11	NNE12	N8	NNW6	N6	NNE6	NW3	N6.5	N12	
6-Apr	NW3	WNW4	WNW5	WNW5	WNW5	WNW4	NW3	NE2	SE9	SE11	SE13	SE14	SSE10	SSE9	SE10	SE8	SSE9	SSE11	SE11	SSE10	SSE9	SSE10	SSE9	SSE10	SSE5.8	SE14	
7-Apr	SSE10	SSE12	SSE11	SSE11	SE13	SE11	SE12	SE13	SE13	SE18	SSE13	S13	S12	S11	S11	S10	S9	SSW10	SW10	S7	SSE8	SSE9	SSE9	SE6	SSE10.0	SE18	
8-Apr	SE10	SE12	SE13	SE13	SE13	SE14	SE15	SE14	SE11	S3	W6	NNW9	NNW12	N12	N13	NNW11	NNE8	NE6	ENE8	E2	NNE0	NNW1	ENE1	ESE3	E3.3	SE15	
9-Apr	SE12	SE13	SE12	SE10	SE11	SE11	ESE15	ESE14	ESE20	SE23	SE22	SSE14	SW15	WSW15	W20	W17	W15	WSW13	WSW10	SSW6	NNW4	NNW3	SW1	SE4	SSE6.5	SE23	
10-Apr	SE6	SE11	SE12	SE16	SE13	SE14	SE15	SE17	SE16	SE17	SE16	SE13	SE8	ESE5	N5	NW8	SSE3	SSE12	S8	SSE7	SSE8	SE7	SE10	SE8	SE9.4	SE17	
11-Apr	SE8	SE4	SE9	SE5	SE7	SE8	SE12	SE15	SE8	SE10	WSW16	WSW14	W12	WSW17	WSW16	W16	W15	W18	WSW24	W31	W30	WNW10	W9	WSW16	WSW8.8	WSW31	
12-Apr	WSW16	W18	W18	WSW18	W18	WSW18	WSW12	W12	WSW16	WSW19	WSW23	WSW23	W26	W25	W23	W24	W27	W27	W25	WNW19	WNW13	WSW10	WSW12	WSW14	W18.6	W27	
13-Apr	WNW13	WNW8	WSW16	W17	WNW21	WNW13	W13	W18	WNW19	WNW31	WNW27	WNW22	WNW22	WNW23	WNW21	WNW20	WNW20	WNW18	NW11	WNW4	E1	WNW0	WNW1	WNW1	WNW14.4	WNW31	
14-Apr	NW2	NNW2	E3	ESE20	ESE20	ESE18	ESE20	ESE23	ESE20	ESE18	ESE19	ESE20	SE14	SE15	SE12	SSE15	SSE17	SE22	SE18	SE19	SE21	SE19	SE16	SE13	SE15.5	ESE23	
15-Apr	SSE10	SSE9	SSE6	SSW2	SE1	SSE4	SE13	SE13	SW9	WSW14	W14	W18	W17	W17	W17	WSW17	WSW19	W16	W9	SSW1	SSW9	W24	WSW13	WSW12	WSW8.7	W24	
16-Apr	W13	WSW15	W19	W17	WSW18	WSW14	WNW9	WSW8	WSW10	SW8	WSW12	WSW18	WSW20	WSW17	W23	WSW26	WSW23	NW22	NW13	W20	WNW14	WNW10	WSW11	W2	W14.2	WSW26	
17-Apr	WNW1	S2	SSE6	SE9	SE10	SE13	SE16	SE16	SE15	SE15	SE16	SSE12	SSW13	SSW15	SW21	SSW14	SSE8	SSE9	SE12	ESE10	N3	NW2	WNW4	NW6	SSE7.5	SW21	
18-Apr	NNW6	NW6	NW11	NW15	NW18	NW15	NNW14	NW14	NW10	NNW11	NNW19	NNW20	NNW19	N14	NNW9	N18	N17	WNW14	N16	NNE7	WNW2	SE1	WNW2	ESE3	NNW10.5	NNW20	
19-Apr	ENE1	ESE3	E3	E3	ESE3	SE7	SE11	SE14	SE13	SE11	SE11	SE10	SW3	W10	WSW15	WSW13	WSW10	W7	S2	SE3	SE6	SE8	SE8	SE10	SSE4.3	WSW15	
20-Apr	SE7	SE1	N2	WNW6	WNW2	WNW2	N2	N4	NNW5	WSW7	WSW10	WSW11	WSW9	WSW12	SW8	SW6	NNW3	N11	NNE16	NNE11	NNW9	NNW9	NW6	NW6	NW3.5	NNE16	
21-Apr	NW5	NW3	N1	E1	ENE1	NNW1	NW4	NW8	NNW9	NNW10	N16	N17	N14	N15	N15	N15	N15	NNE15	E15	E13	E10	ESE18	ESE18	SE22	NNE6.0	SE22	
22-Apr	ESE23	ESE19	ESE13	ESE11	ESE12	ESE15	ESE18	ESE21	SE19	SE18	SE21	SE23	SE22	SE25	SE26	SE27	ESE27	ESE26	MS	MS	MS	MS	MS	MS	ESE20.1	SE27	
23-Apr	MS	MS	MS	MS	MS	E13	E13	E16	ESE15	ESE14	ESE14	ESE19	ESE21	E23	ESE20	ESE21	ESE18	ESE19	E17	ENE20	ENE20	ENE11	NNE8	NNE11	E15.0	E23	
24-Apr	NNE12	NNE14	NNE14	NNE14	NNE15	NNE14	NNE14	NNE15	N17	N18	N20	N20	N19	N20	N22	N24	N25	NNE24	N23	N21	N19	N16	N15	N14	N17.9	N25	
25-Apr	N13	N10	N10	N8	N8	N8	N10	NNW7	NNW6	NNW9	N6	NNW9	NNW10	NW7	N6	NW8	NW11	NNW9	NW14	NNW9	N7	W5	NW3	NNE3	NNW7.8	NW14	
26-Apr	NNE2	WNW2	NE1	W2	WNW2	E1	ESE7	SE7	SE10	ESE11	ESE10	ESE11	ESE11	ESE10	ESE9	NE2	SE7	E8	E7	ENE3	SE5	SE7	SE6	SE16	ESE5.8	SE16	
27-Apr	SE20	SE15	ESE11	SE9	SE7	SE8	SE10	SE7	NE4	SE15	SSE12	SSW13	SW12	SW17	SW20	SW19	WSW19	WSW20	WSW16	WSW13	SW7	SSW5	W3	WNW3	SSW7.1	WSW20	
28-Apr	E2	SE7	SE10	ESE5	ENE4	ESE6	ESE6	SE10	SE9	E3	SE11	SE15	SSE12	SSE14	SSE14	SSE14	SSE14	SSE14	SSE11	SSE10	SE13	SE12	SSE11	SSE11	WSW14	SSE8.7	SE15
29-Apr	W10	WSW11	WSW9	WSW15	WSW17	WSW20	WSW18	WSW19	WSW7	WSW13	WSW11	WSW11	WSW18	WSW18	W16	W13	WSW9	WSW12	SW10	SW9	SW9	SW10	SW16	WSW14	WSW12.8	WSW20	
30-Apr	W15	W16	W18	WSW18	WSW20	WSW18	WSW15	WSW19	WSW16	W21	WSW25	WSW26	WSW21	WSW20	WNW11	W16	NW13	NNW12	WNW6	WSW3	ESE3	NE1	ESE3	SE3	W12.6	WSW26	

SE0.3	SSW0.6	SW0.8	WSW1.0	W0.9	SSE0.7	ESE2.6	ESE2.9	ESE2.1	SE1.1	SW1.0	WSW1.9	W4.0	W3.9	W4.1	WNW4.3	WNW3.3	NW2.9	NNW2.3	N1.4	NE0.8	SE0.4	S1.3	S1.4	Diurnal Average
ESE23	ESE19	N21	NNE23	N28	N27	N29	N26	N24	WNW31	WNW27	WSW26	W26	SE25	NNE28	SE27	W27	W27	W25	WSW31	W30	W24	ESE18	SE22	Diurnal Maximum

MS - Missing  
 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 - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 12 km/h on Apr 13 05:00	Hours in Service: 720 Hours of Data: 709 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 0 km/h on Apr 5 04:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 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-Apr	3	3	5	5	6	6	6	5	5	5	5	5	5	5	5	5	5	5	3	3	2	1	1	1	6
2-Apr	2	1	1	1	1	1	1	2	2	3	3	3	3	4	4	4	3	3	2	2	2	2	2	1	4
3-Apr	1	1	1	1	1	1	1	1	1	2	2	3	4	4	4	4	4	2	2	2	3	2	4	2	4
4-Apr	1	1	1	1	1	1	2	1	1	2	3	3	4	3	3	4	2	2	4	3	2	2	2	1	4
5-Apr	2	1	1	0	1	2	2	2	3	2	2	3	3	3	4	3	3	4	2	3	2	1	1	1	4
6-Apr	1	1	1	1	1	1	1	2	2	2	2	4	4	3	3	3	3	3	3	2	2	3	2	2	4
7-Apr	2	2	2	2	2	2	3	3	4	2	4	5	5	4	4	4	3	4	4	2	2	2	2	2	5
8-Apr	3	3	2	2	2	2	2	3	3	2	2	3	3	3	3	3	3	3	2	1	1	1	1	3	3
9-Apr	2	2	2	2	2	3	2	4	4	3	3	4	4	4	4	4	3	3	3	2	2	1	1	2	4
10-Apr	2	2	3	2	3	2	2	1	1	2	1	2	2	3	2	2	4	4	2	2	2	2	2	3	4
11-Apr	4	1	4	2	2	2	3	2	3	3	4	4	4	4	4	3	3	4	7	6	8	4	3	3	8
12-Apr	3	3	3	4	3	4	4	4	4	5	5	6	6	5	7	5	7	6	6	5	3	4	2	3	7
13-Apr	3	3	4	4	12	4	3	3	4	7	7	5	6	5	6	6	4	4	3	2	1	2	1	1	12
14-Apr	1	1	5	2	2	4	3	2	3	4	3	2	4	3	5	6	8	5	4	4	3	4	5	4	8
15-Apr	4	3	2	2	2	3	2	2	3	4	4	4	4	4	4	4	5	4	3	1	7	7	4	4	7
16-Apr	3	4	4	3	4	3	3	2	3	2	4	4	5	5	5	6	5	8	6	7	4	4	4	2	8
17-Apr	2	2	2	1	3	3	2	2	2	2	2	4	5	6	5	5	3	3	4	2	2	1	1	2	6
18-Apr	2	1	3	3	4	3	4	4	2	4	5	6	5	12	10	5	6	4	7	6	2	2	1	1	12
19-Apr	1	2	1	2	1	2	2	2	2	1	2	3	4	3	4	3	3	3	1	1	1	2	2	2	4
20-Apr	3	1	1	1	2	1	1	4	2	2	2	3	3	3	3	3	3	3	3	3	2	2	1	1	4
21-Apr	2	1	1	1	1	1	2	2	2	2	4	4	4	5	4	4	4	4	3	3	2	5	4	4	5
22-Apr	3	3	3	2	2	2	3	3	4	3	4	4	5	5	5	5	5	5	MS	MS	MS	MS	MS	MS	5
23-Apr	MS	MS	MS	MS	MS	3	3	3	4	3	4	4	5	5	5	4	5	3	4	4	4	6	3	2	6
24-Apr	1	2	1	1	2	2	3	3	4	5	5	6	5	5	5	6	5	4	4	3	3	3	3	3	6
25-Apr	2	3	2	2	2	2	2	2	2	2	4	4	4	3	4	4	4	3	3	2	2	1	1	2	4
26-Apr	2	2	1	1	1	2	2	1	2	2	3	4	3	4	3	2	2	2	3	2	3	4	3	6	6
27-Apr	5	4	3	4	4	2	2	3	2	3	5	5	4	8	7	7	6	6	5	3	2	2	3	2	8
28-Apr	2	3	2	2	2	3	3	2	2	2	2	3	4	5	5	5	5	4	4	3	3	3	3	5	5
29-Apr	2	4	4	2	3	4	3	4	2	3	3	4	4	4	3	4	3	3	3	4	2	4	4	4	4
30-Apr	3	3	4	4	4	3	4	4	3	4	6	6	6	4	7	5	8	3	4	2	2	2	1	2	8

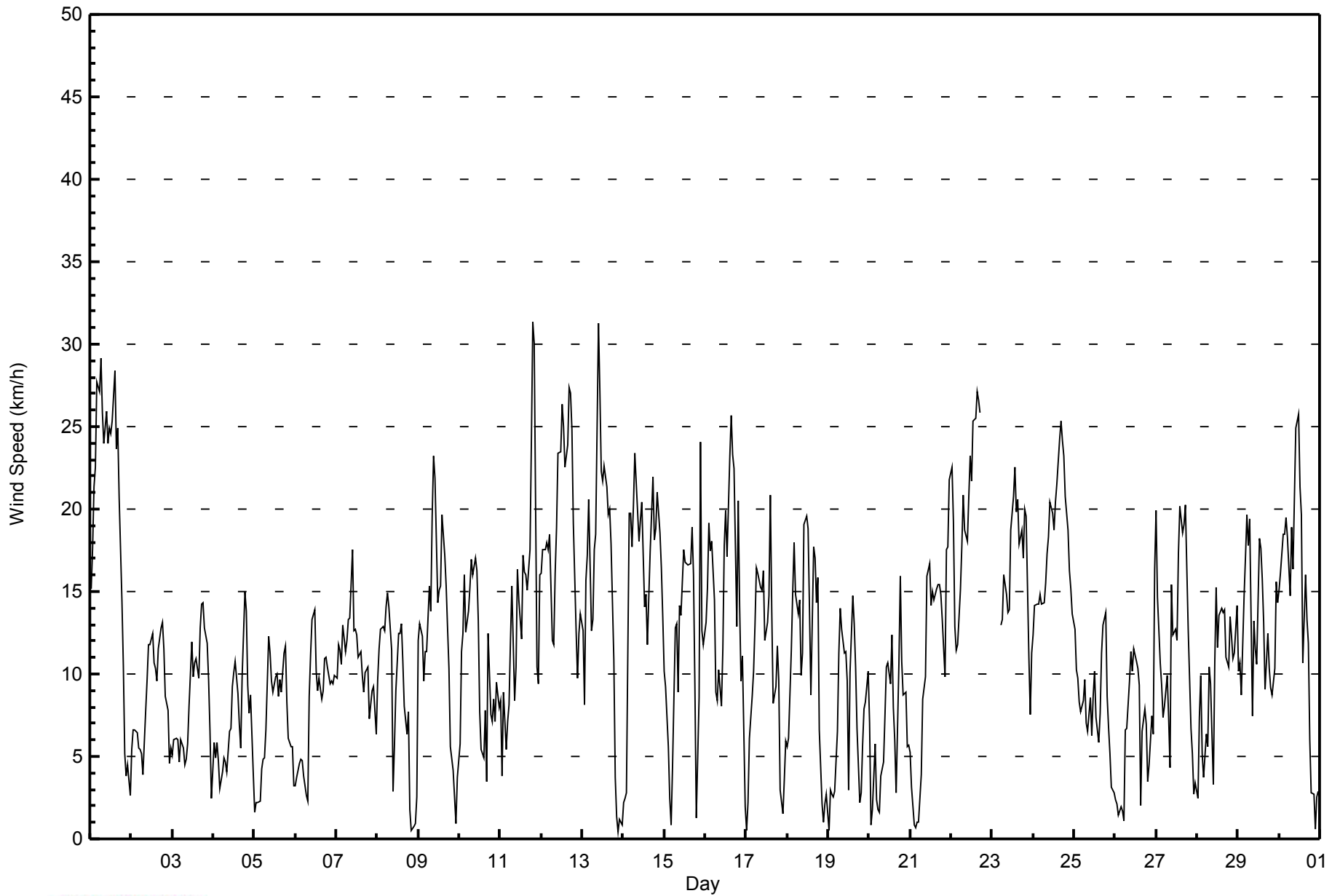
5	4	5	5	12	6	6	5	5	7	7	6	6	12	10	7	8	8	8	7	7	8	7	5	6	
Diurnal Maximum																									

MS - Missing



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Lower Camp - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Lower Camp - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	126	17.77	17.77
6 - 11	238	33.57	51.34
12 - 19	251	35.40	86.74
20 - 28	90	12.69	99.44
29 - 38	4	0.56	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 709

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Lower Camp - April 2015**

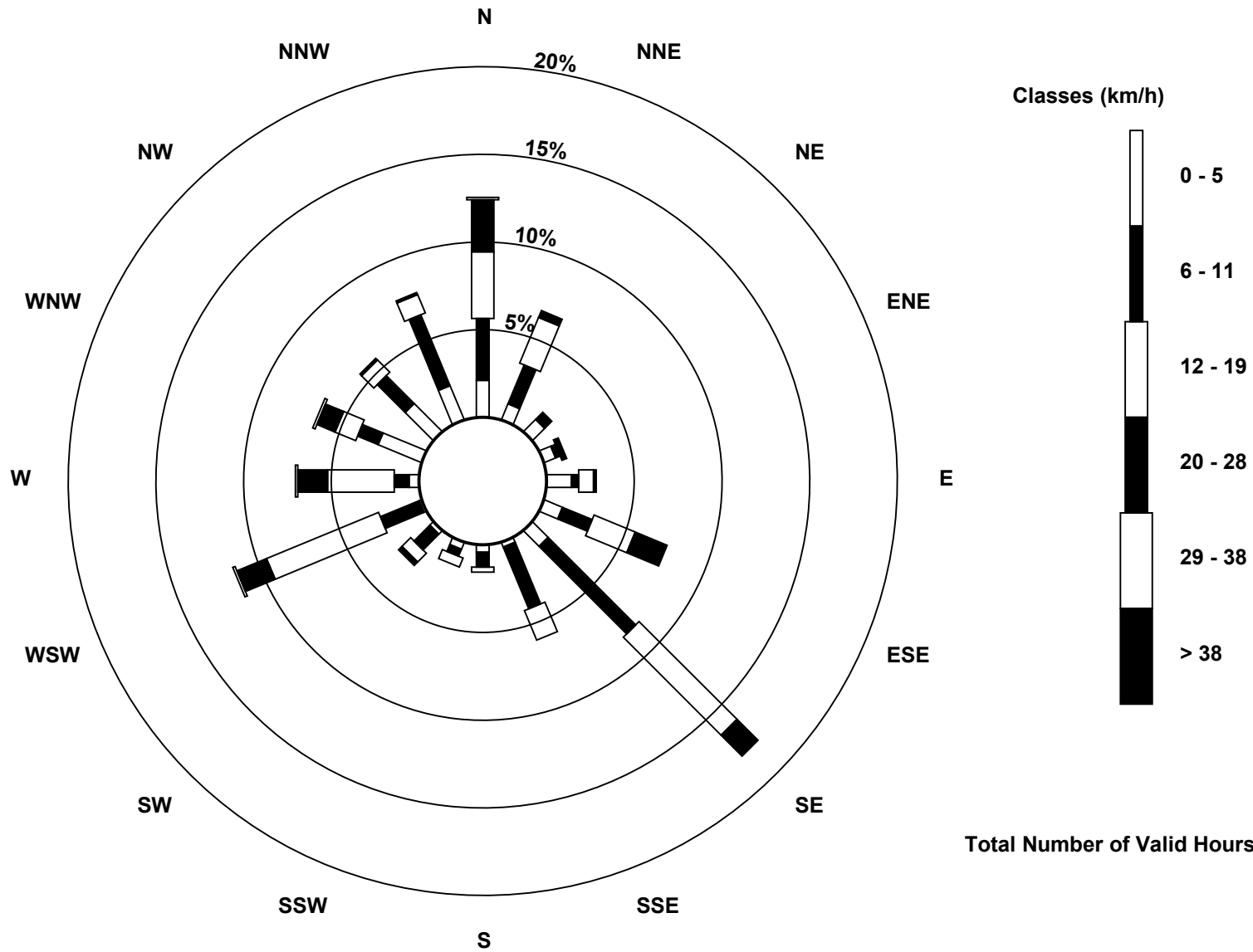
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	7	7	5	10	8	9	2	3	3	2	1	4	19	16	15	126
6 - 11	25	17	4	2	3	13	50	27	6	3	9	17	6	9	16	31	238
12 - 19	27	20	0	0	6	18	56	13	2	4	5	49	27	9	7	8	251
20 - 28	21	3	0	2	1	14	12	0	0	0	2	13	12	8	1	1	90
29 - 38	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	4
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	89	47	11	9	20	53	127	42	11	10	18	81	50	46	40	55	709

Total Number of Valid Hours: 709

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
Lower Camp (AMS 11)**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Lower Camp - April 2015**

Direction of Maximum Speed: 259 deg on Apr 11 20:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 123.4 deg on Apr 22	Hours of Data: 709
Direction of Minimum Speed: 296 deg on Apr 13 22:00	Direction of Minimum Daily Speed Average: 3.3 deg on Apr 8
Direction of Minimum Speed: 296 deg on Apr 13 22:00	Hours of Missing Data: 11
Monthly Average Direction: 283.2 deg	Percent Operational Time: 98.5

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-Apr	360	5	7	12	7	4	2	7	4	2	1	6	5	9	16	8	1	10	16	14	7	359	311	352	6.0
2-Apr	331	330	294	294	319	316	20	36	7	349	338	344	349	338	329	328	6	28	24	21	36	20	5	43	354.3
3-Apr	28	17	344	357	339	322	338	320	341	305	340	337	1	0	2	13	6	15	23	16	33	47	46	11	4.3
4-Apr	15	354	1	349	335	317	355	18	313	330	328	321	317	343	342	7	345	11	21	15	13	23	6	321	353.8
5-Apr	348	90	27	351	292	348	358	358	353	353	343	327	343	349	1	11	31	17	23	0	341	353	29	310	357.8
6-Apr	309	295	284	282	284	294	314	52	130	130	125	131	153	151	142	144	154	156	142	147	150	159	158	156	149.8
7-Apr	154	151	150	151	143	143	136	139	133	128	149	178	182	181	182	189	188	200	218	191	160	159	155	130	159.9
8-Apr	130	141	137	141	139	137	139	129	129	176	279	335	345	351	354	346	16	45	65	81	24	337	61	115	98.1
9-Apr	138	143	142	139	129	127	120	122	122	129	134	149	223	244	265	263	260	255	243	201	344	346	225	132	168.4
10-Apr	140	144	140	139	139	137	135	135	135	131	129	130	126	103	2	313	162	164	175	163	153	144	143	143	139.2
11-Apr	137	139	137	137	137	136	134	136	145	139	251	255	261	257	257	265	262	260	256	259	260	295	268	244	238.8
12-Apr	254	261	259	258	260	254	254	262	251	249	246	245	259	261	261	266	265	269	271	282	302	255	254	247	260.2
13-Apr	294	291	248	267	293	290	271	263	286	294	296	298	301	295	301	300	288	293	308	296	101	296	302	303	289.5
14-Apr	313	333	93	117	118	120	116	119	121	114	115	123	131	130	131	154	148	135	135	127	124	130	138	144	126.7
15-Apr	161	166	164	208	140	155	132	138	216	251	263	269	263	263	260	258	250	261	260	194	197	270	249	250	240.7
16-Apr	260	249	261	260	256	255	284	256	246	236	249	242	256	257	261	258	247	324	312	276	286	283	246	279	263.4
17-Apr	286	169	148	139	138	138	134	127	130	131	128	152	208	208	221	196	168	148	132	111	354	324	299	306	155.4
18-Apr	329	312	313	316	319	320	332	320	304	335	333	331	329	7	342	11	0	302	9	22	299	125	295	104	334.5
19-Apr	75	109	101	97	104	129	128	130	133	136	130	125	222	260	248	257	249	274	170	145	134	136	146	136	158.4
20-Apr	139	127	355	296	302	295	3	354	345	254	253	258	246	256	219	221	339	354	22	16	343	334	313	322	304.9
21-Apr	321	310	351	85	60	327	316	313	331	343	357	351	0	4	3	6	7	16	84	88	96	120	123	124	29.6
22-Apr	117	115	112	108	112	106	119	119	132	134	133	130	126	129	129	130	123	122	MS	MS	MS	MS	MS	MS	123.4
23-Apr	MS	MS	MS	MS	MS	99	95	97	110	104	117	104	108	99	108	110	104	120	97	65	72	65	16	18	95.2
24-Apr	21	16	12	13	22	17	16	13	1	0	7	2	5	3	6	6	10	12	9	7	0	358	357	355	7.5
25-Apr	353	353	357	353	352	351	2	332	345	341	0	331	335	326	10	314	323	324	312	339	5	281	317	23	339.9
26-Apr	24	297	45	279	293	99	114	128	125	120	117	118	120	120	122	52	127	99	81	78	138	124	146	126	117.2
27-Apr	125	125	117	129	137	145	137	129	51	126	163	197	228	217	231	231	249	250	239	248	222	197	281	299	193.8
28-Apr	89	136	137	118	71	108	104	129	133	101	134	137	148	159	152	162	168	168	166	145	146	155	157	247	148.2
29-Apr	266	252	257	246	250	256	251	255	256	238	255	252	256	258	260	264	247	248	235	216	236	220	216	253	248.7
30-Apr	263	267	259	257	257	254	251	258	252	262	257	250	250	252	285	262	304	347	297	241	107	53	102	140	261.0
131.0 192.4 224.2 236.6 271.6 154.6 107.9 120.4 120.5 138.1 235.0 257.4 276.2 277.0 280.1 282.9 290.9 318.2 347.3 0.0 38.1 135.3 189.9 189.8																									
Diurnal Average																									

MS - Missing  
 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 - April 2015**

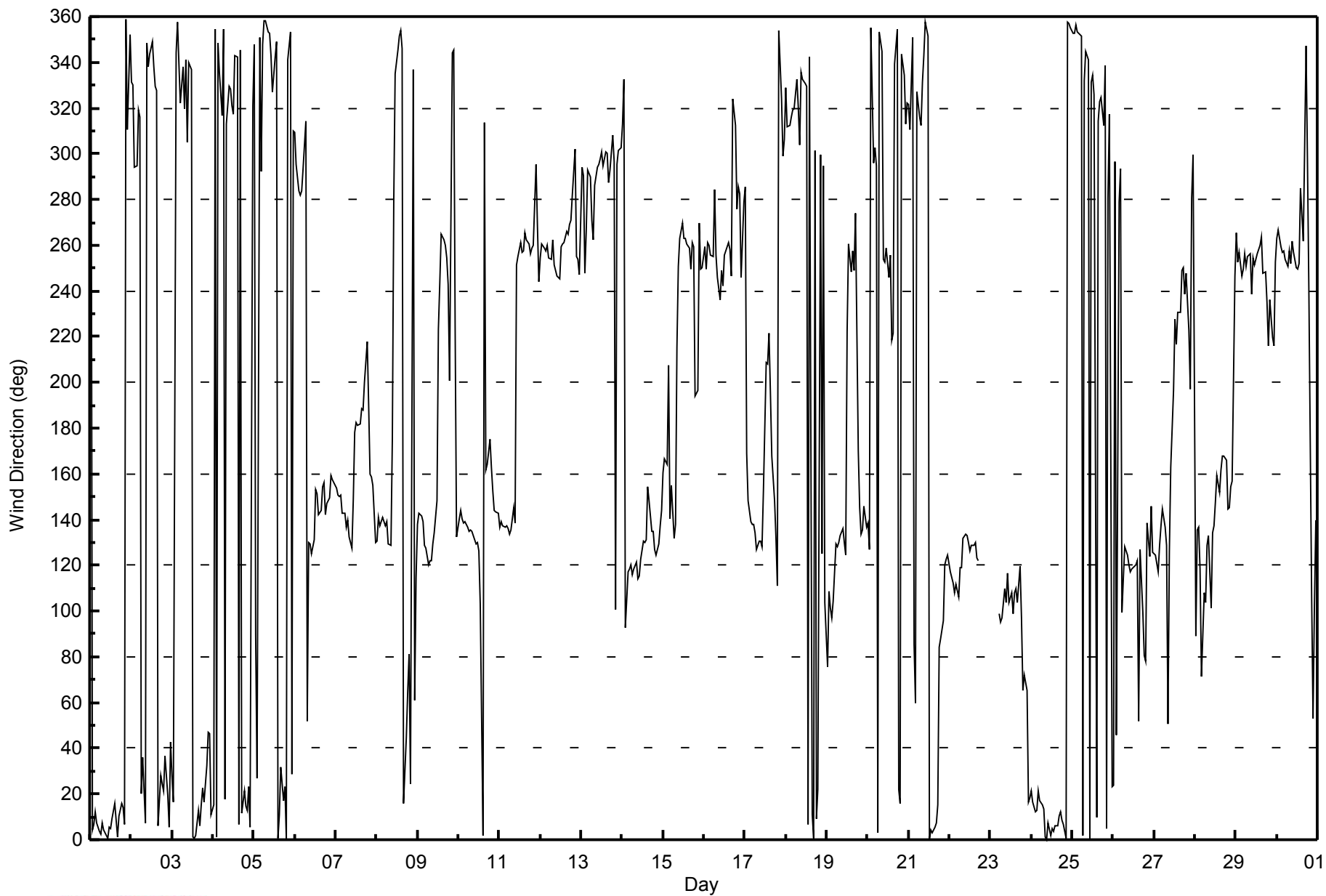
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Apr 13 22:00 Minimum Value: 3 deg on Apr 10 09:00 Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 18 Q <sub>3</sub> = 28 P <sub>90</sub> = 47 P <sub>99</sub> = 93																	Hours in Service: 720 Hours of Data: 709 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.5								
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-Apr	16	14	13	14	13	15	17	17	18	15	17	16	17	17	14	20	17	16	16	16	29	31	29	29	31
2-Apr	13	21	12	15	21	24	27	19	23	21	19	21	22	29	29	25	24	21	14	12	18	26	39	16	39
3-Apr	20	17	17	15	26	15	23	27	28	25	31	25	31	27	26	32	24	13	13	13	15	17	70	64	70
4-Apr	18	22	22	21	31	19	22	14	34	30	38	28	29	27	31	26	52	36	15	15	18	22	14	26	52
5-Apr	46	20	33	23	16	35	23	22	17	18	26	28	29	30	41	25	41	21	15	19	23	22	19	34	46
6-Apr	32	21	14	13	8	12	20	62	12	11	11	16	37	36	24	22	28	23	18	16	13	16	17	16	62
7-Apr	15	14	14	16	11	14	16	18	18	7	29	33	33	35	38	33	29	33	24	23	15	16	18	33	38
8-Apr	21	12	10	10	9	9	10	9	9	66	41	30	20	17	15	21	32	37	20	70	84	56	53	39	84
9-Apr	9	12	12	13	9	12	10	13	10	7	7	38	18	22	12	12	12	12	16	47	35	43	81	23	81
10-Apr	14	10	11	7	10	8	7	4	3	5	6	4	17	45	51	31	98	23	18	16	15	20	11	16	98
11-Apr	29	36	55	17	20	27	8	4	36	38	13	12	16	13	13	12	12	12	12	11	12	22	19	10	55
12-Apr	12	10	11	12	12	13	21	19	14	14	15	16	13	12	14	16	14	12	12	15	10	18	15	16	21
13-Apr	12	37	14	13	16	19	14	11	18	12	13	14	20	14	18	18	13	12	14	60	52	107	80	84	107
14-Apr	41	49	67	5	8	9	7	6	9	9	7	6	15	13	31	30	27	13	14	12	8	12	16	19	67
15-Apr	25	23	31	68	86	43	8	7	47	17	18	16	18	13	15	14	14	12	15	72	32	12	18	15	86
16-Apr	14	14	12	11	12	14	19	22	18	39	29	17	15	13	12	13	13	31	27	16	15	25	13	89	89
17-Apr	102	77	19	12	14	11	8	8	6	6	6	39	27	29	18	26	28	23	19	22	65	82	19	25	102
18-Apr	15	21	11	11	11	12	19	10	11	24	22	20	18	44	67	22	19	18	26	58	59	91	70	30	91
19-Apr	95	32	60	27	30	20	12	8	7	5	9	17	92	18	18	18	19	23	43	36	14	16	15	10	95
20-Apr	22	99	68	15	58	59	49	24	53	21	13	21	42	19	46	54	85	20	12	13	21	17	22	19	99
21-Apr	17	39	65	64	37	49	46	17	24	21	19	17	24	26	21	22	20	26	17	13	14	12	12	10	65
22-Apr	9	9	9	10	14	8	11	10	11	10	10	11	15	11	11	10	11	11	MS	MS	MS	MS	MS	MS	15
23-Apr	MS	MS	MS	MS	MS	16	13	17	19	23	17	17	16	17	23	17	24	15	27	13	12	43	44	15	44
24-Apr	12	10	8	8	10	11	14	18	17	17	18	19	24	21	20	20	18	17	15	14	15	16	16	16	24
25-Apr	17	18	18	20	22	21	17	24	29	26	61	45	38	54	70	58	35	22	18	16	29	17	38	58	70
26-Apr	63	70	45	51	59	88	22	14	12	12	21	18	22	24	26	94	30	25	34	64	36	29	25	15	94
27-Apr	13	15	15	28	25	18	16	46	40	15	33	34	28	25	18	19	14	14	14	11	15	38	83	66	83
28-Apr	71	37	10	31	39	30	44	13	9	55	11	13	27	29	26	26	26	25	22	18	16	18	16	30	71
29-Apr	14	18	41	9	9	10	10	12	33	17	12	17	13	12	13	15	16	12	23	22	16	22	17	19	41
30-Apr	12	11	11	11	11	12	15	12	13	11	13	13	19	15	50	17	49	20	58	75	40	93	64	63	93
Diurnal Maximum																									
MS - Missing																									





**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Lower Camp - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 10, 2015	Last Calibration	March 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	12:30
Gas Cert Reference	LL110099	Station temp.	21 Deg C
Cal Gas Concentration	51.3 ppm	Cal Gas Exp Date	3/25/2016
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-675	-675
Analyzer IP address	192.168.1.43		Lamp voltage	807	804
Calculated slope	0.998215	0.998492	Chamber temp	45.0	45.0
Calculated intercept	1.040033	1.459060	Pressure	713.8	703.3
Analyzer Background	10.9	11.1	Flow	0.497	0.484
Analyzer Coefficient	1.006	1.013	Intensity	91	92

Analyzer make TEI 43i Analyzer serial # 100841398

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	----
as found span	5000	80.9	830.0	842.4	0.985
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	80.9	830.0	830.9	0.999
second point	5000	40.9	419.6	416.9	1.007
third point	5000	20.4	209.3	207.7	1.008
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	80.9	830.0	829.1	1.001
Average Correction Factor					1.004

Corrected As found 842.6 Previous response 830.5 % change -1.4%

**Notes:**

Changed the exhaust pump and inlet filter after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



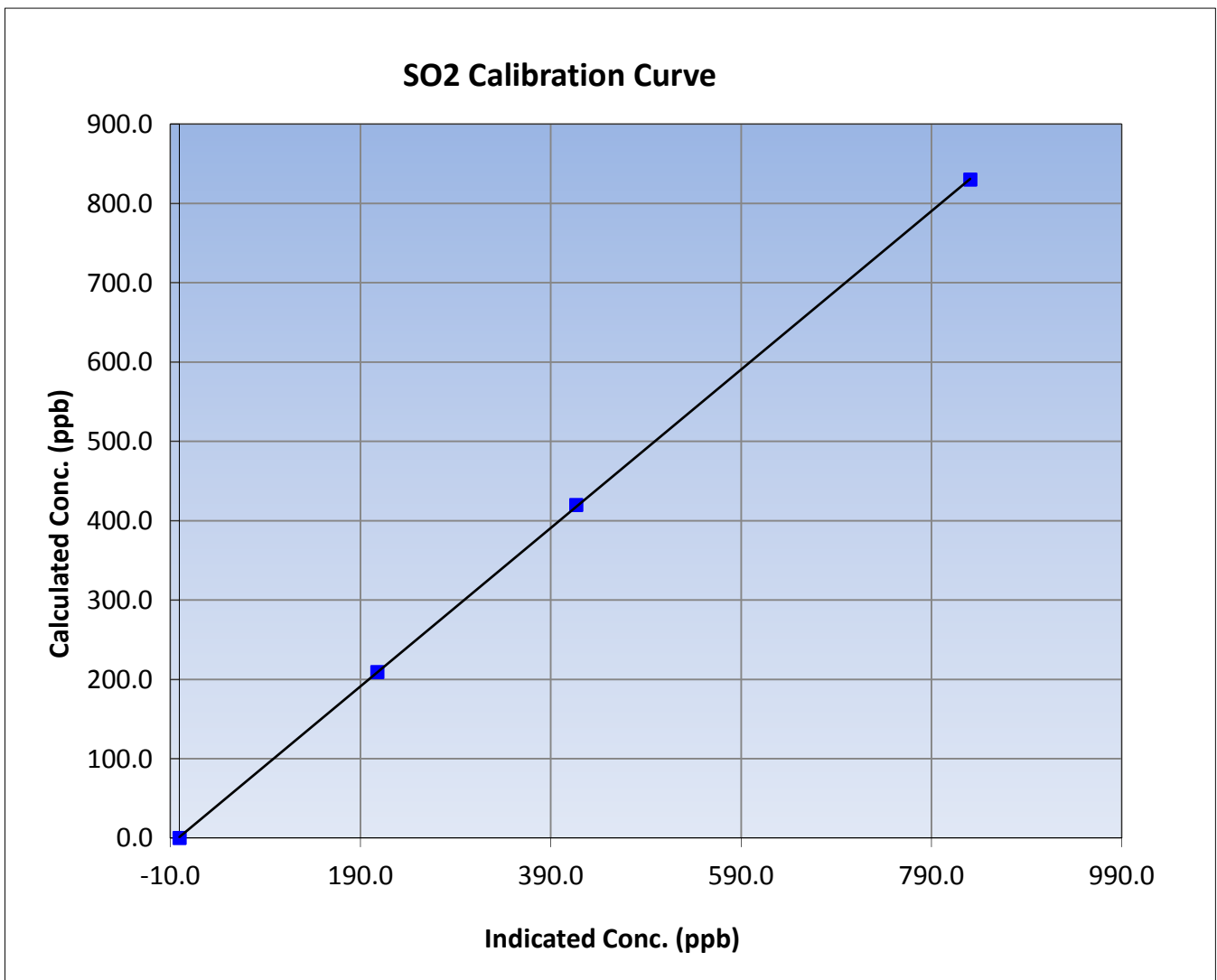
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:35	End Time (MST)	12:30
Analyzer make	TEI 43i	Analyzer serial #	100841398

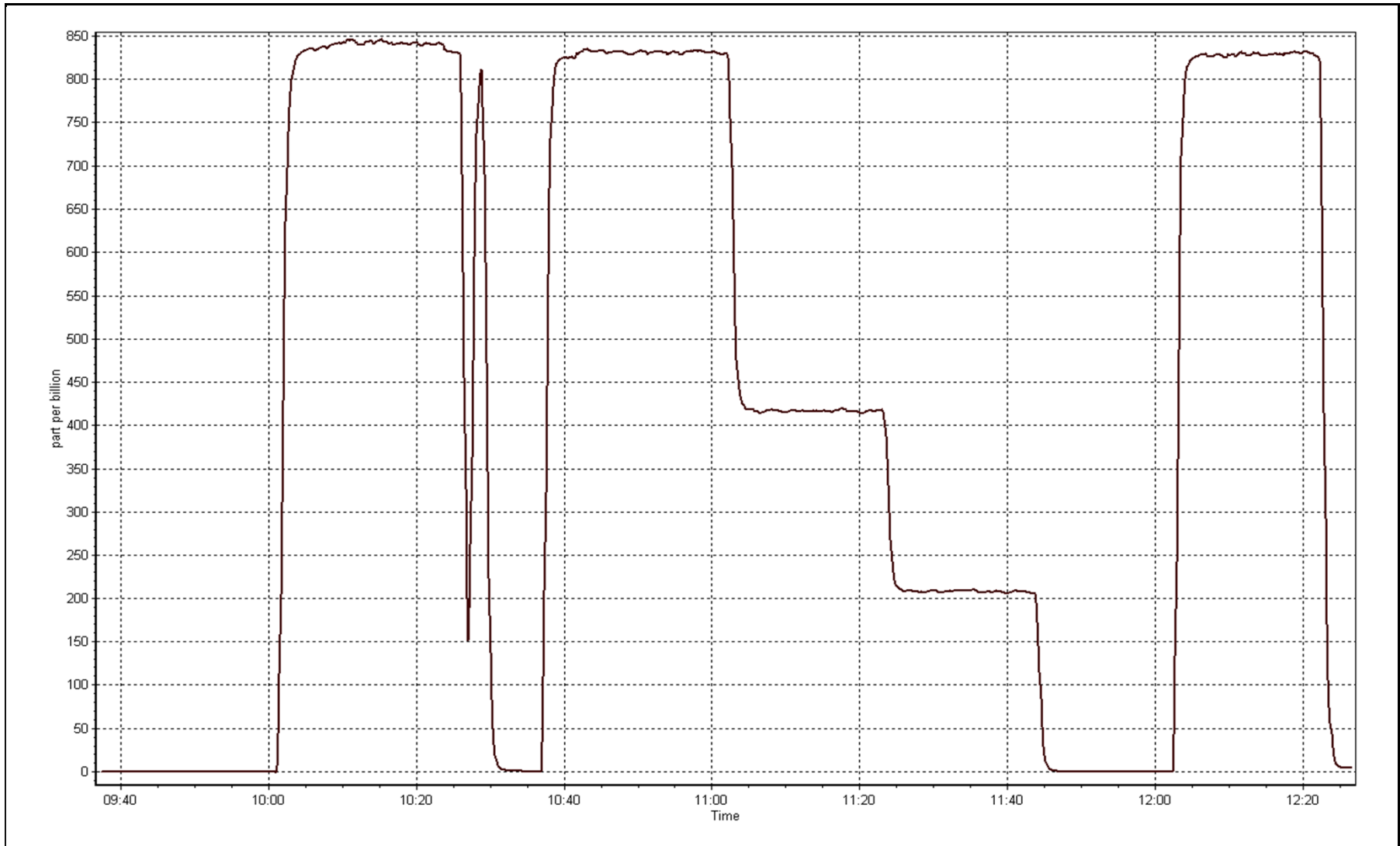
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999982
830.0	830.9	0.9989		
419.6	416.9	1.0066	Slope	0.998492
209.3	207.7	1.0078		
			Intercept	1.459060



SO2 Calibration Plot

Date: April 10, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	April 14, 2015	Last Calibration	March 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:05
Gas Cert Reference	ALM061435	Station temp.	20 Deg C
Cal Gas Concentration	5.15 ppm	Cal Gas Exp Date	9/9/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG air Make/Model	API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492
SO2 gas concentration	51.4 ppm	SO2 gas cert/exp	LL110099 3/25/2016

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-684	-633
Analyzer IP address	192.168.1.45		Lamp voltage	898	904
Calculated slope	0.996168	1.005363	Chamber temp	45	45
Calculated intercept	-0.218323	-0.559828	Pressure	569.8	567.0
Analyzer Background	44.2	21.6	Flow	1.147	1.152
Analyzer Coefficient	0.916	1.297	Intensity	111	61
			Converter temp.	342	340
Analyzer make/model	Thermo 450i		Analyzer serial #	922436966	
Converter make/model	NA		Converter serial #	NA	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.6	----
as found span	5000	72.9	75.1	73.1	1.028
SO2 scrubber check	5000	20.5	210.7	2.0	----
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	72.9	75.1	75.1	1.000
second point	5000	38.8	40.0	40.5	0.986
third point	5000	19.4	20.0	20.6	0.970
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	72.9	75.1	76.0	0.988
Average Correction Factor					0.985

Corrected As found	74.6	Previous response	75.6	% change	1.3%
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**Notes:**

Flash lamp replaced. Adjusted lamp voltage, initial reference voltage, and PMT. Zero and span adjusted. Scrubber check done after the zero/span adjustments. Inlet filter changed after as founds.

Calibration Performed By: Asad Hidayat



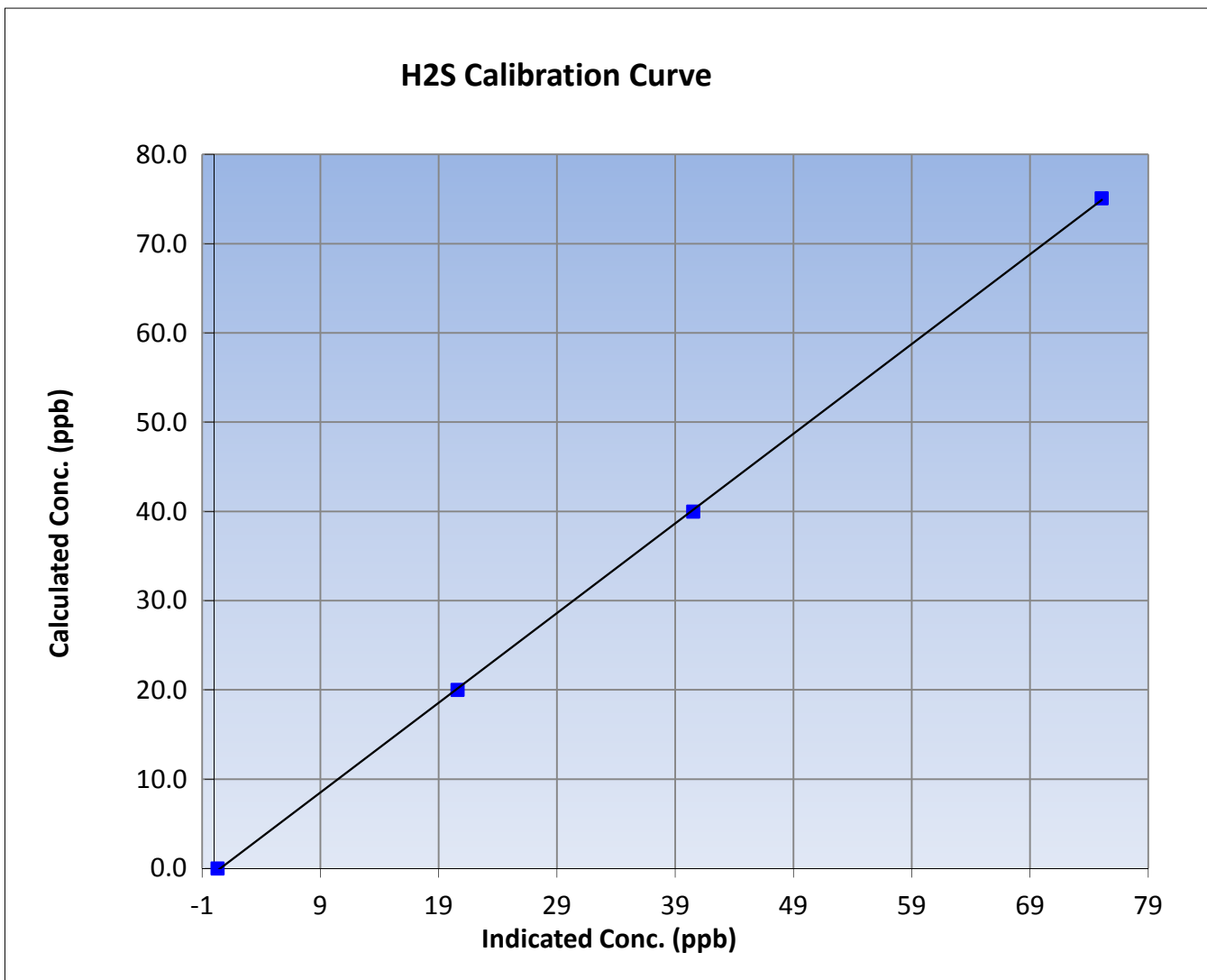
# Wood Buffalo Environmental Association H2S Calibration Report

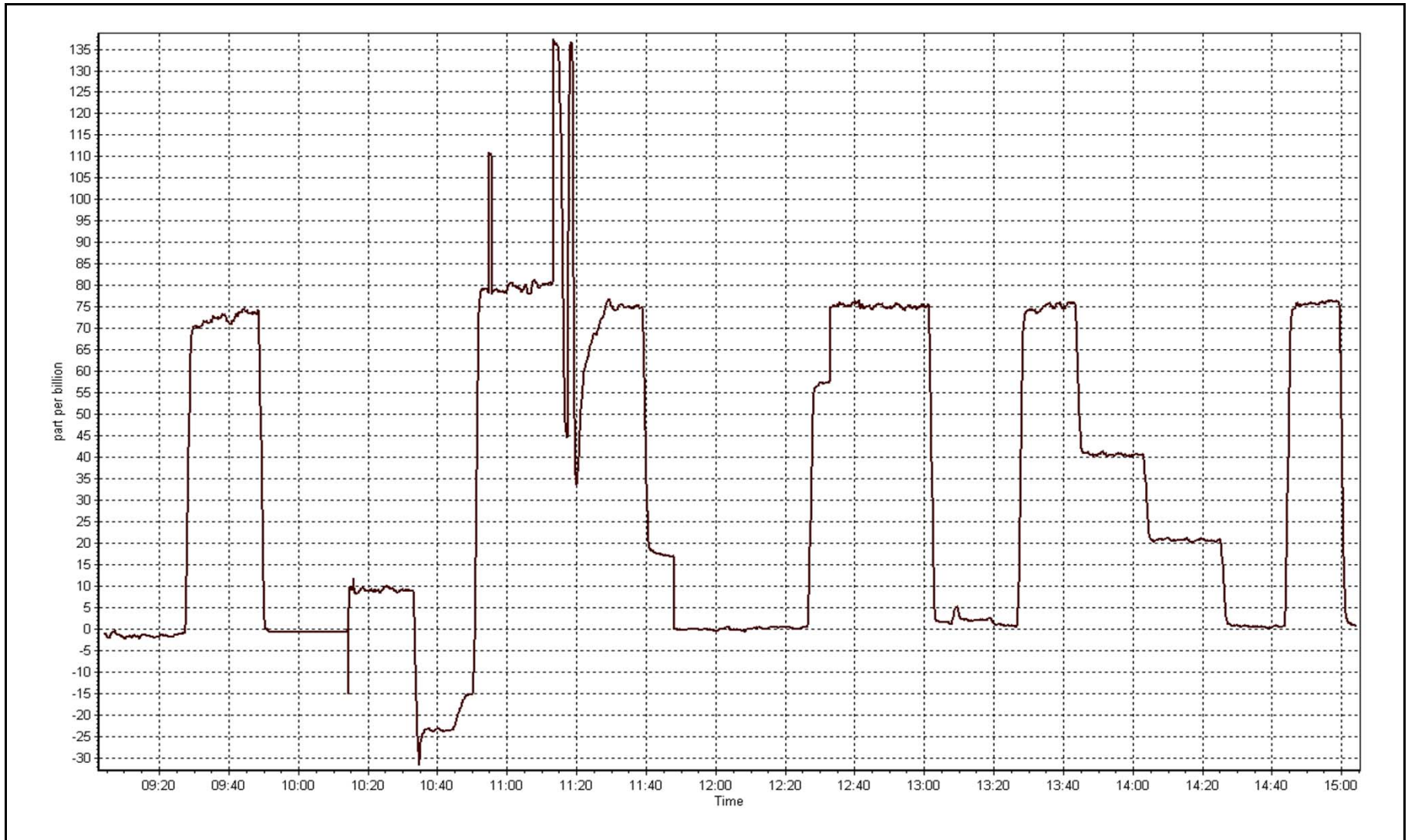
## Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 11, 2015
Station Name	AMS 11	Station Number	AMS 11
Start Time (MST)	9:05	End Time (MST)	13:05
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	0.3	----	Correlation Coefficient	0.999944
75.1	75.1	1.0002		
40.0	40.5	0.9858	Slope	1.005363
20.0	20.6	0.9695		
			Intercept	-0.559828









# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Friday, April 10, 2015	Last Calibration	Wednesday, March 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	12:25
Gas Cert Reference	LL110099	Cal Gas Expiry Date	3/25/2016
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1070.5 ppm
C3H8 Cal Gas Conc.	202 ppm	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
ZAG make/model	Teledyne API 701	Serial Number	3411
DACS make/model	Campbell Scientific CR3000	Serial Number	3492

### Analyzer Information

	<i>Before</i>	<i>After</i>		<i>Before</i>	<i>After</i>
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	37.3	37.3
Calculated slope	1.006581	0.999530	Fuel Pressure	24.0	24.0
Calculated intercept	-0.062254	0.042314	Analyzer Coeff	4.1	4.1
			Analyzer BKG	5.990	5.990

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	-0.05	----
as found span	5000	80.9	17.32	17.30	1.001
calibrator zero	5000	0.0	0.00	-0.05	----
high point	5000	80.9	17.32	17.30	1.001
second point	5000	40.9	8.76	8.67	1.010
third point	5000	20.4	4.37	4.37	0.999
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	80.9	17.32	17.32	1.000
Average Correction Factor					1.004

Corrected As found	17.35	Previous response	17.27	% change	-0.5%
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Notes:

Sample inlet filter changed after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



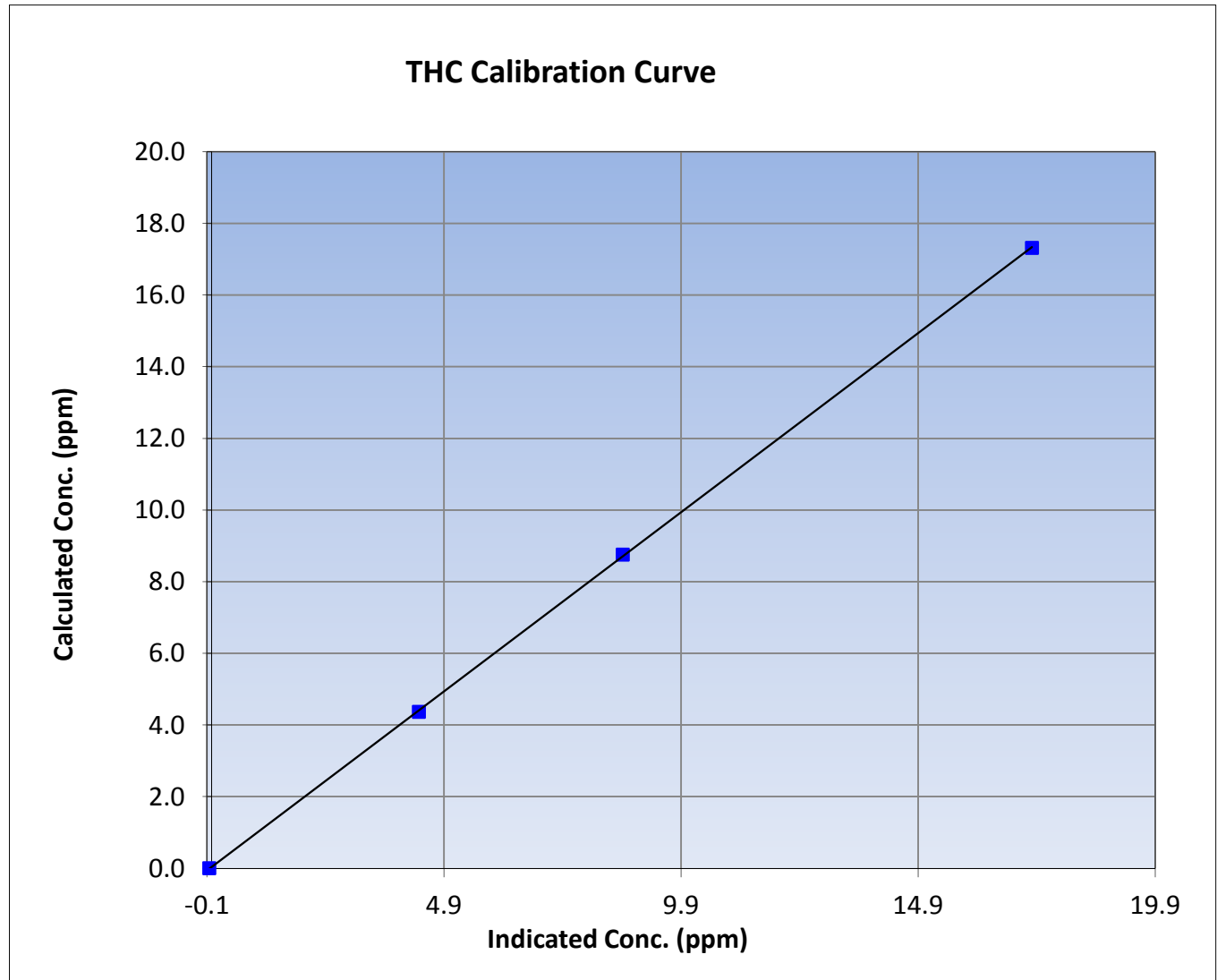
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	9:35	End Time (MST)	12:25
Analyzer make	51i-LT	Analyzer serial #	1410661326

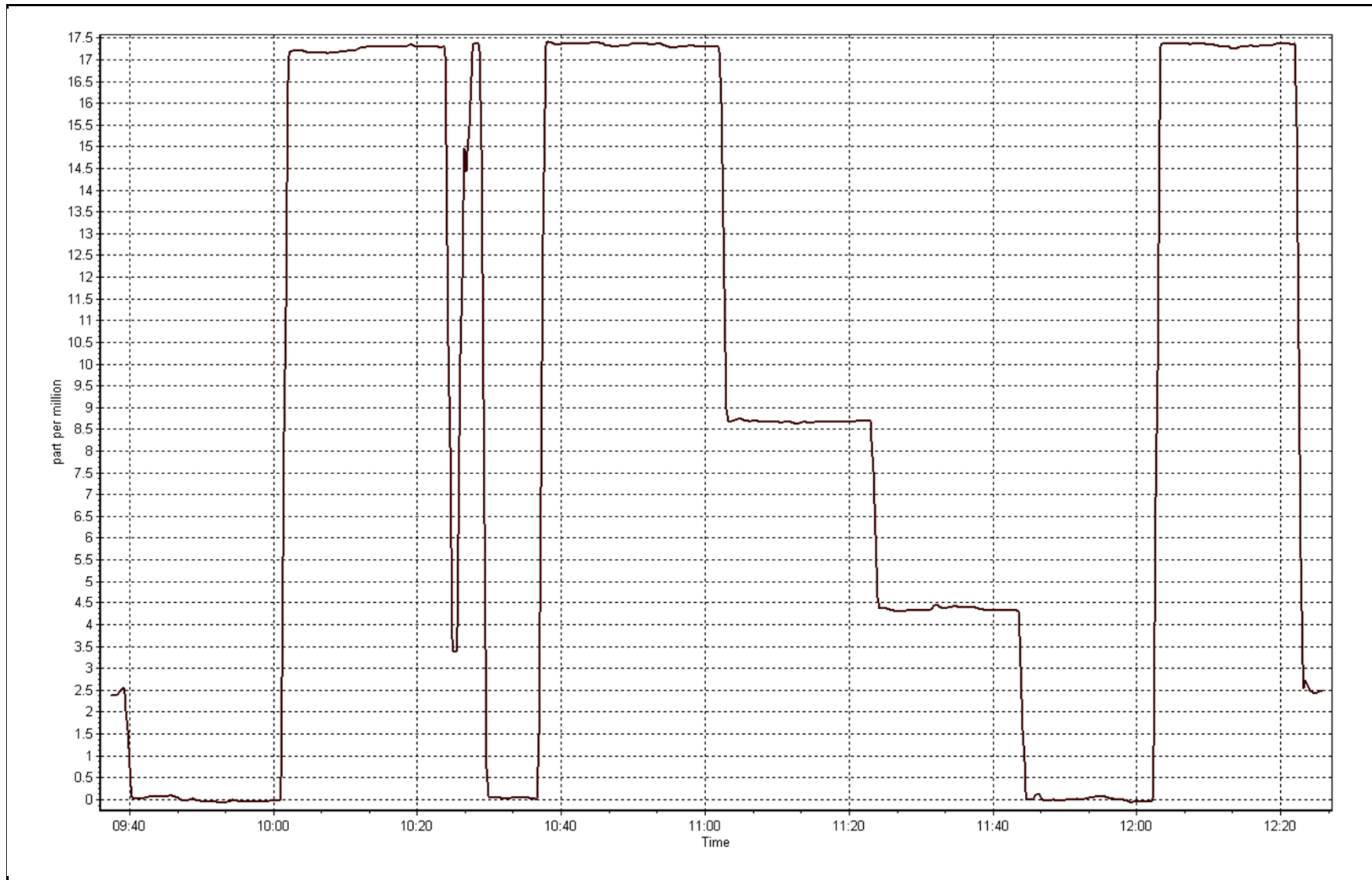
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.05	----	Correlation Coefficient	0.999973
17.32	17.30	1.0012		
8.76	8.67	1.0100		
4.37	4.37	0.9995		
			Slope	0.999530
			Intercept	0.042314



THC Calibration Plot

Date: April 10, 2015



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 12  
MILLENNIUM MINE  
APRIL 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

May 29, 2015

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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)

APRIL 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	659	35	61	96.39	9	0	2	0
TRS(ppb) Average	671	35	49	98.06	1	0	0	0
THC(ppm) Average	655	36	65	95.97	4.3	-	2.4	-
NO2(ppb) Average	660	35	60	96.53	44	0	17	-
NO(ppb) Average	660	35	60	96.53	96	-	12	-
NOX(ppb) Average	660	35	60	96.53	131	-	26	-
PM2.5(ug/m3) Average	703	0	17	97.64	86.7	-	16.3	0
Temperature 2 m (C) Average	707	0	13	98.19	24.5	-	16.3	-
Relative Humidity (%) Average	707	0	13	98.19	99	-	77	-
Wind Speed 10 m (km/h) Average	704	0	16	97.78	34	-	23	-
Wind Direction 10 m (deg) Average	704	0	16	97.78	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)  
 APRIL 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	659	0.5	1	-	0	0	0	0	0	1	9
TRS(ppb) Average	671	0.2	0	-	0	0	0	0	0	0	1
THC(ppm) Average	655	2.22	0.3	-	1.9	2	2.1	2.1	2.3	2.5	4.3
NO2(ppb) Average	660	8.2	9	-	0	1	2	5	12	23	44
NO(ppb) Average	660	3.5	10	-	0	0	0	1	2	7	96
NOX(ppb) Average	660	11.8	17	-	0	1	2	5	14	29	131
PM2.5(ug/m3) Average	703	6.88	6	-	1.5	2.8	3.8	5.3	7.7	12.9	86.7
Temperature 2 m (C) Average	707	5.26	7.5	-	-13.1	-5.3	0.4	5.5	10.7	14.6	24.5
Relative Humidity (%) Average	707	46.7	20	-	14	24	32	43	58	76	99
Wind Speed 10 m (km/h) Average	704	9.8	5	-	0	4	6	9	13	16	34
Wind Direction 10 m (deg) Average	704	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	02 Apr 2015 11:00	03 Apr 2015 12:00	26	DAS collection error - data not recorded
TRS	02 Apr 2015 11:00	02 Apr 2015 23:00	13	DAS collection error - data not recorded
TRS	28 Apr 2015 10:00	28 Apr 2015 10:00	1	Maintenance - manifold cleaning
THC	02 Apr 2015 11:00	03 Apr 2015 11:00	25	DAS collection error - data not recorded
THC	29 Apr 2015 10:00	29 Apr 2015 13:00	4	Maintenance on automated daily zero and span system
NO2, NO, NOX	02 Apr 2015 11:00	03 Apr 2015 11:00	25	DAS collection error - data not recorded
PM2.5	02 Apr 2015 11:00	03 Apr 2015 00:00	14	DAS collection error - data not recorded
PM2.5	29 Apr 2015 12:00	29 Apr 2015 13:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	30 Apr 2015 12:00	30 Apr 2015 12:00	1	Maintenance - Flow and zero reference checks
Temperature	02 Apr 2015 11:00	02 Apr 2015 23:00	13	DAS collection error - data not recorded
Relative Humidity	02 Apr 2015 11:00	02 Apr 2015 23:00	13	DAS collection error - data not recorded
Wind Speed, Wind Direction	02 Apr 2015 11:00	02 Apr 2015 23:00	13	DAS collection error - data not recorded
Wind Speed, Wind Direction	19 Apr 2015 00:00	19 Apr 2015 00:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	28 Apr 2015 11:00	28 Apr 2015 11:00	1	Flat line in sensor output signal
Wind Speed, Wind Direction	30 Apr 2015 20:00	30 Apr 2015 20:00	1	Flat line in sensor output signal

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Summary of Hour Averages

Millennium - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 ppb on Apr 18 10:00	Maximum Daily Average: 2.3 ppb on Apr 13		Hours of Data:	659
Minimum Value: 0 ppb on Apr 1 11:00	Minimum Daily Average: 0.1 ppb on Apr 1		Hours of Missing Data:	61
Maximum Diurnal Average: 0.9 ppb at hour 15	Minimum Diurnal Average: 0.3 ppb at hour 2		Hours of Calibration:	35
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 6		Percent Operational Time:	96.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	0	Z	0	0	0	0	0	0	0	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	0
3-Apr	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0	0	0	0	0	0	0	0	0	0	0	0	0	--	0
4-Apr	0	0	0	0	Z	0	0	0	0	0	0	1	2	2	0	1	5	2	0	0	0	0	0	0	0	0.7	5
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1
7-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Apr	0	0	Z	0	0	0	0	0	0	0	3	2	1	0	0	0	0	0	0	0	0	0	1	1	0	0.6	3
9-Apr	0	0	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-Apr	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1
11-Apr	1	1	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0.6	5
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	0	0.6	6
13-Apr	0	Z	0	0	0	0	0	0	0	6	5	6	8	4	4	6	5	3	2	0	0	1	1	0	0	2.3	8
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	0	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	1	0	0	0.4	3
17-Apr	0	0	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-Apr	Z	0	0	0	0	0	0	0	5	9	1	0	0	0	3	2	0	1	0	0	0	0	1	1	0	1.1	9
19-Apr	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0.5	2
20-Apr	0	0	Z	0	2	1	1	1	1	1	1	1	7	5	7	2	1	0	0	0	0	0	0	0	0	1.4	7
21-Apr	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Apr	0	0	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-Apr	0	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Apr	0	Z	0	0	0	0	0	0	0	1	0	0	1	2	6	2	3	1	0	0	0	0	0	0	0	0.9	6
26-Apr	0	0	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-Apr	0	0	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-Apr	0	0	0	0	Z	0	1	1	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	--	1
29-Apr	0	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	1	2	1	1	0	2	1	3	2	2	2	1	1	0	0.9	3

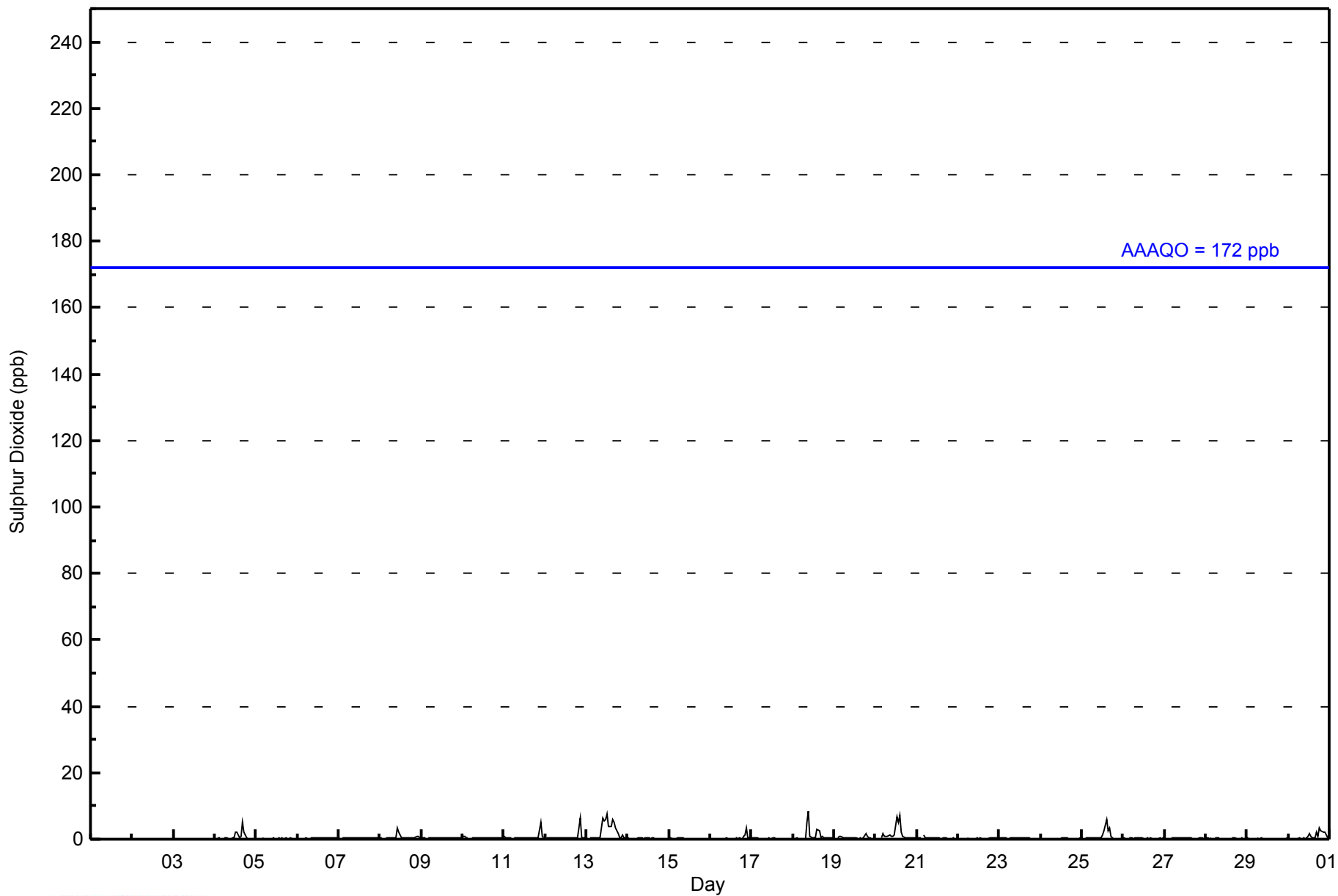
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.8	0.6	0.6	0.9	0.7	0.9	0.7	0.7	0.5	0.4	0.3	0.5	0.6	0.3	0.3	Diurnal Average	
1	1	1	1	2	1	1	1	1	5	9	5	6	8	5	7	6	5	3	3	2	6	5	1	1	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	659	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: 659

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - April 2015**

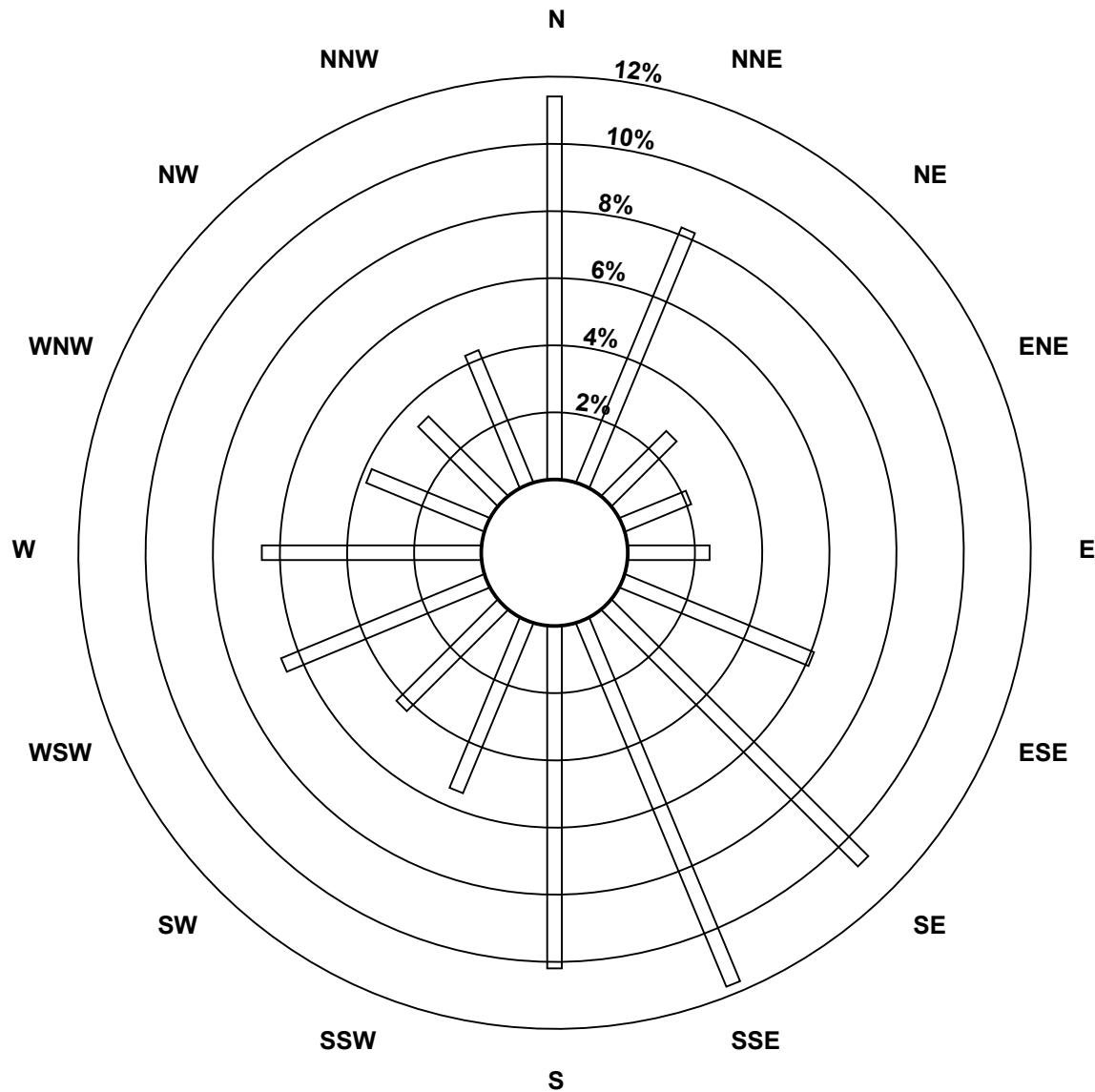
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	75	54	18	14	16	40	71	77	67	36	28	43	43	25	22	28	657
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	75	54	18	14	16	40	71	77	67	36	28	43	43	25	22	28	657

Total Number of Valid Hours: 657

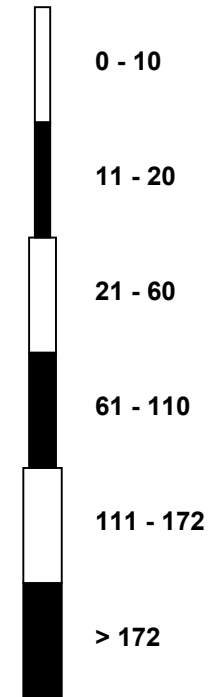
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium (AMS 12)**



Classes (ppb)

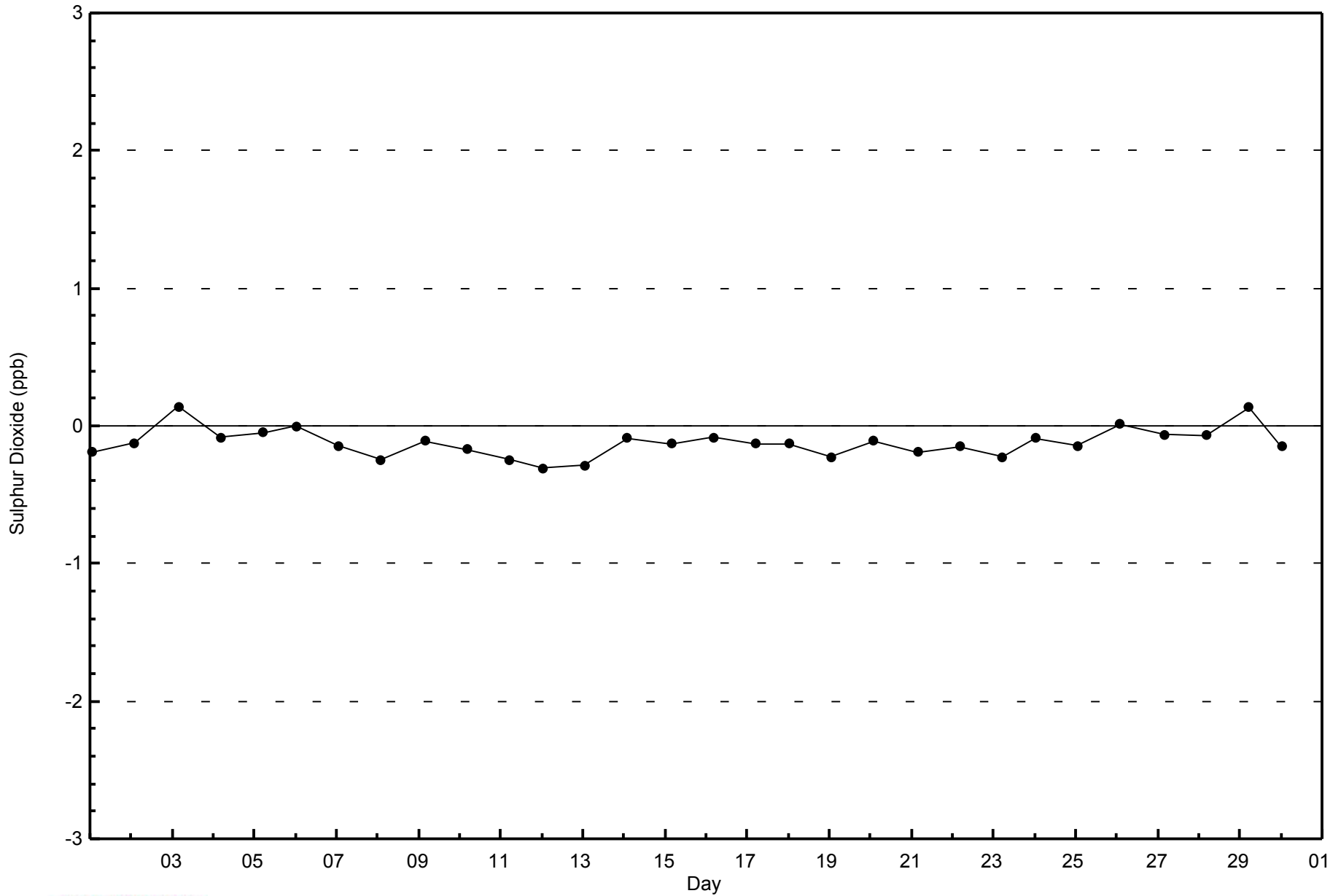


Total Number of Valid Hours: 657



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - April 2015

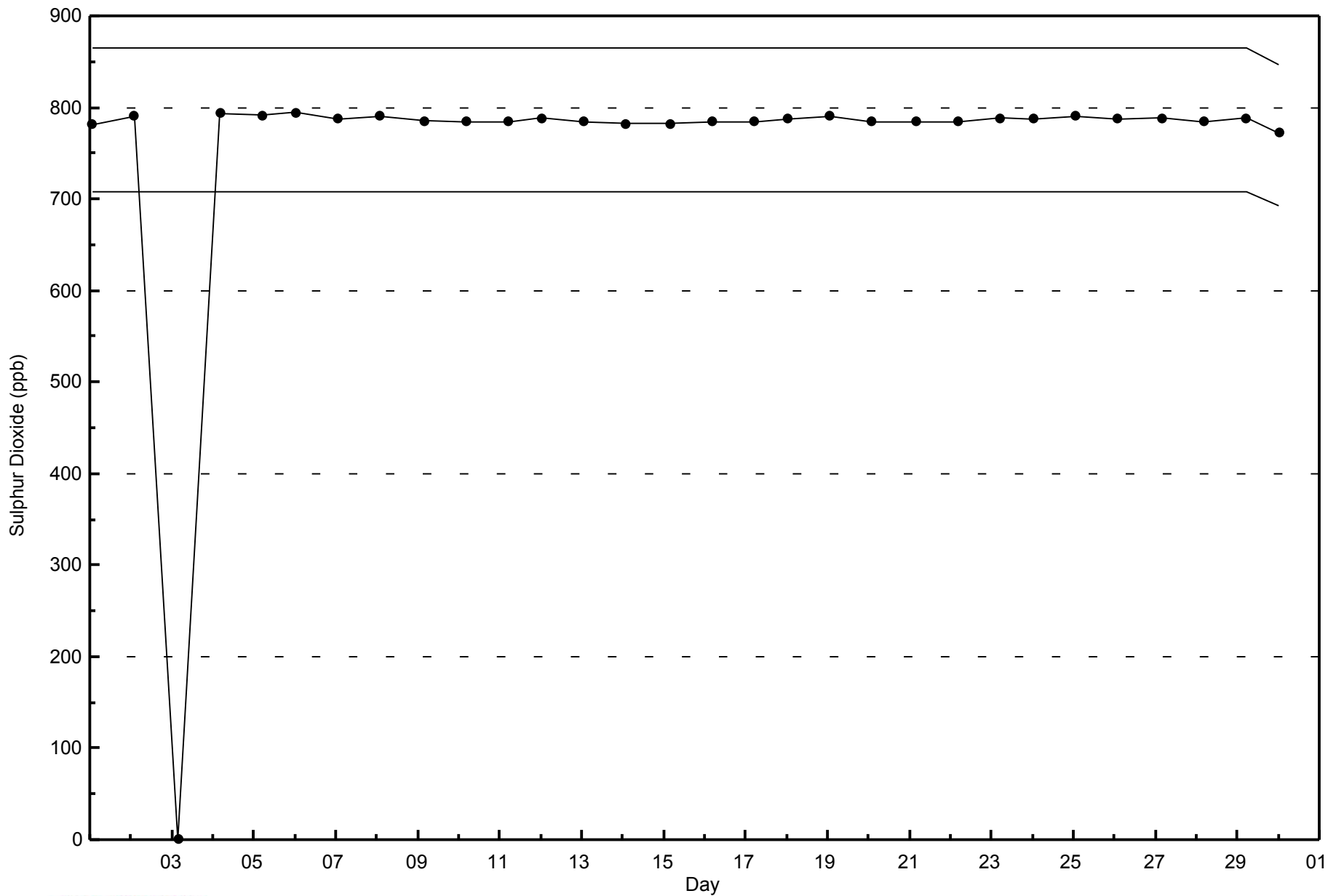






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - April 2015





Summary of Hour Averages

Millennium - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Apr 20 05:00	Maximum Daily Average: 0.4 ppb on Apr 10		Hours of Data:	671
Minimum Value: 0 ppb on Apr 17 23:00	Minimum Daily Average: 0.1 ppb on Apr 27		Hours of Missing Data:	49
Maximum Diurnal Average: 0.3 ppb at hour 5	Minimum Diurnal Average: 0.2 ppb at hour 17		Hours of Calibration:	35
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Apr	0	0	0	Z	0	0	0	0	0	0	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	0	--	0
3-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
4-Apr	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
5-Apr	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
6-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Apr	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
9-Apr	0	0	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
10-Apr	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Apr	1	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.4	1
12-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1
13-Apr	0	1	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
14-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
16-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0.4	1
17-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Apr	0	Z	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
19-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
20-Apr	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
25-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
26-Apr	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
27-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Apr	0	0	0	0	0	Z	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Apr	1	1	0	0	0	0	Z	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	1
30-Apr	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1

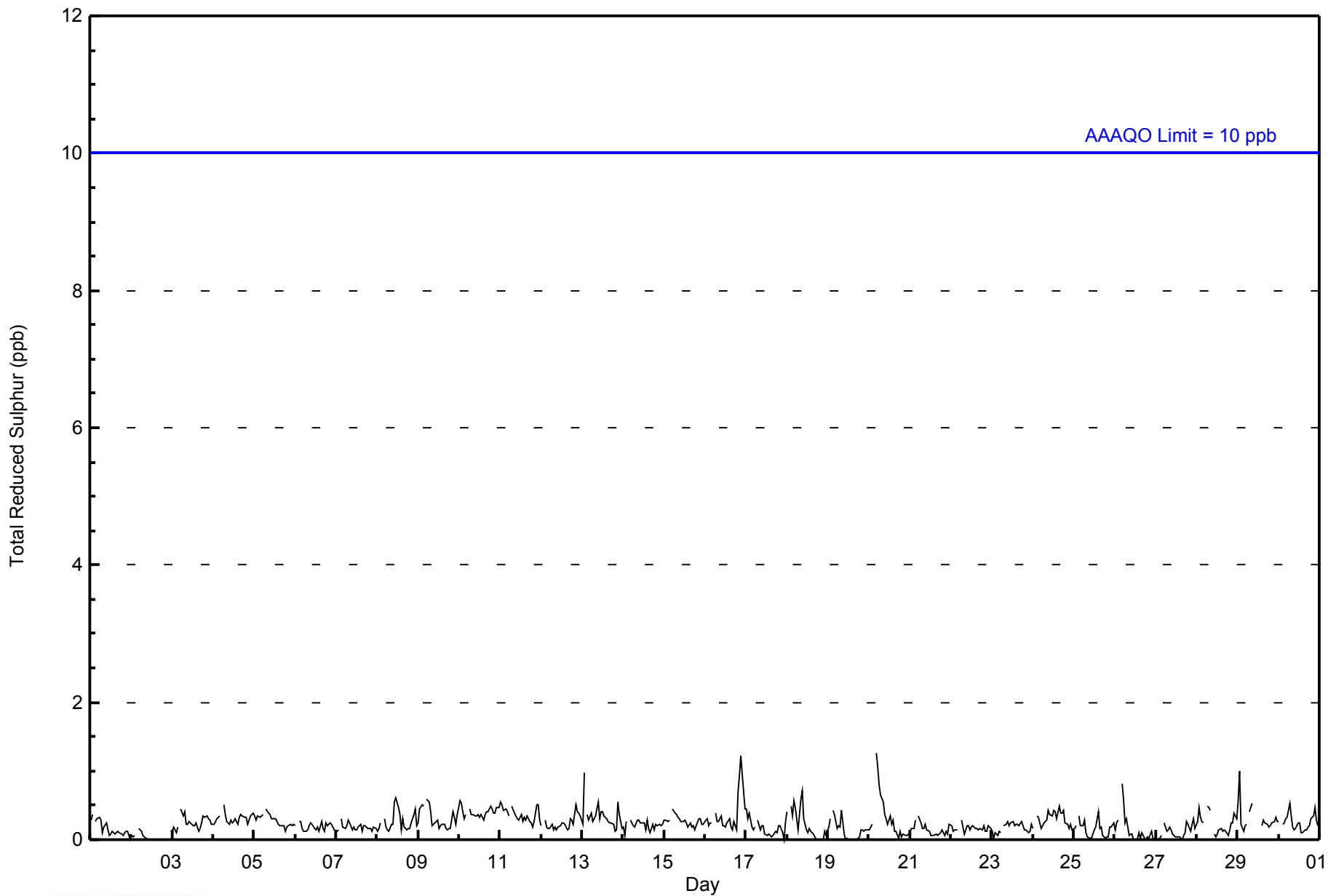
0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	Diurnal Average		
1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	Diurnal Maximum	

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



WBEA  
Hourly Averages

Total Reduced Sulphur (TRS) - ppb  
Millennium - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	671	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: 671

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - April 2015**

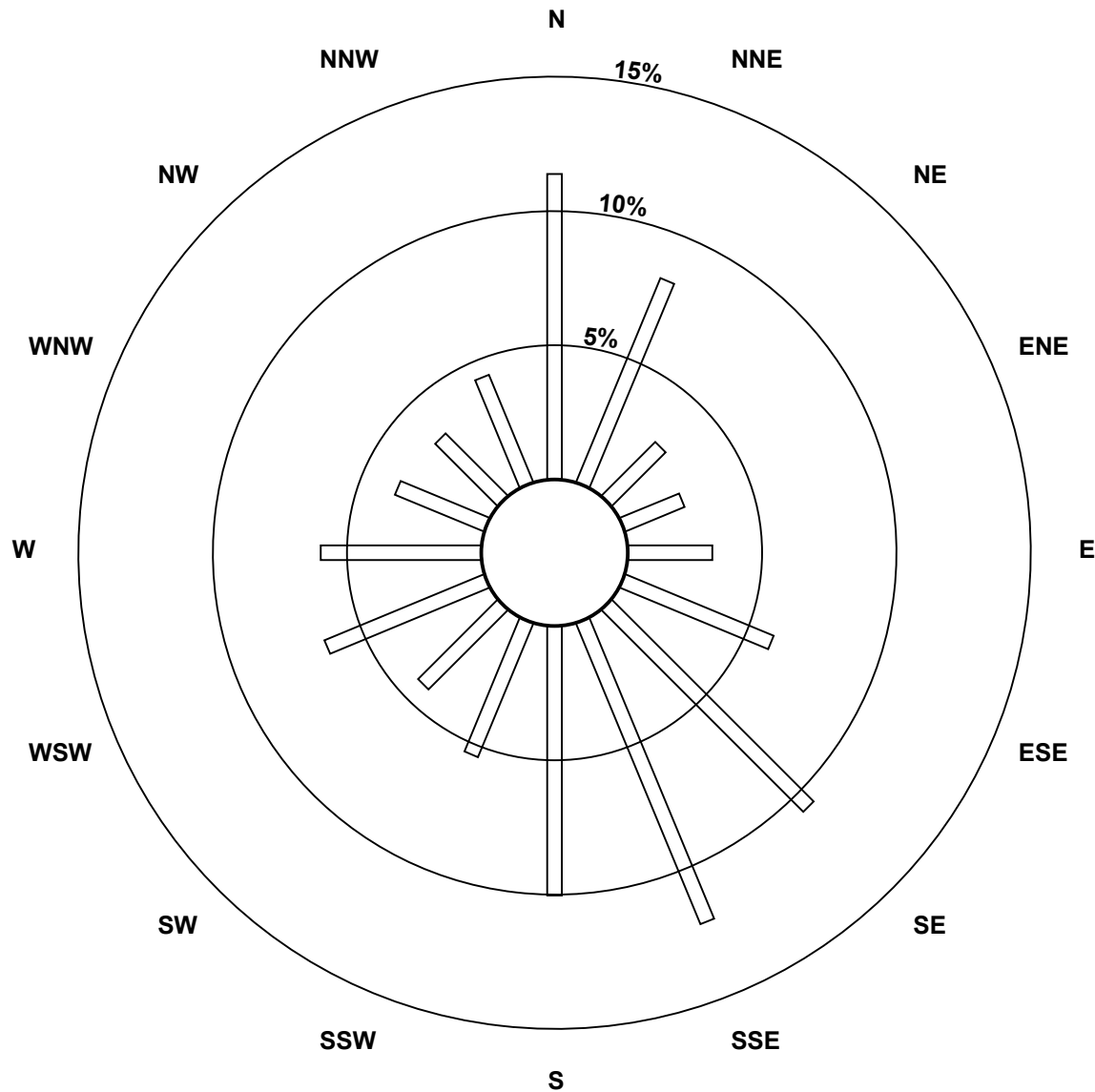
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	76	55	19	16	21	40	71	81	67	36	28	43	40	24	22	29	668
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	76	55	19	16	21	40	71	81	67	36	28	43	40	24	22	29	668

Total Number of Valid Hours: 668

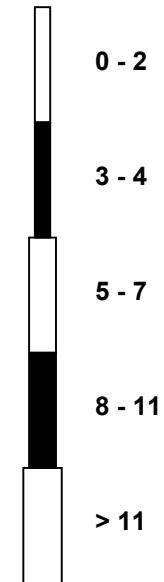
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb  
Millennium (AMS 12)**



Classes (ppb)

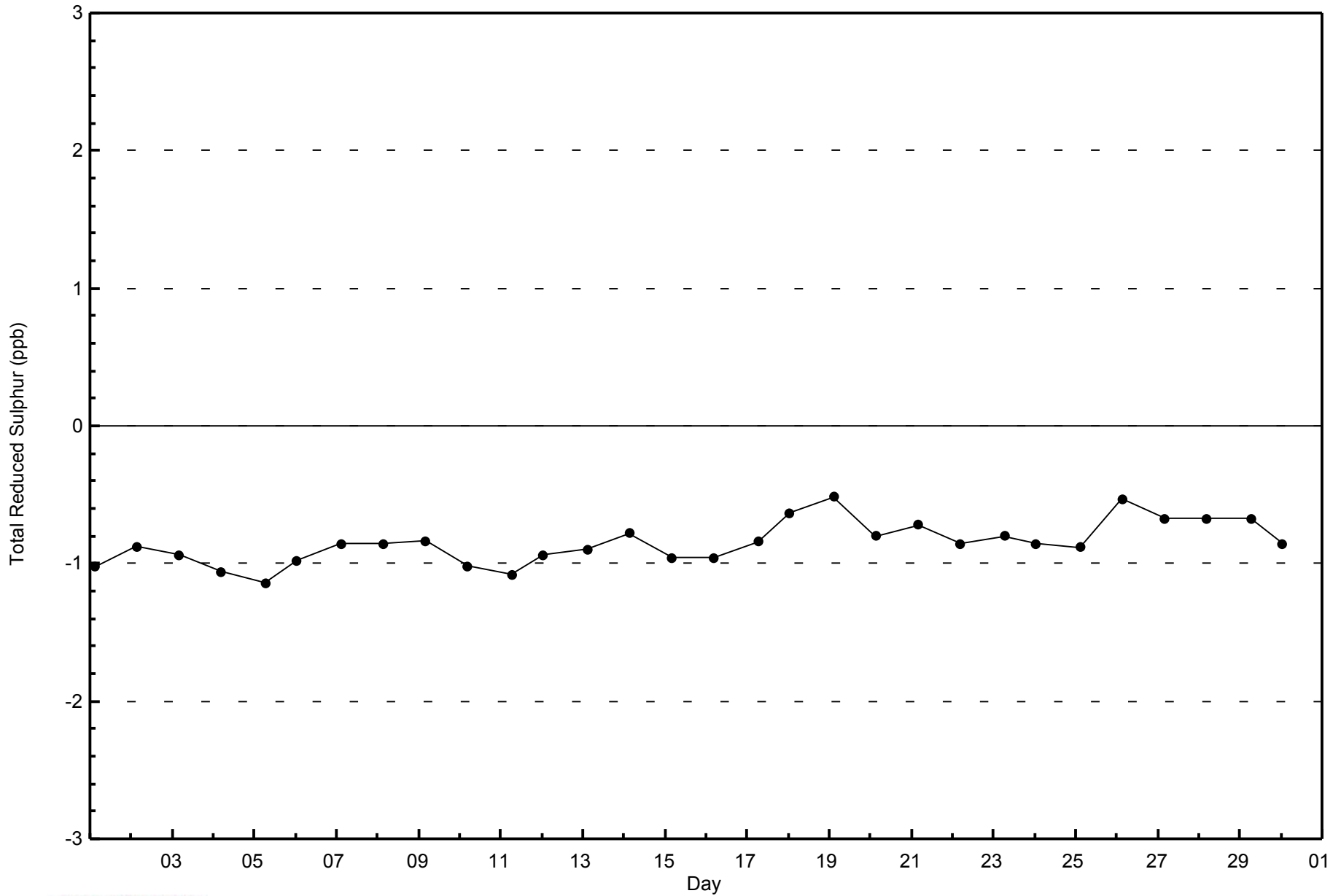


Total Number of Valid Hours: 668



WBEA  
Zero Responses

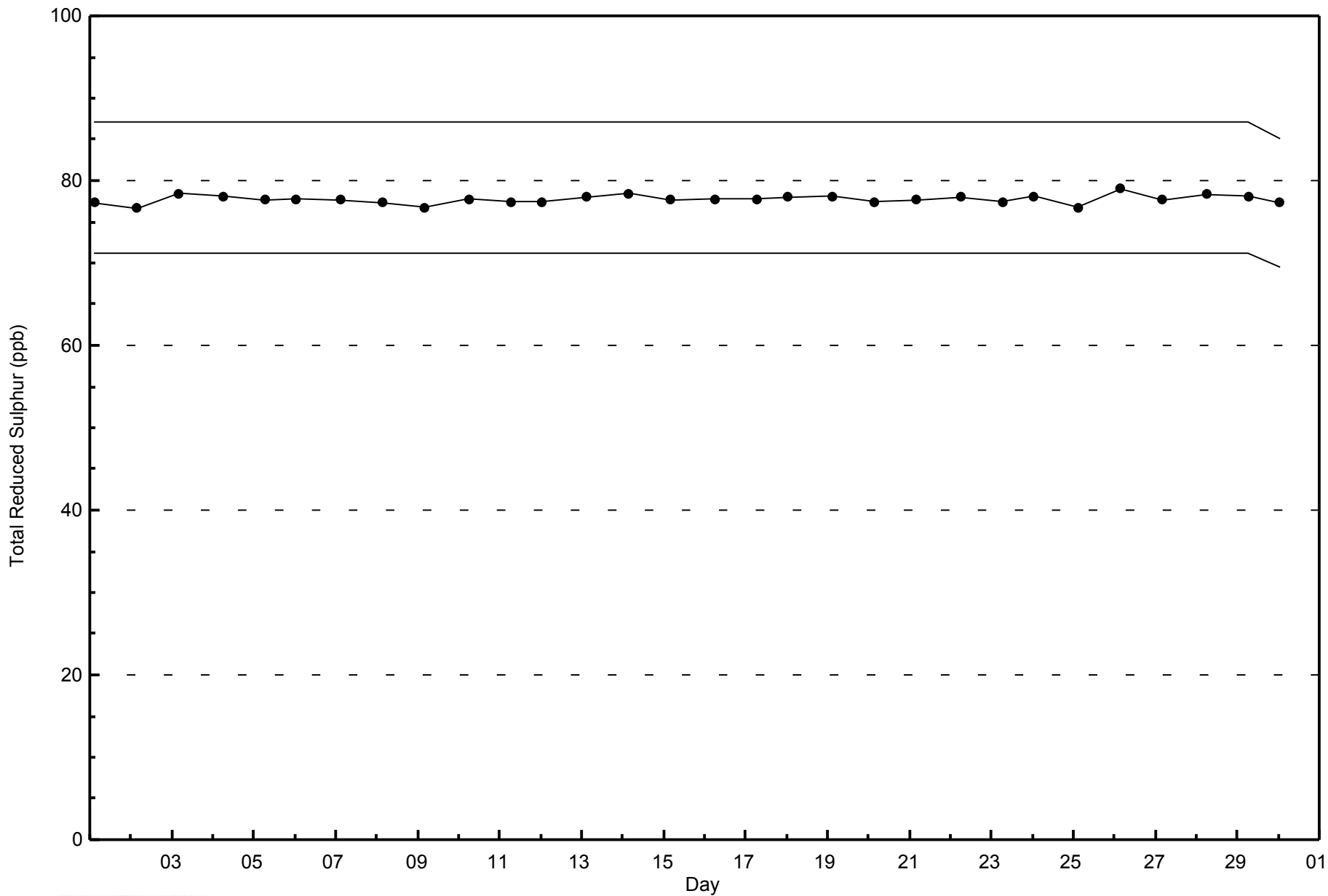
Total Reduced Sulphur (TRS) - ppb  
Millennium - April 2015





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Millennium - April 2015



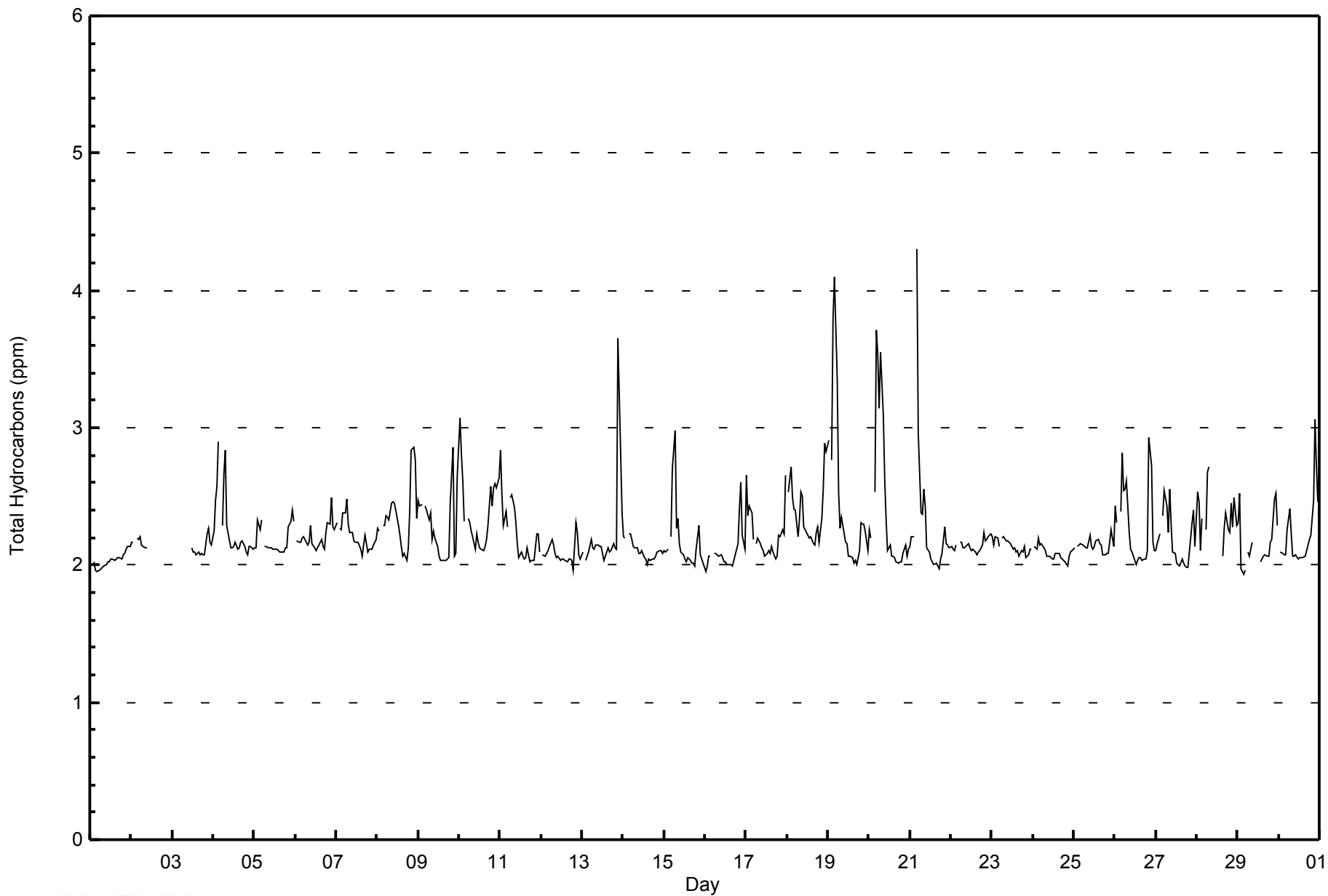






WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Millennium - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Millennium - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	103	15.73	15.73
2.1 - 3.0	539	82.29	98.02
3.1 - 10.0	13	1.98	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 655

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Millennium - April 2015**

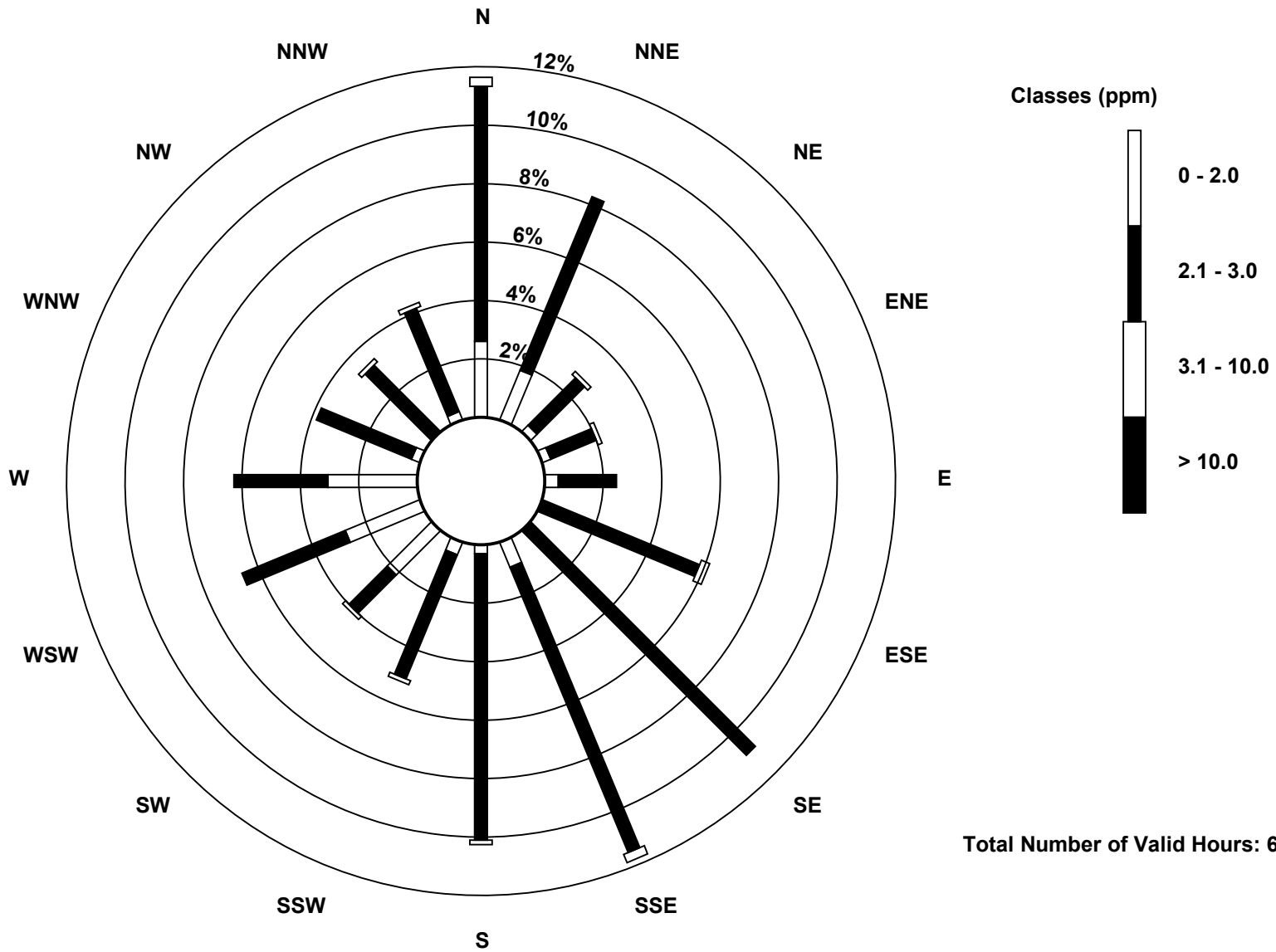
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	17	12	2	2	3	0	0	6	2	3	14	18	20	2	0	2	103
2.1 - 3.0	57	42	15	11	13	38	71	69	64	30	12	25	21	23	21	25	537
3.1 - 10.0	2	0	1	1	0	2	0	2	1	1	1	0	0	0	1	1	13
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	76	54	18	14	16	40	71	77	67	34	27	43	41	25	22	28	653

Total Number of Valid Hours: 653

Total Number of Hours: 720

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

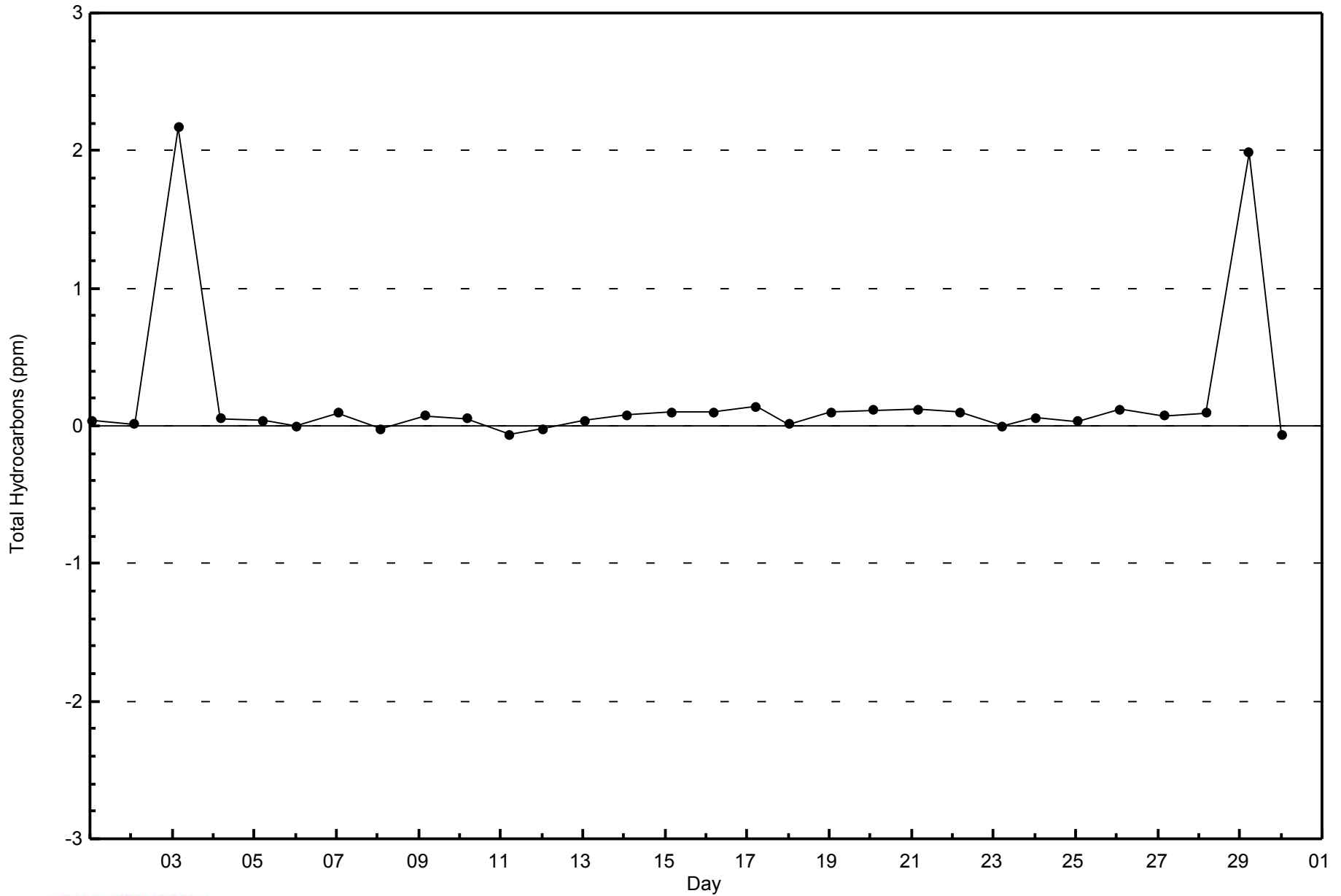
**Total Hydrocarbons (THC) - ppm  
Millennium (AMS 12)**





WBEA  
Zero Responses

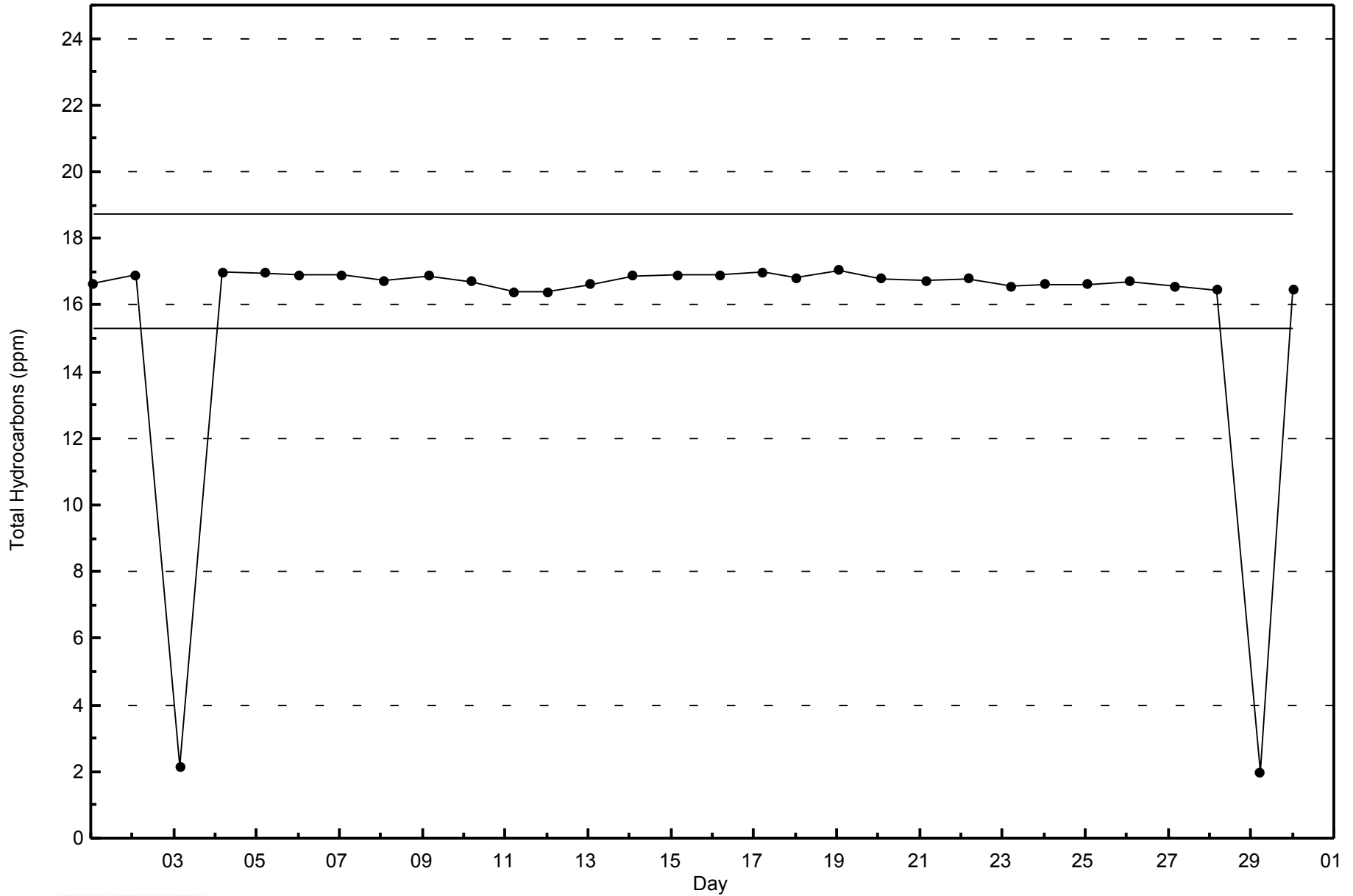
Total Hydrocarbons (THC) - ppm  
Millennium - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Millennium - April 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitric Oxide (NO) - ppb

Millennium - April 2015

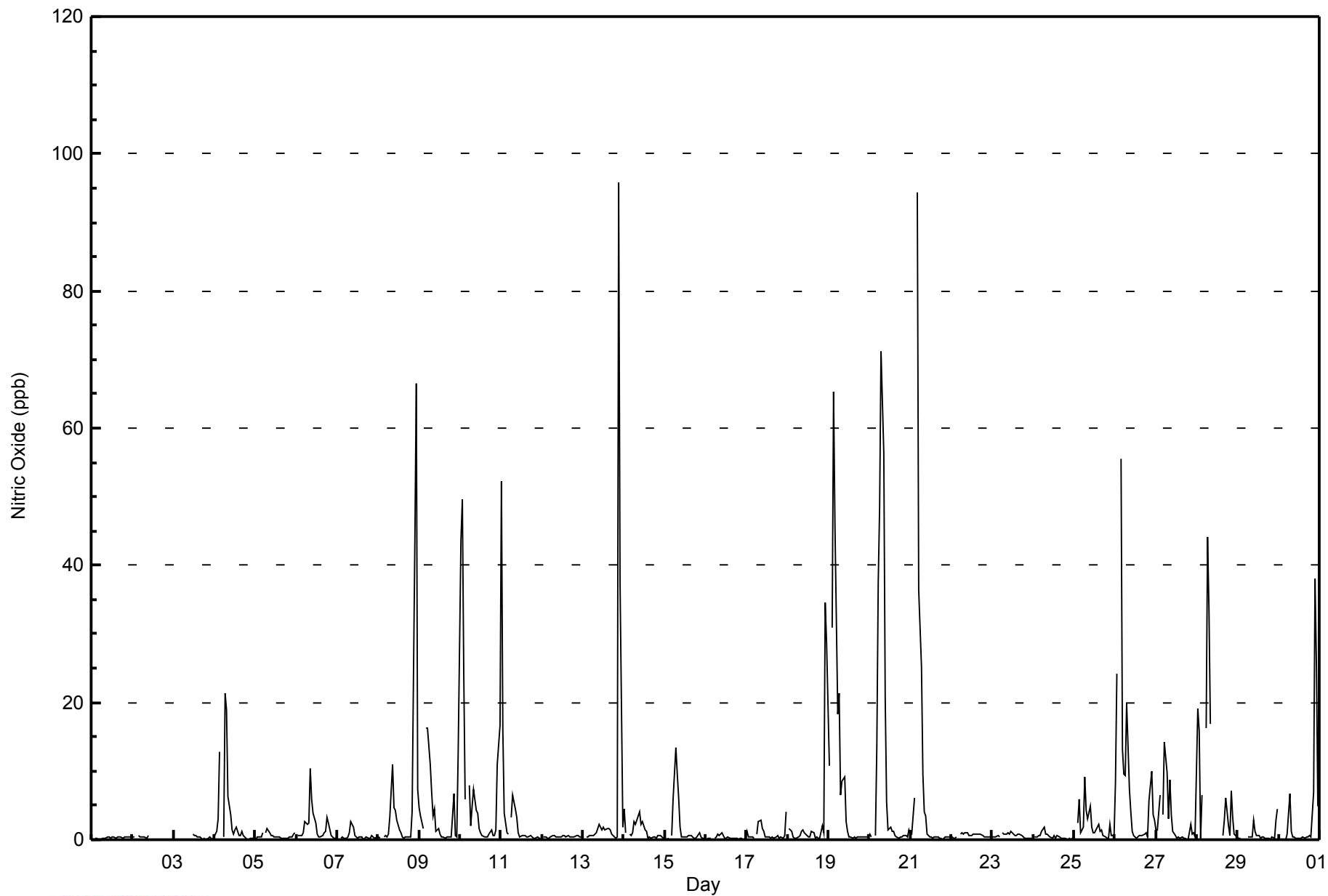
Maximum Value: 96 ppb on Apr 13 22:00																		Maximum Daily Average: 11.6 ppb on Apr 20						Hours in Service: 720			
Minimum Value: 0 ppb on Apr 4 21:00																		Minimum Daily Average: 0.3 ppb on Apr 16						Hours of Data: 660			
Maximum Diurnal Average: 8.3 ppb at hour 7																		Minimum Diurnal Average: 0.3 ppb at hour 20						Hours of Missing Data: 60			
Monthly Average: 3.5 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 7 P <sub>99</sub> = 55						Hours of Calibration: 35			
																		Percent Operational Time: 96.5									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
2-Apr	0	0	Z	1	0	0	0	0	0	1	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	1
3-Apr	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	1	1	1	0	0	0	0	0	0	0	0	0	0	0	--	1
4-Apr	1	1	3	13	Z	0	21	19	6	4	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	3.4	21
5-Apr	0	0	0	0	1	Z	1	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0.5	2	
6-Apr	Z	1	1	1	1	3	2	2	10	6	4	2	1	0	0	1	1	1	1	3	2	1	0	0	0	1.9	10
7-Apr	0	Z	0	0	0	0	0	1	3	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.5	3
8-Apr	0	0	Z	0	1	0	1	3	11	5	4	3	1	1	0	0	0	0	0	0	4	44	67	7	6.7	67	
9-Apr	5	4	2	Z	16	16	11	7	3	4	1	2	1	0	0	0	0	0	0	0	7	1	0	13	4.1	16	
10-Apr	44	50	24	6	Z	8	2	5	7	4	4	2	1	1	0	0	0	1	1	1	1	1	11	17	8.3	50	
11-Apr	52	16	4	1	1	Z	3	6	5	3	1	1	1	1	0	0	1	0	0	0	0	0	0	0	4.2	52	
12-Apr	Z	0	0	0	0	0	1	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1	0	0	0.5	1	
13-Apr	0	Z	0	0	1	1	1	1	1	2	2	1	2	1	2	2	1	1	0	0	0	96	38	2	6.7	96	
14-Apr	4	1	Z	1	1	1	3	2	4	4	2	3	1	1	0	0	0	0	0	0	1	1	0	0	1.4	4	
15-Apr	0	0	0	Z	1	6	13	9	6	2	0	0	0	0	1	1	0	0	0	0	0	1	0	0	1.9	13	
16-Apr	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
17-Apr	1	0	0	0	0	Z	1	3	3	2	1	0	0	0	0	0	0	1	1	0	0	0	1	4	0.9	4	
18-Apr	Z	2	1	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	0	0	2	1	35	29	3.4	35	
19-Apr	11	Z	31	65	46	18	21	6	9	9	3	1	0	0	0	0	0	0	0	0	0	0	0	0	9.8	65	
20-Apr	1	0	Z	1	14	37	48	71	56	21	5	1	2	1	1	1	0	0	0	0	1	1	0	1	11.6	71	
21-Apr	1	1	6	Z	94	36	25	10	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8.1	94	
22-Apr	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1	
23-Apr	0	0	0	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1	
24-Apr	Z	0	0	1	1	1	2	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0.5	2	
25-Apr	0	Z	2	6	1	2	9	4	3	5	2	1	1	1	2	1	1	1	0	0	0	2	1	1	2.1	9	
26-Apr	8	24	Z	55	13	10	9	20	7	4	1	1	0	0	1	1	1	1	1	1	0	6	10	4	7.8	55	
27-Apr	1	1	7	Z	4	14	10	3	9	4	1	1	0	0	0	0	0	0	0	0	2	1	1	0	2.6	14	
28-Apr	19	16	0	7	Z	16	44	33	17	C	C	C	C	C	C	1	3	6	2	1	7	3	1	0	--	44	
29-Apr	0	0	0	0	0	Z	0	0	0	3	1	1	1	0	0	0	0	0	0	0	0	0	3	5	0.7	5	
30-Apr	Z	0	0	0	0	1	7	1	0	0	0	0	0	0	0	0	0	0	0	1	0	7	38	25	3.8	38	
																		Diurnal Average									
																		Diurnal Maximum									
Z - zerospan																		C - Calibration						DF - DAS Failure			





**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Millennium - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Millennium - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	631	95.61	95.61
21 - 40	15	2.27	97.88
41 - 80	12	1.82	99.70
81 - 159	2	0.30	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Millennium - April 2015**

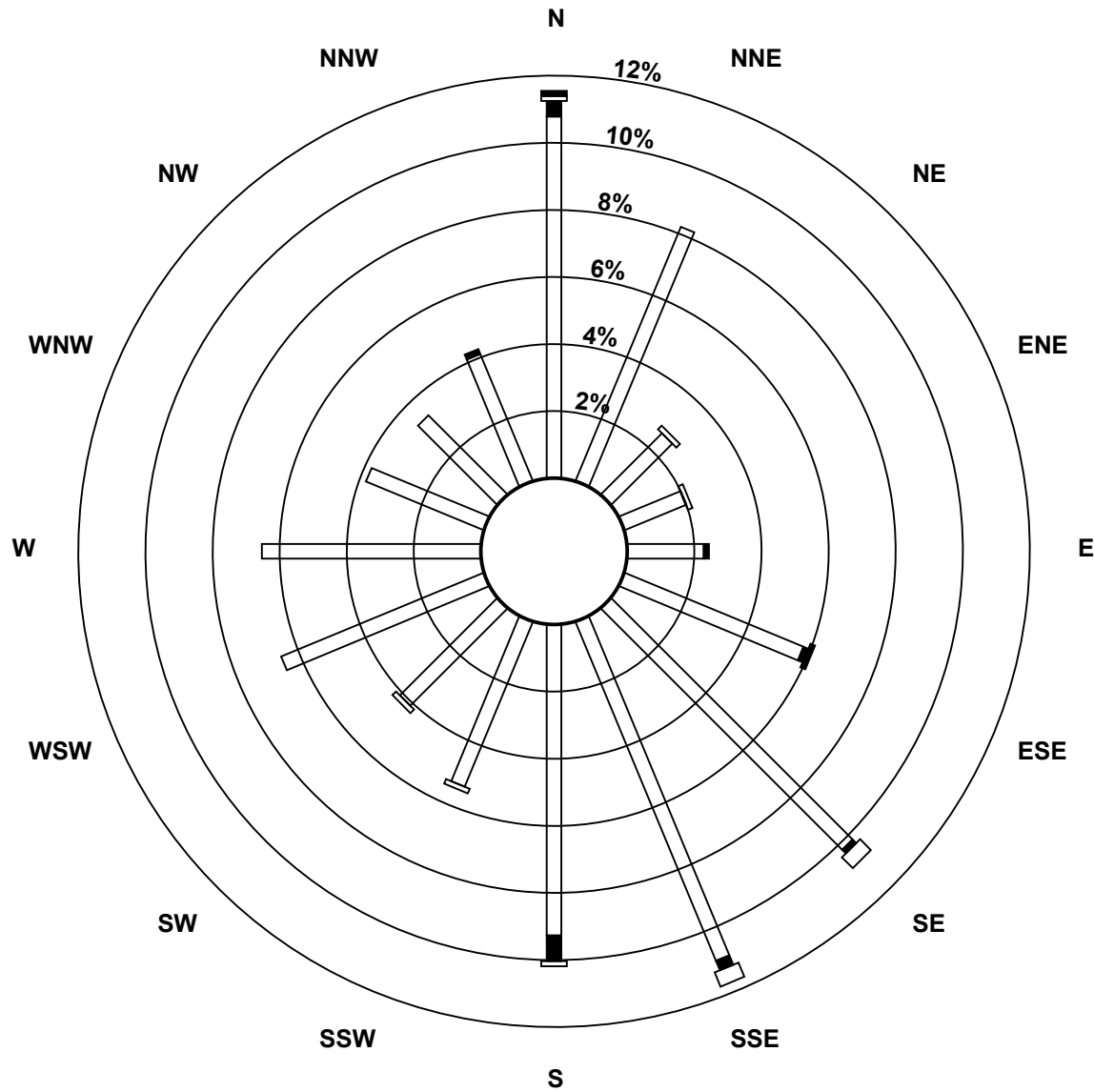
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	71	54	17	13	15	38	67	72	61	35	27	43	43	25	22	27	630
21 - 40	3	0	0	0	1	1	1	2	5	0	0	0	0	0	0	1	14
41 - 80	1	0	1	1	0	0	3	3	1	1	1	0	0	0	0	0	12
81 - 159	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	76	54	18	14	16	40	71	77	67	36	28	43	43	25	22	28	658

Total Number of Valid Hours: 658

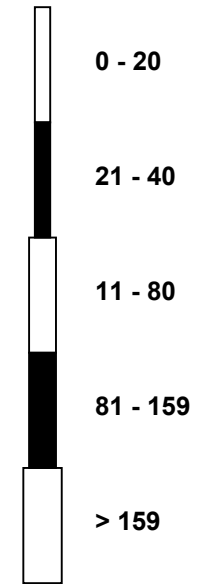
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb  
Millennium (AMS 12)**



Classes (ppb)

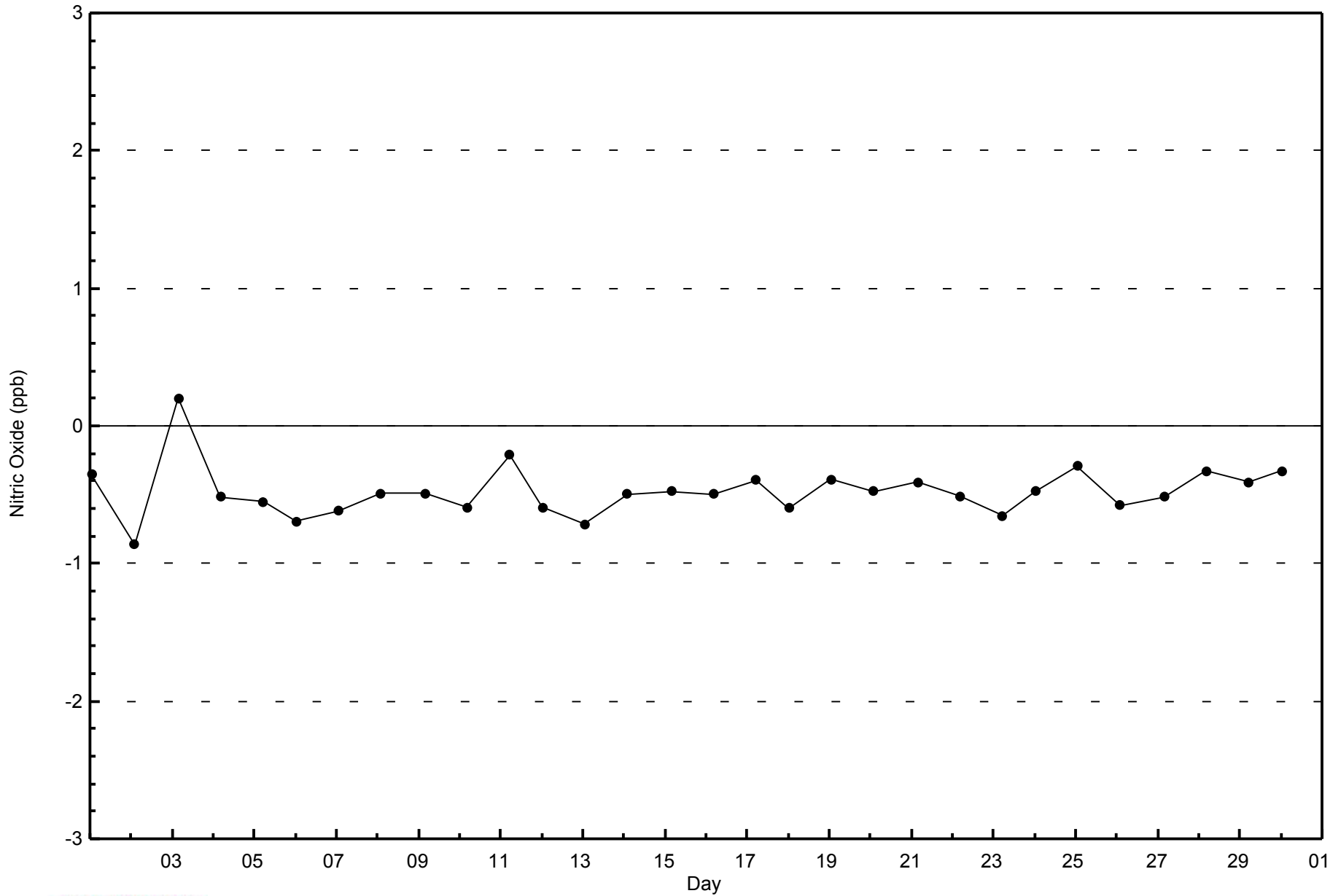


Total Number of Valid Hours: 658



**WBEA**  
**Zero Responses**

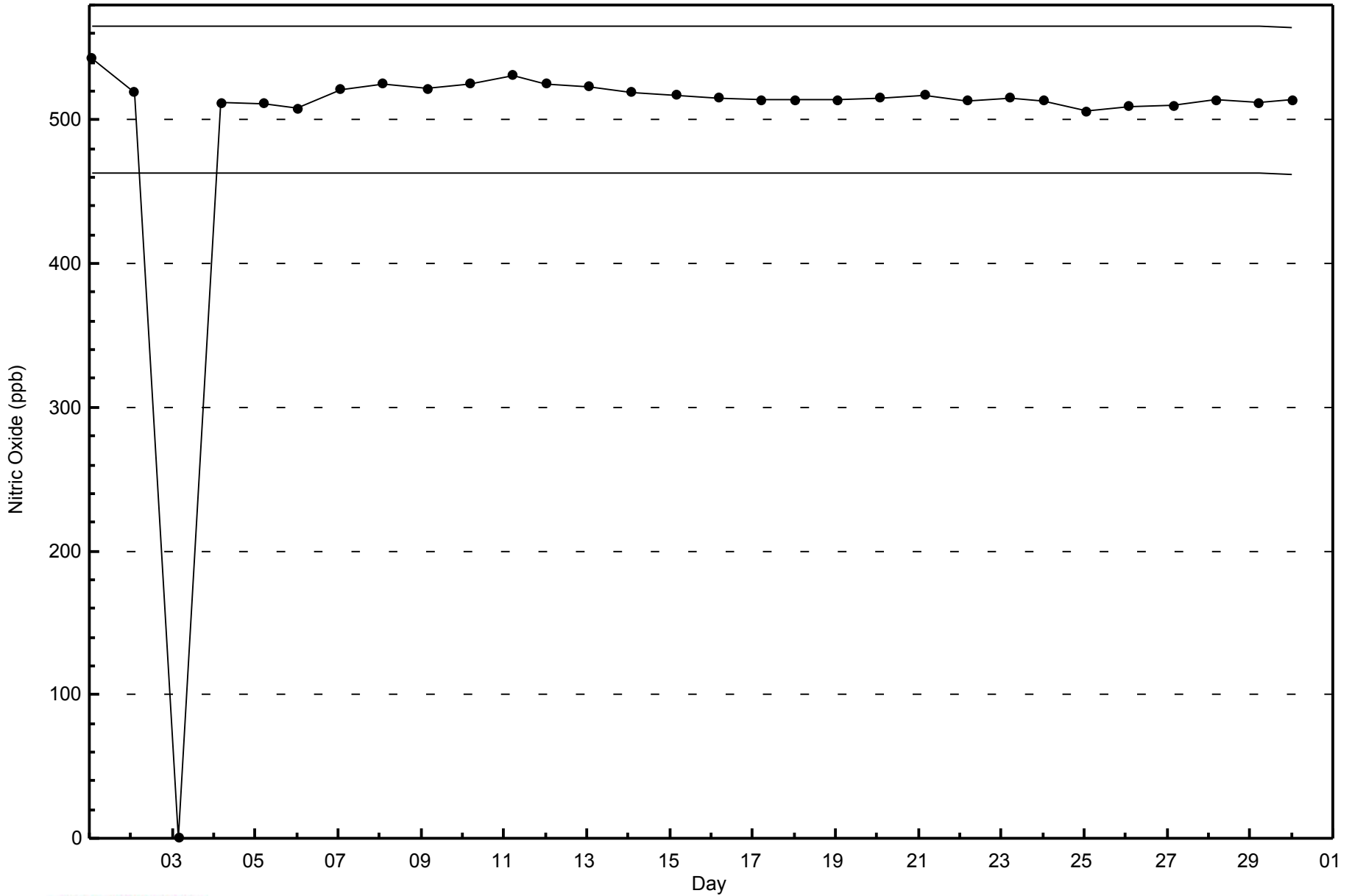
**Nitric Oxide (NO) - ppb**  
**Millennium - April 2015**





**WBEA**  
**Span Responses**

**Nitric Oxide (NO) - ppb**  
**Millennium - April 2015**





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 44 ppb on Apr 10 01:00	Maximum Daily Average: 17.2 ppb on Apr 10		Hours of Data:	660
Minimum Value: 0 ppb on Apr 1 14:00	Minimum Daily Average: 1.3 ppb on Apr 1		Hours of Missing Data:	60
Maximum Diurnal Average: 15.8 ppb at hour 1	Minimum Diurnal Average: 1.4 ppb at hour 14		Hours of Calibration:	35
Monthly Average: 8.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 5 Q <sub>3</sub> = 12 P <sub>90</sub> = 23 P <sub>99</sub> = 38		Percent Operational Time:	96.5

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	3	Z	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	5	6	1.3	7
2-Apr	4	3	Z	6	5	7	4	1	1	1	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	7
3-Apr	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	1	1	2	1	1	1	1	3	5	10	15	12	5	--	15
4-Apr	8	15	22	32	Z	12	23	26	11	7	3	2	3	4	2	2	4	3	2	2	4	5	9	8	9.1	32
5-Apr	9	11	13	14	21	Z	7	5	2	1	1	0	1	1	1	0	0	1	2	7	14	14	22	25	7.5	25
6-Apr	Z	14	14	18	18	23	17	9	17	10	7	5	2	1	2	3	6	8	21	19	18	13	7	6	11.1	23
7-Apr	8	Z	5	7	8	8	7	5	7	4	2	1	1	1	1	1	1	3	4	5	11	9	9	11	5.1	11
8-Apr	9	9	Z	7	11	7	7	9	15	7	7	6	3	2	1	1	1	2	5	10	34	38	37	27	11.1	38
9-Apr	30	27	27	Z	34	34	28	17	9	9	3	4	2	0	0	0	1	1	2	6	37	18	8	23	13.8	37
10-Apr	44	42	41	22	Z	34	16	17	16	10	9	4	3	1	1	1	2	7	19	11	15	26	30	27	17.2	44
11-Apr	43	41	29	20	14	Z	17	17	11	9	4	2	1	2	1	2	3	4	1	1	1	9	6	4	10.4	43
12-Apr	Z	1	2	2	1	3	5	2	1	0	0	0	1	1	1	1	1	2	1	3	10	6	3	1	2.0	10
13-Apr	3	Z	2	1	5	5	5	2	3	5	4	3	3	3	3	4	4	3	3	5	6	35	35	24	7.2	35
14-Apr	24	17	Z	16	13	16	14	8	11	11	7	9	5	4	2	2	1	4	6	5	14	16	11	7	9.7	24
15-Apr	10	3	3	Z	12	14	14	11	8	3	1	1	1	1	1	1	1	1	1	4	20	2	1	1	5.0	20
16-Apr	1	1	1	2	Z	2	3	3	2	3	2	1	0	1	1	1	0	1	3	5	6	8	5	5	2.4	8
17-Apr	15	17	17	15	9	Z	5	7	6	4	3	1	1	2	2	2	3	6	9	5	9	8	8	13	7.1	17
18-Apr	Z	17	12	6	5	4	3	4	6	4	2	1	1	1	3	3	1	3	2	2	16	25	33	33	8.0	33
19-Apr	28	Z	23	21	20	17	16	10	12	11	5	3	1	1	1	1	0	2	5	9	13	13	14	12	10.2	28
20-Apr	21	13	Z	14	29	30	27	31	29	21	10	3	5	3	4	2	1	2	4	6	15	16	15	24	14.1	31
21-Apr	19	16	24	Z	28	22	19	13	7	6	2	1	1	0	1	1	1	1	1	1	9	8	7	8	8.5	28
22-Apr	9	6	7	11	Z	9	6	2	2	2	1	1	2	2	2	2	2	3	4	4	5	4	5	6	4.0	11
23-Apr	7	4	7	7	5	Z	8	3	2	3	2	2	1	1	1	2	2	2	3	3	1	0	1	2	3.0	8
24-Apr	Z	9	9	16	11	12	8	2	2	1	1	1	1	1	1	1	1	1	1	1	1	4	5	7	4.1	16
25-Apr	8	Z	13	18	9	8	11	5	4	6	2	2	2	3	4	3	4	2	1	2	4	12	13	10	6.3	18
26-Apr	26	30	Z	29	25	17	14	18	10	7	2	1	1	0	1	1	2	3	6	3	24	35	28	23	13.2	35
27-Apr	20	18	25	Z	26	29	25	10	14	8	3	2	1	1	1	2	2	1	1	2	11	24	27	14	11.6	29
28-Apr	24	30	13	26	Z	35	35	30	22	C	C	C	C	C	C	4	12	21	12	17	37	21	17	15	--	37
29-Apr	6	7	4	5	4	Z	6	5	4	13	6	3	2	1	1	2	3	3	3	4	4	7	15	12	5.1	15
30-Apr	Z	2	2	2	2	8	18	4	2	1	1	1	1	1	2	1	3	3	7	8	25	38	33	29	8.3	38

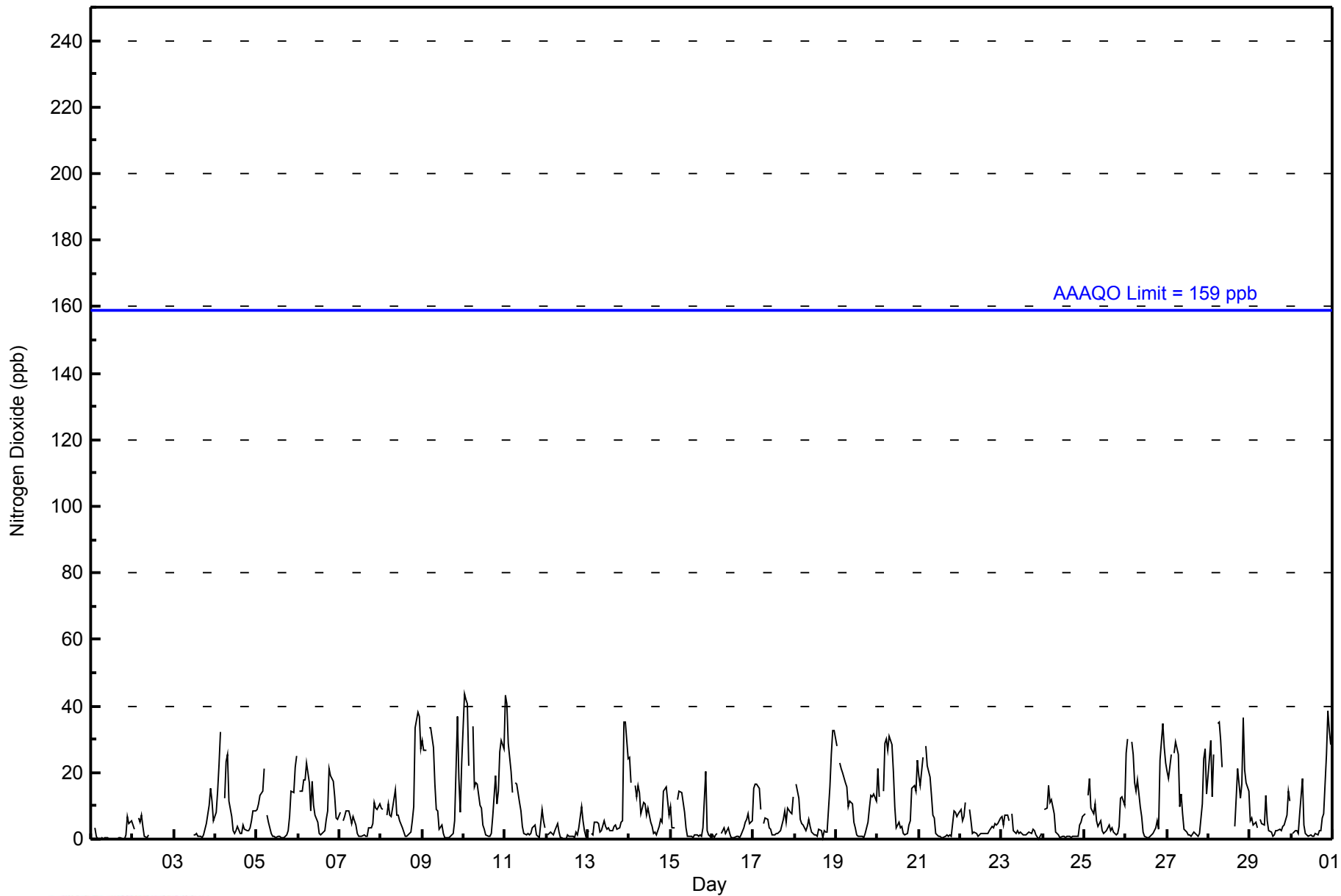
15.8	14.6	13.3	12.8	13.1	14.8	12.5	9.4	8.0	5.9	3.3	2.2	1.7	1.4	1.4	1.6	2.1	3.3	4.6	5.2	12.9	15.1	14.3	13.3	Diurnal Average		
44	42	41	32	34	35	35	31	29	21	10	9	5	4	4	4	4	12	21	21	19	37	38	37	33	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	579	87.73	87.73
21 - 40	76	11.52	99.24
41 - 80	5	0.76	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - April 2015**

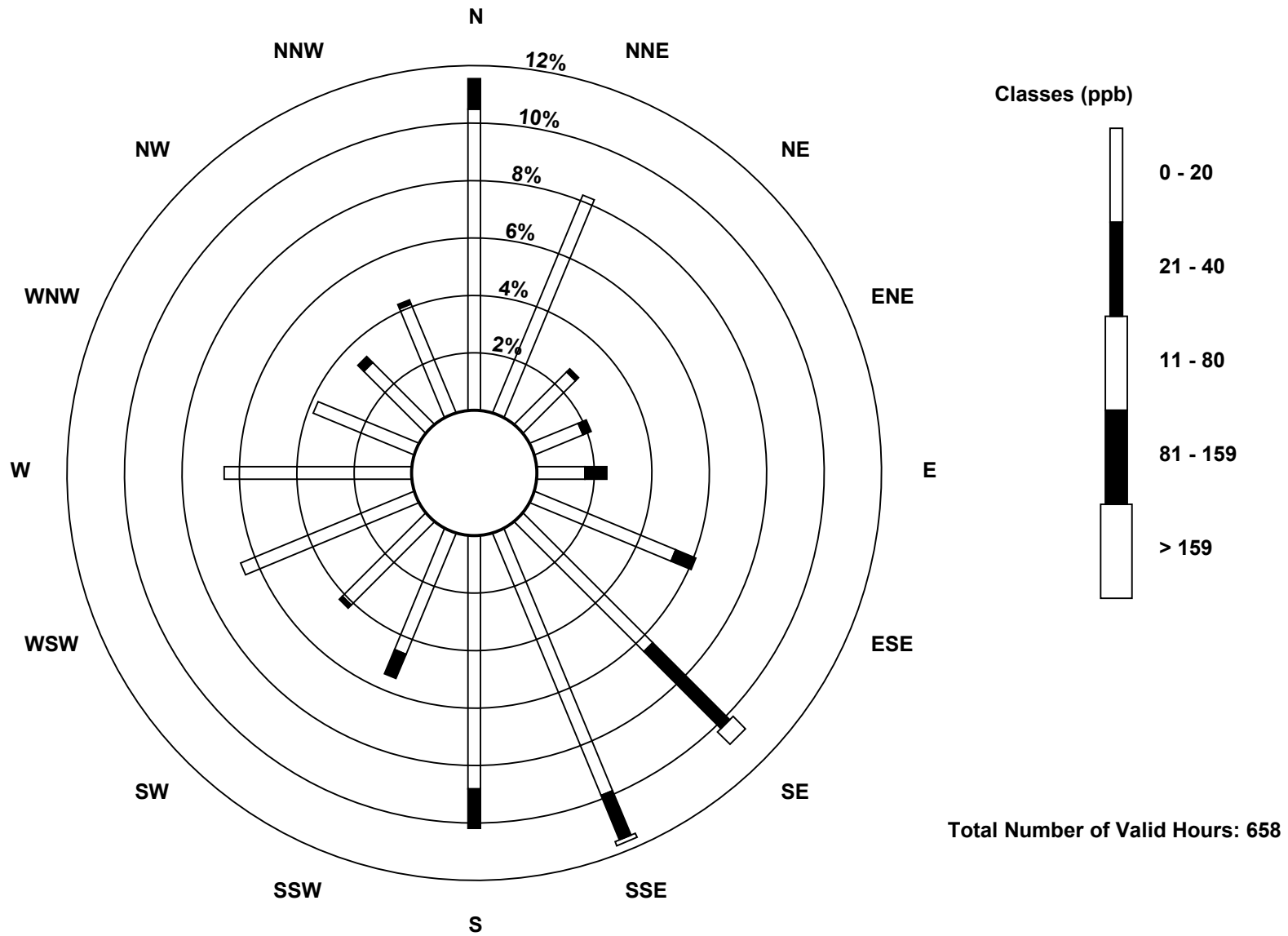
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	69	54	17	12	11	35	42	65	58	30	27	43	43	25	20	27	578
21 - 40	7	0	1	2	5	5	25	11	9	6	1	0	0	0	2	1	75
41 - 80	0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	76	54	18	14	16	40	71	77	67	36	28	43	43	25	22	28	658

Total Number of Valid Hours: 658

Total Number of Hours: 720

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

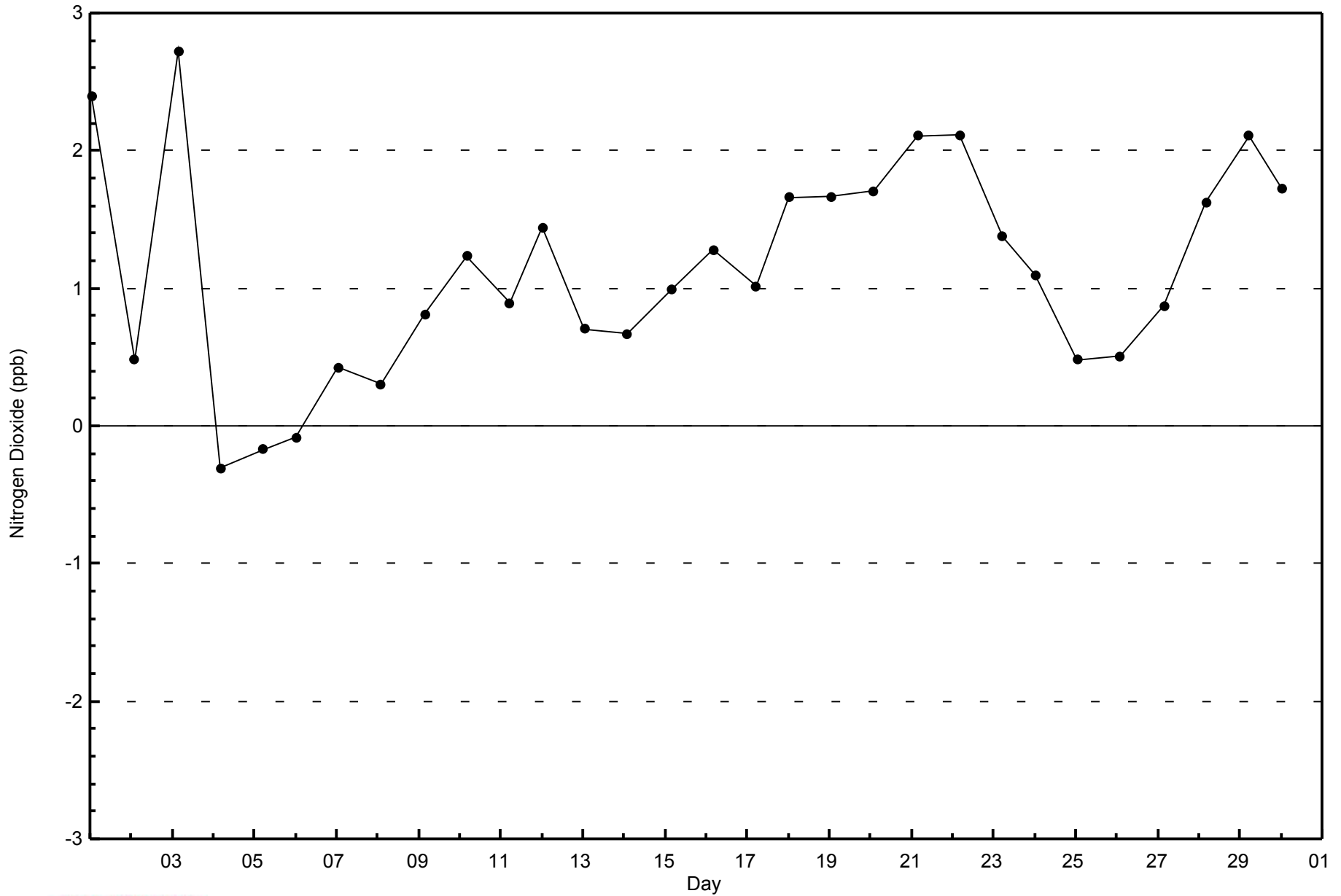
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium (AMS 12)**





WBEA  
Zero Responses

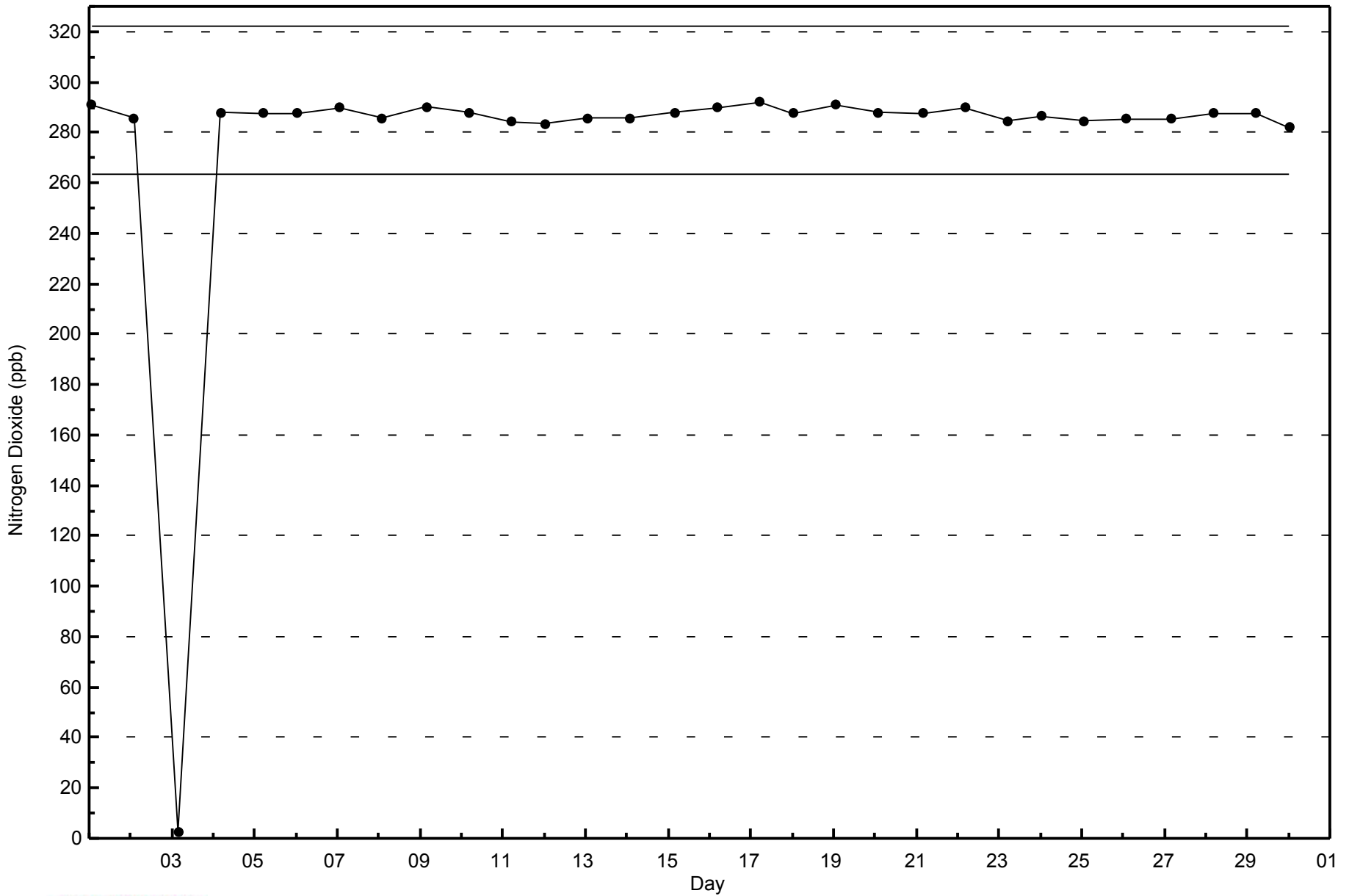
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium - April 2015



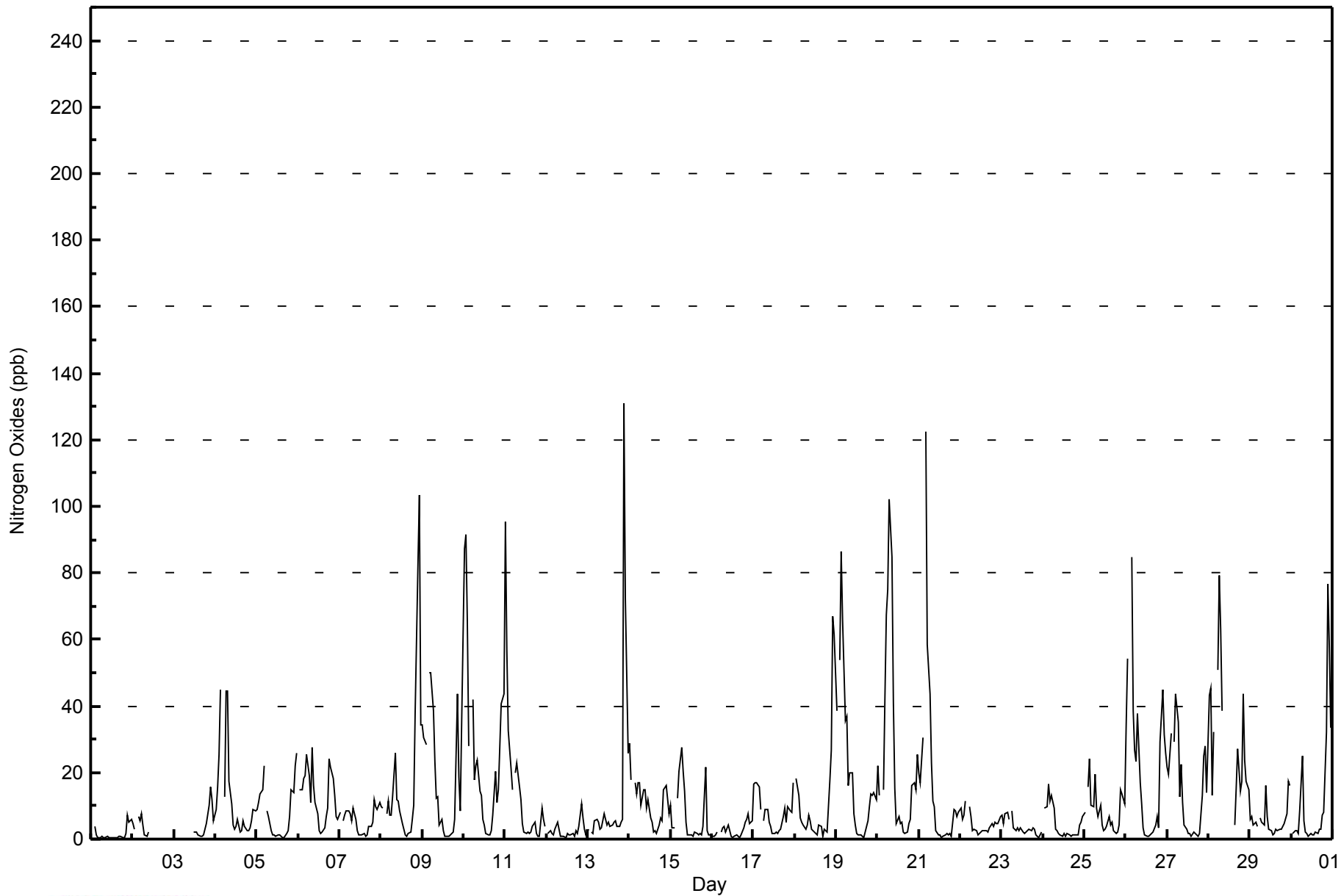


Maximum Value: 131 ppb on Apr 13 22:00																			Maximum Daily Average: 25.6 ppb on Apr 20						Hours in Service: 720							
Minimum Value: 0 ppb on Apr 1 15:00																			Minimum Daily Average: 1.6 ppb on Apr 1						Hours of Data: 660							
Maximum Diurnal Average: 22.1 ppb at hour 22																			Minimum Diurnal Average: 2.0 ppb at hour 15						Hours of Missing Data: 60							
Monthly Average: 11.8 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 5 Q <sub>3</sub> = 14 P <sub>90</sub> = 29 P <sub>99</sub> = 87						Hours of Calibration: 35							
																									Percent Operational Time: 96.5							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24								
1-Apr	4	Z	4	1	0	0	1	0	1	1	1	0	1	0	0	0	1	1	1	0	2	7	5	6	1.6	7						
2-Apr	5	3	Z	7	5	8	4	1	1	2	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	8							
3-Apr	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	2	2	2	1	1	1	1	3	5	10	16	12	5	--	16						
4-Apr	9	16	25	45	Z	13	44	45	18	10	4	3	4	6	2	2	6	4	3	2	4	5	9	8	12.5	45						
5-Apr	9	11	14	15	22	Z	8	7	3	1	1	1	1	1	1	1	1	2	3	7	15	14	22	26	8.0	26						
6-Apr	Z	15	15	18	19	26	19	11	28	16	11	8	3	2	2	3	7	9	24	22	18	13	7	6	13.1	28						
7-Apr	8	Z	6	7	9	9	7	5	10	6	2	1	1	1	2	1	1	4	4	5	12	10	9	11	5.6	12						
8-Apr	10	9	Z	8	11	7	7	13	26	12	12	8	5	3	1	1	2	2	6	10	38	82	103	34	17.8	103						
9-Apr	34	30	28	Z	50	50	39	23	12	13	4	6	3	1	1	1	1	2	2	6	44	19	9	36	17.9	50						
10-Apr	87	92	65	28	Z	42	18	22	24	14	13	6	4	2	1	1	2	7	20	11	15	28	41	44	25.5	92						
11-Apr	96	57	33	21	15	Z	20	23	16	12	5	2	2	2	2	2	4	5	2	1	1	9	6	4	14.7	96						
12-Apr	Z	2	2	2	1	3	5	3	1	1	1	0	2	1	1	2	1	3	2	4	11	6	3	1	2.5	11						
13-Apr	3	Z	2	2	6	6	5	3	4	8	6	4	5	4	4	5	6	4	4	5	6	131	73	26	13.9	131						
14-Apr	29	18	Z	17	14	17	17	10	15	15	9	12	6	5	2	3	2	4	6	5	15	16	12	8	11.1	29						
15-Apr	10	3	3	Z	12	20	27	20	14	5	1	1	1	1	2	2	1	2	1	4	21	3	1	1	6.9	27						
16-Apr	1	1	1	2	Z	2	3	4	2	4	3	1	1	1	1	1	1	1	3	5	6	8	4	5	2.7	8						
17-Apr	16	17	17	16	9	Z	5	9	9	5	4	2	2	2	2	2	3	7	9	5	10	8	8	17	8.0	17						
18-Apr	Z	18	13	6	5	4	3	4	7	5	3	2	2	1	4	4	1	3	2	2	18	27	67	61	11.5	67						
19-Apr	39	Z	54	86	66	35	37	16	20	20	8	4	2	1	1	1	1	2	6	10	13	13	14	12	20.0	86						
20-Apr	22	13	Z	15	42	67	75	102	85	41	15	5	7	5	5	2	2	2	5	6	16	17	15	25	25.6	102						
21-Apr	20	17	30	Z	122	58	44	23	11	10	2	1	1	1	1	1	2	1	2	1	9	8	7	8	16.6	122						
22-Apr	9	6	7	11	Z	10	7	3	3	3	1	2	2	2	2	3	2	3	4	4	5	5	5	7	4.7	11						
23-Apr	7	5	8	8	6	Z	9	3	3	3	3	3	2	2	2	3	3	3	4	3	1	0	1	2	3.6	9						
24-Apr	Z	9	10	17	12	13	9	3	3	2	1	1	2	1	2	1	1	1	1	1	4	5	7	4.6	17							
25-Apr	8	Z	16	24	10	10	20	9	7	10	4	2	3	4	7	4	5	3	2	2	4	15	13	11	8.4	24						
26-Apr	34	54	Z	85	38	27	23	38	17	11	4	1	1	1	1	2	2	4	7	3	29	45	31	26	21.0	85						
27-Apr	22	20	32	Z	29	44	35	13	22	11	4	3	2	2	1	2	2	1	1	2	13	25	28	14	14.2	44						
28-Apr	43	45	13	32	Z	51	79	63	39	C	C	C	C	C	C	4	15	27	14	17	44	24	18	15	--	79						
29-Apr	6	7	4	5	4	Z	6	5	4	16	7	3	3	1	2	3	3	3	3	4	5	8	17	16	5.8	17						
30-Apr	Z	2	2	2	2	8	25	5	2	2	1	1	1	1	2	2	3	3	7	8	32	76	58	33	12.2	76						
																			22.1 19.5 16.9 19.2 21.2 22.1 20.8 16.8 13.9 9.3 4.8 3.1 2.4 2.0 2.0 2.1 2.7 3.9 5.1 5.5 14.4 22.1 20.8 16.4						Diurnal Average							
																			96 92 65 86 122 67 79 102 85 41 15 12 7 6 7 5 15 27 24 22 44 131 103 61						Diurnal Maximum							
Z - zerospan																			C - Calibration						DF - DAS Failure							



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	557	84.39	84.39
21 - 40	59	8.94	93.33
41 - 80	33	5.00	98.33
81 - 159	11	1.67	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 660

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - April 2015**

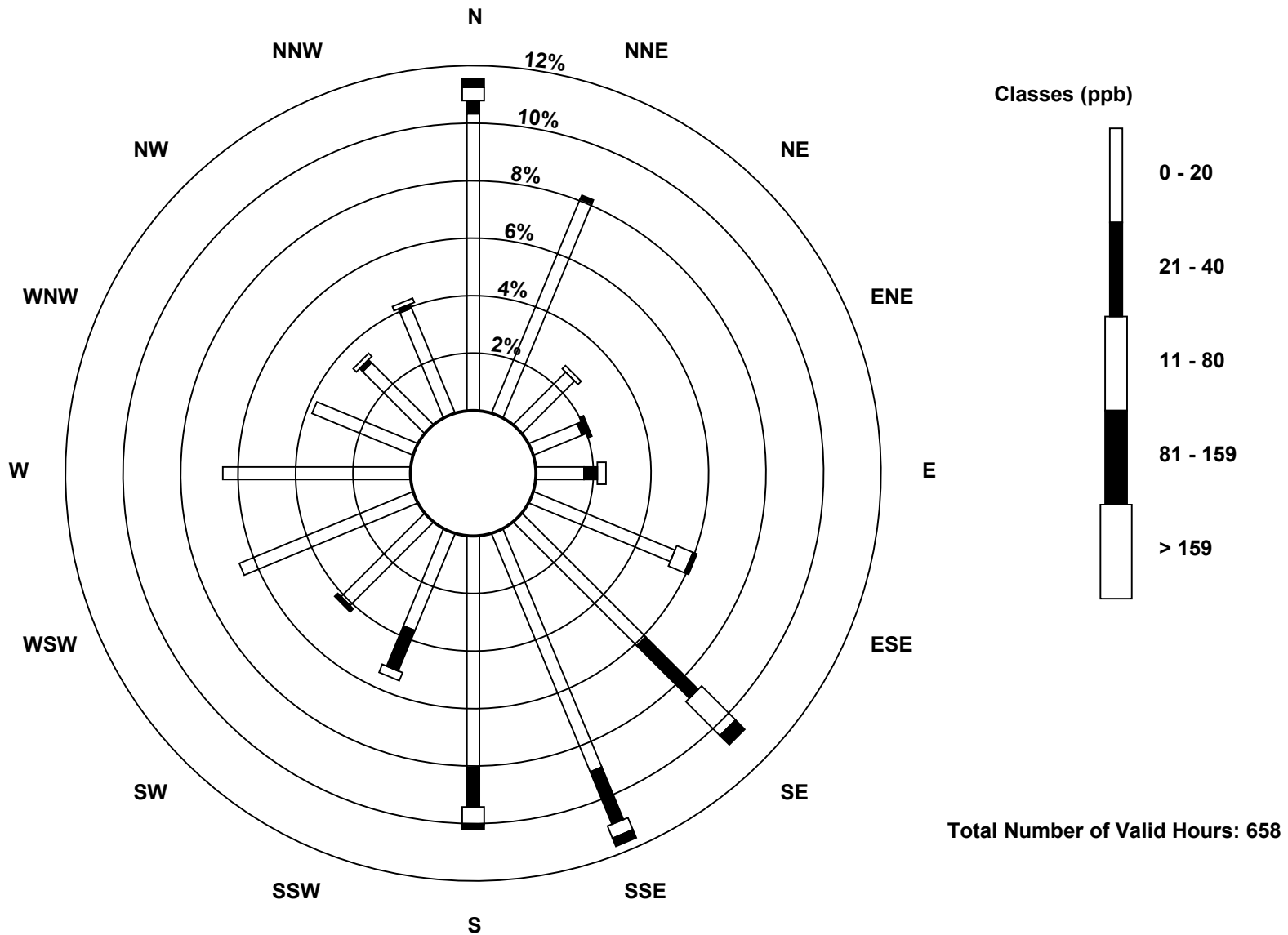
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	68	53	17	12	11	35	40	59	53	24	27	43	43	25	20	26	556
21 - 40	3	1	0	1	3	0	17	13	9	10	0	0	0	0	1	1	59
41 - 80	3	0	1	0	2	4	11	3	4	2	0	0	0	0	1	1	32
81 - 159	2	0	0	1	0	1	3	2	1	0	1	0	0	0	0	0	11
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	76	54	18	14	16	40	71	77	67	36	28	43	43	25	22	28	658

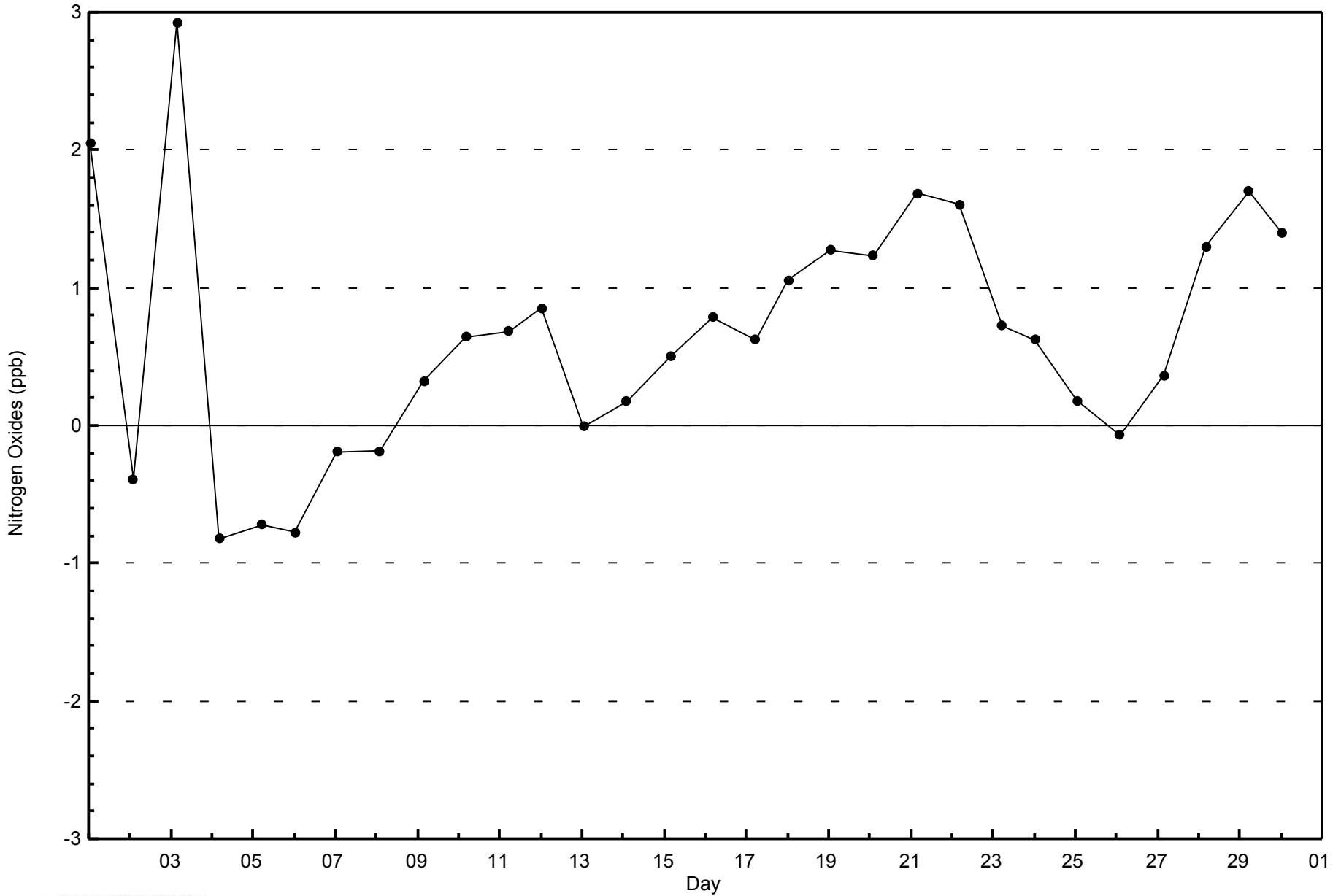
Total Number of Valid Hours: 658

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium (AMS 12)

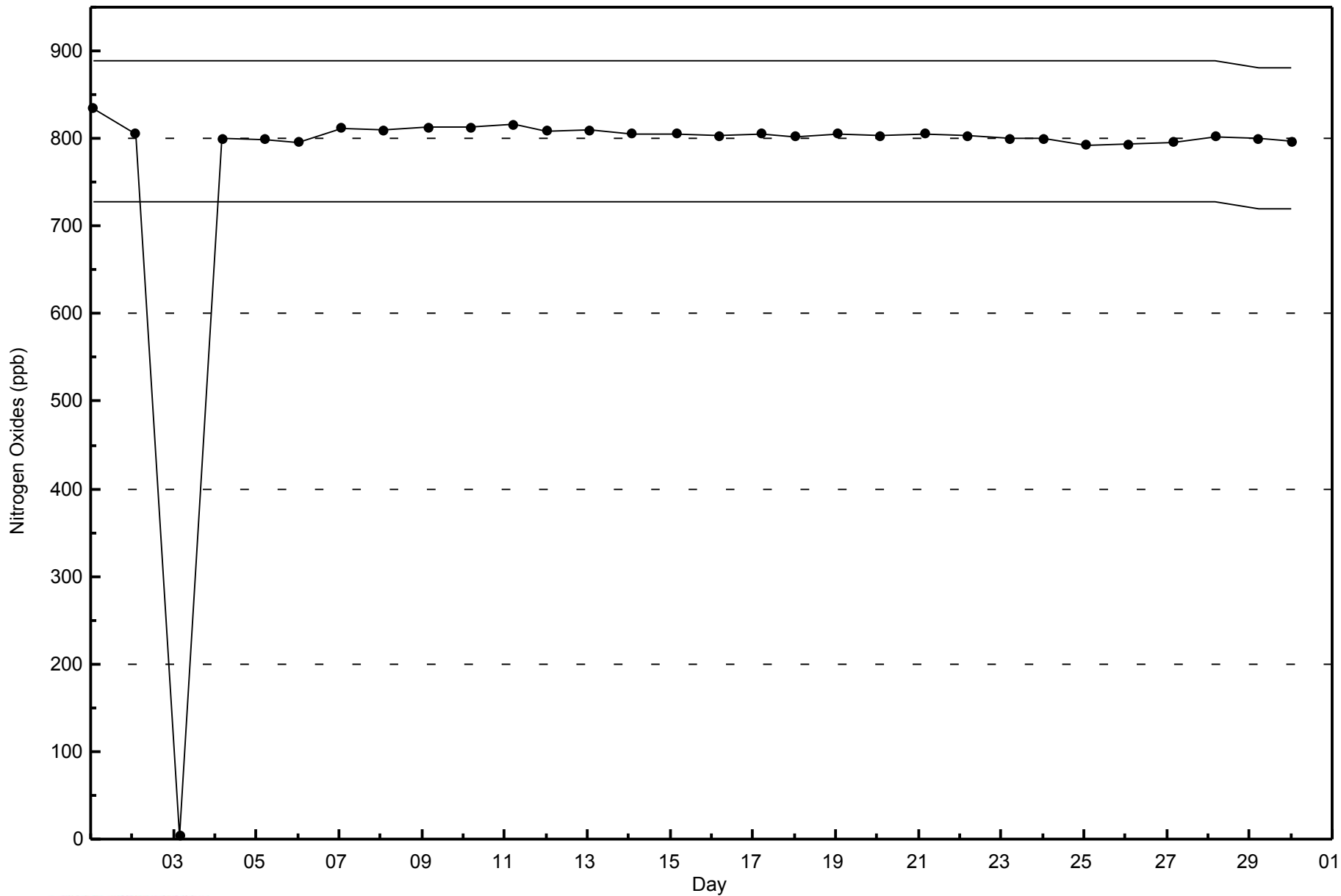






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium - April 2015





Summary of Hour Averages

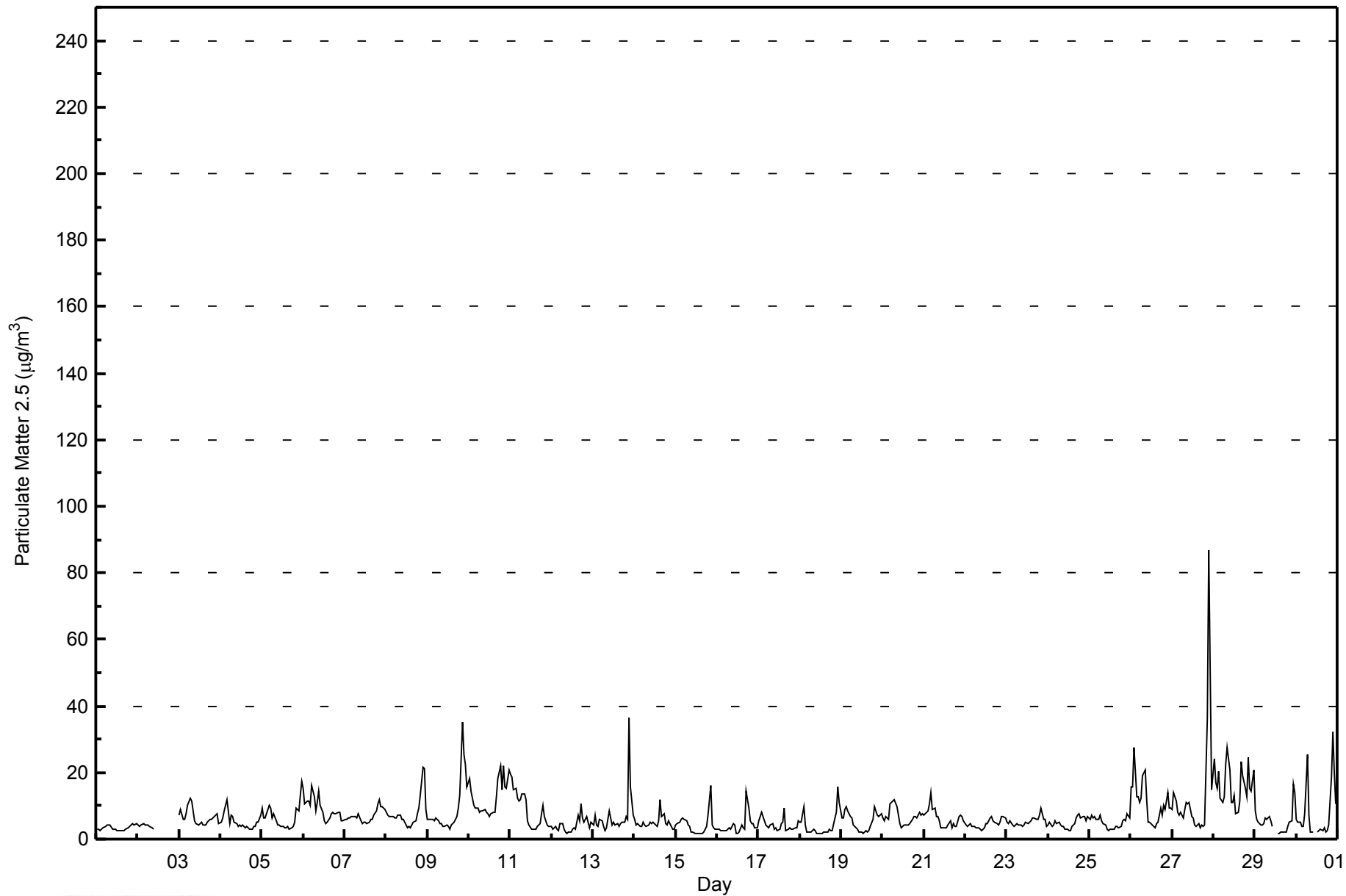
Millennium - April 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 720																																														
Maximum Value: 86.7 µg/m <sup>3</sup> on Apr 27 22:00		Maximum Daily Average: 16.3 µg/m <sup>3</sup> on Apr 28																																														
Minimum Value: 1.5 µg/m <sup>3</sup> on Apr 15 14:00		Hours of Data: 703																																														
Maximum Diurnal Average: 13.0 µg/m <sup>3</sup> at hour 22		Hours of Missing Data: 17																																														
Monthly Average: 6.88 µg/m <sup>3</sup>		Hours of Calibration: 0																																														
Minimum Daily Average: 3.4 µg/m <sup>3</sup> on Apr 1		Percent Operational Time: 97.6																																														
Minimum Diurnal Average: 3.7 µg/m <sup>3</sup> at hour 14																																																
Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 2.8 Q <sub>1</sub> = 3.8 Median = 5.3 Q <sub>3</sub> = 7.7 P <sub>90</sub> = 12.9 P <sub>99</sub> = 25.3																																																
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-Apr	3.2	3.1	2.7	2.8	3.6	4.0	4.1	4.4	4.1	3.1	3.1	2.8	2.7	2.6	2.5	2.6	2.5	2.8	3.6	4.0	4.1	4.5	4.1	4.6	3.4	4.6																						
2-Apr	4.4	4.0	4.3	4.6	4.1	4.4	4.1	3.8	3.3	3.1	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	DF	--	4.6																						
3-Apr	7.0	9.1	6.0	6.0	7.4	10.3	12.1	11.4	8.5	5.7	4.9	4.2	4.5	5.2	4.3	4.3	5.1	5.5	6.1	6.1	6.8	7.2	7.5	4.5	6.7	12.1																						
4-Apr	5.1	6.3	8.4	10.1	12.0	4.7	7.0	6.6	5.3	4.9	3.7	4.1	3.8	4.4	3.5	3.7	3.3	3.1	3.0	3.6	3.8	5.0	5.3	7.3	5.3	12.0																						
5-Apr	9.3	6.5	6.2	8.8	10.1	9.5	6.4	7.7	5.4	4.4	4.0	3.6	3.6	3.5	3.4	3.9	3.0	3.2	3.9	5.0	9.5	8.5	13.1	17.2	6.7	17.2																						
6-Apr	15.1	10.4	11.5	11.6	10.1	16.1	12.7	8.6	10.9	14.3	10.2	7.9	5.4	4.7	5.2	6.5	7.7	7.9	7.5	7.6	8.0	7.9	5.4	5.4	9.1	16.1																						
7-Apr	5.9	5.7	6.2	6.2	6.8	6.7	6.8	6.3	7.5	5.5	4.8	5.1	5.0	4.6	4.9	5.9	6.1	7.2	8.5	10.5	11.8	9.9	9.8	8.8	7.0	11.8																						
8-Apr	7.8	7.1	6.8	6.6	6.9	6.5	6.5	7.0	7.1	5.8	5.7	5.2	3.5	3.7	3.5	4.2	5.1	5.3	7.5	9.2	12.9	21.8	21.4	8.9	7.7	21.8																						
9-Apr	5.9	5.9	5.7	6.1	5.5	6.4	5.7	4.7	4.6	4.0	3.7	4.1	3.8	3.0	4.2	5.1	5.9	6.6	9.2	13.0	35.2	25.5	22.5	15.8	8.8	35.2																						
10-Apr	18.3	14.4	12.2	10.3	9.5	9.2	8.0	8.5	8.6	8.8	8.0	7.7	6.9	7.5	8.1	8.1	12.9	18.0	22.0	14.9	22.0	15.9	15.2	20.7	12.3	22.0																						
11-Apr	19.4	18.7	14.8	15.5	12.3	11.4	11.8	13.6	13.4	11.9	5.5	4.4	3.2	3.1	3.1	3.1	4.0	4.7	7.7	10.2	6.9	4.1	3.6	3.7	8.7	19.4																						
12-Apr	3.9	3.1	3.7	3.1	2.6	4.5	4.8	2.8	2.2	1.8	2.0	2.2	3.0	3.3	3.0	7.0	5.4	10.5	6.4	5.2	6.9	5.3	3.5	5.0	4.2	10.5																						
13-Apr	4.4	7.3	4.2	3.7	5.8	5.5	3.7	2.7	3.3	8.3	6.5	4.2	5.0	4.3	4.8	3.7	4.6	5.1	5.0	6.7	5.9	36.5	15.7	7.3	6.8	36.5																						
14-Apr	6.0	4.2	4.9	3.8	3.8	4.9	4.3	3.9	4.3	4.9	4.8	5.2	4.1	3.7	5.6	11.8	6.6	7.5	4.6	4.3	5.3	3.8	2.8	3.0	4.9	11.8																						
15-Apr	4.2	4.6	5.1	5.9	6.5	6.0	5.5	4.2	3.6	2.2	1.9	1.5	1.6	1.5	1.8	1.9	2.0	2.9	3.7	7.1	16.0	4.4	3.4	2.8	4.2	16.0																						
16-Apr	2.9	2.9	2.6	2.3	2.4	2.6	2.8	3.6	2.9	4.5	4.2	1.8	1.8	2.3	4.3	3.5	2.8	14.2	9.3	5.6	4.7	4.5	3.6	3.5	4.0	14.2																						
17-Apr	5.6	6.7	8.0	5.4	4.2	3.9	3.2	4.4	4.5	2.8	3.6	2.5	2.9	4.6	4.9	9.5	2.6	2.8	3.2	2.8	3.1	3.3	3.2	5.3	4.3	9.5																						
18-Apr	4.9	5.2	9.7	4.1	2.2	2.0	2.1	2.7	2.9	2.4	1.8	1.7	1.7	1.8	2.1	2.2	2.3	2.8	2.7	2.4	6.3	7.9	15.7	10.9	4.2	15.7																						
19-Apr	6.3	6.4	8.9	9.5	8.5	7.0	6.3	4.1	3.7	3.1	2.2	2.3	2.1	1.9	2.3	2.2	2.4	3.7	5.9	10.0	8.5	7.4	6.7	7.8	5.4	10.0																						
20-Apr	6.2	5.7	6.8	5.7	10.8	11.2	11.6	11.7	9.9	7.1	4.8	3.5	4.4	4.1	4.1	4.2	4.6	5.9	6.7	6.6	6.2	8.2	7.3	7.6	6.9	11.7																						
21-Apr	7.4	7.7	8.4	10.8	13.8	8.7	9.2	6.8	6.8	5.7	3.2	3.4	3.4	3.6	4.4	5.4	3.3	4.9	4.0	3.8	6.7	7.0	6.7	5.4	6.3	13.8																						
22-Apr	4.4	3.8	4.2	4.7	4.0	3.7	3.4	3.3	3.3	2.6	3.1	3.4	4.8	4.7	6.4	6.8	5.4	5.3	4.6	4.3	5.3	6.7	6.6	6.2	4.6	6.8																						
23-Apr	5.2	4.6	5.4	4.3	3.9	4.3	4.5	4.3	4.2	3.9	4.4	5.1	4.7	5.0	5.6	6.4	6.6	6.1	5.7	7.3	9.2	5.7	5.7	4.0	5.2	9.2																						
24-Apr	4.4	5.3	4.0	4.4	5.4	4.6	5.2	4.1	3.8	3.8	2.9	2.8	2.6	2.6	4.0	4.8	6.4	7.1	7.6	6.5	6.9	6.6	5.6	6.8	4.9	7.6																						
25-Apr	6.0	7.3	6.5	6.8	6.0	6.0	7.2	5.3	4.7	4.3	3.1	2.5	2.8	2.9	3.1	3.7	3.8	3.3	3.8	5.5	5.8	5.4	7.5	6.4	5.0	7.5																						
26-Apr	15.6	15.6	27.5	12.9	12.9	11.1	12.1	18.9	20.6	12.0	5.3	5.1	4.1	3.6	3.6	4.8	5.2	9.4	7.1	10.0	8.7	13.8	9.5	9.4	10.8	27.5																						
27-Apr	9.0	13.9	11.5	8.0	7.4	7.9	6.4	8.8	10.8	10.6	11.2	6.7	6.2	4.4	4.0	4.6	3.3	4.1	4.0	4.4	36.6	86.7	51.1	14.8	14.0	86.7																						
28-Apr	24.0	16.8	15.1	20.4	12.4	10.9	12.7	22.5	27.7	20.7	10.9	11.1	13.3	7.7	8.1	11.6	23.1	19.0	15.3	12.9	24.5	15.2	14.5	20.7	16.3	27.7																						
29-Apr	8.5	6.0	5.0	4.4	4.1	4.9	6.3	5.9	6.8	5.3	3.7	M	M	1.6	1.7	2.3	2.0	2.1	2.2	3.8	4.9	5.6	16.7	13.9	5.3	16.7																						
30-Apr	5.8	5.2	5.0	4.0	4.0	7.8	25.4	7.1	2.2	2.1	2.0	M	2.3	2.7	3.0	2.5	3.4	1.9	2.4	4.4	18.8	32.4	19.8	10.8	7.6	32.4																						
																								7.9	7.4	7.7	7.1	7.0	6.9	7.4	7.0	6.9	6.0	4.7	4.2	4.1	3.7	4.1	5.0	5.2	6.3	6.3	6.8	10.7	13.0	10.8	8.6	Diurnal Average
																								24.0	18.7	27.5	20.4	13.8	16.1	25.4	22.5	27.7	20.7	11.2	11.1	13.3	7.7	8.1	11.8	23.1	19.0	22.0	14.9	36.6	86.7	51.1	20.7	Diurnal Maximum
M - Maintenance DF - DAS Failure																								Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																								



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Millennium - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Millennium - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	375	53.34	53.34
6 - 15	285	40.54	93.88
16 - 25	35	4.98	98.86
26 - 80	7	1.00	99.86
> 81.0	1	0.14	100.00

Total Number of Valid Hours: 703

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Millennium - April 2015**

Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	55	35	12	3	9	24	25	29	21	10	21	39	34	17	17	23	374
6 - 15	22	24	7	13	13	16	42	48	36	19	8	5	9	8	6	7	283
16 - 25	0	0	0	0	0	1	11	6	12	4	0	1	0	0	0	0	35
26 - 80	0	0	0	0	0	1	0	2	0	4	0	0	0	0	0	0	7
> 81.0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
<b>Totals</b>	<b>77</b>	<b>59</b>	<b>19</b>	<b>16</b>	<b>22</b>	<b>42</b>	<b>78</b>	<b>85</b>	<b>69</b>	<b>38</b>	<b>29</b>	<b>45</b>	<b>43</b>	<b>25</b>	<b>23</b>	<b>30</b>	<b>700</b>

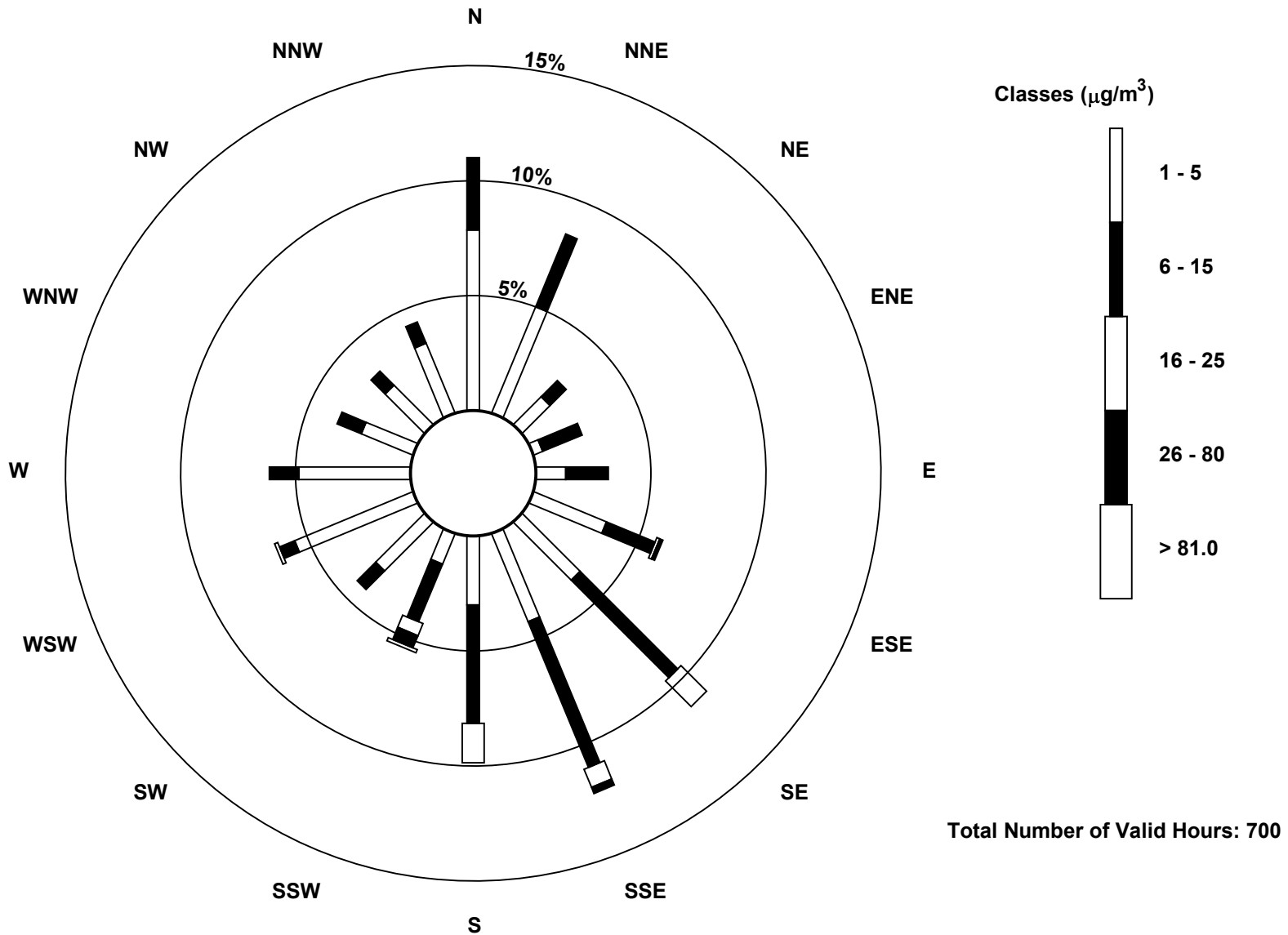
Total Number of Valid Hours: 700

Total Number of Hours: 720



Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Millennium (AMS 12)



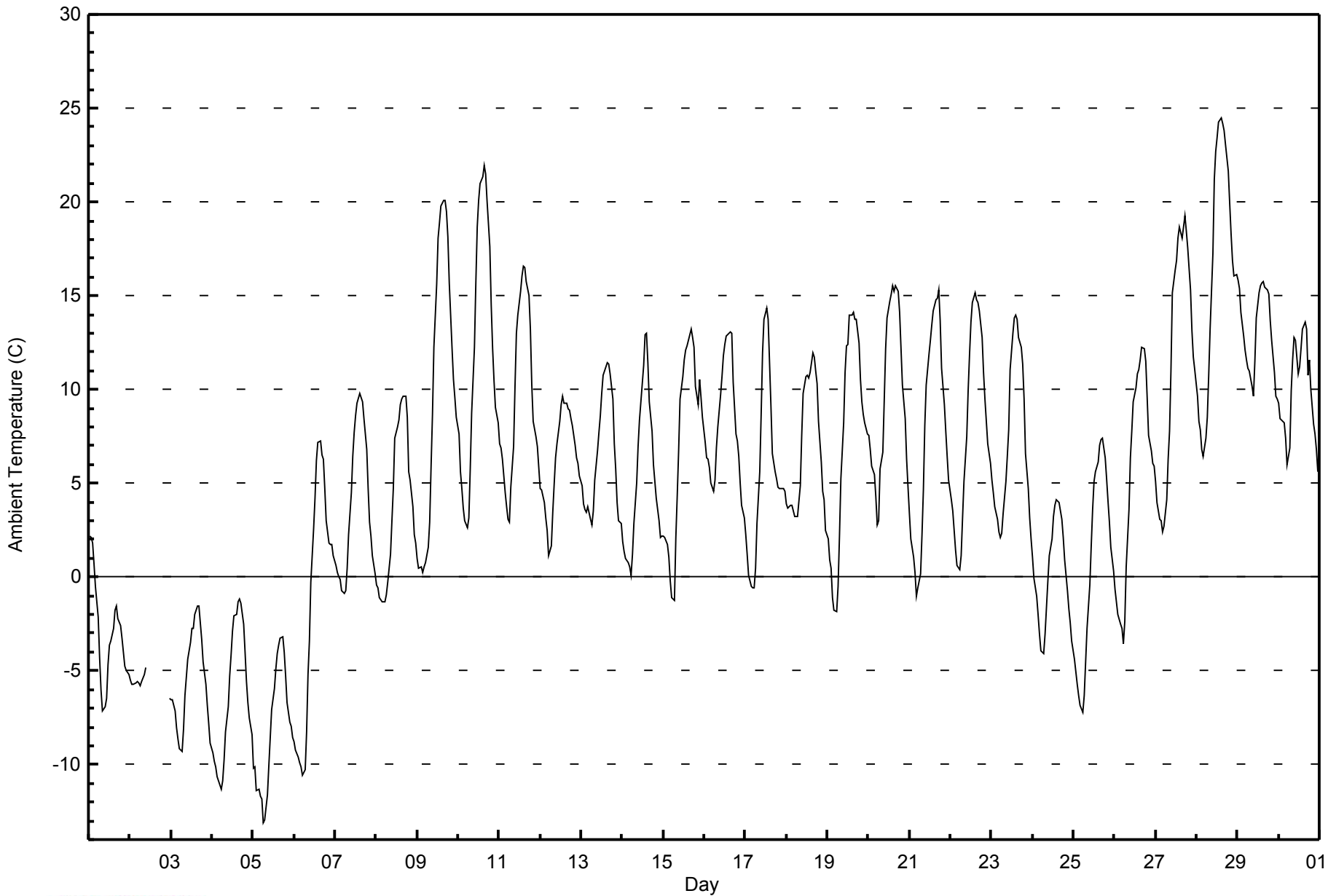


Maximum Value: 24.5 C on Apr 28 15:00		Maximum Daily Average: 16.3 C on Apr 28		Hours in Service: 720																							
Minimum Value: -13.1 C on Apr 5 07:00		Minimum Daily Average: -8.1 C on Apr 5		Hours of Data: 707																							
Maximum Diurnal Average: 11.1 C at hour 16		Minimum Diurnal Average: -0.7 C at hour 6		Hours of Missing Data: 13																							
Monthly Average: 5.26 C		Percentiles: P <sub>1</sub> = -11.5 P <sub>10</sub> = -5.3 Q <sub>1</sub> = 0.4 Median = 5.5 Q <sub>3</sub> = 10.7 P <sub>90</sub> = 14.6 P <sub>99</sub> = 22.5		Hours of Calibration: 0																							
				Percent Operational Time: 98.2																							
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-Apr	2.1	2.1	1.8	0.7	-0.5	-2.1	-4.3	-6.1	-7.1	-6.9	-6.5	-4.7	-3.6	-3.4	-2.8	-1.8	-1.6	-2.2	-2.6	-3.3	-4.0	-4.8	-5.0	-5.2	-3.0	2.1	
2-Apr	-5.5	-5.7	-5.7	-5.6	-5.6	-5.6	-5.8	-5.6	-5.2	-4.8	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	-6.5	--	-4.8
3-Apr	-6.5	-6.6	-7.1	-8.1	-8.6	-9.2	-9.3	-8.1	-6.3	-5.4	-4.4	-3.5	-2.8	-2.8	-2.0	-1.5	-1.5	-2.4	-3.3	-4.5	-5.8	-6.8	-7.8	-8.8	-5.5	-1.5	
4-Apr	-9.4	-9.8	-10.1	-10.7	-10.9	-11.3	-10.9	-9.8	-8.2	-6.9	-5.3	-4.1	-2.9	-2.1	-2.0	-1.3	-1.2	-1.4	-2.5	-4.0	-5.6	-6.7	-7.5	-8.4	-6.4	-1.2	
5-Apr	-10.2	-10.1	-11.4	-11.3	-11.7	-11.9	-13.1	-13.0	-11.6	-10.1	-8.6	-7.1	-6.0	-4.9	-4.1	-3.6	-3.3	-3.2	-4.0	-5.3	-6.7	-7.7	-7.9	-8.5	-8.1	-3.2	
6-Apr	-8.8	-9.2	-9.6	-9.9	-10.1	-10.6	-10.3	-8.3	-5.2	-3.4	-0.3	2.5	4.2	6.2	7.2	7.3	6.5	6.3	4.7	3.0	1.8	1.8	1.8	1.1	-1.3	7.3	
7-Apr	0.6	0.3	0.0	-0.1	-0.7	-0.9	-0.7	0.5	2.3	4.5	6.4	7.7	8.6	9.3	9.8	9.6	9.3	8.5	6.8	4.7	2.9	2.2	1.1	0.2	3.9	9.8	
8-Apr	-0.4	-0.6	-1.1	-1.3	-1.3	-1.3	-1.0	-0.3	1.2	3.0	4.7	7.4	8.0	8.4	9.2	9.5	9.7	9.7	8.5	5.6	5.1	3.7	2.3	1.8	3.8	9.7	
9-Apr	1.0	0.4	0.6	0.3	0.5	0.8	1.6	2.9	5.9	8.7	12.2	15.6	18.1	18.9	19.8	20.0	20.1	19.5	18.1	15.7	12.2	10.5	9.6	8.6	10.1	20.1	
10-Apr	7.6	5.6	4.7	3.7	3.0	2.6	3.1	5.8	8.7	12.3	15.7	18.7	20.1	21.0	21.3	21.9	21.5	20.1	17.6	14.5	12.2	10.5	9.0	8.2	12.1	21.9	
11-Apr	7.1	6.9	6.3	4.5	3.7	3.1	2.9	4.8	7.0	10.2	13.0	14.0	15.2	16.0	16.6	16.5	15.7	15.0	13.2	10.2	8.3	7.5	6.9	5.9	9.6	16.6	
12-Apr	4.8	4.6	4.0	3.1	2.5	1.1	1.6	3.4	5.0	6.3	7.1	8.3	9.2	9.7	9.3	9.3	9.0	8.9	8.5	8.1	7.1	6.4	6.0	5.4	6.2	9.7	
13-Apr	4.9	3.9	3.6	3.4	3.8	3.1	2.8	3.5	5.2	6.7	7.7	8.6	9.8	10.7	11.2	11.4	11.4	10.8	9.5	7.1	5.7	4.0	3.0	2.8	6.4	11.4	
14-Apr	1.9	1.4	1.0	0.8	0.5	0.1	1.2	2.9	5.0	7.0	8.4	9.3	11.3	12.9	13.0	11.4	9.3	7.8	6.0	5.1	4.2	3.0	2.1	2.1	5.3	13.0	
15-Apr	2.2	2.1	1.7	1.1	-0.2	-1.1	-1.3	2.1	4.4	6.7	9.5	10.7	11.6	12.1	12.3	12.9	13.3	12.8	12.3	10.1	9.2	10.5	9.6	8.5	7.2	13.3	
16-Apr	7.2	6.3	6.3	5.8	5.0	4.5	5.1	6.9	8.0	9.7	10.7	11.8	12.4	12.8	13.0	13.1	13.0	10.4	7.7	7.2	6.5	5.0	3.8	3.2	8.1	13.1	
17-Apr	2.3	1.2	0.1	-0.5	-0.6	-0.6	0.5	2.8	5.6	8.7	12.0	13.7	14.3	13.8	11.4	9.1	6.6	5.6	5.2	4.8	4.7	4.7	4.8	4.6	5.6	14.3	
18-Apr	3.9	3.6	3.9	3.8	3.5	3.2	3.3	4.1	4.9	7.5	9.8	10.7	10.8	10.6	10.9	12.0	11.8	11.0	10.3	8.3	6.2	4.6	4.1	2.5	6.9	12.0	
19-Apr	2.0	0.9	0.5	-1.1	-1.8	-1.8	-0.5	2.2	5.3	8.2	10.9	12.3	12.4	14.0	14.0	14.1	13.8	13.8	12.4	10.6	9.4	8.7	8.2	7.6	7.3	14.1	
20-Apr	7.5	6.8	5.9	5.5	4.2	2.8	3.0	5.7	6.7	9.4	12.2	13.8	14.7	15.1	15.5	15.2	15.5	15.2	14.1	12.2	10.3	8.5	6.3	4.8	9.6	15.5	
21-Apr	3.4	2.0	1.1	0.3	-1.1	-0.6	0.2	2.3	4.6	8.1	10.3	11.9	12.6	13.4	14.2	14.8	14.9	15.3	13.7	11.1	9.2	7.8	6.5	5.2	7.5	15.3	
22-Apr	4.1	3.5	2.5	1.4	0.7	0.4	1.1	3.1	5.1	7.5	9.9	11.9	13.6	14.6	15.2	14.8	14.7	14.2	12.8	10.9	9.5	8.3	7.1	6.1	8.0	15.2	
23-Apr	5.2	4.5	3.8	3.1	2.4	2.1	2.3	3.4	5.1	6.4	7.8	11.0	13.0	13.8	14.0	13.8	12.8	12.2	11.3	9.5	6.6	4.7	3.2	2.0	7.3	14.0	
24-Apr	1.0	0.0	-1.0	-2.0	-3.0	-4.0	-4.1	-3.0	-1.6	-0.2	1.2	2.0	3.2	3.9	4.1	4.0	3.5	3.0	2.1	0.9	-0.7	-1.7	-2.4	-3.4	0.1	4.1	
25-Apr	-4.4	-5.0	-5.8	-6.3	-6.8	-7.2	-6.3	-4.5	-2.8	-0.4	1.7	3.6	5.1	5.6	6.1	7.0	7.3	7.4	6.3	5.3	4.1	2.9	1.6	0.3	0.6	7.4	
26-Apr	-0.6	-1.3	-2.0	-2.5	-2.7	-3.6	-2.3	0.6	3.6	6.4	7.8	9.3	10.1	10.8	11.1	11.5	12.2	12.2	11.5	9.5	7.5	6.7	6.1	5.9	5.3	12.2	
27-Apr	5.1	4.0	3.1	3.0	2.4	2.7	4.1	6.3	7.7	11.0	15.2	16.3	16.9	18.0	18.7	18.1	18.6	19.3	18.4	17.6	15.3	13.1	11.7	11.1	11.6	19.3	
28-Apr	9.7	8.3	7.9	6.8	6.4	7.4	8.5	10.7	13.2	17.3	21.2	22.7	23.4	24.3	24.5	24.2	23.8	23.1	21.6	19.9	18.3	16.9	16.1	16.1	16.3	24.5	
29-Apr	15.8	15.3	14.1	12.9	12.1	11.6	11.1	10.9	10.2	9.6	11.5	13.8	15.2	15.5	15.7	15.8	15.5	15.3	15.1	13.7	12.6	10.9	9.6	9.5	13.1	15.8	
30-Apr	9.3	8.5	8.3	8.2	7.4	6.0	6.9	9.9	11.5	12.8	12.7	10.8	11.2	12.2	13.2	13.6	13.2	10.8	11.6	10.0	8.2	7.6	6.8	5.6	9.8	13.6	
		2.1	1.5	0.9	0.3	-0.2	-0.7	-0.4	1.2	2.9	5.0	7.4	8.9	10.0	10.7	11.0	11.1	10.9	10.3	9.2	7.5	6.0	4.9	4.0	2.9	Diurnal Average	
		15.8	15.3	14.1	12.9	12.1	11.6	11.1	10.9	13.2	17.3	21.2	22.7	23.4	24.3	24.5	24.2	23.8	23.1	21.6	19.9	18.3	16.9	16.1	16.1	Diurnal Maximum	
MS - Missing																											



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Millennium - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Millennium - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	168	23.76	23.76
0 - 10	343	48.51	72.28
10 - 20	179	25.32	97.60
> 20	17	2.40	100.00

Total Number of Valid Hours: 707

Total Number of Hours: 720

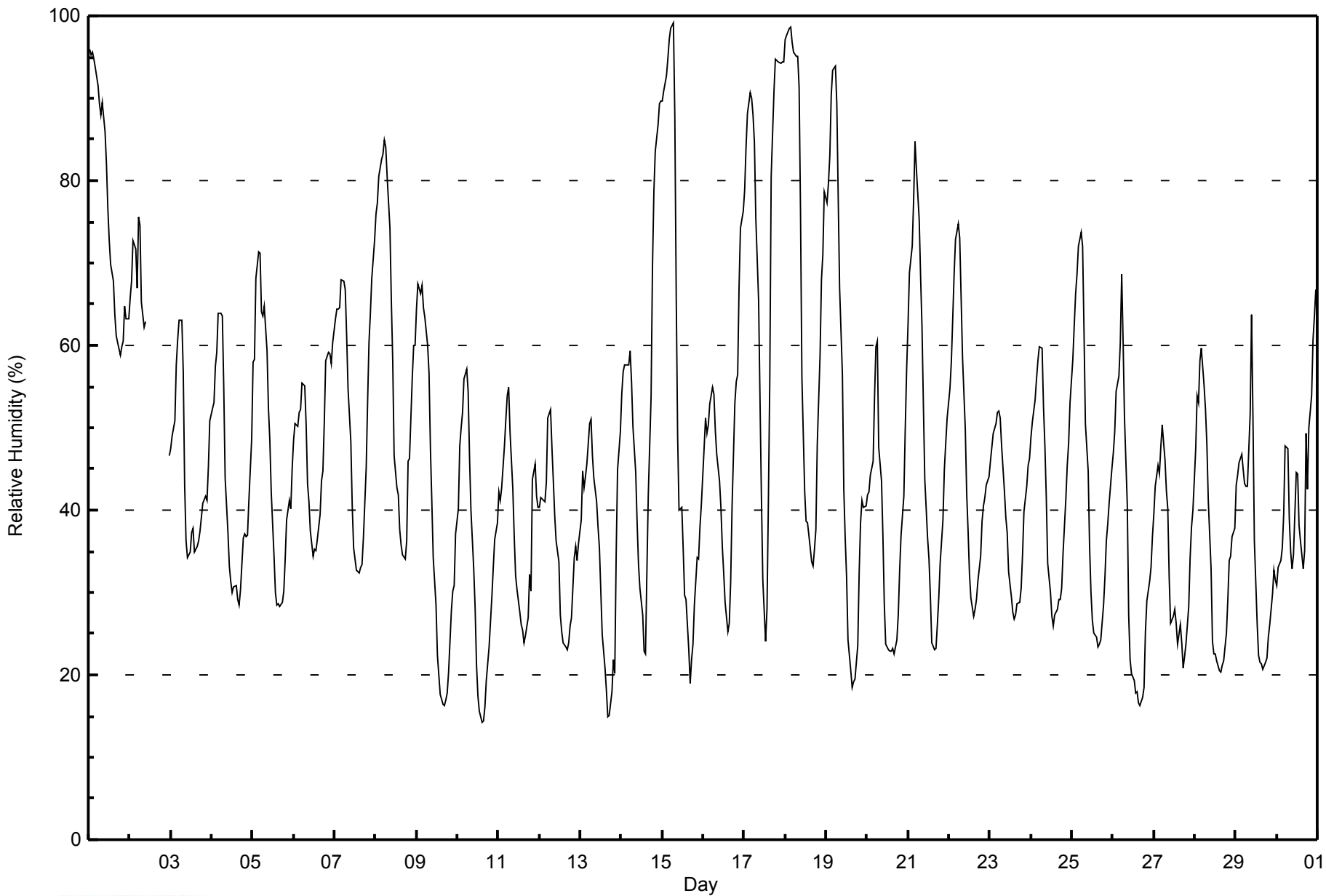


Maximum Value: 99 % on Apr 15 07:00																		Maximum Daily Average: 76.8 % on Apr 1						Hours in Service: 720		
Minimum Value: 14 % on Apr 10 15:00																		Minimum Daily Average: 33.7 % on Apr 10						Hours of Data: 707		
Maximum Diurnal Average: 66.7 % at hour 6																		Minimum Diurnal Average: 28.2 % at hour 15						Hours of Missing Data: 13		
Monthly Average: 46.7 %																		Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 24 Q <sub>1</sub> = 32 Median = 43 Q <sub>3</sub> = 58 P <sub>90</sub> = 76 P <sub>99</sub> = 97						Hours of Calibration: 0		
																								Percent Operational Time: 98.2		
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-Apr	96	95	96	95	94	92	89	88	90	86	82	77	73	70	68	64	61	60	59	60	61	65	63	63	76.8	96
2-Apr	66	68	73	72	67	76	75	65	62	63	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	47	--	76
3-Apr	48	49	51	58	61	63	63	57	43	36	34	35	37	38	35	36	36	38	39	41	42	41	45	51	44.8	63
4-Apr	52	53	58	59	64	64	63	55	44	37	33	31	30	31	31	29	29	30	37	37	37	37	41	49	43.0	64
5-Apr	58	58	68	71	71	64	64	65	59	52	48	42	34	30	29	29	28	29	30	34	39	41	40	45	47.1	71
6-Apr	48	50	50	52	52	55	55	50	43	41	37	34	35	35	36	40	44	45	51	58	59	59	58	60	47.9	60
7-Apr	63	64	64	65	68	68	67	61	55	48	40	35	34	33	32	33	33	37	45	53	60	64	68	73	52.7	73
8-Apr	76	77	81	83	83	85	84	80	74	65	58	47	43	42	38	36	35	34	36	46	46	56	60	60	59.3	85
9-Apr	64	67	66	67	65	63	60	57	48	41	34	29	22	20	18	16	16	17	18	20	28	30	31	37	39.0	67
10-Apr	40	48	50	52	56	57	54	46	40	33	28	21	18	16	14	14	16	19	23	26	29	33	36	39	33.7	57
11-Apr	42	41	43	48	51	54	55	49	43	37	32	30	28	26	25	24	25	27	32	30	44	46	42	40	38.1	55
12-Apr	40	41	41	41	43	51	52	48	44	39	36	34	27	25	24	23	23	24	26	27	34	36	34	36	35.4	52
13-Apr	39	45	43	44	46	51	51	47	44	41	38	35	30	25	21	18	15	15	18	22	20	35	45	50	34.8	51
14-Apr	54	57	58	58	58	59	56	50	44	38	33	30	27	23	23	33	42	54	69	79	84	87	89	90	53.9	90
15-Apr	90	91	93	95	97	98	99	88	66	49	40	40	35	30	29	23	19	22	24	29	34	34	38	41	54.3	99
16-Apr	48	51	49	50	53	55	54	50	47	44	40	36	32	29	25	26	31	41	53	56	57	67	74	76	47.7	76
17-Apr	79	84	88	91	90	88	85	75	65	53	42	32	24	28	41	56	80	91	95	95	94	94	94	94	73.3	95
18-Apr	97	98	99	99	97	96	95	95	91	76	56	42	39	38	37	34	33	35	38	48	59	68	71	79	67.4	99
19-Apr	77	80	83	90	93	94	89	78	67	57	43	37	32	24	21	18	19	19	24	32	38	41	40	41	51.6	94
20-Apr	42	42	44	46	54	60	61	48	44	37	29	24	23	23	23	23	22	24	27	33	37	42	50	57	38.1	61
21-Apr	62	69	72	78	85	81	75	68	62	53	44	37	34	29	24	23	23	26	29	34	39	45	48	51	49.6	85
22-Apr	55	58	63	69	73	75	73	66	59	50	42	37	32	29	27	28	29	31	34	39	41	42	43	44	47.4	75
23-Apr	46	48	49	51	52	52	51	48	42	39	37	33	29	28	27	27	29	29	31	35	40	43	45	46	39.8	52
24-Apr	49	51	53	56	58	60	60	53	48	42	34	30	27	26	27	28	29	29	31	35	41	45	48	53	42.2	60
25-Apr	58	62	66	69	72	74	72	62	50	45	36	30	27	25	25	23	24	24	29	32	36	38	41	45	44.4	74
26-Apr	47	50	54	56	60	69	61	51	41	27	22	20	19	18	18	17	16	17	18	25	29	31	33	37	34.9	69
27-Apr	40	43	45	44	48	50	46	42	40	32	26	27	28	26	24	26	24	21	22	24	28	34	38	40	34.2	50
28-Apr	47	54	53	58	60	55	52	48	41	33	24	23	22	22	20	20	21	22	25	29	34	34	37	38	36.4	60
29-Apr	43	44	46	47	45	43	43	43	52	64	51	36	26	22	21	21	21	21	22	25	26	30	33	32	35.7	64
30-Apr	31	33	34	35	39	48	47	39	35	33	35	45	44	38	36	33	35	49	43	50	54	61	64	67	42.8	67
																								Diurnal Average		
																								Diurnal Maximum		
56.6 59.0 61.1 63.2 65.1 66.7 65.0 59.1 52.7 46.4 39.1 34.8 31.5 29.3 28.2 28.3 29.6 32.1 35.4 39.7 43.8 47.5 50.0 52.6																										
97 98 99 99 97 98 99 95 91 86 82 77 73 70 68 64 80 91 95 95 94 94 94 94																										
MS - Missing																										



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Millennium - April 2015**





Maximum Speed: 34 km/h on Apr 1 07:00	Maximum Daily Speed Average: 22.6 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 18 22:00	Minimum Daily Speed Average: 2.4 km/h on Apr 8	Hours of Data: 704
Maximum Diurnal Speed Average: 3.2 km/h at hour 15	Minimum Diurnal Speed Average: 0.3 km/h at hour 9	Hours of Missing Data: 16
Monthly Average Velocity: 0.3 km/h 99.1 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 16 P <sub>99</sub> = 26	Percent Operational Time: 97.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NNE17	NNE18	NNE22	NNE27	NNE27	N33	N34	N33	N33	N29	N26	N25	N24	N26	N28	N24	N22	N22	N20	N16	NNE11	NNE8	NNE9	NNE8	N22.6	N34
2-Apr	NNW5	N7	NNW5	NNW5	NNW4	N7	N7	N6	N8	N10	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	ENE6	----	N10
3-Apr	ENE4	E4	NE6	ENE5	E4	E5	E5	ESE5	E4	NNE5	NNW5	N8	N11	N12	N13	N11	NNE13	NNE14	NNE14	NNE16	NNE15	NE13	NE10	E7	NNE7.4	NNE16
4-Apr	E7	E5	ENE4	ESE2	E3	ENE4	E4	E4	NE4	N7	NNW5	NNW5	NNW8	NNW8	N9	NNW5	NNE4	NNE6	NNE13	NNE16	NNE16	NNE12	NNE8	N6	NNE5.6	NNE16
5-Apr	NNW3	NNE6	N4	N4	N4	N12	NNE16	N12	N12	N12	N11	N9	N11	N12	N12	N11	N9	NNE10	NNE11	NNE11	NNE10	ENE7	E5	SE5	NNE8.4	NNE16
6-Apr	SE7	SE9	SE11	SE10	SE10	SE9	SE10	SE10	SSE6	S6	S6	S7	S10	S10	SSE8	SSE7	SSE8	SSE7	SE9	SSE8	SSE6	S8	S11	S10	SSE8.1	S11
7-Apr	S10	S9	S10	S10	S8	S8	SSE8	S10	S11	S12	S13	S15	S15	S13	S13	S12	SSW11	SSW10	S12	S10	S8	S9	S8	SSE6	S10.4	S15
8-Apr	SSE6	SSE6	SSE6	SE7	SSE7	SSE5	SSE6	S6	S6	SE1	NNW5	WNNW7	N12	N14	NNE12	N11	NNE8	NNE9	NE8	ENE6	E5	SE6	S5	SSE5	ENE2.4	N14
9-Apr	SE5	SSE5	S5	SE6	SE8	SE10	SSE8	SSE7	SSE7	S9	SSE12	S13	SSW13	SW14	SW16	SW15	WSW12	WSW11	SW9	SSW8	SSW7	S6	S6	SSE5	SSW7.4	SW16
10-Apr	SSE5	SE7	SE7	SE7	SE8	SE7	SSE4	SSE5	SSE5	SE6	SE6	SE6	SE7	S10	SSW9	SSE7	SSE9	S7	SSE4	S8	SSE5	SE5	SE6	SE6	SSE6.1	S10
11-Apr	SE8	SE7	SSE6	SE5	SSE5	SSE5	SSE4	S5	S6	S5	WSW8	W9	WNNW7	W13	W11	WNNW11	WNNW11	W11	W16	WSW21	W20	WNNW9	W6	WSW7	WSW5.9	WSW21
12-Apr	WSW9	W13	WSW12	WSW11	WSW9	SSE4	S4	SW10	WSW11	WSW11	WSW16	WSW16	W17	W17	WSW16	W18	W18	W15	W14	W12	NW12	W6	WSW7	SW10	WSW11.2	W18
13-Apr	W10	W4	WSW8	W10	WNNW15	WNNW12	W11	W14	WNNW15	WNNW19	WNNW17	NW15	NW16	WNNW16	WNNW16	WNNW13	NW13	NW12	NW7	NNW4	ESE1	ESE5	ESE6	SE9	WNNW9.2	WNNW19
14-Apr	SE10	SE9	SE10	SE11	SE13	ESE12	SE13	SE15	SE13	SE13	SE12	SE12	SSE8	SSE7	S9	SSE14	SSE12	SSE13	SSE11	SE14	SE14	SE14	SSE11	SSE9	SE11.3	SE15
15-Apr	SSE7	SSE7	SSE5	SSE4	SSW4	SSE4	SSE4	SE5	SSW5	WSW6	WSW5	W13	W10	WSW13	WNNW14	W13	W12	WSW10	WSW9	SSW4	SSW8	W15	WSW10	SW11	WSW6.1	W15
16-Apr	WSW10	SW10	WSW12	WSW12	WSW9	WSW8	WSW7	SW7	SSW8	SSE8	S9	SW14	WSW12	WSW13	W16	WSW16	WSW16	NNW17	NNW9	WNNW12	WNNW9	WNNW9	WSW7	W6	WSW8.5	NNW17
17-Apr	SW3	SSE2	SSE3	SSE4	SSE5	SSE5	SSE6	SSE5	SSE6	SSE7	S8	S10	SSW13	SSW15	SSW19	SSW18	S10	SSE9	SE12	ESE10	SSE6	SE3	SE3	WNNW3	S6.8	SSW19
18-Apr	NW5	NW5	NW9	NW9	NW11	NNW13	N16	NNW11	NW11	NW12	NW13	NNW15	NNW14	NNW17	NW10	N13	N20	NNW9	N15	NE12	ESE2	NW0	S1	AF	NNW9.6	N20
19-Apr	SSW4	SSW3	S3	SW4	SSW4	S5	S5	SSE5	SSE5	S5	SSE5	SSE6	SE3	S9	SW7	W10	WNNW6	W6	SW2	S3	SSE4	SSE4	S6	SE6	SSW3.7	W10
20-Apr	SE6	SSE4	SW3	W3	NW5	NNW4	NE3	ENE3	N5	N4	NNW5	NNW4	SW2	N6	NNW7	N7	NNW6	NNE8	NNE13	NNE14	NNE15	NNE14	NNE14	N11	N5.2	NNE15
21-Apr	N11	N6	N7	NNE4	N2	N4	N7	NNW7	NW7	NW8	N11	N11	N12	N12	N13	NNE10	NNE11	ENE11	E10	ENE9	E10	ESE14	ESE14	SE12	NNE5.9	ESE14
22-Apr	ESE13	ESE13	SE12	SE11	SE13	ESE14	ESE15	ESE15	ESE14	ESE14	ESE15	ESE15	ESE16	SE17	ESE16	SE18	ESE17	ESE18	ESE15	ESE14	ESE18	ESE17	ESE18	ESE17	ESE15.1	SE18
23-Apr	SE15	SE16	SE16	ESE14	ESE11	ESE9	ESE8	ESE9	ESE11	E8	E8	ESE11	E11	E12	ESE13	ESE12	SE15	ESE14	ESE11	ENE13	ENE20	ENE14	ENE9	NE7	ESE11.1	ENE20
24-Apr	NNE10	NNE13	NNE13	NE12	NE14	NE14	NNE12	NE13	NNE14	NE13	NE17	NNE16	NE12	NE13	NNE13	NNE20	N25	N25	N26	NNE23	NNE24	NNE19	NNE16	NNE15	NNE16.1	N26
25-Apr	N14	N16	NNE15	N10	N10	NNE13	NNE12	N8	N6	NNW6	NW6	WNNW8	WNNW8	W7	WNNW5	NNW5	NW8	NW7	N10	N11	N13	NNE14	NE11	ENE7	N7.8	NNE16
26-Apr	SSE5	SSE4	SSE4	SE5	SSW5	SSW8	SSW5	SSW5	S5	S6	S4	S7	SSW8	S6	NE3	E4	E5	ENE5	NE7	ENE5	E5	ESE8	SE12	SE14	SSE4.0	SE14
27-Apr	SE12	SE7	SE8	SE10	SE9	ESE9	SE10	SE10	SSW6	SSW10	SSW14	SSW14	SW12	SSW15	SW16	SSW16	SW14	SW15	SW13	SW7	SSW6	SSW7	SSW6	SSW7	S8.2	SSW16
28-Apr	SE5	SE6	SSE7	SE6	SE8	SE7	SSE5	S4	SSW5	SSW3	UO	SSE9	S11	SSE10	SSE11	SSE12	S14	S15	SSE8	SSE10	SE10	S7	SSE6	WSW5	SSE7.4	S15
29-Apr	WNNW8	WNNW10	W8	W8	W8	W12	WNNW11	W10	W5	SSW5	SW5	W5	W11	W13	WSW11	W10	WSW6	WSW7	WSW8	SW8	SW7	SSW6	SSW7	SW8	WSW7.3	W13
30-Apr	WSW9	WSW7	WSW7	WSW9	SW9	SSE4	S4	SW7	W11	W13	WSW16	WSW16	WSW14	SW13	W11	W8	NW11	N12	NNW6	AF	S3	SSE4	S5	SSE4	WSW6.6	WSW16
SE1.9 ESE1.9 SE1.6 SE1.5 ESE1.4 E1.9 ENE2.1 ESE1.1 SSW0.3 W0.4 WSW1.3 WSW1.9 W2.5 W2.8 W3.2 W2.4 W2.3 WNNW2.0 NNE2.3 NE2.4 ENE2.6 E2.7 SE3.0 SE2.7																								Diurnal Average		
NNE17 NNE18 NNE22 NNE27 NNE27 N33 N34 N33 N33 N29 N26 N25 N24 N26 N28 N24 N25 N25 N26 NNE23 NNE24 NNE19 ESE18 ESE17																								Diurnal Maximum		

AF - Analyzer Failure UO - Unstable Operation MS - Missing  
 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 - April 2015**

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 km/h on Apr 18 16:00			Hours of Data:	704
Minimum Value: 1 km/h on Apr 5 05:00			Hours of Missing Data:	16
			Hours of Calibration:	0
			Percent Operational Time:	97.8
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 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-Apr	3	3	4	5	5	5	7	7	7	6	6	5	5	5	6	5	5	5	4	3	3	2	2	1	7
2-Apr	2	2	2	2	2	2	2	1	2	2	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	2	2
3-Apr	1	1	1	2	1	1	1	1	2	3	3	3	4	3	3	4	3	3	3	3	3	3	3	2	4
4-Apr	2	1	1	2	1	1	1	1	2	2	2	2	3	3	3	2	2	3	3	3	3	3	2	2	3
5-Apr	2	1	1	1	1	4	3	2	3	2	3	3	3	3	3	4	2	2	2	2	2	2	2	2	4
6-Apr	2	3	3	2	3	2	3	3	2	2	2	2	3	4	3	3	3	2	2	2	1	2	2	2	4
7-Apr	2	2	2	2	2	2	2	3	3	3	4	5	4	4	4	4	4	3	3	2	2	2	2	1	5
8-Apr	2	1	1	1	2	1	1	1	1	1	2	2	4	3	3	3	3	2	1	1	1	1	1	1	4
9-Apr	1	1	1	2	2	2	2	2	2	3	3	3	4	5	5	5	4	4	3	2	1	1	1	1	5
10-Apr	1	1	1	2	1	1	1	2	2	2	2	2	3	4	4	3	4	2	2	2	1	1	1	1	4
11-Apr	2	2	1	1	1	1	1	2	2	2	3	3	3	4	4	4	4	4	6	7	7	4	2	2	7
12-Apr	3	4	4	4	4	2	2	3	3	4	6	6	6	7	6	7	7	6	5	5	4	3	2	3	7
13-Apr	4	2	3	5	6	5	4	4	5	7	7	6	6	6	6	5	5	5	3	2	1	2	2	3	7
14-Apr	3	2	3	3	4	4	4	4	4	4	3	4	3	2	3	4	5	5	4	4	4	4	4	3	5
15-Apr	2	2	1	1	1	2	1	2	2	2	3	5	4	4	5	5	5	4	3	1	5	6	3	4	6
16-Apr	3	3	4	4	3	3	2	2	3	3	3	6	4	6	6	5	6	7	5	6	3	3	2	2	7
17-Apr	2	1	1	1	1	1	1	1	2	2	3	4	4	5	7	6	4	3	4	3	3	2	2	2	7
18-Apr	2	2	3	3	4	5	5	4	4	4	4	7	6	7	5	9	5	3	7	7	1	2	2	AF	9
19-Apr	1	2	1	2	1	2	1	1	1	1	2	2	3	3	3	4	3	2	1	1	1	1	2	2	4
20-Apr	2	1	1	1	1	2	1	1	1	1	2	2	2	3	3	3	3	3	4	3	2	2	2	2	4
21-Apr	2	2	2	2	1	1	3	2	2	3	3	4	4	3	3	4	3	4	4	3	4	5	5	4	5
22-Apr	4	4	4	3	4	4	4	4	4	4	5	5	5	6	5	6	5	5	5	5	6	5	5	5	6
23-Apr	5	5	5	5	5	4	3	3	4	3	3	4	4	4	5	4	5	5	4	7	6	5	5	4	7
24-Apr	2	3	2	2	2	2	3	2	3	4	4	5	4	4	5	6	5	5	4	5	4	3	3	3	6
25-Apr	2	4	3	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	2	2	5	3	5
26-Apr	1	1	1	2	2	1	1	1	1	2	2	3	3	3	2	3	2	2	2	1	1	2	4	4	4
27-Apr	4	2	3	2	2	2	3	3	2	3	5	4	4	5	5	5	5	6	5	3	1	1	1	1	6
28-Apr	2	1	1	1	2	2	2	1	1	2	UO	3	4	4	4	4	5	4	3	2	2	2	2	3	5
29-Apr	3	4	3	3	3	4	4	4	2	2	2	2	4	5	4	4	3	3	3	2	2	2	2	3	5
30-Apr	3	3	3	4	3	2	1	4	4	4	5	6	5	5	6	4	6	4	4	AF	1	2	2	2	6
Diurnal Maximum																									
5 5 5 5 6 5 7 7 7 7 7 7 6 7 7 9 7 7 7 7 7 6 5 5																									

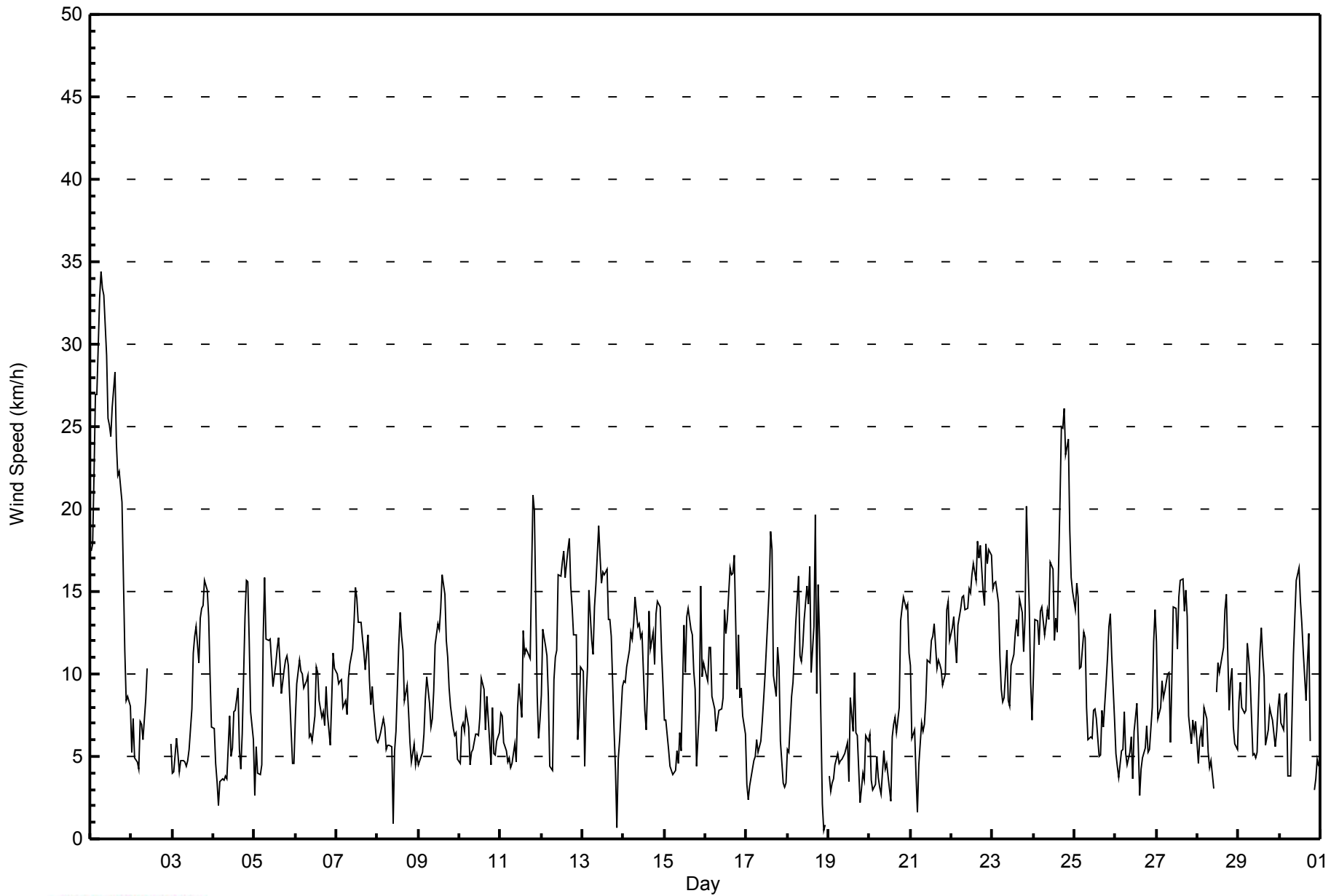
AF - Analyzer Failure      UO - Unstable Operation      MS - Missing





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Millennium - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Millennium - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	149	21.16	21.16
6 - 11	324	46.02	67.19
12 - 19	204	28.98	96.16
20 - 28	22	3.13	99.29
29 - 38	5	0.71	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 704

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Millennium - April 2015**

Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	7	3	3	7	14	5	9	39	17	12	6	2	4	2	4	15	149
6 - 11	32	18	6	7	7	11	46	41	41	17	14	28	21	13	12	10	324
12 - 19	20	32	10	2	1	26	23	5	11	9	9	15	19	10	7	5	204
20 - 28	13	6	0	1	0	0	0	0	0	0	0	1	1	0	0	0	22
29 - 38	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	77	59	19	17	22	42	78	85	69	38	29	46	45	25	23	30	704

Total Number of Valid Hours: 704

Total Number of Hours: 720





Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Direction (WD) - deg

Millennium - April 2015

Direction of Maximum Speed: 11 deg on Apr 1 07:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 10.0 deg on Apr 1	Hours of Data: 704
Direction of Minimum Speed: 321 deg on Apr 18 22:00	Direction of Minimum Daily Speed Average: 2.4 deg on Apr 8
Direction of Minimum Speed: 321 deg on Apr 18 22:00	Hours of Missing Data: 16
Monthly Average Direction: 227.6 deg	Percent Operational Time: 97.8

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-Apr	22	22	19	15	14	11	11	8	5	4	1	5	1	8	10	10	3	3	10	9	17	29	23	18	10.0
2-Apr	347	353	340	328	343	355	6	3	10	7	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	65
3-Apr	71	86	47	66	83	89	99	105	99	28	339	356	355	1	4	8	15	18	22	21	32	40	52	80	30.5
4-Apr	83	92	72	111	82	66	80	85	41	7	332	341	329	328	1	329	18	15	21	25	27	29	19	10	21.6
5-Apr	347	14	5	357	2	4	14	8	1	4	5	355	2	6	4	2	8	24	19	23	29	60	79	135	12.3
6-Apr	139	135	133	129	136	135	138	134	156	185	169	180	179	176	167	168	165	152	142	147	159	170	172	170	154.7
7-Apr	171	171	172	173	169	170	166	172	182	176	182	181	185	185	180	179	192	196	181	175	169	173	173	168	177.9
8-Apr	147	153	149	144	150	160	160	172	182	134	343	303	8	10	16	10	27	32	42	77	99	129	170	159	74.3
9-Apr	146	166	170	144	143	137	147	158	161	172	168	177	209	226	220	227	245	248	235	211	195	188	184	152	192.0
10-Apr	152	128	126	144	132	140	154	150	148	145	143	143	128	185	202	167	167	169	158	171	163	144	132	133	152.2
11-Apr	127	136	150	143	158	157	155	179	179	170	256	269	285	274	274	284	284	274	262	257	262	300	261	250	250.2
12-Apr	257	264	258	252	239	151	189	231	255	246	237	237	268	268	251	262	264	261	268	276	306	268	240	228	255.4
13-Apr	271	272	237	263	286	287	274	273	288	295	295	306	305	300	300	301	304	304	316	333	106	103	111	128	291.0
14-Apr	128	124	125	126	129	122	133	130	132	128	127	136	154	160	170	167	156	152	149	136	130	133	147	150	138.3
15-Apr	155	163	165	157	152	194	166	141	203	242	254	279	264	254	286	273	273	254	238	198	200	273	247	232	240.1
16-Apr	237	224	256	256	253	245	258	236	199	163	188	215	251	257	263	250	242	330	343	283	299	293	255	266	254.7
17-Apr	215	164	158	155	152	156	152	165	159	155	176	174	199	197	202	194	169	149	133	122	158	146	140	303	171.5
18-Apr	322	325	318	320	325	344	353	331	311	314	321	338	340	339	310	5	11	329	360	38	123	321	190	AF	339.9
19-Apr	198	211	181	227	205	189	179	165	167	173	151	150	134	176	219	271	293	263	229	174	166	163	180	142	192.0
20-Apr	145	151	218	273	315	337	47	69	356	359	331	330	234	9	328	2	348	16	21	27	32	25	13	1	9.3
21-Apr	2	354	4	18	352	354	358	333	311	313	351	355	360	4	10	19	12	65	79	78	92	111	114	125	28.2
22-Apr	120	122	129	134	127	121	122	123	123	120	119	118	121	126	123	126	118	118	118	115	118	120	122	123	121.6
23-Apr	127	128	124	120	117	106	108	106	118	101	93	102	98	97	105	112	126	116	117	65	60	77	74	46	103.3
24-Apr	28	29	29	34	35	36	32	34	32	38	36	29	40	35	21	12	6	11	11	13	13	18	16	12	22.5
25-Apr	8	11	15	11	10	13	13	8	349	328	305	296	298	265	298	331	317	316	353	354	5	24	53	75	357.7
26-Apr	147	162	159	146	197	210	208	209	188	180	186	185	196	184	48	80	93	67	45	71	91	119	126	130	146.8
27-Apr	131	146	140	133	128	122	129	139	195	200	192	193	217	207	228	211	227	235	235	235	209	195	193	197	191.1
28-Apr	141	143	147	141	134	144	148	174	202	198	UO	155	169	157	157	164	176	180	167	148	146	173	162	244	162.1
29-Apr	297	291	275	259	263	276	289	277	274	203	232	267	265	264	258	278	246	242	237	217	218	213	208	230	258.0
30-Apr	239	241	244	245	228	157	180	235	263	269	251	244	237	227	275	259	313	356	332	AF	169	147	170	168	249.3
124.9 120.2 124.4 133.6 123.4 82.3 75.9 113.8 210.6 276.6 254.7 246.4 268.2 266.0 277.9 280.4 305.6 337.5 15.6 46.3 66.6 90.4 124.4 138.8																									
Diurnal Average																									

AF - Analyzer Failure      UO - Unstable Operation      MS - Missing  
 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 - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 90 deg on Apr 18 22:00			Hours of Data:	704
Minimum Value: 8 deg on Apr 27 22:00			Hours of Missing Data:	16
			Hours of Calibration:	0
			Percent Operational Time:	97.8
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 13 Q <sub>1</sub> = 16 Median = 22 Q <sub>3</sub> = 30 P <sub>90</sub> = 39 P <sub>99</sub> = 80				

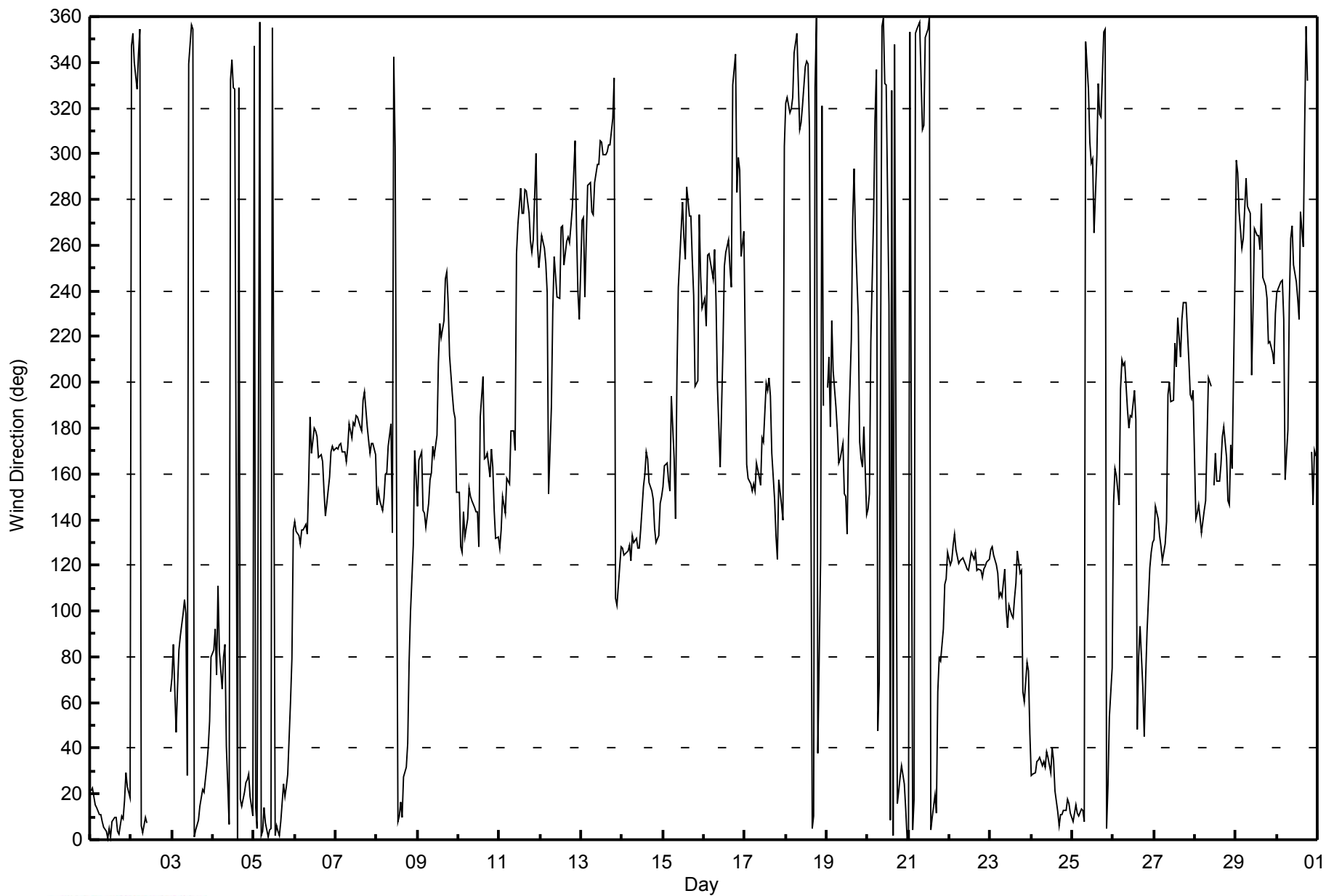
Day	Hourly Period Ending At (MST)																								Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																							
1-Apr	14	13	14	13	14	13	14	16	18	17	17	17	18	16	15	14	16	18	13	14	14	14	13	13	18																						
2-Apr	24	22	28	31	31	20	16	18	15	16	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	MS	21	31																						
3-Apr	26	27	15	20	25	21	24	43	44	64	58	36	24	18	18	25	18	15	14	13	11	11	16	26	64																						
4-Apr	20	25	28	80	33	18	26	30	54	21	53	59	38	38	30	47	47	28	15	13	12	12	16	15	80																						
5-Apr	43	10	23	15	10	15	12	14	16	15	19	28	22	20	17	17	22	18	15	12	10	23	27	26	43																						
6-Apr	18	17	16	16	15	16	16	17	24	24	31	25	27	26	27	25	20	18	14	14	14	14	14	14	31																						
7-Apr	15	15	15	15	15	15	16	16	19	17	19	19	20	21	20	19	23	20	16	15	16	15	15	14	23																						
8-Apr	17	12	12	11	14	16	17	17	22	89	41	35	21	15	19	18	25	15	10	23	13	13	26	13	89																						
9-Apr	18	18	13	15	13	14	15	18	17	19	17	19	28	28	27	28	31	30	24	17	9	10	10	20	31																						
10-Apr	19	12	11	12	11	13	11	18	21	22	26	31	34	47	39	37	25	19	18	14	10	14	16	15	47																						
11-Apr	15	18	14	16	13	20	21	23	22	34	31	32	45	28	36	32	28	29	29	28	29	32	30	27	45																						
12-Apr	30	28	29	30	42	55	43	26	30	34	27	29	29	32	30	31	27	31	28	28	27	38	26	26	55																						
13-Apr	34	46	25	33	28	27	27	25	27	29	31	32	32	32	33	33	31	29	34	25	81	22	20	18	81																						
14-Apr	16	17	16	16	16	18	19	17	18	18	18	18	25	26	21	19	27	20	18	17	16	16	18	18	27																						
15-Apr	19	19	17	20	14	20	38	30	48	36	65	32	40	32	31	34	32	29	27	21	24	29	29	26	65																						
16-Apr	26	23	30	31	30	27	27	34	25	30	29	25	33	35	31	30	28	47	31	30	27	27	19	17	47																						
17-Apr	49	42	28	13	10	13	15	19	25	25	28	24	22	21	22	18	20	18	18	19	40	46	25	27	49																						
18-Apr	30	34	29	32	33	31	23	32	30	30	32	34	32	36	48	56	16	35	31	20	60	90	88	AF	90																						
19-Apr	16	64	22	50	20	25	15	19	26	28	38	42	77	27	47	36	45	33	37	10	15	19	17	16	77																						
20-Apr	14	13	25	31	16	38	20	60	24	39	45	69	88	62	45	33	45	25	13	12	10	12	11	14	88																						
21-Apr	15	15	14	12	24	15	26	32	26	28	25	27	21	18	17	27	20	26	27	21	27	22	22	19	32																						
22-Apr	19	18	19	20	17	18	18	19	21	22	23	25	24	23	27	20	22	21	21	21	20	20	19	18	27																						
23-Apr	20	17	18	20	27	31	27	30	26	33	35	32	34	34	31	30	22	25	22	26	16	23	48	43	48																						
24-Apr	17	12	12	12	11	12	18	17	17	23	21	21	32	27	34	23	17	16	15	13	13	15	14	12	34																						
25-Apr	12	12	12	11	11	11	12	13	34	37	50	39	43	51	64	65	37	40	27	18	14	14	30	24	65																						
26-Apr	21	20	9	16	25	8	9	15	30	32	71	53	36	59	81	67	50	34	20	14	18	17	16	17	81																						
27-Apr	17	16	18	16	15	16	17	18	32	21	21	21	34	25	27	21	31	29	25	23	18	8	8	12	34																						
28-Apr	28	14	11	10	13	15	24	27	24	65	UO	22	24	22	21	20	19	17	17	15	13	26	19	61	65																						
29-Apr	26	29	26	23	25	23	24	24	40	24	35	41	32	30	34	31	36	27	27	16	17	23	20	25	41																						
30-Apr	27	31	39	38	27	37	25	42	31	30	30	29	30	29	46	39	40	28	35	AF	22	29	28	23	46																						
Diurnal Maximum																								49	64	39	80	42	55	43	60	54	89	71	69	88	62	81	67	50	47	37	30	81	90	88	61

AF - Analyzer Failure      UO - Unstable Operation      MS - Missing



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Millennium - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 28, 2015	Last Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	14:15
Gas Cert Reference	LL104223	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	2/12/2018
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
ZAG Make/Model	API 701	Serial Number	4889
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-665	-665
Analyzer IP address	192.168.1.43		Lamp voltage	798	793
Calculated slope	0.992485	0.999404	Chamber temp	45.1	45.0
Calculated intercept	0.340061	0.372119	Pressure	707.9	724.8
Analyzer Background	9.2	8.9	Flow	0.434	0.442
Analyzer Coefficient	1.229	1.204	Intensity	91	92

Analyzer make Thermo 43i Analyzer serial # 1118148499

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.1	----
as found span	6000	98.8	795.3	804.8	0.988
calibrator zero	5500	0.0	0.0	0.0	----
high point	5000	82.8	799.8	800.1	1.000
second point	5000	41.4	399.9	399.8	1.000
third point	5000	20.7	200.0	199.2	1.004
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	82.8	799.8	793.1	1.009
Average Correction Factor					1.001

Corrected As found 805.0 Previous response 801.0 % change -0.5%

Notes:

Span was adjusted.

Calibration Performed By: Devin Russell



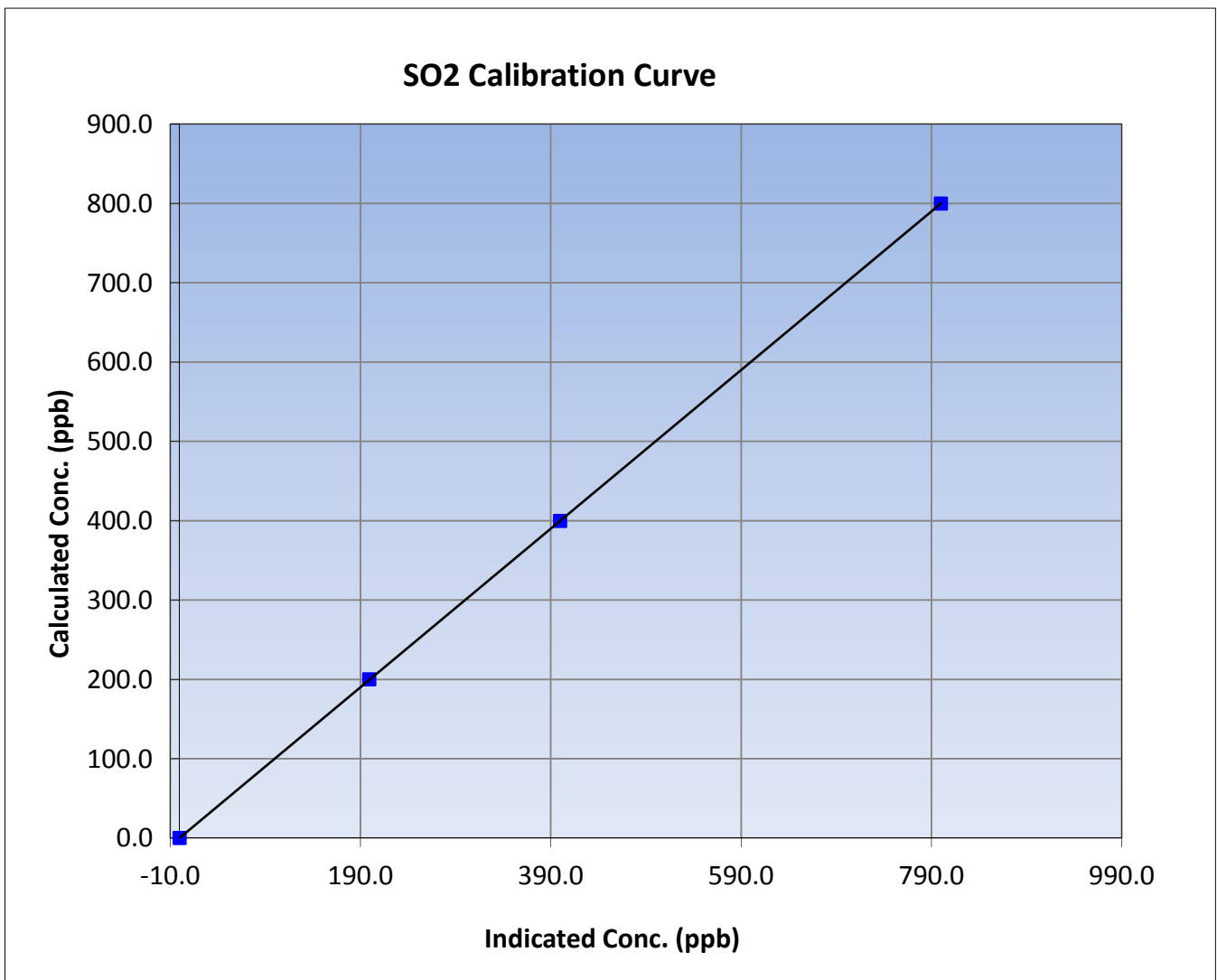
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 28, 2015	Previous Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	8:50	End Time (MST)	14:15
Analyzer make	Thermo 43i	Analyzer serial #	1118148499

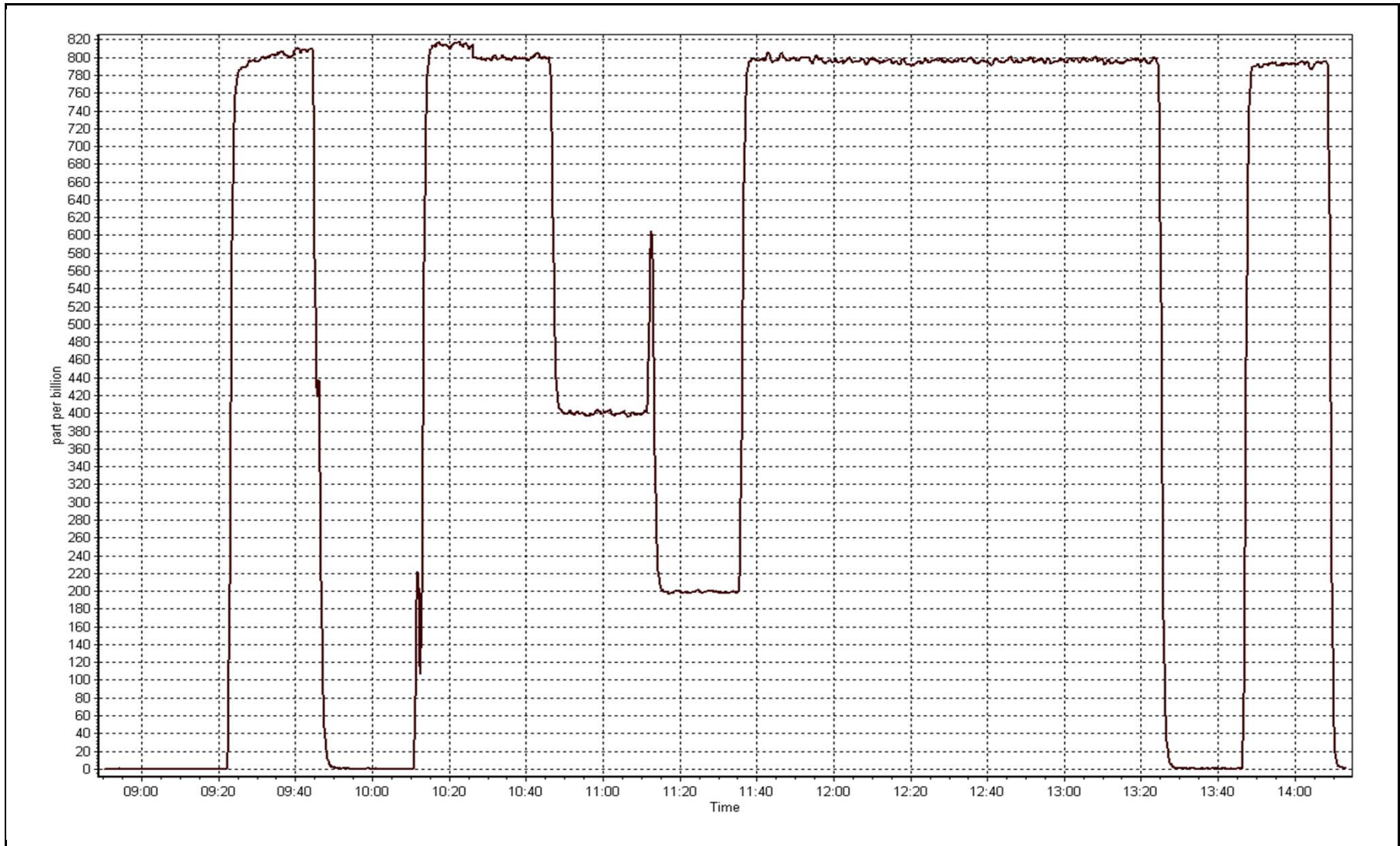
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999999
799.8	800.1	0.9997		
399.9	399.8	1.0002	Slope	0.999404
200.0	199.2	1.0036		
			Intercept	0.372119



SO2 Calibration Plot

Date: April 28, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

### Station Information

Calibration Date	April 29, 2015	Last Calibration	March 25, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	14:00
Gas Cert Reference	LL84557	Station temp.	22 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	5/30/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Dil air Make/Model	API 701	Serial Number	4889
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2581
SO2 gas concentration	48.3 ppm	SO2 gas cert/exp	LL104223 12/02/20118

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-597	-597
Analyzer IP address	192.168.1.42		Lamp voltage	886	888
Calculated slope	1.006489	0.995977	Chamber temp	44	44
Calculated intercept	-0.248713	0.711967	Pressure	688.7	682.4
Analyzer Background	18.9	19.5	Flow	0.605	0.601
Analyzer Coefficient	0.640	0.64	Intensity	46300	47xxx
			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	-0.6	----
as found span	5000	38.5	80.1	79.9	1.003
SO2 scrubber check	5000	20.7	200.0	0.3	----
calibrator zero	5000	0.0	0.0	-0.6	----
high point	5000	38.5	80.1	79.8	1.004
second point	5000	19.2	39.9	39.3	1.017
third point	5000	9.6	20.0	19.3	1.037
as left zero	5000	0.0	0.0	-0.3	----
as left span	5000	38.5	80.1	79.5	1.007
Average Correction Factor					1.019

Corrected As found	80.5	Previous response	79.8	% change	-0.8%
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Notes:

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

Calibration Performed By:

Devin Russell



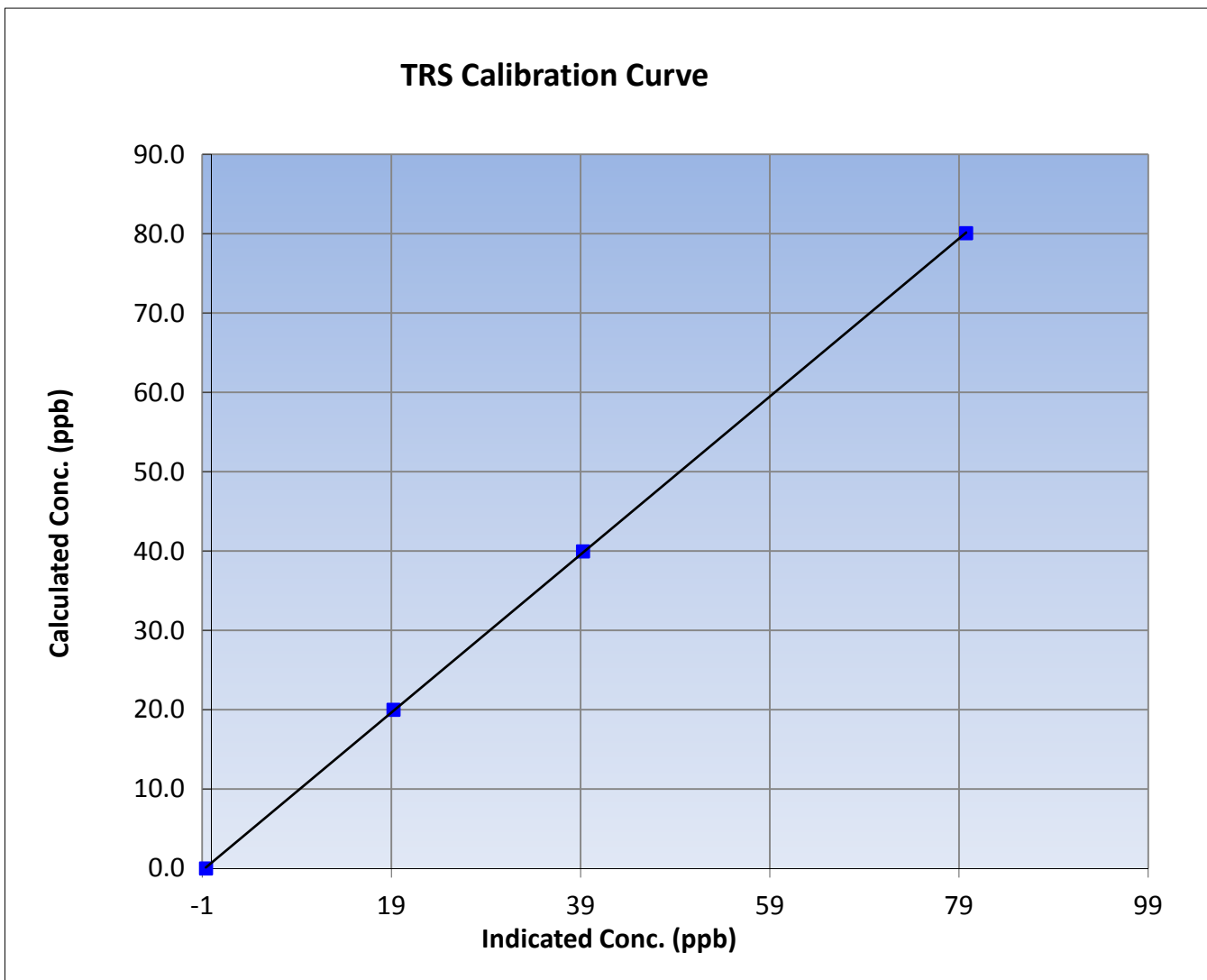
# Wood Buffalo Environmental Association TRS Calibration Report

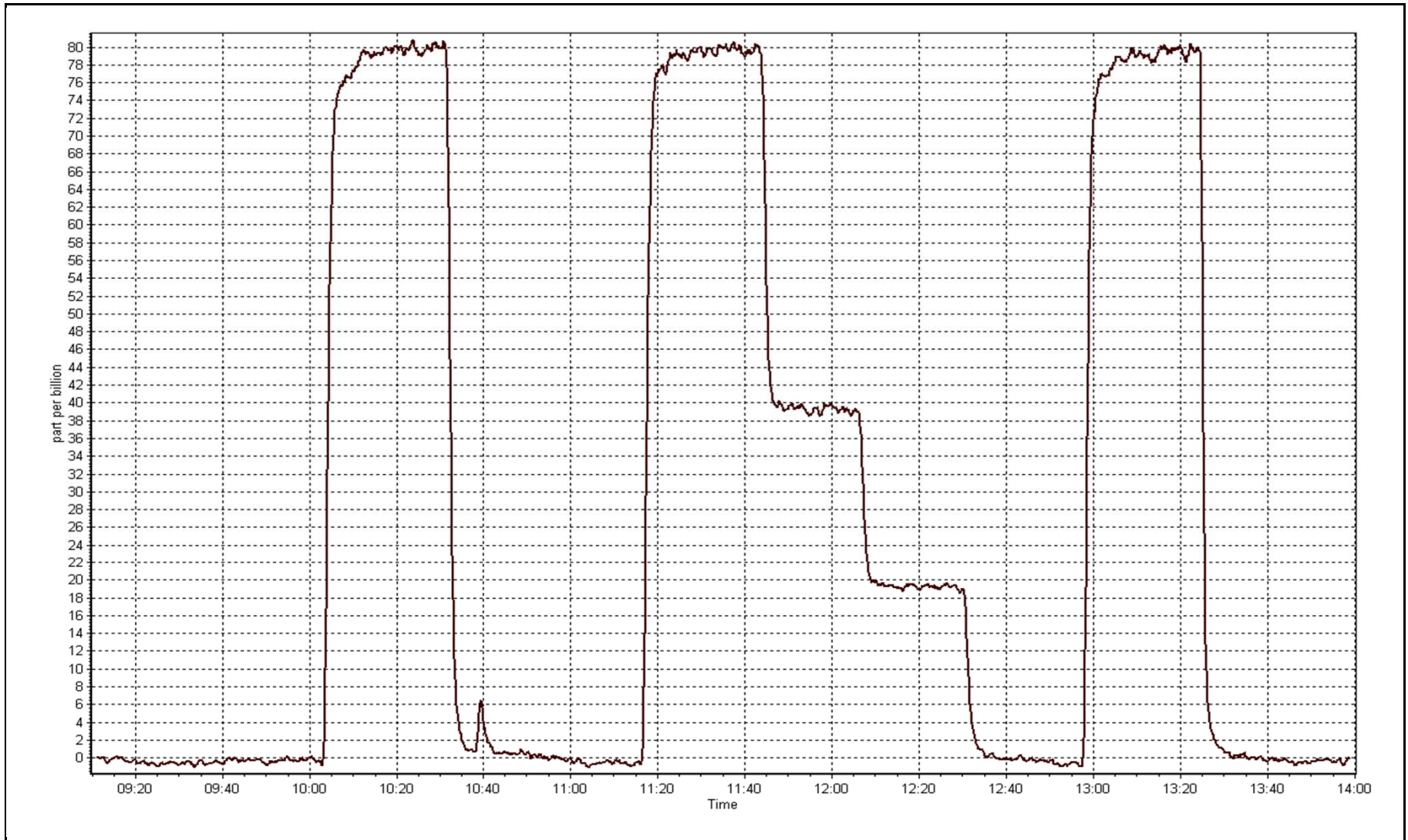
## Station Information

Calibration Date	April 29, 2015	Previous Calibration	March 25, 2015
Station Name	AMS 12	Station Number	AMS 12
Start Time (MST)	9:10	End Time (MST)	14:00
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	-0.6	----	Correlation Coefficient	0.999987
80.1	79.8	1.0039		
39.9	39.3	1.0172	Slope	0.995977
20.0	19.3	1.0373		
			Intercept	0.711967







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Tuesday, April 28, 2015	Last Calibration	Tuesday, March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	14:15
Gas Cert Reference	LL104223	Cal Gas Expiry Date	2/12/2018
CH4 Cal Gas Conc.	489 ppm	CH4 Equiv Conc.	1017.0 ppm
C3H8 Cal Gas Conc.	192 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
ZAG make/model	Teledyne API 701	Serial Number	4889
DACS make/model	Campbell Scientific CR3000	Serial Number	2581

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	9.4	11.8
Analyzer IP address	192.168.1.51		Air or Bypass Press	42.3	42.9
Calculated slope	0.999138	0.997855	Fuel Pressure	20.2	19.3
Calculated intercept	0.028383	0.043910	Analyzer Coeff	3.9	
			Analyzer BKG	2.308	

Analyzer make Thermo 51i-LT Analyzer serial # 1317958296

## 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	-0.02	----
as found span	6000	98.8	16.75	16.27	1.029
calibrator zero	6000	0.0	0.00	-0.05	----
high point	5000	82.8	16.84	16.83	1.001
second point	5000	41.4	8.42	8.40	1.002
third point	5000	20.7	4.21	4.18	1.007
as left zero	5000	0.0	0.00	0.00	----
as left span	5000	82.8	16.84	16.79	1.003
Average Correction Factor					1.003

Corrected As found 16.29 Previous response 16.73 % change 2.7%

Notes:

Span adjusted.

Calibration Performed By:

Devin Russell



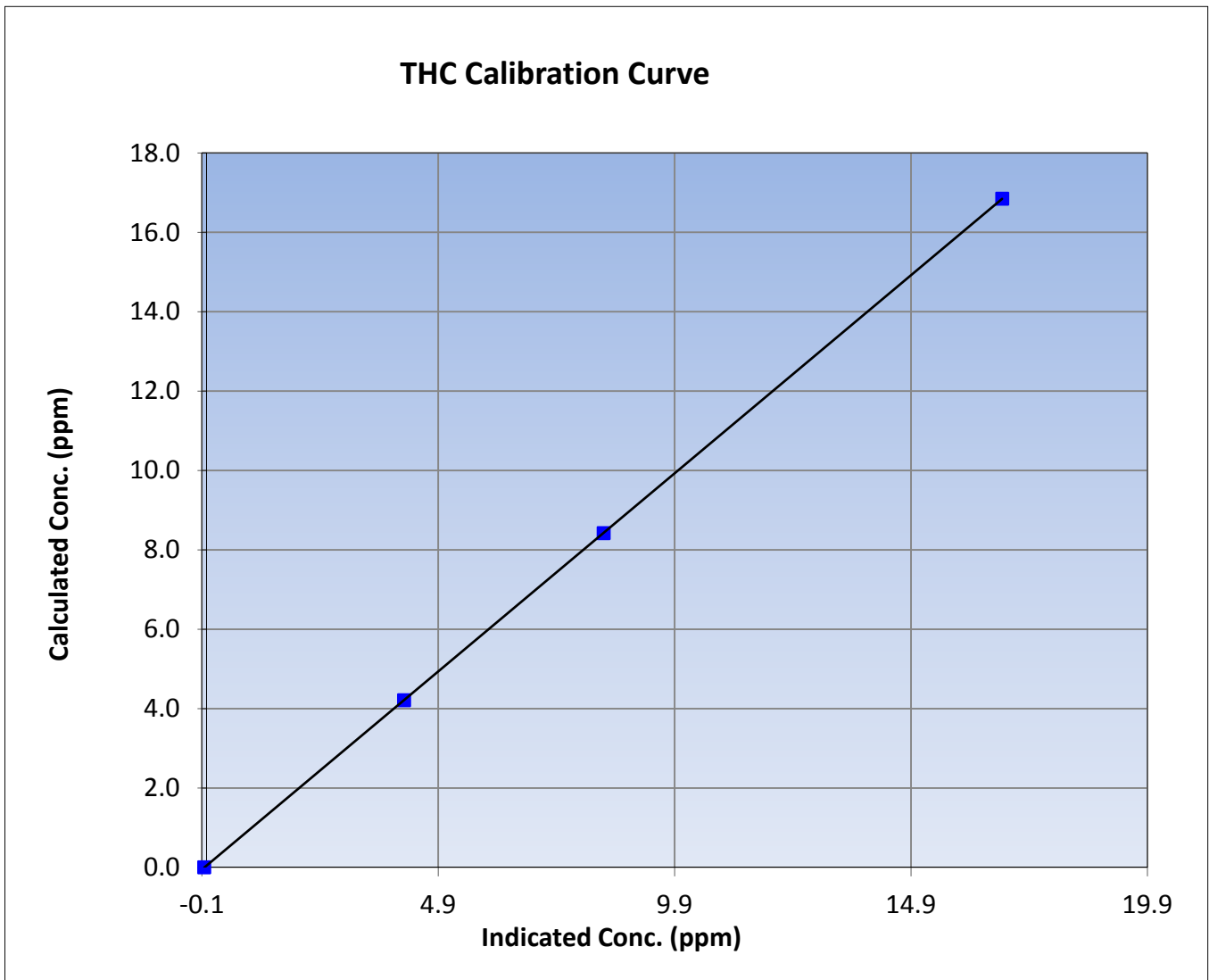
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 28, 2015	Previous Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	8:50	End Time (MST)	14:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

## Calibration Data

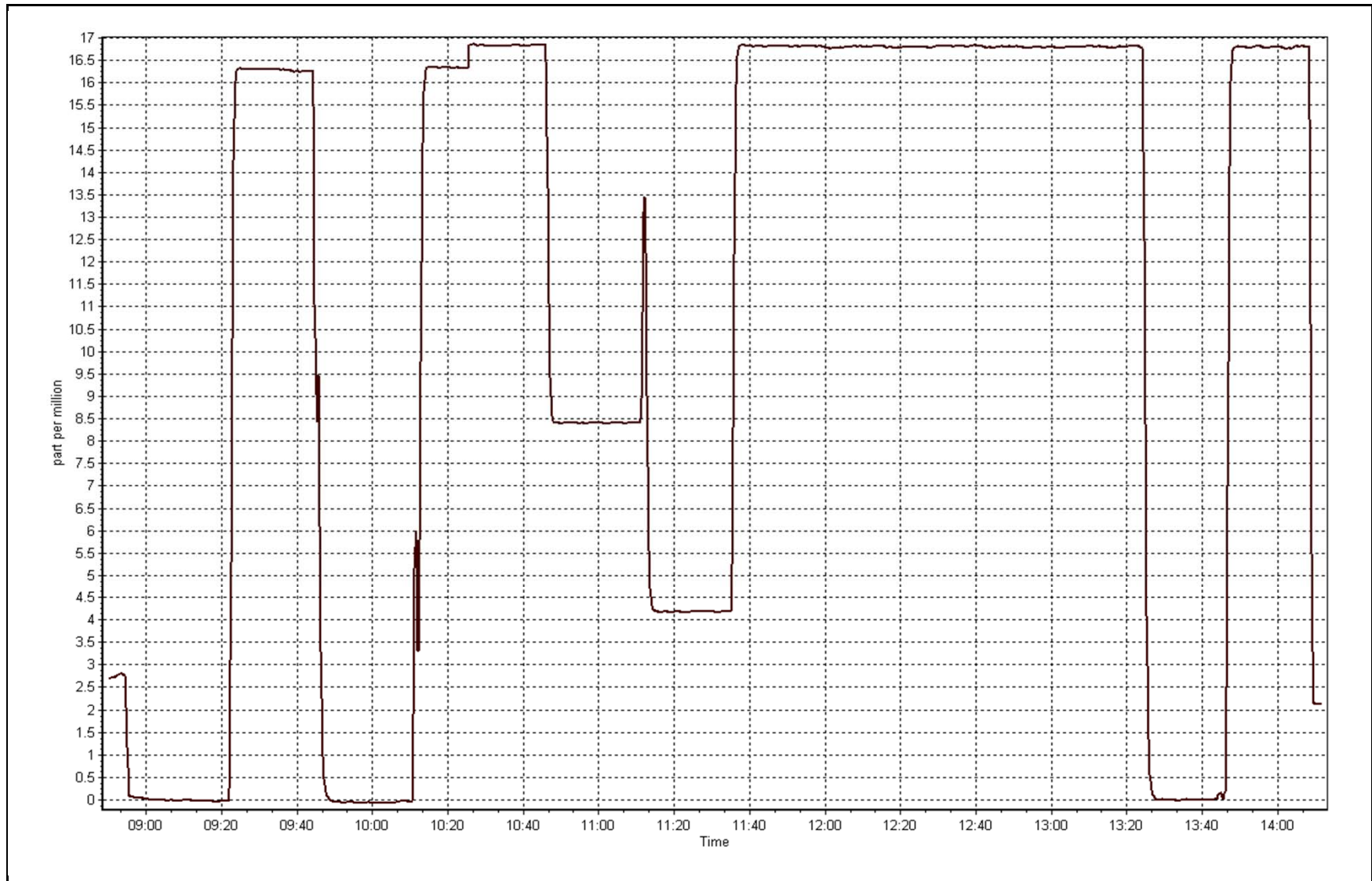
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.05	----	Correlation Coefficient	0.999999
16.84	16.83	1.0007		
8.42	8.40	1.0025	Slope	0.997855
4.21	4.18	1.0073		
			Intercept	0.043910





THC Calibration Plot

Date: April 28, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 28, 2015	Previous Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	8:50	End Time (MST)	14:15
NO Cal Gas Conc	48.3 ppm	Gas Cert Reference	LL104223
NOx Cal Gas Conc	48.3 ppm	Cal Gas Expiry Date	2/12/2018
Calibrator	Sabio 4010	Serial Number	11091107
Zero air Generator	Teledyne API T701	Serial Number	4889

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2581
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.997499	0.999819	0.998428
	Data Offset	0.991874	0.404214	0.096932
Current Calibration	Data Slope	0.995920	0.996820	1.015124
	Data Offset	0.669374	0.597874	-0.643022

## Analyzer Information

Analyzer make/model \_\_\_\_\_ Analyzer serial # \_\_\_\_\_

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.155		1.164	
NOx coefficient	1.150		1.161	
NO2 coefficient			1.000	
NO bkgnd	0.8		0.8	
NOx bkgnd	2.0		2.0	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	313.9	Deg C	316.7	Deg C
PMT voltage		V	37.8	V
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	88	ccm	87	ccm
R Cell press NO	2.9	mmHg	2.9	mmHg
R Cell Press Nox	2.9	mmHg	2.9	mmHg
NO sample flow	501	lpm	508	lpm
Nox sample Flow	0.501	lpm	0.514	lpm

**Notes:**

Span adjusted. NO values used for GPT portion of the calibration was the Second High GPT point.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 28, 2015

Station Number:

AMS 12

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	6000	0.0	0.0	0.0	0.0	-0.2	-0.7	0.5	----	----
as found span	6000	98.8	795.3	795.3	0.0	791.5	790.1	1.3	1.0049	1.0066
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.2	-0.2	----	----
high point	5000	82.8	799.8	799.8	0.0	802.2	801.5	0.7	0.9971	0.9979
second point	5000	41.4	399.9	399.9	0.0	401.9	401.9	0.0	0.9951	0.9951
third point	5000	20.7	200.0	200.0	0.0	199.1	198.6	0.5	1.0043	1.0068
as left zero	5000	0.0	0.0	0.0	0.0	-0.4	0.2	-0.5	----	----
as left span	5000	82.8	799.8	506.7	293.1	798.6	506.1	292.5	1.0015	1.0012
Average Correction Factor									0.9988	0.9999

Corrected As found      NO<sub>x</sub>= 791.6                      NO= 790.8                      Percent Change              NO<sub>x</sub>= 0.6%                      NO= 0.5%  
 Previous Response      NO<sub>x</sub>= 796.3                      NO= 795.1

### GPT Calibration Data

Dilution Flow      5000      ccm      Source Gas Flow      82.80      ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.2			N/A	
1st NO2 (300)	----	506.7	298.0	800.3	506.7	293.5	0.9832	1.0000	1.0154	98.5%
2nd NO2 (200)	----	608.1	196.6	803.0	608.1	194.9	0.9798	1.0000	1.0089	99.1%
3rd NO2 (100)	----	707.2	97.6	804.9	707.2	97.8	0.9775	1.0000	0.9982	100.2%
4th NO2 (0)	804.8	----	0.5	805.3	804.8	0.5	0.9771	1.0000	N/A	----
Average Correction Factor							0.9794	1.0000	1.0075	99.3%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

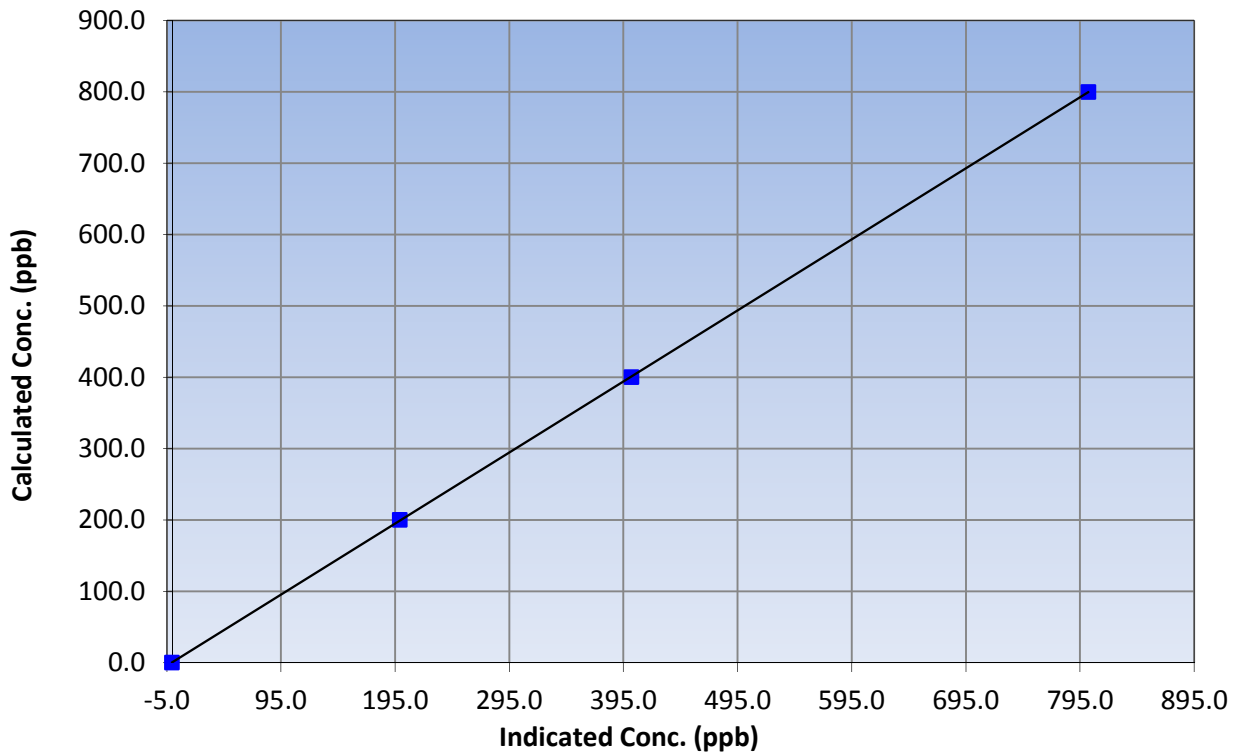
### Station Information

Calibration Date	April 28, 2015	Previous Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	8:50	End Time (MST)	14:15
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999994
799.8	802.2	0.9971		
399.9	401.9	0.9951	Slope	0.995920
200.0	199.1	1.0043		
			Intercept	0.669374

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

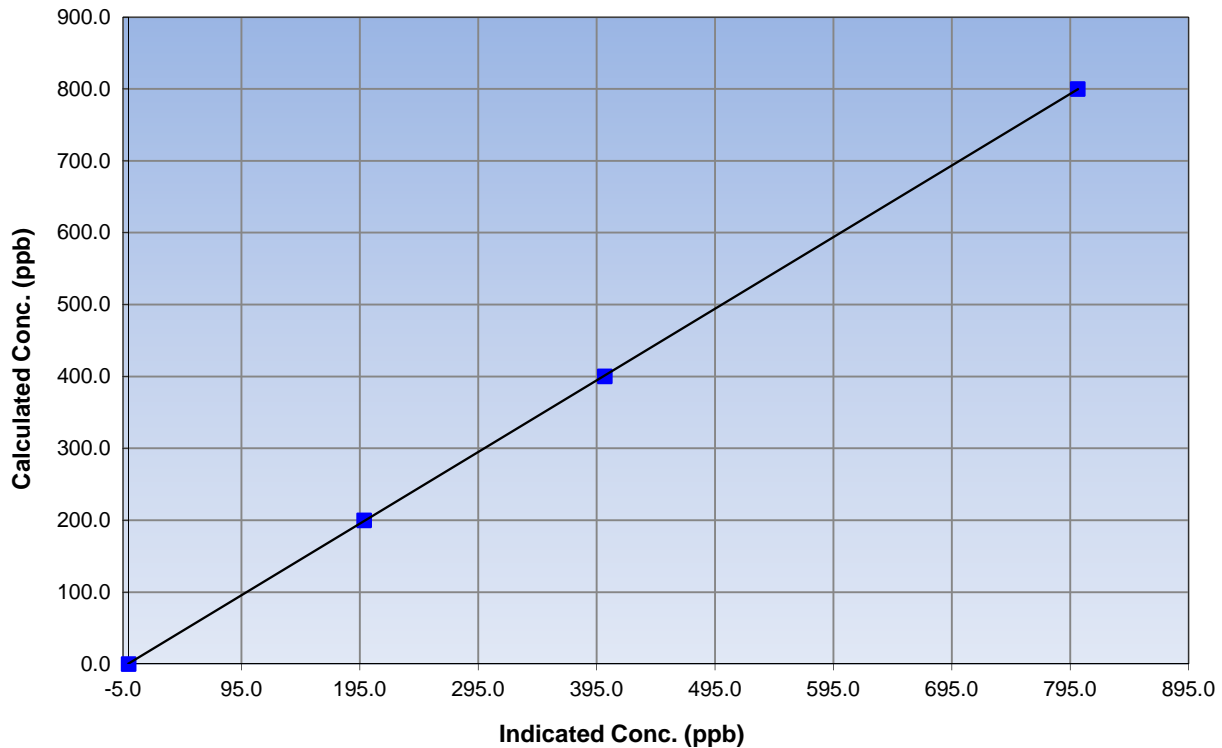
### Station Information

Calibration Date	April 28, 2015	Previous Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	8:50	End Time (MST)	14:15
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999989
799.8	801.5	0.9979		
399.9	401.9	0.9951		
200.0	198.6	1.0068	Slope	0.996820
			Intercept	0.597874

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

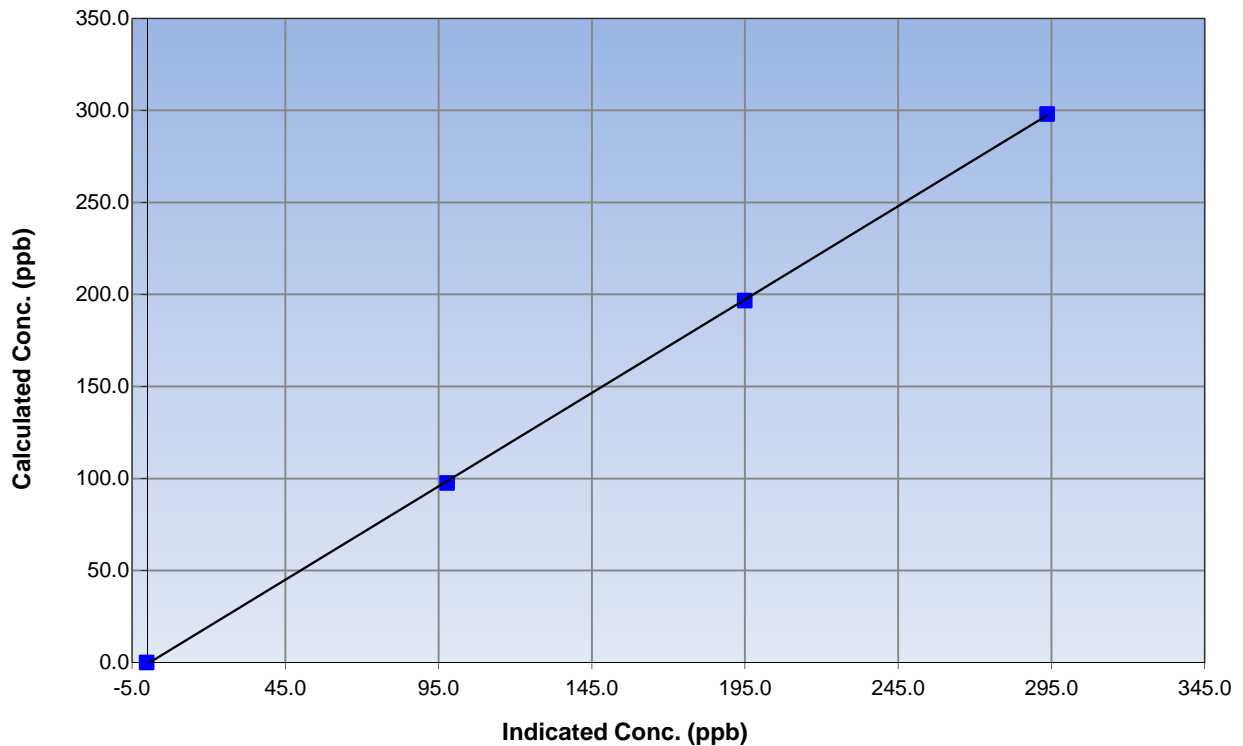
### Station Information

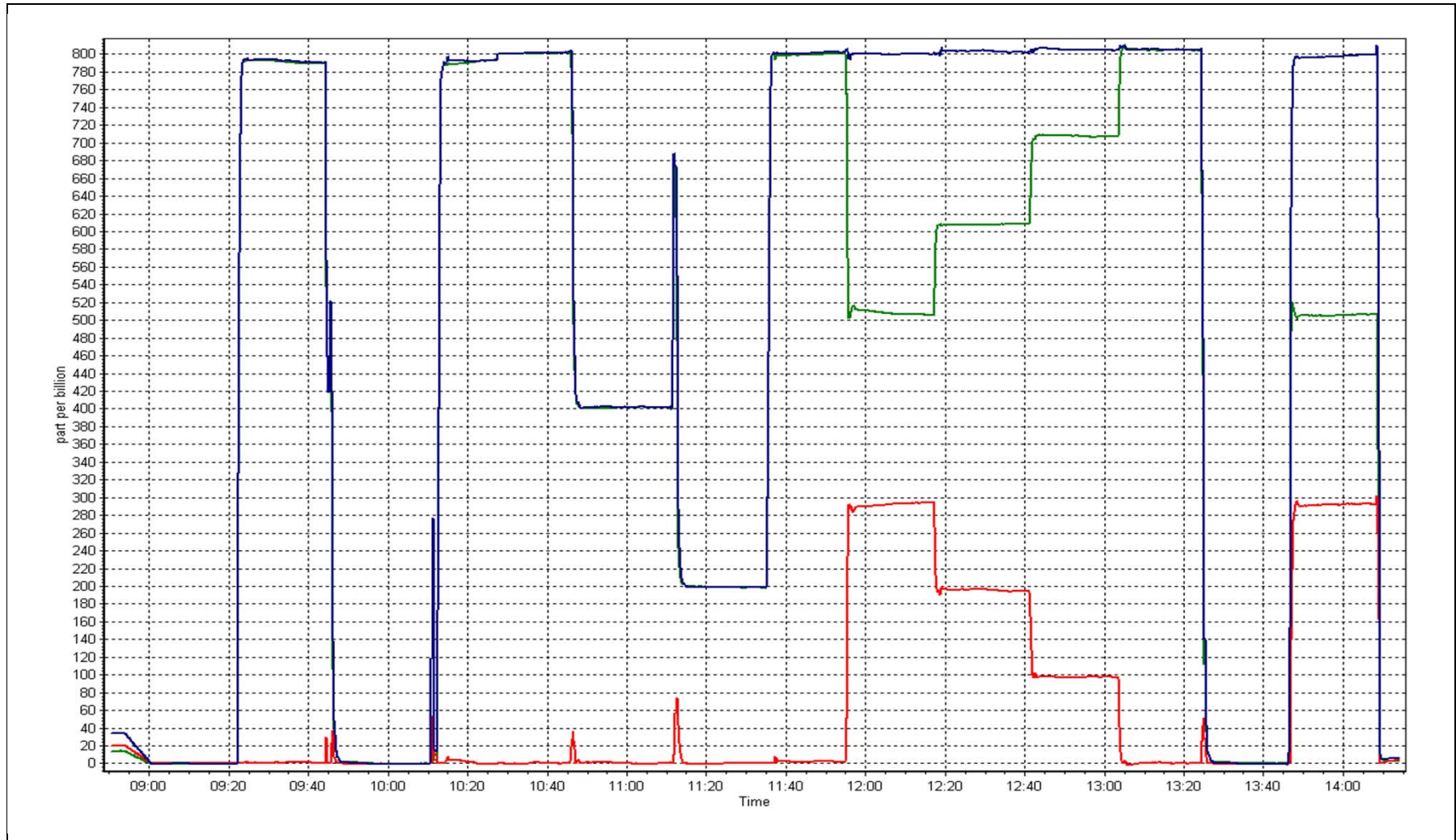
Calibration Date	April 28, 2015	Previous Calibration	March 24, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	8:50	End Time (MST)	14:15
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999947
298.0	293.5	1.0154		
196.6	194.9	1.0089	Slope	1.015124
97.6	97.8	0.9982		
			Intercept	-0.643022

### NO<sub>2</sub> Calibration Curve





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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 13  
FORT MCKAY SOUTH  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
 APRIL 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	672	37	48	98.47	38	0	5	0
TRS(ppb) Average	675	34	45	98.47	2	0	0	0
THC(ppm) Average	671	37	49	98.33	4.4	-	2.5	-
O3(ppb) Average	674	35	46	98.47	48	0	38	-
NO2(ppb) Average	673	35	47	98.33	28	0	7	-
NO(ppb) Average	673	35	47	98.33	32	-	3	-
NOX(ppb) Average	673	35	47	98.33	45	-	9	-
PM2.5(ug/m3) Average	699	0	21	97.08	27.9	-	11.5	0
Temperature 2 m (C) Average	720	0	0	100.00	25	-	14.2	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	73.0	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	19	-	14.0	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
 APRIL 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	672	1.3	3	-	0	0	0	1	1	2	38
TRS(ppb) Average	675	0.2	0	-	0	0	0	0	0	0	2
THC(ppm) Average	671	2.17	0.3	-	1.9	2	2	2.1	2.2	2.4	4.4
O3(ppb) Average	674	27.1	12	-	0	7	17	31	37	40	48
NO2(ppb) Average	673	3.3	4	-	0	0	1	2	5	8	28
NO(ppb) Average	673	0.8	3	-	0	0	0	0	1	2	32
NOX(ppb) Average	673	4.1	6	-	0	0	1	2	5	10	45
PM2.5(ug/m3) Average	699	4.3	3.2	-	0.5	1.5	2.1	3.5	5.6	8.1	27.9
Temperature 2 m (C) Average	720	3.8	8.6	-	-18.6	-6	-2.9	3.7	10.6	14.7	25
Relative Humidity (%) Average	720	51.2	23	-	14	24	33	46	71	85	98
Wind Speed 10 m (km/h) Average	720	7.2	4	-	0	2	3	7	10	13	19
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	19 Apr 2015 07:00	19 Apr 2015 17:00	11	Station power failure
THC	09 Apr 2015 13:00	09 Apr 2015 13:00	1	Maintenance - verified analyzer air and pressure sensor values
NO2, NO, NOX	09 Apr 2015 09:00	09 Apr 2015 09:00	1	Maintenance- verified O3 point for calibration
PM2.5	10 Apr 2015 11:00	10 Apr 2015 12:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	19 Apr 2015 18:00	20 Apr 2015 00:00	7	Unstable operation following station power failure
PM2.5	27 Apr 2015 09:00	27 Apr 2015 09:00	1	Intermittent unstable operation

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 38 ppb on Apr 9 10:00	Maximum Daily Average: 5.5 ppb on Apr 26		Hours of Data:	672
Minimum Value: 0 ppb on Apr 10 06:00	Minimum Daily Average: 0.1 ppb on Apr 18		Hours of Missing Data:	48
Maximum Diurnal Average: 3.9 ppb at hour 10	Minimum Diurnal Average: 0.5 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 1.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 15		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-Apr	1	Z	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
2-Apr	1	1	Z	1	1	1	1	C	C	C	C	C	C	C	0	1	1	1	1	0	1	1	1	0	0	--	1
3-Apr	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.4	1
4-Apr	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Apr	Z	0	0	0	0	0	0	0	1	4	6	13	16	9	3	5	3	1	1	1	1	0	0	0	0	3.0	16
7-Apr	0	Z	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0.6	1
8-Apr	0	1	Z	0	0	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
9-Apr	1	1	1	Z	1	1	0	1	13	38	19	6	0	0	0	0	0	0	0	1	1	0	0	0	0	3.7	38
10-Apr	0	0	0	0	Z	0	0	2	2	1	2	1	1	1	2	3	1	2	1	1	1	1	1	1	1	1.2	3
11-Apr	1	1	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1
12-Apr	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.1	3
13-Apr	3	Z	2	2	1	1	1	0	1	2	2	1	1	1	1	0	1	3	2	2	2	2	2	2	2	1.6	3
14-Apr	0	0	Z	0	0	0	0	1	2	6	8	8	9	5	2	9	4	6	6	4	3	1	1	1	1	3.4	9
15-Apr	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
16-Apr	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1
17-Apr	1	1	1	1	1	Z	1	1	1	3	17	15	1	1	1	1	1	1	1	1	1	1	1	1	1	2.2	17
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Apr	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	4
20-Apr	2	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.8	2
21-Apr	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.3	1
22-Apr	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0.6	1
23-Apr	0	0	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-Apr	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
25-Apr	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
26-Apr	0	1	Z	1	0	0	0	1	4	18	11	12	10	7	12	12	11	9	7	5	2	1	0	0	0	5.5	18
27-Apr	1	1	2	Z	1	1	1	5	15	19	14	1	1	1	1	0	0	0	0	0	0	1	1	1	1	2.9	19
28-Apr	1	1	1	1	Z	0	1	4	6	7	8	14	3	4	6	3	6	2	4	1	1	2	2	1	1	3.3	14
29-Apr	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
30-Apr	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0.6	1

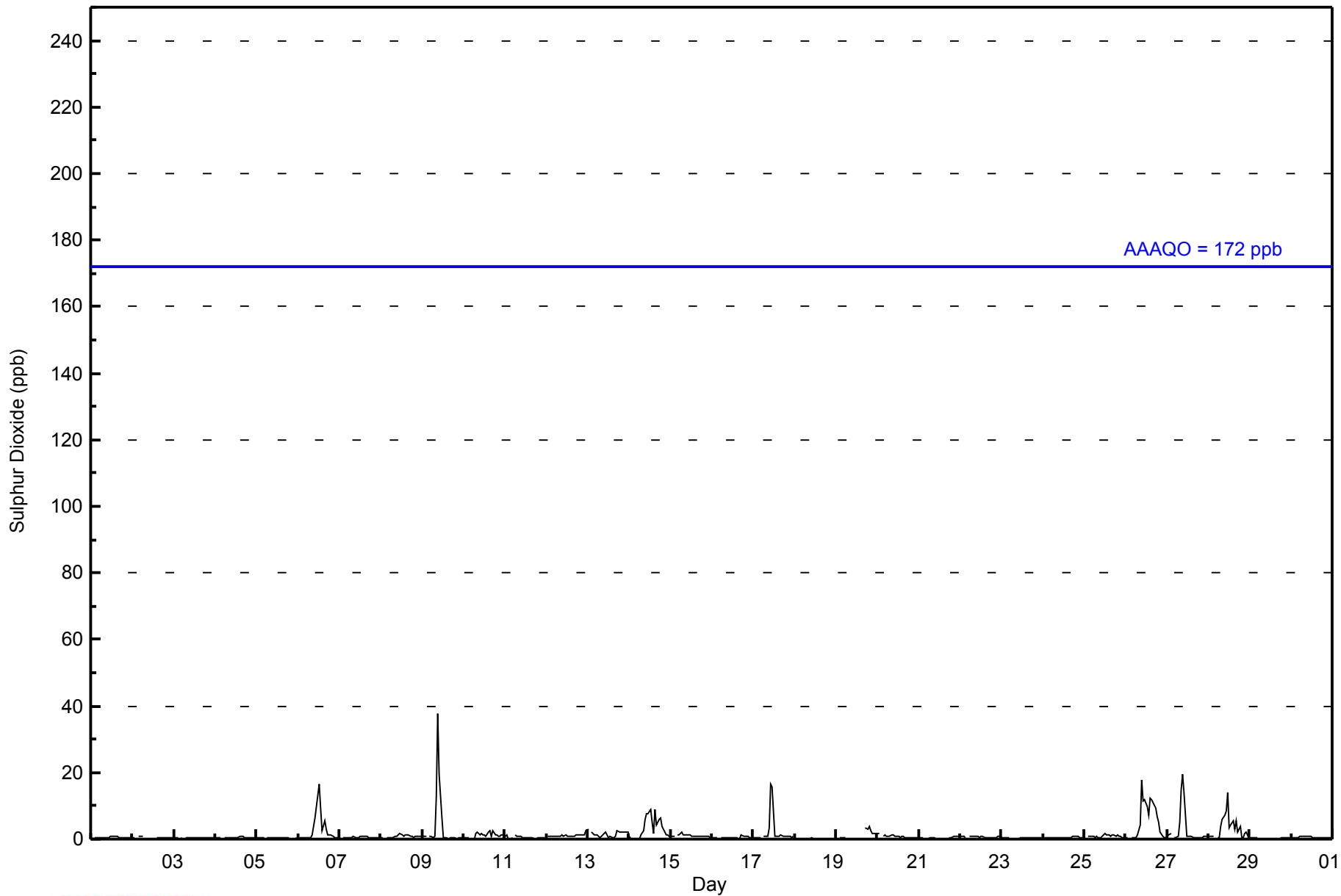
0.7	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.9	2.0	3.9	3.5	3.0	1.9	1.4	1.3	1.5	1.3	1.3	1.2	1.0	0.8	0.7	0.7	0.7	Diurnal Average	
3	2	2	2	1	1	2	5	15	38	19	15	16	9	12	12	11	9	7	5	3	2	2	3	Diurnal Maximum		

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	655	97.47	97.47
11 - 20	16	2.38	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: 672

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

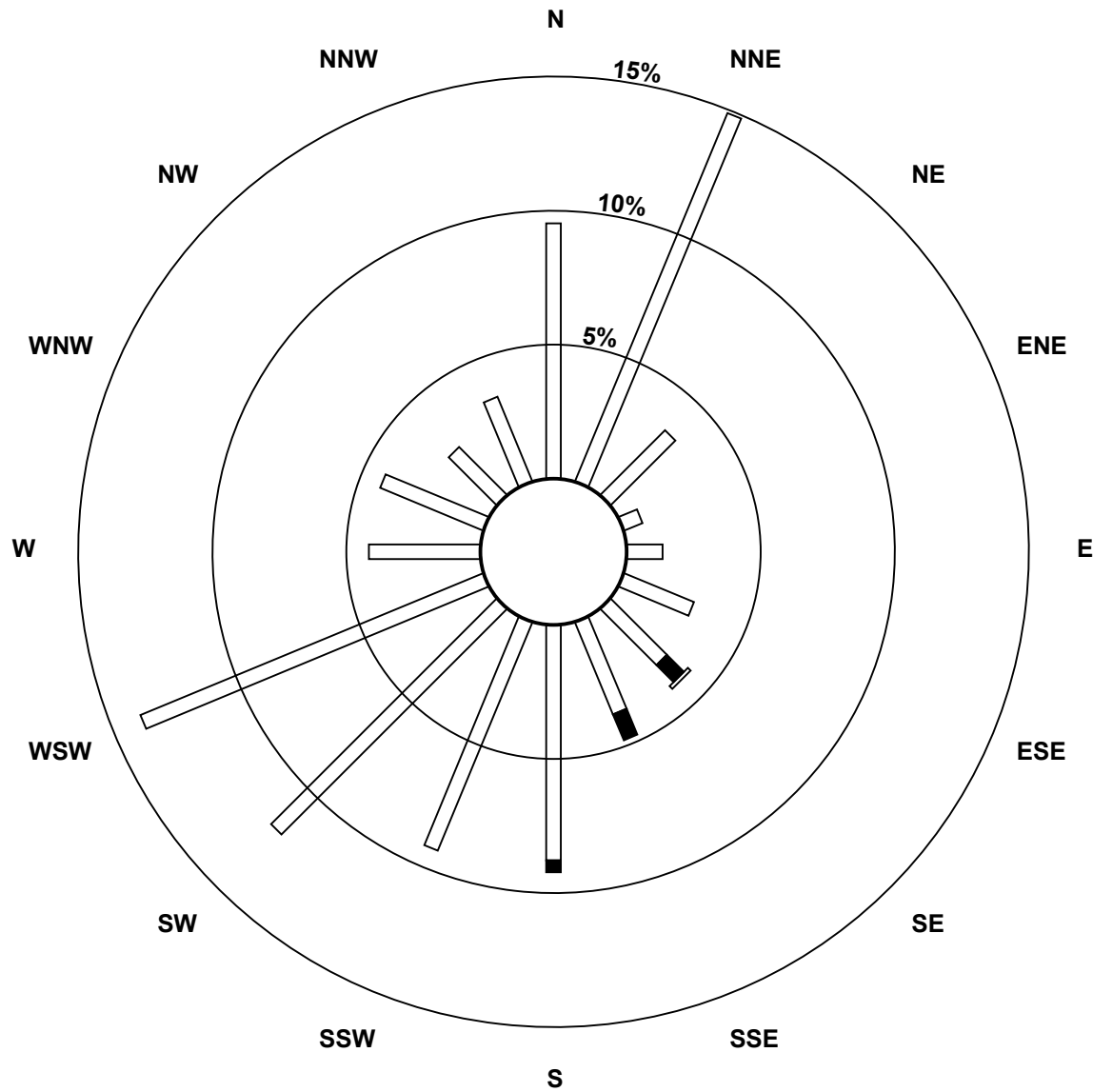
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	64	100	23	5	9	19	20	25	59	62	80	93	28	28	17	23	655
11 - 20	0	0	0	0	0	0	6	7	3	0	0	0	0	0	0	0	16
21 - 60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	100	23	5	9	19	27	32	62	62	80	93	28	28	17	23	672

Total Number of Valid Hours: 672

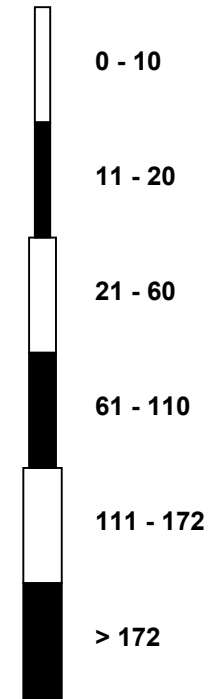
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)**



Classes (ppb)

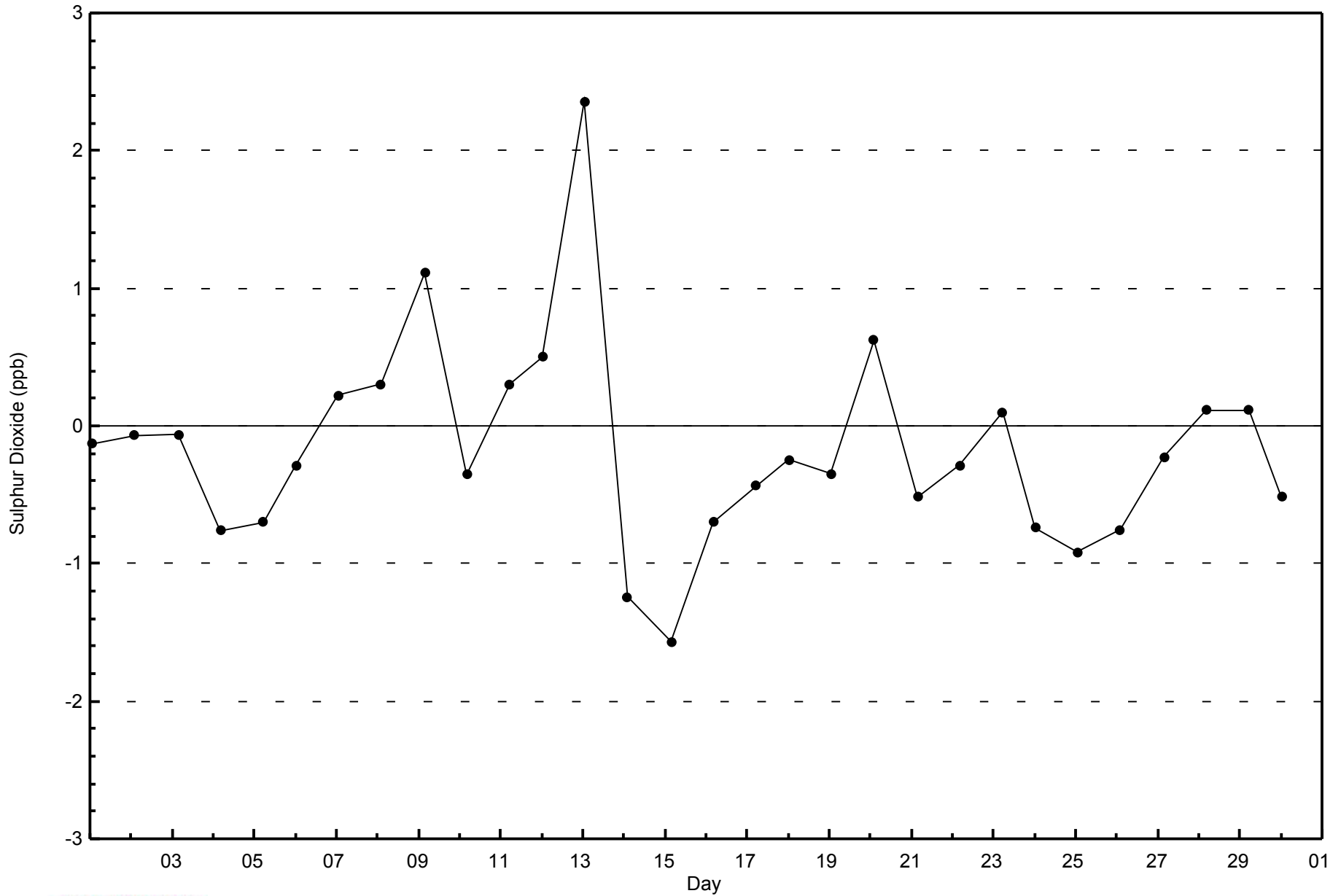


Total Number of Valid Hours: 672



WBEA  
Zero Responses

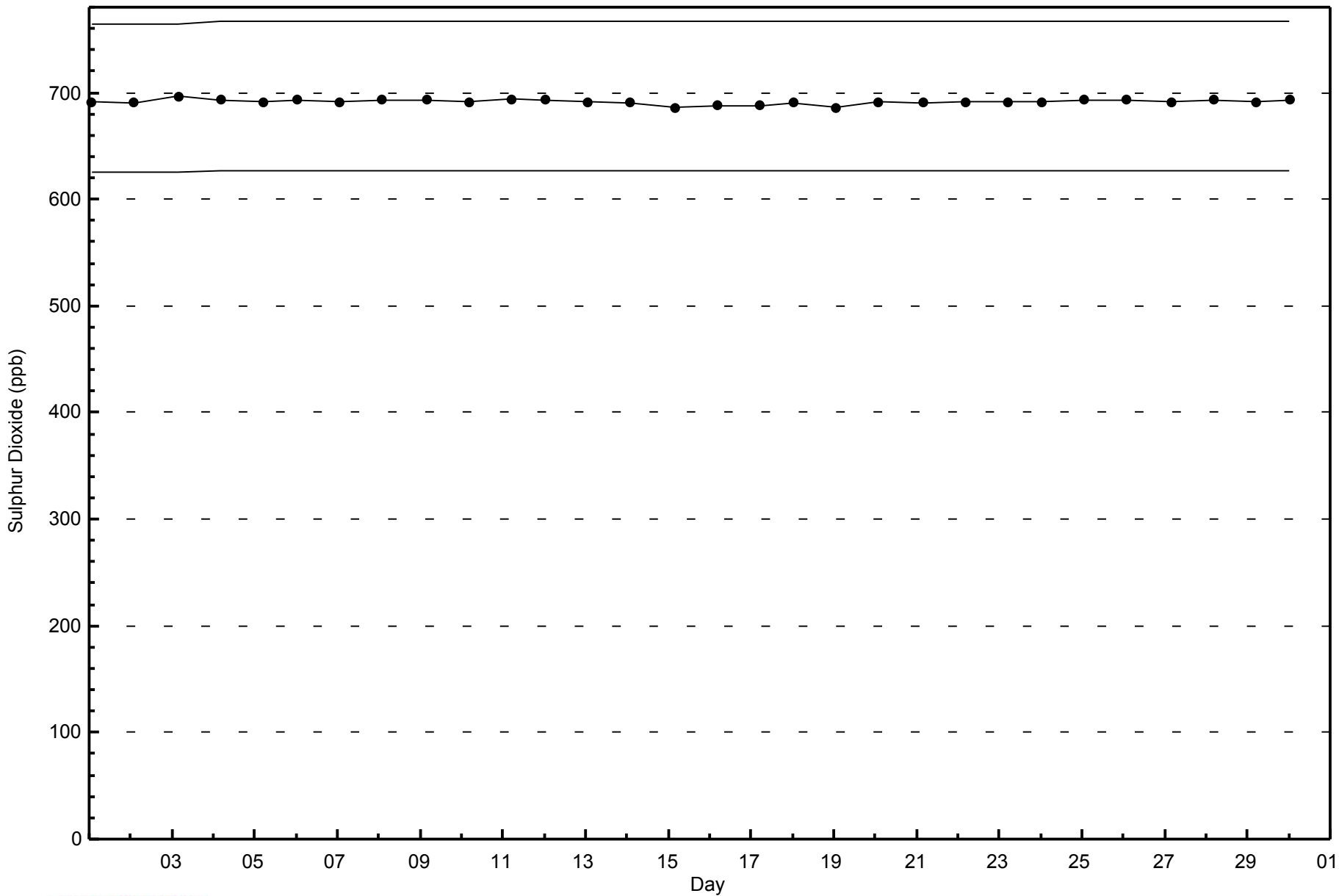
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Apr 9 10:00	Maximum Daily Average: 0.4 ppb on Apr 28		Hours of Data:	675
Minimum Value: 0 ppb on Apr 27 14:00	Minimum Daily Average: 0.1 ppb on Apr 23		Hours of Missing Data:	45
Maximum Diurnal Average: 0.3 ppb at hour 10	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
6-Apr	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0.3	1
7-Apr	0	0	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-Apr	0	0	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-Apr	0	0	0	0	Z	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
10-Apr	0	0	0	0	0	Z	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
11-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
14-Apr	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
15-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
16-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
17-Apr	0	0	0	0	0	0	Z	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
19-Apr	0	0	Z	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0	0	0	0	0	0	-	0
20-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
25-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Apr	0	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-Apr	0	0	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
28-Apr	0	0	0	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	0.4	1	
29-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	

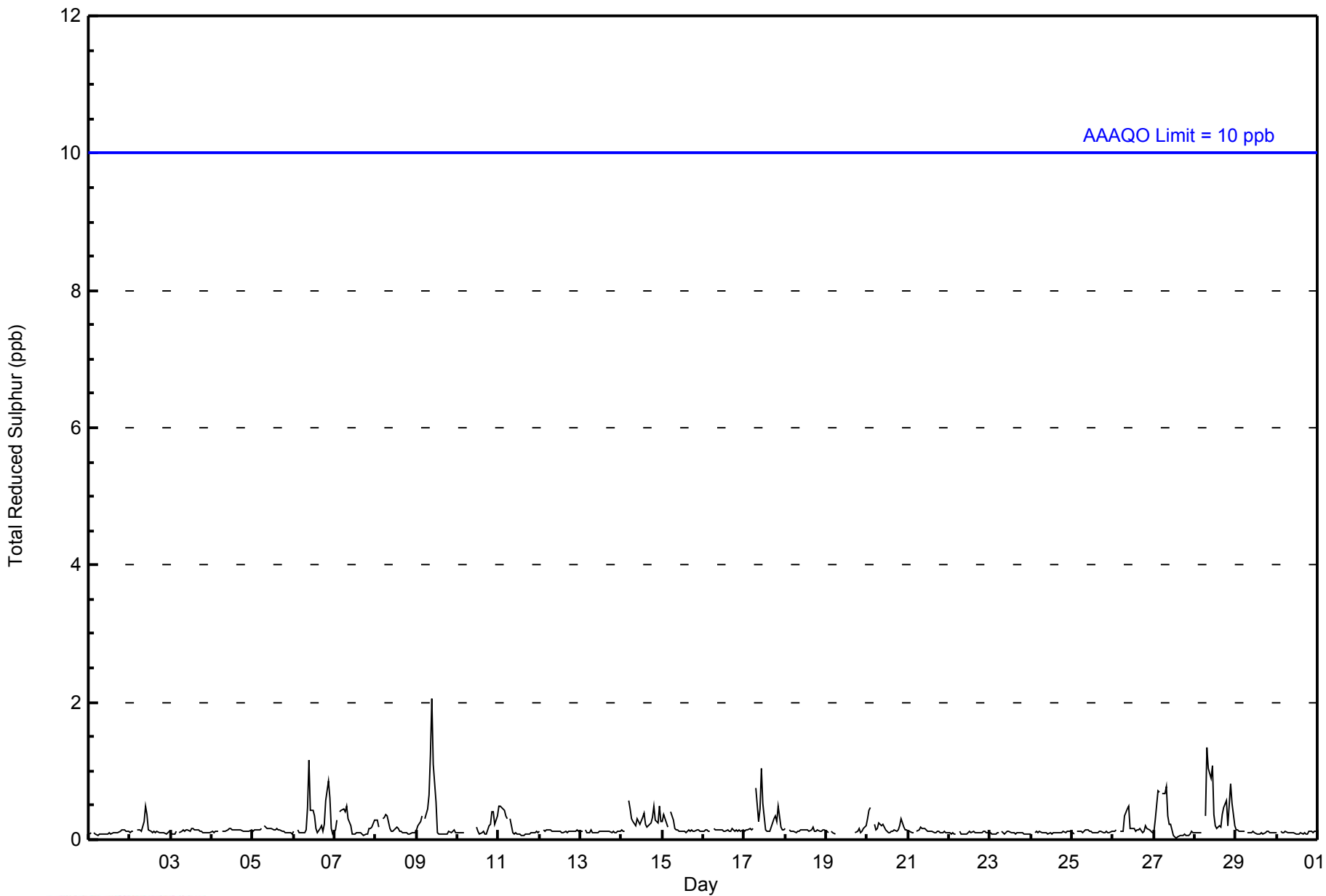
0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	Diurnal Average	
0	0	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	Diurnal Maximum	

Z - zerospan      C - Calibration      PF - Power Failure  
 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 - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	675	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: 675

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - April 2015**

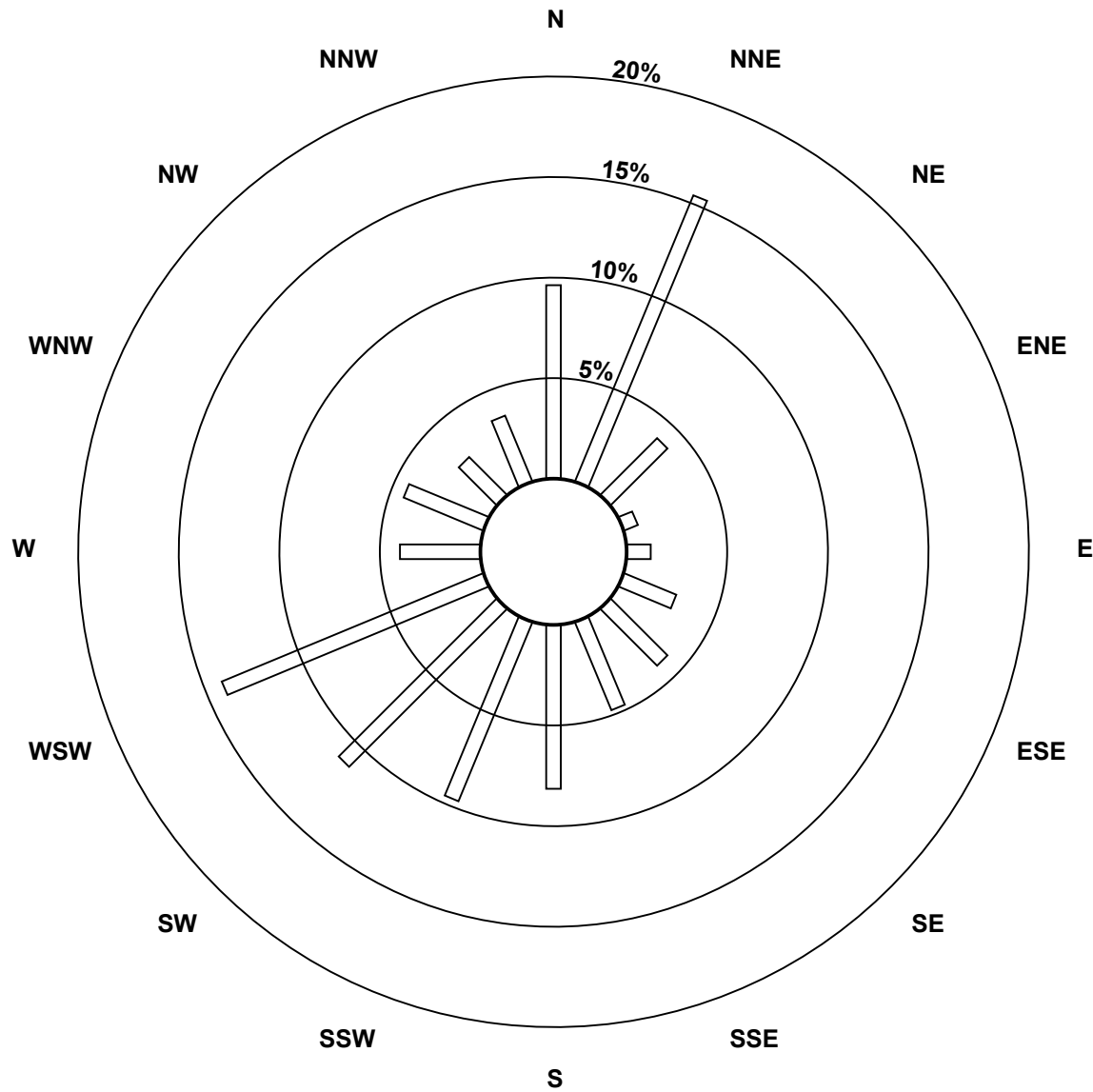
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	65	104	27	5	8	19	27	32	55	65	75	95	27	29	18	24	675
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	104	27	5	8	19	27	32	55	65	75	95	27	29	18	24	675

Total Number of Valid Hours: 675

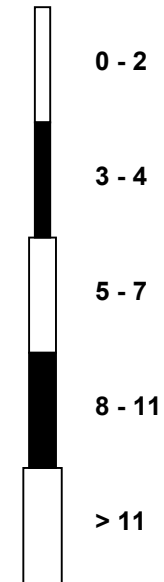
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb  
Fort McKay South (AMS 13)**



Classes (ppb)

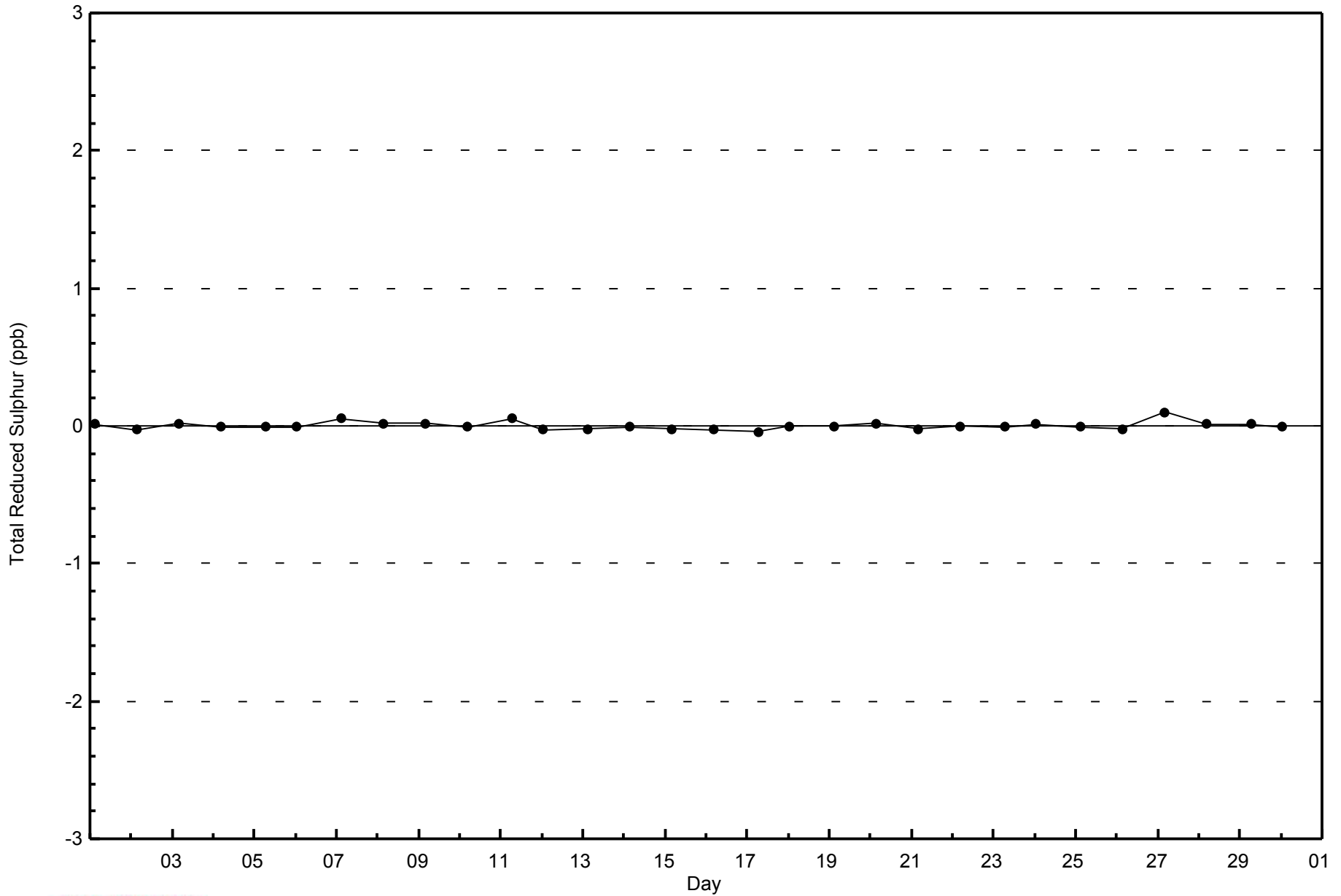


**Total Number of Valid Hours: 675**



**WBEA**  
**Zero Responses**

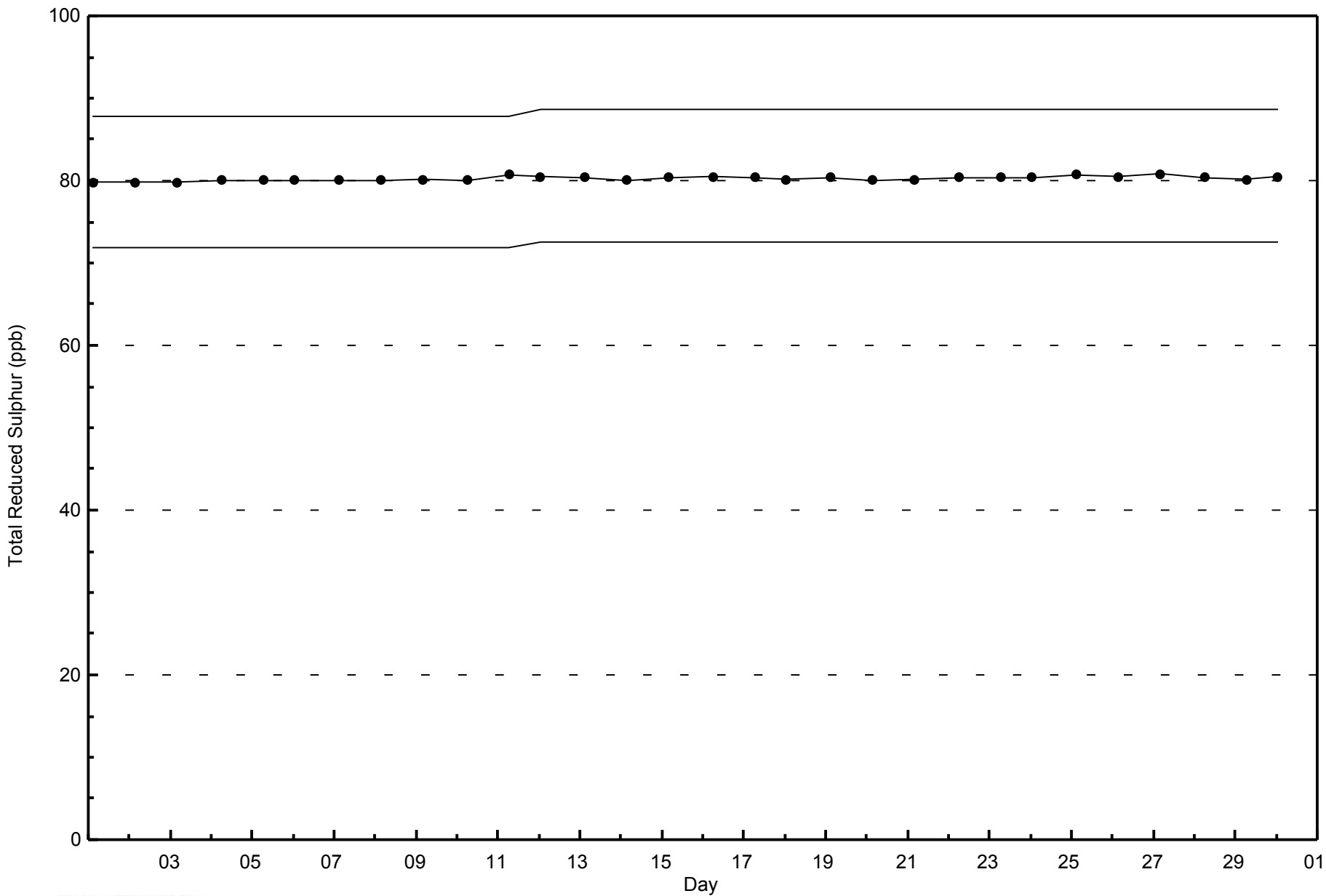
**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - April 2015**





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - April 2015



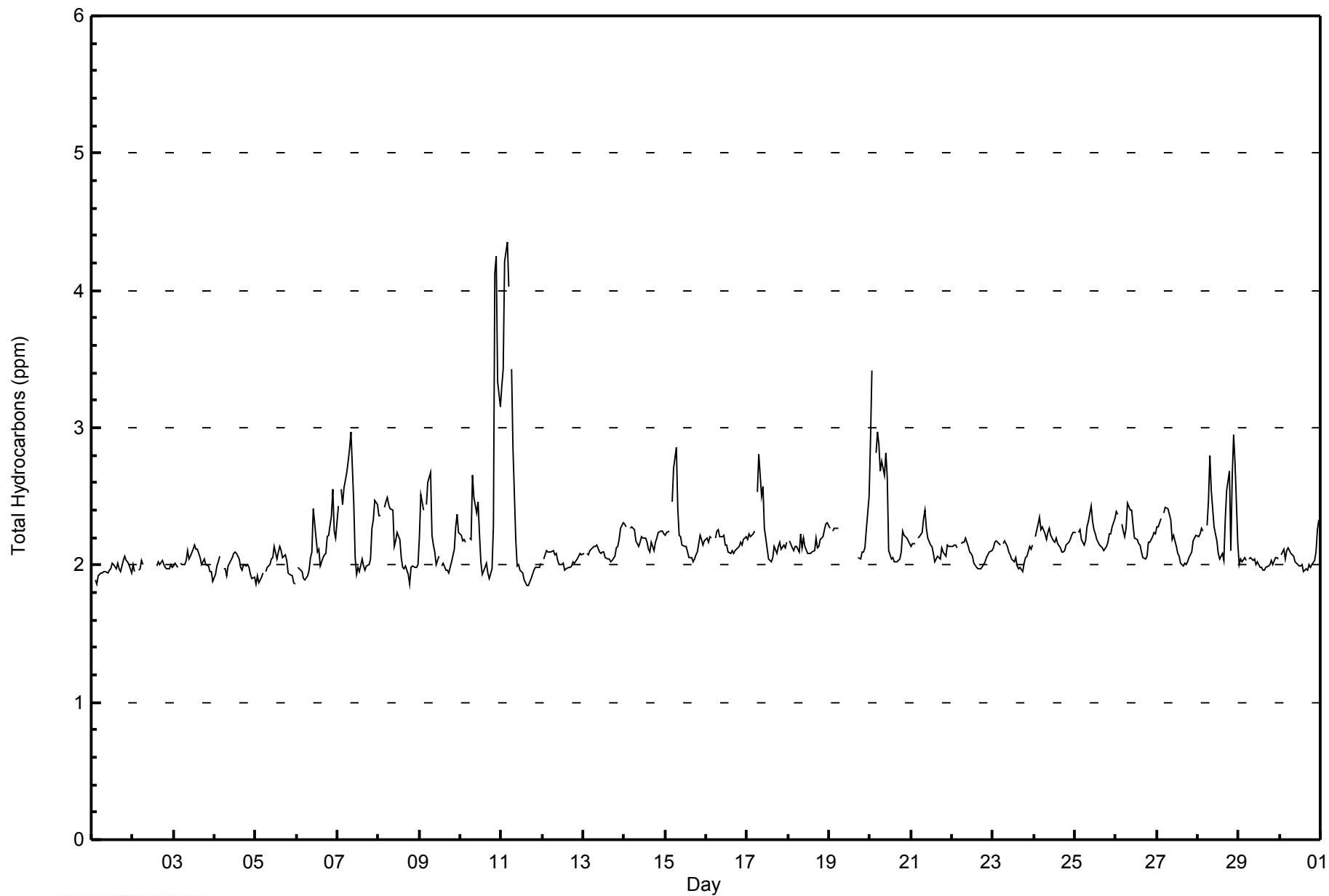


Maximum Value: 4.4 ppm on Apr 11 04:00		Maximum Daily Average: 2.5 ppm on Apr 11		Hours in Service: 720																							
Minimum Value: 1.9 ppm on Apr 1 01:00		Minimum Daily Average: 2.0 ppm on Apr 1		Hours of Data: 671																							
Maximum Diurnal Average: 2.3 ppm at hour 8		Minimum Diurnal Average: 2.0 ppm at hour 16		Hours of Missing Data: 49																							
Monthly Average: 2.17 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.4		Hours of Calibration: 37																							
				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-Apr	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	2.0	2.1	
2-Apr	2.0	1.9	Z	2.0	2.0	2.0	2.0	C	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	
3-Apr	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.1	
4-Apr	1.9	2.0	2.0	2.1	Z	2.0	2.0	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1	
5-Apr	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.1	
6-Apr	Z	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.4	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.4	2.6	2.2	2.2	2.1	2.6	
7-Apr	2.4	Z	2.6	2.4	2.6	2.7	2.8	2.8	3.0	2.4	2.1	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.5	2.4	2.3	3.0	
8-Apr	2.4	2.4	Z	2.4	2.5	2.5	2.4	2.4	2.4	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.2	2.5	
9-Apr	2.2	2.5	2.4	Z	2.4	2.6	2.7	2.2	2.1	2.1	2.0	2.1	M	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.3	2.4	2.2	2.2	2.7	
10-Apr	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.7	2.5	2.4	2.5	2.2	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.3	4.1	4.3	3.3	3.2	2.4	4.3	
11-Apr	3.3	3.4	4.2	4.4	4.0	Z	3.4	2.8	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	2.5	4.4	
12-Apr	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	
13-Apr	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.3	2.1	2.3	
14-Apr	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3
15-Apr	2.2	2.2	2.3	Z	2.5	2.7	2.9	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.9	
16-Apr	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	
17-Apr	2.2	2.2	2.2	2.2	2.2	Z	2.5	2.8	2.5	2.6	2.3	2.2	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.8	
18-Apr	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.3	
19-Apr	2.3	Z	2.2	2.3	2.3	2.3	2.3	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	2.1	2.0	2.1	2.1	2.1	2.3	2.5	
20-Apr	2.9	3.4	Z	2.8	3.0	2.9	2.7	2.8	2.7	2.8	2.6	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.4	3.4	
21-Apr	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	
22-Apr	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	
23-Apr	2.1	2.2	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.1	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	2.2	
24-Apr	Z	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	
25-Apr	2.2	Z	2.2	2.3	2.2	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.4	
26-Apr	2.4	2.4	Z	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
27-Apr	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.4	
28-Apr	2.2	2.2	2.3	2.2	Z	2.3	2.5	2.8	2.5	2.3	2.2	2.2	2.1	2.0	2.1	2.0	2.3	2.5	2.7	2.1	2.6	3.0	2.7	2.2	2.4	3.0	
29-Apr	2.0	2.0	2.0	2.1	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	
30-Apr	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.1	2.3	
		2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	Diurnal Average	
		3.3	3.4	4.2	4.4	4.0	2.9	3.4	2.8	3.0	2.8	2.6	2.3	2.2	2.2	2.1	2.3	2.5	2.7	2.3	4.1	4.3	3.3	3.2	Diurnal Maximum		
Z - zerspan		C - Calibration				M - Maintenance				PF - Power Failure																	



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	231	34.43	34.43
2.1 - 3.0	429	63.93	98.36
3.1 - 10.0	11	1.64	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - April 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	21	50	12	3	3	6	4	2	5	15	27	47	16	10	7	3	231
2.1 - 3.0	43	50	11	2	6	13	23	30	56	43	46	46	12	18	10	20	429
3.1 - 10.0	0	0	0	0	0	0	0	0	1	4	6	0	0	0	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	100	23	5	9	19	27	32	62	62	79	93	28	28	17	23	671

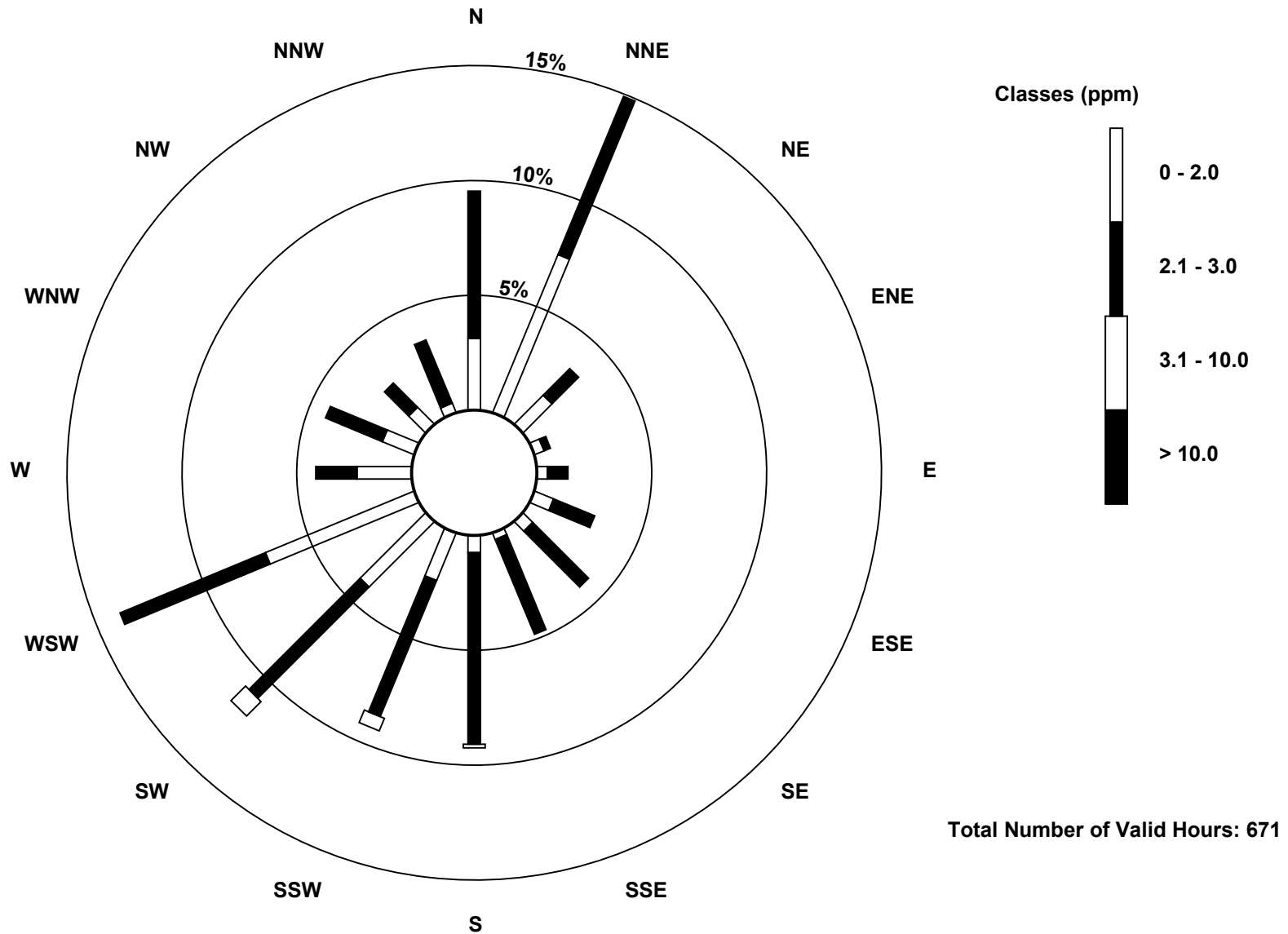
Total Number of Valid Hours: 671

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Apr 2015

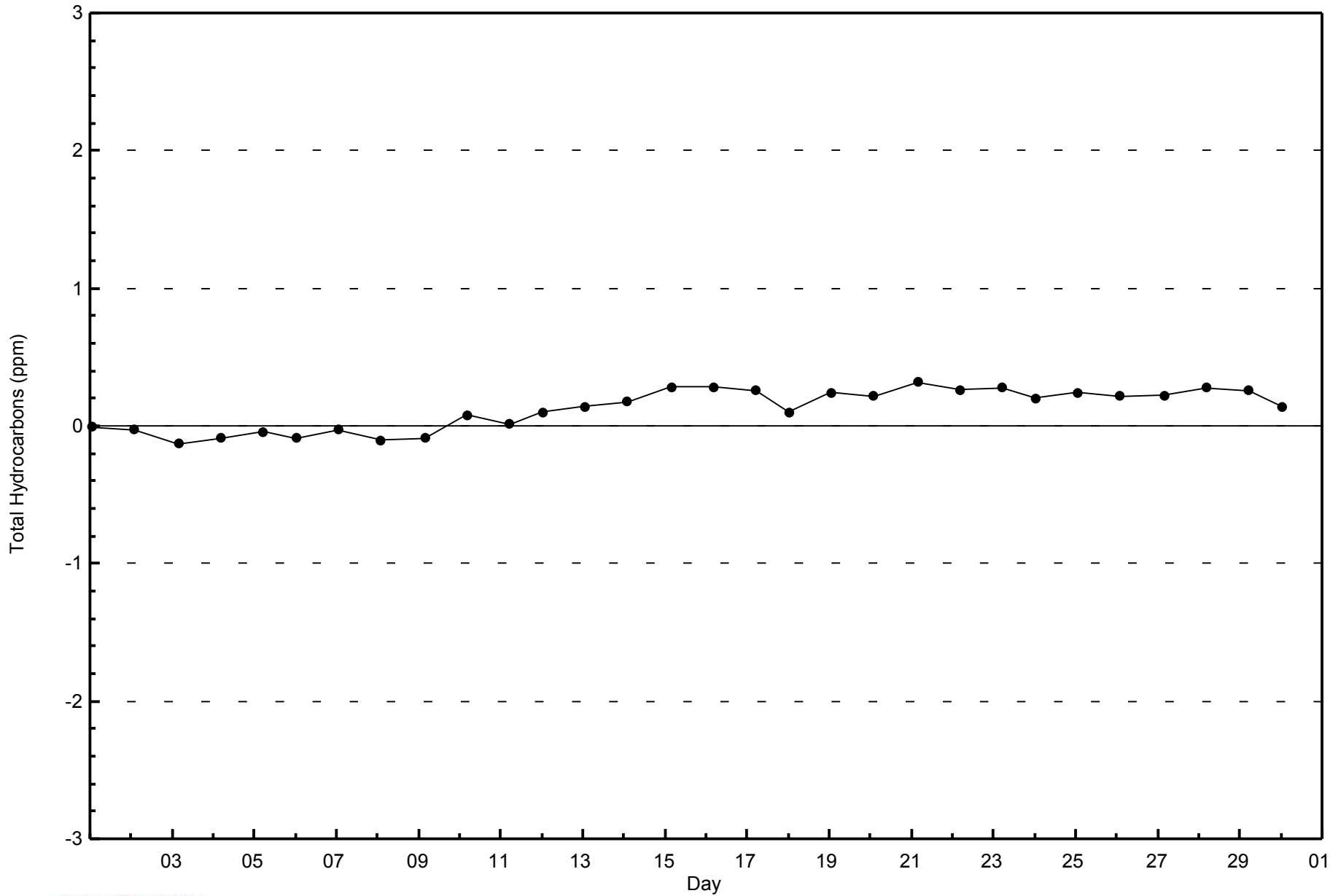
Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)





WBEA  
Zero Responses

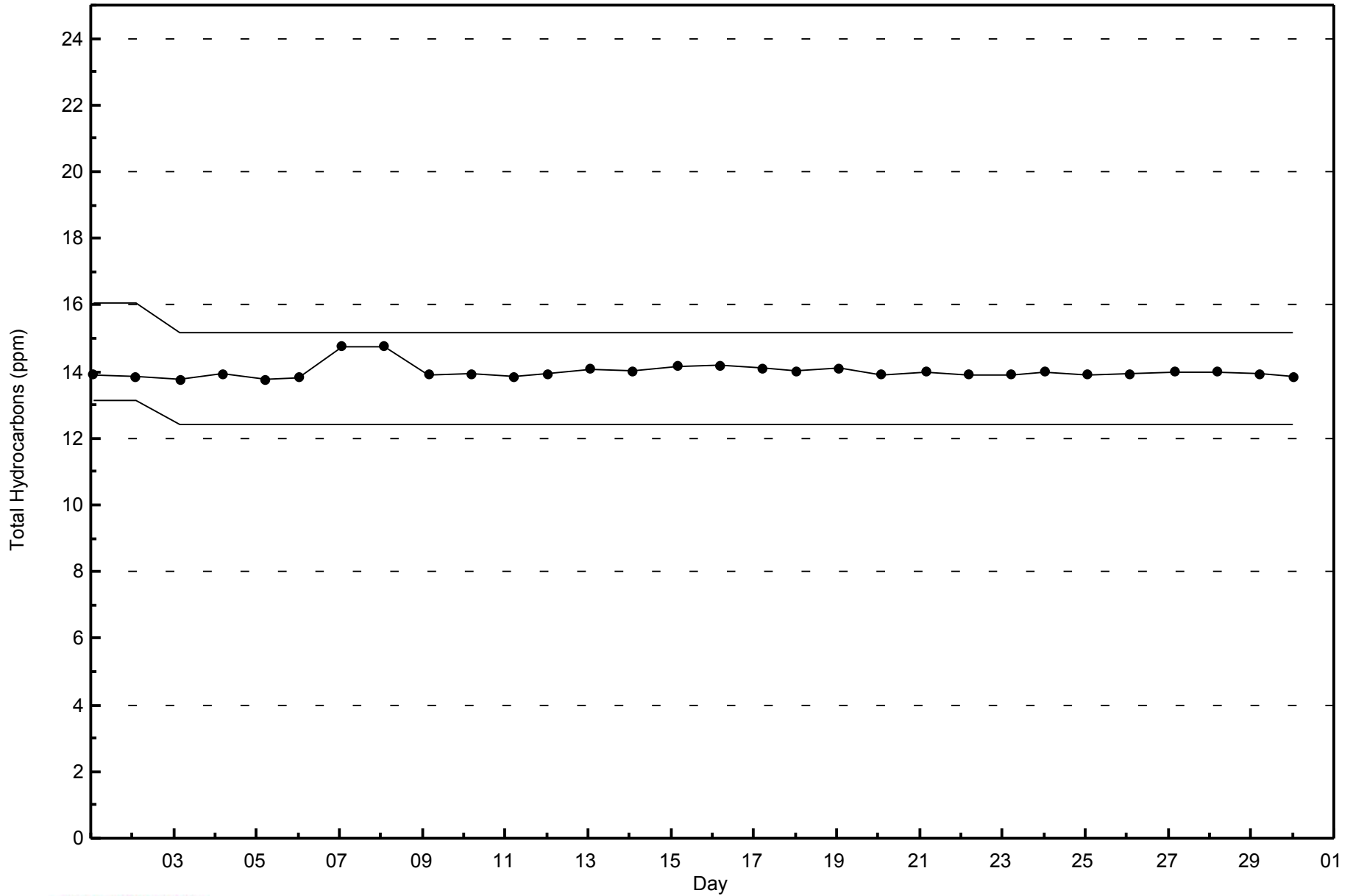
Total Hydrocarbons (THC) - ppm  
Fort McKay South - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay South - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 48 ppb on Apr 27 18:00	Maximum Daily Average: 38.2 ppb on Apr 29		Hours of Data:	674
Minimum Value: 0 ppb on Apr 11 06:00	Minimum Daily Average: 19.0 ppb on Apr 8		Hours of Missing Data:	46
Maximum Diurnal Average: 38.6 ppb at hour 16	Minimum Diurnal Average: 14.7 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 27.1 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 7 Q <sub>1</sub> = 17 Median = 31 Q <sub>3</sub> = 37 P <sub>90</sub> = 40 P <sub>99</sub> = 46		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-Apr	29	29	29	Z	28	28	27	27	26	26	28	29	29	29	29	29	29	29	26	25	26	20	17	25	26.9	29	
2-Apr	20	25	27	29	Z	24	23	26	27	28	32	32	33	36	36	35	34	35	36	37	37	38	36	31	31.2	38	
3-Apr	29	25	20	15	13	Z	12	13	21	32	36	35	34	35	36	35	35	35	34	34	34	28	25	20	27.7	36	
4-Apr	16	12	11	10	9	9	Z	21	21	26	31	29	30	32	33	33	32	31	31	31	33	33	27	20	24.3	33	
5-Apr	17	16	16	13	11	12	11	Z	28	29	31	33	33	33	33	33	33	33	34	33	30	29	29	22	25.7	34	
6-Apr	17	12	Z	12	11	9	8	15	19	23	28	25	29	33	36	34	35	35	32	23	17	19	29	23	22.8	36	
7-Apr	15	15	13	Z	9	7	7	18	25	27	34	36	38	38	39	38	39	37	37	34	7	1	2	6	22.7	39	
8-Apr	7	4	2	2	Z	6	7	9	13	28	31	28	28	34	35	36	35	35	32	22	15	12	9	7	19.0	36	
9-Apr	3	1	2	3	2	Z	3	18	C	C	C	C	C	39	40	40	40	42	41	28	24	8	3	11	19.5	42	
10-Apr	13	9	7	4	5	7	Z	11	21	29	36	39	43	46	46	46	46	46	40	32	23	23	10	1	25.4	46	
11-Apr	0	1	4	5	2	0	1	Z	33	37	38	40	43	43	43	43	43	42	42	42	43	42	38	27	28.4	43	
12-Apr	34	37	Z	37	36	35	34	34	35	36	37	38	39	39	39	39	38	38	38	37	35	35	37	35	36.6	39	
13-Apr	36	37	37	Z	39	38	37	37	39	39	38	38	38	38	38	39	40	41	40	30	20	17	13	9	33.8	41	
14-Apr	7	6	5	3	Z	2	3	18	28	26	28	31	31	35	39	38	40	39	37	37	32	23	26	31	24.5	40	
15-Apr	29	26	16	4	3	Z	2	16	27	31	34	35	37	39	41	42	44	42	41	29	21	40	38	38	29.3	44	
16-Apr	37	36	36	35	33	17	Z	32	35	34	33	38	40	41	44	45	44	41	42	44	40	34	17	12	35.1	45	
17-Apr	30	32	25	10	3	1	5	Z	28	29	27	31	41	41	40	39	31	31	29	23	19	13	7	14	23.9	41	
18-Apr	14	16	Z	30	32	32	31	28	30	30	34	36	37	37	39	37	35	36	36	25	12	6	5	4	27.1	39	
19-Apr	3	3	2	Z	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	41	30	17	16	11	10	8	--	41
20-Apr	6	5	4	1	Z	1	3	8	14	20	27	38	41	41	41	41	40	38	34	28	27	25	27	25	23.2	41	
21-Apr	27	19	11	9	7	Z	6	17	21	24	32	37	36	36	39	40	38	37	36	34	31	25	30	29	27.0	40	
22-Apr	23	16	13	17	9	8	Z	29	31	32	34	34	35	36	38	40	40	39	36	34	32	32	32	31	29.2	40	
23-Apr	22	14	12	12	17	21	31	Z	35	35	34	35	36	37	37	37	37	36	34	30	32	30	30	30	29.3	37	
24-Apr	29	32	Z	23	28	27	27	30	30	31	33	33	33	34	34	34	35	32	25	22	22	21	17	15	28.1	35	
25-Apr	13	14	12	Z	8	8	10	9	13	16	25	29	30	32	33	33	33	32	31	23	18	15	10	6	19.7	33	
26-Apr	4	3	3	3	Z	3	7	8	22	27	34	34	35	36	36	37	37	37	36	26	19	16	15	14	21.3	37	
27-Apr	11	10	15	10	9	Z	7	22	26	29	33	38	38	39	42	46	48	48	47	46	38	24	24	29	29.5	48	
28-Apr	24	17	16	13	9	7	Z	18	25	32	34	38	46	45	45	46	42	44	39	39	33	28	24	31	30.2	46	
29-Apr	36	36	34	27	31	40	38	Z	36	37	37	39	42	42	42	43	43	42	39	37	40	39	39	38	38.2	43	
30-Apr	38	33	Z	38	37	36	34	36	36	36	36	37	39	42	43	38	41	42	42	41	20	13	8	10	5	32.5	43

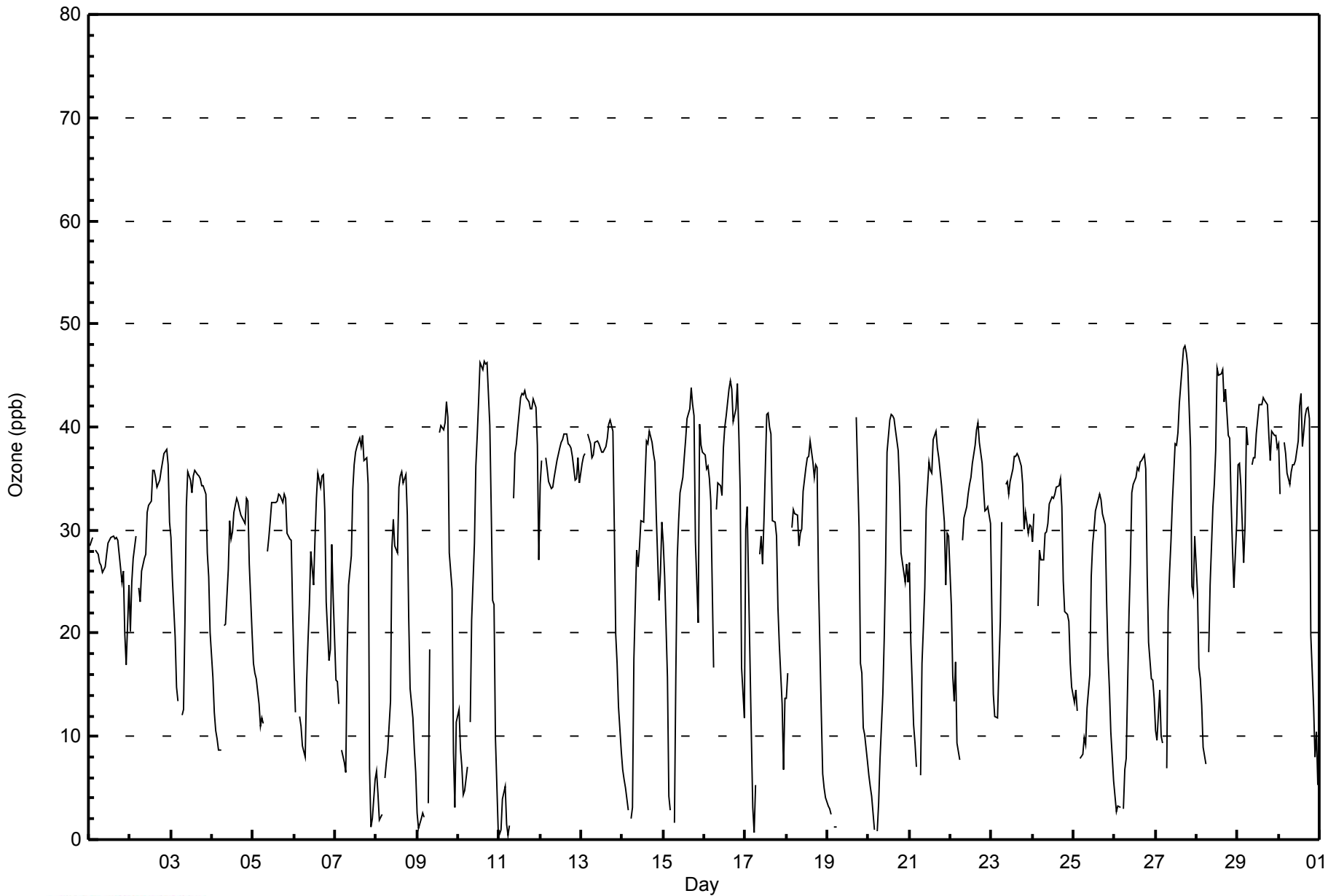
19.6	18.1	14.9	14.7	15.7	15.1	15.7	20.8	26.6	29.7	32.6	34.5	36.2	37.6	38.3	38.6	38.2	37.9	35.9	30.7	26.2	23.2	21.3	19.8	Diurnal Average	
38	37	37	38	39	40	38	37	39	39	38	40	46	46	46	46	48	48	47	46	43	42	39	38	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	192	28.49	28.49
21 - 50	482	71.51	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**

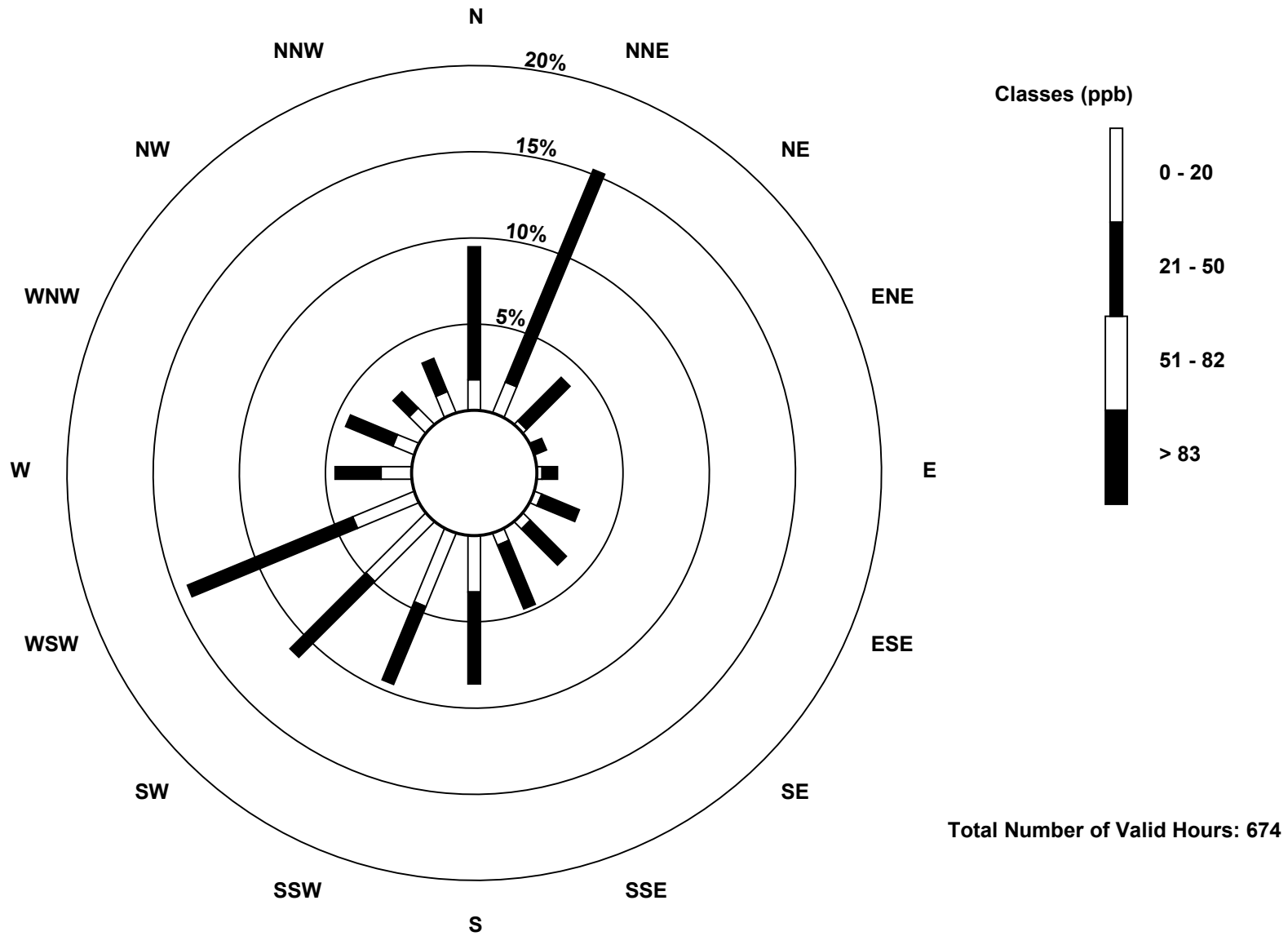
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	13	2	0	2	3	4	5	22	31	33	26	12	9	9	9	192
21 - 50	52	90	24	5	6	16	20	27	36	33	42	70	18	20	9	14	482
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	103	26	5	8	19	24	32	58	64	75	96	30	29	18	23	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)

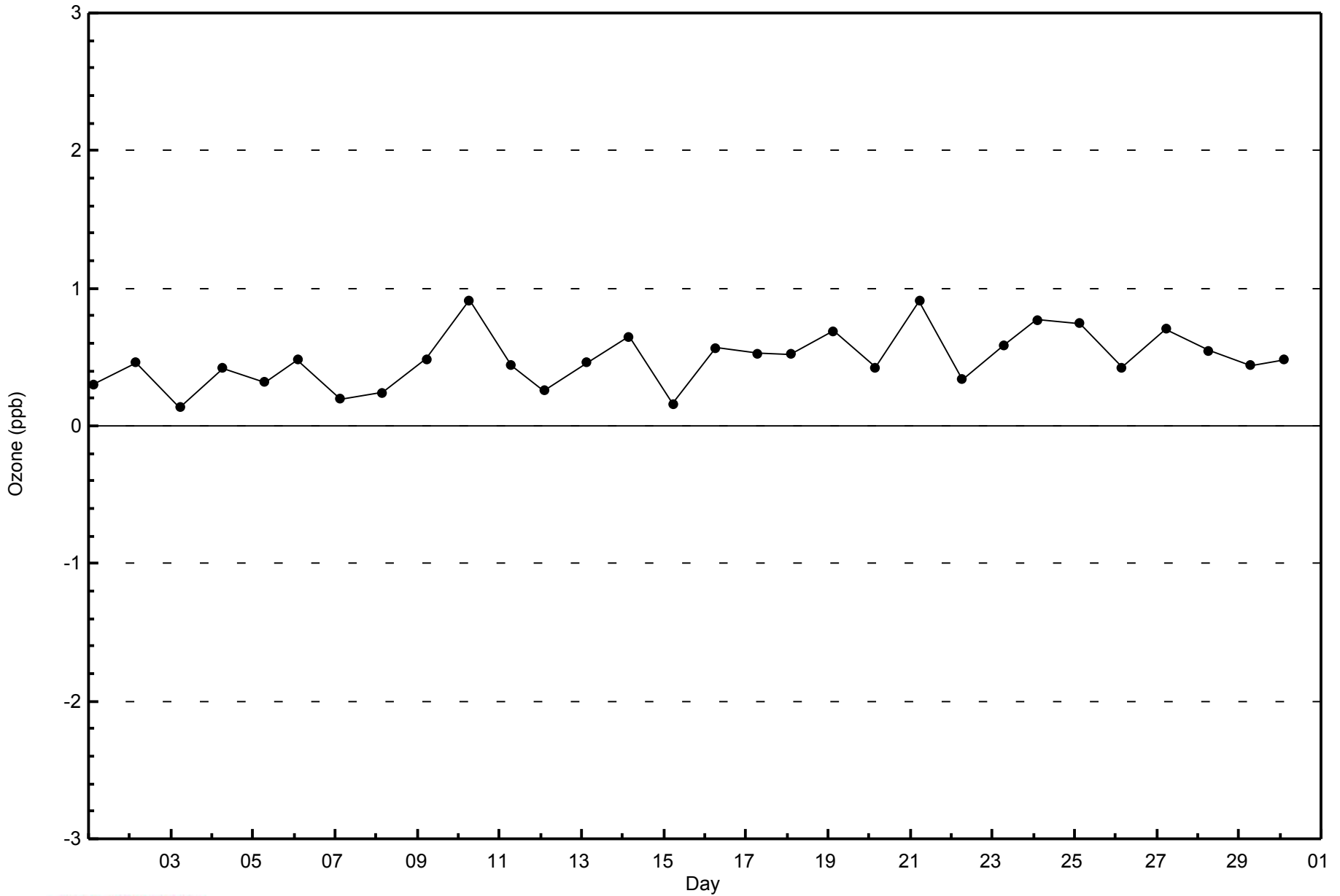






WBEA  
Zero Responses

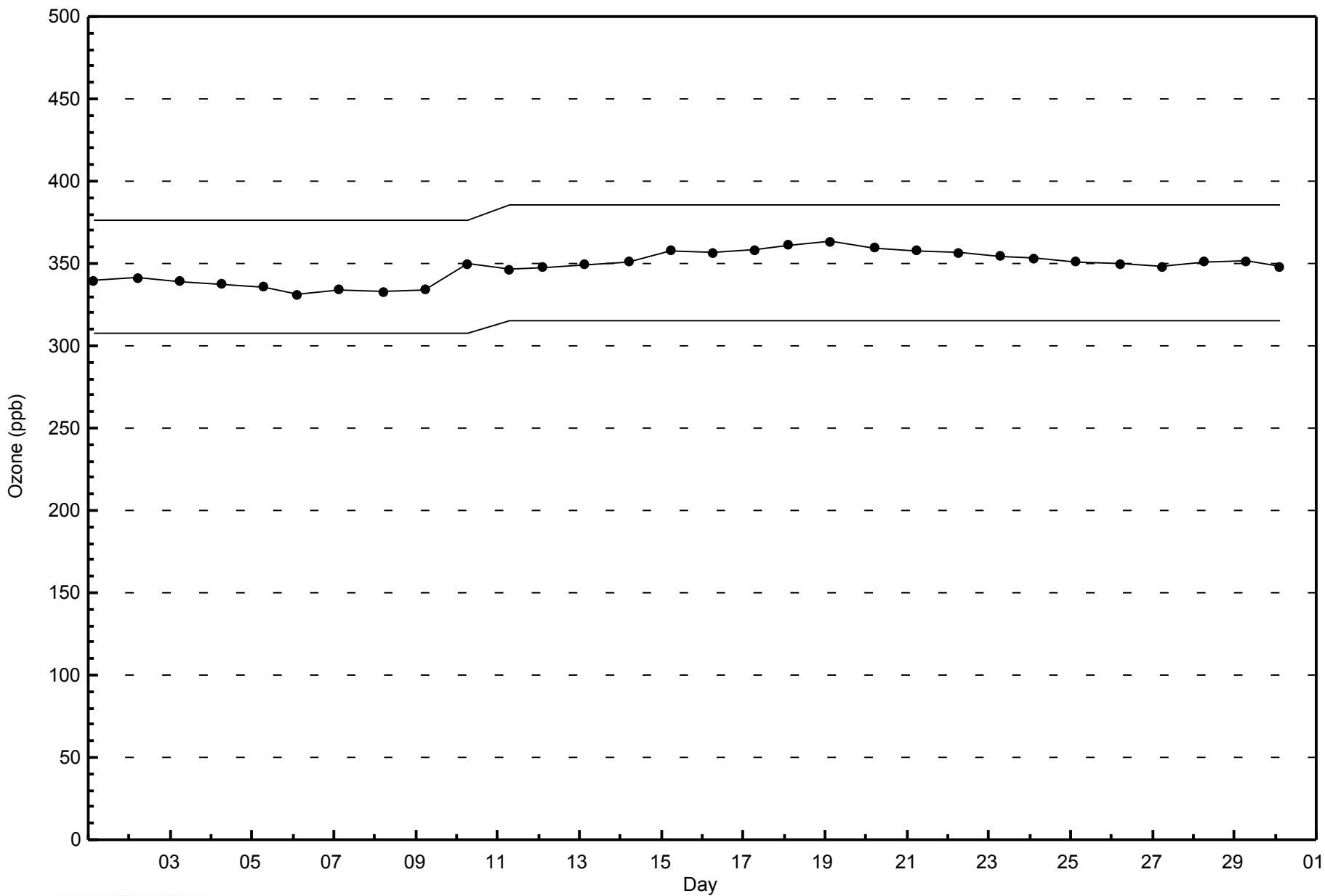
Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - April 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - April 2015



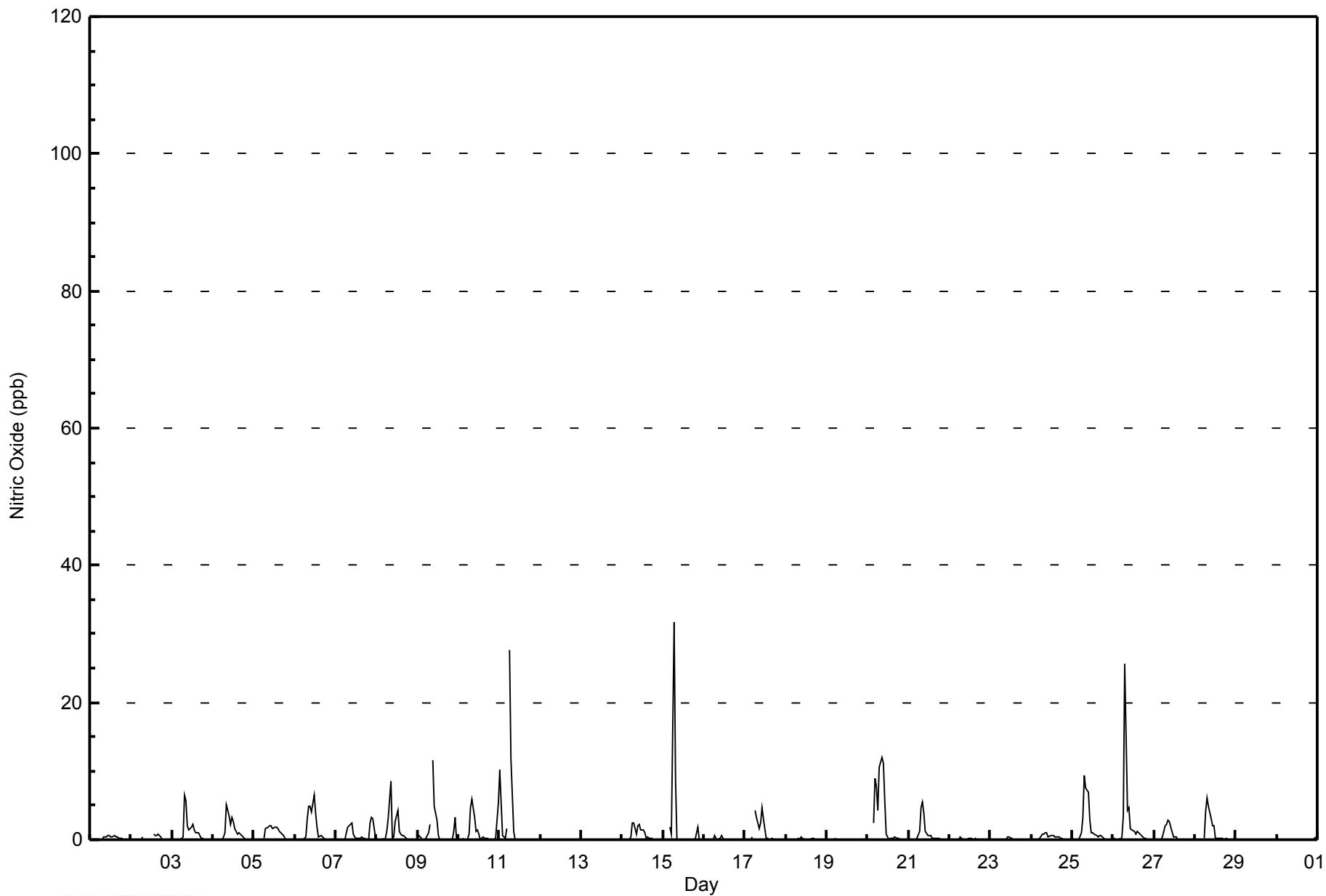


Maximum Value: 32 ppb on Apr 15 07:00														Maximum Daily Average: 2.8 ppb on Apr 20														Hours in Service: 720			
Minimum Value: 0 ppb on Apr 1 01:00														Minimum Daily Average: 0.0 ppb on Apr 29														Hours of Data: 673			
Maximum Diurnal Average: 3.8 ppb at hour 8														Minimum Diurnal Average: 0.0 ppb at hour 20														Hours of Missing Data: 47			
Monthly Average: 0.8 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 11														Hours of Calibration: 35			
																												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-Apr	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1					
2-Apr	0	0	Z	0	0	0	0	0	C	C	C	C	C	1	1	1	1	0	0	0	0	0	0	0.2	1						
3-Apr	0	0	0	Z	0	0	0	7	6	2	1	2	2	1	1	1	1	0	0	0	0	0	0	1.1	7						
4-Apr	0	0	0	0	Z	0	0	1	5	3	2	3	3	2	1	1	1	1	0	0	0	0	0	1.0	5						
5-Apr	0	0	0	0	0	Z	0	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0.8	2						
6-Apr	Z	0	0	0	0	0	0	3	5	5	4	6	4	2	0	1	0	0	0	0	0	0	0	1.4	6						
7-Apr	0	Z	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	2	3	3	0.8	3						
8-Apr	0	0	Z	0	0	0	1	3	8	0	0	3	4	1	1	1	1	0	0	0	0	0	0	1.1	8						
9-Apr	0	1	0	Z	0	0	1	2	M	12	5	3	1	0	0	0	0	0	0	0	0	1	3	1.3	12						
10-Apr	0	0	0	0	Z	0	1	5	6	3	1	1	1	0	0	0	0	0	0	0	0	0	0	1.1	6						
11-Apr	10	5	1	0	2	Z	28	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	28						
12-Apr	Z	0	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-Apr	0	Z	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-Apr	0	0	Z	0	0	0	2	2	1	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0.7	2						
15-Apr	0	0	0	Z	2	1	32	9	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2.0	32						
16-Apr	0	0	0	0	Z	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1						
17-Apr	0	0	0	0	0	Z	4	3	2	2	5	3	0	0	0	0	0	0	0	0	0	0	0	0.9	5						
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0						
19-Apr	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	-	0						
20-Apr	0	0	Z	2	9	8	4	11	12	11	6	1	0	0	0	0	0	0	0	0	0	0	0	2.8	12						
21-Apr	0	0	0	Z	0	0	1	5	5	4	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	5						
22-Apr	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1						
23-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0						
24-Apr	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1						
25-Apr	0	Z	0	0	0	1	3	9	8	7	3	1	1	1	1	0	1	1	0	0	0	0	0	1.6	9						
26-Apr	0	0	Z	0	0	0	3	26	4	5	2	1	1	1	1	1	1	0	0	0	0	0	0	2.1	26						
27-Apr	0	0	0	Z	0	0	2	2	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3						
28-Apr	0	0	0	0	Z	0	4	6	5	3	2	2	0	0	0	0	0	0	0	0	0	0	0	1.0	6						
29-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0						
30-Apr	Z	0	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			
0.4														0.3														0.0			
10														5														1			
0.1														0.5														0.5			
2														9														8			
3.2														3.8														2.8			
32														26														12			
2.8														2.5														1.5			
12														12														6			
1.5														1.2														0.8			
6														6														4			
0.8														0.5														0.3			
2														2														1			
0.3														0.3														0.3			
1														1														1			
0.2														0.1														0.0			
1														0														0			
0.1														0.0														0.1			
0														0														0			
0.2														0.2														0.2			
3														3														5			
																												Diurnal Maximum			
Z - zerspan														C - Calibration														M - Maintenance			
																												PF - Power Failure			



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	670	99.55	99.55
21 - 40	3	0.45	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**

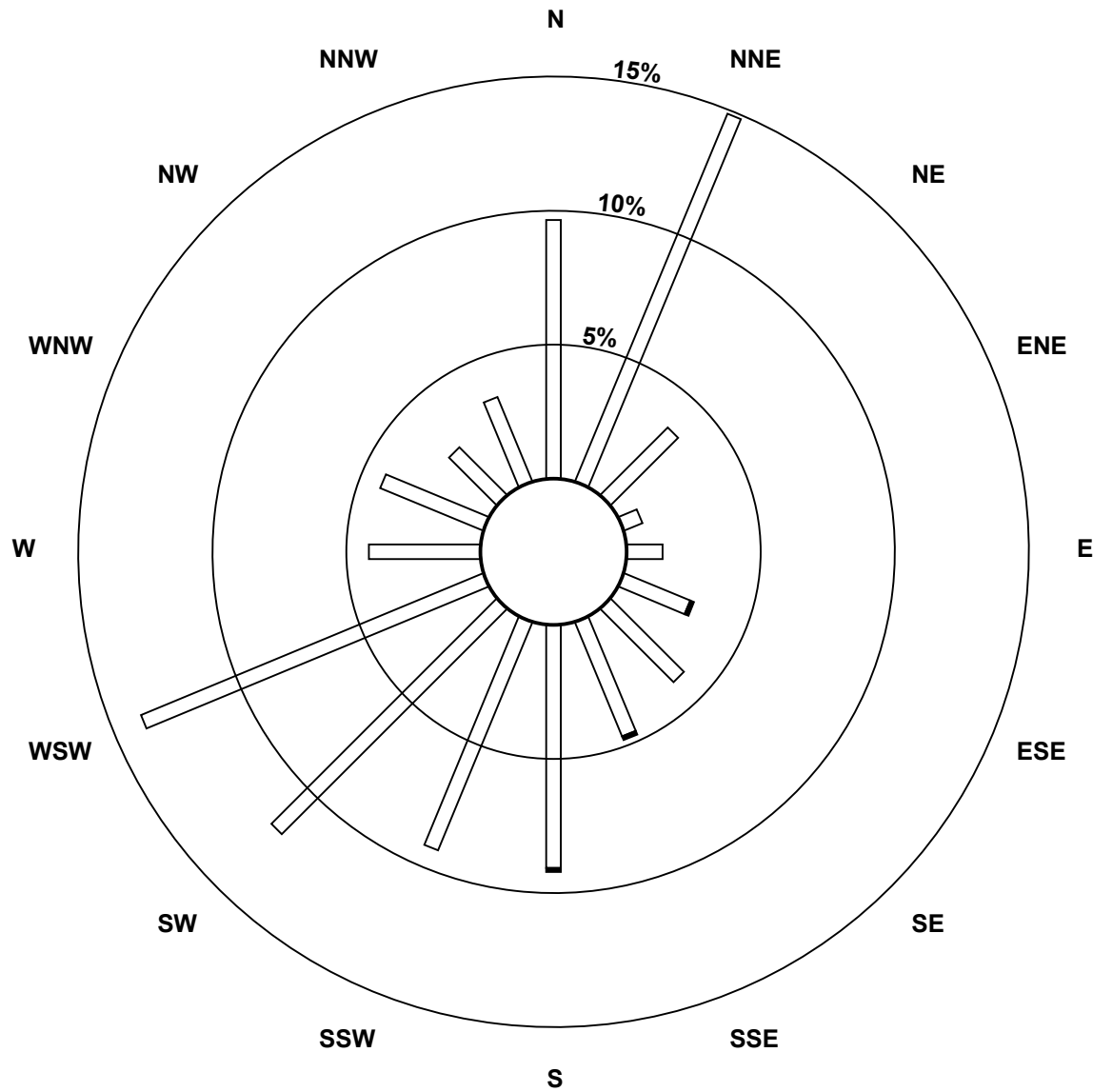
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	100	24	5	9	18	26	31	61	62	80	93	28	28	17	23	670
21 - 40	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	100	24	5	9	19	26	32	62	62	80	93	28	28	17	23	673

Total Number of Valid Hours: 673

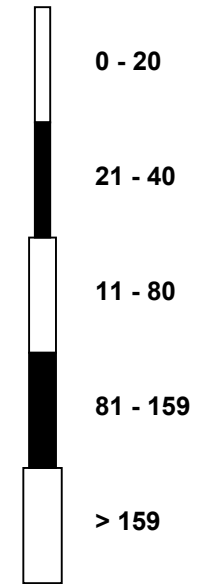
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb  
Fort McKay South (AMS 13)**



Classes (ppb)

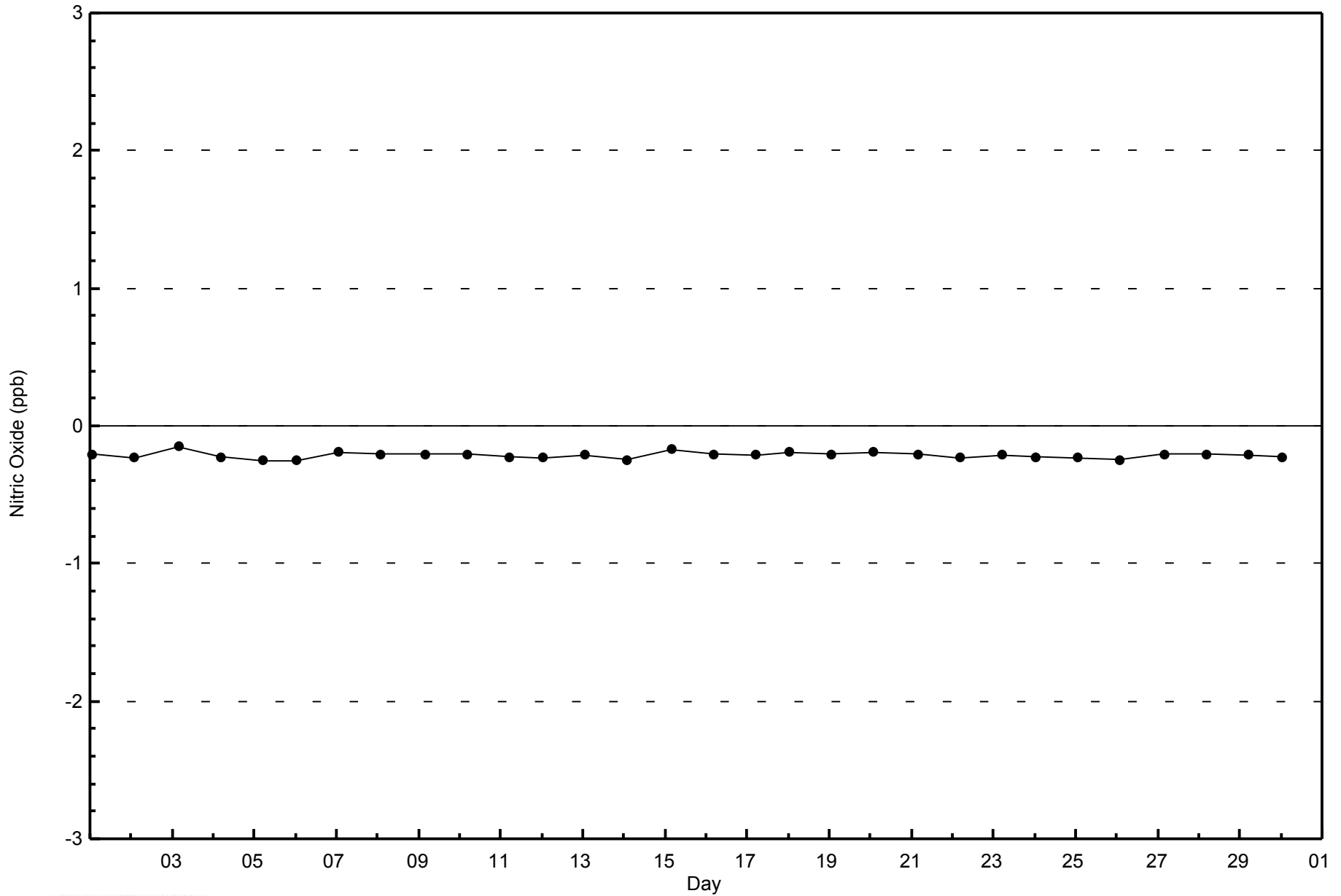


**Total Number of Valid Hours: 673**



**WBEA**  
**Zero Responses**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**

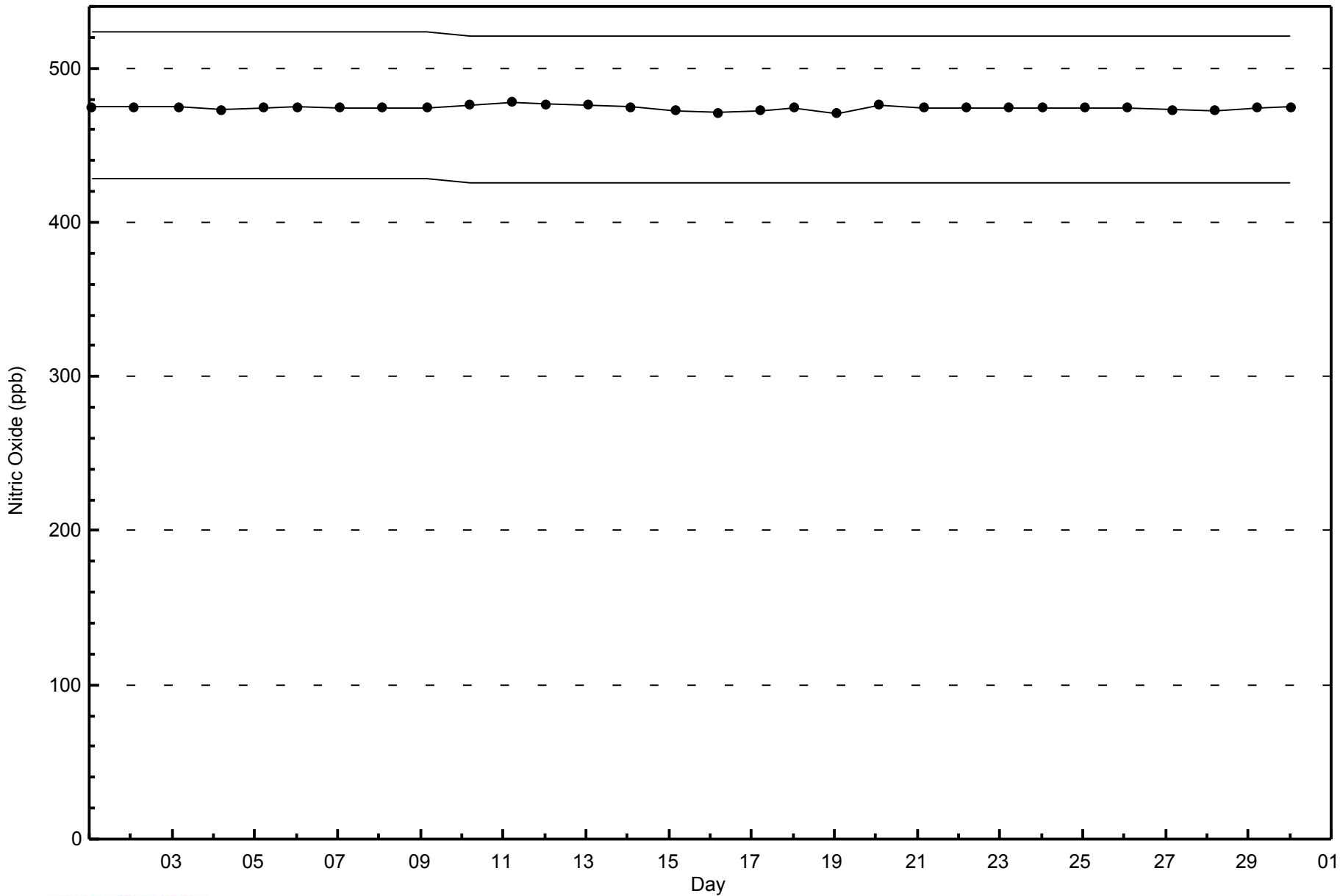






WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort McKay South - April 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Fort McKay South - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 28 ppb on Apr 11 00:00	Maximum Daily Average: 6.6 ppb on Apr 20		Hours of Data:	673
Minimum Value: 0 ppb on Apr 9 18:00	Minimum Daily Average: 0.3 ppb on Apr 12		Hours of Missing Data:	47
Maximum Diurnal Average: 6.6 ppb at hour 8	Minimum Diurnal Average: 1.4 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 3.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 8 P <sub>99</sub> = 18		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-Apr	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	4	5	4	4	3	2	1.8	5	
2-Apr	6	5	Z	1	2	3	3	4	C	C	C	C	C	2	2	2	3	3	2	1	1	2	2	6	2.8	6	
3-Apr	8	8	8	Z	6	5	5	16	11	5	4	4	6	4	3	3	3	3	3	2	1	1	1	1	4.7	16	
4-Apr	2	2	3	3	Z	4	4	4	9	7	5	6	5	4	2	3	3	3	4	4	2	1	1	3	3.6	9	
5-Apr	3	2	1	2	3	Z	2	6	5	5	4	4	4	4	4	4	4	4	3	1	1	1	1	1	3.0	6	
6-Apr	Z	3	3	3	3	3	3	7	9	9	9	12	9	5	2	4	3	2	2	4	6	4	3	4	4.8	12	
7-Apr	6	Z	5	6	7	7	5	8	7	7	3	2	2	1	1	2	1	3	1	1	22	18	18	11	6.2	22	
8-Apr	7	7	Z	7	6	6	8	8	12	1	1	6	9	4	3	3	4	2	1	1	1	1	1	1	4.4	12	
9-Apr	5	10	8	Z	5	4	3	8	M	17	11	8	2	1	0	0	0	0	1	1	1	11	21	7	5.6	21	
10-Apr	2	2	7	11	Z	6	4	12	16	10	5	6	4	1	2	3	2	3	3	4	4	3	13	28	6.5	28	
11-Apr	21	17	10	4	7	Z	15	17	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4.3	21	
12-Apr	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	0.5	4	
14-Apr	4	4	Z	4	6	5	4	8	5	8	8	6	7	4	2	4	3	3	3	6	9	6	1	1	4.8	9	
15-Apr	1	2	2	Z	6	7	14	7	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	2.0	14	
16-Apr	0	1	0	0	Z	1	3	1	0	1	3	1	0	0	0	0	1	2	1	0	0	0	0	0	0.7	3	
17-Apr	0	0	1	2	4	Z	8	10	5	7	10	8	1	1	1	2	6	3	3	5	4	2	1	2	3.7	10	
18-Apr	Z	3	1	1	1	1	1	2	1	1	1	0	1	1	0	2	2	1	1	1	1	1	1	1	1.1	3	
19-Apr	1	Z	1	1	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0	0	0	0	1	1	2	--	2
20-Apr	2	2	Z	10	12	10	6	12	17	20	14	3	1	1	2	2	3	2	3	9	8	8	5	3	6.6	20	
21-Apr	2	2	2	Z	2	2	3	10	10	8	4	2	2	2	1	1	2	1	3	1	0	0	0	0	2.6	10	
22-Apr	0	0	1	1	Z	1	2	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	2	
23-Apr	0	0	1	1	1	Z	1	1	0	0	1	2	1	1	1	1	0	1	1	3	1	3	2	2	1.0	3	
24-Apr	Z	3	7	11	6	6	6	3	3	2	1	2	1	2	1	2	1	2	1	1	3	4	6	8	3.6	11	
25-Apr	9	Z	8	11	8	8	7	9	7	7	4	2	2	2	2	2	2	3	3	2	2	5	9	9	4.9	11	
26-Apr	10	8	Z	6	4	2	6	17	9	10	4	4	3	3	4	4	4	4	4	5	5	3	3	4	5.4	17	
27-Apr	9	11	6	Z	5	5	6	9	8	8	7	3	3	2	1	0	0	0	0	0	0	4	7	2	4.2	11	
28-Apr	1	1	1	1	Z	1	8	14	14	10	10	9	2	2	3	2	4	2	5	2	3	6	11	7	5.2	14	
29-Apr	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	1	1	0.5	4	
30-Apr	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	10	11	1.3	11	

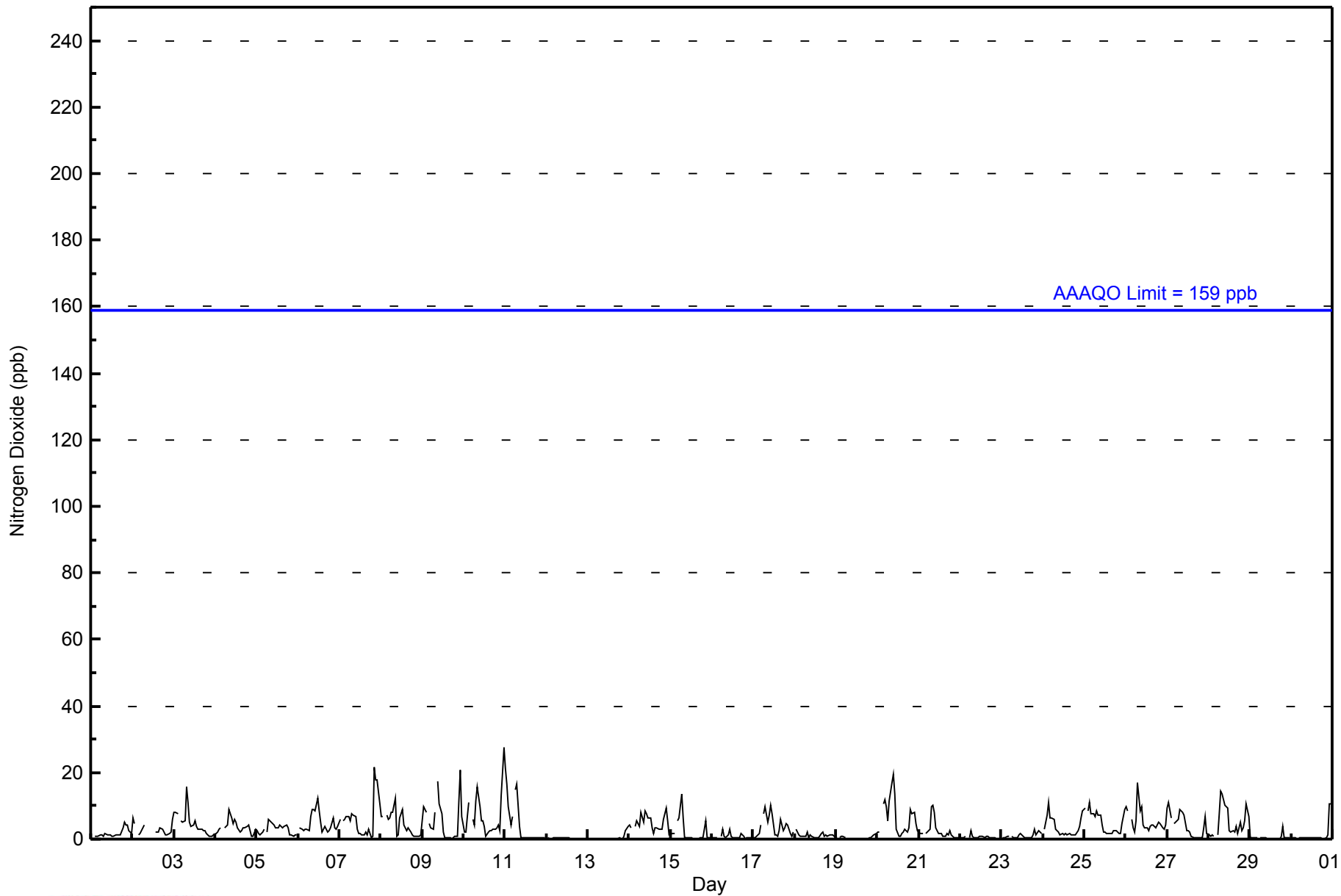
4.1	3.7	3.1	3.5	3.7	3.5	4.4	6.6	5.8	5.3	4.0	3.3	2.4	1.7	1.4	1.6	1.9	1.6	1.9	2.1	2.8	3.0	4.2	4.0	Diurnal Average	
21	17	10	11	12	10	15	17	17	20	14	12	9	5	4	4	6	4	5	9	22	18	21	28	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	669	99.41	99.41
21 - 40	4	0.59	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: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

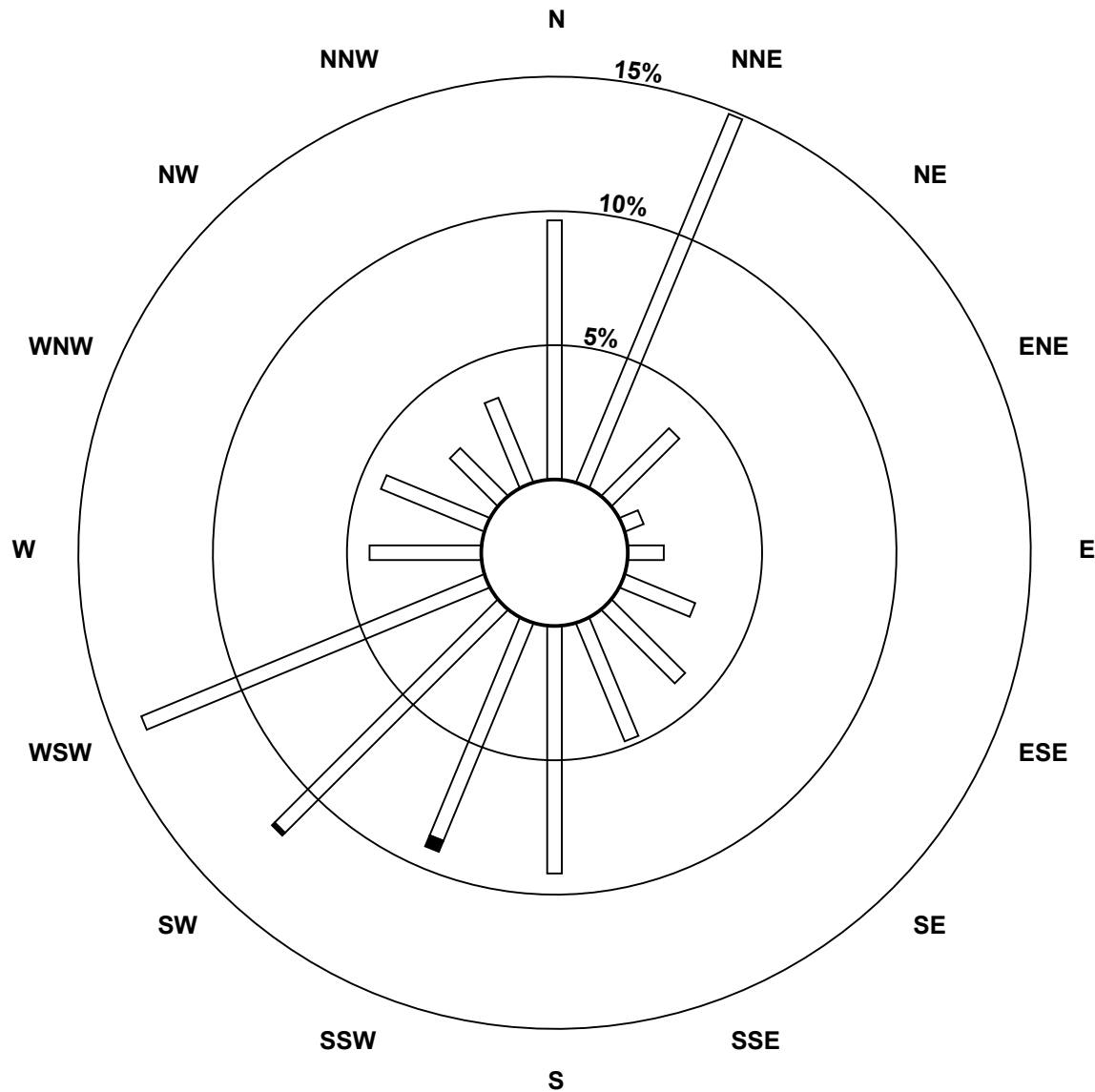
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	100	24	5	9	19	26	32	62	59	79	93	28	28	17	23	669
21 - 40	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	100	24	5	9	19	26	32	62	62	80	93	28	28	17	23	673

Total Number of Valid Hours: 673

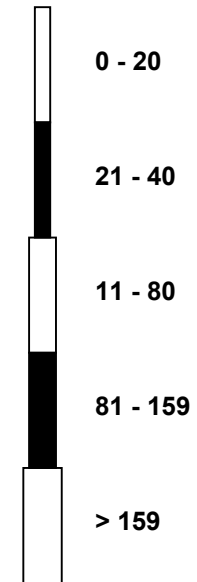
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)



Classes (ppb)

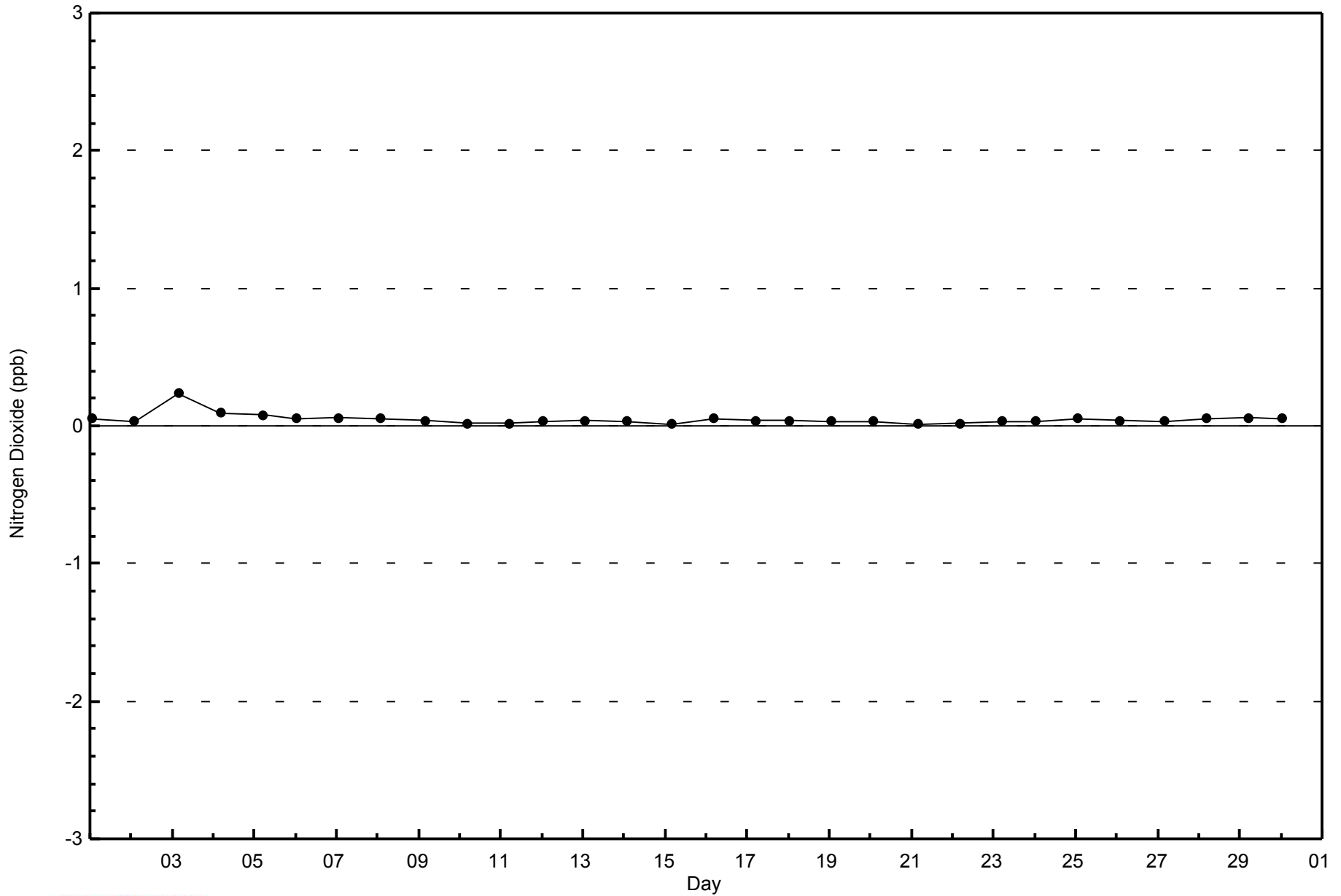


Total Number of Valid Hours: 673



WBEA  
Zero Responses

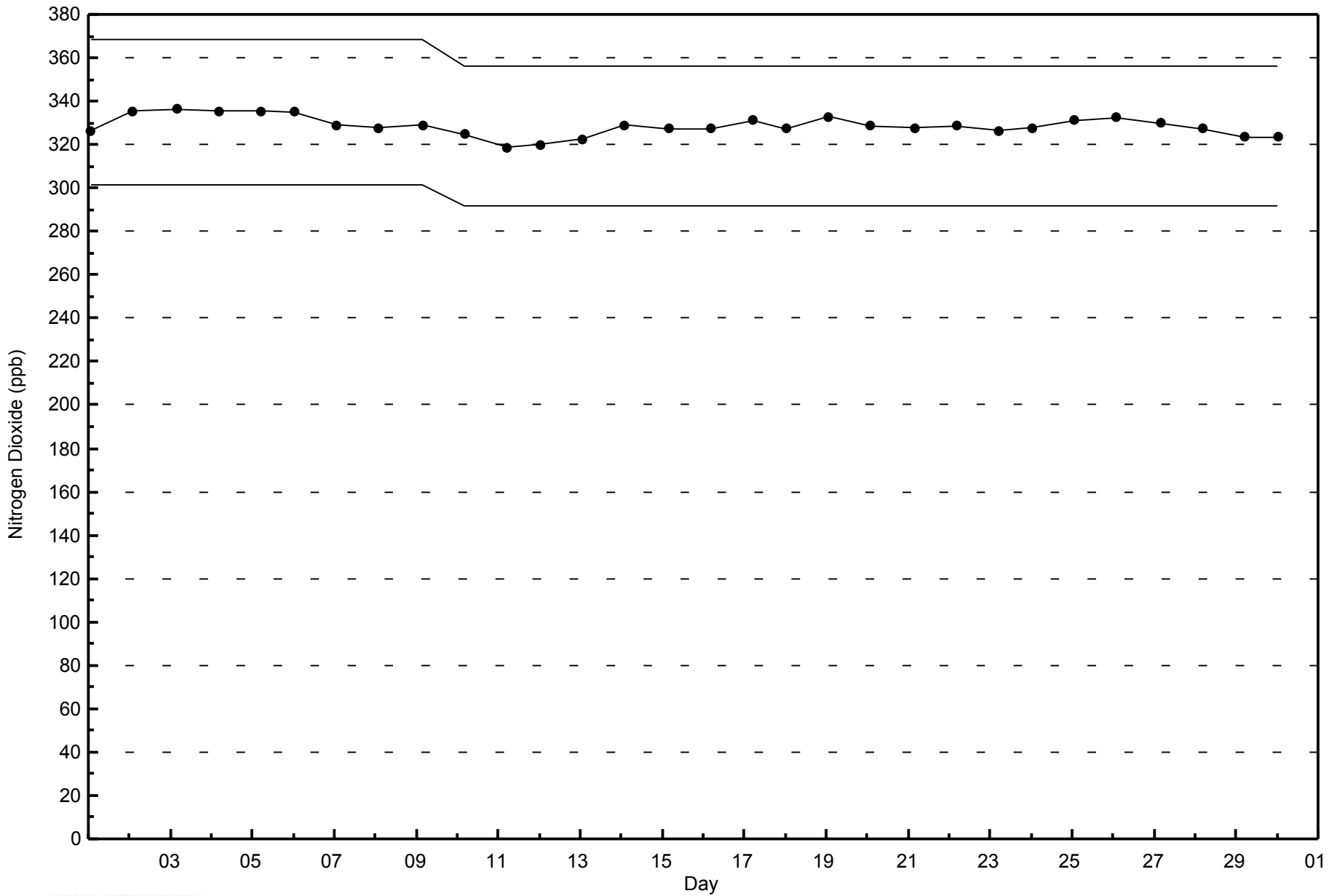
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





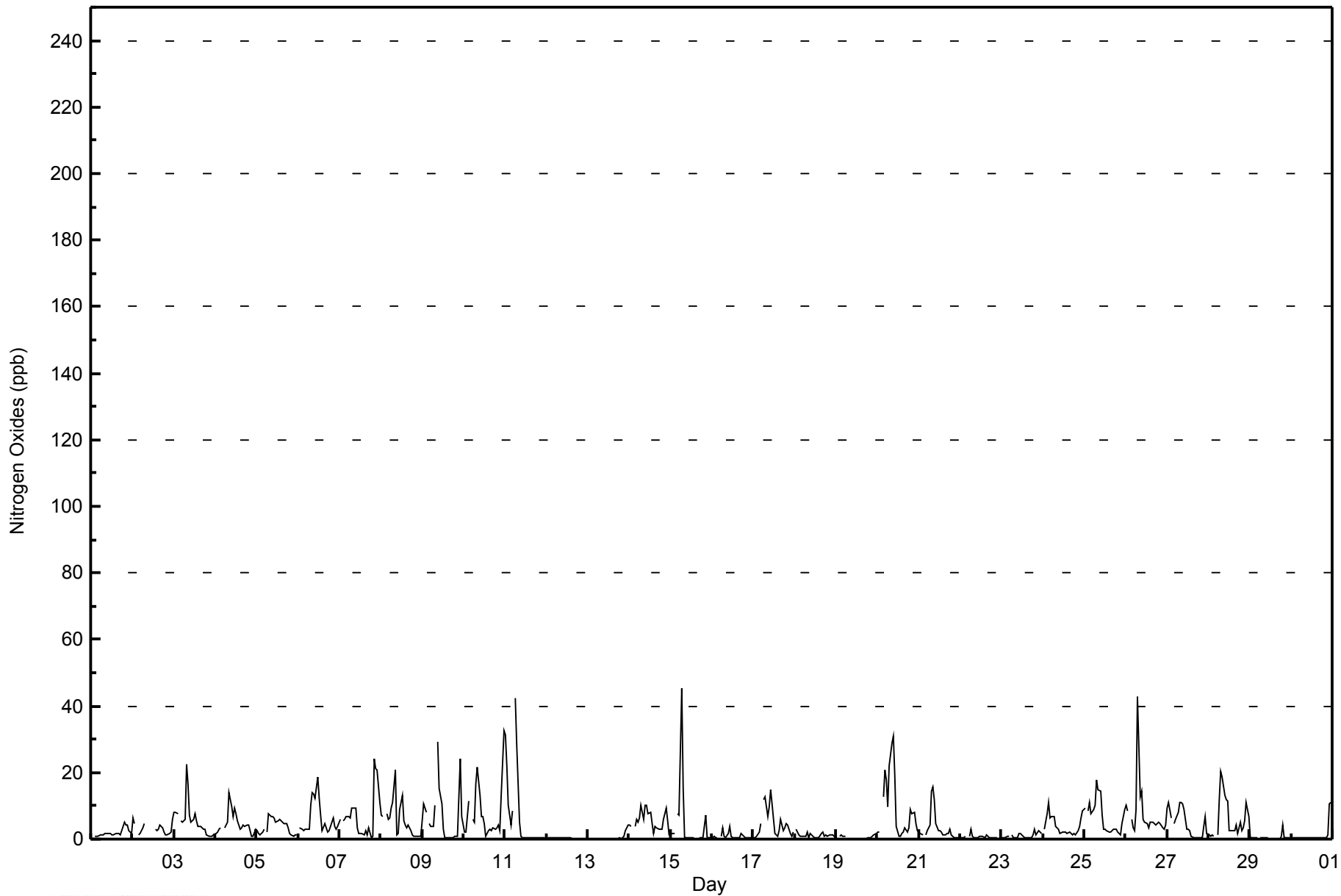


Maximum Value: 45 ppb on Apr 15 07:00																		Maximum Daily Average: 9.5 ppb on Apr 20						Hours in Service: 720			
Minimum Value: 0 ppb on Apr 12 22:00																		Minimum Daily Average: 0.3 ppb on Apr 12						Hours of Data: 673			
Maximum Diurnal Average: 10.5 ppb at hour 8																		Minimum Diurnal Average: 1.7 ppb at hour 15						Hours of Missing Data: 47			
Monthly Average: 4.1 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 10 P <sub>99</sub> = 29						Hours of Calibration: 35			
																								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-Apr	1	Z	1	1	1	1	1	1	2	2	2	2	1	1	2	2	2	1	4	5	4	4	3	2	2.0	5	
2-Apr	6	5	Z	1	2	3	3	5	C	C	C	C	C	3	3	3	4	4	2	1	1	2	2	6	3.0	6	
3-Apr	8	8	8	Z	6	5	6	22	17	7	5	6	8	5	4	4	3	3	3	1	1	1	1	1	5.8	22	
4-Apr	2	2	3	3	Z	3	4	5	14	10	7	9	8	5	3	4	4	4	4	4	2	1	1	3	4.6	14	
5-Apr	2	1	1	2	3	Z	2	8	7	7	6	5	5	6	6	5	5	5	4	1	1	1	1	1	3.8	8	
6-Apr	Z	3	3	3	3	3	3	10	14	14	12	19	12	7	3	5	3	2	2	4	6	4	3	4	6.2	19	
7-Apr	6	Z	5	6	7	7	6	9	9	9	4	2	2	2	1	2	1	3	1	1	24	21	21	11	7.0	24	
8-Apr	7	7	Z	8	6	6	9	11	21	1	2	9	13	5	4	3	4	2	1	1	1	1	1	1	5.4	21	
9-Apr	5	10	8	Z	5	4	4	10	M	29	15	11	3	1	0	0	0	0	1	1	1	13	24	7	6.9	29	
10-Apr	2	2	7	11	Z	6	5	16	22	13	7	7	5	1	3	3	3	3	3	4	4	3	13	33	7.6	33	
11-Apr	32	22	10	4	9	Z	43	28	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6.9	43	
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	0.5	4	
14-Apr	4	4	Z	4	6	5	6	10	6	10	10	8	8	5	2	4	3	3	3	3	6	9	6	1	5.5	10	
15-Apr	1	2	2	Z	7	7	45	15	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	4.0	45	
16-Apr	0	1	0	0	Z	1	4	1	0	2	4	1	0	0	0	0	1	2	1	0	0	0	0	0	0.8	4	
17-Apr	0	0	1	2	4	Z	12	13	7	10	15	11	2	1	1	3	6	3	3	5	4	2	1	2	4.6	15	
18-Apr	Z	3	1	1	1	1	1	2	1	2	1	0	0	1	0	2	2	1	1	1	1	1	1	1	1.2	3	
19-Apr	0	Z	1	1	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	-	2	
20-Apr	2	2	Z	13	21	18	10	22	29	31	19	4	1	1	2	2	3	2	4	9	8	8	5	3	9.5	31	
21-Apr	2	2	1	Z	1	3	4	15	16	12	5	2	2	2	1	1	2	2	3	1	0	0	0	0	3.4	16	
22-Apr	0	0	0	1	Z	1	3	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	3	
23-Apr	0	0	0	1	1	Z	1	0	0	0	2	2	1	1	1	0	0	1	1	3	1	3	2	2	1.1	3	
24-Apr	Z	3	7	11	7	7	7	4	3	3	2	2	2	2	2	2	2	2	1	2	1	2	4	6	8	3.9	11
25-Apr	9	Z	8	11	8	9	10	18	15	14	7	3	3	2	2	2	3	3	3	2	2	1	5	9	6.5	18	
26-Apr	10	8	Z	6	4	2	9	43	13	15	6	5	4	4	5	5	5	4	5	5	5	3	3	4	7.5	43	
27-Apr	9	11	6	Z	5	6	8	11	11	11	9	3	3	3	1	0	0	0	0	0	0	4	7	2	4.8	11	
28-Apr	1	1	1	1	Z	1	12	20	18	13	12	11	3	2	3	2	4	2	5	2	3	5	11	7	6.2	20	
29-Apr	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	1	1	0.5	4	
30-Apr	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	11	11	1.3	11	
																		Diurnal Average						Diurnal Maximum			
																		32						33			
Z - zerospan																		C - Calibration						M - Maintenance		PF - Power Failure	



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	654	97.18	97.18
21 - 40	16	2.38	99.55
41 - 80	3	0.45	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - April 2015**

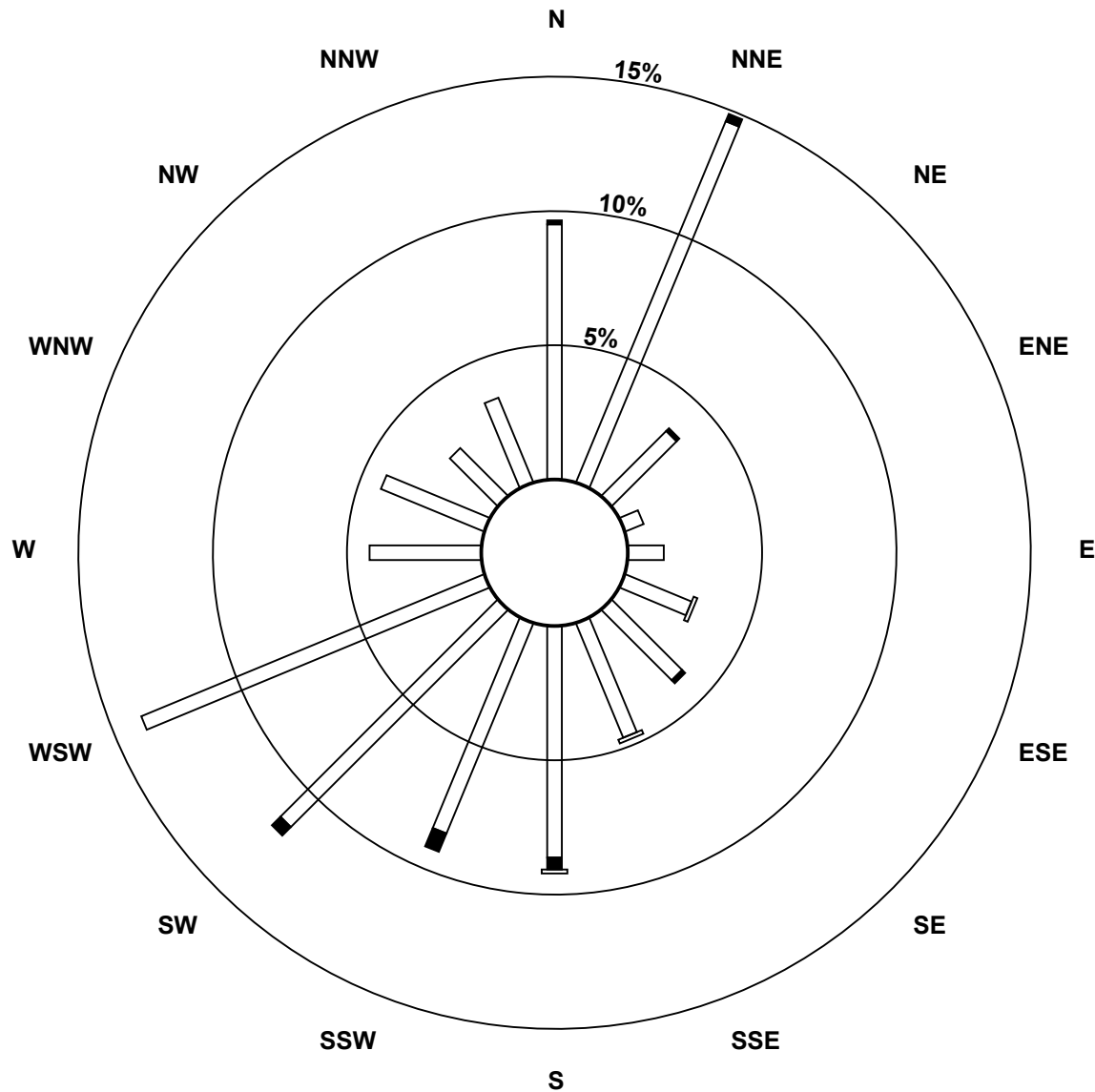
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	64	98	23	5	9	18	25	31	58	57	77	93	28	28	17	23	654
21 - 40	1	2	1	0	0	0	1	0	3	5	3	0	0	0	0	0	16
11 - 80	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	100	24	5	9	19	26	32	62	62	80	93	28	28	17	23	673

Total Number of Valid Hours: 673

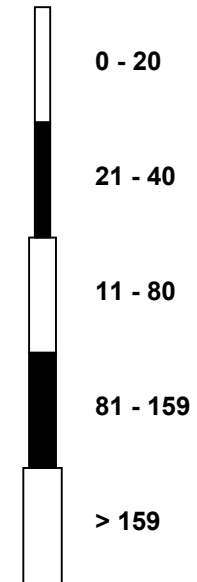
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

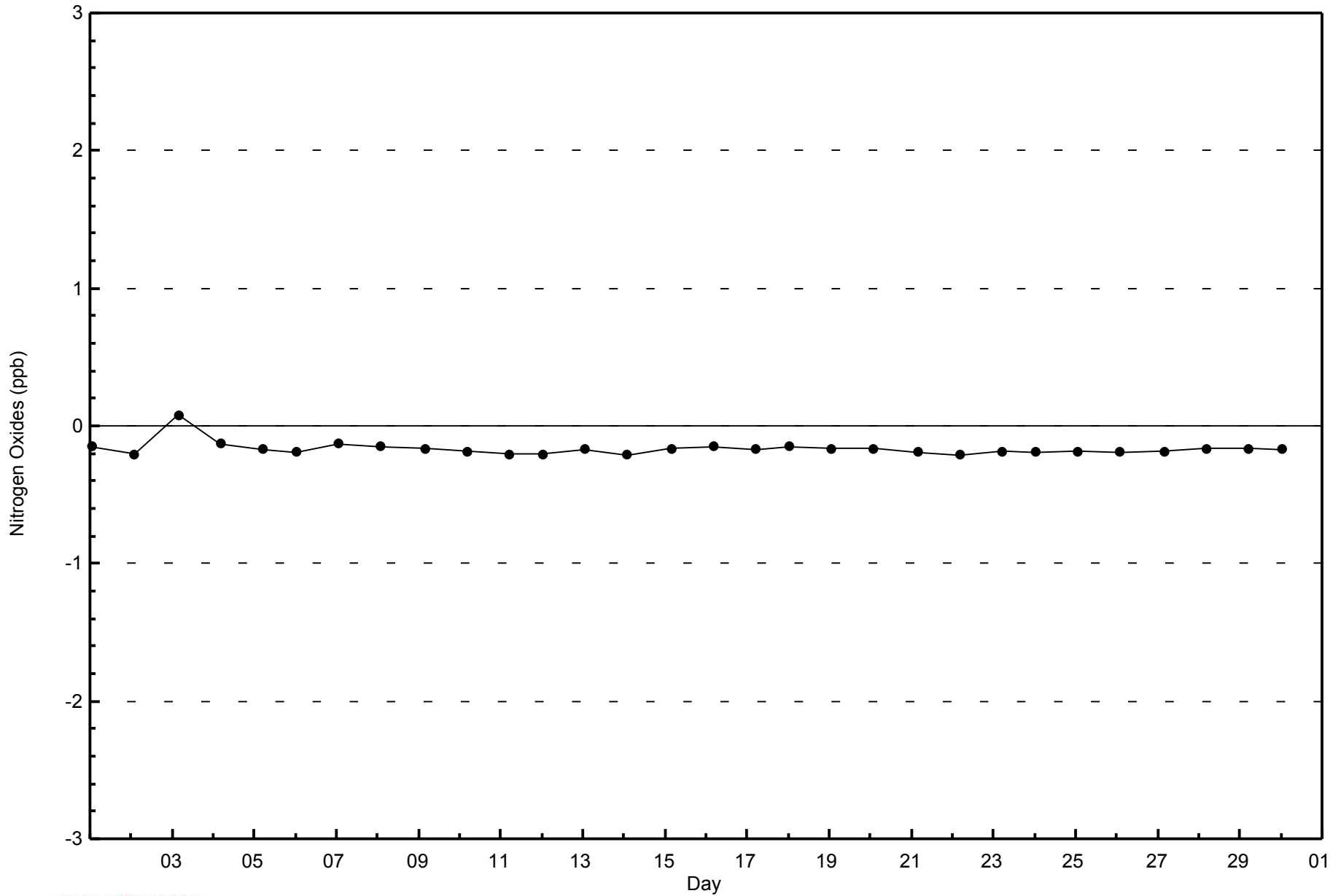
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South (AMS 13)



Classes (ppb)



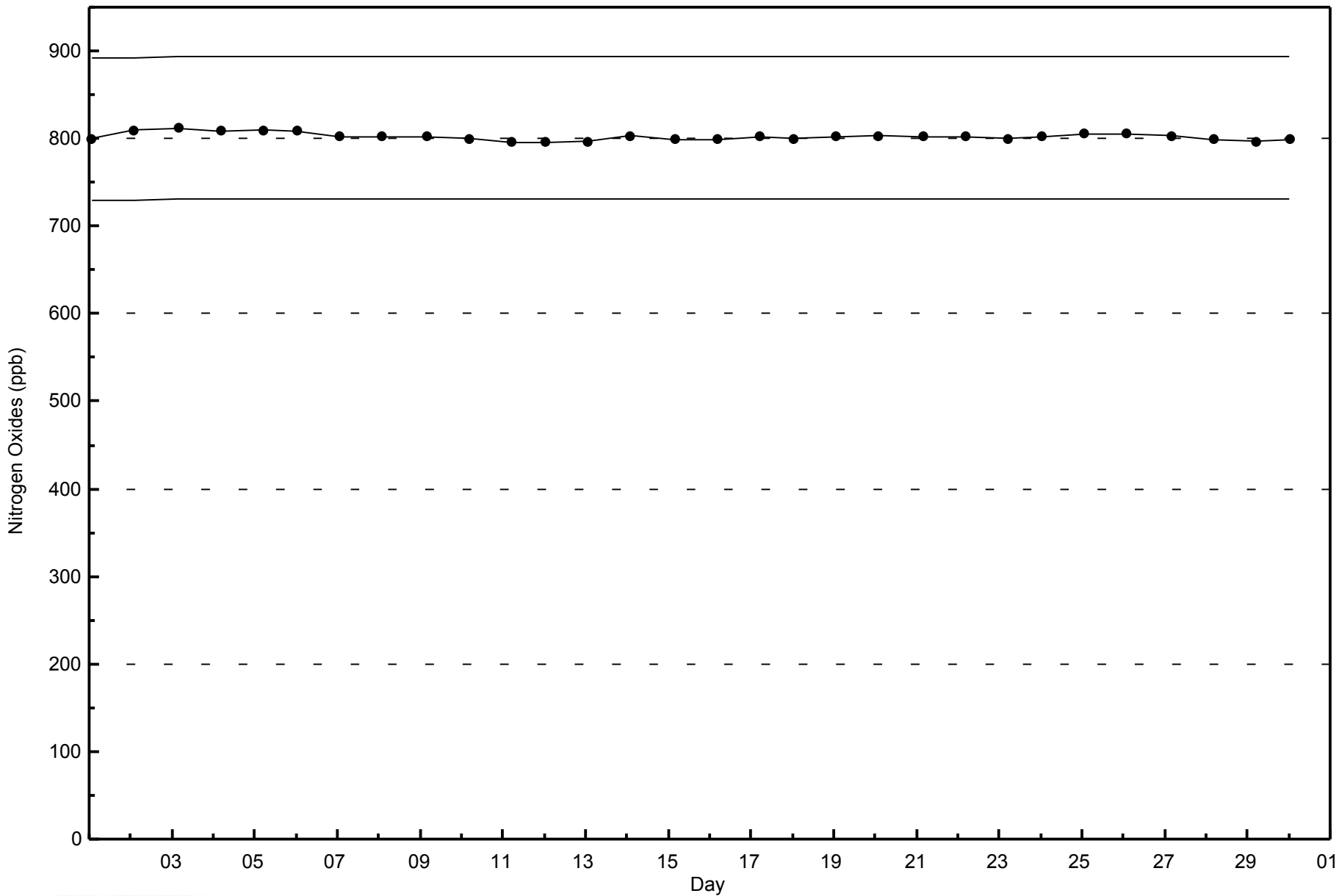
Total Number of Valid Hours: 673





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - April 2015





Summary of Hour Averages

Fort McKay South - April 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 27.9 µg/m <sup>3</sup> on Apr 11 00:00	Maximum Daily Average: 11.5 µg/m <sup>3</sup> on Apr 10	Hours of Data:	699
Minimum Value: 0.5 µg/m <sup>3</sup> on Apr 15 15:00	Minimum Daily Average: 1.2 µg/m <sup>3</sup> on Apr 12	Hours of Missing Data:	21
Maximum Diurnal Average: 6.4 µg/m <sup>3</sup> at hour 24	Minimum Diurnal Average: 2.1 µg/m <sup>3</sup> at hour 14	Hours of Calibration:	0
Monthly Average: 4.30 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.6 P <sub>10</sub> = 1.5 Q <sub>1</sub> = 2.1 Median = 3.5 Q <sub>3</sub> = 5.6 P <sub>90</sub> = 8.1 P <sub>99</sub> = 16.6	Percent Operational Time:	97.1

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-Apr	3.0	3.0	2.7	2.8	2.9	3.3	3.6	3.6	3.4	3.2	2.1	1.8	1.5	1.4	1.4	1.3	1.3	1.3	2.7	3.4	3.3	4.0	4.4	4.8	2.8	4.8																							
2-Apr	5.6	5.0	4.6	4.2	3.7	3.8	3.9	4.2	3.7	2.4	2.2	1.7	1.8	1.6	1.5	1.9	2.3	2.7	3.7	4.3	5.8	6.4	6.7	7.9	3.8	7.9																							
3-Apr	7.2	7.7	8.3	7.7	6.5	6.4	6.7	9.8	7.3	3.4	2.3	2.3	2.9	3.1	2.5	2.9	3.5	3.9	4.3	3.9	3.1	3.7	4.4	4.7	4.9	9.8																							
4-Apr	4.4	4.0	3.8	4.3	3.9	2.8	2.9	4.1	4.8	2.8	1.9	2.2	2.1	1.5	1.0	1.7	2.3	2.5	2.5	4.5	4.7	2.9	4.0	5.7	3.2	5.7																							
5-Apr	8.5	6.0	4.6	4.0	3.9	4.3	3.7	6.7	4.8	2.7	3.1	2.5	2.6	2.8	2.6	2.8	3.0	3.2	2.7	3.4	4.5	6.7	7.2	8.0	4.3	8.5																							
6-Apr	8.2	7.1	5.3	4.3	4.3	3.7	3.7	5.8	6.4	5.8	3.4	3.3	2.7	1.8	2.4	3.7	4.7	3.7	6.6	10.7	12.3	8.7	7.8	7.3	5.6	12.3																							
7-Apr	7.7	8.0	8.2	8.1	7.7	8.6	9.5	10.0	6.6	4.0	2.4	2.7	2.9	3.0	3.4	4.0	4.0	5.2	5.0	5.8	13.2	12.8	12.5	10.1	6.9	13.2																							
8-Apr	8.9	8.3	7.8	8.1	7.4	6.7	6.3	6.8	6.6	2.7	1.8	2.8	4.3	4.2	3.5	3.7	4.3	3.5	3.3	4.1	5.3	5.4	5.2	5.6	5.3	8.9																							
9-Apr	6.8	8.7	8.3	8.1	7.3	7.0	8.0	8.7	4.4	4.2	4.3	4.0	2.2	2.0	2.5	2.8	3.3	4.2	6.3	7.6	9.3	12.4	13.0	9.6	6.5	13.0																							
10-Apr	9.3	8.6	8.5	9.0	8.1	8.6	7.8	14.1	7.8	6.4	M	M	7.8	6.8	8.4	8.9	9.2	9.5	10.2	10.4	21.5	19.5	25.6	27.9	11.5	27.9																							
11-Apr	21.8	17.3	15.5	14.5	14.6	16.4	16.5	16.8	5.7	3.4	3.1	3.0	1.5	1.2	1.0	0.6	0.6	1.2	1.6	1.5	1.6	1.5	1.8	2.4	6.9	21.8																							
12-Apr	2.6	2.2	1.7	1.5	1.7	1.9	1.9	1.5	1.2	0.9	0.7	0.7	0.7	0.8	0.7	0.7	0.8	0.7	1.0	0.9	0.9	0.9	0.9	1.1	1.2	2.6																							
13-Apr	1.8	2.1	2.0	1.8	2.2	2.1	2.1	2.1	1.5	1.1	1.1	1.2	1.0	0.8	0.5	0.9	0.8	0.8	0.9	1.8	3.7	4.7	5.8	5.1	2.0	5.8																							
14-Apr	4.3	4.0	4.1	4.4	5.3	5.2	4.8	3.7	1.9	2.2	2.0	1.5	1.6	1.5	1.1	1.5	5.9	3.9	5.0	5.6	6.1	5.9	4.9	4.5	3.8	6.1																							
15-Apr	6.3	7.4	6.4	6.2	8.7	15.2	8.4	4.4	2.1	1.3	0.8	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.9	1.8	4.3	1.8	1.6	1.7	3.5	15.2																							
16-Apr	1.7	1.8	1.8	1.6	1.6	2.0	2.8	1.9	1.4	1.5	1.9	1.2	1.0	1.0	1.0	1.2	1.6	3.8	2.0	2.0	2.5	3.2	3.9	5.0	2.1	5.0																							
17-Apr	5.7	4.5	4.0	4.2	5.0	5.6	6.5	5.8	3.1	3.1	2.9	2.3	1.3	1.4	2.2	5.0	5.8	5.5	5.3	4.9	4.3	3.7	3.4	3.8	4.1	6.5																							
18-Apr	4.5	4.9	3.4	2.8	2.7	2.4	2.5	2.4	2.1	1.6	1.3	1.0	1.1	1.8	1.8	1.6	1.5	1.3	1.8	2.4	3.5	4.2	4.2	3.2	2.5	4.9																							
19-Apr	3.2	3.4	3.0	2.7	2.8	2.9	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	-	3.4																						
20-Apr	2.8	2.2	2.3	2.6	2.7	2.5	2.3	2.9	2.7	2.7	2.2	1.2	1.1	1.2	1.3	1.5	1.7	1.6	1.8	2.9	3.1	3.5	3.3	3.8	2.3	3.8																							
21-Apr	4.4	4.4	4.2	3.8	3.5	3.8	3.2	2.8	2.5	2.3	2.0	1.6	1.6	1.7	1.5	1.5	1.7	2.0	2.3	3.0	3.2	3.6	3.8	5.3	2.9	5.3																							
22-Apr	7.3	7.8	7.6	6.8	5.8	5.4	5.5	3.0	1.6	1.7	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.6	2.1	3.0	3.3	3.5	3.4	3.8	3.5	7.8																							
23-Apr	4.4	4.8	5.2	5.6	4.6	3.8	3.2	2.2	2.1	2.2	2.3	2.5	2.2	2.1	2.0	1.8	2.2	2.7	3.4	4.6	6.0	5.1	5.1	7.0	3.6	7.0																							
24-Apr	9.2	8.2	8.2	7.1	7.4	6.5	6.7	6.2	4.8	3.8	2.5	2.5	2.6	2.5	2.6	2.8	3.2	3.2	4.8	6.0	5.3	5.0	5.2	5.0	5.1	9.2																							
25-Apr	5.4	5.3	5.2	5.3	5.4	5.7	5.1	4.1	2.6	2.3	1.7	1.5	1.5	1.4	1.6	1.8	2.3	2.3	2.9	3.5	4.7	5.1	6.1	6.0	3.7	6.1																							
26-Apr	5.7	5.0	5.2	4.8	4.5	4.3	4.2	4.0	4.5	2.7	1.5	1.3	1.4	1.7	2.1	2.5	3.1	3.0	3.6	8.8	8.0	7.0	7.0	8.9	4.4	8.9																							
27-Apr	10.4	10.5	11.1	9.2	8.1	7.7	7.7	8.4	UO	4.9	5.3	4.6	4.2	4.2	2.9	2.8	2.7	2.6	2.9	3.4	3.8	5.2	6.2	6.4	5.9	11.1																							
28-Apr	6.4	6.3	6.3	6.1	5.9	5.8	6.8	6.9	5.6	5.1	6.1	5.1	4.9	4.6	5.0	5.1	6.3	7.9	7.3	9.6	12.0	12.0	13.4	9.2	7.1	13.4																							
29-Apr	4.6	4.5	4.0	4.0	4.0	3.4	2.9	2.7	2.6	2.3	1.9	1.4	1.4	1.5	1.7	1.8	1.8	1.8	2.0	3.4	3.2	3.6	4.0	5.1	2.9	5.1																							
30-Apr	7.0	6.8	6.2	4.9	4.1	3.4	2.8	2.2	1.8	1.5	1.7	1.9	2.2	1.8	2.3	1.8	2.1	2.0	2.0	2.4	3.5	4.4	5.4	5.4	3.3	7.0																							
																								6.3	6.0	5.6	5.4	5.2	5.4	5.3	5.4	3.8	2.9	2.4	2.2	2.2	2.1	2.2	2.4	2.9	3.1	3.5	4.5	5.7	5.7	6.2	6.4	Diurnal Average	
																								21.8	17.3	15.5	14.5	14.6	16.4	16.5	16.8	7.8	6.4	6.1	5.1	7.8	6.8	8.4	8.9	9.2	9.5	10.2	10.7	21.5	19.5	25.6	27.9	Diurnal Maximum	

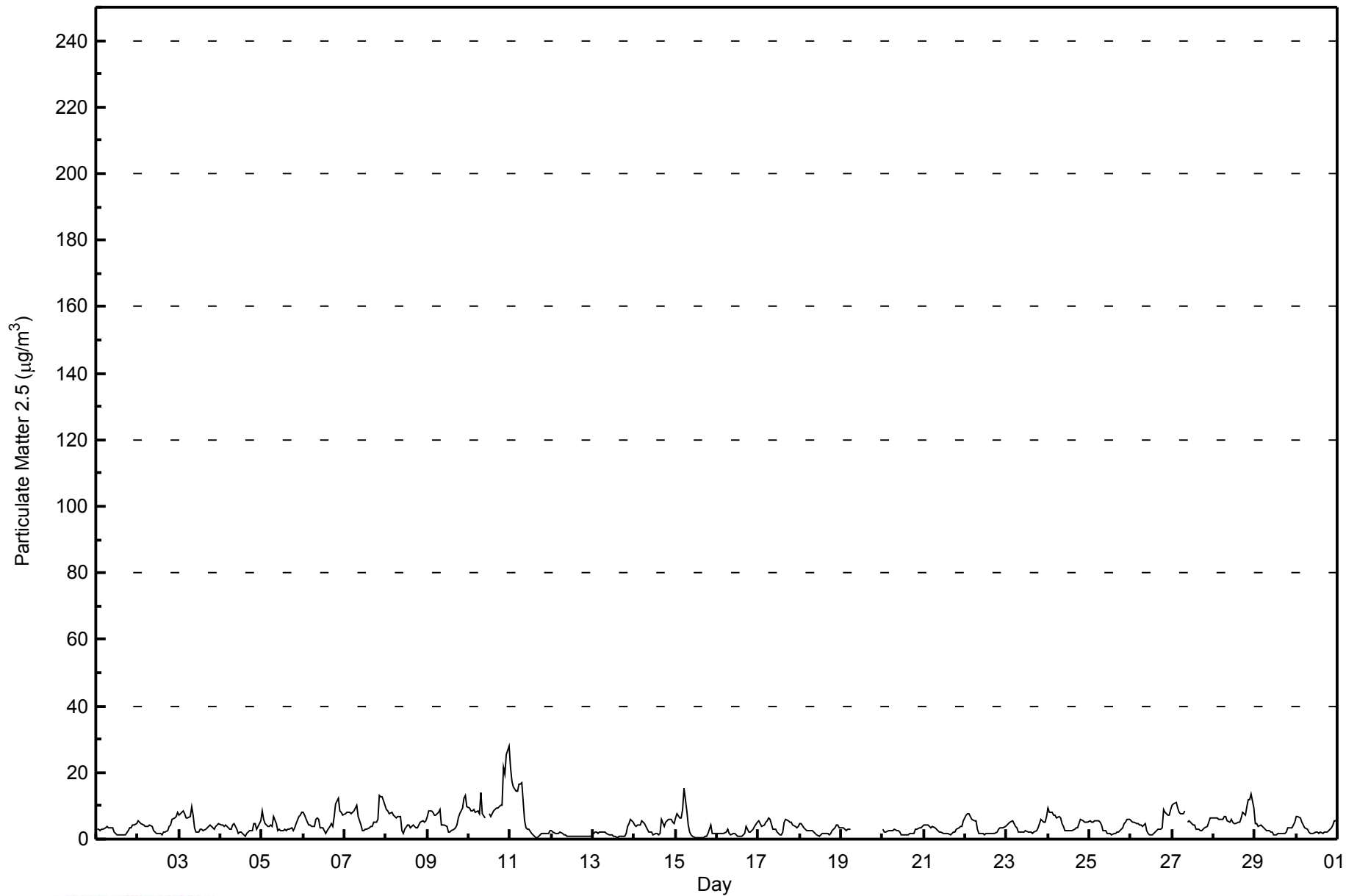
M - Maintenance      UO - Unstable Operation      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO):      24-hr 30 µg/m<sup>3</sup>





WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort McKay South - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	490	70.10	70.10
6 - 15	167	23.89	93.99
16 - 25	7	1.00	94.99
26 - 80	2	0.29	95.28
> 81.0	0	0.00	95.28

Total Number of Valid Hours: 699

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort McKay South - April 2015**

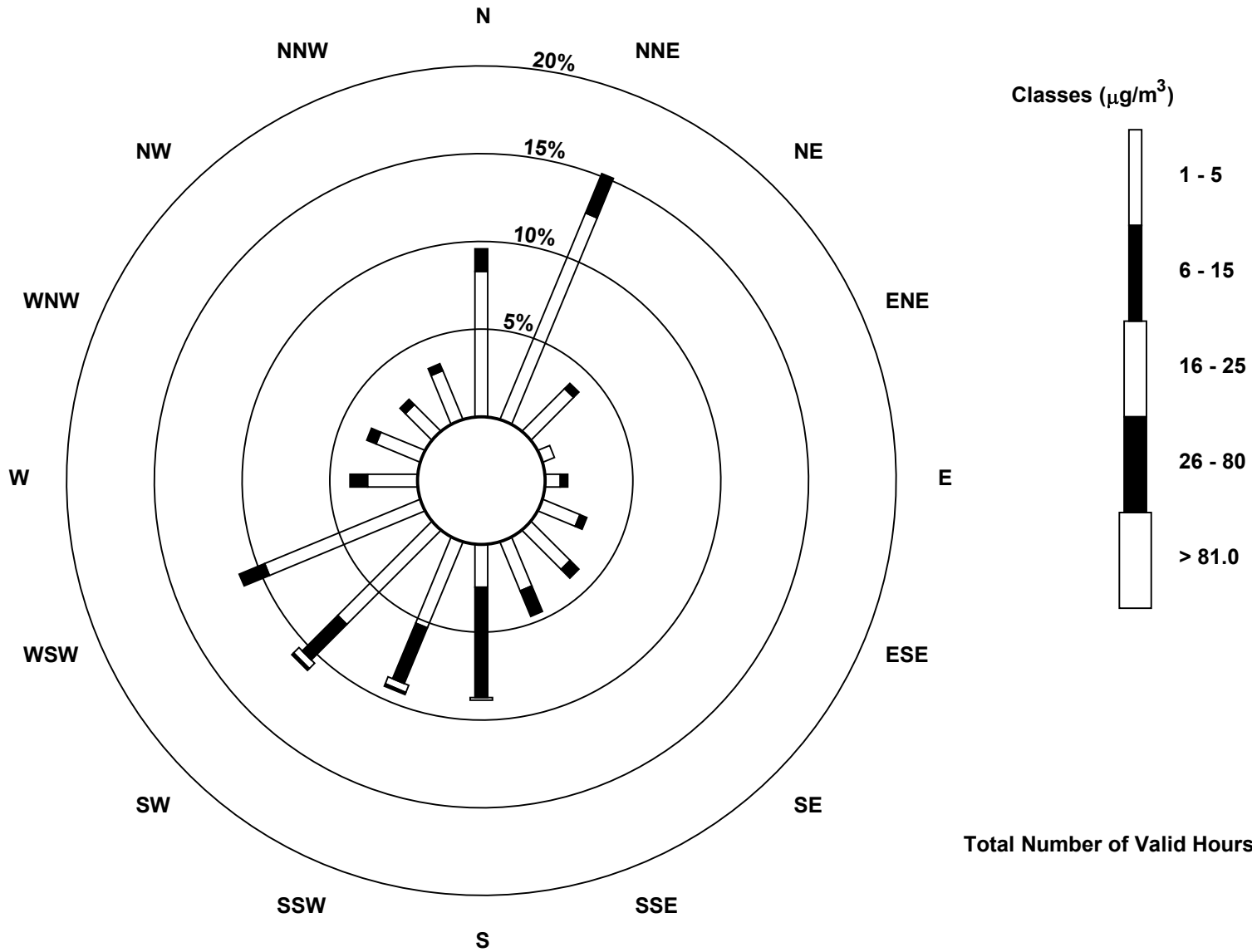
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	58	89	24	5	6	16	22	21	17	37	53	67	20	19	15	21	490
6 - 15	9	17	3	0	3	3	5	11	44	24	20	11	7	4	3	3	167
16 - 25	0	0	0	0	0	0	0	0	1	3	3	0	0	0	0	0	7
26 - 80	0	0	0	0	0	0	0	0	0	1	1	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
<b>Totals</b>	67	106	27	5	9	19	27	32	62	65	77	78	27	23	18	24	666

Total Number of Valid Hours: 699

Total Number of Hours: 720

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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South (AMS 13)**





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

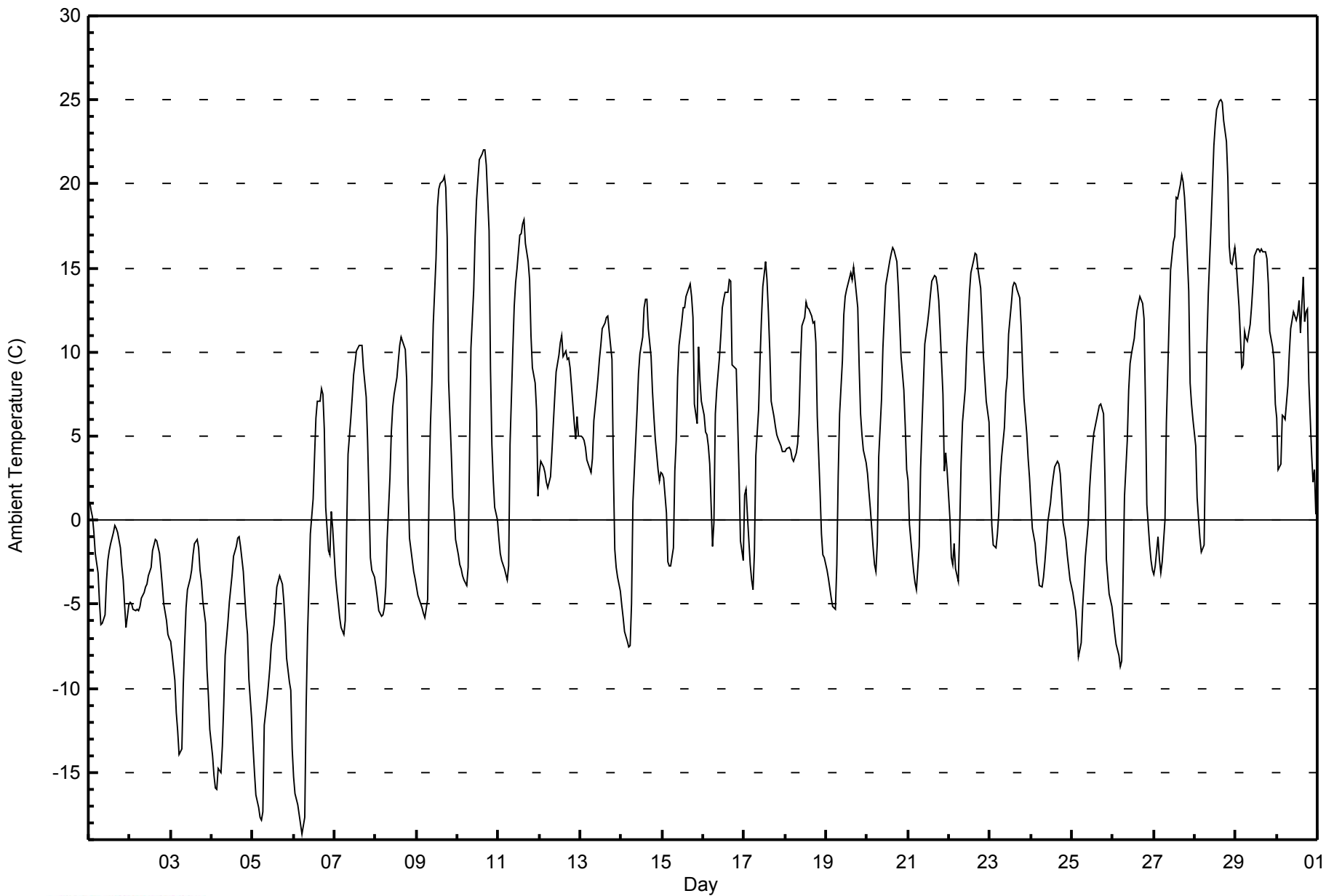
**Ambient Temperature (AT) - C**  
**Fort McKay South - April 2015**

Maximum Value: 25.0 C on Apr 28 16:00		Maximum Daily Average: 14.2 C on Apr 28		Hours in Service: 720																							
Minimum Value: -18.6 C on Apr 6 06:00		Minimum Daily Average: -10.1 C on Apr 5		Hours of Data: 720																							
Maximum Diurnal Average: 11.3 C at hour 16		Minimum Diurnal Average: -4.3 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 3.80 C		Percentiles: P <sub>1</sub> = -17.2 P <sub>10</sub> = -6.0 Q <sub>1</sub> = -2.9 Median = 3.7 Q <sub>3</sub> = 10.6 P <sub>90</sub> = 14.7 P <sub>99</sub> = 21.8		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-Apr	1.1	0.6	0.2	-0.8	-2.0	-3.1	-4.9	-6.2	-6.1	-5.6	-3.6	-2.4	-1.8	-1.4	-0.7	-0.3	-0.5	-0.8	-1.6	-2.7	-3.6	-5.1	-6.3	-5.1	-2.6	1.1	
2-Apr	-4.9	-5.0	-5.3	-5.4	-5.3	-5.4	-5.1	-4.7	-4.3	-4.0	-3.8	-3.3	-2.8	-1.8	-1.5	-1.1	-1.2	-2.0	-2.9	-3.9	-5.0	-6.0	-6.8	-7.1	-4.1	-1.1	
3-Apr	-7.2	-8.0	-9.5	-11.4	-12.6	-13.9	-13.6	-9.9	-7.4	-5.2	-4.1	-3.5	-3.0	-2.1	-1.4	-1.2	-1.7	-3.0	-3.7	-4.8	-6.2	-8.9	-10.5	-12.4	-6.9	-1.2	
4-Apr	-14.0	-15.2	-16.0	-16.0	-14.7	-15.1	-13.4	-11.0	-8.1	-6.1	-4.9	-4.0	-3.2	-2.1	-1.5	-1.1	-1.0	-1.5	-3.0	-4.5	-5.8	-6.8	-9.5	-11.9	-7.9	-1.0	
5-Apr	-13.5	-15.0	-16.3	-17.1	-17.7	-17.9	-17.3	-12.2	-10.7	-9.8	-8.7	-7.4	-6.2	-5.1	-4.0	-3.6	-3.3	-3.8	-4.8	-6.2	-8.2	-9.6	-10.1	-13.6	-10.1	-3.3	
6-Apr	-15.2	-16.2	-16.9	-17.5	-18.1	-18.6	-17.7	-11.1	-6.8	-3.9	-0.9	1.3	3.8	6.1	7.1	7.1	7.8	7.5	5.4	0.8	-1.8	-2.0	0.5	-0.5	-4.2	7.8	
7-Apr	-3.3	-4.2	-5.0	-5.8	-6.3	-6.8	-6.0	-0.6	3.9	6.1	7.4	8.6	9.3	10.1	10.4	10.4	10.4	9.1	7.3	4.7	1.4	-2.2	-3.0	-3.4	2.2	10.4	
8-Apr	-3.9	-4.7	-5.4	-5.7	-5.6	-5.3	-4.0	-1.2	2.5	5.3	6.7	7.5	8.5	9.5	10.4	10.9	10.7	10.2	8.3	2.2	-1.1	-2.4	-3.0	-3.4	2.0	10.9	
9-Apr	-3.9	-4.5	-4.9	-5.2	-5.5	-5.8	-4.7	1.7	5.7	8.1	11.7	15.6	18.6	19.7	20.0	20.2	20.4	19.8	16.8	8.3	3.8	1.4	0.5	-1.1	6.5	20.4	
10-Apr	-2.1	-2.6	-2.9	-3.3	-3.6	-3.9	-2.8	4.1	10.2	13.8	16.9	19.1	20.3	21.4	21.8	22.1	22.1	21.1	17.2	9.0	4.5	2.4	0.8	0.0	8.6	22.1	
11-Apr	-1.0	-1.9	-2.4	-2.8	-3.3	-3.6	-2.7	4.5	10.2	12.7	14.1	15.0	16.9	17.1	17.6	17.9	16.5	15.4	14.3	11.0	9.1	8.2	6.5	1.4	7.9	17.9	
12-Apr	2.8	3.5	3.2	2.9	2.3	1.9	2.6	4.0	5.7	7.4	8.8	9.8	10.6	10.9	9.7	10.1	9.6	9.6	9.1	8.0	5.8	4.8	6.1	5.0	6.4	10.9	
13-Apr	5.0	4.9	4.7	4.3	3.6	3.1	2.9	3.6	5.9	7.6	8.5	9.6	10.4	11.4	11.8	12.1	12.1	11.2	9.5	3.1	-1.7	-2.8	-3.4	-4.2	5.6	12.1	
14-Apr	-5.0	-5.8	-6.6	-7.2	-7.6	-7.5	-4.9	1.1	4.7	6.5	8.8	9.9	10.9	12.6	13.2	13.1	11.4	9.8	7.7	6.2	4.8	3.0	2.4	2.8	3.5	13.2	
15-Apr	2.8	2.5	0.4	-2.5	-2.7	-2.8	-1.7	3.0	4.7	8.5	10.4	11.8	12.6	12.6	13.3	13.8	14.1	13.3	12.1	6.9	5.7	10.3	8.3	7.1	6.9	14.1	
16-Apr	6.2	5.2	5.1	4.4	3.4	-1.6	-0.1	6.4	7.8	9.7	11.1	12.6	13.2	13.6	13.6	14.3	14.2	9.2	9.1	9.0	5.9	2.7	-1.3	-2.4	7.1	14.3	
17-Apr	1.5	1.9	0.3	-2.6	-3.6	-4.2	-1.9	3.8	6.6	9.5	11.9	13.9	15.4	14.3	12.4	10.1	7.1	6.2	5.6	5.1	4.8	4.4	4.0	4.1	5.4	15.4	
18-Apr	4.1	4.2	4.4	4.1	3.7	3.5	4.0	4.6	6.4	9.4	11.6	12.1	13.0	12.6	12.6	12.2	11.7	11.8	10.6	6.2	1.7	-0.8	-2.0	-2.2	6.6	13.0	
19-Apr	-3.0	-3.5	-4.1	-4.6	-5.1	-5.3	-2.6	2.7	6.3	9.5	12.2	13.3	13.7	14.0	14.8	14.3	15.1	14.3	12.7	9.2	6.3	5.1	4.1	3.4	6.0	15.1	
20-Apr	2.8	1.7	0.7	-1.6	-2.6	-3.0	-1.3	3.7	7.2	10.3	12.1	14.0	15.0	15.5	15.9	16.2	16.0	15.4	13.9	11.8	9.7	7.7	5.6	3.0	7.9	16.2	
21-Apr	2.3	-0.3	-2.1	-3.0	-3.7	-4.1	-1.6	3.1	5.7	8.1	10.5	11.7	12.5	13.4	14.2	14.5	14.5	14.0	13.1	11.3	7.5	2.9	4.0	3.0	6.3	14.5	
22-Apr	0.1	-2.2	-2.6	-1.4	-2.9	-3.6	-0.4	3.4	5.9	7.8	10.3	11.8	13.6	14.7	15.5	15.9	15.8	15.0	13.8	11.9	9.7	8.4	7.1	5.8	7.2	15.9	
23-Apr	2.4	-0.3	-1.5	-1.6	-0.9	0.5	2.5	3.7	5.5	7.6	8.5	11.0	12.9	13.9	14.1	14.0	13.7	13.2	11.6	9.2	7.2	5.1	3.7	2.5	6.6	14.1	
24-Apr	1.0	-0.5	-1.4	-2.5	-3.1	-3.9	-3.9	-3.4	-2.4	-1.4	-0.1	1.0	1.9	2.6	3.2	3.5	3.4	2.7	1.3	-0.2	-1.2	-2.0	-2.8	-3.6	-0.5	3.5	
25-Apr	-4.3	-4.9	-5.4	-6.4	-8.1	-7.3	-5.2	-3.7	-2.1	-0.3	1.9	3.2	4.3	5.2	6.0	6.4	6.9	6.9	6.3	2.5	-2.3	-3.4	-4.4	-5.1	-0.6	6.9	
26-Apr	-5.9	-6.7	-7.4	-8.1	-8.7	-8.4	-3.3	1.4	4.7	7.8	9.3	9.9	10.8	11.8	12.5	12.9	13.3	12.9	11.9	7.0	0.9	-1.5	-2.4	-3.0	3.0	13.3	
27-Apr	-3.2	-2.7	-1.0	-2.3	-3.1	-2.5	0.0	5.9	8.9	12.1	14.8	16.5	16.9	19.2	19.1	19.9	20.6	20.2	19.2	17.7	13.7	8.2	6.9	6.0	9.6	20.6	
28-Apr	4.5	1.4	0.1	-1.1	-1.9	-1.5	4.3	10.4	13.5	17.6	20.0	22.3	23.5	24.5	24.9	25.0	24.8	23.8	22.5	20.3	16.3	15.3	15.2	16.2	14.2	25.0	
29-Apr	15.3	14.0	12.7	9.1	9.2	11.2	10.9	10.7	11.7	12.7	14.1	15.8	16.1	16.1	16.0	16.1	16.0	16.0	15.5	14.0	11.2	10.3	9.6	6.9	13.0	16.1	
30-Apr	6.1	3.0	3.4	6.3	6.2	6.0	8.0	9.9	11.4	11.9	12.4	11.9	12.2	13.1	11.1	14.5	11.9	12.4	12.6	8.2	3.9	2.2	3.0	0.3	8.4	14.5	
		-1.1	-2.0	-2.7	-3.5	-4.0	-4.3	-2.8	0.9	3.6	5.8	7.6	8.9	10.0	10.8	11.1	11.3	11.1	10.3	9.0	6.0	3.2	1.6	0.8	-0.4	Diurnal Average	
		15.3	14.0	12.7	9.1	9.2	11.2	10.9	10.7	13.5	17.6	20.0	22.3	23.5	24.5	24.9	25.0	24.8	23.8	22.5	20.3	16.3	15.3	15.2	16.2	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	277	38.47	38.47
0 - 10	242	33.61	72.08
10 - 20	181	25.14	97.22
> 20	20	2.78	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %  
Fort McKay South - April 2015**

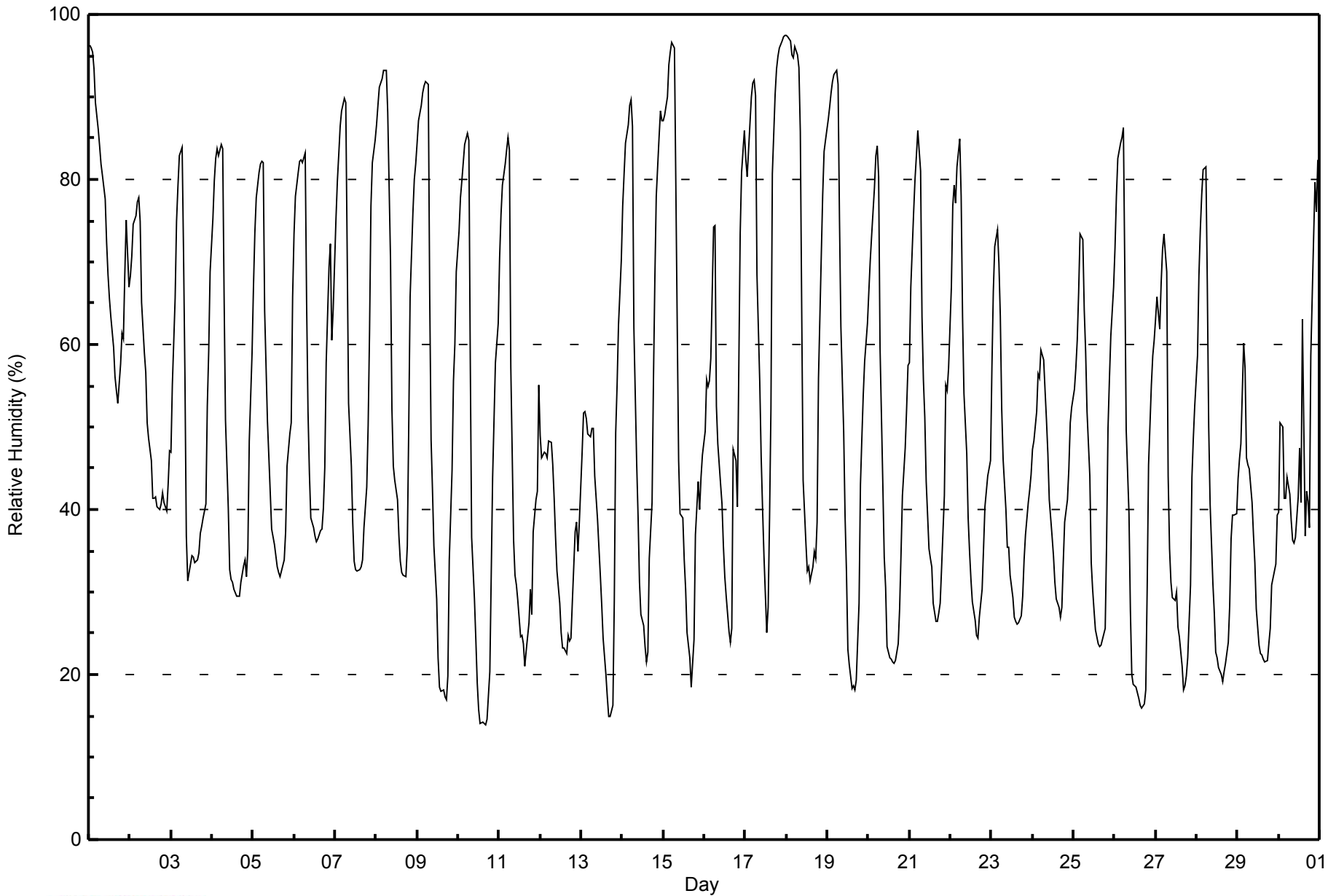
Maximum Value: 98 % on Apr 18 00:00																		Maximum Daily Average: 73.5 % on Apr 1																		Hours in Service: 720													
Minimum Value: 14 % on Apr 10 17:00																		Minimum Daily Average: 35.4 % on Apr 29																		Hours of Data: 720													
Maximum Diurnal Average: 78.7 % at hour 6																		Minimum Diurnal Average: 27.6 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 51.2 %																		Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 24 Q <sub>1</sub> = 33 Median = 46 Q <sub>3</sub> = 71 P <sub>90</sub> = 85 P <sub>99</sub> = 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-Apr	96	96	95	93	89	86	84	82	80	78	72	69	66	63	60	56	54	53	58	61	61	69	75	67	73.5	96																							
2-Apr	68	71	74	76	77	78	75	65	59	57	50	49	46	41	41	42	40	40	41	42	41	40	43	47	54.3	78																							
3-Apr	47	55	66	75	79	83	84	71	56	37	31	33	34	34	34	34	35	37	38	39	41	53	59	69	51.0	84																							
4-Apr	75	80	83	84	83	84	84	66	51	40	33	31	31	30	29	30	30	31	33	34	32	35	48	59	50.7	84																							
5-Apr	67	74	78	81	82	82	82	64	51	46	42	38	36	34	33	32	32	33	34	37	45	49	51	66	52.9	82																							
6-Apr	73	78	81	82	82	82	83	65	52	44	39	38	37	36	36	37	38	40	45	58	69	72	61	64	58.1	83																							
7-Apr	75	80	83	86	88	90	89	71	53	45	38	34	33	33	33	33	34	38	43	50	62	77	82	85	59.7	90																							
8-Apr	87	89	91	92	93	93	93	88	70	52	45	43	41	37	34	32	32	32	36	50	66	76	80	82	63.9	93																							
9-Apr	84	87	89	91	91	92	92	66	49	42	36	29	22	19	18	18	17	17	20	34	45	56	60	69	51.7	92																							
10-Apr	74	78	80	82	84	86	85	59	37	29	24	19	16	14	14	14	14	15	20	32	44	51	58	63	45.4	86																							
11-Apr	70	76	79	82	83	85	84	57	36	32	31	29	25	25	24	21	23	26	30	27	37	41	42	55	46.7	85																							
12-Apr	49	46	47	47	46	48	48	46	41	37	32	29	25	23	23	23	25	24	24	29	37	39	35	39	35.9	49																							
13-Apr	47	52	52	51	49	49	50	50	44	39	35	32	28	24	20	17	15	15	16	29	49	55	62	70	39.7	70																							
14-Apr	77	81	84	87	89	90	86	62	46	39	31	27	26	23	21	23	34	41	56	68	78	85	88	87	59.6	90																							
15-Apr	87	88	90	94	95	97	96	79	62	46	40	39	34	30	25	22	18	21	24	37	43	40	44	47	54.1	97																							
16-Apr	49	56	55	56	58	74	74	52	48	43	41	36	32	30	25	24	26	47	46	40	57	73	81	86	50.4	86																							
17-Apr	83	80	84	90	92	92	90	68	55	46	40	34	25	28	39	52	81	90	93	95	96	97	97	98	72.8	98																							
18-Apr	97	97	97	95	95	96	95	94	86	64	43	36	33	33	31	33	35	34	38	56	71	78	83	85	66.9	97																							
19-Apr	87	89	90	92	93	93	91	75	62	49	39	32	23	21	18	19	18	19	29	43	49	54	58	62	54.5	93																							
20-Apr	66	70	73	79	83	84	80	60	43	34	31	23	22	22	21	21	22	24	28	35	42	47	52	57	46.7	84																							
21-Apr	58	67	76	80	83	86	81	63	56	51	43	35	34	33	29	26	26	28	29	33	42	55	54	57	51.1	86																							
22-Apr	67	77	79	77	82	85	78	63	54	47	39	35	32	29	27	25	24	27	30	35	40	42	44	46	49.3	85																							
23-Apr	57	66	72	74	70	63	52	46	40	35	35	32	29	27	26	26	26	27	29	34	37	41	42	44	43.1	74																							
24-Apr	47	48	52	56	56	59	58	54	51	47	41	37	34	31	29	28	27	28	34	38	41	45	51	52	43.6	59																							
25-Apr	55	57	60	66	73	73	64	59	52	44	34	30	28	25	24	23	24	24	26	36	50	56	61	67	46.3	73																							
26-Apr	72	78	83	84	85	86	69	50	39	28	20	19	18	18	17	16	16	16	18	30	46	55	59	61	45.1	86																							
27-Apr	63	66	62	67	72	73	69	44	35	31	29	29	30	26	25	21	18	19	20	22	31	44	49	53	41.5	73																							
28-Apr	59	68	74	78	81	82	67	50	41	31	27	23	22	21	20	19	20	21	24	28	37	39	39	39	42.2	82																							
29-Apr	44	46	48	60	57	46	45	45	41	37	33	28	24	22	22	22	22	22	24	26	31	33	33	39	35.4	60																							
30-Apr	40	50	50	41	41	44	42	39	36	36	37	41	47	41	63	37	42	41	38	59	73	80	76	82	49.0	82																							
																								67.4	71.5	74.2	76.6	77.8	78.7	75.7	61.8	50.9	42.9	37.1	33.7	31.1	29.2	28.8	27.6	28.9	31.0	34.1	41.2	49.7	55.9	58.9	63.2	Diurnal Average	
																								97	97	97	95	95	97	96	94	86	78	72	69	66	63	63	56	81	90	93	95	96	97	97	98	Diurnal Maximum	





**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort McKay South - April 2015**





Maximum Speed: 19 km/h on Apr 1 12:00	Maximum Daily Speed Average: 13.6 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 27 04:00	Minimum Daily Speed Average: 1.0 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 2.3 km/h at hour 4	Minimum Diurnal Speed Average: 0.0 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 1.2 km/h 282.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 7 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 P <sub>99</sub> = 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-Apr	N13	N14	N16	N18	NNE18	N19	N18	N17	NNE16	N17	N17	NNE19	N17	NNE15	NNE17	N16	N14	N13	NNE10	NNE6	NNE6	NNE3	NNE4	N4	N13.6	NNE19
2-Apr	N3	NNW4	NW4	WNW4	NW3	WNW3	NE1	N5	NNE7	NNE10	NNE11	NNE10	NE8	NE10	NNE9	NNE8	NNE8	NNE9	NNE7	NNE7	NNE8	N7	N6	N4	NNE5.9	NNE11
3-Apr	NNE5	NNE3	N3	NNW3	NW3	NW3	W1	N4	N4	NE4	N8	N9	NE9	NE8	NNE9	NNE10	NNE11	NNE10	NNE9	NNE7	NNE6	N4	NNW4	N3	NNE5.4	NNE11
4-Apr	W2	W2	WSW2	SW2	SSW1	W2	NNE1	SE1	NNE3	NNE6	N7	NNE7	NE7	NE8	NNE9	NNE8	NNE8	NNE8	NNE10	NNE9	NNE9	NNE8	NNW3	NW4	NNE4.3	NNE10
5-Apr	WNW3	WSW3	WSW4	WSW3	NW3	WNW2	SW2	NNE6	NNE9	NNE10	NNE9	N8	NNE9	NNE9	NNE9	N10	NNE10	NNE9	NNE8	NNE6	NNE5	NNE6	NNE6	WNW2	N5.1	NNE10
6-Apr	W2	W3	W2	WSW3	WSW3	SW3	SW2	E1	ESE5	ESE5	S6	SE5	SSE6	SSE9	S7	SSE6	SSE8	SSE7	SSE5	S4	S4	SSW5	S7	S5	S3.7	SSE9
7-Apr	SSE3	SSE3	S3	S3	S3	S4	S4	S6	S6	SSW10	SSW13	SSW12	SSW12	SSW13	SSW13	SW11	SSW11	SW11	SW8	SW7	SSW5	S3	S3	SSW3	SSW6.8	SSW13
8-Apr	SW2	WSW2	SSW3	SSW3	S5	S5	S4	S4	SSW4	NW2	NNE7	NNE7	NNE8	NE9	NNE8	NE7	NE7	NE7	ENE4	WSW1	WSW3	WSW3	SW2	SW2	NE1.0	NE9
9-Apr	WSW2	WSW3	WSW2	WSW3	SW2	SSW2	SSW4	S7	SE7	SE8	SE7	S10	SW12	SW15	SW15	SW13	SW12	WSW11	SSW7	SSW5	SSW4	SSW5	SSW3	SW3	SSW5.7	SW15
10-Apr	SW2	W2	SSW1	SW2	S3	S3	SSW2	SSE3	S5	S8	S9	S8	SSW8	SSW9	S7	SSE6	S4	E3	S5	SSW3	SSW2	SW3	SW3	SSW3	S4.0	SSW9
11-Apr	SW1	SW3	SW3	SSW3	SSW2	SSW2	S2	SSW4	SW6	SW6	WSW11	SW6	W8	W10	W10	W9	WSW10	W9	WSW13	WSW17	WSW16	WNW10	W4	SW5	WSW6.6	WSW17
12-Apr	WSW7	WSW9	WSW10	WSW10	WSW11	WSW12	WSW13	WSW10	WSW12	WSW11	SW14	WSW16	WSW15	WSW16	WSW16	WSW18	W13	WSW14	W11	WNW8	WSW4	WSW8	WSW10	WSW6	WSW11.1	WSW18
13-Apr	W9	W14	W14	WNW15	WNW14	WNW7	W5	W7	WNW11	WNW12	WNW14	WNW12	NW13	WNW13	WNW12	WNW11	WNW11	NW8	NW5	WNW3	WSW3	NW3	NNW2	NW2	WNW8.9	WNW15
14-Apr	WSW2	WSW2	WNW2	WSW2	WSW3	WNW2	NNW2	SE6	SSE7	SE8	SSE7	SSE9	SSE8	SSE8	S9	S8	S15	SSE11	SSE10	SSE10	SSE8	S6	S8	SSE8	SSE5.8	S15
15-Apr	S6	S5	SSW2	SSW4	S4	S3	SSE4	SSW4	SW4	WSW9	SW9	WSW13	WSW11	W11	WSW13	WSW12	SW13	WSW12	WSW7	SSW2	SW7	WSW9	SW6	SW7	SW6.7	WSW13
16-Apr	SW8	SSW8	SW8	WSW7	SSW5	S2	SSE2	SW5	SW7	SSW9	SSW12	SW13	WSW13	WSW13	WSW15	WSW15	W13	NNW14	WNW9	W9	WNW4	SW5	SSW3	SSW4	WSW6.9	WSW15
17-Apr	WSW10	WSW8	SSW3	SSW2	SSW3	S3	S4	S6	S7	S7	SE6	SE6	SSW12	SSW12	SSW14	SSW13	S6	SE5	SE5	SSE3	SE2	N2	NNW2	NW4	SSW4.7	SSW14
18-Apr	NW4	NW5	NNW8	NNW10	NNW10	NNW10	N9	NW7	NW8	NW11	NNW13	N16	NNW14	N13	NNE9	NNE11	N7	NNW9	N11	NNW3	SW4	SW2	SW3	SW2	NNW7.1	N16
19-Apr	SSW2	SW2	SW2	SW3	SSW2	SSW2	S4	SSE4	ESE6	SE7	S6	S8	SW9	WSW6	W6	NW6	WSW7	WNW5	SSW2	SSW2	SW3	WSW1	SW2	WNW1	SW2.5	SW9
20-Apr	WSW2	SW2	NW2	W2	SW2	WSW2	SSW2	NE4	NNE4	NNE4	N5	NE4	NE6	NNE8	NE7	NNE7	NNE7	NNE9	NNE9	NNE9	N9	N8	N6	NNW5	NNE4.0	NNE9
21-Apr	NNW6	NNW5	NNW1	W2	WSW1	SW2	NNW1	NNE5	NNE8	N10	N11	N14	N13	N13	NNE13	N12	NNE12	NNE12	NNE9	NE5	ENE3	SE3	SE4	SE4	NNE5.7	N14
22-Apr	SE3	W2	E2	ESE4	NE2	NNE3	NE3	ESE6	ESE7	E8	ESE9	ESE11	SE11	ESE11	ESE12	ESE11	SE12	ESE11	ESE9	ESE8	ESE6	ESE6	ESE4	ESE4	ESE6.4	SE12
23-Apr	NE2	NNE3	NNE4	NNE5	NNE5	NE4	E5	E7	E9	E8	NNE11	NE12	NE12	ENE11	NE13	ENE12	E10	ENE11	NE13	NE12	NE9	NNE7	NNE10	NNE10	NE7.7	NE13
24-Apr	NNE12	NNE12	NNE11	NNE10	NNE10	NNE11	NNE12	NNE13	NNE14	NNE15	NNE15	NNE15	N15	N16	NNE15	NNE15	NNE15	NNE16	N15	N15	N13	N13	N10	N9	NNE13.2	N16
25-Apr	N7	N7	N6	N5	NNW4	NNW5	N6	NNE8	N7	NNE8	N9	N10	N10	N10	N8	N8	N7	N8	N6	NNW4	WNW2	WNW2	WNW2	WNW2	N6.0	N10
26-Apr	W3	WSW3	WSW3	SW2	SW3	SSW2	SE1	ESE3	ESE5	SSE5	SSE7	SSE6	S7	SSW6	S6	S6	SE6	SE6	SE4	SE3	SW3	SW3	SW2	WSW3	S3.1	S7
27-Apr	S3	S5	SSW4	NNE0	SW2	N0	SSE1	SSE8	SSE8	SSE8	S9	SSW13	SSW10	SSW16	SW14	SW17	WSW15	WSW14	WSW10	SW7	SW6	SSW6	SW6	SW7	SSW7.2	SW17
28-Apr	SW4	W2	SW3	SW3	WSW3	SW2	S3	SE3	SE4	SE6	SE7	SSE9	S11	S11	S12	SSE11	S12	S12	S8	S5	S5	S6	S5	WSW9	S5.6	S12
29-Apr	WSW5	W4	SW2	SW3	WSW8	WSW11	WSW8	WSW9	WSW6	WSW8	W6	WSW9	WSW12	WSW10	WSW9	WSW7	SW8	WSW8	SSW6	SW7	SW7	SSW7	SW9	SW7	WSW7.0	WSW12
30-Apr	WSW7	SSW6	SW8	WSW11	WSW11	WSW10	SW11	WSW12	WSW11	WSW14	SW15	SW16	WSW14	WSW11	WSW6	WSW7	NW7	WNW8	WSW5	SSW3	WSW2	SW4	SSW6	S4	WSW8.0	SW16

W1.8	W2.2	W2.1	W2.3	W2.0	NNW1.8	W0.8	S0.3	NE0.0	NE0.3	NNW0.4	NNW0.6	W1.7	W1.9	W1.6	NNW1.7	NNW1.5	NNW2.1	NNW1.4	NW0.7	W0.8	W1.3	WSW1.3	WSW1.5	Diurnal Average
N13	N14	N16	N18	NNE18	N19	N18	N17	NNE16	N17	N17	NNE19	N17	WSW16	NNE17	WSW18	WSW15	NNE16	N15	WSW17	WSW16	N13	N10	NNE10	Diurnal Maximum

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

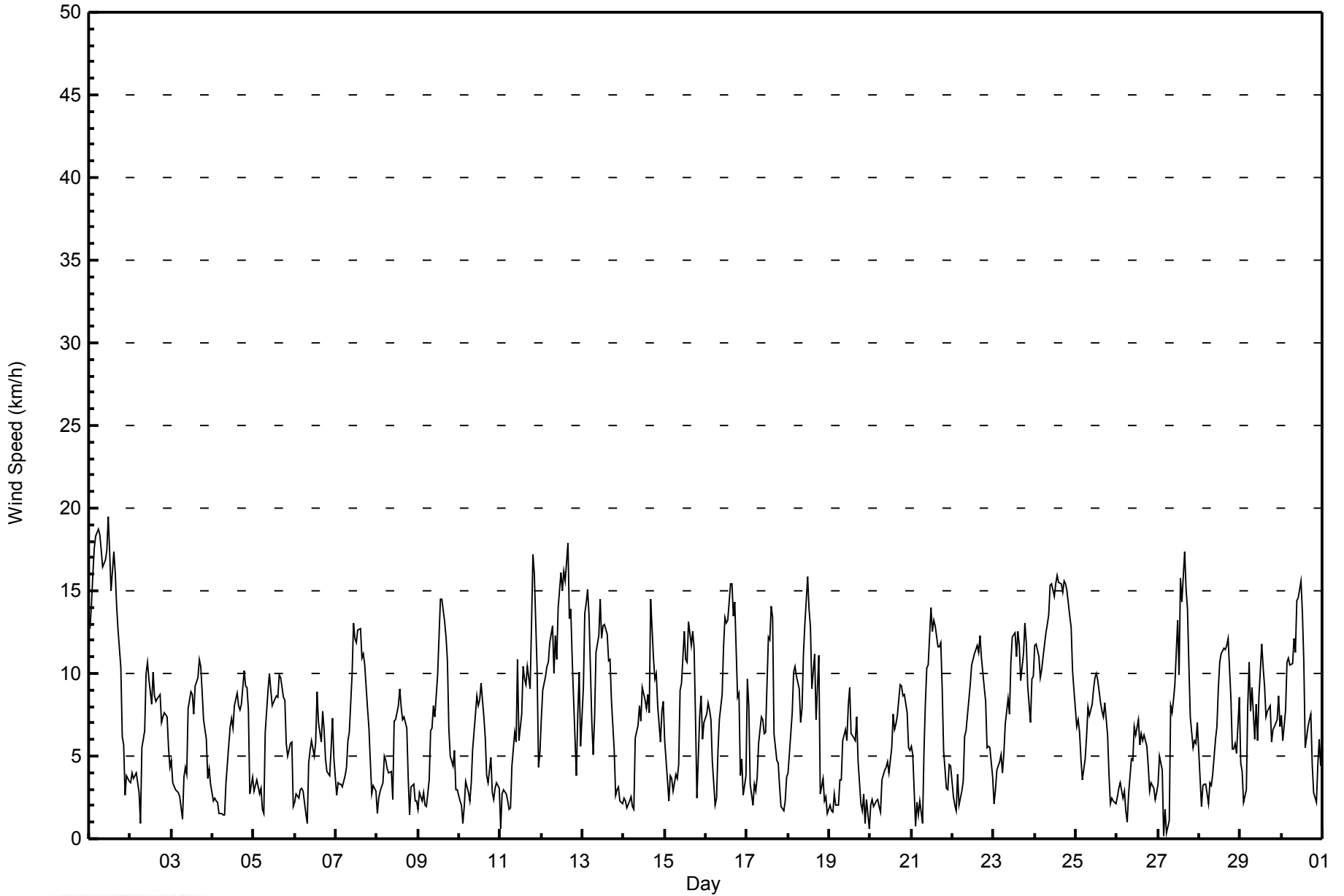


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Apr 12 16:00 Minimum Value: 0 km/h on Apr 26 03:00 Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 6																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	4	4	5	5	6	6	6	6	6	6	5	6	6	5	5	5	4	4	3	2	2	2	1	2	6
2-Apr	1	1	1	1	1	1	1	2	2	3	3	3	3	4	3	3	3	3	2	2	2	2	2	1	4
3-Apr	1	1	1	1	0	1	1	1	1	2	3	3	3	3	3	3	3	3	3	2	3	1	1	1	3
4-Apr	1	1	0	1	1	1	1	1	1	2	3	3	3	3	3	3	2	3	3	3	3	2	1	1	3
5-Apr	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	2	2	1	1	2	1	3
6-Apr	1	1	1	1	0	1	1	1	2	2	2	2	3	4	3	3	3	2	2	1	1	2	2	2	4
7-Apr	1	1	1	1	1	1	1	2	3	3	5	5	4	5	4	4	4	3	3	1	2	1	0	1	5
8-Apr	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	2	2	2	2	1	1	1	1	1	3
9-Apr	1	0	1	1	1	1	1	3	2	2	2	5	4	5	5	5	4	4	3	1	1	1	2	1	5
10-Apr	0	1	1	1	1	1	1	1	2	3	3	3	3	4	3	2	2	2	1	1	0	1	1	1	4
11-Apr	1	1	1	1	1	1	1	2	3	2	4	3	4	4	5	5	5	5	5	6	6	5	3	1	6
12-Apr	2	2	3	3	3	4	4	5	5	4	5	5	6	7	6	7	7	6	5	4	2	3	4	4	7
13-Apr	5	6	6	7	6	3	2	3	5	5	6	5	5	5	5	4	4	4	2	1	1	1	1	1	7
14-Apr	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	4	5	4	4	4	3	2	3	3	5
15-Apr	2	2	1	1	1	1	1	1	2	3	4	5	4	5	5	5	5	5	3	1	7	5	2	2	7
16-Apr	2	2	3	2	2	1	1	3	3	3	4	5	5	5	6	6	7	7	5	4	2	2	1	1	7
17-Apr	3	3	2	1	1	1	1	2	2	2	2	3	4	5	5	5	4	2	2	1	1	1	1	1	5
18-Apr	1	2	3	3	3	4	5	3	4	5	5	5	5	5	4	4	4	5	5	1	1	1	1	1	5
19-Apr	1	1	1	1	1	1	1	1	2	2	3	3	4	5	4	3	4	2	1	1	1	1	1	1	5
20-Apr	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	2	3	3	3	3	2	2	1	1	3
21-Apr	1	1	1	1	1	0	1	2	2	3	3	4	4	4	4	4	3	3	3	2	2	1	2	2	4
22-Apr	1	1	1	1	1	1	1	3	2	3	4	4	4	4	5	5	4	4	3	4	3	2	2	2	5
23-Apr	1	1	1	1	1	1	2	3	3	3	4	4	5	5	5	4	3	5	5	4	4	3	3	3	5
24-Apr	4	4	4	3	3	3	4	4	4	5	5	5	5	5	5	5	5	5	5	4	4	4	3	3	5
25-Apr	2	2	2	1	1	1	2	2	2	3	3	3	3	3	4	3	3	2	2	2	0	0	0	1	4
26-Apr	1	1	0	0	1	1	1	1	1	2	3	3	3	4	3	3	3	2	2	1	0	1	1	1	4
27-Apr	1	1	1	1	0	1	1	3	3	3	4	5	4	6	5	6	6	5	4	2	1	1	1	2	6
28-Apr	2	1	1	1	1	0	1	1	2	3	3	4	4	4	4	4	5	4	3	2	1	3	2	4	5
29-Apr	2	3	1	1	3	3	3	4	3	3	3	4	4	4	4	3	3	3	2	2	2	2	2	2	4
30-Apr	2	1	2	3	3	3	3	4	4	5	5	5	6	5	4	3	5	4	2	1	1	1	2	1	6
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	285	39.58	39.58
6 - 11	313	43.47	83.06
12 - 19	122	16.94	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - April 2015**

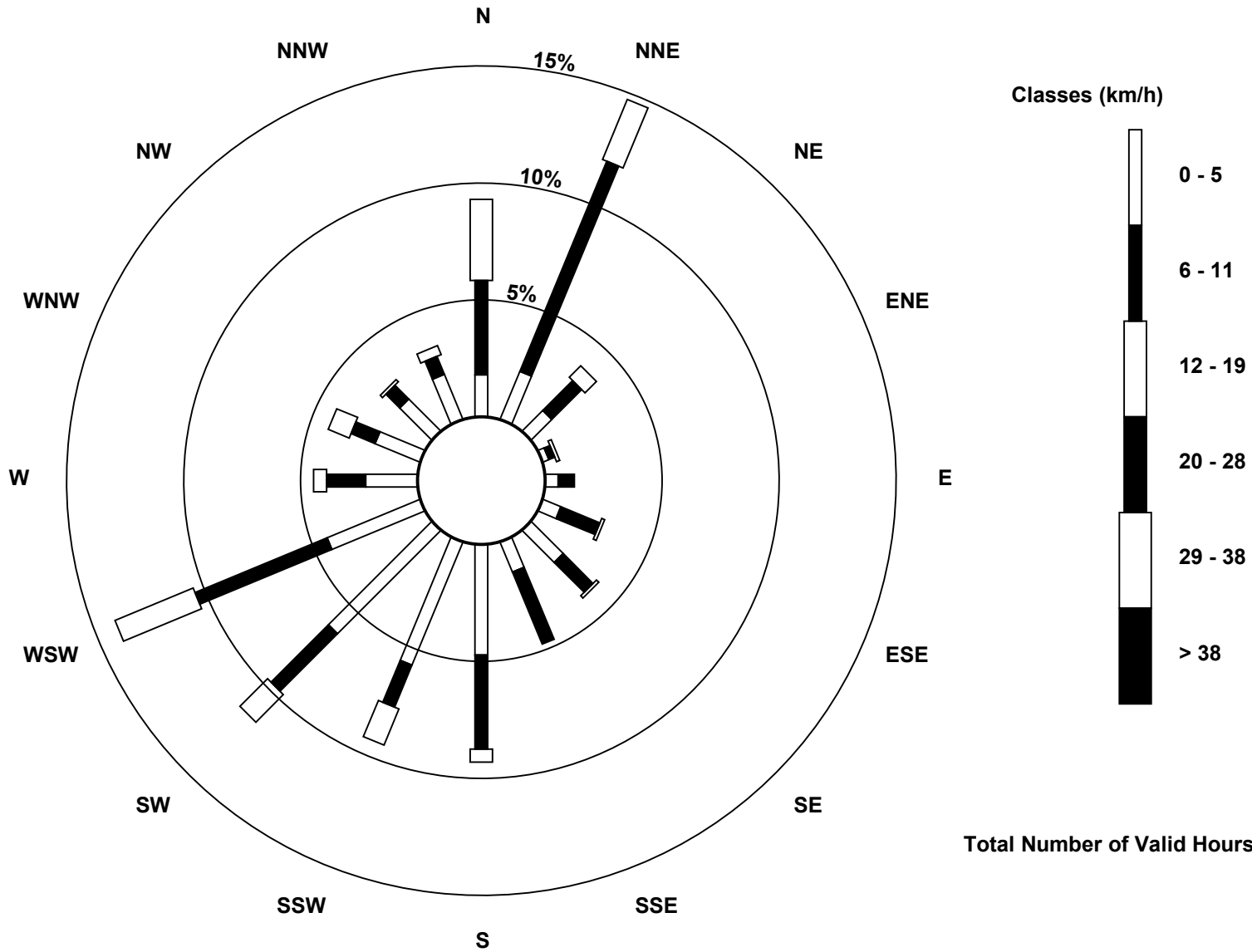
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	16	9	2	4	6	14	10	34	41	45	31	16	15	14	15	285
6 - 11	29	70	13	2	5	13	13	24	29	14	25	44	12	8	6	6	313
12 - 19	25	20	5	1	0	1	1	0	4	12	12	26	4	7	1	3	122
20 - 28	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	67	106	27	5	9	20	28	34	67	67	82	101	32	30	21	24	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
Fort McKay South (AMS 13)**





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Fort McKay South - April 2015**

Direction of Maximum Speed: 12 deg on Apr 1 12:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 10.0 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 13 deg on Apr 27 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.0 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 241.4 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	6	4	5	7	13	10	9	10	14	7	10	12	10	12	14	5	4	5	14	28	24	28	14	9	10.0
2-Apr	353	339	308	295	304	302	46	7	12	19	23	13	42	38	31	30	30	29	27	31	26	8	0	6	16.3
3-Apr	25	19	355	331	326	323	264	4	9	45	11	7	39	42	24	24	17	12	19	30	29	353	342	353	15.3
4-Apr	267	266	245	232	206	278	30	141	33	22	9	33	39	45	29	30	23	30	19	22	23	19	341	321	20.0
5-Apr	289	246	246	255	306	284	221	31	12	17	25	10	15	18	30	6	13	16	23	22	24	12	12	301	9.2
6-Apr	260	260	262	254	238	228	236	98	121	114	169	127	159	164	185	164	148	155	165	180	182	193	191	180	173.8
7-Apr	152	162	189	185	178	187	186	178	172	194	206	192	194	200	204	214	209	217	223	214	198	175	190	203	198.4
8-Apr	232	249	202	197	189	181	188	181	204	311	26	29	22	35	28	36	38	39	59	246	248	238	227	233	35.6
9-Apr	247	245	244	243	225	203	195	169	142	132	143	179	214	229	229	224	228	238	213	200	212	204	210	228	208.8
10-Apr	236	262	211	225	178	179	192	159	171	171	179	187	201	207	177	154	176	99	172	204	207	235	224	205	187.2
11-Apr	219	214	226	208	193	204	182	194	234	233	237	234	268	259	265	260	251	271	254	251	254	285	267	228	249.3
12-Apr	238	242	237	239	239	240	240	249	245	240	221	239	244	246	249	252	262	250	269	290	248	241	248	255	246.2
13-Apr	280	268	271	287	295	292	260	272	297	301	303	303	308	302	300	286	295	314	310	284	242	318	329	313	292.6
14-Apr	251	242	286	255	243	282	335	141	157	145	150	155	155	164	173	186	170	149	147	160	164	169	170	166	165.5
15-Apr	176	174	195	205	191	186	165	193	218	237	236	254	256	260	239	239	235	240	238	198	235	249	227	233	231.7
16-Apr	220	213	232	239	210	173	151	223	225	202	195	215	248	238	250	255	272	342	285	271	284	227	192	210	240.2
17-Apr	251	249	207	201	192	187	181	170	186	169	141	146	202	210	207	205	188	138	137	151	133	8	336	323	194.6
18-Apr	319	313	332	337	334	341	352	307	306	321	346	357	348	360	29	27	2	331	2	331	234	224	220	232	342.2
19-Apr	206	230	220	223	201	204	179	152	117	136	176	176	231	253	265	322	255	289	192	195	232	244	225	284	215.1
20-Apr	253	231	311	273	232	246	203	36	18	32	10	53	40	20	46	31	28	21	19	12	8	360	351	344	13.6
21-Apr	346	346	332	269	256	228	330	13	19	11	11	1	9	5	13	10	13	13	17	54	61	124	142	139	12.9
22-Apr	131	274	90	113	56	14	35	109	111	97	109	113	129	123	108	119	127	121	106	106	111	117	115	104	111.6
23-Apr	49	16	18	16	32	48	81	98	99	85	30	38	40	75	48	64	94	63	50	45	43	16	23	24	51.1
24-Apr	28	29	23	15	23	16	12	17	13	19	16	24	9	8	13	12	17	12	4	5	5	4	4	5	13.7
25-Apr	357	354	3	0	342	333	350	12	10	17	9	9	8	2	360	353	359	360	351	337	284	301	289	302	357.3
26-Apr	267	239	241	216	214	212	139	122	107	153	156	158	182	212	183	174	142	136	133	141	236	224	224	255	177.4
27-Apr	189	190	203	13	231	358	162	163	164	165	187	212	201	207	215	224	242	249	246	235	214	212	224	228	213.2
28-Apr	227	272	235	216	240	233	181	145	134	125	138	149	170	170	170	163	179	178	174	170	175	182	188	253	176.4
29-Apr	240	275	228	232	253	256	258	253	254	251	263	255	246	251	246	244	231	237	212	225	231	213	224	227	242.9
30-Apr	245	208	232	242	240	240	236	240	243	239	231	226	237	249	258	243	321	302	258	198	241	231	208	185	239.7
279.2	275.2	277.8	278.0	274.5	281.7	271.4	185.0	43.8	50.3	318.1	291.9	274.2	269.0	275.1	281.3	284.9	334.6	345.4	323.8	277.2	271.7	245.9	254.0		
Diurnal Average																									

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





**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

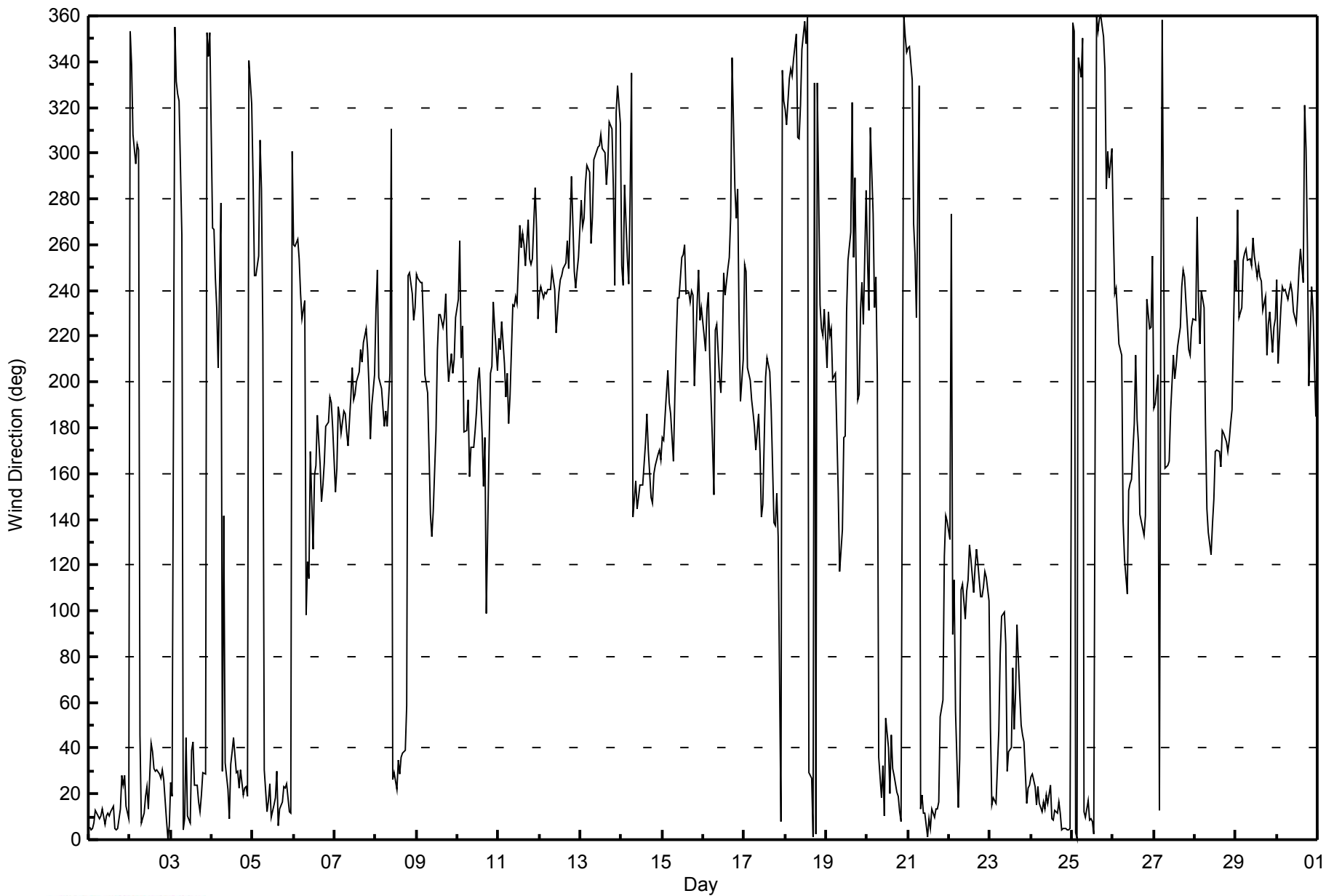
**Wind Direction (WD) - deg  
Fort McKay South - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Apr 27 06:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 5 deg on Apr 5 03:00																									
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 18 Q <sub>1</sub> = 24 Median = 31 Q <sub>3</sub> = 39 P <sub>90</sub> = 51 P <sub>99</sub> = 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-Apr	25	24	24	24	25	23	25	27	27	27	26	24	26	28	24	25	25	25	23	25	21	55	23	31	55
2-Apr	31	27	36	29	38	30	82	36	33	27	28	31	41	29	34	34	35	28	29	26	25	25	22	26	82
3-Apr	22	21	33	17	13	15	51	31	40	71	48	36	39	41	31	34	26	23	23	26	34	41	18	18	71
4-Apr	37	30	28	40	39	38	43	52	52	49	45	47	52	47	37	36	33	36	22	24	23	23	49	19	52
5-Apr	28	10	5	31	39	53	58	37	30	29	35	41	39	36	38	26	27	28	23	21	22	16	17	41	58
6-Apr	23	19	14	11	8	10	54	66	36	41	45	52	57	40	45	44	35	35	24	17	22	21	17	22	66
7-Apr	19	19	12	13	14	20	12	21	34	32	27	31	32	28	28	30	28	23	19	15	24	18	12	16	34
8-Apr	57	41	16	11	13	12	32	24	51	92	36	36	38	37	32	36	32	32	39	59	23	17	42	17	92
9-Apr	17	7	17	20	31	33	16	23	32	28	34	37	30	27	28	26	30	27	24	9	11	15	45	23	45
10-Apr	33	49	78	53	18	20	18	28	36	29	30	39	41	39	46	50	65	55	21	20	34	31	27	17	78
11-Apr	80	34	23	25	27	87	68	32	40	36	26	59	64	36	48	49	33	49	26	24	28	39	45	14	87
12-Apr	17	16	18	22	20	20	23	40	29	33	32	31	34	29	28	31	35	31	33	39	46	33	28	40	46
13-Apr	41	37	36	33	38	43	39	32	40	39	39	41	43	40	41	43	38	40	35	36	44	31	49	47	49
14-Apr	22	26	42	31	23	35	60	31	34	31	39	31	35	40	31	38	27	30	32	27	26	23	25	27	60
15-Apr	26	25	39	17	21	23	21	49	47	33	43	35	36	40	31	34	29	27	24	26	29	28	25	22	49
16-Apr	19	19	21	22	46	47	37	47	34	31	27	31	35	32	28	30	45	31	48	38	63	33	34	30	63
17-Apr	23	24	52	38	17	18	13	25	29	34	44	52	29	31	27	26	35	29	29	29	55	51	42	22	55
18-Apr	29	29	30	27	29	29	28	34	38	37	36	27	35	38	32	31	40	41	32	47	14	42	29	59	59
19-Apr	42	52	71	22	23	34	18	34	27	38	50	35	43	76	61	58	51	52	26	40	21	75	30	77	77
20-Apr	44	29	42	37	27	11	50	29	43	70	51	73	60	61	50	38	36	27	24	21	21	21	22	18	73
21-Apr	20	15	90	47	39	20	64	28	27	27	33	27	30	29	30	30	26	24	24	34	66	36	33	27	90
22-Apr	38	62	92	32	46	27	33	43	46	39	40	37	41	38	39	37	34	34	37	35	38	37	41	62	92
23-Apr	65	31	18	15	18	29	33	41	39	50	31	33	34	44	38	39	37	41	31	30	33	29	21	24	65
24-Apr	23	26	25	23	25	24	26	28	28	30	33	28	28	29	28	28	25	25	25	25	24	24	23	23	33
25-Apr	26	24	22	20	22	24	32	31	36	33	36	37	37	40	47	44	41	26	31	21	28	16	14	40	47
26-Apr	26	13	7	9	25	47	78	53	35	55	56	64	51	81	58	60	49	44	39	33	15	18	28	21	81
27-Apr	35	15	23	93	45	97	92	34	34	33	32	30	33	31	29	25	28	30	27	22	18	15	11	11	97
28-Apr	77	51	23	30	18	32	17	49	47	45	40	36	30	30	31	31	26	23	25	23	19	29	23	37	77
29-Apr	49	88	81	27	14	21	23	28	40	27	44	38	31	30	32	33	27	24	28	25	15	15	17	14	88
30-Apr	16	17	17	18	18	19	22	27	29	24	28	25	31	42	56	42	57	44	33	34	65	22	20	23	65
	80	88	92	93	46	97	92	66	52	92	56	73	64	81	61	60	65	55	48	59	66	75	49	77	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort McKay South - April 2015**





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 38 ppb on Apr 9 10:00	Maximum Daily Average: 5.5 ppb on Apr 26		Hours of Data:	672
Minimum Value: 0 ppb on Apr 10 06:00	Minimum Daily Average: 0.1 ppb on Apr 18		Hours of Missing Data:	48
Maximum Diurnal Average: 3.9 ppb at hour 10	Minimum Diurnal Average: 0.5 ppb at hour 6		Hours of Calibration:	37
Monthly Average: 1.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 15		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-Apr	1	Z	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
2-Apr	1	1	Z	1	1	1	1	C	C	C	C	C	C	C	0	1	1	1	1	0	1	1	1	0	0	--	1
3-Apr	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.4	1
4-Apr	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Apr	Z	0	0	0	0	0	0	0	1	4	6	13	16	9	3	5	3	1	1	1	1	0	0	0	3.0	16	
7-Apr	0	Z	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0.6	1
8-Apr	0	1	Z	0	0	1	0	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	2
9-Apr	1	1	1	Z	1	1	0	1	13	38	19	6	0	0	0	0	0	0	0	1	1	0	0	0	3.7	38	
10-Apr	0	0	0	0	Z	0	0	2	2	1	2	1	1	1	2	3	1	2	1	1	1	1	1	1	1.2	3	
11-Apr	1	1	0	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0.5	1	
12-Apr	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1.1	3	
13-Apr	3	Z	2	2	1	1	1	0	1	2	2	1	1	1	1	0	1	3	2	2	2	2	2	2	1.6	3	
14-Apr	0	0	Z	0	0	0	0	1	2	6	8	8	9	5	2	9	4	6	6	4	3	1	1	1	3.4	9	
15-Apr	1	1	1	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2	
16-Apr	1	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1	
17-Apr	1	1	1	1	1	Z	1	1	1	3	17	15	1	1	1	1	1	1	1	1	1	1	1	1	2.2	17	
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
19-Apr	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	4	
20-Apr	2	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.8	2	
21-Apr	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.3	1	
22-Apr	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0.6	1	
23-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
24-Apr	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
25-Apr	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
26-Apr	0	1	Z	1	0	0	0	1	4	18	11	12	10	7	12	12	11	9	7	5	2	1	0	0	5.5	18	
27-Apr	1	1	2	Z	1	1	1	5	15	19	14	1	1	1	1	0	0	0	0	0	0	1	1	1	2.9	19	
28-Apr	1	1	1	1	Z	0	1	4	6	7	8	14	3	4	6	3	6	2	4	1	1	2	2	1	3.3	14	
29-Apr	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
30-Apr	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0.6	1	

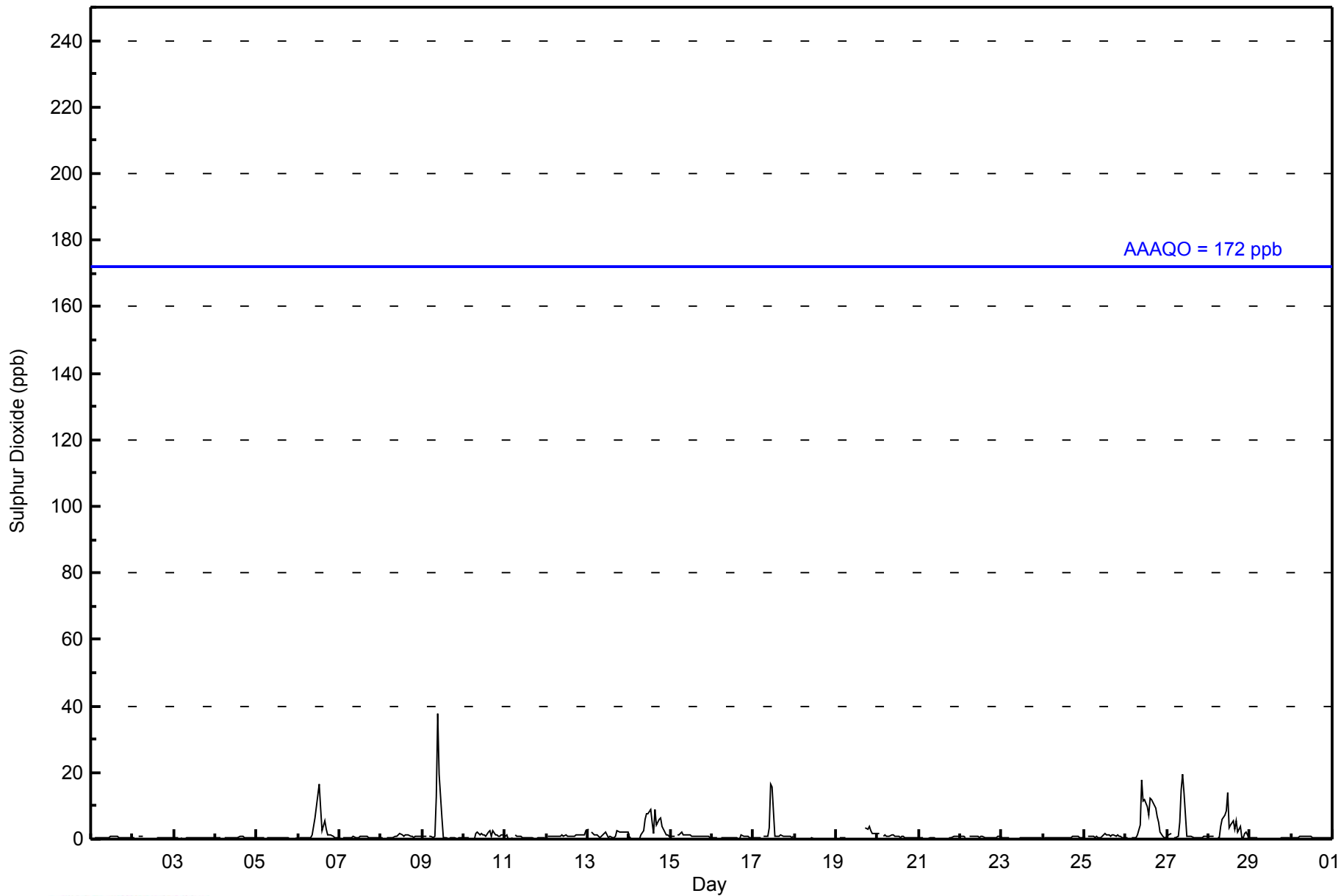
0.7	0.6	0.6	0.5	0.6	0.5	0.5	0.5	0.9	2.0	3.9	3.5	3.0	1.9	1.4	1.3	1.5	1.3	1.3	1.2	1.0	0.8	0.7	0.7	0.7	Diurnal Average	
3	2	2	2	1	1	2	5	15	38	19	15	16	9	12	12	11	9	7	5	3	2	2	3	Diurnal Maximum		

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	655	97.47	97.47
11 - 20	16	2.38	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: 672

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

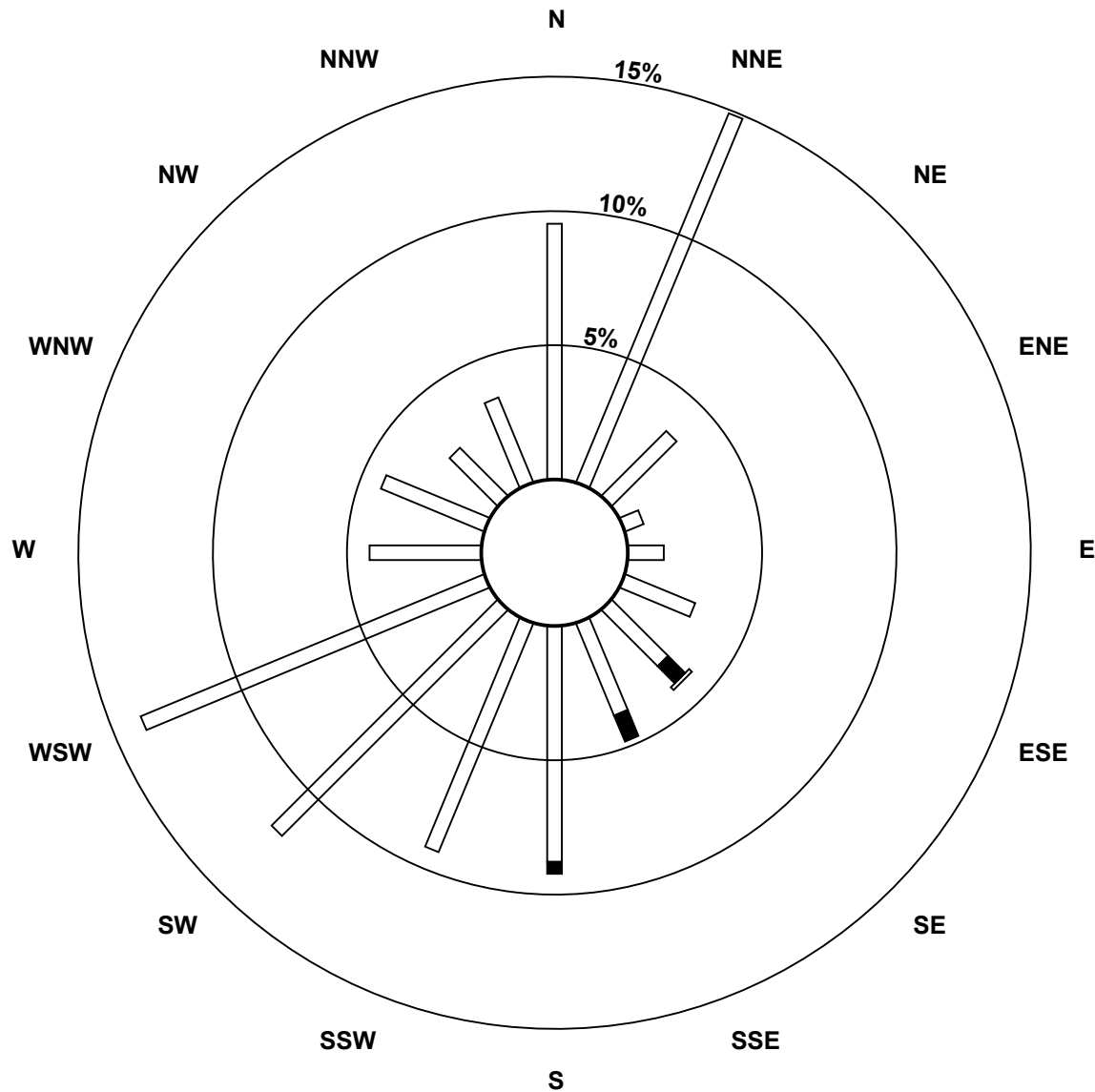
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	64	100	23	5	9	19	20	25	59	62	80	93	28	28	17	23	655
11 - 20	0	0	0	0	0	0	6	7	3	0	0	0	0	0	0	0	16
21 - 60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	100	23	5	9	19	27	32	62	62	80	93	28	28	17	23	672

Total Number of Valid Hours: 672

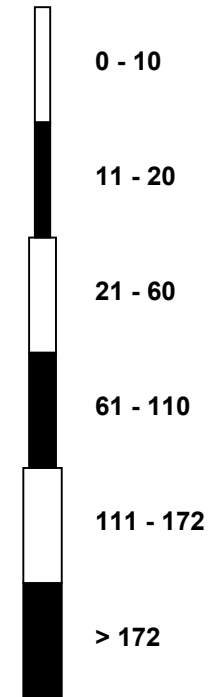
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)**



Classes (ppb)

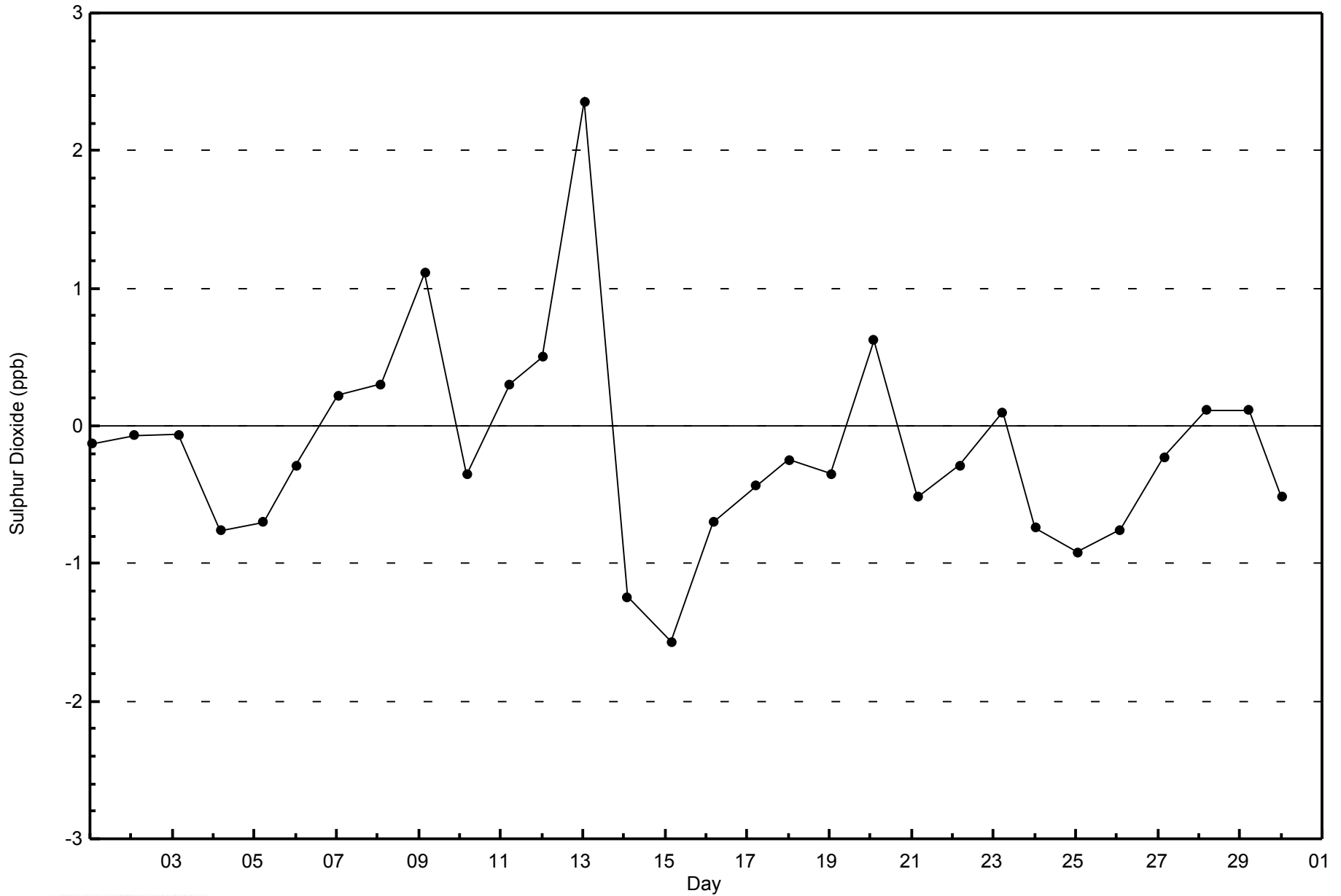


Total Number of Valid Hours: 672



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - April 2015

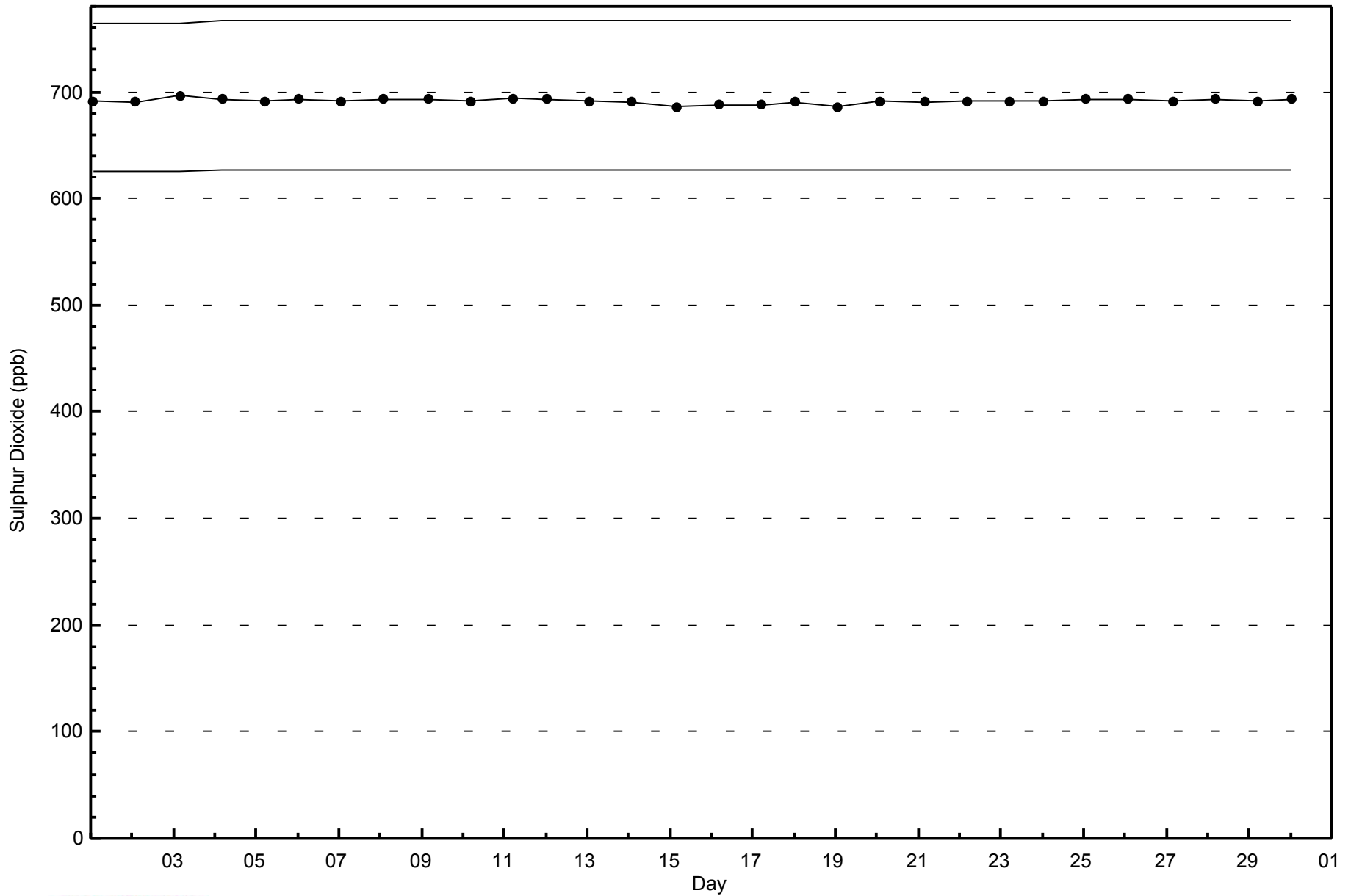






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 2 ppb on Apr 9 10:00	Maximum Daily Average: 0.4 ppb on Apr 28		Hours of Data:	675
Minimum Value: 0 ppb on Apr 27 14:00	Minimum Daily Average: 0.1 ppb on Apr 23		Hours of Missing Data:	45
Maximum Diurnal Average: 0.3 ppb at hour 10	Minimum Diurnal Average: 0.1 ppb at hour 15		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Apr	0	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
4-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
5-Apr	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
6-Apr	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.3	1
7-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
8-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
9-Apr	0	0	0	0	Z	0	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
10-Apr	0	0	0	0	0	Z	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
11-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
12-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
13-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
14-Apr	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
15-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
16-Apr	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	
17-Apr	0	0	0	0	0	0	Z	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
19-Apr	0	0	Z	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0	0	0	0	0	0	-	0	
20-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
21-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
25-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
26-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
27-Apr	0	0	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
28-Apr	0	0	0	0	0	Z	0	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	0.4	1	
29-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	
30-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	

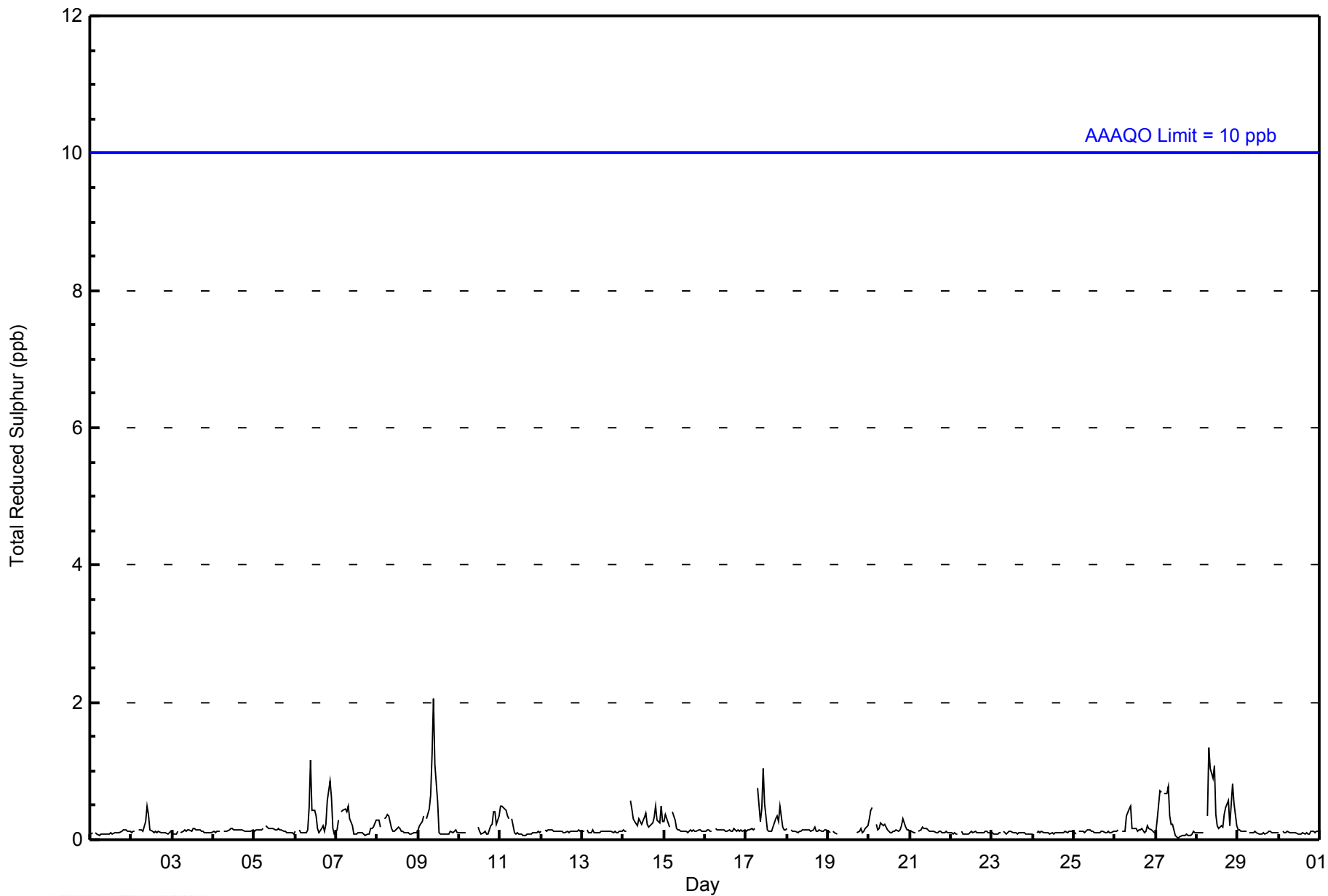
0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	Daily Average
0	0	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	Daily Maximum

Z - zeronspan      C - Calibration      PF - Power Failure  
 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 - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	675	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: 675

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - April 2015**

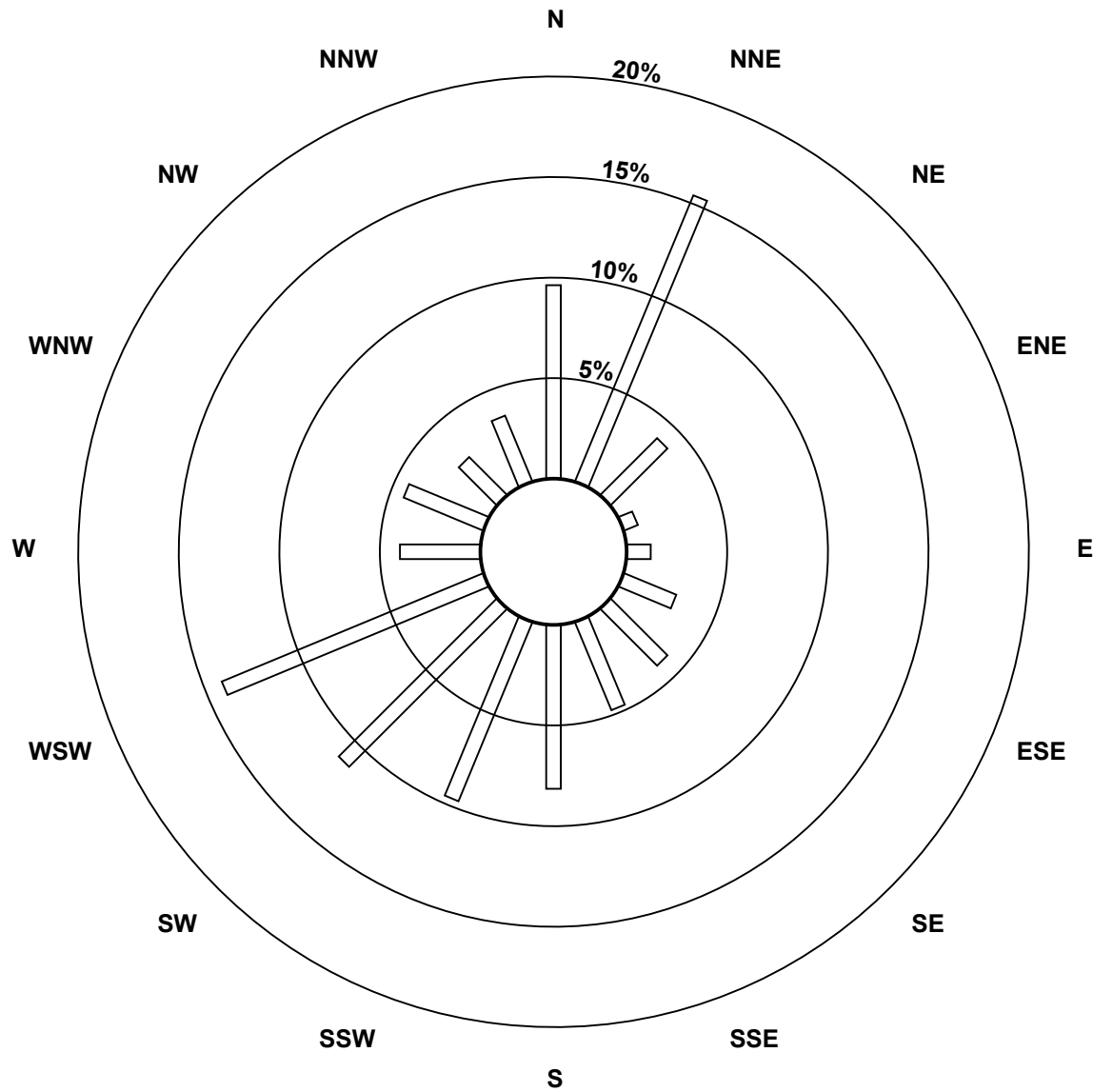
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	65	104	27	5	8	19	27	32	55	65	75	95	27	29	18	24	675
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	104	27	5	8	19	27	32	55	65	75	95	27	29	18	24	675

Total Number of Valid Hours: 675

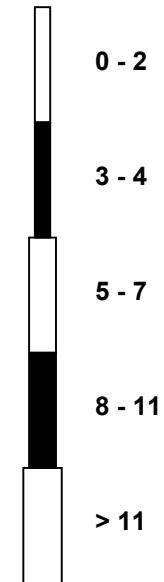
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb  
Fort McKay South (AMS 13)**



Classes (ppb)

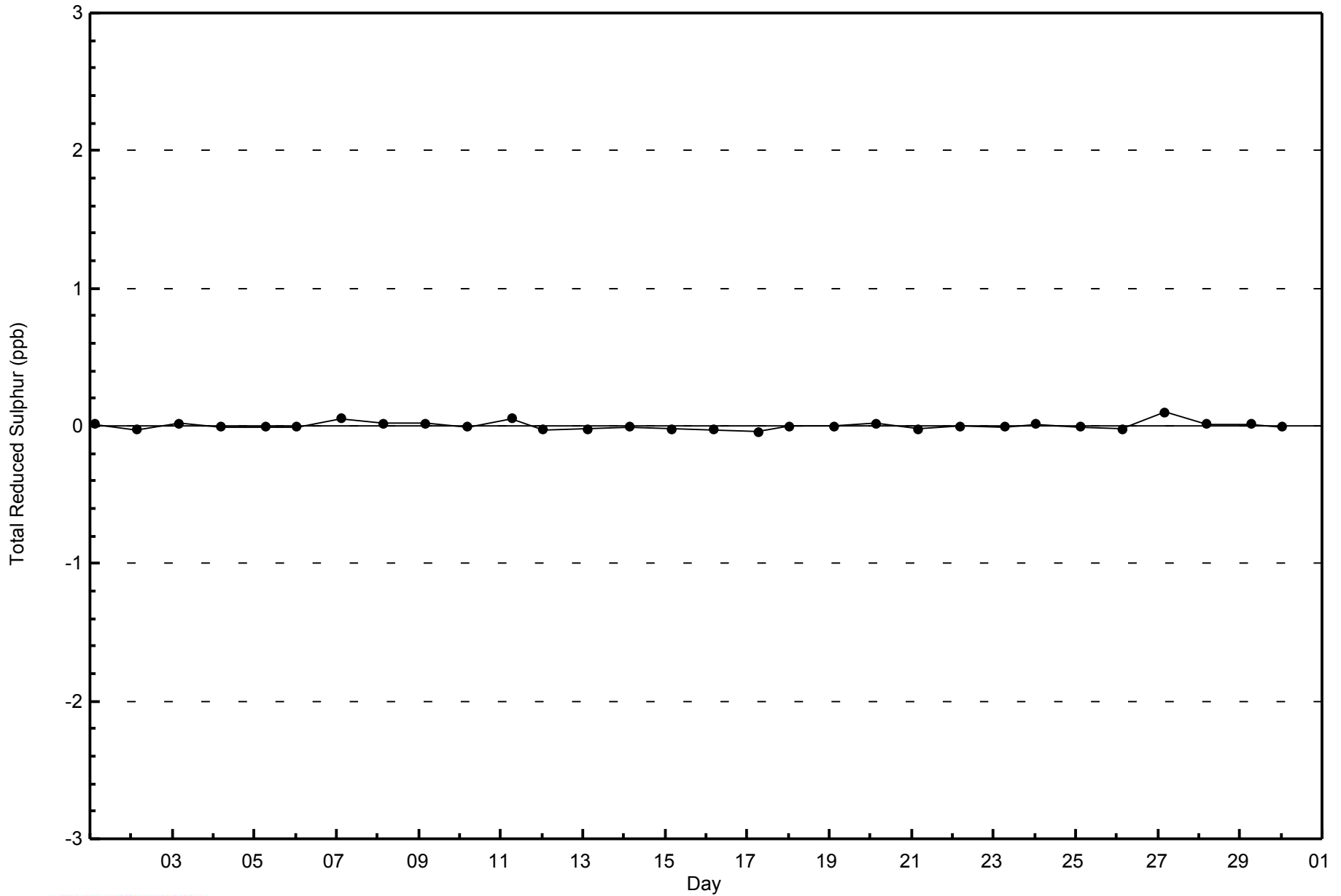


Total Number of Valid Hours: 675



WBEA  
Zero Responses

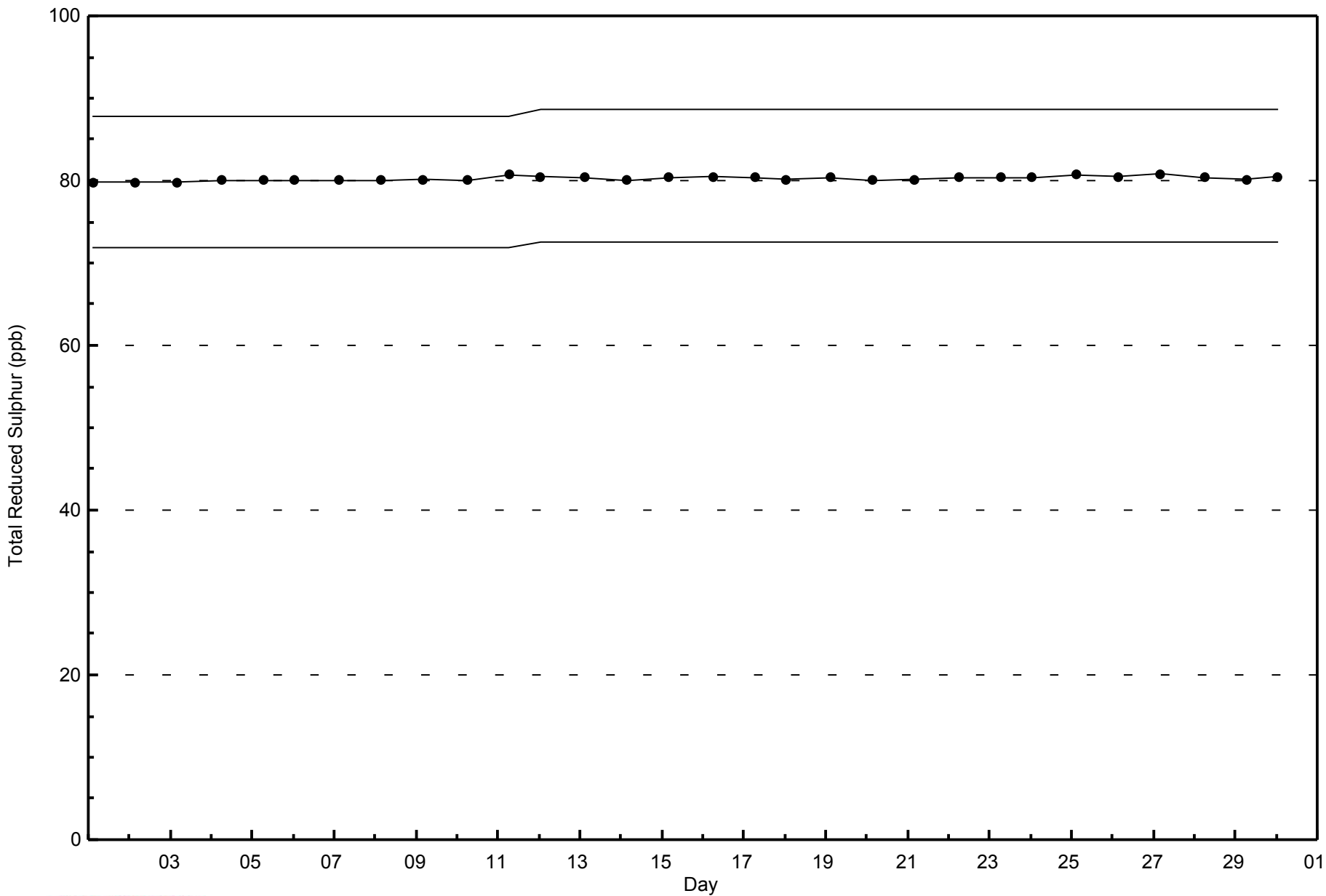
Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - April 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - April 2015**







Wood Buffalo Environmental Association

Summary of Hour Averages

Total Hydrocarbons (THC) - ppm

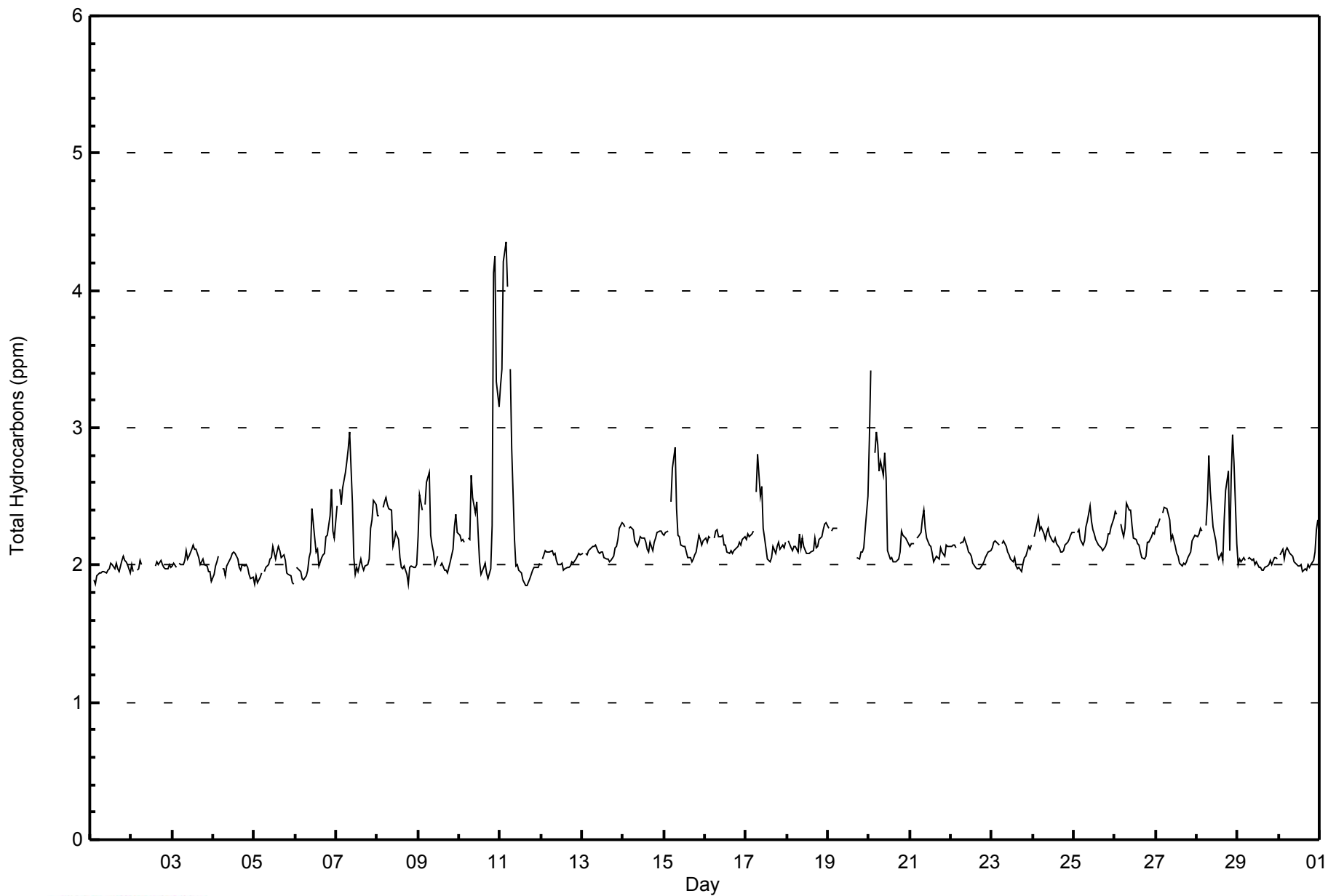
Fort McKay South - April 2015

Maximum Value: 4.4 ppm on Apr 11 04:00																			Maximum Daily Average: 2.5 ppm on Apr 11						Hours in Service: 720	
Minimum Value: 1.9 ppm on Apr 1 01:00																			Minimum Daily Average: 2.0 ppm on Apr 1						Hours of Data: 671	
Maximum Diurnal Average: 2.3 ppm at hour 8																			Minimum Diurnal Average: 2.0 ppm at hour 16						Hours of Missing Data: 49	
Monthly Average: 2.17 ppm																			Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.0 Median = 2.1 Q <sub>3</sub> = 2.2 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.4						Hours of Calibration: 37	
																									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-Apr	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	1.9	2.0	2.1
2-Apr	2.0	1.9	Z	2.0	2.0	2.0	2.0	C	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	--	2.0	
3-Apr	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	
4-Apr	1.9	2.0	2.0	2.1	Z	2.0	2.0	1.9	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.1	
5-Apr	1.9	1.9	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.0	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.1	
6-Apr	Z	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.4	2.2	2.1	2.1	2.0	2.1	2.1	2.1	2.2	2.2	2.4	2.6	2.2	2.1	2.6	
7-Apr	2.4	Z	2.6	2.4	2.6	2.7	2.8	2.8	3.0	2.4	2.1	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.3	2.3	2.5	2.3	3.0	
8-Apr	2.4	2.4	Z	2.4	2.5	2.5	2.4	2.4	2.4	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.5	
9-Apr	2.2	2.5	2.4	Z	2.4	2.6	2.7	2.2	2.1	2.1	2.0	2.1	M	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.1	2.3	2.4	2.2	2.7	
10-Apr	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.7	2.5	2.4	2.5	2.2	2.0	1.9	2.0	2.0	1.9	1.9	2.0	2.3	4.1	4.3	3.3	2.4	4.3	
11-Apr	3.3	3.4	4.2	4.4	4.0	Z	3.4	2.8	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	2.5	4.4	
12-Apr	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	
13-Apr	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.1	2.3	
14-Apr	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.3	2.2	2.2	2.3	
15-Apr	2.2	2.2	2.3	Z	2.5	2.7	2.9	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.2	2.9	
16-Apr	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.3	
17-Apr	2.2	2.2	2.2	2.2	2.2	Z	2.5	2.8	2.5	2.6	2.3	2.2	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.8	
18-Apr	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.3	2.3	2.2	2.3	
19-Apr	2.3	Z	2.2	2.3	2.3	2.3	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	2.1	2.0	2.1	2.1	2.1	--	2.5	
20-Apr	2.9	3.4	Z	2.8	3.0	2.9	2.7	2.8	2.7	2.8	2.6	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.2	2.2	2.2	2.2	2.4	3.4	
21-Apr	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.4	
22-Apr	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	
23-Apr	2.1	2.2	2.2	2.2	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	
24-Apr	Z	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.3	
25-Apr	2.2	Z	2.2	2.3	2.2	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.2	2.4	
26-Apr	2.4	2.4	Z	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.1	2.0	2.1	2.2	2.2	2.2	2.2	2.2	2.4	
27-Apr	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.4	
28-Apr	2.2	2.2	2.3	2.2	Z	2.3	2.5	2.8	2.5	2.3	2.2	2.2	2.1	2.0	2.1	2.0	2.3	2.5	2.7	2.1	2.6	3.0	2.7	2.4	3.0	
29-Apr	2.0	2.0	2.0	2.1	2.0	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.1	
30-Apr	Z	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3	2.3	2.1	2.3	
																			2.2 2.3 2.2 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.2 2.2 2.1 2.1 2.1 2.0 2.0 2.0 2.0 2.1 2.1 2.2 2.2 2.2 2.2						Diurnal Average	
																			3.3 3.4 4.2 4.4 4.0 2.9 3.4 2.8 3.0 2.8 2.6 2.3 2.2 2.2 2.2 2.1 2.3 2.5 2.7 2.3 4.1 4.3 3.3 3.2						Diurnal Maximum	
Z - zerspan			C - Calibration			M - Maintenance			PF - Power Failure																	



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	231	34.43	34.43
2.1 - 3.0	429	63.93	98.36
3.1 - 10.0	11	1.64	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - April 2015**

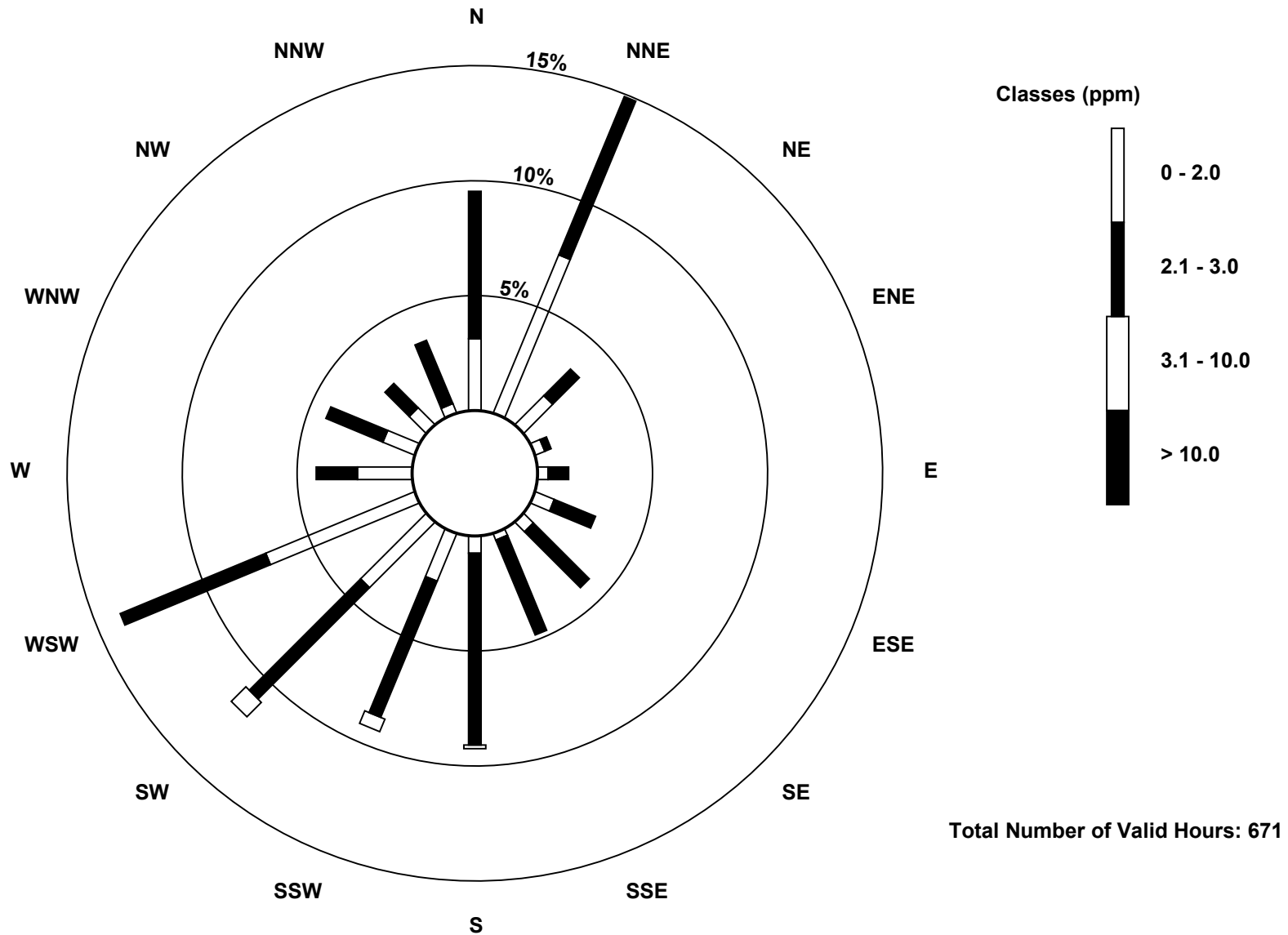
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	21	50	12	3	3	6	4	2	5	15	27	47	16	10	7	3	231
2.1 - 3.0	43	50	11	2	6	13	23	30	56	43	46	46	12	18	10	20	429
3.1 - 10.0	0	0	0	0	0	0	0	0	1	4	6	0	0	0	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	100	23	5	9	19	27	32	62	62	79	93	28	28	17	23	671

Total Number of Valid Hours: 671

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

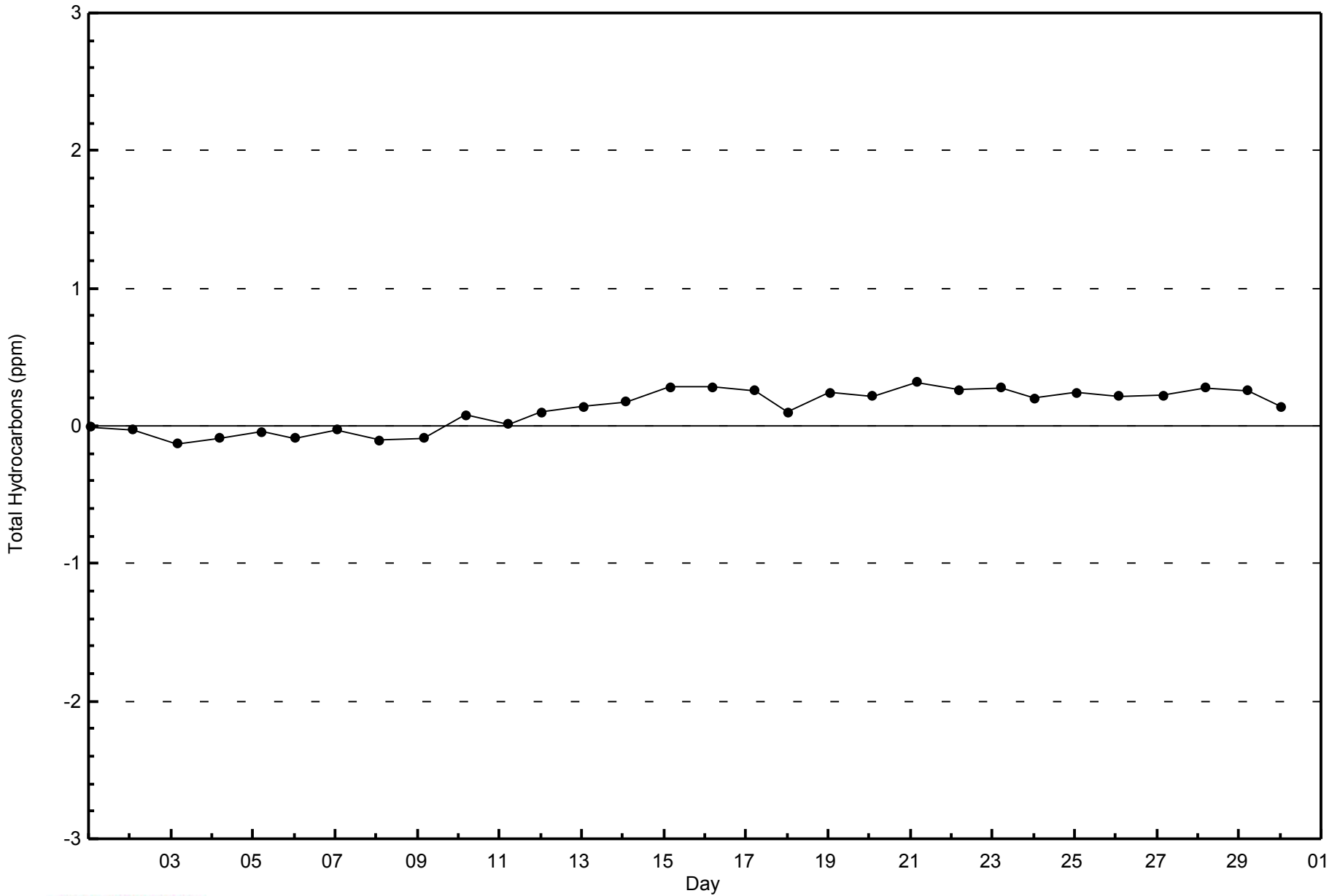
Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)





WBEA  
Zero Responses

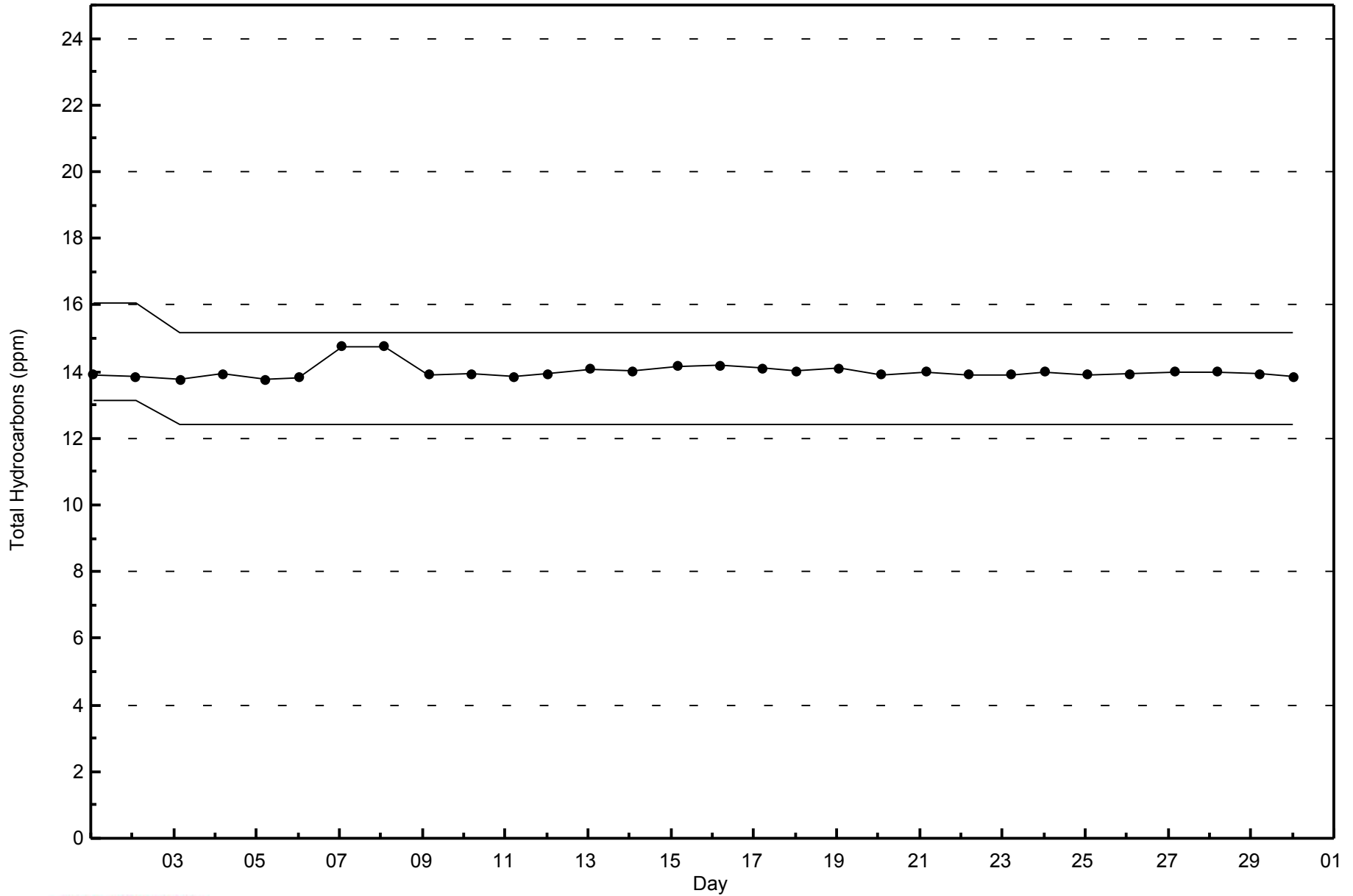
Total Hydrocarbons (THC) - ppm  
Fort McKay South - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Fort McKay South - April 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Fort McKay South - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 48 ppb on Apr 27 18:00	Maximum Daily Average: 38.2 ppb on Apr 29		Hours of Data:	674
Minimum Value: 0 ppb on Apr 11 06:00	Minimum Daily Average: 19.0 ppb on Apr 8		Hours of Missing Data:	46
Maximum Diurnal Average: 38.6 ppb at hour 16	Minimum Diurnal Average: 14.7 ppb at hour 4		Hours of Calibration:	35
Monthly Average: 27.1 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 7 Q <sub>1</sub> = 17 Median = 31 Q <sub>3</sub> = 37 P <sub>90</sub> = 40 P <sub>99</sub> = 46		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-Apr	29	29	29	Z	28	28	27	27	26	26	28	29	29	29	29	29	29	29	26	25	26	20	17	25	26.9	29	
2-Apr	20	25	27	29	Z	24	23	26	27	28	32	32	33	36	36	35	34	35	36	37	37	38	36	31	31.2	38	
3-Apr	29	25	20	15	13	Z	12	13	21	32	36	35	34	35	36	35	35	35	34	34	34	28	25	20	27.7	36	
4-Apr	16	12	11	10	9	9	Z	21	21	26	31	29	30	32	33	33	32	31	31	31	33	33	27	20	24.3	33	
5-Apr	17	16	16	13	11	12	11	Z	28	29	31	33	33	33	33	33	33	33	34	33	30	29	29	22	25.7	34	
6-Apr	17	12	Z	12	11	9	8	15	19	23	28	25	29	33	36	34	35	35	32	23	17	19	29	23	22.8	36	
7-Apr	15	15	13	Z	9	7	7	18	25	27	34	36	38	38	39	38	39	37	37	34	7	1	2	6	22.7	39	
8-Apr	7	4	2	2	Z	6	7	9	13	28	31	28	28	34	35	36	35	35	32	22	15	12	9	7	19.0	36	
9-Apr	3	1	2	3	2	Z	3	18	C	C	C	C	C	39	40	40	40	42	41	28	24	8	3	11	19.5	42	
10-Apr	13	9	7	4	5	7	Z	11	21	29	36	39	43	46	46	46	46	46	40	32	23	23	10	1	25.4	46	
11-Apr	0	1	4	5	2	0	1	Z	33	37	38	40	43	43	43	43	43	42	42	42	43	42	38	27	28.4	43	
12-Apr	34	37	Z	37	36	35	34	34	35	36	37	38	39	39	39	39	38	38	38	37	35	35	37	35	36.6	39	
13-Apr	36	37	37	Z	39	38	37	37	39	39	38	38	38	38	38	39	40	41	40	30	20	17	13	9	33.8	41	
14-Apr	7	6	5	3	Z	2	3	18	28	26	28	31	31	35	39	38	40	39	37	37	32	23	26	31	24.5	40	
15-Apr	29	26	16	4	3	Z	2	16	27	31	34	35	37	39	41	42	44	42	41	29	21	40	38	38	29.3	44	
16-Apr	37	36	36	35	33	17	Z	32	35	34	33	38	40	41	44	45	44	41	42	44	40	34	17	12	35.1	45	
17-Apr	30	32	25	10	3	1	5	Z	28	29	27	31	41	41	40	39	31	31	29	23	19	13	7	14	23.9	41	
18-Apr	14	16	Z	30	32	32	31	28	30	30	34	36	37	37	39	37	35	36	36	25	12	6	5	4	27.1	39	
19-Apr	3	3	2	Z	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	41	30	17	16	11	10	8	--	41
20-Apr	6	5	4	1	Z	1	3	8	14	20	27	38	41	41	41	41	40	38	34	28	27	25	27	25	23.2	41	
21-Apr	27	19	11	9	7	Z	6	17	21	24	32	37	36	36	39	40	38	37	36	34	31	25	30	29	27.0	40	
22-Apr	23	16	13	17	9	8	Z	29	31	32	34	34	35	36	38	40	40	39	36	34	32	32	32	31	29.2	40	
23-Apr	22	14	12	12	17	21	31	Z	35	35	34	35	36	37	37	37	37	36	34	30	32	30	30	30	29.3	37	
24-Apr	29	32	Z	23	28	27	27	30	30	31	33	33	34	34	34	35	32	25	22	22	21	17	15	15	28.1	35	
25-Apr	13	14	12	Z	8	8	10	9	13	16	25	29	30	32	33	33	33	32	31	23	18	15	10	6	19.7	33	
26-Apr	4	3	3	3	Z	3	7	8	22	27	34	34	35	36	36	37	37	37	36	26	19	16	15	14	21.3	37	
27-Apr	11	10	15	10	9	Z	7	22	26	29	33	38	38	39	42	46	48	48	47	46	38	24	24	29	29.5	48	
28-Apr	24	17	16	13	9	7	Z	18	25	32	34	38	46	45	45	46	42	44	39	39	33	28	24	31	30.2	46	
29-Apr	36	36	34	27	31	40	38	Z	36	37	37	39	42	42	42	43	43	42	39	37	40	39	39	38	38.2	43	
30-Apr	38	33	Z	38	37	36	34	36	36	36	37	39	42	43	38	41	42	42	41	20	13	8	10	5	32.5	43	

19.6	18.1	14.9	14.7	15.7	15.1	15.7	20.8	26.6	29.7	32.6	34.5	36.2	37.6	38.3	38.6	38.2	37.9	35.9	30.7	26.2	23.2	21.3	19.8	Diurnal Average	
38	37	37	38	39	40	38	37	39	39	38	40	46	46	46	46	48	48	47	46	43	42	39	38	Diurnal Maximum	

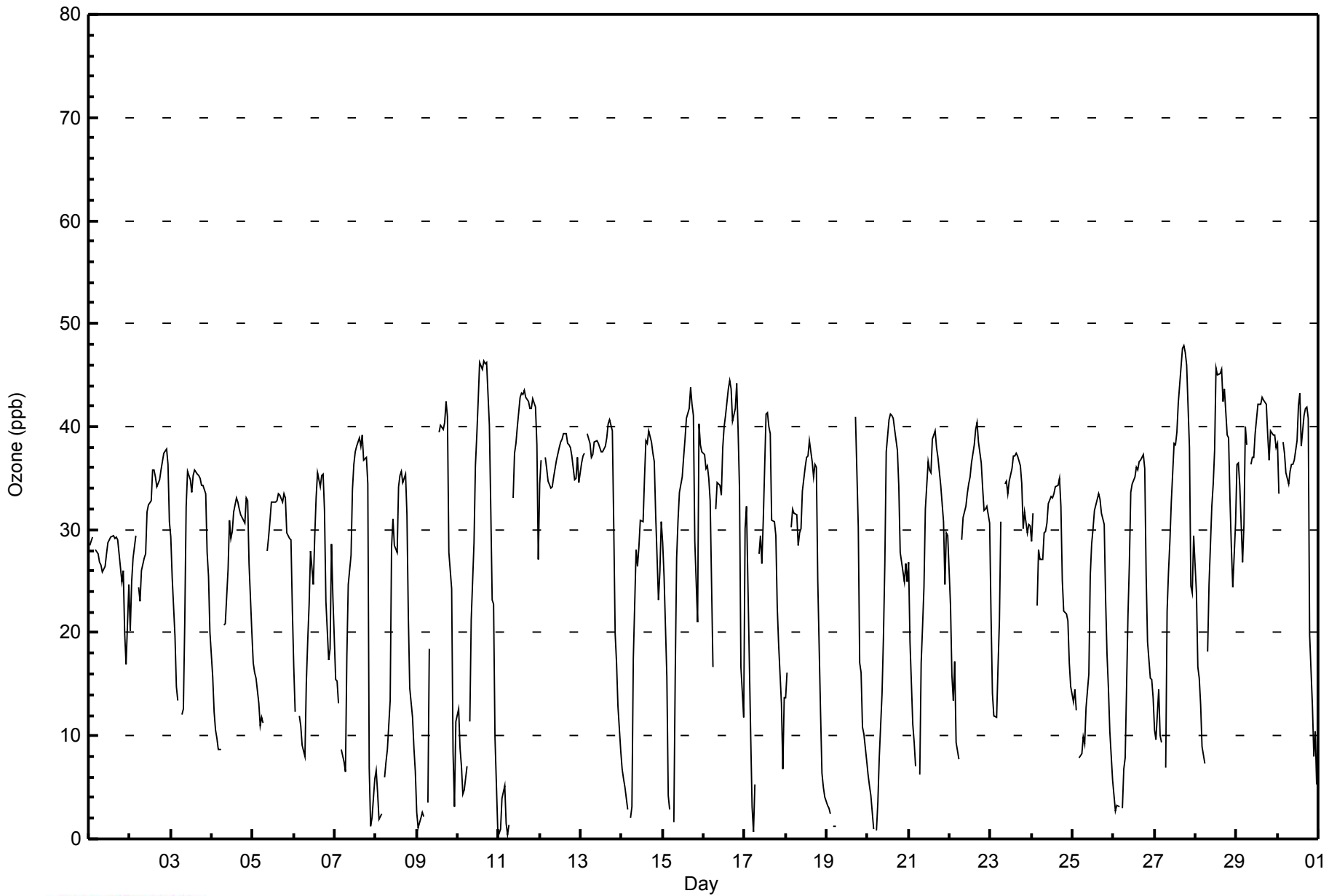
Z - zeronspan      C - Calibration      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	192	28.49	28.49
21 - 50	482	71.51	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 674

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**

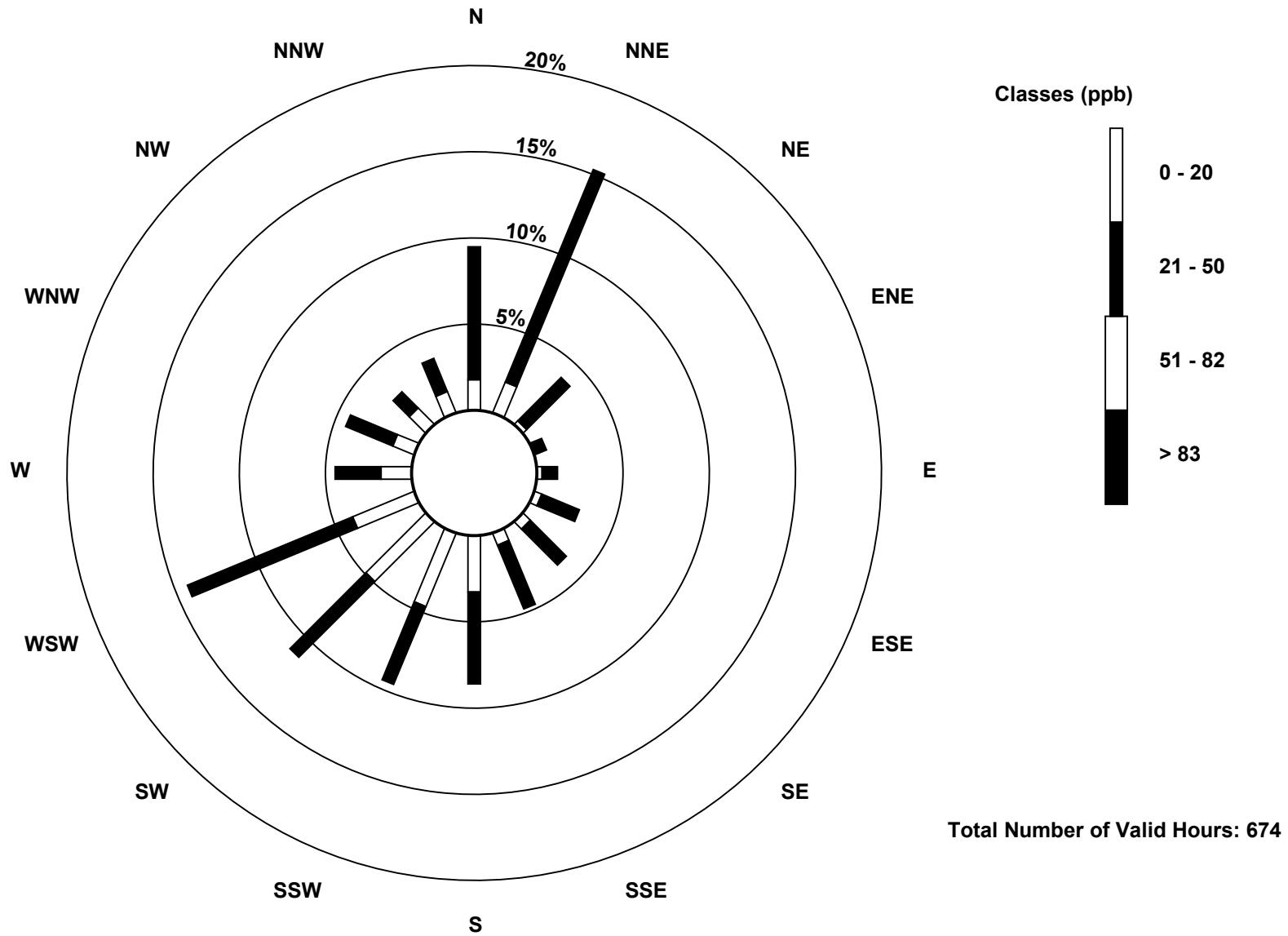
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	12	13	2	0	2	3	4	5	22	31	33	26	12	9	9	9	192
21 - 50	52	90	24	5	6	16	20	27	36	33	42	70	18	20	9	14	482
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	103	26	5	8	19	24	32	58	64	75	96	30	29	18	23	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

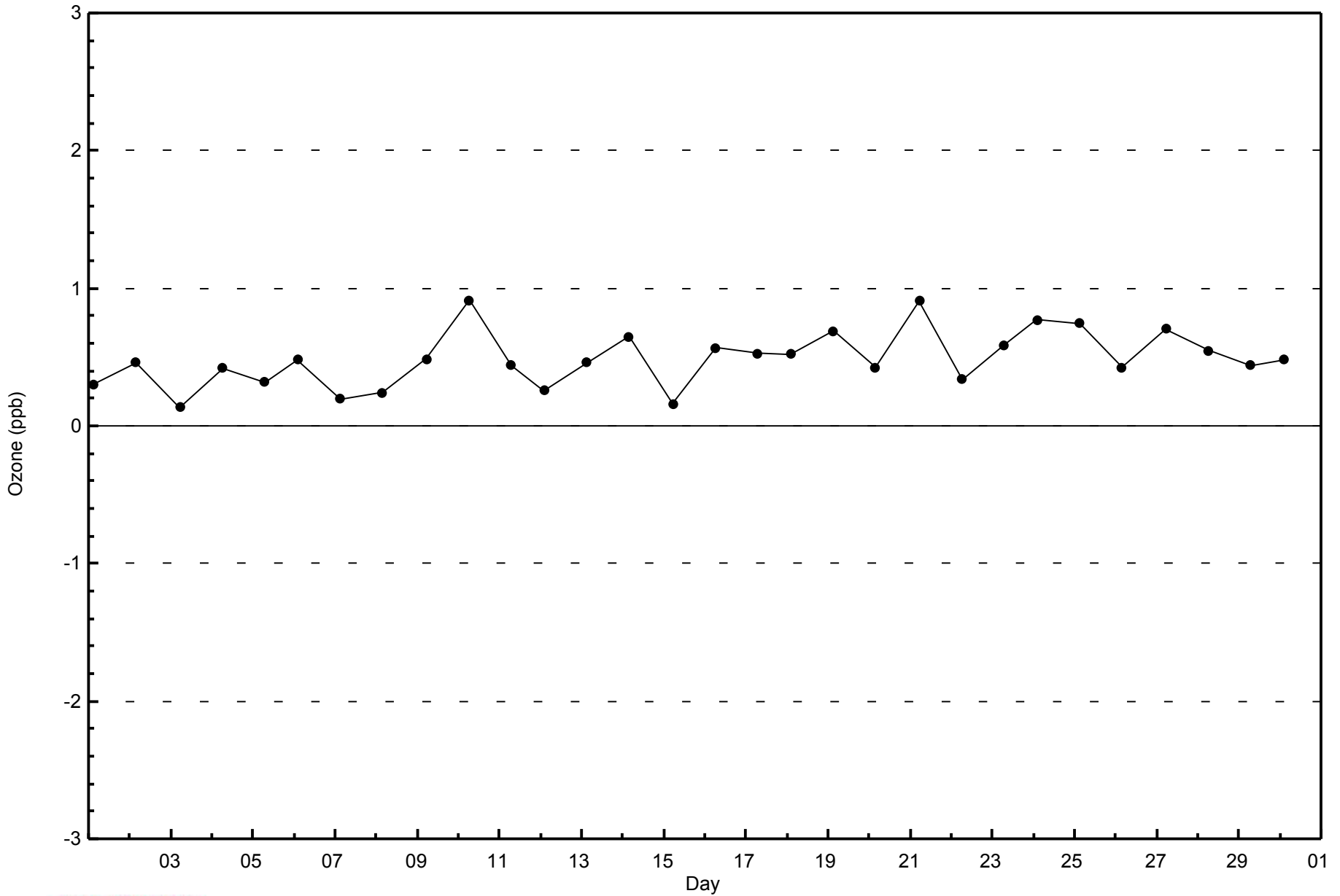
Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)





WBEA  
Zero Responses

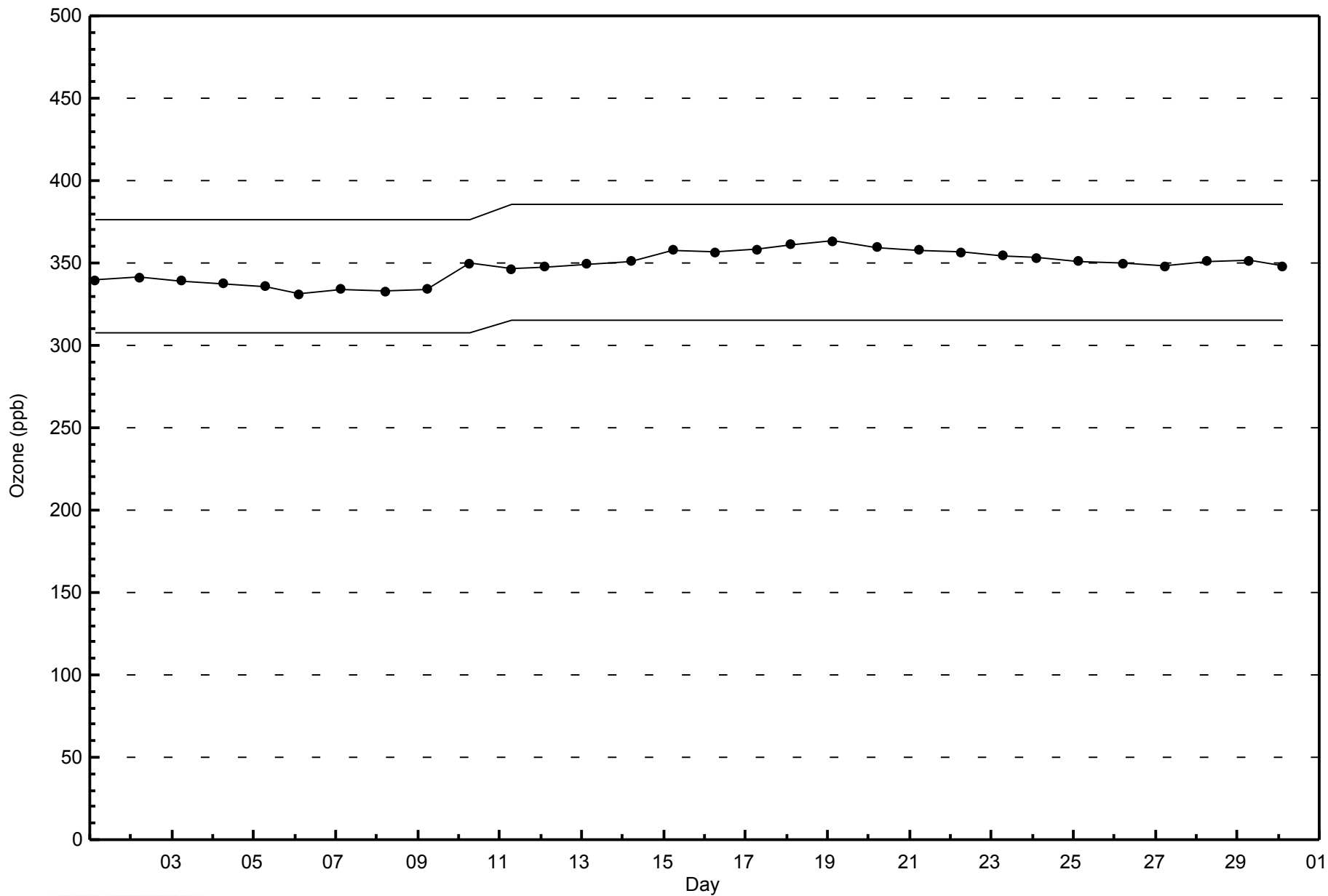
Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - April 2015





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - April 2015**



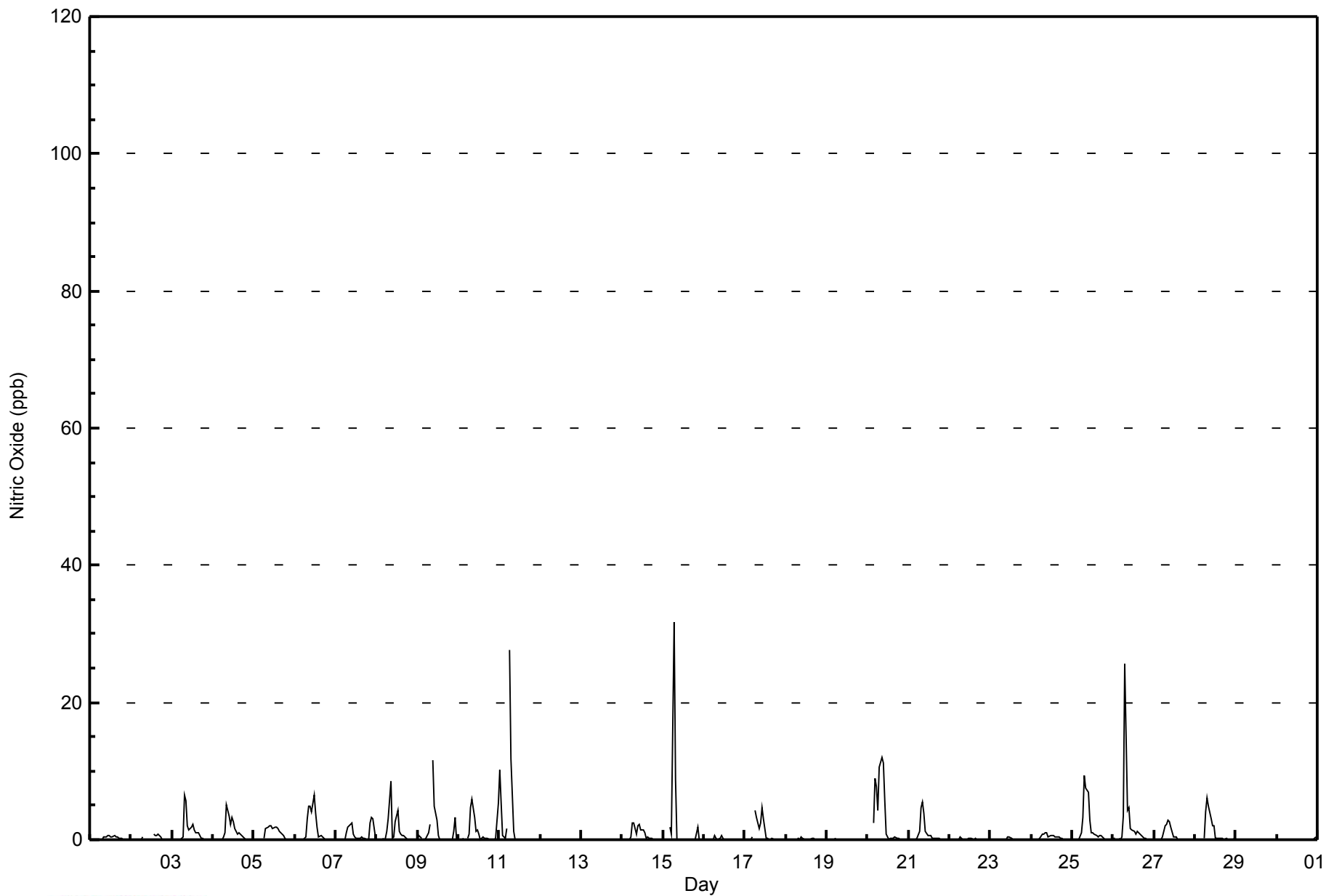


Maximum Value: 32 ppb on Apr 15 07:00																		Maximum Daily Average: 2.8 ppb on Apr 20																		Hours in Service: 720	
Minimum Value: 0 ppb on Apr 1 01:00																		Minimum Daily Average: 0.0 ppb on Apr 29																		Hours of Data: 673	
Maximum Diurnal Average: 3.8 ppb at hour 8																		Minimum Diurnal Average: 0.0 ppb at hour 20																		Hours of Missing Data: 47	
Monthly Average: 0.8 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 11																		Hours of Calibration: 35	
																																				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-Apr	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1											
2-Apr	0	0	Z	0	0	0	0	0	C	C	C	C	C	1	1	1	1	0	0	0	0	0	0	0.2	1												
3-Apr	0	0	0	Z	0	0	0	7	6	2	1	2	2	1	1	1	1	0	0	0	0	0	0	1.1	7												
4-Apr	0	0	0	0	Z	0	0	1	5	3	2	3	3	2	1	1	1	1	0	0	0	0	0	1.0	5												
5-Apr	0	0	0	0	0	Z	0	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0.8	2												
6-Apr	Z	0	0	0	0	0	0	3	5	5	4	6	4	2	0	1	0	0	0	0	0	0	0	1.4	6												
7-Apr	0	Z	0	0	0	0	1	2	2	2	1	0	0	0	0	0	0	0	0	0	2	3	3	0.8	3												
8-Apr	0	0	Z	0	0	0	1	3	8	0	0	3	4	1	1	1	1	0	0	0	0	0	0	1.1	8												
9-Apr	0	1	0	Z	0	0	1	2	M	12	5	3	1	0	0	0	0	0	0	0	0	1	3	0	1.3	12											
10-Apr	0	0	0	0	Z	0	1	5	6	3	1	1	1	0	0	0	0	0	0	0	0	0	0	1.1	6												
11-Apr	10	5	1	0	2	Z	28	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.5	28												
12-Apr	Z	0	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-Apr	0	Z	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-Apr	0	0	Z	0	0	0	2	2	1	2	2	1	2	1	0	0	0	0	0	0	0	0	0	0.7	2												
15-Apr	0	0	0	Z	2	1	32	9	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2.0	32												
16-Apr	0	0	0	0	Z	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1												
17-Apr	0	0	0	0	0	Z	4	3	2	2	5	3	0	0	0	0	0	0	0	0	0	0	0	0.9	5												
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0												
19-Apr	0	Z	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	-	0												
20-Apr	0	0	Z	2	9	8	4	11	12	11	6	1	0	0	0	0	0	0	0	0	0	0	0	2.8	12												
21-Apr	0	0	0	Z	0	0	1	5	5	4	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	5												
22-Apr	0	0	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1												
23-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0												
24-Apr	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1												
25-Apr	0	Z	0	0	0	1	3	9	8	7	3	1	1	1	1	0	1	1	0	0	0	0	0	1.6	9												
26-Apr	0	0	Z	0	0	0	3	26	4	5	2	1	1	1	1	1	1	0	0	0	0	0	0	2.1	26												
27-Apr	0	0	0	Z	0	0	2	2	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0.6	3												
28-Apr	0	0	0	0	Z	0	4	6	5	3	2	2	0	0	0	0	0	0	0	0	0	0	0	1.0	6												
29-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0												
30-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0												
																		Diurnal Average		Diurnal Maximum																	
																		10		5																	
																		0.4		0.3																	
																		1		2																	
																		0.5		0.5																	
																		8		8																	
																		32		32																	
																		3.8		3.8																	
																		26		26																	
																		2.8		2.8																	
																		12		12																	
																		2.5		2.5																	
																		12		12																	
																		1.5		1.5																	
																		6		6																	
																		1.2		1.2																	
																		6		6																	
																		0.8		0.8																	
																		4		4																	
																		0.5		0.5																	
																		2		2																	
																		0.3		0.3																	
																		2		2																	
																		0.3		0.3																	
																		1		1																	
																		0.2		0.2																	
																		1		1																	
																		0.1		0.1																	
																		0		0																	
																		0.0		0.0																	
																		0		0																	
																		0.1		0.1																	
																		2		2																	
																		0.2		0.2																	
																		3		3																	
																		0.2		0.2																	
																		3		3																	
																		0.2		0.2																	
																		5		5																	



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Fort McKay South - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	670	99.55	99.55
21 - 40	3	0.45	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**

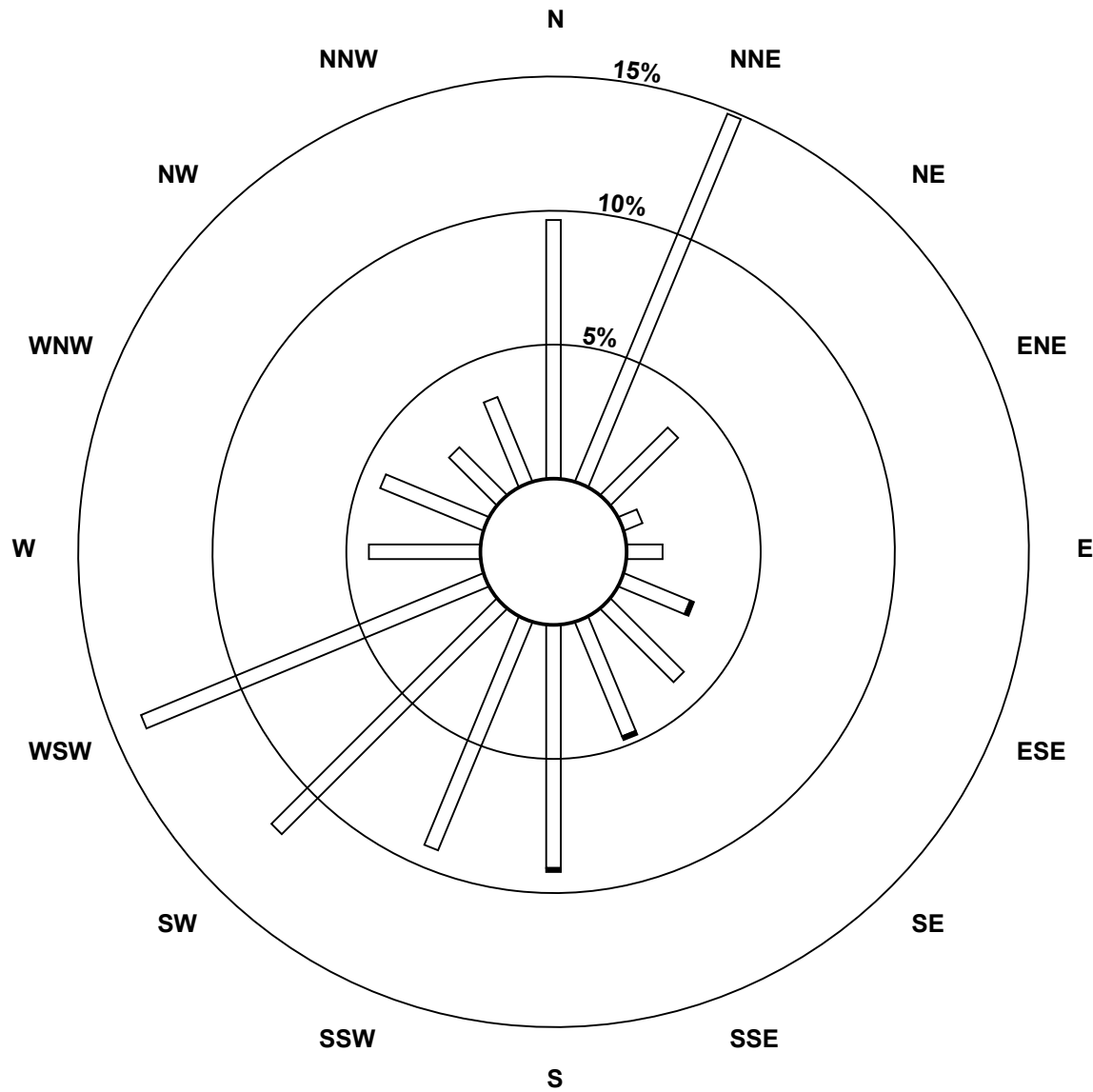
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	100	24	5	9	18	26	31	61	62	80	93	28	28	17	23	670
21 - 40	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	100	24	5	9	19	26	32	62	62	80	93	28	28	17	23	673

Total Number of Valid Hours: 673

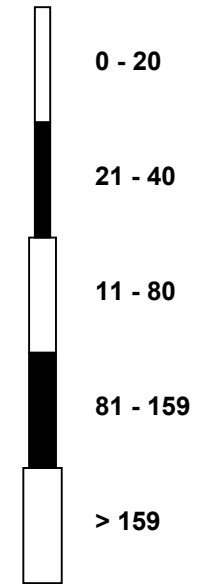
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitric Oxide (NO) - ppb  
Fort McKay South (AMS 13)



Classes (ppb)

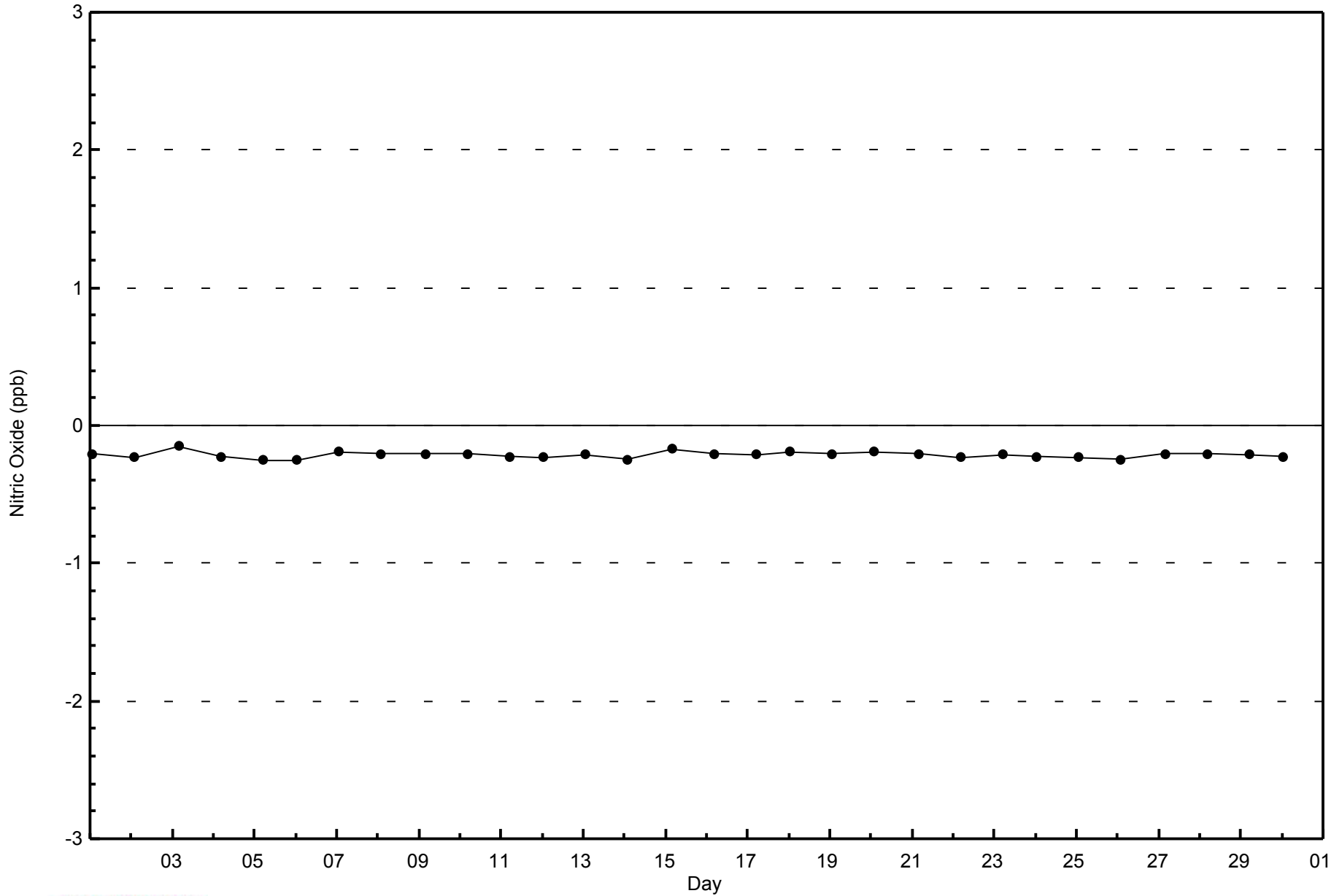


Total Number of Valid Hours: 673



**WBEA**  
**Zero Responses**

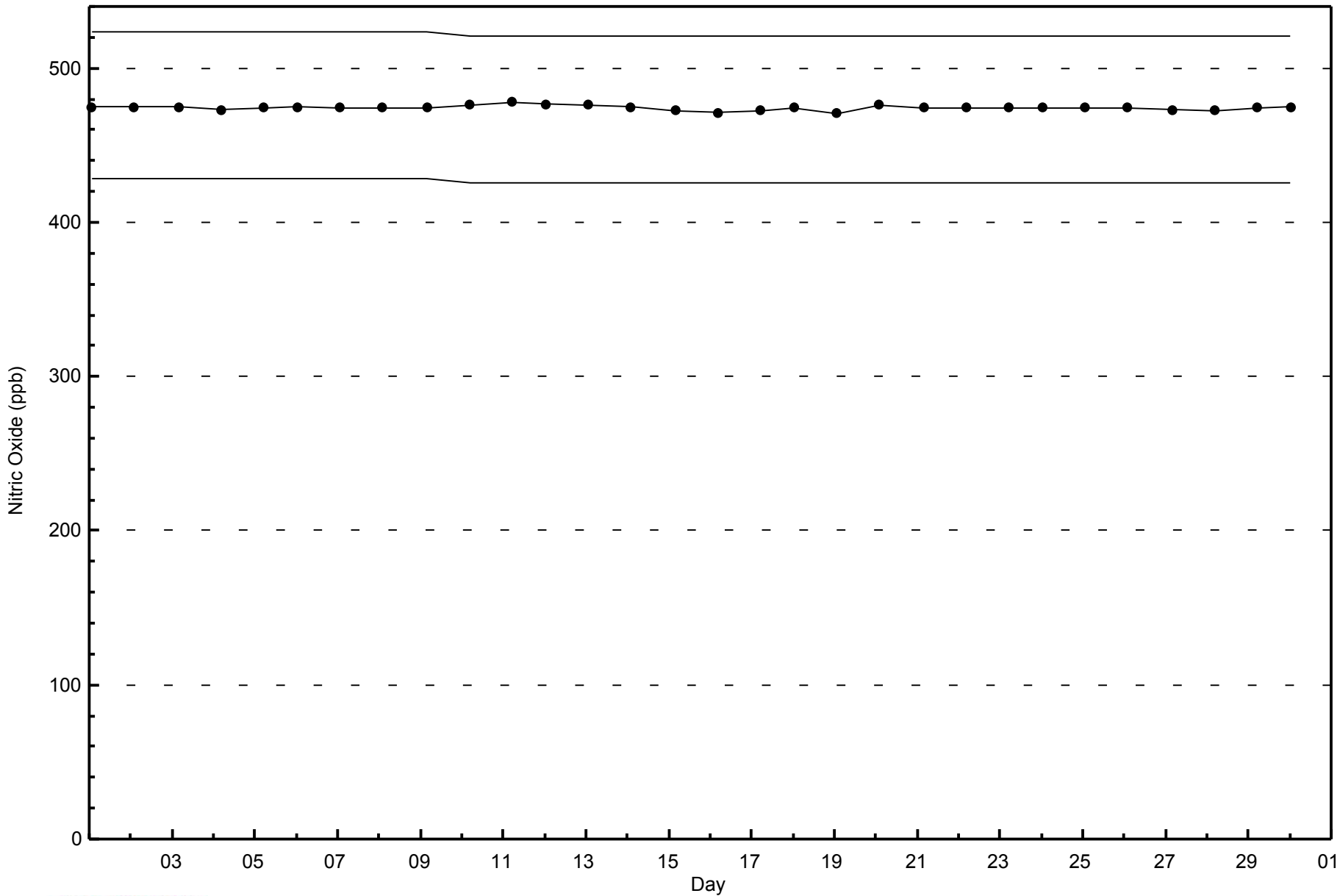
**Nitric Oxide (NO) - ppb**  
**Fort McKay South - April 2015**





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort McKay South - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 28 ppb on Apr 11 00:00	Maximum Daily Average: 6.6 ppb on Apr 20		Hours of Data:	673
Minimum Value: 0 ppb on Apr 9 18:00	Minimum Daily Average: 0.3 ppb on Apr 12		Hours of Missing Data:	47
Maximum Diurnal Average: 6.6 ppb at hour 8	Minimum Diurnal Average: 1.4 ppb at hour 15		Hours of Calibration:	35
Monthly Average: 3.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 8 P <sub>99</sub> = 18		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-Apr	1	Z	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	4	5	4	4	3	2	1.8	5	
2-Apr	6	5	Z	1	2	3	3	4	C	C	C	C	C	2	2	2	3	3	2	1	1	2	2	6	2.8	6	
3-Apr	8	8	8	Z	6	5	5	16	11	5	4	4	6	4	3	3	3	3	3	2	1	1	1	1	4.7	16	
4-Apr	2	2	3	3	Z	4	4	4	9	7	5	6	5	4	2	3	3	3	4	4	2	1	1	3	3.6	9	
5-Apr	3	2	1	2	3	Z	2	6	5	5	4	4	4	4	4	4	4	4	3	1	1	1	1	1	3.0	6	
6-Apr	Z	3	3	3	3	3	3	7	9	9	9	12	9	5	2	4	3	2	2	4	6	4	3	4	4.8	12	
7-Apr	6	Z	5	6	7	7	5	8	7	7	3	2	2	1	1	2	1	3	1	1	22	18	18	11	6.2	22	
8-Apr	7	7	Z	7	6	6	8	8	12	1	1	6	9	4	3	3	4	2	1	1	1	1	1	1	4.4	12	
9-Apr	5	10	8	Z	5	4	3	8	M	17	11	8	2	1	0	0	0	0	1	1	1	11	21	7	5.6	21	
10-Apr	2	2	7	11	Z	6	4	12	16	10	5	6	4	1	2	3	2	3	3	4	4	3	13	28	6.5	28	
11-Apr	21	17	10	4	7	Z	15	17	4	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	4.3	21	
12-Apr	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	0.5	4	
14-Apr	4	4	Z	4	6	5	4	8	5	8	8	6	7	4	2	4	3	3	3	6	9	6	1	1	4.8	9	
15-Apr	1	2	2	Z	6	7	14	7	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	2.0	14	
16-Apr	0	1	0	0	Z	1	3	1	0	1	3	1	0	0	0	0	1	2	1	0	0	0	0	0	0.7	3	
17-Apr	0	0	1	2	4	Z	8	10	5	7	10	8	1	1	1	2	6	3	3	5	4	2	1	2	3.7	10	
18-Apr	Z	3	1	1	1	1	1	2	1	1	1	0	1	1	0	2	2	1	1	1	1	1	1	1	1.1	3	
19-Apr	1	Z	1	1	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0	0	0	0	1	1	2	--	2
20-Apr	2	2	Z	10	12	10	6	12	17	20	14	3	1	1	2	2	3	2	3	9	8	8	5	3	6.6	20	
21-Apr	2	2	2	Z	2	2	3	10	10	8	4	2	2	2	1	1	2	1	3	1	0	0	0	0	2.6	10	
22-Apr	0	0	1	1	Z	1	2	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	2	
23-Apr	0	0	1	1	1	Z	1	1	0	0	1	2	1	1	1	1	0	1	1	3	1	3	2	2	1.0	3	
24-Apr	Z	3	7	11	6	6	6	3	3	2	1	2	1	2	1	2	1	2	1	1	3	4	6	8	3.6	11	
25-Apr	9	Z	8	11	8	8	7	9	7	7	4	2	2	2	2	2	2	3	3	2	2	5	9	4.9	11		
26-Apr	10	8	Z	6	4	2	6	17	9	10	4	4	3	3	4	4	4	4	4	5	5	3	3	4	5.4	17	
27-Apr	9	11	6	Z	5	5	6	9	8	8	7	3	3	2	1	0	0	0	0	0	0	4	7	2	4.2	11	
28-Apr	1	1	1	1	Z	1	8	14	14	10	10	9	2	2	3	2	4	2	5	2	3	6	11	7	5.2	14	
29-Apr	1	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	1	1	0.5	4	
30-Apr	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	10	11	1.3	11	

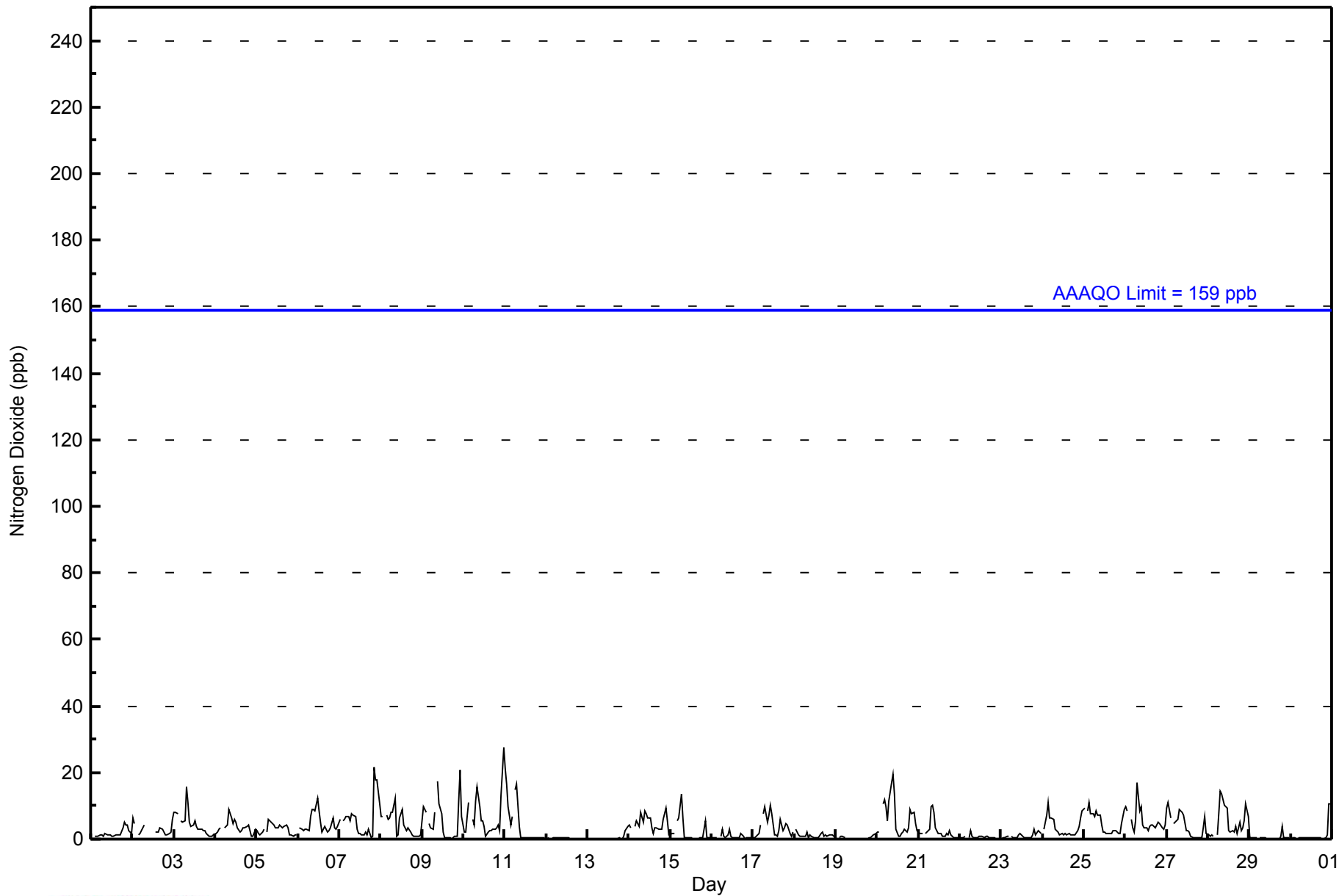
4.1	3.7	3.1	3.5	3.7	3.5	4.4	6.6	5.8	5.3	4.0	3.3	2.4	1.7	1.4	1.6	1.9	1.6	1.9	2.1	2.8	3.0	4.2	4.0	Diurnal Average	
21	17	10	11	12	10	15	17	17	20	14	12	9	5	4	4	6	4	5	9	22	18	21	28	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	669	99.41	99.41
21 - 40	4	0.59	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: 673

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - April 2015**

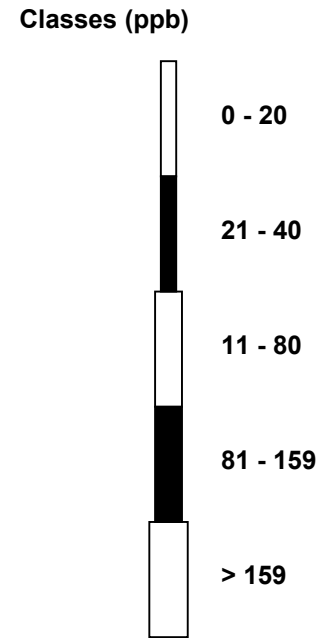
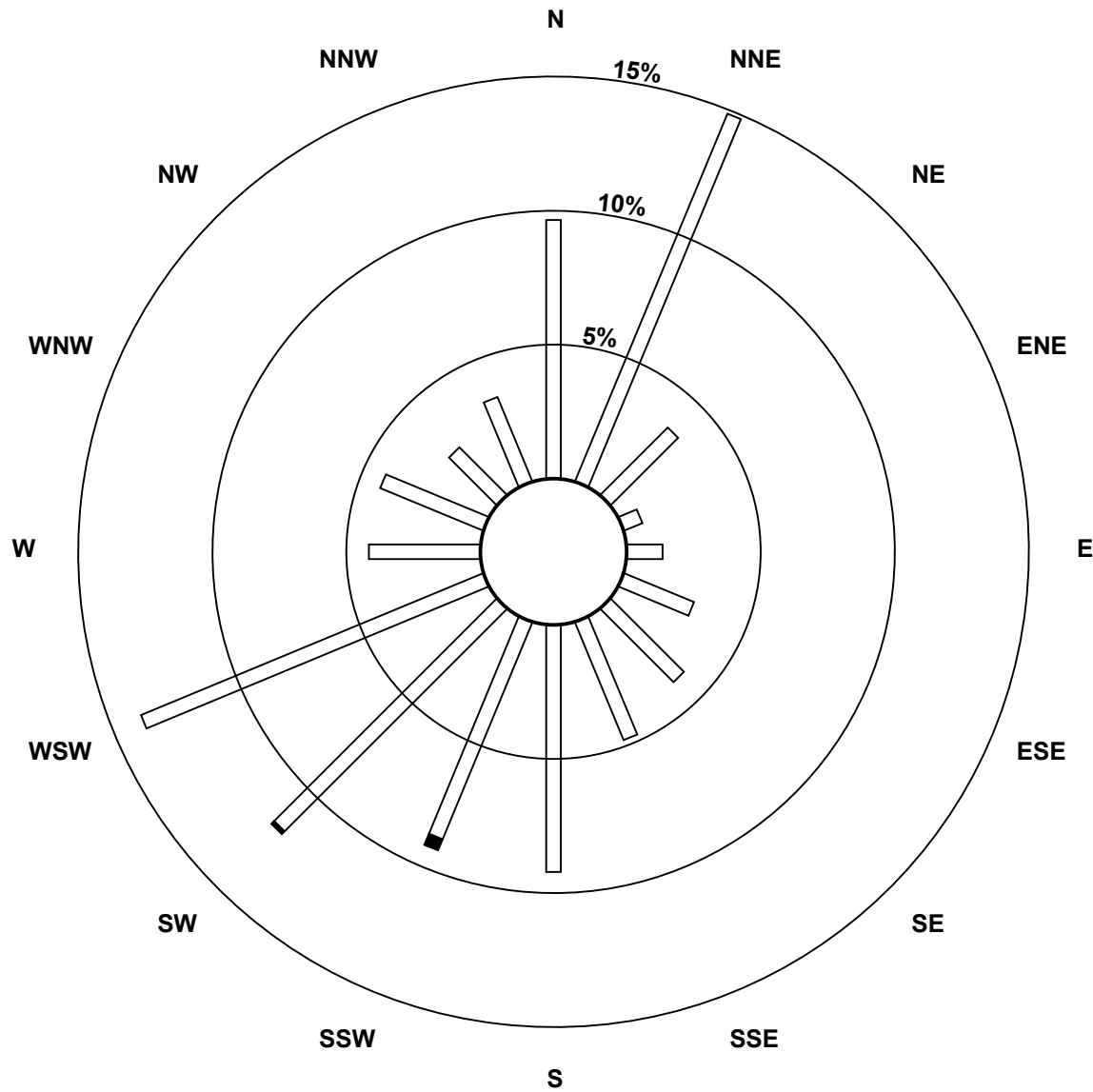
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	65	100	24	5	9	19	26	32	62	59	79	93	28	28	17	23	669
21 - 40	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	100	24	5	9	19	26	32	62	62	80	93	28	28	17	23	673

Total Number of Valid Hours: 673

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)

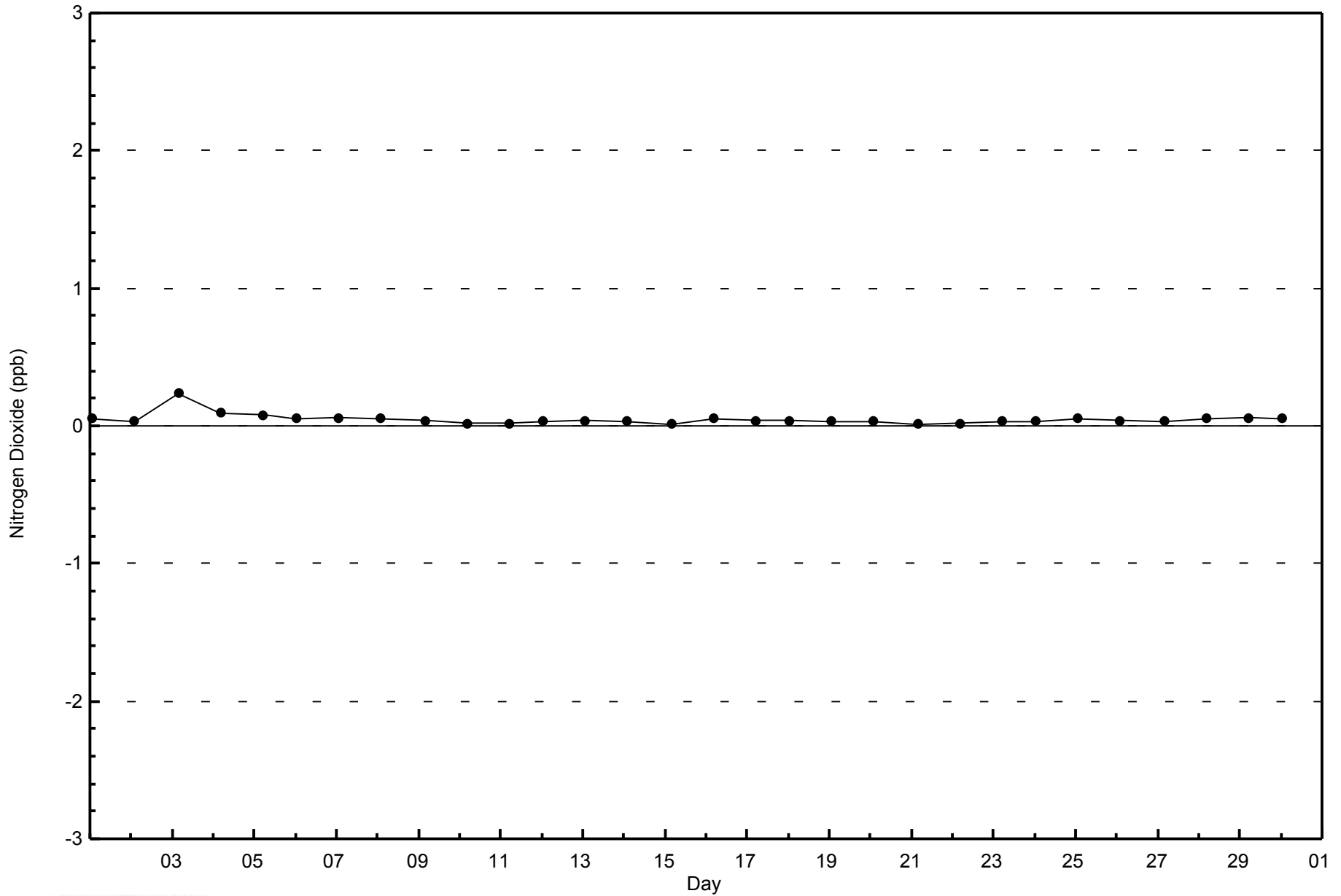


Total Number of Valid Hours: 673



WBEA  
Zero Responses

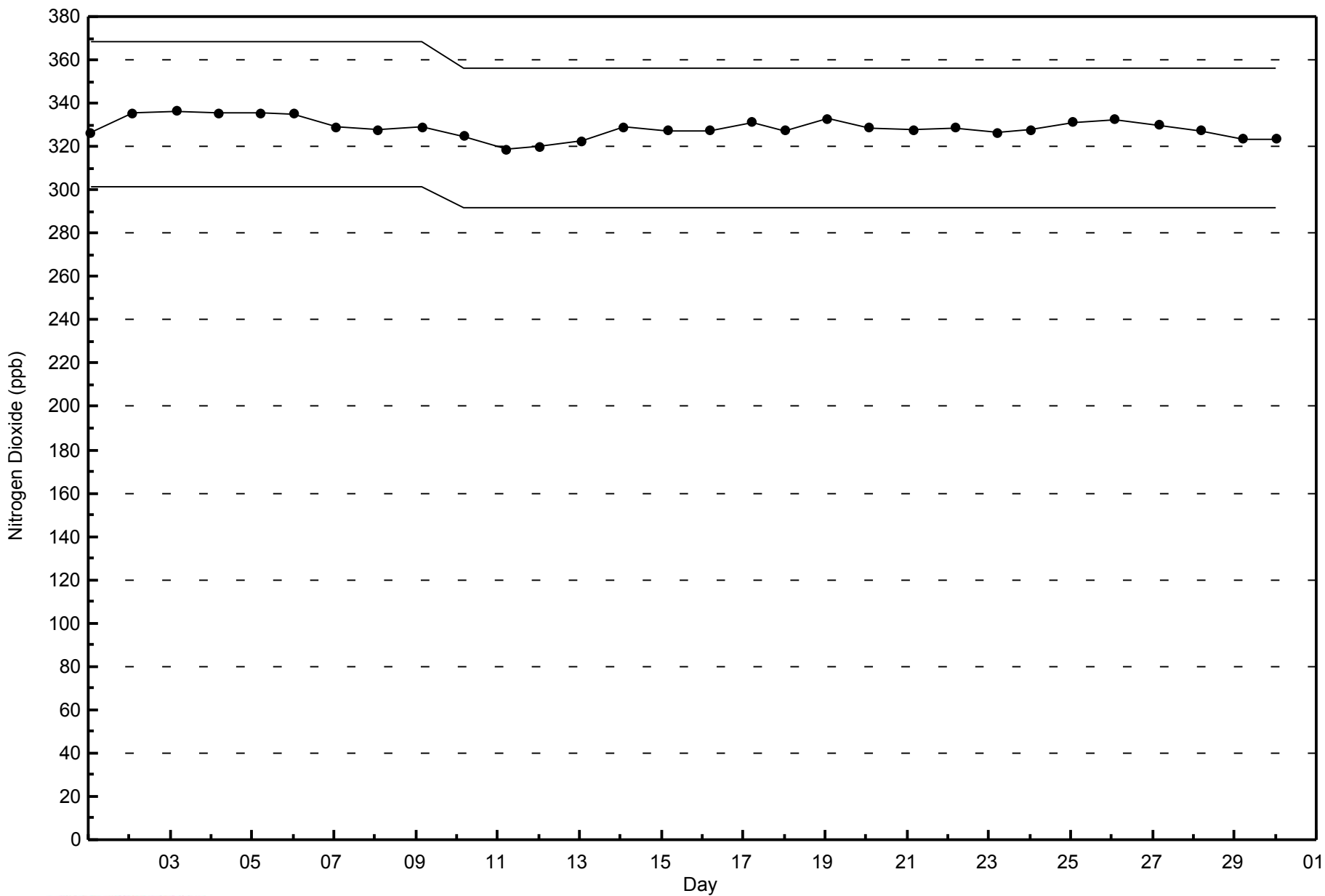
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - April 2015



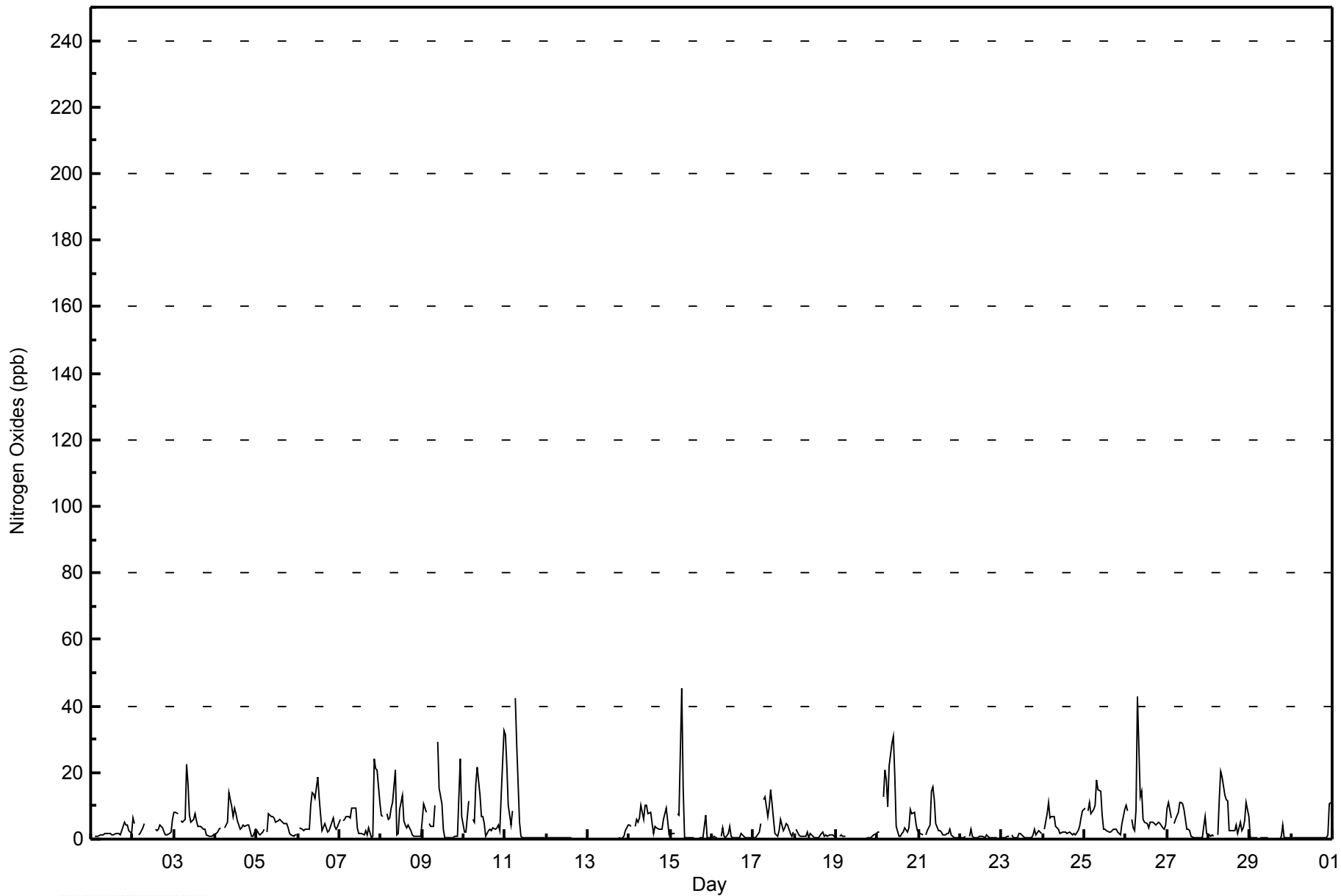


Maximum Value: 45 ppb on Apr 15 07:00																		Maximum Daily Average: 9.5 ppb on Apr 20						Hours in Service: 720			
Minimum Value: 0 ppb on Apr 12 22:00																		Minimum Daily Average: 0.3 ppb on Apr 12						Hours of Data: 673			
Maximum Diurnal Average: 10.5 ppb at hour 8																		Minimum Diurnal Average: 1.7 ppb at hour 15						Hours of Missing Data: 47			
Monthly Average: 4.1 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 10 P <sub>99</sub> = 29						Hours of Calibration: 35			
																		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-Apr	1	Z	1	1	1	1	1	1	2	2	2	2	1	1	2	2	2	1	4	5	4	4	3	2	2.0	5	
2-Apr	6	5	Z	1	2	3	3	5	C	C	C	C	C	3	3	3	4	4	2	1	1	2	2	6	3.0	6	
3-Apr	8	8	8	Z	6	5	6	22	17	7	5	6	8	5	4	4	3	3	3	1	1	1	1	1	5.8	22	
4-Apr	2	2	3	3	Z	3	4	5	14	10	7	9	8	5	3	4	4	4	4	4	2	1	1	3	4.6	14	
5-Apr	2	1	1	2	3	Z	2	8	7	7	6	5	5	6	6	5	5	5	4	1	1	1	1	1	3.8	8	
6-Apr	Z	3	3	3	3	3	3	10	14	14	12	19	12	7	3	5	3	2	2	4	6	4	3	4	6.2	19	
7-Apr	6	Z	5	6	7	7	6	9	9	9	4	2	2	2	1	2	1	3	1	1	24	21	21	11	7.0	24	
8-Apr	7	7	Z	8	6	6	9	11	21	1	2	9	13	5	4	3	4	2	1	1	1	1	1	1	5.4	21	
9-Apr	5	10	8	Z	5	4	4	10	M	29	15	11	3	1	0	0	0	0	1	1	1	13	24	7	6.9	29	
10-Apr	2	2	7	11	Z	6	5	16	22	13	7	7	5	1	3	3	3	3	3	4	4	3	13	33	7.6	33	
11-Apr	32	22	10	4	9	Z	43	28	5	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6.9	43	
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	0.5	4		
14-Apr	4	4	Z	4	6	5	6	10	6	10	10	8	8	5	2	4	3	3	3	3	6	9	6	1	5.5	10	
15-Apr	1	2	2	Z	7	7	45	15	1	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	4.0	45	
16-Apr	0	1	0	0	Z	1	4	1	0	2	4	1	0	0	0	0	1	2	1	0	0	0	0	0	0.8	4	
17-Apr	0	0	1	2	4	Z	12	13	7	10	15	11	2	1	1	3	6	3	3	5	4	2	1	2	4.6	15	
18-Apr	Z	3	1	1	1	1	1	2	1	2	1	0	0	1	0	2	2	1	1	1	1	1	1	1	1.2	3	
19-Apr	0	Z	1	1	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	0	0	0	1	1	2	-	2
20-Apr	2	2	Z	13	21	18	10	22	29	31	19	4	1	1	2	2	3	2	4	9	8	8	5	3	9.5	31	
21-Apr	2	2	1	Z	1	3	4	15	16	12	5	2	2	2	1	1	2	2	3	1	0	0	0	0	3.4	16	
22-Apr	0	0	0	1	Z	1	3	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	3	
23-Apr	0	0	0	1	1	Z	1	0	0	0	2	2	1	1	1	0	0	1	1	3	1	3	2	2	1.1	3	
24-Apr	Z	3	7	11	7	7	7	4	3	3	2	2	2	2	2	2	2	2	1	2	1	2	4	6	8	3.9	11
25-Apr	9	Z	8	11	8	9	10	18	15	14	7	3	3	2	2	2	3	3	3	2	2	1	5	9	6.5	18	
26-Apr	10	8	Z	6	4	2	9	43	13	15	6	5	4	4	5	5	5	4	5	5	5	3	3	4	7.5	43	
27-Apr	9	11	6	Z	5	6	8	11	11	11	9	3	3	3	1	0	0	0	0	0	0	4	7	2	4.8	11	
28-Apr	1	1	1	1	Z	1	12	20	18	13	12	11	3	2	3	2	4	2	5	2	3	5	11	7	6.2	20	
29-Apr	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	1	1	1	0.5	4	
30-Apr	Z	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	11	11	1.3	11	
																		Diurnal Average									
																		Diurnal Maximum									
Z - zerospan																		C - Calibration						M - Maintenance		PF - Power Failure	



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	654	97.18	97.18
21 - 40	16	2.38	99.55
41 - 80	3	0.45	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - April 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	64	98	23	5	9	18	25	31	58	57	77	93	28	28	17	23	654
21 - 40	1	2	1	0	0	0	1	0	3	5	3	0	0	0	0	0	16
11 - 80	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	65	100	24	5	9	19	26	32	62	62	80	93	28	28	17	23	673

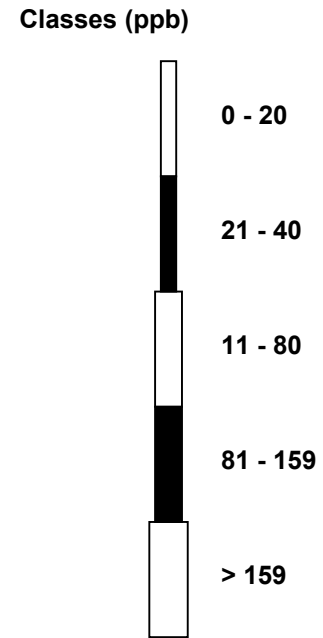
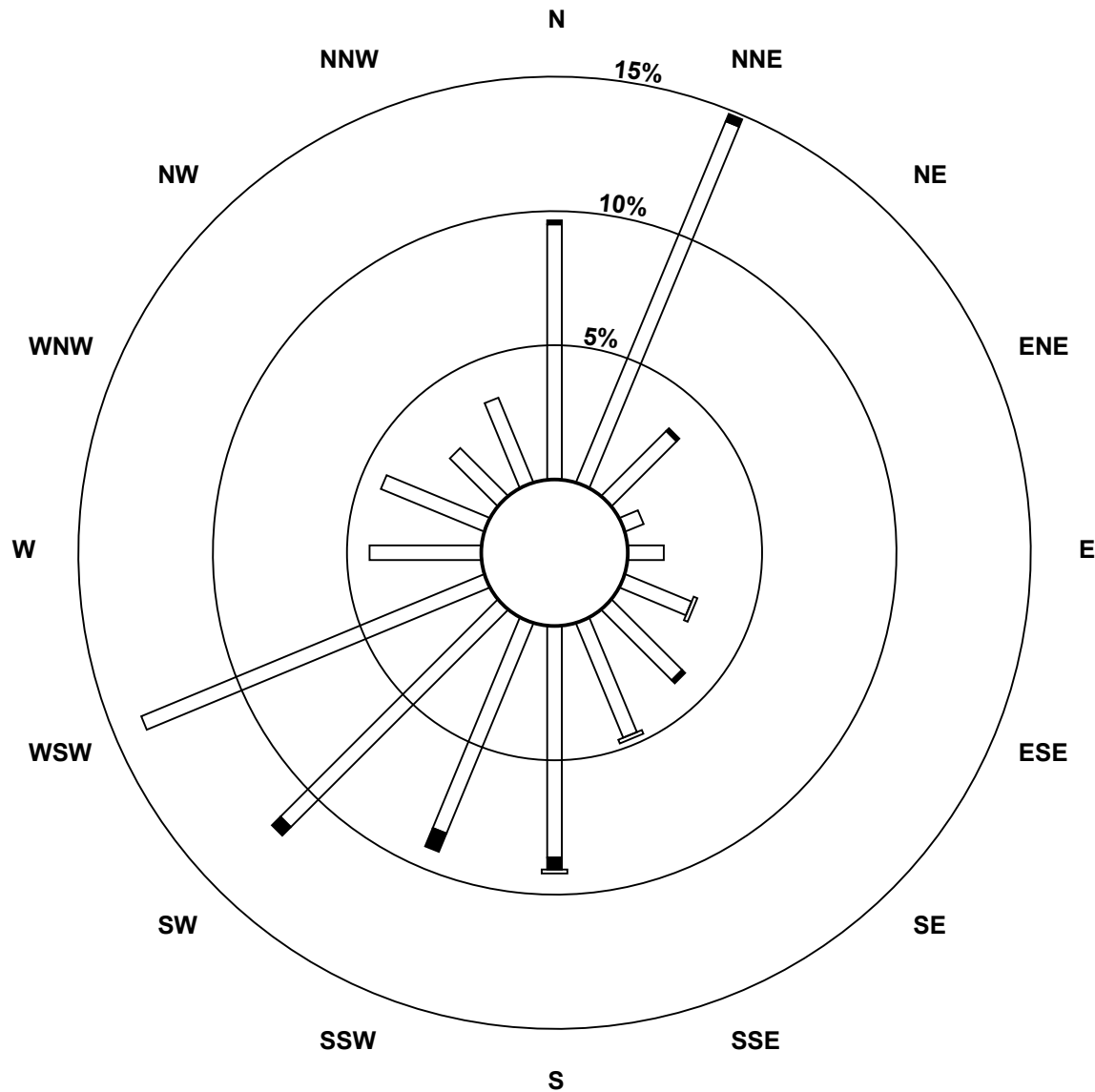
Total Number of Valid Hours: 673

Total Number of Hours: 720

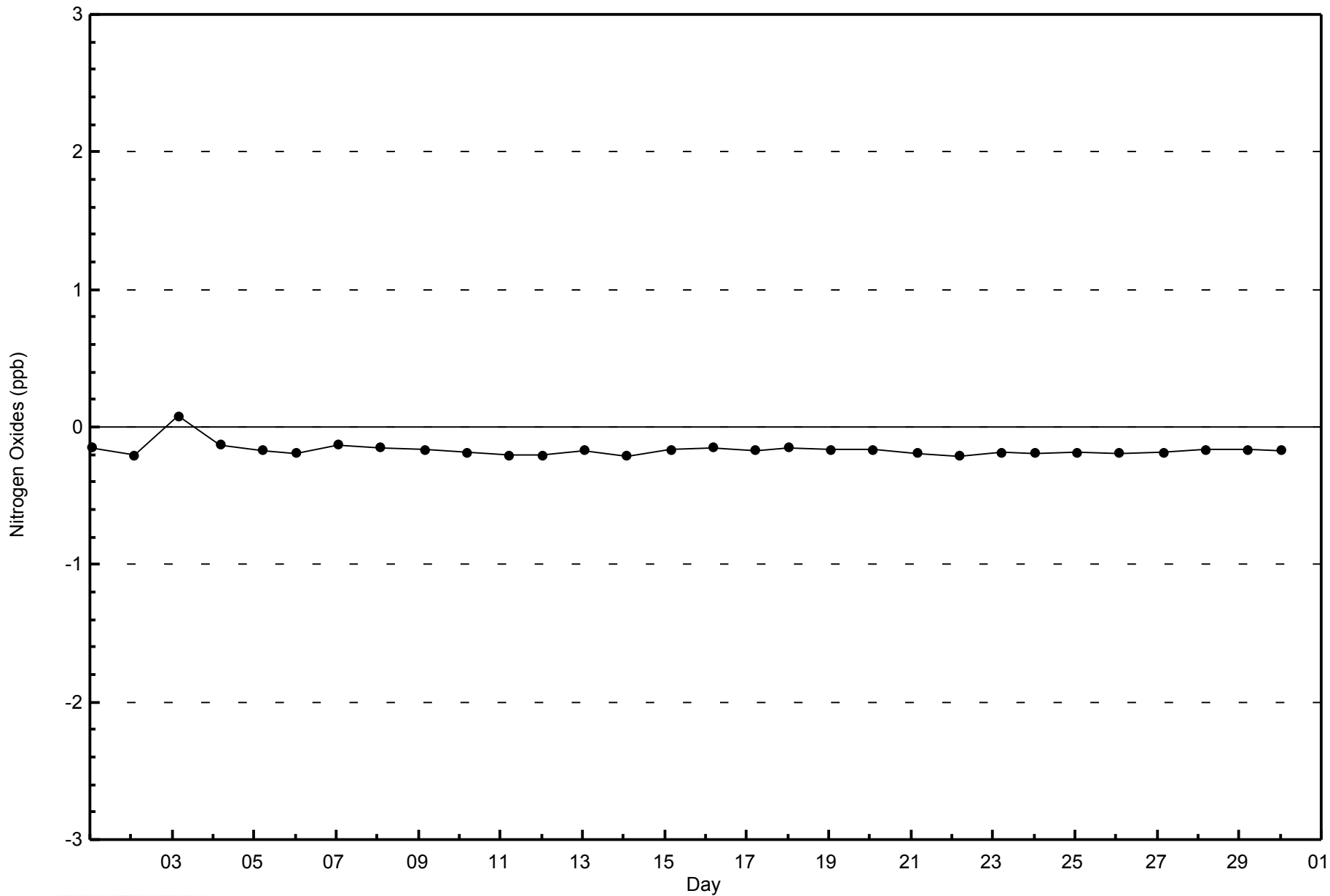


Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South (AMS 13)



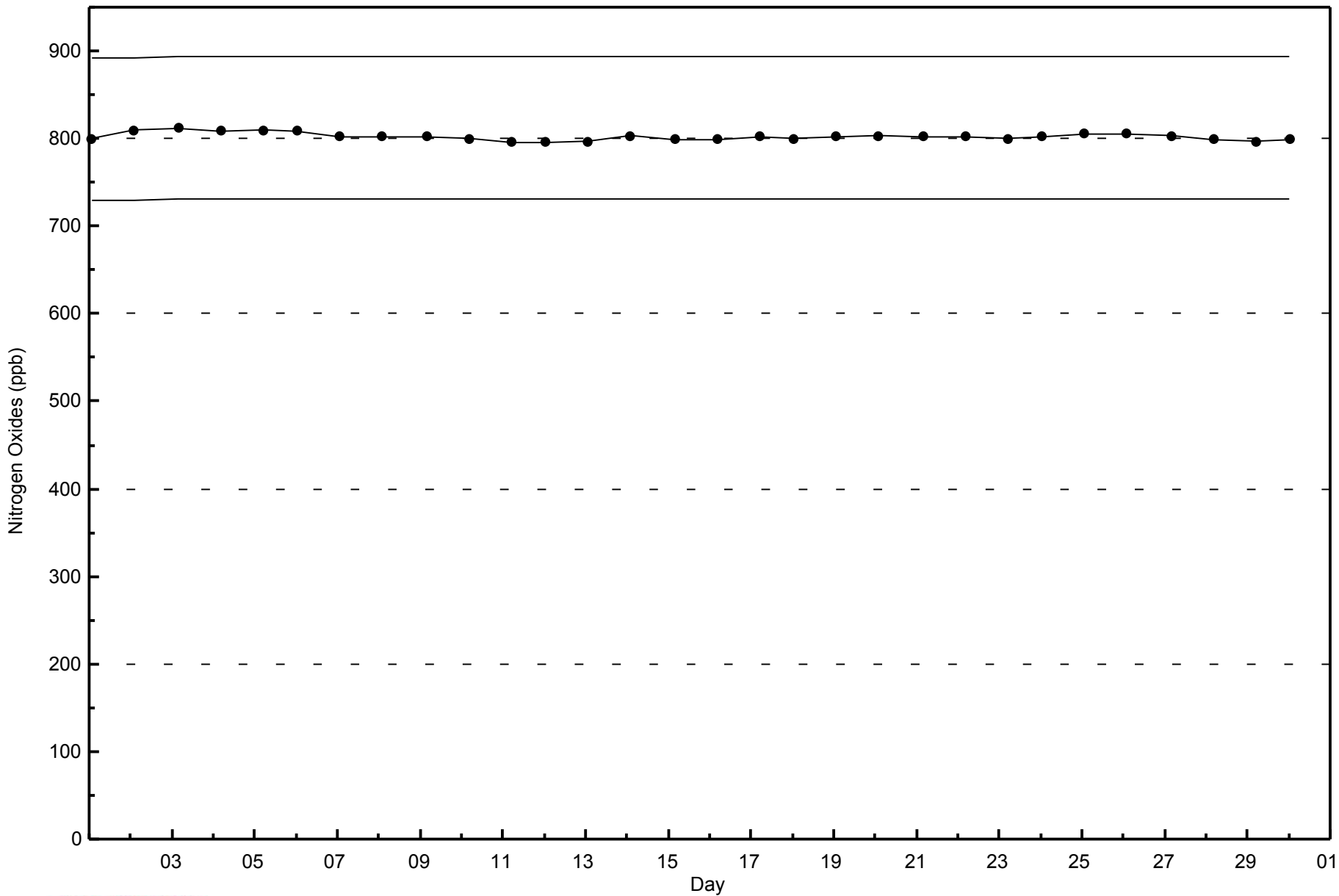
Total Number of Valid Hours: 673





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - April 2015





Summary of Hour Averages

Fort McKay South - April 2015

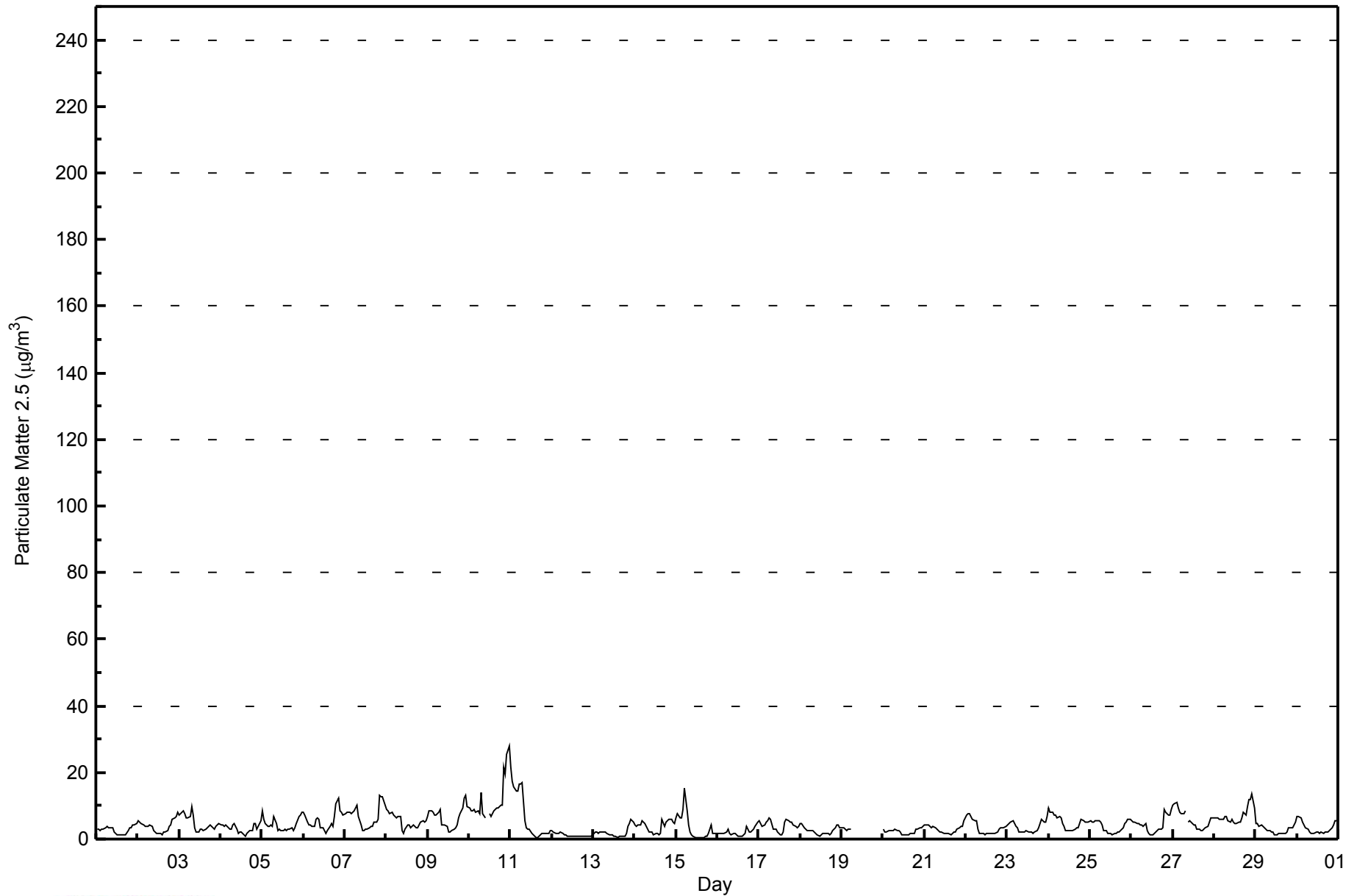
Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 27.9 µg/m <sup>3</sup> on Apr 11 00:00 Minimum Value: 0.5 µg/m <sup>3</sup> on Apr 15 15:00 Maximum Diurnal Average: 6.4 µg/m <sup>3</sup> at hour 24 Monthly Average: 4.30 µg/m <sup>3</sup>		Maximum Daily Average: 11.5 µg/m <sup>3</sup> on Apr 10 Minimum Daily Average: 1.2 µg/m <sup>3</sup> on Apr 12 Minimum Diurnal Average: 2.1 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.6 P <sub>10</sub> = 1.5 Q <sub>1</sub> = 2.1 Median = 3.5 Q <sub>3</sub> = 5.6 P <sub>90</sub> = 8.1 P <sub>99</sub> = 16.6		Hours in Service: 720 Hours of Data: 699 Hours of Missing Data: 21 Hours of Calibration: 0 Percent Operational Time: 97.1																							
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-Apr	3.0	3.0	2.7	2.8	2.9	3.3	3.6	3.6	3.4	3.2	2.1	1.8	1.5	1.4	1.4	1.3	1.3	1.3	2.7	3.4	3.3	4.0	4.4	4.8	2.8	4.8	
2-Apr	5.6	5.0	4.6	4.2	3.7	3.8	3.9	4.2	3.7	2.4	2.2	1.7	1.8	1.6	1.5	1.9	2.3	2.7	3.7	4.3	5.8	6.4	6.7	7.9	3.8	7.9	
3-Apr	7.2	7.7	8.3	7.7	6.5	6.4	6.7	9.8	7.3	3.4	2.3	2.3	2.9	3.1	2.5	2.9	3.5	3.9	4.3	3.9	3.1	3.7	4.4	4.7	4.9	9.8	
4-Apr	4.4	4.0	3.8	4.3	3.9	2.8	2.9	4.1	4.8	2.8	1.9	2.2	2.1	1.5	1.0	1.7	2.3	2.5	2.5	4.5	4.7	2.9	4.0	5.7	3.2	5.7	
5-Apr	8.5	6.0	4.6	4.0	3.9	4.3	3.7	6.7	4.8	2.7	3.1	2.5	2.6	2.8	2.6	2.8	3.0	3.2	2.7	3.4	4.5	6.7	7.2	8.0	4.3	8.5	
6-Apr	8.2	7.1	5.3	4.3	4.3	3.7	3.7	5.8	6.4	5.8	3.4	3.3	2.7	1.8	2.4	3.7	4.7	3.7	6.6	10.7	12.3	8.7	7.8	7.3	5.6	12.3	
7-Apr	7.7	8.0	8.2	8.1	7.7	8.6	9.5	10.0	6.6	4.0	2.4	2.7	2.9	3.0	3.4	4.0	4.0	5.2	5.0	5.8	13.2	12.8	12.5	10.1	6.9	13.2	
8-Apr	8.9	8.3	7.8	8.1	7.4	6.7	6.3	6.8	6.6	2.7	1.8	2.8	4.3	4.2	3.5	3.7	4.3	3.5	3.3	4.1	5.3	5.4	5.2	5.6	5.3	8.9	
9-Apr	6.8	8.7	8.3	8.1	7.3	7.0	8.0	8.7	4.4	4.2	4.3	4.0	2.2	2.0	2.5	2.8	3.3	4.2	6.3	7.6	9.3	12.4	13.0	9.6	6.5	13.0	
10-Apr	9.3	8.6	8.5	9.0	8.1	8.6	7.8	14.1	7.8	6.4	M	M	7.8	6.8	8.4	8.9	9.2	9.5	10.2	10.4	21.5	19.5	25.6	27.9	11.5	27.9	
11-Apr	21.8	17.3	15.5	14.5	14.6	16.4	16.5	16.8	5.7	3.4	3.1	3.0	1.5	1.2	1.0	0.6	0.6	1.2	1.6	1.5	1.6	1.5	1.8	2.4	6.9	21.8	
12-Apr	2.6	2.2	1.7	1.5	1.7	1.9	1.9	1.5	1.2	0.9	0.7	0.7	0.7	0.8	0.7	0.7	0.8	0.7	1.0	0.9	0.9	0.9	0.9	1.1	1.2	2.6	
13-Apr	1.8	2.1	2.0	1.8	2.2	2.1	2.1	2.1	1.5	1.1	1.1	1.2	1.0	0.8	0.5	0.9	0.8	0.8	0.9	1.8	3.7	4.7	5.8	5.1	2.0	5.8	
14-Apr	4.3	4.0	4.1	4.4	5.3	5.2	4.8	3.7	1.9	2.2	2.0	1.5	1.6	1.5	1.1	1.5	5.9	3.9	5.0	5.6	6.1	5.9	4.9	4.5	3.8	6.1	
15-Apr	6.3	7.4	6.4	6.2	8.7	15.2	8.4	4.4	2.1	1.3	0.8	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.9	1.8	4.3	1.8	1.6	1.7	3.5	15.2	
16-Apr	1.7	1.8	1.8	1.6	1.6	2.0	2.8	1.9	1.4	1.5	1.9	1.2	1.0	1.0	1.0	1.2	1.6	3.8	2.0	2.0	2.5	3.2	3.9	5.0	2.1	5.0	
17-Apr	5.7	4.5	4.0	4.2	5.0	5.6	6.5	5.8	3.1	3.1	2.9	2.3	1.3	1.4	2.2	5.0	5.8	5.5	5.3	4.9	4.3	3.7	3.4	3.8	4.1	6.5	
18-Apr	4.5	4.9	3.4	2.8	2.7	2.4	2.5	2.4	2.1	1.6	1.3	1.0	1.1	1.8	1.8	1.6	1.5	1.3	1.8	2.4	3.5	4.2	4.2	3.2	2.5	4.9	
19-Apr	3.2	3.4	3.0	2.7	2.8	2.9	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	UO	UO	UO	UO	UO	UO	UO	UO	3.4
20-Apr	2.8	2.2	2.3	2.6	2.7	2.5	2.3	2.9	2.7	2.7	2.2	1.2	1.1	1.2	1.3	1.5	1.7	1.6	1.8	2.9	3.1	3.5	3.3	3.8	2.3	3.8	
21-Apr	4.4	4.4	4.2	3.8	3.5	3.8	3.2	2.8	2.5	2.3	2.0	1.6	1.6	1.7	1.5	1.5	1.7	2.0	2.3	3.0	3.2	3.6	3.8	5.3	2.9	5.3	
22-Apr	7.3	7.8	7.6	6.8	5.8	5.4	5.5	3.0	1.6	1.7	1.5	1.5	1.6	1.6	1.6	1.6	1.5	1.6	2.1	3.0	3.3	3.5	3.4	3.8	3.5	7.8	
23-Apr	4.4	4.8	5.2	5.6	4.6	3.8	3.2	2.2	2.1	2.2	2.3	2.5	2.2	2.1	2.0	1.8	2.2	2.7	3.4	4.6	6.0	5.1	5.1	7.0	3.6	7.0	
24-Apr	9.2	8.2	8.2	7.1	7.4	6.5	6.7	6.2	4.8	3.8	2.5	2.5	2.6	2.5	2.6	2.8	3.2	3.2	4.8	6.0	5.3	5.0	5.2	5.0	5.1	9.2	
25-Apr	5.4	5.3	5.2	5.3	5.4	5.7	5.1	4.1	2.6	2.3	1.7	1.5	1.5	1.4	1.6	1.8	2.3	2.3	2.9	3.5	4.7	5.1	6.1	6.0	3.7	6.1	
26-Apr	5.7	5.0	5.2	4.8	4.5	4.3	4.2	4.0	4.5	2.7	1.5	1.3	1.4	1.7	2.1	2.5	3.1	3.0	3.6	8.8	8.0	7.0	7.0	8.9	4.4	8.9	
27-Apr	10.4	10.5	11.1	9.2	8.1	7.7	7.7	8.4	UO	4.9	5.3	4.6	4.2	4.2	2.9	2.8	2.7	2.6	2.9	3.4	3.8	5.2	6.2	6.4	5.9	11.1	
28-Apr	6.4	6.3	6.3	6.1	5.9	5.8	6.8	6.9	5.6	5.1	6.1	5.1	4.9	4.6	5.0	5.1	6.3	7.9	7.3	9.6	12.0	12.0	13.4	9.2	7.1	13.4	
29-Apr	4.6	4.5	4.0	4.0	4.0	3.4	2.9	2.7	2.6	2.3	1.9	1.4	1.4	1.5	1.7	1.8	1.8	1.8	2.0	3.4	3.2	3.6	4.0	5.1	2.9	5.1	
30-Apr	7.0	6.8	6.2	4.9	4.1	3.4	2.8	2.2	1.8	1.5	1.7	1.9	2.2	1.8	2.3	1.8	2.1	2.0	2.0	2.4	3.5	4.4	5.4	5.4	3.3	7.0	
																								Diurnal Average		Diurnal Maximum	
																								6.3		21.8	
																								6.0		17.3	
																								5.6		15.5	
																								5.4		14.5	
																								5.2		14.6	
																								5.4		16.4	
																								5.3		16.5	
																								5.4		16.8	
																								3.8		7.8	
																								2.9		6.4	
																								2.4		6.1	
																								2.2		5.1	
																								2.2		7.8	
																								2.1		6.8	
																								2.2		8.4	
																								2.4		8.9	
																								2.9		9.2	
																								3.1		9.5	
																								3.5		10.2	
																								4.5		10.7	
																								5.7		21.5	
																								5.7		19.5	
																								6.2		25.6	
																								6.4		27.9	

M - Maintenance UO - Unstable Operation PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort McKay South - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	490	70.10	70.10
6 - 15	167	23.89	93.99
16 - 25	7	1.00	94.99
26 - 80	2	0.29	95.28
> 81.0	0	0.00	95.28

Total Number of Valid Hours: 699

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - April 2015**

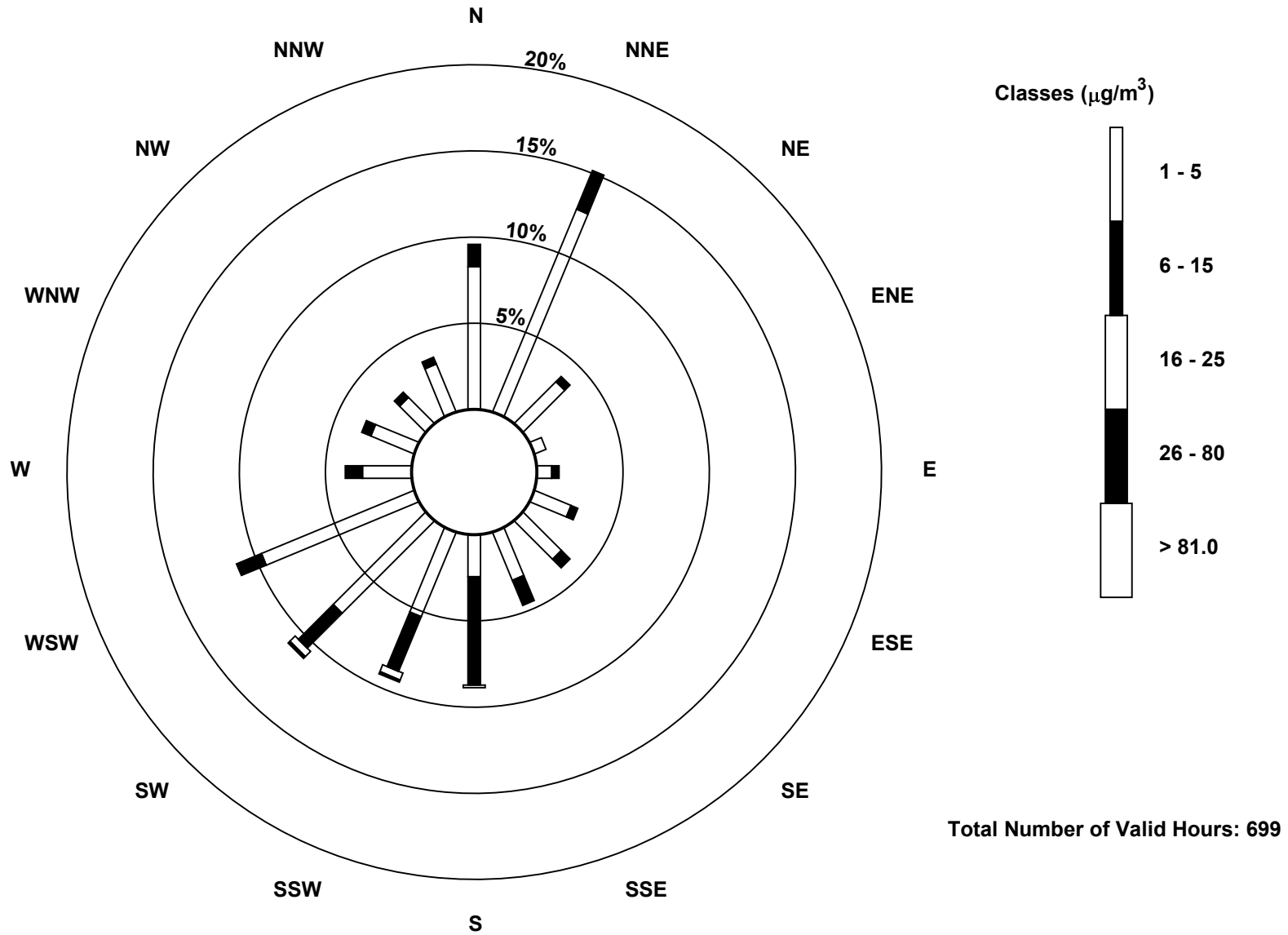
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	58	89	24	5	6	16	22	21	17	37	53	67	20	19	15	21	490
6 - 15	9	17	3	0	3	3	5	11	44	24	20	11	7	4	3	3	167
16 - 25	0	0	0	0	0	0	0	0	1	3	3	0	0	0	0	0	7
26 - 80	0	0	0	0	0	0	0	0	0	1	1	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
<b>Totals</b>	67	106	27	5	9	19	27	32	62	65	77	78	27	23	18	24	666

Total Number of Valid Hours: 699

Total Number of Hours: 720

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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort McKay South (AMS 13)**







**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

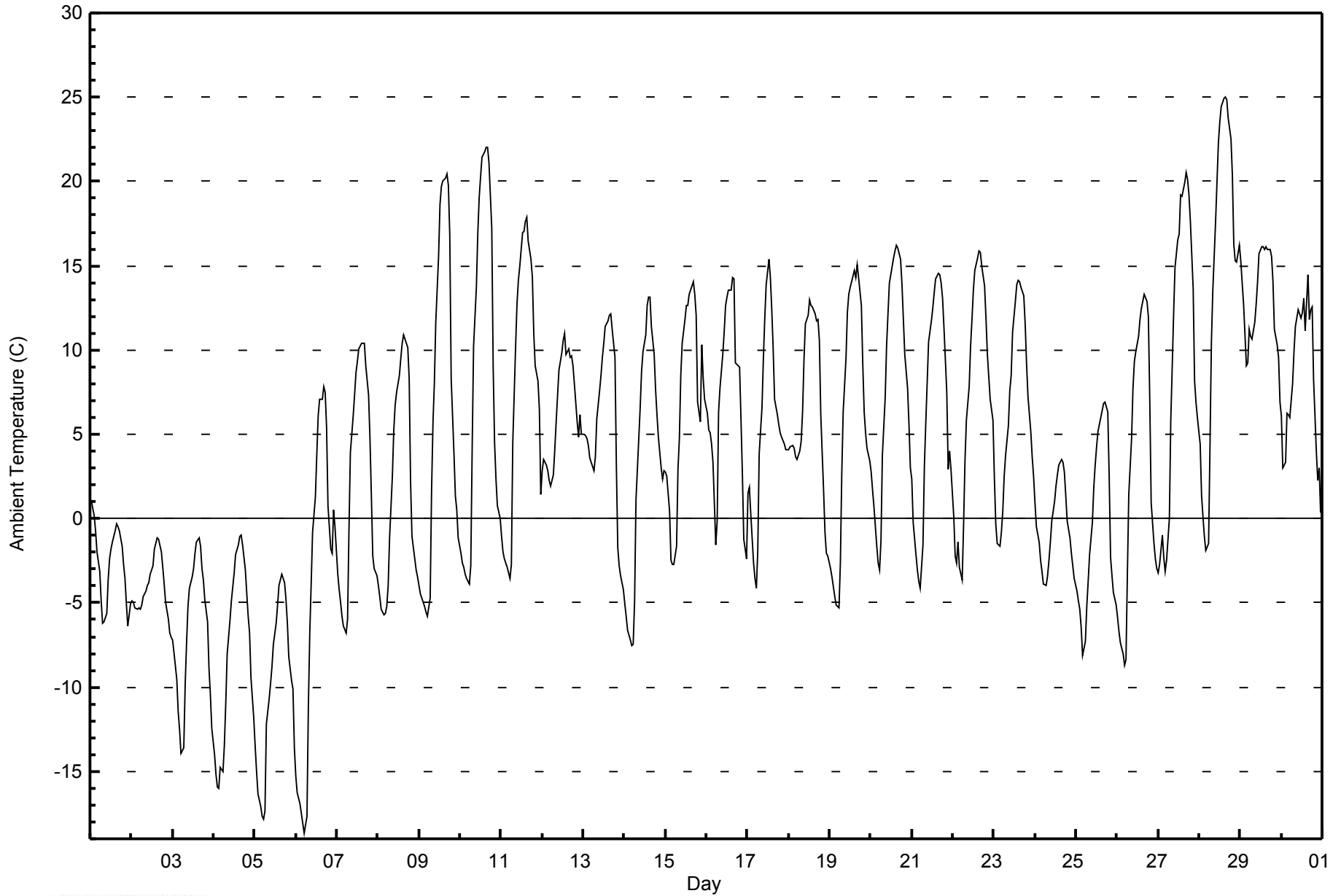
**Ambient Temperature (AT) - C**  
**Fort McKay South - April 2015**

Maximum Value: 25.0 C on Apr 28 16:00		Maximum Daily Average: 14.2 C on Apr 28		Hours in Service: 720																							
Minimum Value: -18.6 C on Apr 6 06:00		Minimum Daily Average: -10.1 C on Apr 5		Hours of Data: 720																							
Maximum Diurnal Average: 11.3 C at hour 16		Minimum Diurnal Average: -4.3 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: 3.80 C		Percentiles: P <sub>1</sub> = -17.2 P <sub>10</sub> = -6.0 Q <sub>1</sub> = -2.9 Median = 3.7 Q <sub>3</sub> = 10.6 P <sub>90</sub> = 14.7 P <sub>99</sub> = 21.8		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-Apr	1.1	0.6	0.2	-0.8	-2.0	-3.1	-4.9	-6.2	-6.1	-5.6	-3.6	-2.4	-1.8	-1.4	-0.7	-0.3	-0.5	-0.8	-1.6	-2.7	-3.6	-5.1	-6.3	-5.1	-2.6	1.1	
2-Apr	-4.9	-5.0	-5.3	-5.4	-5.3	-5.4	-5.1	-4.7	-4.3	-4.0	-3.8	-3.3	-2.8	-1.8	-1.5	-1.1	-1.2	-2.0	-2.9	-3.9	-5.0	-6.0	-6.8	-7.1	-4.1	-1.1	
3-Apr	-7.2	-8.0	-9.5	-11.4	-12.6	-13.9	-13.6	-9.9	-7.4	-5.2	-4.1	-3.5	-3.0	-2.1	-1.4	-1.2	-1.7	-3.0	-3.7	-4.8	-6.2	-8.9	-10.5	-12.4	-6.9	-1.2	
4-Apr	-14.0	-15.2	-16.0	-16.0	-14.7	-15.1	-13.4	-11.0	-8.1	-6.1	-4.9	-4.0	-3.2	-2.1	-1.5	-1.1	-1.0	-1.5	-3.0	-4.5	-5.8	-6.8	-9.5	-11.9	-7.9	-1.0	
5-Apr	-13.5	-15.0	-16.3	-17.1	-17.7	-17.9	-17.3	-12.2	-10.7	-9.8	-8.7	-7.4	-6.2	-5.1	-4.0	-3.6	-3.3	-3.8	-4.8	-6.2	-8.2	-9.6	-10.1	-13.6	-10.1	-3.3	
6-Apr	-15.2	-16.2	-16.9	-17.5	-18.1	-18.6	-17.7	-11.1	-6.8	-3.9	-0.9	1.3	3.8	6.1	7.1	7.1	7.8	7.5	5.4	0.8	-1.8	-2.0	0.5	-0.5	-4.2	7.8	
7-Apr	-3.3	-4.2	-5.0	-5.8	-6.3	-6.8	-6.0	-0.6	3.9	6.1	7.4	8.6	9.3	10.1	10.4	10.4	10.4	9.1	7.3	4.7	1.4	-2.2	-3.0	-3.4	2.2	10.4	
8-Apr	-3.9	-4.7	-5.4	-5.7	-5.6	-5.3	-4.0	-1.2	2.5	5.3	6.7	7.5	8.5	9.5	10.4	10.9	10.7	10.2	8.3	2.2	-1.1	-2.4	-3.0	-3.4	2.0	10.9	
9-Apr	-3.9	-4.5	-4.9	-5.2	-5.5	-5.8	-4.7	1.7	5.7	8.1	11.7	15.6	18.6	19.7	20.0	20.2	20.4	19.8	16.8	8.3	3.8	1.4	0.5	-1.1	6.5	20.4	
10-Apr	-2.1	-2.6	-2.9	-3.3	-3.6	-3.9	-2.8	4.1	10.2	13.8	16.9	19.1	20.3	21.4	21.8	22.1	22.1	21.1	17.2	9.0	4.5	2.4	0.8	0.0	8.6	22.1	
11-Apr	-1.0	-1.9	-2.4	-2.8	-3.3	-3.6	-2.7	4.5	10.2	12.7	14.1	15.0	16.9	17.1	17.6	17.9	16.5	15.4	14.3	11.0	9.1	8.2	6.5	1.4	7.9	17.9	
12-Apr	2.8	3.5	3.2	2.9	2.3	1.9	2.6	4.0	5.7	7.4	8.8	9.8	10.6	10.9	9.7	10.1	9.6	9.6	9.1	8.0	5.8	4.8	6.1	5.0	6.4	10.9	
13-Apr	5.0	4.9	4.7	4.3	3.6	3.1	2.9	3.6	5.9	7.6	8.5	9.6	10.4	11.4	11.8	12.1	12.1	11.2	9.5	3.1	-1.7	-2.8	-3.4	-4.2	5.6	12.1	
14-Apr	-5.0	-5.8	-6.6	-7.2	-7.6	-7.5	-4.9	1.1	4.7	6.5	8.8	9.9	10.9	12.6	13.2	13.1	11.4	9.8	7.7	6.2	4.8	3.0	2.4	2.8	3.5	13.2	
15-Apr	2.8	2.5	0.4	-2.5	-2.7	-2.8	-1.7	3.0	4.7	8.5	10.4	11.8	12.6	12.6	13.3	13.8	14.1	13.3	12.1	6.9	5.7	10.3	8.3	7.1	6.9	14.1	
16-Apr	6.2	5.2	5.1	4.4	3.4	-1.6	-0.1	6.4	7.8	9.7	11.1	12.6	13.2	13.6	13.6	14.3	14.2	9.2	9.1	9.0	5.9	2.7	-1.3	-2.4	7.1	14.3	
17-Apr	1.5	1.9	0.3	-2.6	-3.6	-4.2	-1.9	3.8	6.6	9.5	11.9	13.9	15.4	14.3	12.4	10.1	7.1	6.2	5.6	5.1	4.8	4.4	4.0	4.1	5.4	15.4	
18-Apr	4.1	4.2	4.4	4.1	3.7	3.5	4.0	4.6	6.4	9.4	11.6	12.1	13.0	12.6	12.6	12.2	11.7	11.8	10.6	6.2	1.7	-0.8	-2.0	-2.2	6.6	13.0	
19-Apr	-3.0	-3.5	-4.1	-4.6	-5.1	-5.3	-2.6	2.7	6.3	9.5	12.2	13.3	13.7	14.0	14.8	14.3	15.1	14.3	12.7	9.2	6.3	5.1	4.1	3.4	6.0	15.1	
20-Apr	2.8	1.7	0.7	-1.6	-2.6	-3.0	-1.3	3.7	7.2	10.3	12.1	14.0	15.0	15.5	15.9	16.2	16.0	15.4	13.9	11.8	9.7	7.7	5.6	3.0	7.9	16.2	
21-Apr	2.3	-0.3	-2.1	-3.0	-3.7	-4.1	-1.6	3.1	5.7	8.1	10.5	11.7	12.5	13.4	14.2	14.5	14.5	14.0	13.1	11.3	7.5	2.9	4.0	3.0	6.3	14.5	
22-Apr	0.1	-2.2	-2.6	-1.4	-2.9	-3.6	-0.4	3.4	5.9	7.8	10.3	11.8	13.6	14.7	15.5	15.9	15.8	15.0	13.8	11.9	9.7	8.4	7.1	5.8	7.2	15.9	
23-Apr	2.4	-0.3	-1.5	-1.6	-0.9	0.5	2.5	3.7	5.5	7.6	8.5	11.0	12.9	13.9	14.1	14.0	13.7	13.2	11.6	9.2	7.2	5.1	3.7	2.5	6.6	14.1	
24-Apr	1.0	-0.5	-1.4	-2.5	-3.1	-3.9	-3.9	-3.4	-2.4	-1.4	-0.1	1.0	1.9	2.6	3.2	3.5	3.4	2.7	1.3	-0.2	-1.2	-2.0	-2.8	-3.6	-0.5	3.5	
25-Apr	-4.3	-4.9	-5.4	-6.4	-8.1	-7.3	-5.2	-3.7	-2.1	-0.3	1.9	3.2	4.3	5.2	6.0	6.4	6.9	6.9	6.3	2.5	-2.3	-3.4	-4.4	-5.1	-0.6	6.9	
26-Apr	-5.9	-6.7	-7.4	-8.1	-8.7	-8.4	-3.3	1.4	4.7	7.8	9.3	9.9	10.8	11.8	12.5	12.9	13.3	12.9	11.9	7.0	0.9	-1.5	-2.4	-3.0	3.0	13.3	
27-Apr	-3.2	-2.7	-1.0	-2.3	-3.1	-2.5	0.0	5.9	8.9	12.1	14.8	16.5	16.9	19.2	19.1	19.9	20.6	20.2	19.2	17.7	13.7	8.2	6.9	6.0	9.6	20.6	
28-Apr	4.5	1.4	0.1	-1.1	-1.9	-1.5	4.3	10.4	13.5	17.6	20.0	22.3	23.5	24.5	24.9	25.0	24.8	23.8	22.5	20.3	16.3	15.3	15.2	16.2	14.2	25.0	
29-Apr	15.3	14.0	12.7	9.1	9.2	11.2	10.9	10.7	11.7	12.7	14.1	15.8	16.1	16.1	16.0	16.1	16.0	16.0	15.5	14.0	11.2	10.3	9.6	6.9	13.0	16.1	
30-Apr	6.1	3.0	3.4	6.3	6.2	6.0	8.0	9.9	11.4	11.9	12.4	11.9	12.2	13.1	11.1	14.5	11.9	12.4	12.6	8.2	3.9	2.2	3.0	0.3	8.4	14.5	
		-1.1	-2.0	-2.7	-3.5	-4.0	-4.3	-2.8	0.9	3.6	5.8	7.6	8.9	10.0	10.8	11.1	11.3	11.1	10.3	9.0	6.0	3.2	1.6	0.8	-0.4	Diurnal Average	
		15.3	14.0	12.7	9.1	9.2	11.2	10.9	10.7	13.5	17.6	20.0	22.3	23.5	24.5	24.9	25.0	24.8	23.8	22.5	20.3	16.3	15.3	15.2	16.2	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Fort McKay South - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Fort McKay South - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	277	38.47	38.47
0 - 10	242	33.61	72.08
10 - 20	181	25.14	97.22
> 20	20	2.78	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

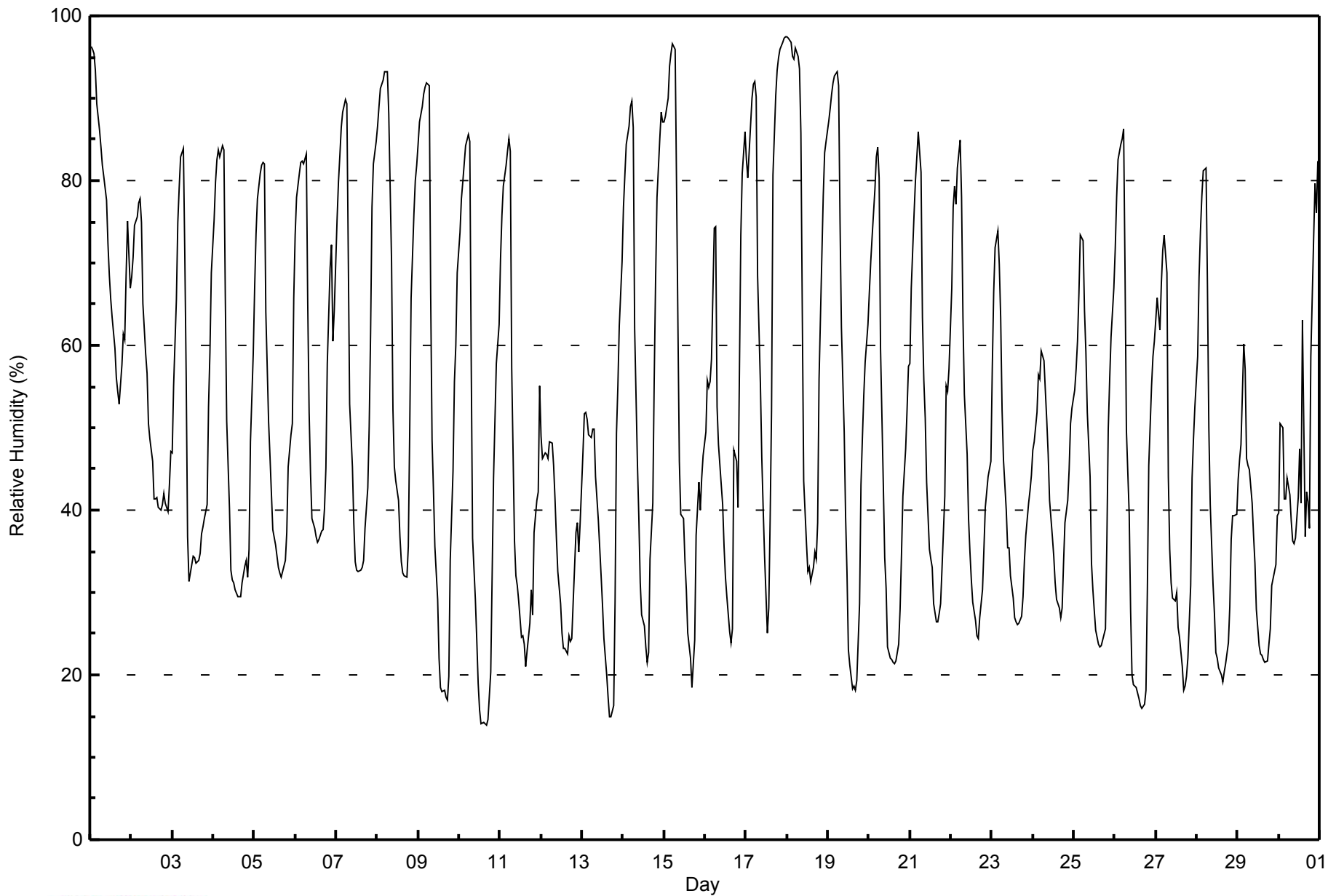


Maximum Value: 98 % on Apr 18 00:00																			Maximum Daily Average: 73.5 % on Apr 1						Hours in Service: 720																								
Minimum Value: 14 % on Apr 10 17:00																			Minimum Daily Average: 35.4 % on Apr 29						Hours of Data: 720																								
Maximum Diurnal Average: 78.7 % at hour 6																			Minimum Diurnal Average: 27.6 % at hour 16						Hours of Missing Data: 0																								
Monthly Average: 51.2 %																			Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 24 Q <sub>1</sub> = 33 Median = 46 Q <sub>3</sub> = 71 P <sub>90</sub> = 85 P <sub>99</sub> = 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-Apr	96	96	95	93	89	86	84	82	80	78	72	69	66	63	60	56	54	53	58	61	61	69	75	67	73.5	96																							
2-Apr	68	71	74	76	77	78	75	65	59	57	50	49	46	41	41	42	40	40	41	42	41	40	43	47	54.3	78																							
3-Apr	47	55	66	75	79	83	84	71	56	37	31	33	34	34	34	34	35	37	38	39	41	53	59	69	51.0	84																							
4-Apr	75	80	83	84	83	84	84	66	51	40	33	31	31	30	29	30	30	31	33	34	32	35	48	59	50.7	84																							
5-Apr	67	74	78	81	82	82	82	64	51	46	42	38	36	34	33	32	32	33	34	37	45	49	51	66	52.9	82																							
6-Apr	73	78	81	82	82	82	83	65	52	44	39	38	37	36	36	37	38	40	45	58	69	72	61	64	58.1	83																							
7-Apr	75	80	83	86	88	90	89	71	53	45	38	34	33	33	33	33	34	38	43	50	62	77	82	85	59.7	90																							
8-Apr	87	89	91	92	93	93	93	88	70	52	45	43	41	37	34	32	32	32	36	50	66	76	80	82	63.9	93																							
9-Apr	84	87	89	91	91	92	92	66	49	42	36	29	22	19	18	18	17	17	20	34	45	56	60	69	51.7	92																							
10-Apr	74	78	80	82	84	86	85	59	37	29	24	19	16	14	14	14	14	15	20	32	44	51	58	63	45.4	86																							
11-Apr	70	76	79	82	83	85	84	57	36	32	31	29	25	25	24	21	23	26	30	27	37	41	42	55	46.7	85																							
12-Apr	49	46	47	47	46	48	48	46	41	37	32	29	25	23	23	23	25	24	24	29	37	39	35	39	35.9	49																							
13-Apr	47	52	52	51	49	49	50	50	44	39	35	32	28	24	20	17	15	15	16	29	49	55	62	70	39.7	70																							
14-Apr	77	81	84	87	89	90	86	62	46	39	31	27	26	23	21	23	34	41	56	68	78	85	88	87	59.6	90																							
15-Apr	87	88	90	94	95	97	96	79	62	46	40	39	34	30	25	22	18	21	24	37	43	40	44	47	54.1	97																							
16-Apr	49	56	55	56	58	74	74	52	48	43	41	36	32	30	25	24	26	47	46	40	57	73	81	86	50.4	86																							
17-Apr	83	80	84	90	92	92	90	68	55	46	40	34	25	28	39	52	81	90	93	95	96	97	97	98	72.8	98																							
18-Apr	97	97	97	95	95	96	95	94	86	64	43	36	33	33	31	33	35	34	38	56	71	78	83	85	66.9	97																							
19-Apr	87	89	90	92	93	93	91	75	62	49	39	32	23	21	18	19	18	19	29	43	49	54	58	62	54.5	93																							
20-Apr	66	70	73	79	83	84	80	60	43	34	31	23	22	22	21	21	22	24	28	35	42	47	52	57	46.7	84																							
21-Apr	58	67	76	80	83	86	81	63	56	51	43	35	34	33	29	26	26	28	29	33	42	55	54	57	51.1	86																							
22-Apr	67	77	79	77	82	85	78	63	54	47	39	35	32	29	27	25	24	27	30	35	40	42	44	46	49.3	85																							
23-Apr	57	66	72	74	70	63	52	46	40	35	35	32	29	27	26	26	26	27	29	34	37	41	42	44	43.1	74																							
24-Apr	47	48	52	56	56	59	58	54	51	47	41	37	34	31	29	28	27	28	34	38	41	45	51	52	43.6	59																							
25-Apr	55	57	60	66	73	73	64	59	52	44	34	30	28	25	24	23	24	24	26	36	50	56	61	67	46.3	73																							
26-Apr	72	78	83	84	85	86	69	50	39	28	20	19	18	18	17	16	16	16	18	30	46	55	59	61	45.1	86																							
27-Apr	63	66	62	67	72	73	69	44	35	31	29	29	30	26	25	21	18	19	20	22	31	44	49	53	41.5	73																							
28-Apr	59	68	74	78	81	82	67	50	41	31	27	23	22	21	20	19	20	21	24	28	37	39	39	39	42.2	82																							
29-Apr	44	46	48	60	57	46	45	45	41	37	33	28	24	22	22	22	22	22	24	26	31	33	33	39	35.4	60																							
30-Apr	40	50	50	41	41	44	42	39	36	36	37	41	47	41	63	37	42	41	38	59	73	80	76	82	49.0	82																							
																								67.4	71.5	74.2	76.6	77.8	78.7	75.7	61.8	50.9	42.9	37.1	33.7	31.1	29.2	28.8	27.6	28.9	31.0	34.1	41.2	49.7	55.9	58.9	63.2	Diurnal Average	
																								97	97	97	95	95	97	96	94	86	78	72	69	66	63	63	56	81	90	93	95	96	97	97	98	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort McKay South - April 2015**





Maximum Speed: 19 km/h on Apr 1 12:00	Maximum Daily Speed Average: 13.6 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 0 km/h on Apr 27 04:00	Minimum Daily Speed Average: 1.0 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 2.3 km/h at hour 4	Minimum Diurnal Speed Average: 0.0 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 1.2 km/h 282.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 7 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 P <sub>99</sub> = 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-Apr	N13	N14	N16	N18	NNE18	N19	N18	N17	NNE16	N17	N17	NNE19	N17	NNE15	NNE17	N16	N14	N13	NNE10	NNE6	NNE6	NNE3	NNE4	N4	N13.6	NNE19
2-Apr	N3	NNW4	NW4	WNW4	NW3	WNW3	NE1	N5	NNE7	NNE10	NNE11	NNE10	NE8	NE10	NNE9	NNE8	NNE8	NNE9	NNE7	NNE7	NNE8	N7	N6	N4	NNE5.9	NNE11
3-Apr	NNE5	NNE3	N3	NNW3	NW3	NW3	W1	N4	N4	NE4	N8	N9	NE9	NE8	NNE9	NNE10	NNE11	NNE10	NNE9	NNE7	NNE6	N4	NNW4	N3	NNE5.4	NNE11
4-Apr	W2	W2	WSW2	SW2	SSW1	W2	NNE1	SE1	NNE3	NNE6	N7	NNE7	NE7	NE8	NNE9	NNE8	NNE8	NNE8	NNE10	NNE9	NNE9	NNE8	NNW3	NW4	NNE4.3	NNE10
5-Apr	WNW3	WSW3	WSW4	WSW3	NW3	WNW2	SW2	NNE6	NNE9	NNE10	NNE9	N8	NNE9	NNE9	NNE9	N10	NNE10	NNE9	NNE8	NNE6	NNE5	NNE6	NNE6	WNW2	N5.1	NNE10
6-Apr	W2	W3	W2	WSW3	WSW3	SW3	SW2	E1	ESE5	ESE5	S6	SE5	SSE6	SSE9	S7	SSE6	SSE8	SSE7	SSE5	S4	S4	SSW5	S7	S5	S3.7	SSE9
7-Apr	SSE3	SSE3	S3	S3	S3	S4	S4	S6	S6	SSW10	SSW13	SSW12	SSW12	SSW13	SSW13	SW11	SSW11	SW11	SW8	SW7	SSW5	S3	S3	SSW3	SSW6.8	SSW13
8-Apr	SW2	WSW2	SSW3	SSW3	S5	S5	S4	S4	SSW4	NW2	NNE7	NNE7	NNE8	NE9	NNE8	NE7	NE7	NE7	ENE4	WSW1	WSW3	WSW3	SW2	SW2	NE1.0	NE9
9-Apr	WSW2	WSW3	WSW2	WSW3	SW2	SSW2	SSW4	S7	SE7	SE8	SE7	S10	SW12	SW15	SW15	SW13	SW12	WSW11	SSW7	SSW5	SSW4	SSW5	SSW3	SW3	SSW5.7	SW15
10-Apr	SW2	W2	SSW1	SW2	S3	S3	SSW2	SSE3	S5	S8	S9	S8	SSW8	SSW9	S7	SSE6	S4	E3	S5	SSW3	SSW2	SW3	SW3	SSW3	S4.0	SSW9
11-Apr	SW1	SW3	SW3	SSW3	SSW2	SSW2	S2	SSW4	SW6	SW6	WSW11	SW6	W8	W10	W10	W9	WSW10	W9	WSW13	WSW17	WSW16	WNW10	W4	SW5	WSW6.6	WSW17
12-Apr	WSW7	WSW9	WSW10	WSW10	WSW11	WSW12	WSW13	WSW10	WSW12	WSW11	SW14	WSW16	WSW15	WSW16	WSW16	WSW18	W13	WSW14	W11	WNW8	WSW4	WSW8	WSW10	WSW6	WSW11.1	WSW18
13-Apr	W9	W14	W14	WNW15	WNW14	WNW7	W5	W7	WNW11	WNW12	WNW14	WNW12	NW13	WNW13	WNW12	WNW11	WNW11	NW8	NW5	WNW3	WSW3	NW3	NNW2	NW2	WNW8.9	WNW15
14-Apr	WSW2	WSW2	WNW2	WSW2	WSW3	WNW2	NNW2	SE6	SSE7	SE8	SSE7	SSE9	SSE8	SSE8	S9	S8	S15	SSE11	SSE10	SSE10	SSE8	S6	S8	SSE8	SSE5.8	S15
15-Apr	S6	S5	SSW2	SSW4	S4	S3	SSE4	SSW4	SW4	WSW9	SW9	WSW13	WSW11	W11	WSW13	WSW12	SW13	WSW12	WSW7	SSW2	SW7	WSW9	SW6	SW7	SW6.7	WSW13
16-Apr	SW8	SSW8	SW8	WSW7	SSW5	S2	SSE2	SW5	SW7	SSW9	SSW12	SW13	WSW13	WSW13	WSW15	WSW15	W13	NNW14	WNW9	W9	WNW4	SW5	SSW3	SSW4	WSW6.9	WSW15
17-Apr	WSW10	WSW8	SSW3	SSW2	SSW3	S3	S4	S6	S7	S7	SE6	SE6	SSW12	SSW12	SSW14	SSW13	S6	SE5	SE5	SSE3	SE2	N2	NNW2	NW4	SSW4.7	SSW14
18-Apr	NW4	NW5	NNW8	NNW10	NNW10	NNW10	N9	NW7	NW8	NW11	NNW13	N16	NNW14	N13	NNE9	NNE11	N7	NNW9	N11	NNW3	SW4	SW2	SW3	SW2	NNW7.1	N16
19-Apr	SSW2	SW2	SW2	SW3	SSW2	SSW2	S4	SSE4	ESE6	SE7	S6	S8	SW9	WSW6	W6	NW6	WSW7	WNW5	SSW2	SSW2	SW3	WSW1	SW2	WNW1	SW2.5	SW9
20-Apr	WSW2	SW2	NW2	W2	SW2	WSW2	SSW2	NE4	NNE4	NNE4	N5	NE4	NE6	NNE8	NE7	NNE7	NNE7	NNE9	NNE9	NNE9	N9	N8	N6	NNW5	NNE4.0	NNE9
21-Apr	NNW6	NNW5	NNW1	W2	WSW1	SW2	NNW1	NNE5	NNE8	N10	N11	N14	N13	N13	NNE13	N12	NNE12	NNE12	NNE9	NE5	ENE3	SE3	SE4	SE4	NNE5.7	N14
22-Apr	SE3	W2	E2	ESE4	NE2	NNE3	NE3	ESE6	ESE7	E8	ESE9	ESE11	SE11	ESE11	ESE12	ESE11	SE12	ESE11	ESE9	ESE8	ESE6	ESE6	ESE4	ESE4	ESE6.4	SE12
23-Apr	NE2	NNE3	NNE4	NNE5	NNE5	NE4	E5	E7	E9	E8	NNE11	NE12	NE12	ENE11	NE13	ENE12	E10	ENE11	NE13	NE12	NE9	NNE7	NNE10	NNE10	NE7.7	NE13
24-Apr	NNE12	NNE12	NNE11	NNE10	NNE10	NNE11	NNE12	NNE13	NNE14	NNE15	NNE15	NNE15	N15	N16	NNE15	NNE15	NNE15	NNE16	N15	N15	N13	N13	N10	N9	NNE13.2	N16
25-Apr	N7	N7	N6	N5	NNW4	NNW5	N6	NNE8	N7	NNE8	N9	N10	N10	N10	N8	N8	N7	N8	N6	NNW4	WNW2	WNW2	WNW2	WNW2	N6.0	N10
26-Apr	W3	WSW3	WSW3	SW2	SW3	SSW2	SE1	ESE3	ESE5	SSE5	SSE7	SSE6	S7	SSW6	S6	S6	SE6	SE6	SE4	SE3	SW3	SW3	SW2	WSW3	S3.1	S7
27-Apr	S3	S5	SSW4	NNE0	SW2	N0	SSE1	SSE8	SSE8	SSE8	S9	SSW13	SSW10	SSW16	SW14	SW17	WSW15	WSW14	WSW10	SW7	SW6	SSW6	SW6	SW7	SSW7.2	SW17
28-Apr	SW4	W2	SW3	SW3	WSW3	SW2	S3	SE3	SE4	SE6	SE7	SSE9	S11	S11	S12	SSE11	S12	S12	S8	S5	S5	S6	S5	WSW9	S5.6	S12
29-Apr	WSW5	W4	SW2	SW3	WSW8	WSW11	WSW8	WSW9	WSW6	WSW8	W6	WSW9	WSW12	WSW10	WSW9	WSW7	SW8	WSW8	SSW6	SW7	SW7	SSW7	SW9	SW7	WSW7.0	WSW12
30-Apr	WSW7	SSW6	SW8	WSW11	WSW11	WSW10	SW11	WSW12	WSW11	WSW14	SW15	SW16	WSW14	WSW11	WSW6	WSW7	NW7	WNW8	WSW5	SSW3	WSW2	SW4	SSW6	S4	WSW8.0	SW16

W1.8	W2.2	W2.1	W2.3	W2.0	NNW1.8	W0.8	S0.3	NE0.0	NE0.3	NNW0.4	NNW0.6	W1.7	W1.9	W1.6	NNW1.7	NNW1.5	NNW2.1	NNW1.4	NW0.7	W0.8	W1.3	WSW1.3	WSW1.5	Diurnal Average	
N13	N14	N16	N18	NNE18	N19	N18	N17	NNE16	N17	N17	NNE19	N17	WSW16	NNE17	WSW18	WSW15	NNE16	N15	WSW17	WSW16	N13	N10	NNE10	Diurnal Maximum	

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

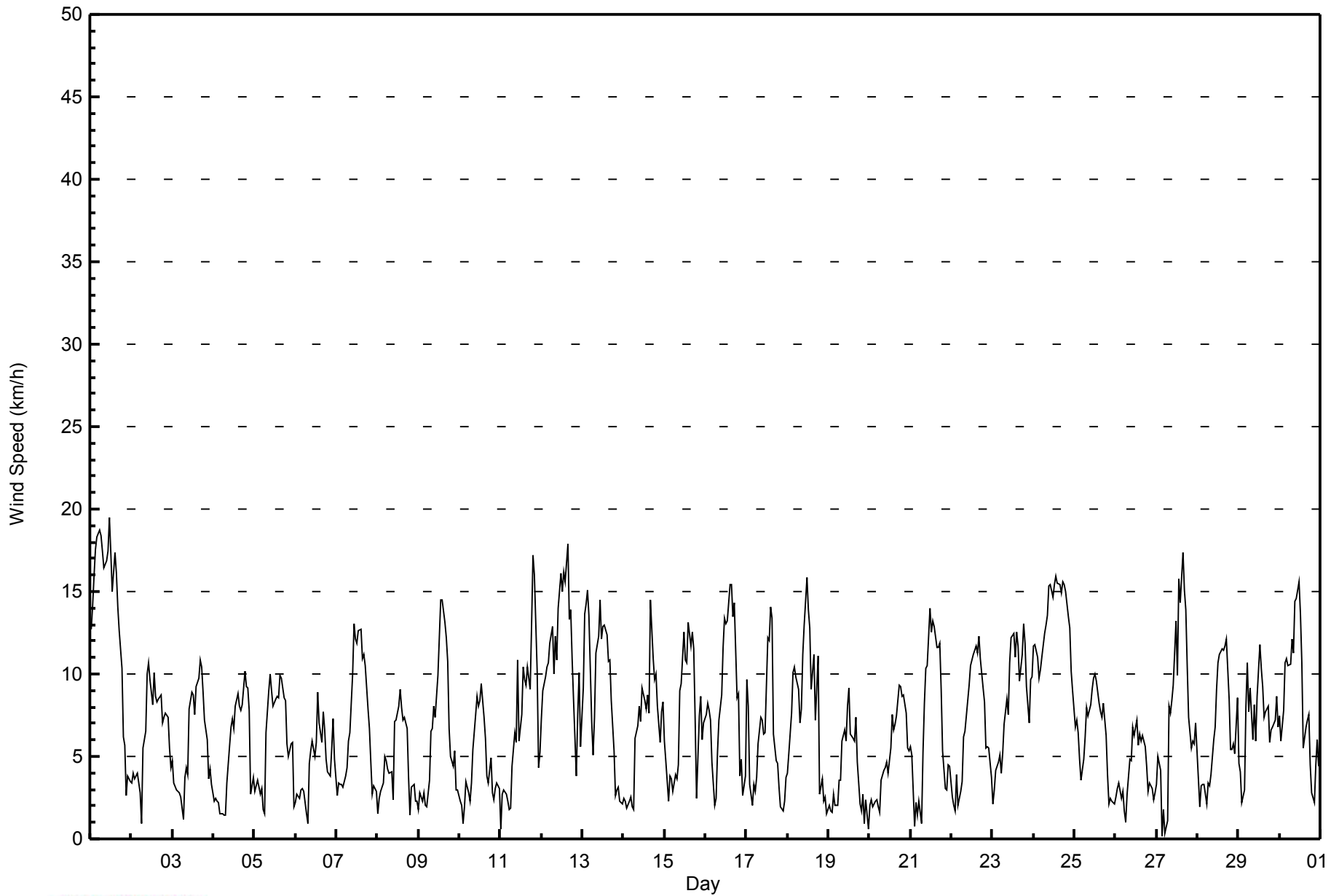


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Apr 12 16:00 Minimum Value: 0 km/h on Apr 26 03:00 Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 6																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	4	4	5	5	6	6	6	6	6	6	5	6	6	5	5	5	4	4	3	2	2	2	1	2	6
2-Apr	1	1	1	1	1	1	1	2	2	3	3	3	3	4	3	3	3	3	2	2	2	2	2	1	4
3-Apr	1	1	1	1	0	1	1	1	1	2	3	3	3	3	3	3	3	3	3	2	3	1	1	1	3
4-Apr	1	1	0	1	1	1	1	1	1	2	3	3	3	3	3	3	2	3	3	3	3	2	1	1	3
5-Apr	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3	2	2	1	1	2	1	3
6-Apr	1	1	1	1	0	1	1	1	2	2	2	2	3	4	3	3	3	2	2	1	1	2	2	2	4
7-Apr	1	1	1	1	1	1	1	2	3	3	5	5	4	5	4	4	4	3	3	1	2	1	0	1	5
8-Apr	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	2	2	2	2	1	1	1	1	1	3
9-Apr	1	0	1	1	1	1	1	3	2	2	2	5	4	5	5	5	4	4	3	1	1	1	2	1	5
10-Apr	0	1	1	1	1	1	1	1	2	3	3	3	3	4	3	2	2	2	1	1	0	1	1	1	4
11-Apr	1	1	1	1	1	1	1	2	3	2	4	3	4	4	5	5	5	5	5	6	6	5	3	1	6
12-Apr	2	2	3	3	3	4	4	5	5	4	5	5	6	7	6	7	7	6	5	4	2	3	4	4	7
13-Apr	5	6	6	7	6	3	2	3	5	5	6	5	5	5	5	4	4	4	2	1	1	1	1	1	7
14-Apr	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	4	5	4	4	4	3	2	3	3	5
15-Apr	2	2	1	1	1	1	1	1	2	3	4	5	4	5	5	5	5	5	3	1	7	5	2	2	7
16-Apr	2	2	3	2	2	1	1	3	3	3	4	5	5	5	6	6	7	7	5	4	2	2	1	1	7
17-Apr	3	3	2	1	1	1	1	2	2	2	2	3	4	5	5	5	4	2	2	1	1	1	1	1	5
18-Apr	1	2	3	3	3	4	5	3	4	5	5	5	5	5	4	4	4	5	5	1	1	1	1	1	5
19-Apr	1	1	1	1	1	1	1	1	2	2	3	3	4	5	4	3	4	2	1	1	1	1	1	1	5
20-Apr	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	2	3	3	3	3	2	2	1	1	3
21-Apr	1	1	1	1	1	0	1	2	2	3	3	4	4	4	4	4	3	3	3	2	2	1	2	2	4
22-Apr	1	1	1	1	1	1	1	3	2	3	4	4	4	4	5	5	4	4	3	4	3	2	2	2	5
23-Apr	1	1	1	1	1	1	2	3	3	3	4	4	5	5	5	4	3	5	5	4	4	3	3	3	5
24-Apr	4	4	4	3	3	3	4	4	4	5	5	5	5	5	5	5	5	5	4	4	4	4	3	3	5
25-Apr	2	2	2	1	1	1	2	2	2	3	3	3	3	3	4	3	3	2	2	2	0	0	0	1	4
26-Apr	1	1	0	0	1	1	1	1	1	2	3	3	3	4	3	3	3	2	2	1	0	1	1	1	4
27-Apr	1	1	1	1	0	1	1	3	3	3	4	5	4	6	5	6	6	5	4	2	1	1	1	2	6
28-Apr	2	1	1	1	1	0	1	1	2	3	3	4	4	4	4	4	5	4	3	2	1	3	2	4	5
29-Apr	2	3	1	1	3	3	3	4	3	3	3	4	4	4	4	3	3	3	2	2	2	2	2	2	4
30-Apr	2	1	2	3	3	3	3	4	4	5	5	5	6	5	4	3	5	4	2	1	1	1	2	1	6
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort McKay South - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	285	39.58	39.58
6 - 11	313	43.47	83.06
12 - 19	122	16.94	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - April 2015**

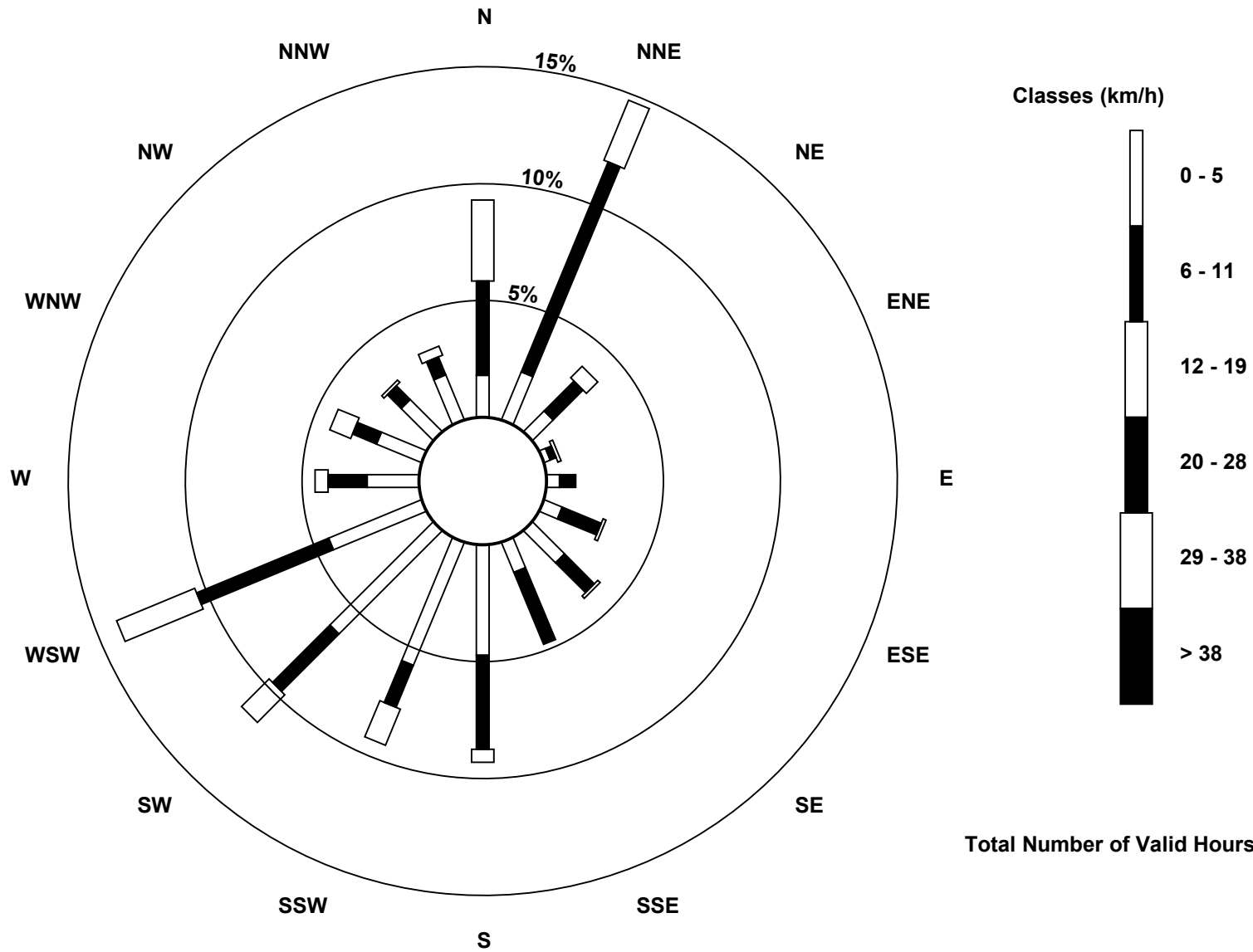
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	16	9	2	4	6	14	10	34	41	45	31	16	15	14	15	285
6 - 11	29	70	13	2	5	13	13	24	29	14	25	44	12	8	6	6	313
12 - 19	25	20	5	1	0	1	1	0	4	12	12	26	4	7	1	3	122
20 - 28	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	67	106	27	5	9	20	28	34	67	67	82	101	32	30	21	24	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
Fort McKay South (AMS 13)**





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg  
Fort McKay South - April 2015**

Direction of Maximum Speed: 12 deg on Apr 1 12:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 10.0 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 13 deg on Apr 27 04:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.0 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 241.4 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	6	4	5	7	13	10	9	10	14	7	10	12	10	12	14	5	4	5	14	28	24	28	14	9	10.0
2-Apr	353	339	308	295	304	302	46	7	12	19	23	13	42	38	31	30	30	29	27	31	26	8	0	6	16.3
3-Apr	25	19	355	331	326	323	264	4	9	45	11	7	39	42	24	24	17	12	19	30	29	353	342	353	15.3
4-Apr	267	266	245	232	206	278	30	141	33	22	9	33	39	45	29	30	23	30	19	22	23	19	341	321	20.0
5-Apr	289	246	246	255	306	284	221	31	12	17	25	10	15	18	30	6	13	16	23	22	24	12	12	301	9.2
6-Apr	260	260	262	254	238	228	236	98	121	114	169	127	159	164	185	164	148	155	165	180	182	193	191	180	173.8
7-Apr	152	162	189	185	178	187	186	178	172	194	206	192	194	200	204	214	209	217	223	214	198	175	190	203	198.4
8-Apr	232	249	202	197	189	181	188	181	204	311	26	29	22	35	28	36	38	39	59	246	248	238	227	233	35.6
9-Apr	247	245	244	243	225	203	195	169	142	132	143	179	214	229	229	224	228	238	213	200	212	204	210	228	208.8
10-Apr	236	262	211	225	178	179	192	159	171	171	179	187	201	207	177	154	176	99	172	204	207	235	224	205	187.2
11-Apr	219	214	226	208	193	204	182	194	234	233	237	234	268	259	265	260	251	271	254	251	254	285	267	228	249.3
12-Apr	238	242	237	239	239	240	240	249	245	240	221	239	244	246	249	252	262	250	269	290	248	241	248	255	246.2
13-Apr	280	268	271	287	295	292	260	272	297	301	303	303	308	302	300	286	295	314	310	284	242	318	329	313	292.6
14-Apr	251	242	286	255	243	282	335	141	157	145	150	155	155	164	173	186	170	149	147	160	164	169	170	166	165.5
15-Apr	176	174	195	205	191	186	165	193	218	237	236	254	256	260	239	239	235	240	238	198	235	249	227	233	231.7
16-Apr	220	213	232	239	210	173	151	223	225	202	195	215	248	238	250	255	272	342	285	271	284	227	192	210	240.2
17-Apr	251	249	207	201	192	187	181	170	186	169	141	146	202	210	207	205	188	138	137	151	133	8	336	323	194.6
18-Apr	319	313	332	337	334	341	352	307	306	321	346	357	348	360	29	27	2	331	2	331	234	224	220	232	342.2
19-Apr	206	230	220	223	201	204	179	152	117	136	176	176	231	253	265	322	255	289	192	195	232	244	225	284	215.1
20-Apr	253	231	311	273	232	246	203	36	18	32	10	53	40	20	46	31	28	21	19	12	8	360	351	344	13.6
21-Apr	346	346	332	269	256	228	330	13	19	11	11	1	9	5	13	10	13	13	17	54	61	124	142	139	12.9
22-Apr	131	274	90	113	56	14	35	109	111	97	109	113	129	123	108	119	127	121	106	106	111	117	115	104	111.6
23-Apr	49	16	18	16	32	48	81	98	99	85	30	38	40	75	48	64	94	63	50	45	43	16	23	24	51.1
24-Apr	28	29	23	15	23	16	12	17	13	19	16	24	9	8	13	12	17	12	4	5	5	4	4	5	13.7
25-Apr	357	354	3	0	342	333	350	12	10	17	9	9	8	2	360	353	359	360	351	337	284	301	289	302	357.3
26-Apr	267	239	241	216	214	212	139	122	107	153	156	158	182	212	183	174	142	136	133	141	236	224	224	255	177.4
27-Apr	189	190	203	13	231	358	162	163	164	165	187	212	201	207	215	224	242	249	246	235	214	212	224	228	213.2
28-Apr	227	272	235	216	240	233	181	145	134	125	138	149	170	170	170	163	179	178	174	170	175	182	188	253	176.4
29-Apr	240	275	228	232	253	256	258	253	254	251	263	255	246	251	246	244	231	237	212	225	231	213	224	227	242.9
30-Apr	245	208	232	242	240	240	236	240	243	239	231	226	237	249	258	243	321	302	258	198	241	231	208	185	239.7
279.2	275.2	277.8	278.0	274.5	281.7	271.4	185.0	43.8	50.3	318.1	291.9	274.2	269.0	275.1	281.3	284.9	334.6	345.4	323.8	277.2	271.7	245.9	254.0		
Diurnal Average																									

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

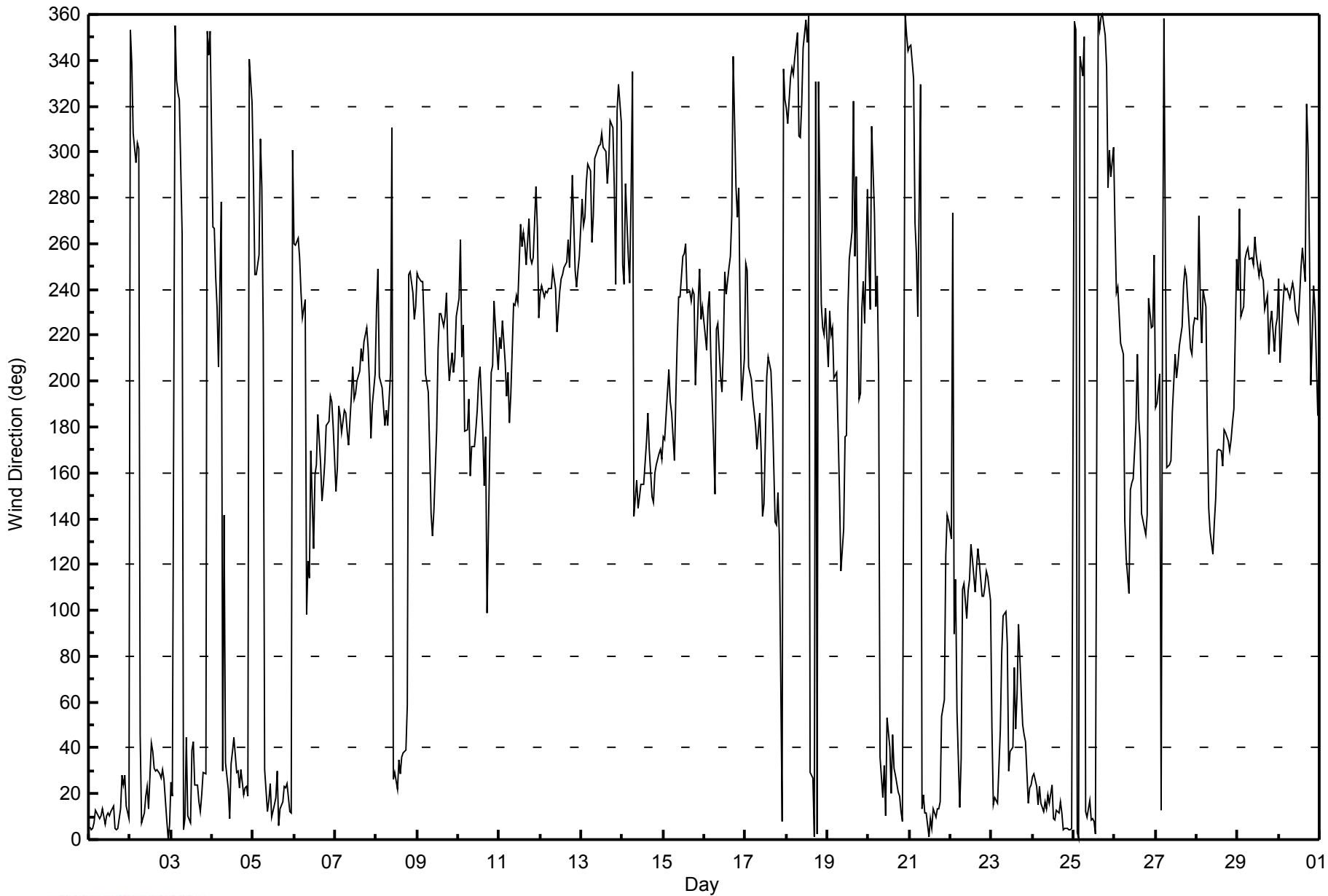
Wind Direction (WD) - deg  
Fort McKay South - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Apr 27 06:00		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 5 deg on Apr 5 03:00																									
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 18 Q <sub>1</sub> = 24 Median = 31 Q <sub>3</sub> = 39 P <sub>90</sub> = 51 P <sub>99</sub> = 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-Apr	25	24	24	24	25	23	25	27	27	27	26	24	26	28	24	25	25	25	23	25	21	55	23	31	55
2-Apr	31	27	36	29	38	30	82	36	33	27	28	31	41	29	34	34	35	28	29	26	25	25	22	26	82
3-Apr	22	21	33	17	13	15	51	31	40	71	48	36	39	41	31	34	26	23	23	26	34	41	18	18	71
4-Apr	37	30	28	40	39	38	43	52	52	49	45	47	52	47	37	36	33	36	22	24	23	23	49	19	52
5-Apr	28	10	5	31	39	53	58	37	30	29	35	41	39	36	38	26	27	28	23	21	22	16	17	41	58
6-Apr	23	19	14	11	8	10	54	66	36	41	45	52	57	40	45	44	35	35	24	17	22	21	17	22	66
7-Apr	19	19	12	13	14	20	12	21	34	32	27	31	32	28	28	30	28	23	19	15	24	18	12	16	34
8-Apr	57	41	16	11	13	12	32	24	51	92	36	36	38	37	32	36	32	32	39	59	23	17	42	17	92
9-Apr	17	7	17	20	31	33	16	23	32	28	34	37	30	27	28	26	30	27	24	9	11	15	45	23	45
10-Apr	33	49	78	53	18	20	18	28	36	29	30	39	41	39	46	50	65	55	21	20	34	31	27	17	78
11-Apr	80	34	23	25	27	87	68	32	40	36	26	59	64	36	48	49	33	49	26	24	28	39	45	14	87
12-Apr	17	16	18	22	20	20	23	40	29	33	32	31	34	29	28	31	35	31	33	39	46	33	28	40	46
13-Apr	41	37	36	33	38	43	39	32	40	39	39	41	43	40	41	43	38	40	35	36	44	31	49	47	49
14-Apr	22	26	42	31	23	35	60	31	34	31	39	31	35	40	31	38	27	30	32	27	26	23	25	27	60
15-Apr	26	25	39	17	21	23	21	49	47	33	43	35	36	40	31	34	29	27	24	26	29	28	25	22	49
16-Apr	19	19	21	22	46	47	37	47	34	31	27	31	35	32	28	30	45	31	48	38	63	33	34	30	63
17-Apr	23	24	52	38	17	18	13	25	29	34	44	52	29	31	27	26	35	29	29	29	55	51	42	22	55
18-Apr	29	29	30	27	29	29	28	34	38	37	36	27	35	38	32	31	40	41	32	47	14	42	29	59	59
19-Apr	42	52	71	22	23	34	18	34	27	38	50	35	43	76	61	58	51	52	26	40	21	75	30	77	77
20-Apr	44	29	42	37	27	11	50	29	43	70	51	73	60	61	50	38	36	27	24	21	21	21	22	18	73
21-Apr	20	15	90	47	39	20	64	28	27	27	33	27	30	29	30	30	26	24	24	34	66	36	33	27	90
22-Apr	38	62	92	32	46	27	33	43	46	39	40	37	41	38	39	37	34	34	37	35	38	37	41	62	92
23-Apr	65	31	18	15	18	29	33	41	39	50	31	33	34	44	38	39	37	41	31	30	33	29	21	24	65
24-Apr	23	26	25	23	25	24	26	28	28	30	33	28	28	29	28	28	25	25	25	25	24	24	23	23	33
25-Apr	26	24	22	20	22	24	32	31	36	33	36	37	37	40	47	44	41	26	31	21	28	16	14	40	47
26-Apr	26	13	7	9	25	47	78	53	35	55	56	64	51	81	58	60	49	44	39	33	15	18	28	21	81
27-Apr	35	15	23	93	45	97	92	34	34	33	32	30	33	31	29	25	28	30	27	22	18	15	11	11	97
28-Apr	77	51	23	30	18	32	17	49	47	45	40	36	30	30	31	31	26	23	25	23	19	29	23	37	77
29-Apr	49	88	81	27	14	21	23	28	40	27	44	38	31	30	32	33	27	24	28	25	15	15	17	14	88
30-Apr	16	17	17	18	18	19	22	27	29	24	28	25	31	42	56	42	57	44	33	34	65	22	20	23	65
	80	88	92	93	46	97	92	66	52	92	56	73	64	81	61	60	65	55	48	59	66	75	49	77	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort McKay South - April 2015**





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 2, 2015	Last Calibration	March 11, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	12:55
Gas Cert Reference	S980455A	Station temp.	22 Deg C
Cal Gas Concentration	50 ppm	Cal Gas Exp Date	9/26/2017
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG Make/Model	API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	512	512
Analyzer IP address	192.168.1.44		Lamp voltage	1930	1930
Calculated slope	0.995667	0.994253	Chamber temp	50.0	50.0
Calculated intercept	1.568765	1.434025	Pressure	26.5	26.5
Analyzer Background	24.2	24.2	Flow	695	695
Analyzer Coefficient	1.770	1.770	Intensity	65.2	65.2

Analyzer make API T100 Analyzer serial # 599

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	70.3	703.0	703.3	1.000
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	70.3	703.0	706.4	0.995
second point	5000	35.1	351.0	350.7	1.001
third point	5000	17.6	176.0	174.2	1.010
as left zero	5000	0.0	0.0	-0.2	----
as left span	5000	70.3	703.0	696.6	1.009
Average Correction Factor					1.002

Corrected As found 703.4 Previous response 704.5 % change 0.2%

**Notes:**

No adjustments or maintenance Done, Filter changed out

Calibration Performed By: Melissa Lemay



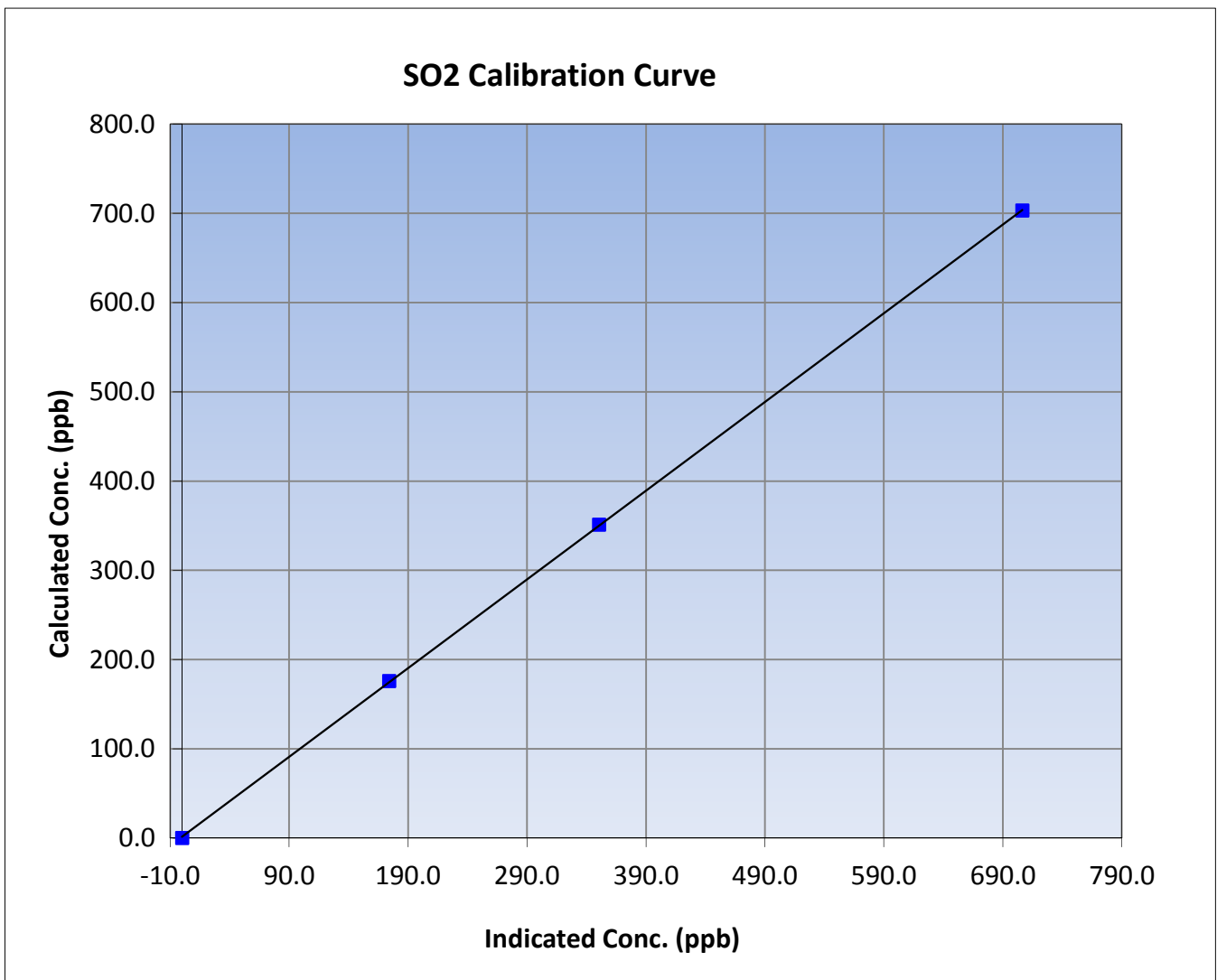
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 2, 2015	Previous Calibration	March 11, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:50	End Time (MST)	12:55
Analyzer make	API T100	Analyzer serial #	599

## Calibration Data

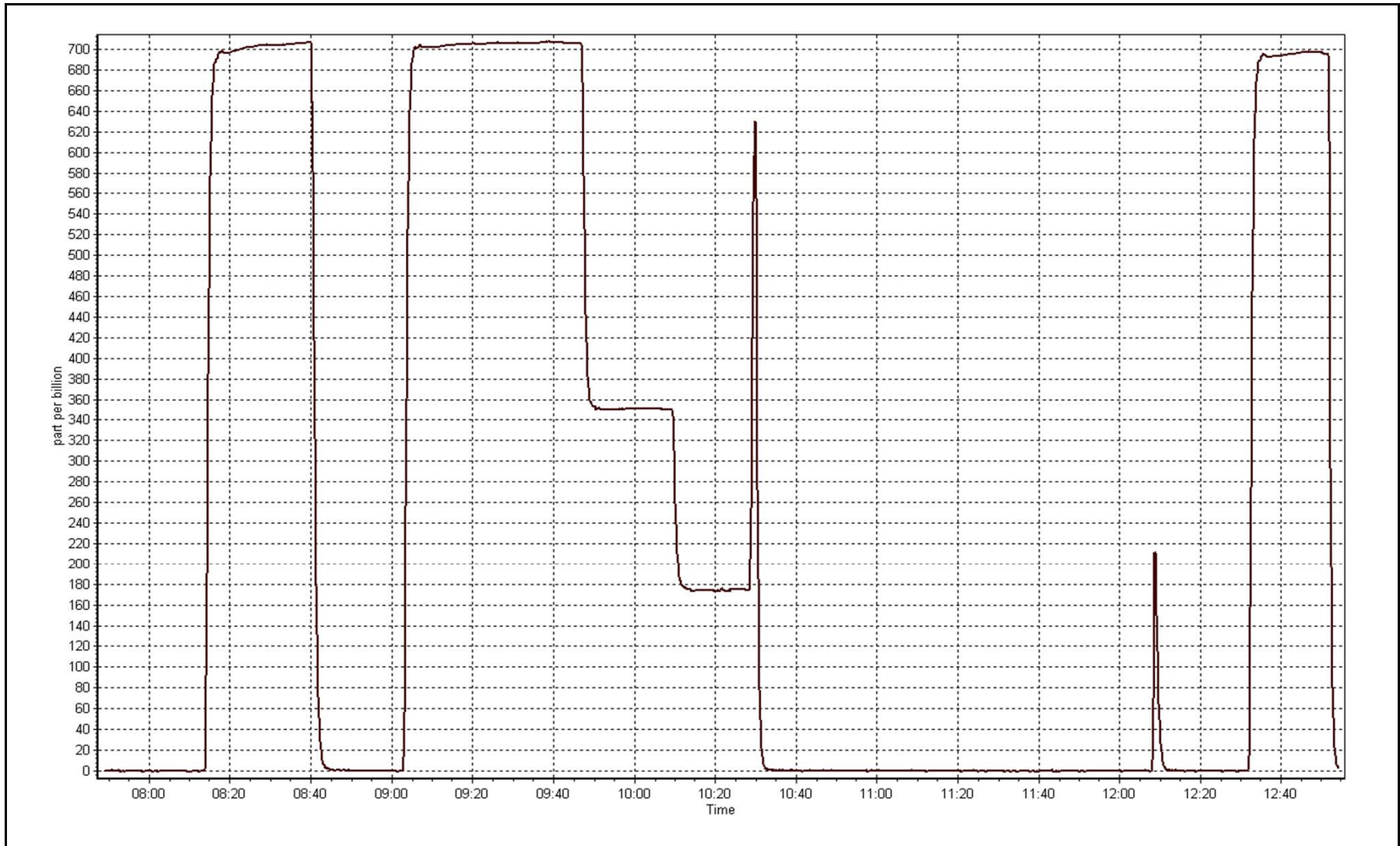
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999980
703.0	706.4	0.9952		
351.0	350.7	1.0009	Slope	0.994253
176.0	174.2	1.0103		
			Intercept	1.434025





SO2 Calibration Plot

Date: April 2, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	April 10, 2015	Last Calibration	March 9, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:45	End Time (MST)	10:25
Gas Cert Reference	CC178364	Station temp.	22 Deg C
Cal Gas Concentration	5.07 ppm	Cal Gas Exp Date	5/30/2013
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Dil air Make/Model	API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	S980455A Sep-17

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-727	-727
Analyzer IP address	192.168.1.44		Lamp voltage	1013	1011
Calculated slope	0.998631	0.990974	Chamber temp	45	45
Calculated intercept	0.105796	0.113112	Pressure	702.8	704.0
Analyzer Background	1.81	1.81	Flow	0.452	0.455
Analyzer Coefficient	1.044	1.044	Intensity	90	90
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1218153359	
Converter make/model	CDN-101		Converter serial #	456	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	----
as found span	5000	78.9	80.0	80.7	0.991
SO2 scrubber check	5000	17.6	179.9	0.2	----
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	78.9	80.0	80.7	0.991
second point	5000	39.4	40.0	40.1	0.996
third point	5000	19.7	20.0	19.9	1.003
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	78.9	80.0	80.8	0.990
Average Correction Factor					0.997

Corrected As found	80.7	Previous response	80.0	% change	-0.8%
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Notes:

Filter changed out after as founds, scrubber checked after as founds, no adjustments or maintenance done

Calibration Performed By: Melissa Lemay



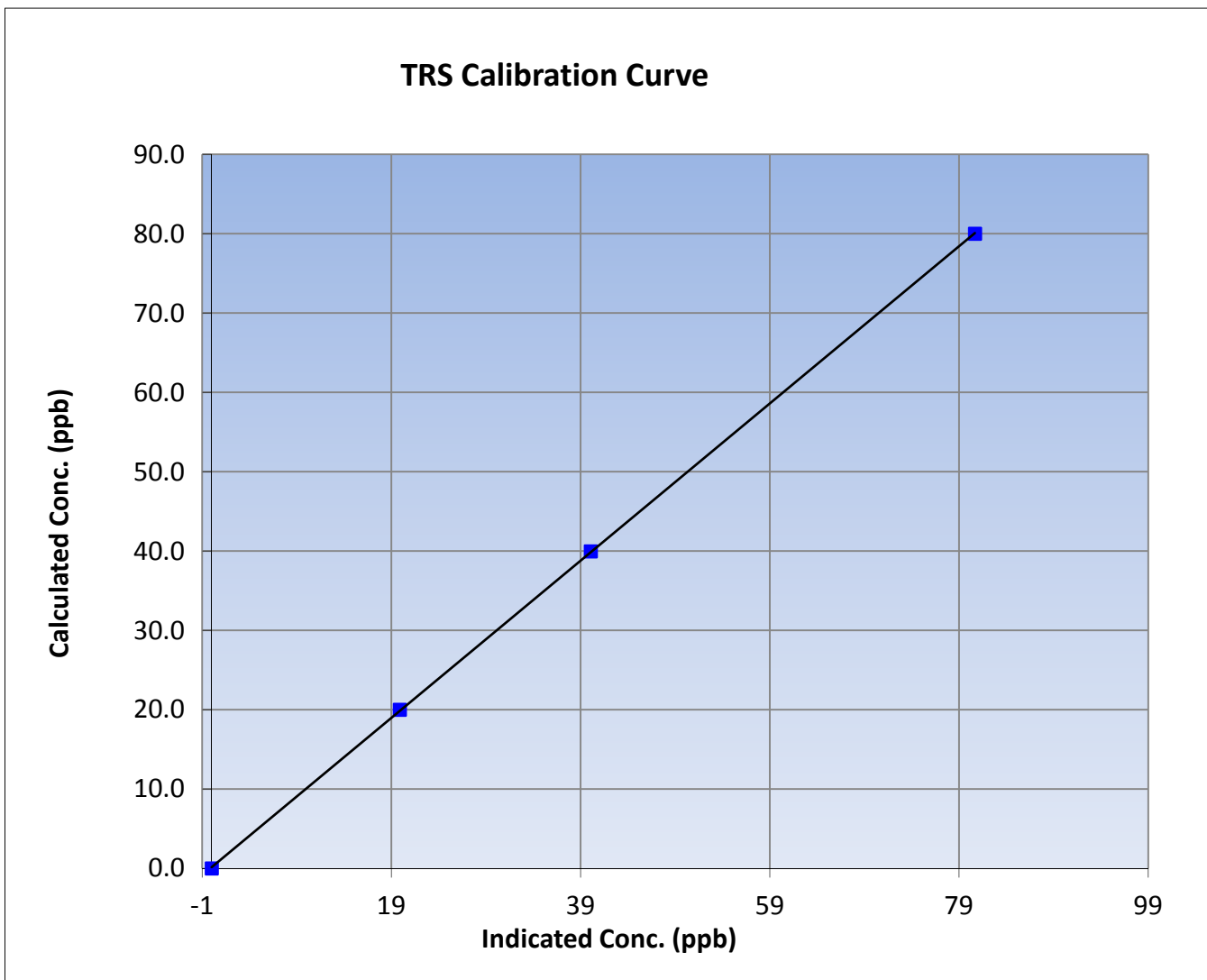
# Wood Buffalo Environmental Association TRS Calibration Report

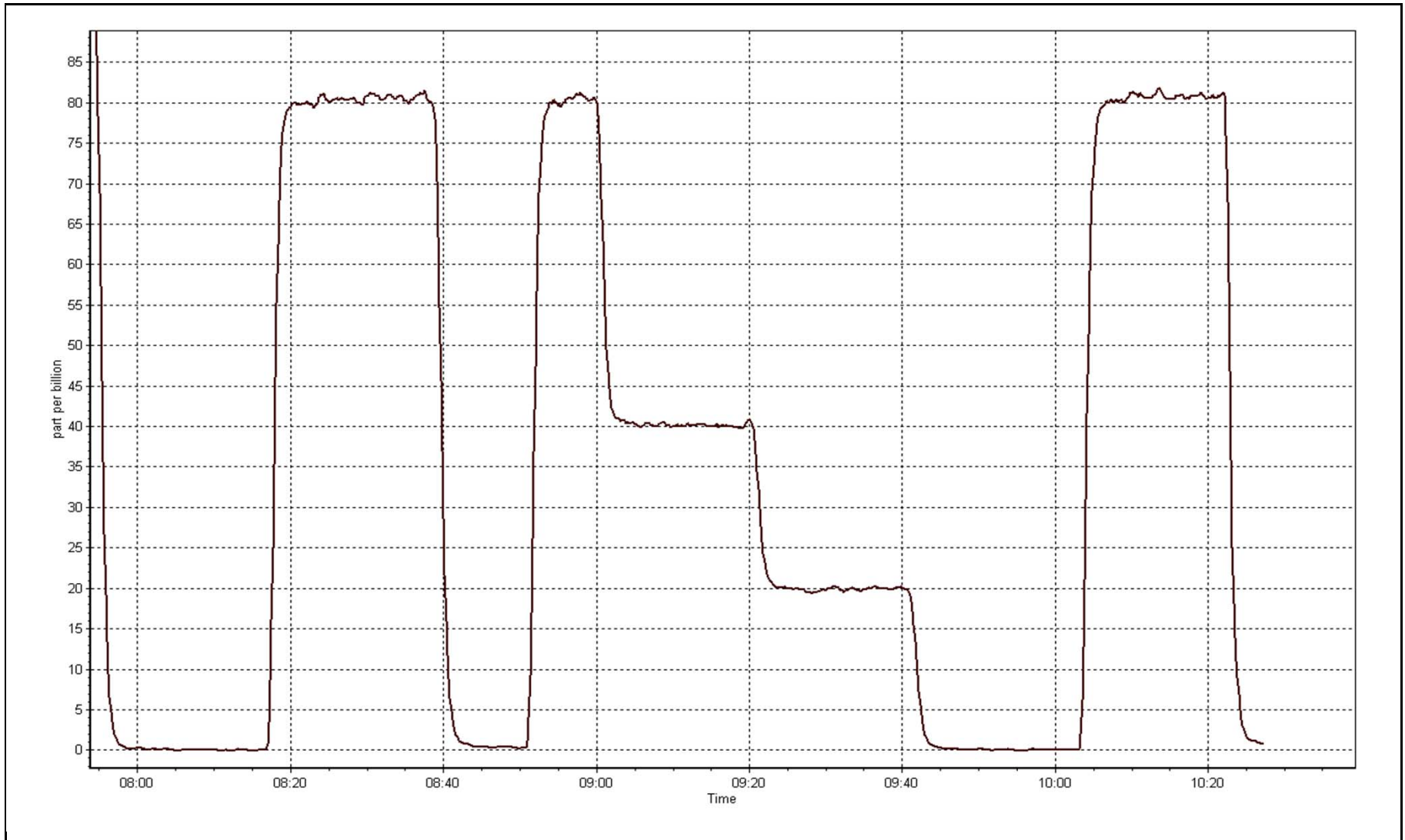
## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 9, 2015
Station Name	AMS 13	Station Number	AMS 13
Start Time (MST)	7:45	End Time (MST)	10:25
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153359

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999985
80.0	80.7	0.9914		
40.0	40.1	0.9963	Slope	0.990974
20.0	19.9	1.0028		
			Intercept	0.113112







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Thursday, April 02, 2015	Last Calibration	Wednesday, March 12, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	13:10
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	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
ZAG make/model	Teledyne API 701	Serial Number	3410
DACS make/model	Campbell Scientific CR3000	Serial Number	1850

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.0	8.0
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.6	36.6
Calculated slope	1.000192	1.002959	Fuel Pressure	22.6	22.6
Calculated intercept	0.010761	-0.021824	Analyzer Coeff	4.498	4.512
			Analyzer BKG	2.150	2.220

Analyzer make	51i-LT	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	-0.04	----
as found span	5000	70.3	14.53	14.31	1.015
calibrator zero	5000	0.0	0.00	-0.01	----
high point	5000	70.3	14.53	14.50	1.002
second point	5000	35.1	7.25	7.24	1.002
third point	5000	17.6	3.64	3.70	0.983
as left zero	5000	0.0	0.00	0.07	----
as left span	5000	70.3	14.53	14.20	1.023
Average Correction Factor					0.996

Corrected As found	14.35	Previous response	14.51	% change	1.1%
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**Notes:**

zero and span adjusted, hydrogen changed out, filter changed out

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association THC Calibration Report

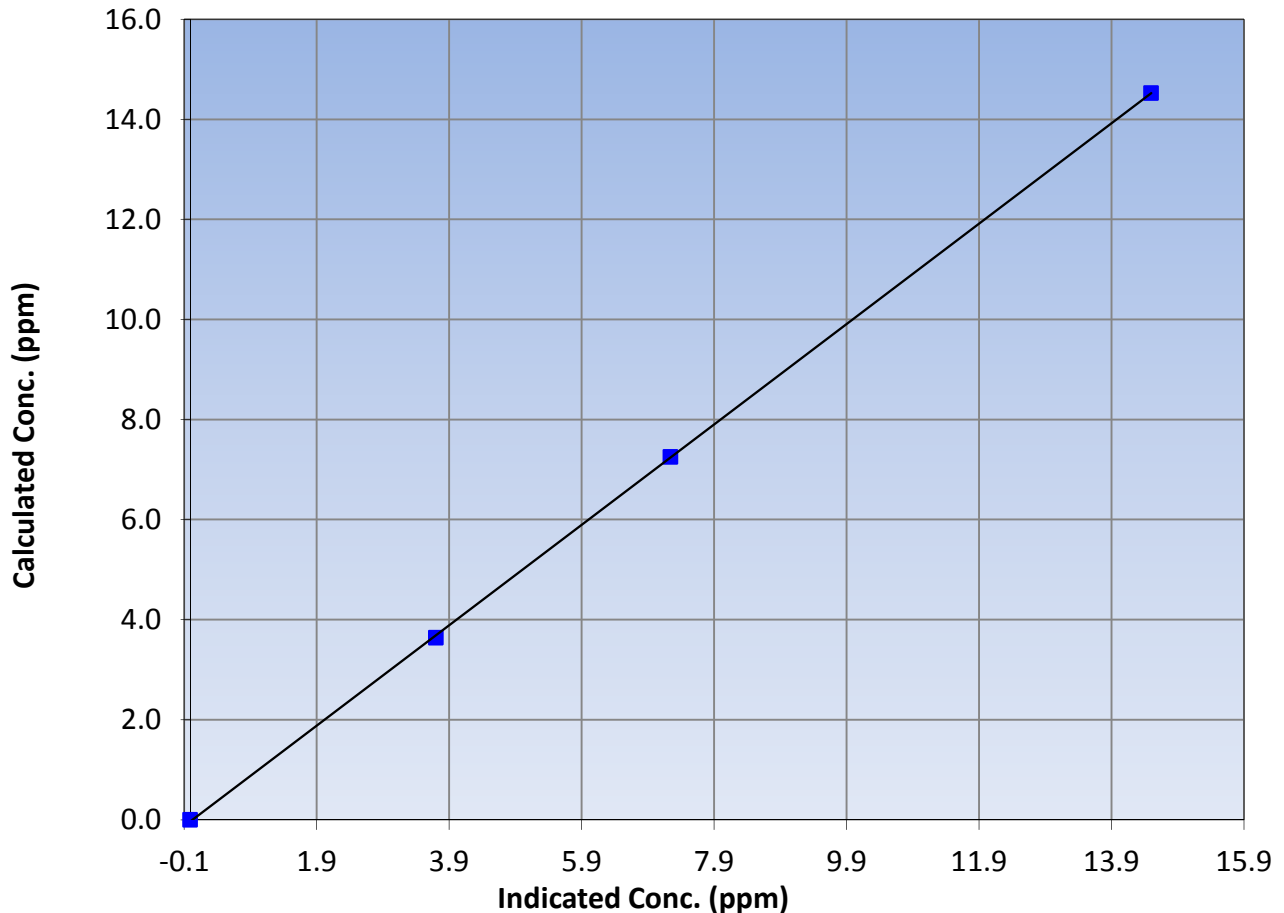
## Station Information

Calibration Date	April 2, 2015	Previous Calibration	March 12, 2014
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:50	End Time (MST)	13:10
Analyzer make	51i-LT	Analyzer serial #	1236656114

## Calibration Data

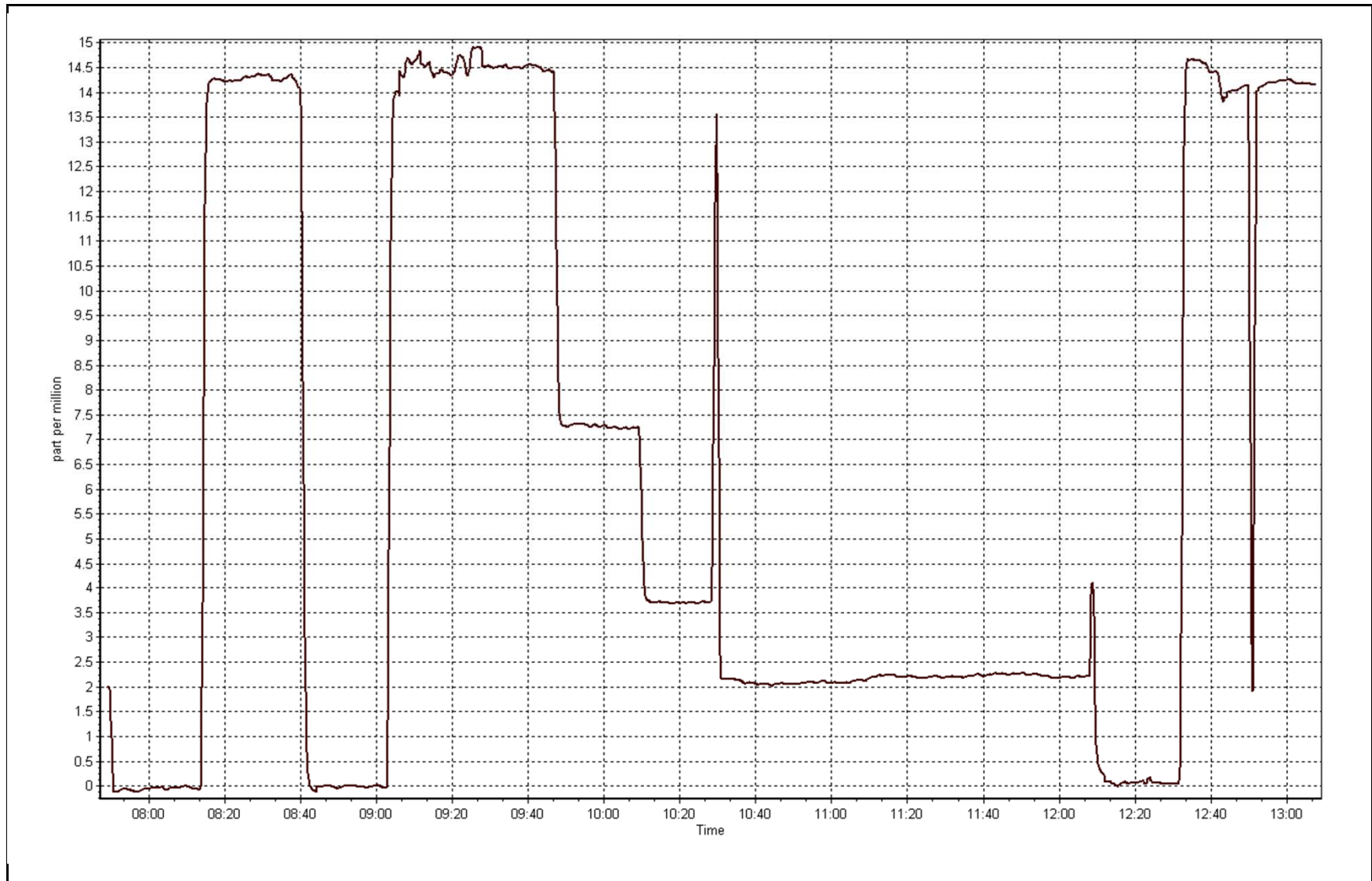
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	----	Correlation Coefficient	0.999966
14.53	14.50	1.0019		
7.25	7.24	1.0019		
3.64	3.70	0.9830		
			Slope	1.002959
			Intercept	-0.021824

**THC Calibration Curve**



THC Calibration Plot

Date: April 2, 2015





# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 9, 2015	Previous Calibration	March 12, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	8:40	End Time (MST)	12:16
NO2 GPT Ref date	Thursday, April 02, 2015	Transfer Standard	Sabio 4010
Calibrator Make/Model	Sabio 4010	Station temp.	22 Deg C
ZAG make/model	Teledyne API 701	Serial Number	11041107
DACS make/model	Campbell Scientific CR3000	Serial Number	3410
		Serial Number	1850

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Box temp.	27.1	26.8
Analyzer IP address	192.168.1.79		Lamp temp.	58.0	58.0
Calculated slope	1.004665	1.002209	Pressure	26.5	26.5
Calculated intercept	-0.341380	-0.697667	Flow	0.742	0.742
Analyzer Background	-0.1	-0.1	Intensity	2996.2	2996.2
Analyzer Coefficient	0.980	1.034			

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	0.4	----
as found span	5000	0.90	325.9	321.1	1.015
calibrator zero	5000	0.00	0.0	0.4	----
high point	5000	0.90	325.9	325.4	1.002
second point	5000	0.58	194.4	195.5	0.994
third point	5000	0.36	103.4	103.8	0.996
as left zero	5000	0.00	0.0	0.4	----
as left span	5000	0.90	325.9	339.0	0.961
Average Correction Factor					0.997

Corrected As found	320.7	Previous response	324.7	% change	1.3%
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**Notes:**

Purged filter for 5 minutes after change out; after as founds, span adjusted

Calibration Performed By: Melissa Lemay





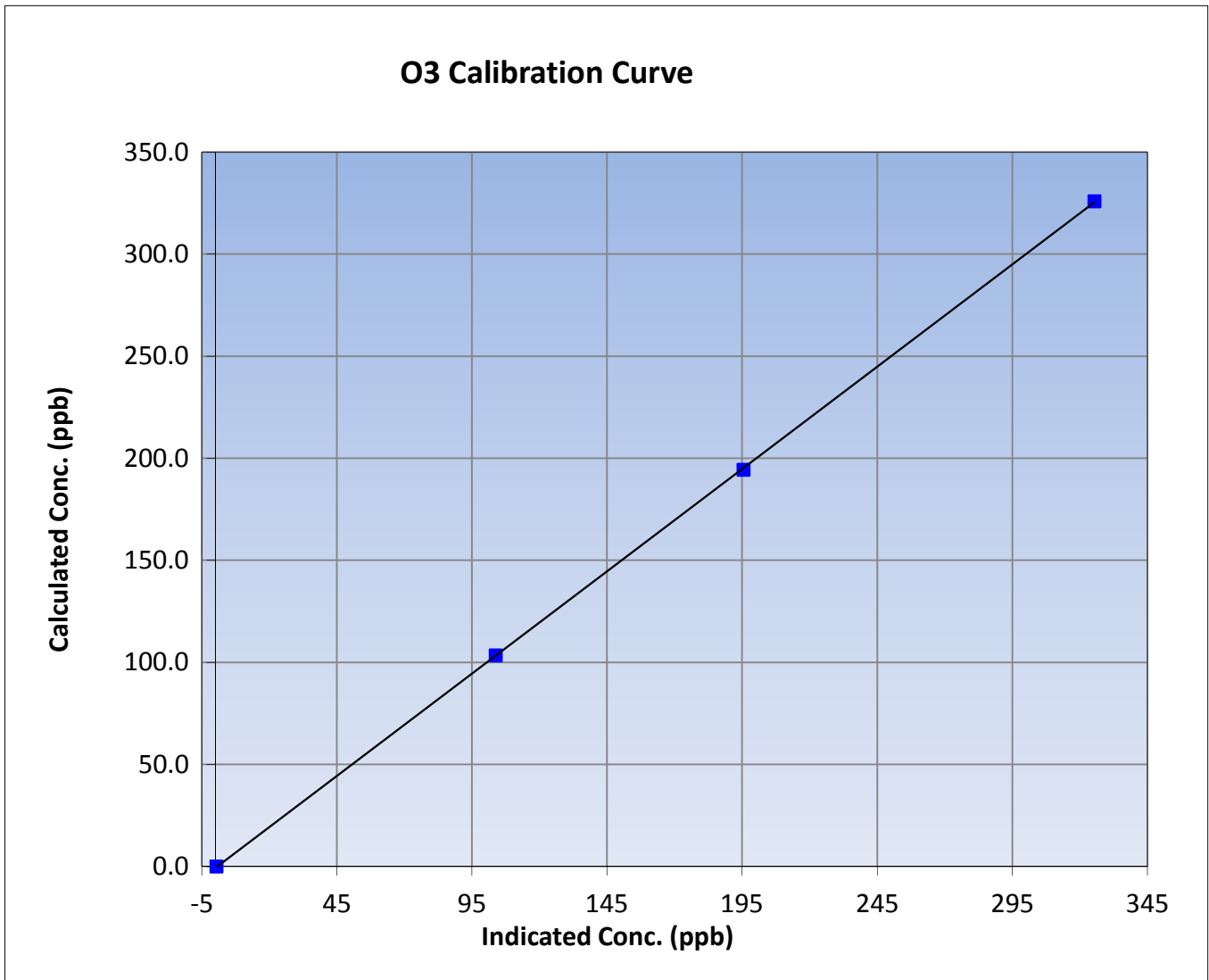
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	Thursday, April 09, 2015	Previous Calibration	March 12, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	8:40	End Time (MST)	12:16
Analyzer make	API T400	Analyzer serial #	825

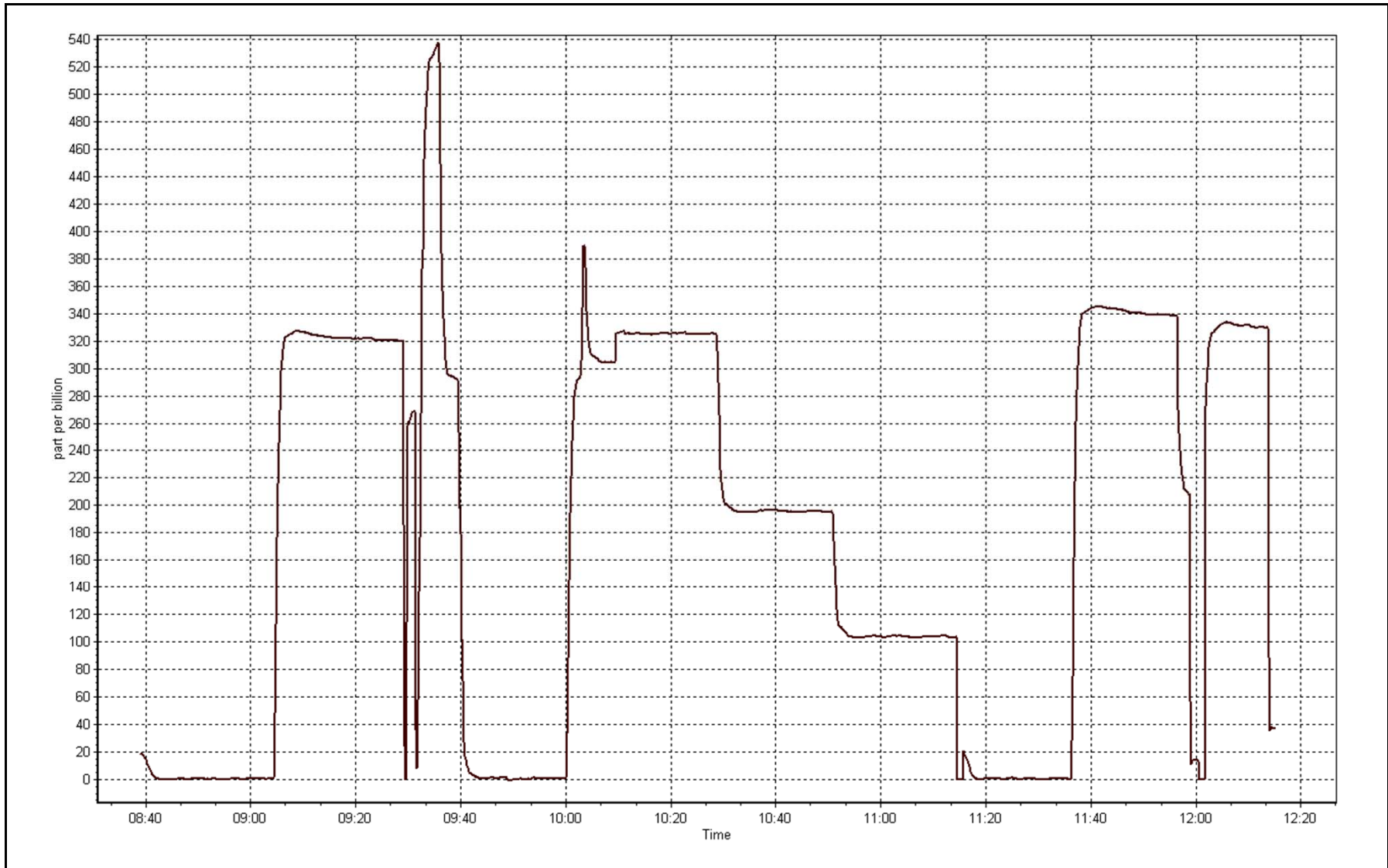
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999982
325.9	325.4	1.0015		
194.4	195.5	0.9944	Slope	1.002209
103.4	103.8	0.9961		
			Intercept	-0.697667



O3 Calibration Plot

Date: April 9, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 2, 2015	Previous Calibration	November 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	7:50	End Time (MST)	12:55
NO Cal Gas Conc	56.9 ppm	Gas Cert Reference	S980455A
NOx Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	26/9/2017
Calibrator	Sabio 4010	Serial Number	11041107
Zero air Generator	Teledyne API T701	Serial Number	3410

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	1850
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998929	1.000996	0.994996
	Data Offset	1.144805	1.106437	-0.013106
Current Calibration	Data Slope	0.998929	1.001752	0.993054
	Data Offset	1.441219	1.352688	0.368073

## Analyzer Information

Analyzer make/model	42i	Analyzer serial #	1410661329
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.708		0.708	
NOx coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	6.3		6.3	
NOx bkgrnd	6.4		6.4	
Chamber Temp	50.3	Deg C	50.3	Deg C
Moly Temp	322.6	Deg C	322.6	Deg C
PMT voltage	-846.6	V	-846.6	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	180.9	mmHg	180.9	mmHg
R Cell Press Nox	181.2	mmHg	181.2	mmHg
NO sample flow	0.904	lpm	0.904	lpm
Nox sample Flow	0.908	lpm	0.908	lpm

**Notes:**

No adjustments or maintenance done, filter changed out



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 2, 2015

Station Number:

AMS 13

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	-0.3	-0.1	----	----
as found span	5000	70.3	800.0	800.0	0.0	803.8	801.8	2.0	0.9953	0.9978
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
high point	5000	70.3	800.0	800.0	0.0	800.2	798.0	2.2	0.9998	1.0025
second point	5000	35.1	399.4	399.4	0.0	397.4	396.4	1.0	1.0051	1.0077
third point	5000	17.6	200.3	200.3	0.0	198.0	197.6	0.3	1.0116	1.0136
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	----	----
as left span	5000	70.3	800.0	471.5	328.5	807.7	475.4	332.4	0.9905	0.9918
Average Correction Factor									1.0055	1.0079

Corrccted As found NO<sub>x</sub>= 804.1 NO= 802.1 Percent Change NO<sub>x</sub>= -0.5% NO= -0.5%  
 Previous Response NO<sub>x</sub>= 799.7 NO= 798.1

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 70.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	471.5	325.9	799.3	471.5	327.8	0.9870	1.0000	0.9942	100.6%
2nd NO2 (200)	----	603.0	194.4	798.8	603.0	195.8	0.9876	1.0000	0.9928	100.7%
3rd NO2 (100)	----	694.0	103.4	798.8	694.0	103.0	0.9876	1.0000	1.0039	99.6%
4th NO2 (0)	797.4	----	1.9	799.3	797.4	1.9	0.9870	1.0000	N/A	----
Average Correction Factor							0.9873	1.0000	0.9970	100.3%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

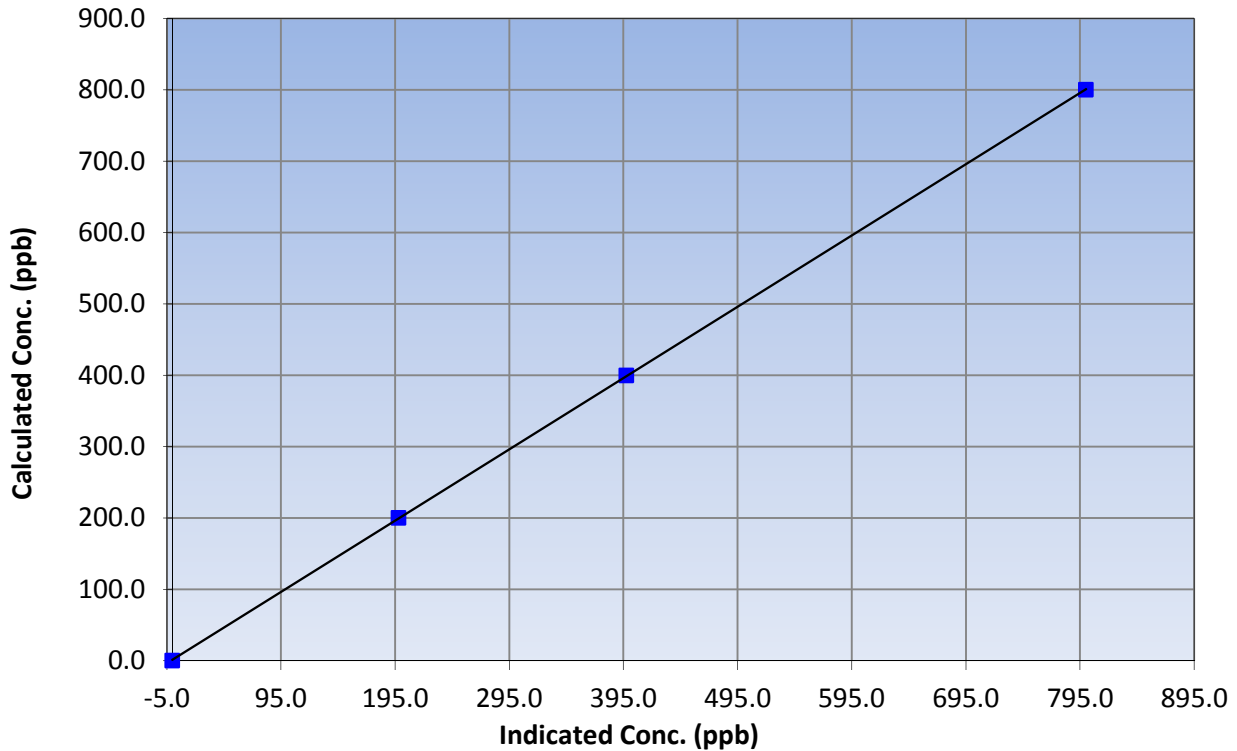
### Station Information

Calibration Date	April 2, 2015	Previous Calibration	November 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:50	End Time (MST)	12:55
Analyzer make	42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999987
800.0	800.2	0.9998		
399.4	397.4	1.0051	Slope	0.998929
200.3	198.0	1.0116		
			Intercept	1.441219

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

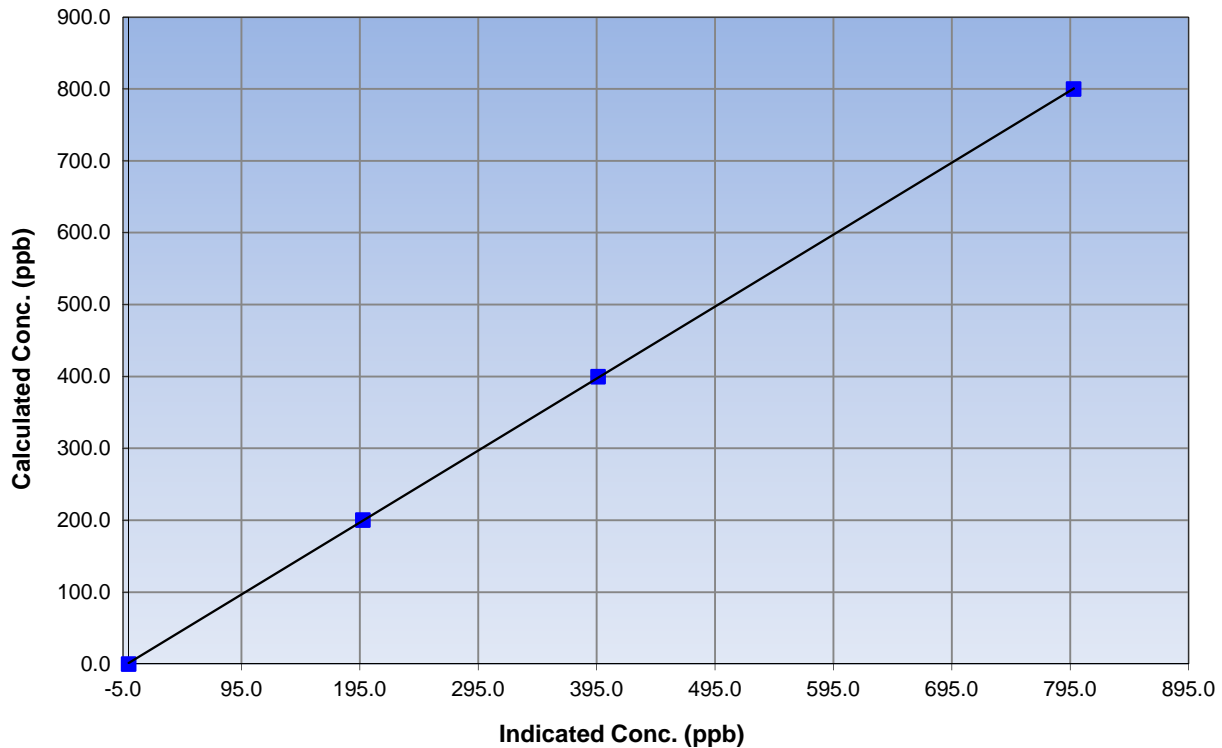
### Station Information

Calibration Date	April 2, 2015	Previous Calibration	November 3, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:50	End Time (MST)	12:55
Analyzer make	42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999988
800.0	798.0	1.0025		
399.4	396.4	1.0077	Slope	1.001752
200.3	197.6	1.0136		
			Intercept	1.352688

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

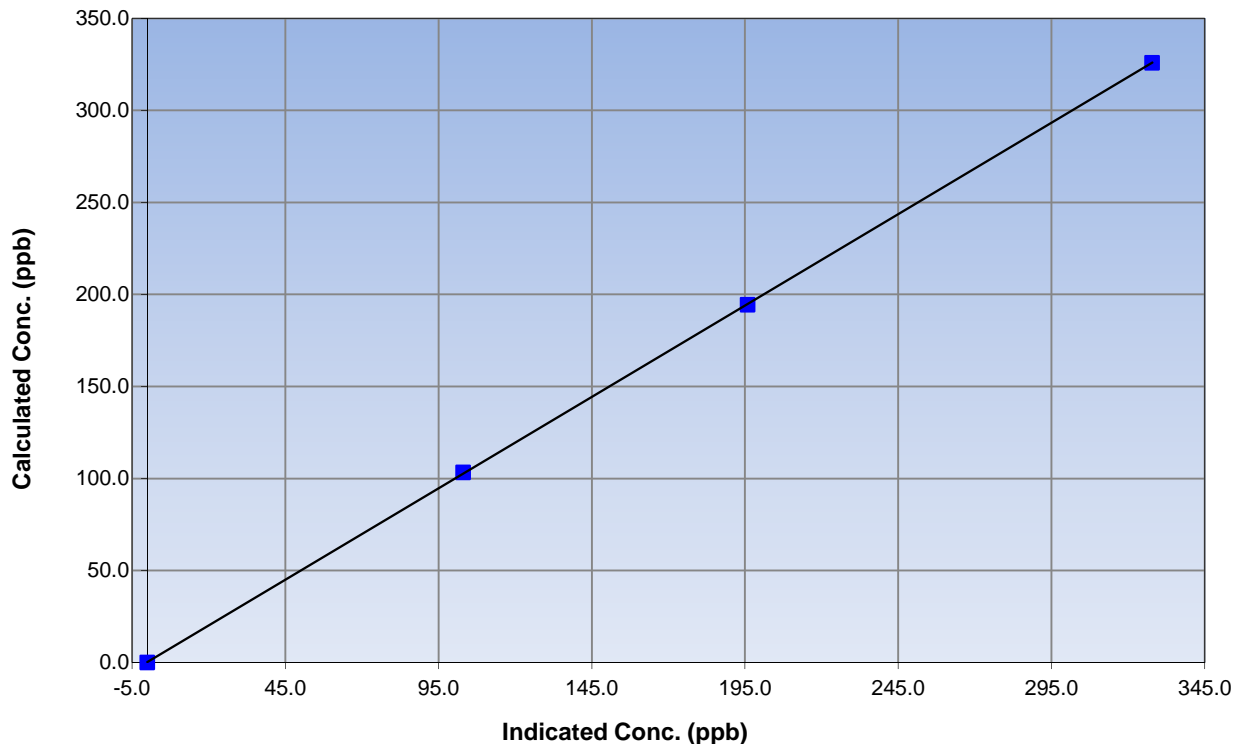
### Station Information

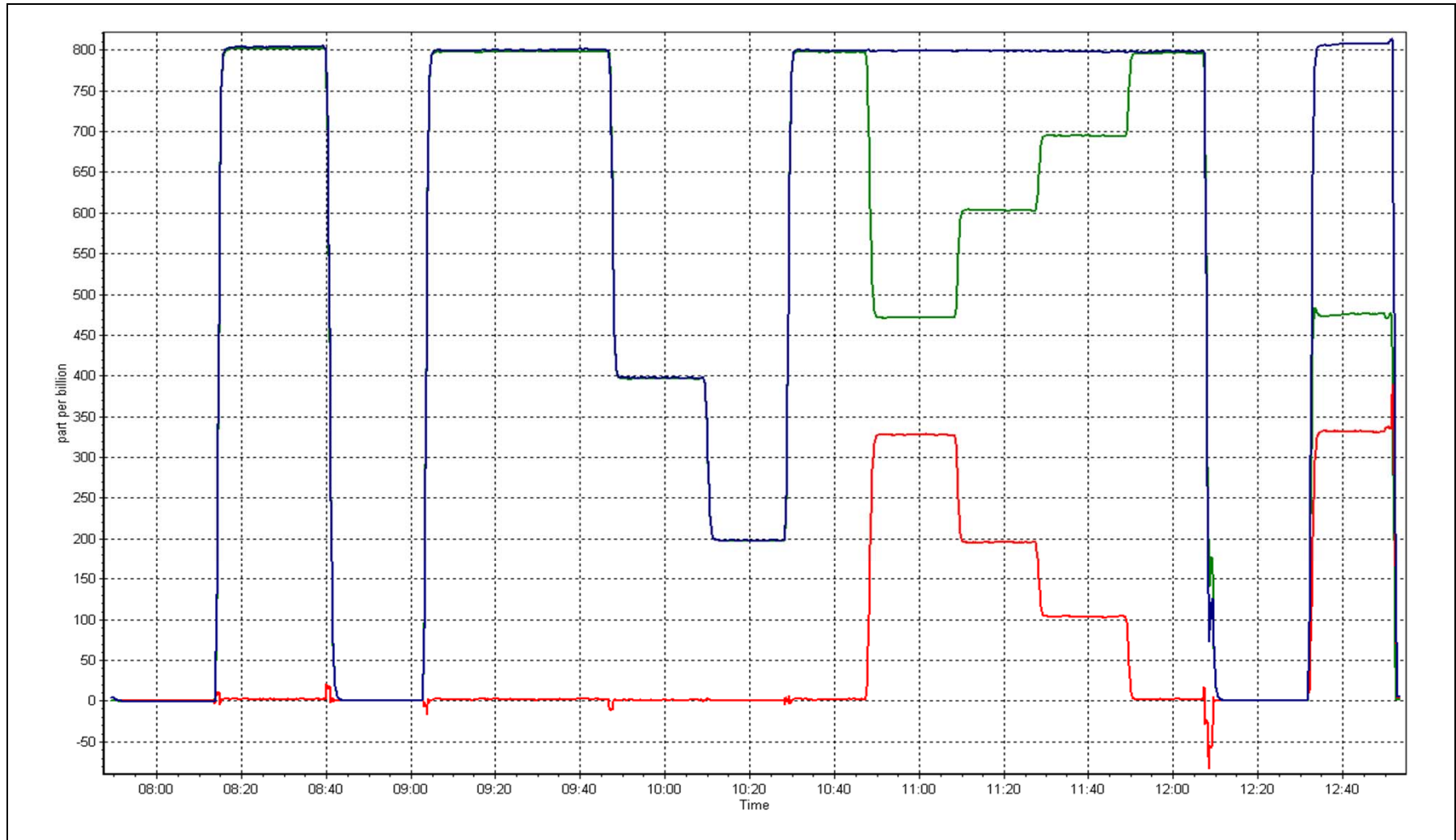
Calibration Date	April 2, 2015	Previous Calibration	November 3, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	7:50	End Time (MST)	12:55
Analyzer make	42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	---	Correlation Coefficient	0.999985
325.9	327.8	0.9942		
194.4	195.8	0.9928	Slope	0.993054
103.4	103.0	1.0039		
			Intercept	0.368073

### NO<sub>2</sub> Calibration Curve







# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 14  
ANZAC  
APRIL 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

May 29, 2015

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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)

APRIL 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	629	46	91	93.75	5	0	1	0
TRS(ppb) Average	681	34	39	99.31	1	0	0	0
THC(ppm) Average	681	39	39	100.00	2.4	-	2	-
NMHC(ppm) Average	681	39	39	100.00	0.046	-	0.003	-
CH4(ppm) Average	681	39	39	100.00	2.4	-	2	-
NO2(ppb) Average	673	47	47	100.00	9	0	2	-
NO(ppb) Average	673	47	47	100.00	7	-	1	-
NOX(ppb) Average	673	47	47	100.00	14	-	2	-
O3(ppb) Average	676	34	44	98.61	59	0	46	-
PM2.5(ug/m3) Average	712	0	8	98.89	12.6	-	6.2	0
Temperature 2 m (C) Average	720	0	0	100.00	23.4	-	14.9	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	77	-
Surface Wetness (% of range) Average	500	0	220	69.44	35	-	8	-
Wind Speed 10 m (km/h) Average	718	0	2	99.72	22	-	16	-
Wind Direction 10 m (deg) Average	718	0	2	99.72	-	-	-	-
Precipitation (mm) Total	720	0	0	100.00	0.8	-	0.8	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
 APRIL 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	629	0.3	0	-	0	0	0	0	0	1	5
TRS(ppb) Average	681	0.2	0	-	0	0	0	0	0	0	1
THC(ppm) Average	681	1.89	0	-	1.8	1.9	1.9	1.9	1.9	1.9	2.4
NMHC (ppm) Average	681	0.001	0.004	-	0	0	0	0	0	0	0.046
CH4(ppm) Average	681	1.89	0	-	1.8	1.9	1.9	1.9	1.9	1.9	2.4
NO2(ppb) Average	673	1	1	-	0	0	0	1	1	2	9
NO(ppb) Average	673	0.2	1	-	0	0	0	0	0	1	7
NOX(ppb) Average	673	1.3	2	-	0	0	0	1	1	3	14
O3(ppb) Average	676	38.5	8	-	5	28	36	40	43	47	59
PM2.5(ug/m3) Average	712	3.07	2.3	-	0.1	0.9	1.4	2.3	4.2	6.2	12.6
Temperature 2 m (C) Average	720	4.06	7.3	-	-16.6	-5.6	-1.1	4	9.3	13.4	23.4
Relative Humidity (%) Average	720	48.1	20	-	13	24	32	45	60	78	98
Surface Wetness (% of range) Average	500	1.4	4	-	0	0	0	0	0	4	35
Wind Speed 20 m (km/h) Average	718	9.7	4	-	1	5	6	9	13	16	22
Wind Direction 20 m (deg) Average	718	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	2.03	0	0	0	0	0	0	0.8

## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)

APRIL 2015

## OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	03 Apr 2015 23:00	04 Apr 2015 16:00	18	Intermittent unstable operation - excessive baseline drift
SO2	18 Apr 2015 08:00	18 Apr 2015 21:00	14	Intermittent unstable operation - excessive baseline drift
SO2	29 Apr 2015 06:00	29 Apr 2015 18:00	13	Intermittent unstable operation - excessive baseline drift
TRS	14 Apr 2015 13:00	14 Apr 2015 17:00	5	Station power failure
O3	04 Apr 2015 01:00	04 Apr 2015 05:00	5	Maintenance - analyzer in auto zero and span mode
O3	14 Apr 2015 13:00	14 Apr 2015 17:00	5	Station power failure
PM2.5	14 Apr 2015 13:00	14 Apr 2015 17:00	5	Station power failure
PM2.5	15 Apr 2015 12:00	15 Apr 2015 12:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	27 Apr 2015 14:00	27 Apr 2015 15:00	2	Maintenance - Flow and zero reference checks
Surface Leaf Wetness	02 Apr 2015 10:00	11 Apr 2015 11:00	218	Sensor malfunction - wiring damaged by wildlife
Surface Leaf Wetness	11 Apr 2015 12:00	11 Apr 2015 13:00	2	Maintenance - replaced wiring
Wind Speed, Wind Direction	05 Apr 2015 05:00	05 Apr 2015 06:00	2	Flat line in sensor output signal -sensor frozen

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Summary of Hour Averages

Anzac - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 5 ppb on Apr 30 20:00	Maximum Daily Average: 0.7 ppb on Apr 20		Hours of Data:	629
Minimum Value: 0 ppb on Apr 1 20:00	Minimum Daily Average: 0.1 ppb on Apr 1		Hours of Missing Data:	91
Maximum Diurnal Average: 0.6 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 4		Hours of Calibration:	46
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 2		Percent Operational Time:	93.8

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-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	2	1	0	0	0	0	0	0.5	3
3-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Z	UO	UO	0.1	0	
4-Apr	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	3	3	1	0	0	0	0	0	0	--	3
5-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
6-Apr	0	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1
7-Apr	Z	0	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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	2	1	2	2	2	1	0	0	0	0	0	0.6	2
9-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Apr	0	0	0	0	0	0	0	0	0	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
11-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
12-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
14-Apr	0	Z	0	0	0	0	0	0	0	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	--	0
15-Apr	C	C	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
16-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0.3	1
17-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
18-Apr	0	0	0	0	0	Z	0	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	--	0
19-Apr	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	0.2	1
20-Apr	0	Z	0	0	0	0	0	2	3	2	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.7	3
21-Apr	0	0	Z	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2
22-Apr	0	0	0	Z	0	0	0	1	1	0	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0.6	1
23-Apr	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
24-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Apr	Z	0	0	0	0	0	0	5	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	5
26-Apr	0	Z	0	0	0	0	0	0	1	1	1	2	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	2
27-Apr	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	0.3	1
28-Apr	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
29-Apr	0	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	--	0
30-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	1	0	0	0.5	5

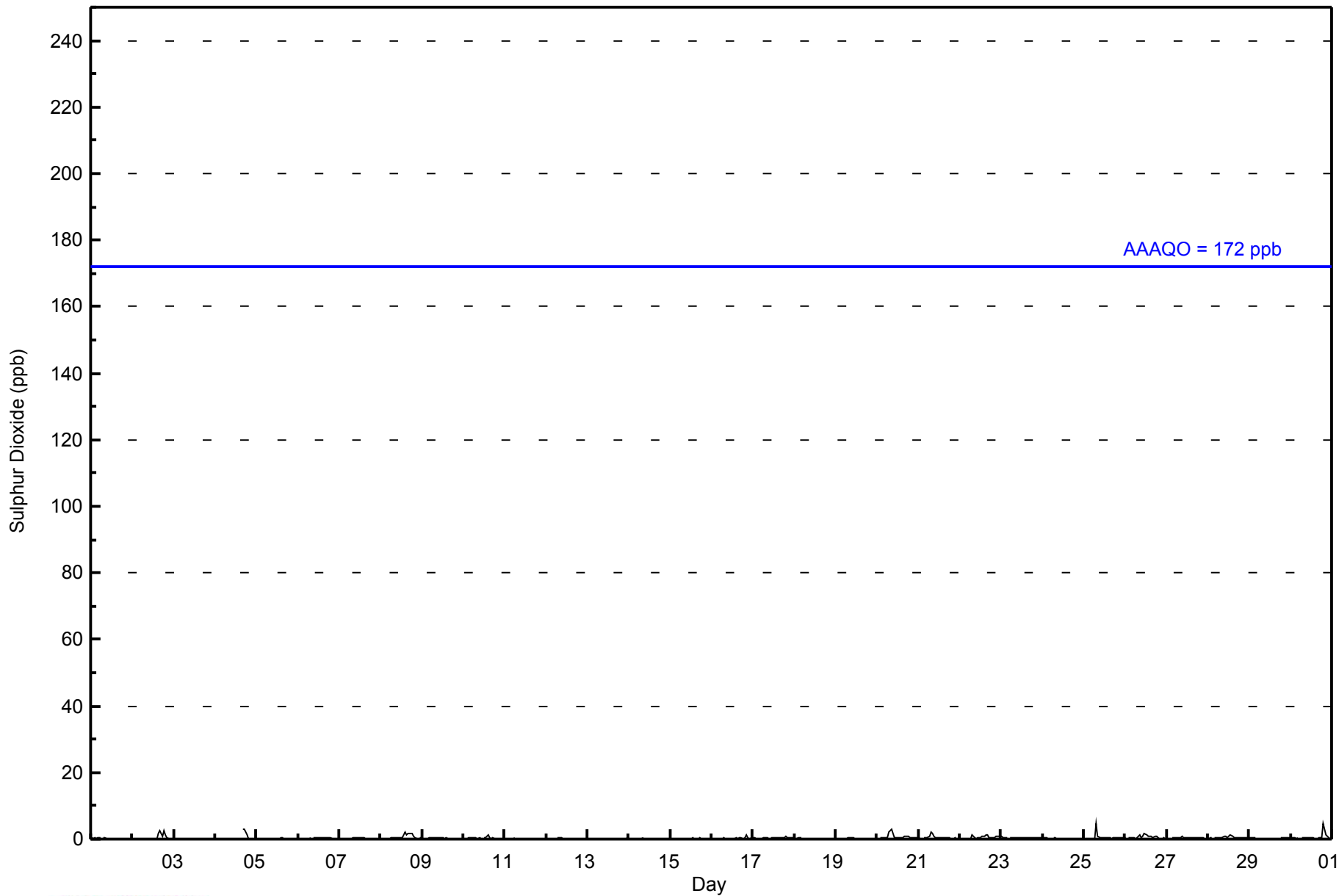
0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.4	0.4	0.5	0.3	0.2	0.2	0.2	Diurnal Average	
1	1	0	0	0	0	1	5	3	2	1	2	1	1	2	2	2	3	3	2	5	1	1	1	1	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	629	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: 629

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - April 2015**

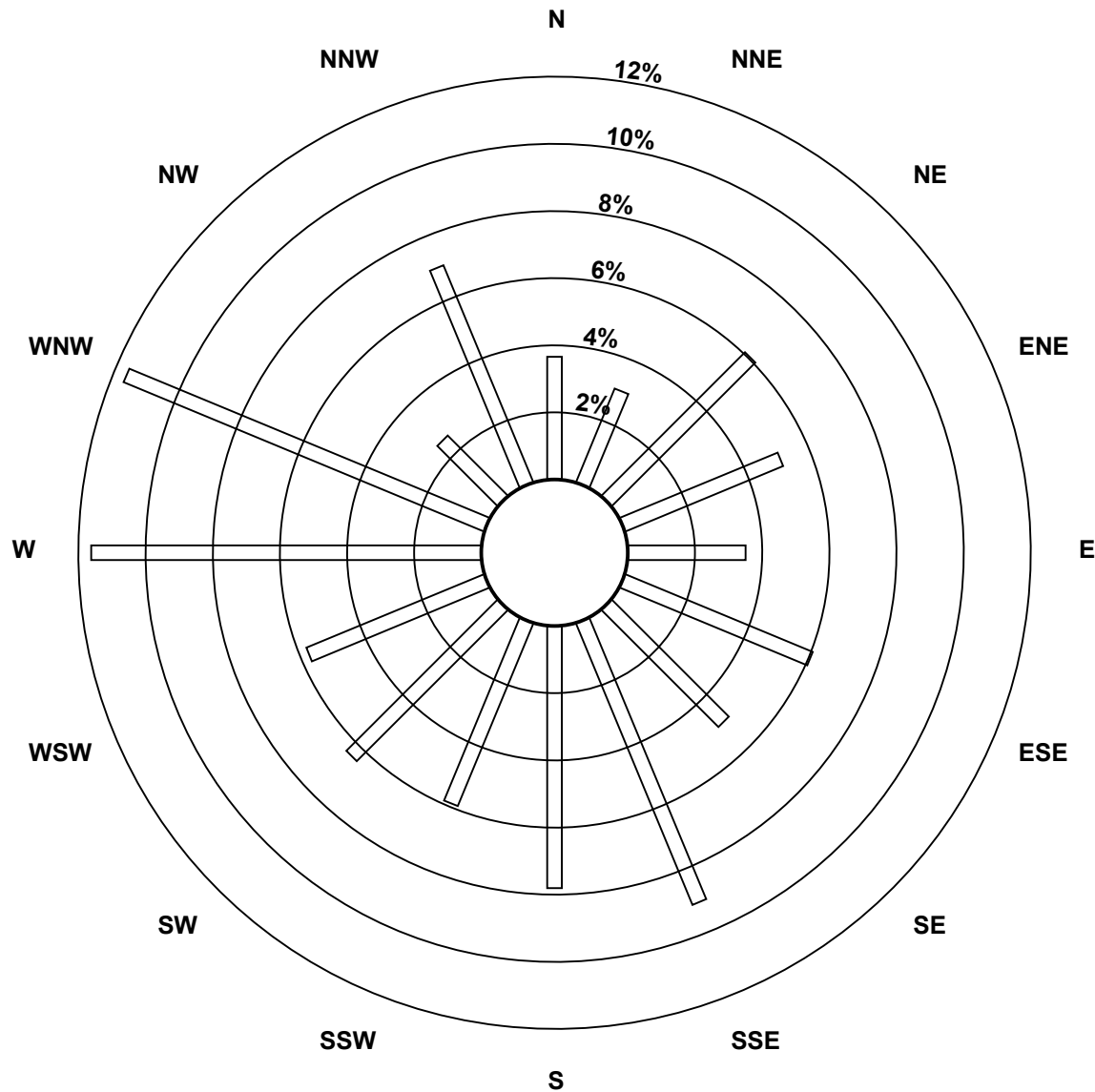
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	23	19	38	32	22	38	31	57	49	37	40	36	73	73	16	44	628
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	23	19	38	32	22	38	31	57	49	37	40	36	73	73	16	44	628

Total Number of Valid Hours: 628

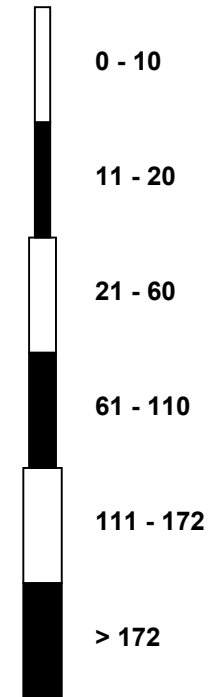
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac (AMS 14)**



Classes (ppb)

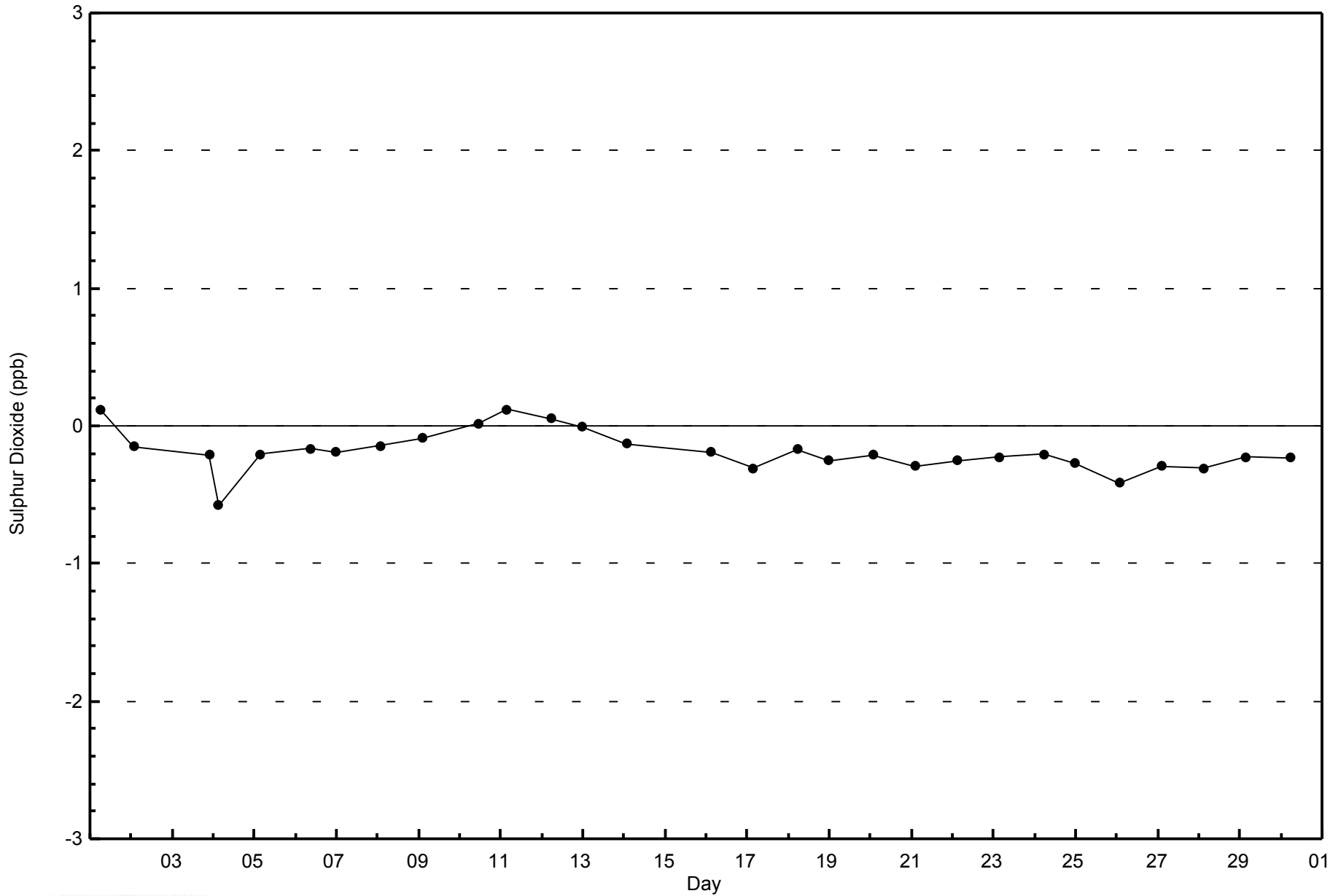


Total Number of Valid Hours: 628



WBEA  
Zero Responses

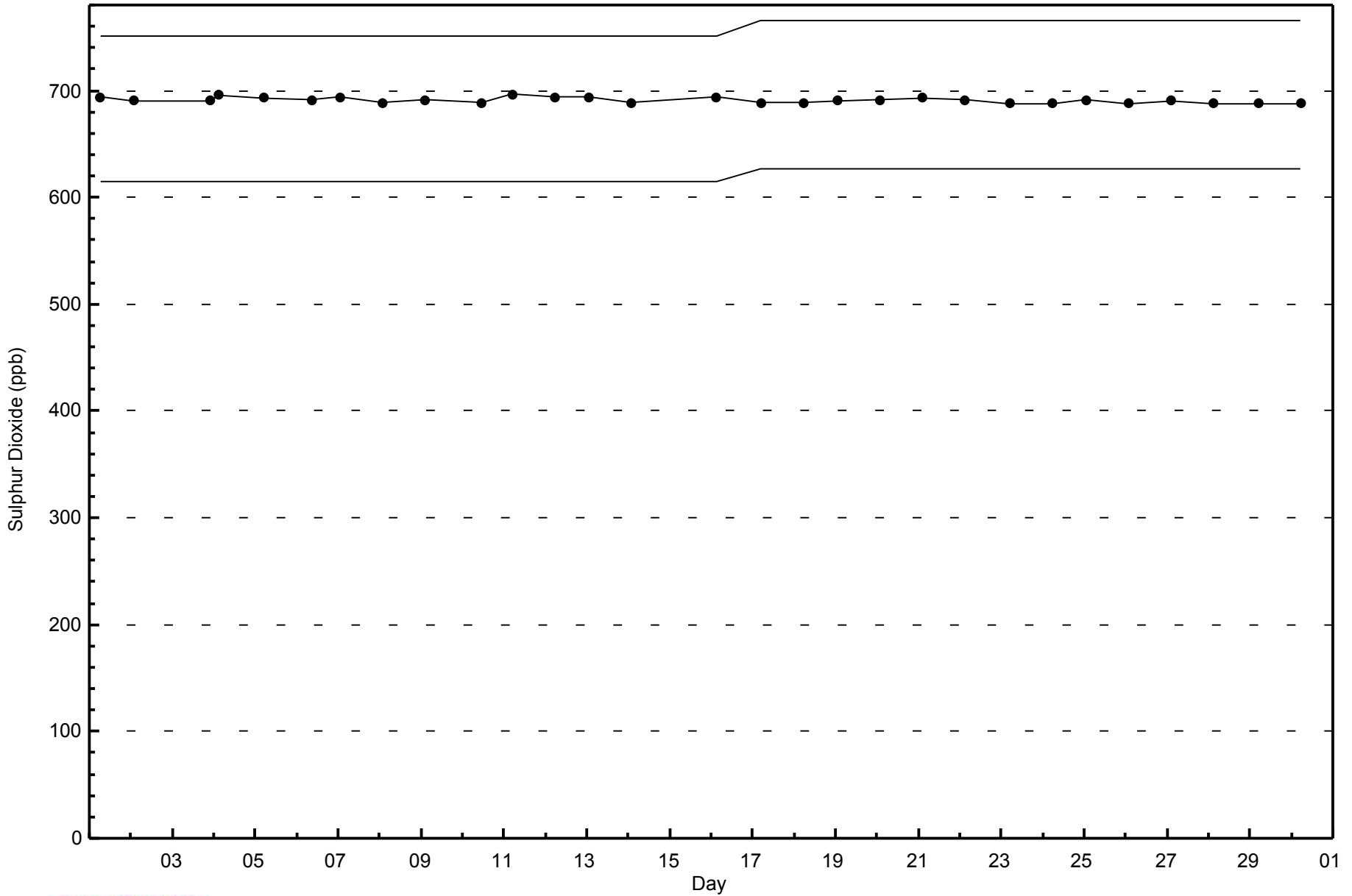
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - April 2015





Summary of Hour Averages

Anzac - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Apr 17 20:00	Maximum Daily Average: 0.4 ppb on Apr 26		Hours of Data:	681
Minimum Value: 0 ppb on Apr 19 06:00	Minimum Daily Average: 0.2 ppb on Apr 19		Hours of Missing Data:	39
Maximum Diurnal Average: 0.3 ppb at hour 6	Minimum Diurnal Average: 0.2 ppb at hour 2		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	99.3

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

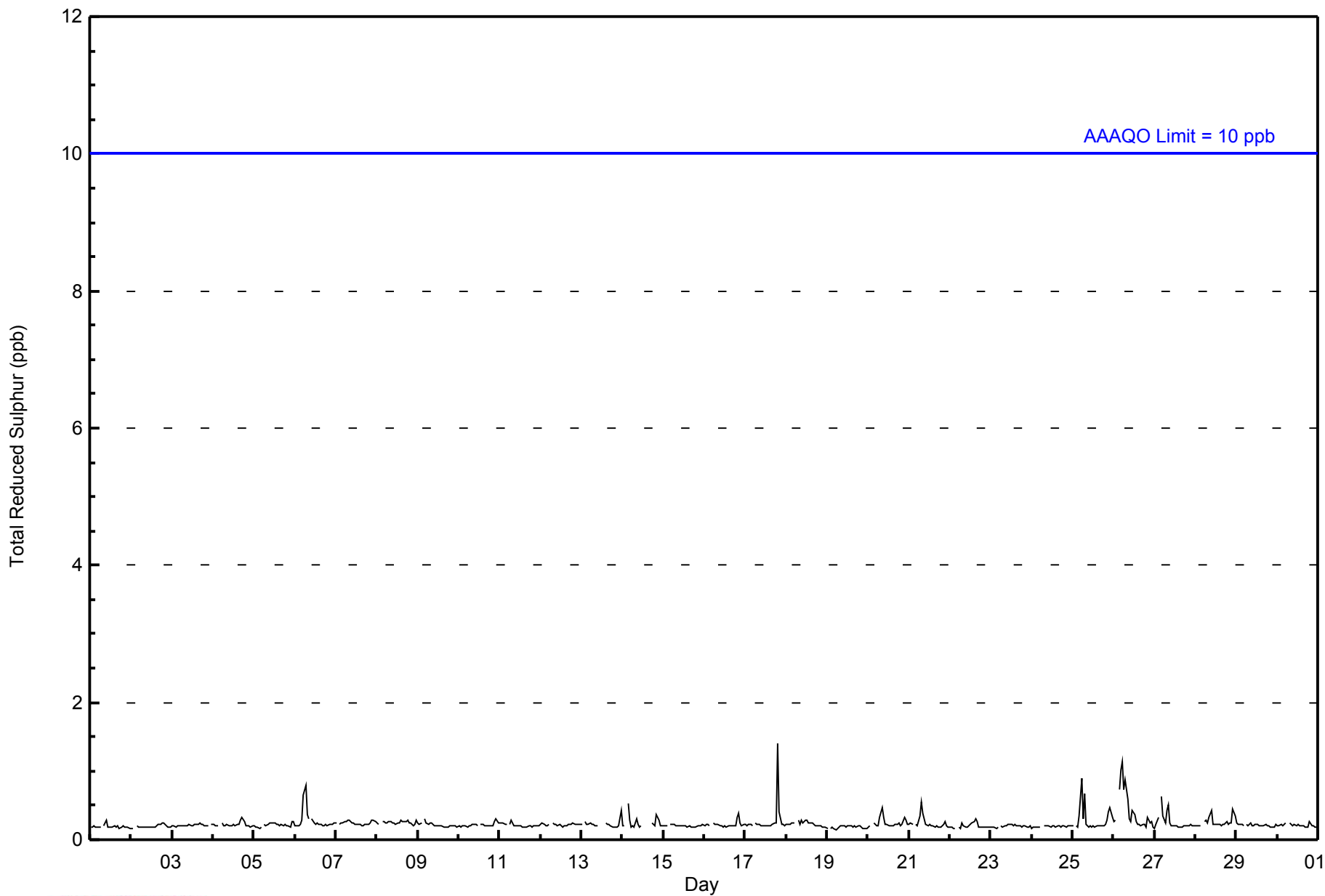
0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	Diurnal Average	
0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	Diurnal Maximum	

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



WBEA  
Hourly Averages

Total Reduced Sulphur (TRS) - ppb  
Anzac - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	681	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - April 2015**

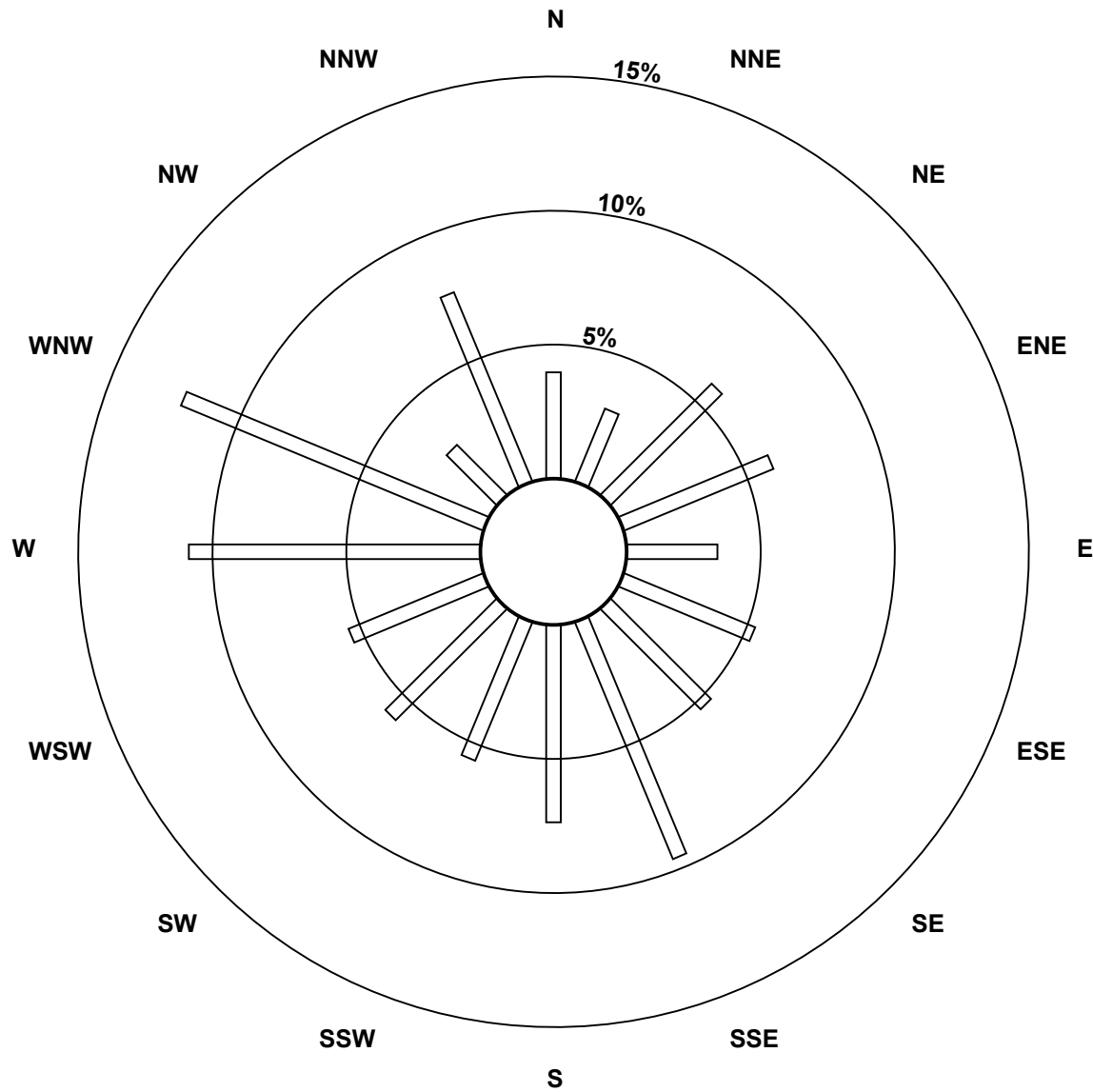
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	27	20	40	41	23	36	36	65	50	38	40	37	74	83	18	52	680
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	20	40	41	23	36	36	65	50	38	40	37	74	83	18	52	680

Total Number of Valid Hours: 680

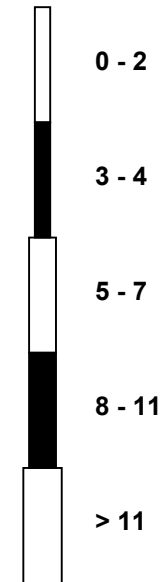
Total Number of Hours: 720

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

**Total Reduced Sulphur (TRS) - ppb  
Anzac (AMS 14)**



**Classes (ppb)**

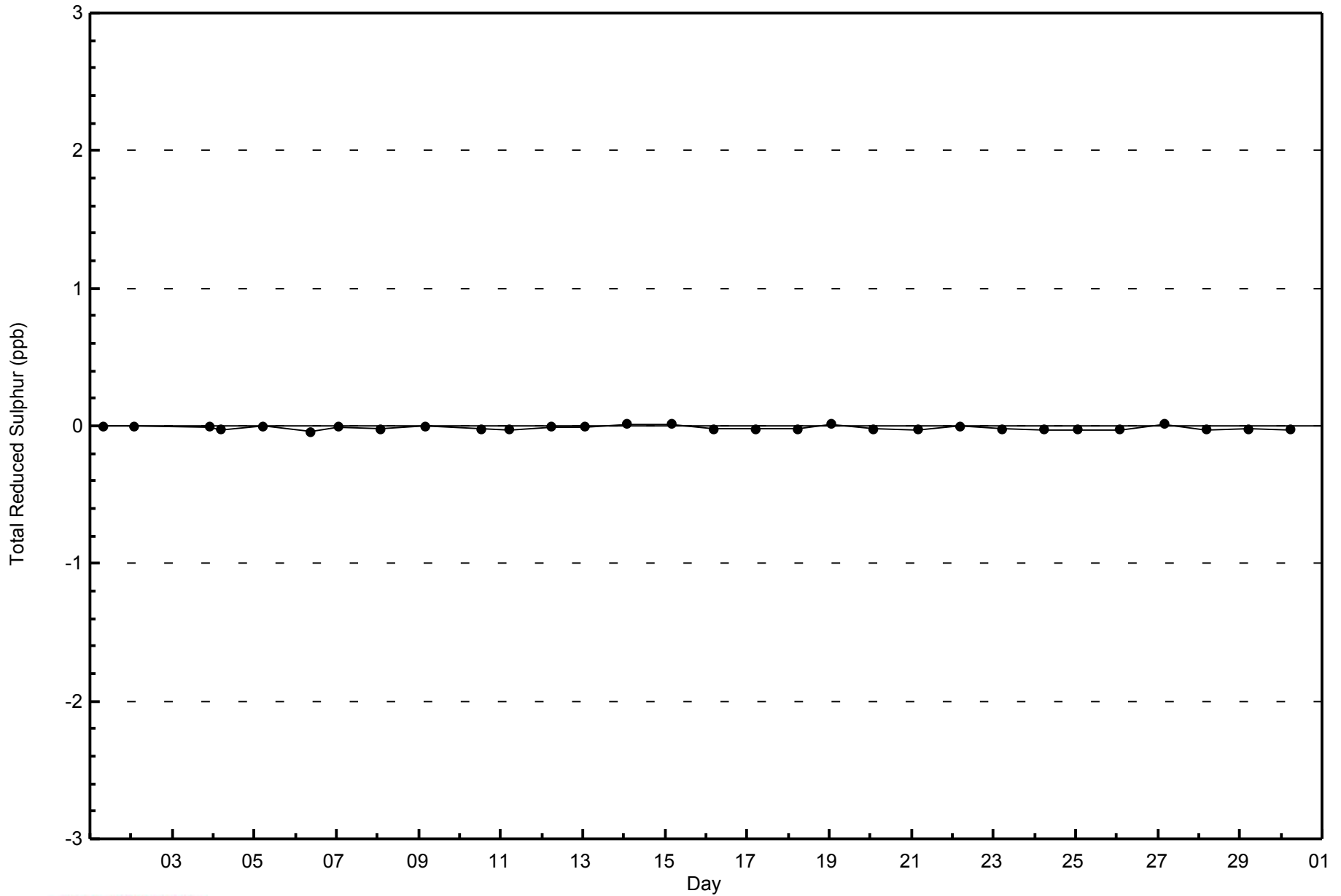


**Total Number of Valid Hours: 680**



WBEA  
Zero Responses

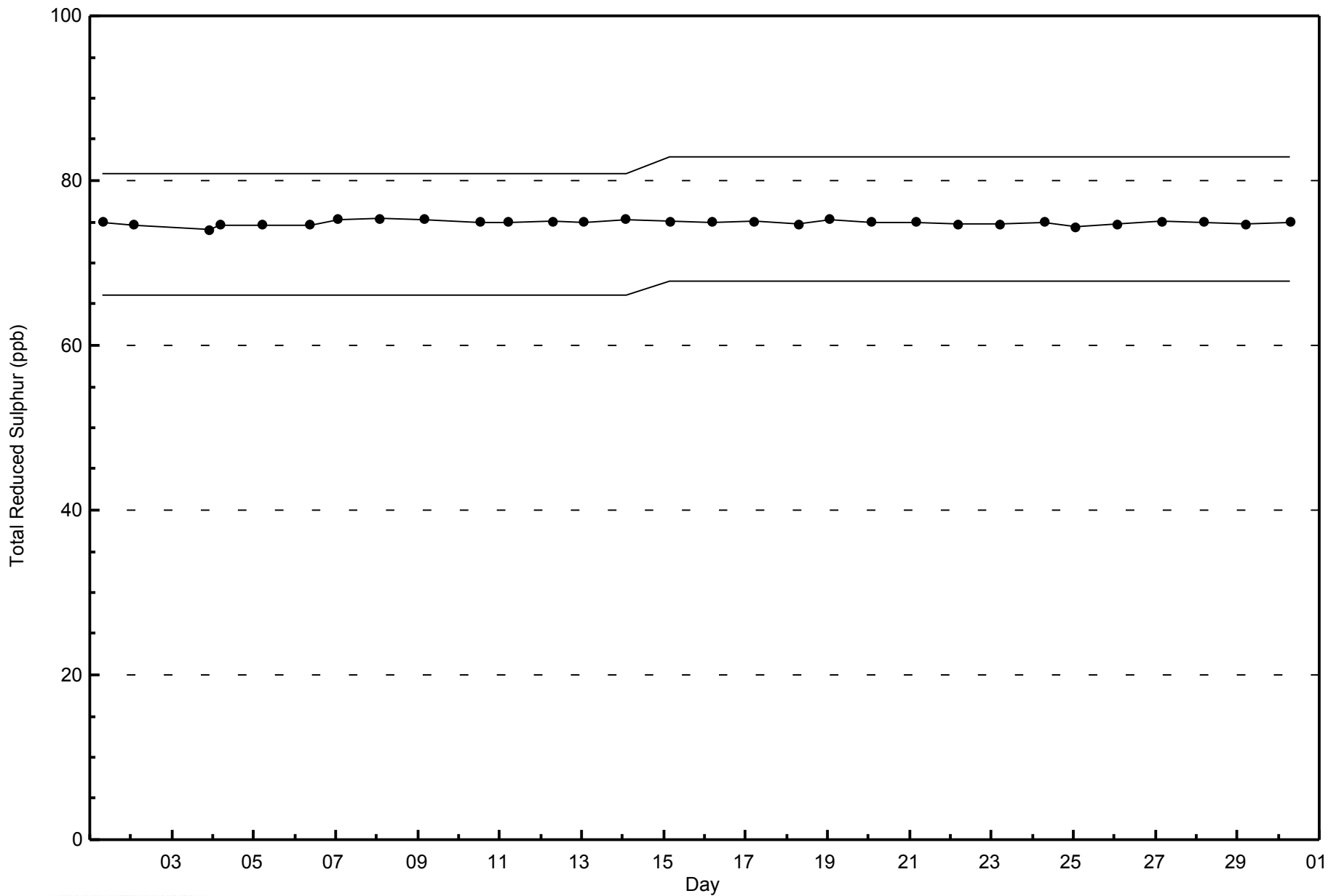
Total Reduced Sulphur (TRS) - ppb  
Anzac - April 2015





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Anzac - April 2015

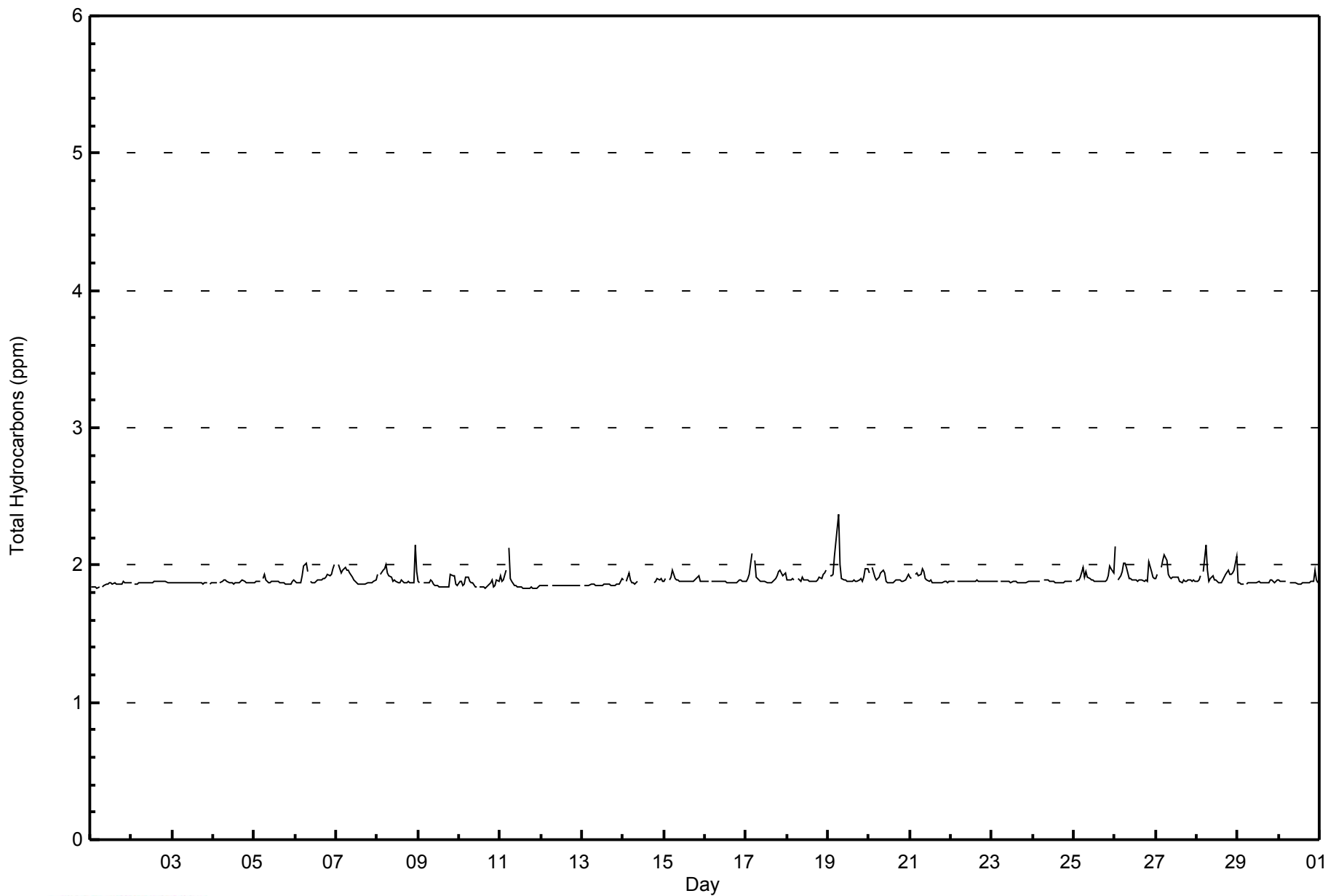






WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Anzac - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	671	98.53	98.53
2.1 - 3.0	10	1.47	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - April 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	27	20	40	41	24	38	33	59	49	37	36	35	74	86	18	53	670
2.1 - 3.0	0	0	0	0	0	0	0	3	1	0	4	2	0	0	0	0	10
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
<b>Totals</b>	27	20	40	41	24	38	33	62	50	37	40	37	74	86	18	53	680

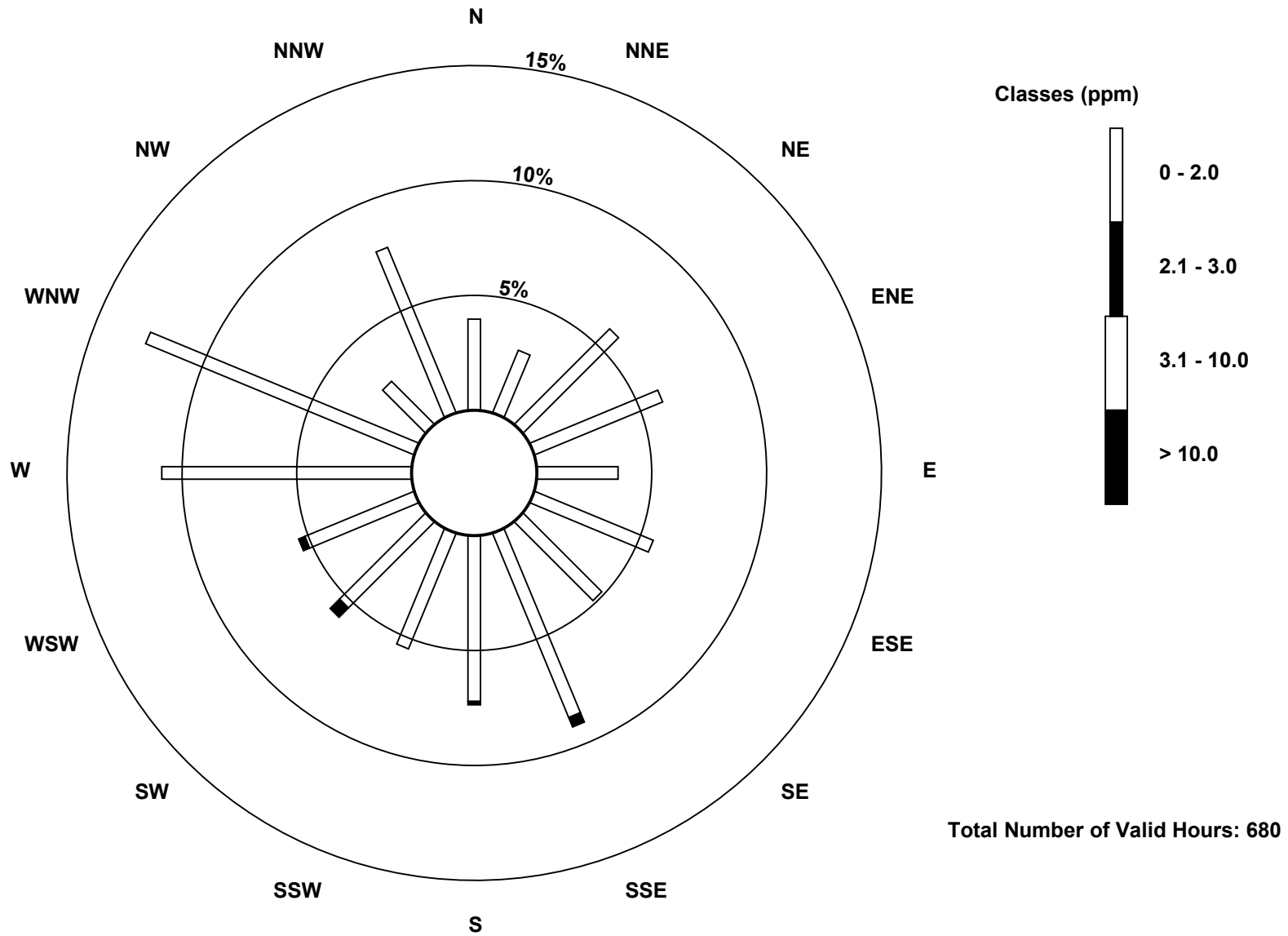
Total Number of Valid Hours: 680

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Apr 2015

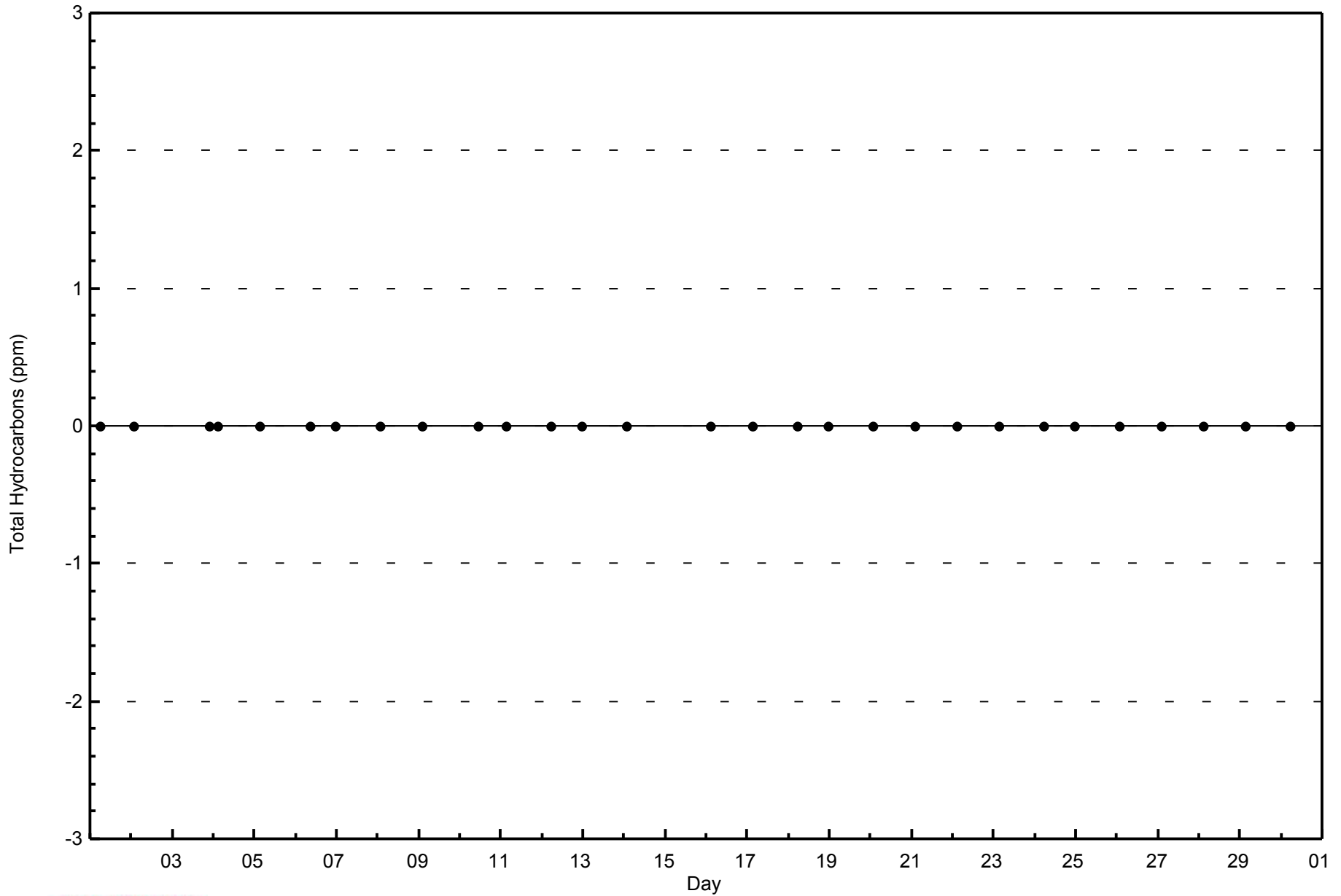
Total Hydrocarbons (THC) - ppm  
Anzac (AMS 14)





WBEA  
Zero Responses

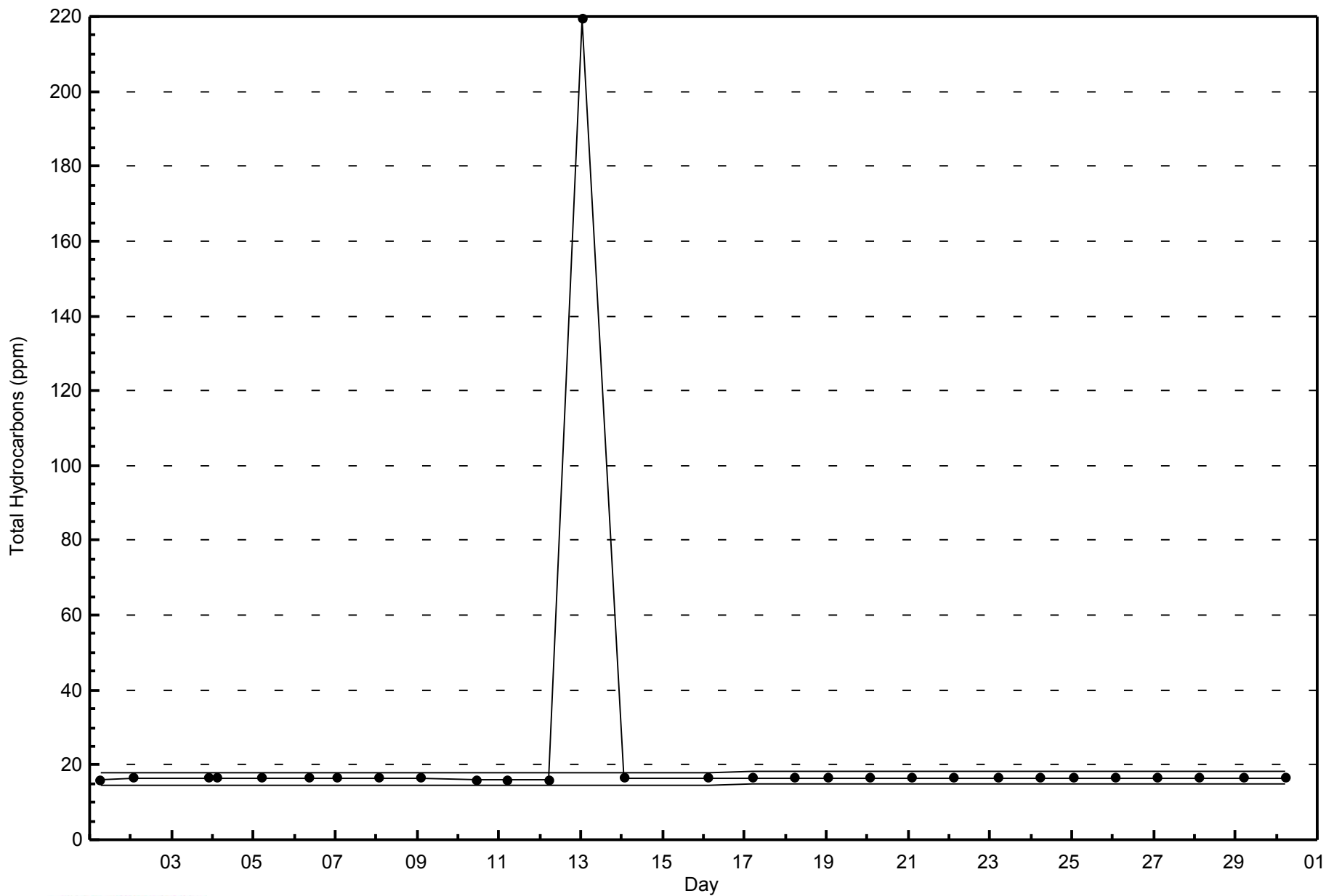
Total Hydrocarbons (THC) - ppm  
Anzac - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Anzac - April 2015





Summary of Hour Averages

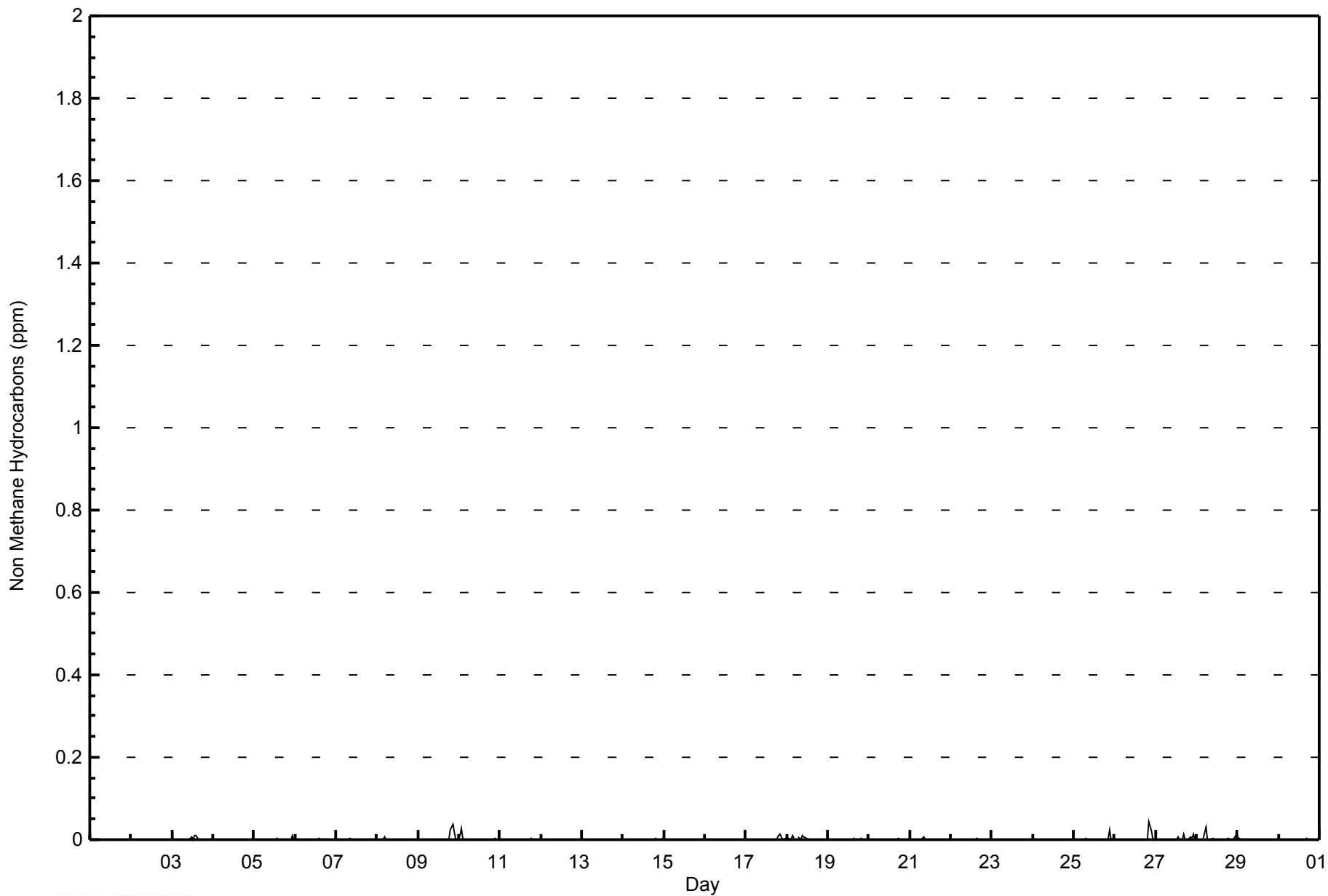
Anzac - April 2015

Maximum Value: 0.046 ppm on Apr 26 21:00		Maximum Daily Average: 0.003 ppm on Apr 9		Hours in Service: 720																																													
Minimum Value: 0.000 ppm on Apr 1 01:00		Minimum Daily Average: 0.000 ppm on Apr 2		Hours of Data: 681																																													
Maximum Diurnal Average: 0.004 ppm at hour 21		Minimum Diurnal Average: 0.000 ppm at hour 13		Hours of Missing Data: 39																																													
Monthly Average: 0.001 ppm		Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0		Hours of Calibration: 39																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
2-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
3-Apr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.009	0.009	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	0.000	0.000	0.000														
4-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
5-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
6-Apr	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
7-Apr	Z	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
8-Apr	0.000	Z	0.000	0.000	0.008	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
9-Apr	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	0.001	0.025	0.037	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
10-Apr	0.009	0.028	0.005	0.000	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	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
11-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.003	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															
12-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
13-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
14-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	C	C	C	C	C	C	C	C	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
15-Apr	0.000	0.001	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
16-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
17-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.011	0.012	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000															
18-Apr	0.004	0.005	0.001	0.010	0.004	Z	0.006	0.004	0.001	0.010	0.008	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
19-Apr	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
20-Apr	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
21-Apr	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.003	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
22-Apr	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
23-Apr	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
24-Apr	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
25-Apr	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
26-Apr	0.000	Z	0.000	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
27-Apr	0.000	0.000	Z	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
28-Apr	0.002	0.001	0.000	Z	0.003	0.030	0.001	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
29-Apr	0.002	0.004	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
30-Apr	0.000	0.001	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
																								0.001	0.002	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.001	0.004	0.002	0.001	0.001	Diurnal Average	
																								0.009	0.028	0.005	0.010	0.008	0.030	0.006	0.004	0.006	0.010	0.008	0.006	0.001	0.009	0.009	0.004	0.013	0.002	0.005	0.025	0.046	0.024	0.014	0.014	Diurnal Maximum	
Z - zerospan																								C - Calibration																									



WBEA  
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	655	96.18	96.18
0.006 - 0.05	26	3.82	100.00
0.06 - 0.1	0	0.00	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - April 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	26	19	40	41	23	37	31	59	50	33	37	33	74	86	16	49	654
0.006 - 0.05	1	1	0	0	1	1	2	3	0	4	3	4	0	0	2	4	26
0.06 - 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	20	40	41	24	38	33	62	50	37	40	37	74	86	18	53	680

Total Number of Valid Hours: 680

Total Number of Hours: 720





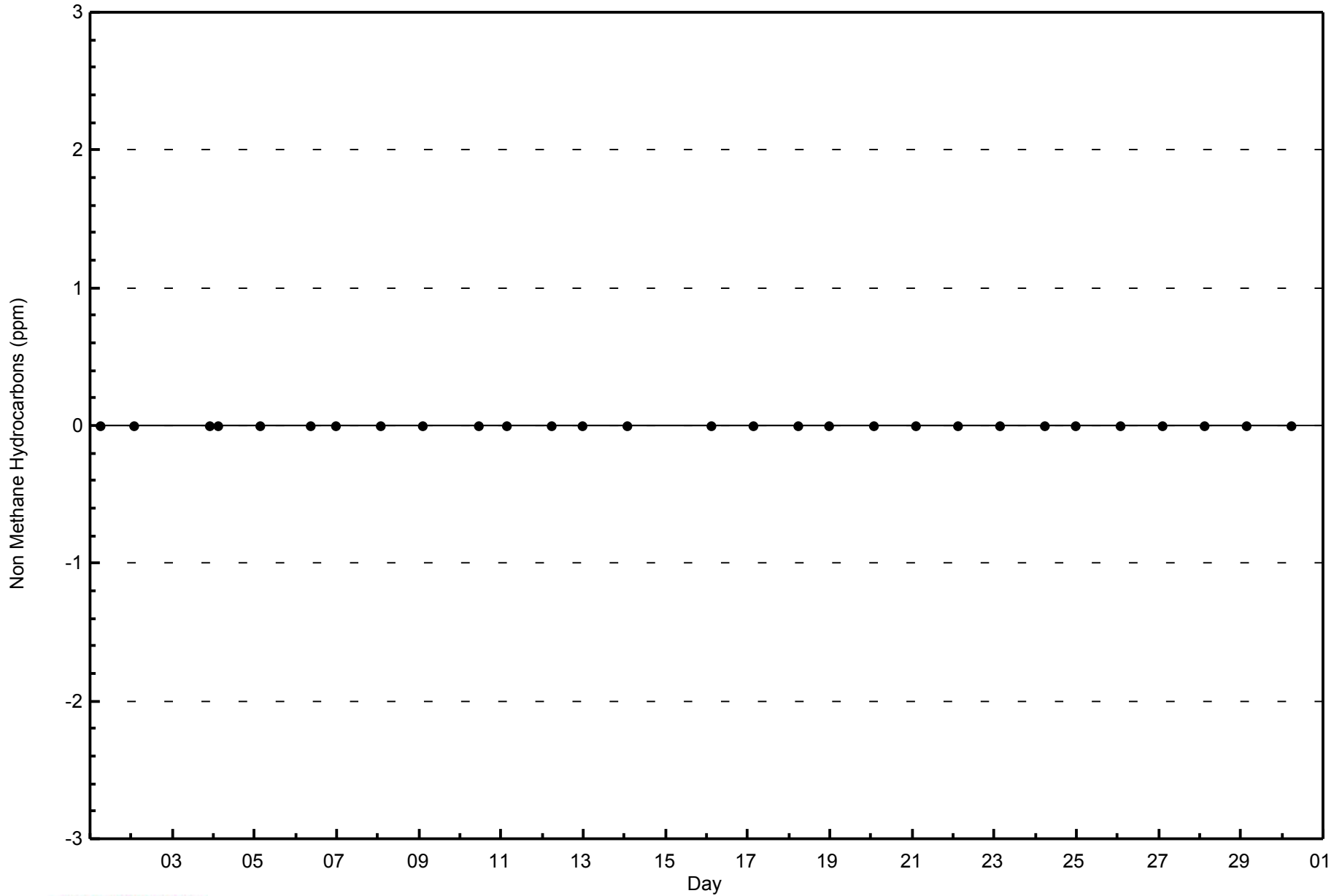


WBEA

Zero Responses

Non Methane Hydrocarbons (NMHC) - ppm

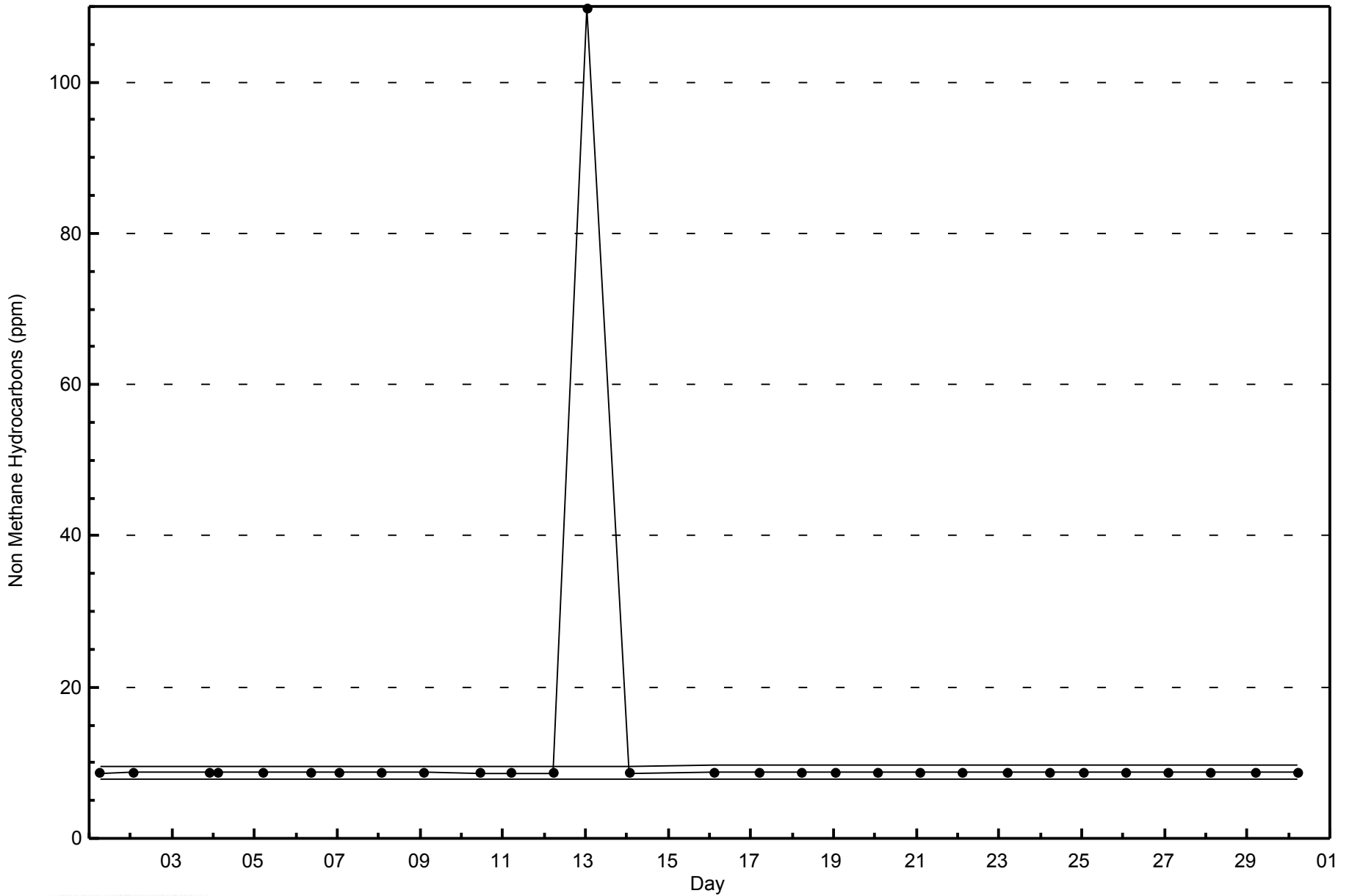
Anzac - April 2015





WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - April 2015

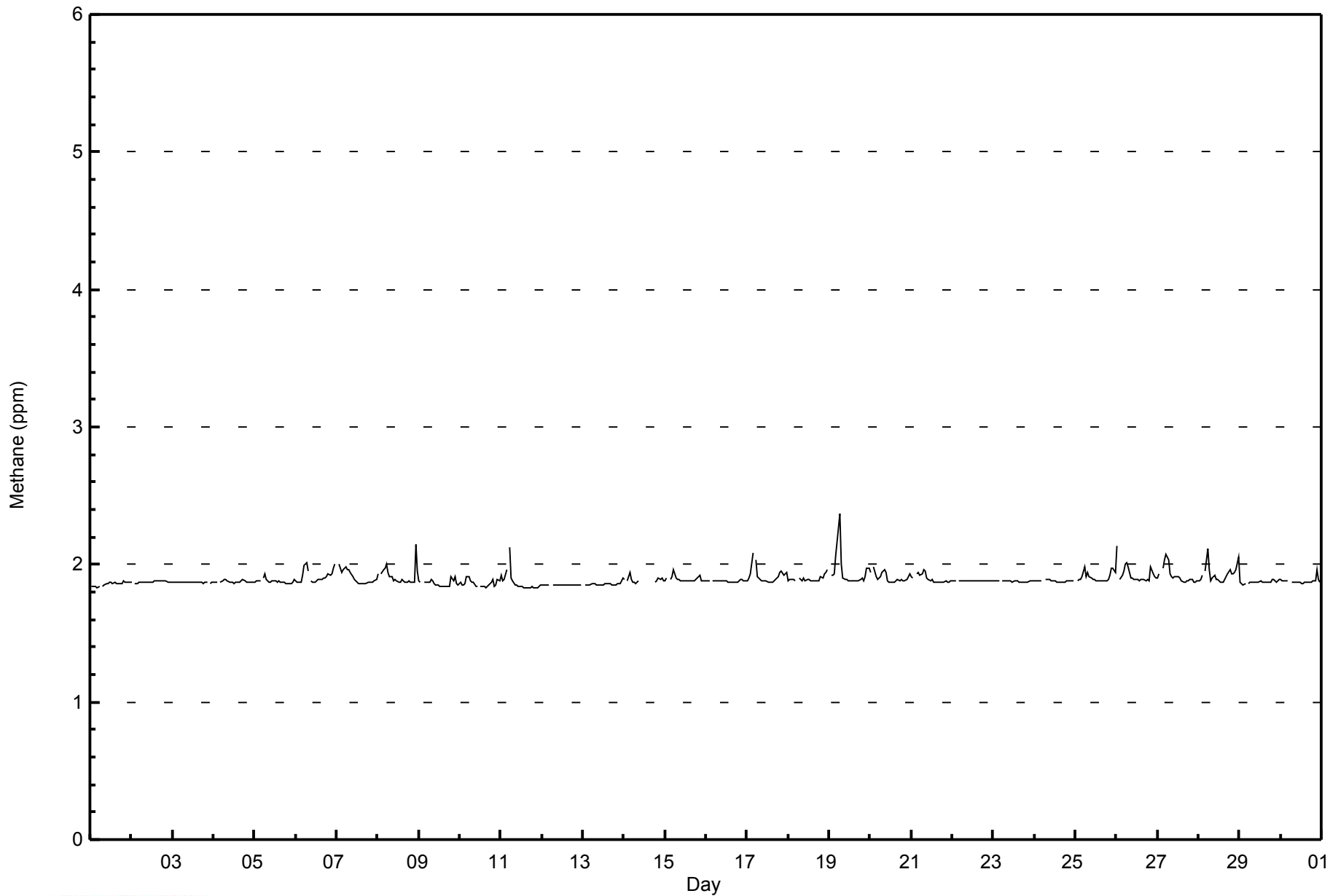






WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Anzac - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	671	98.53	98.53
2.1 - 3.0	10	1.47	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 681

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - April 2015**

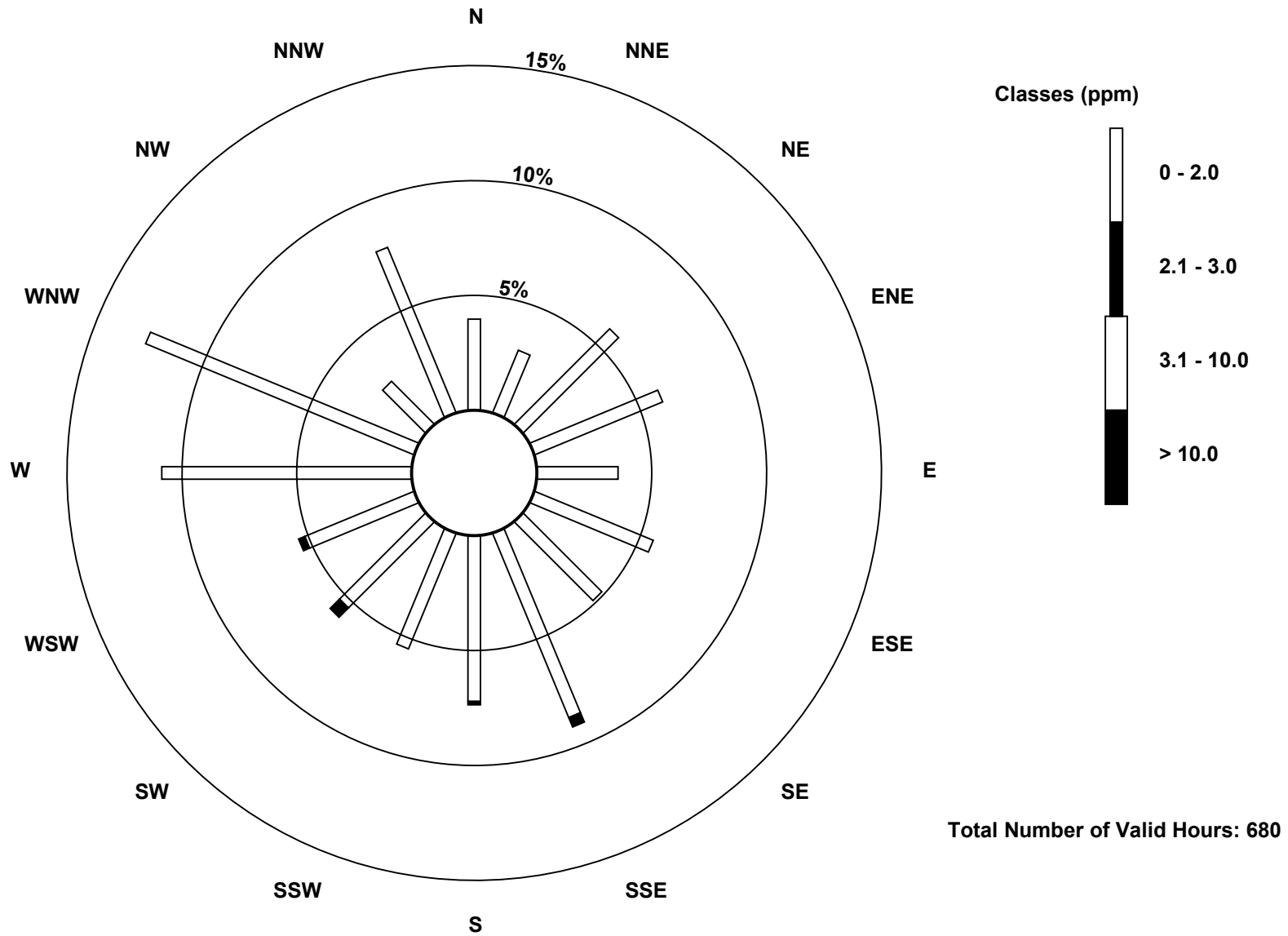
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	27	20	40	41	24	38	33	59	49	37	36	35	74	86	18	53	670
2.1 - 3.0	0	0	0	0	0	0	0	3	1	0	4	2	0	0	0	0	10
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	20	40	41	24	38	33	62	50	37	40	37	74	86	18	53	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

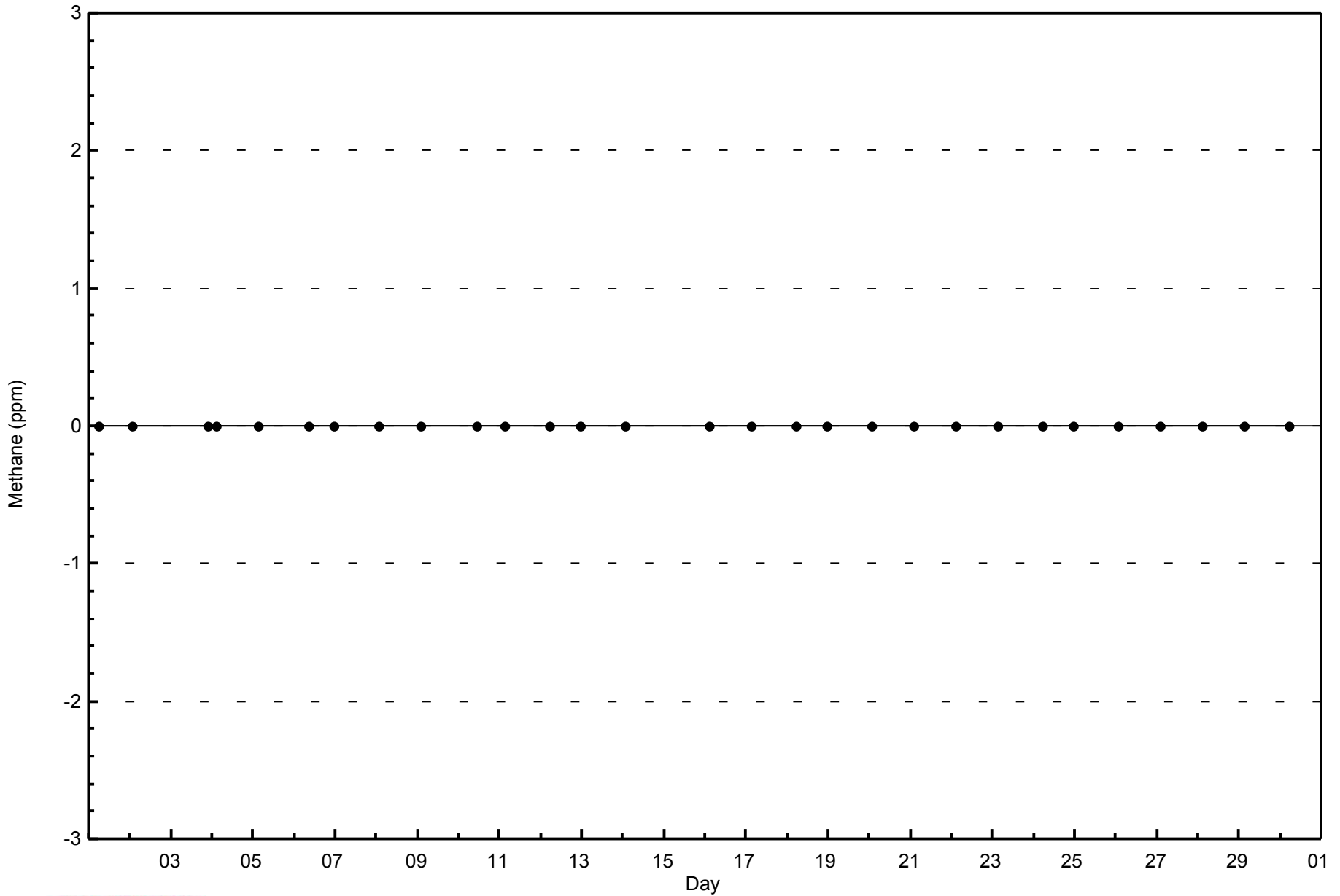
Methane (CH<sub>4</sub>) - ppm  
Anzac (AMS 14)





WBEA  
Zero Responses

Methane (CH<sub>4</sub>) - ppm  
Anzac - April 2015

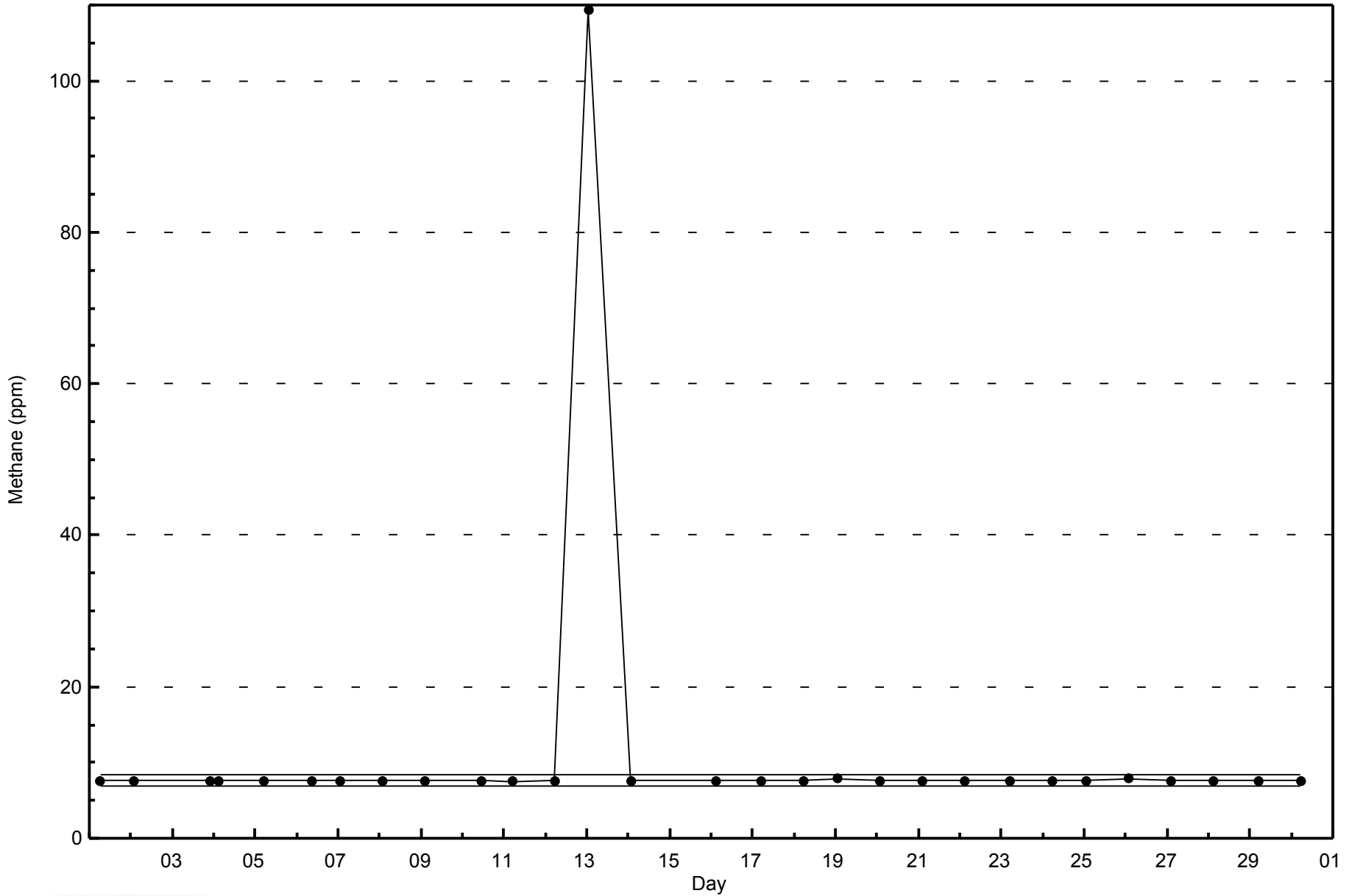






WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Anzac - April 2015



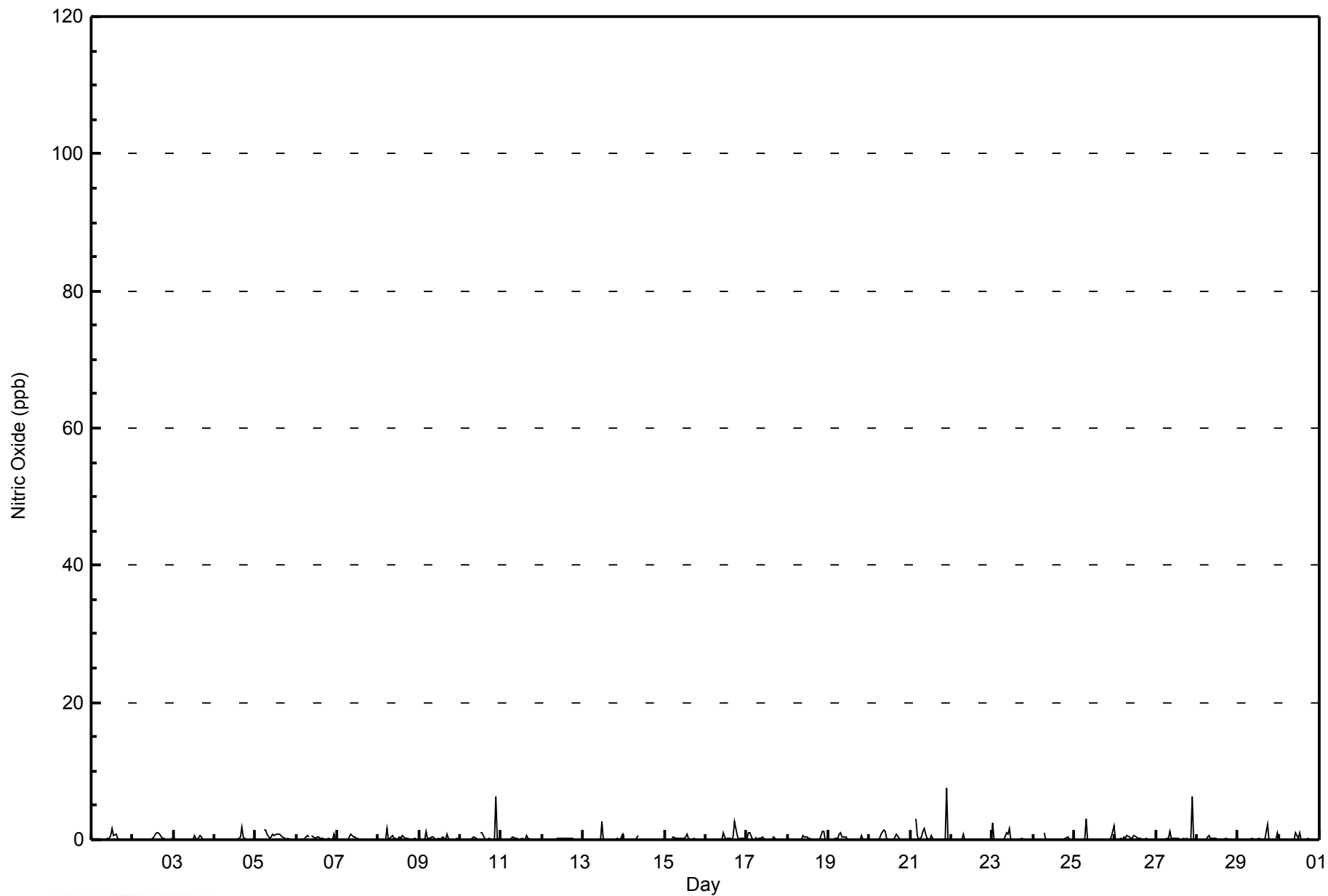


Maximum Value: 7 ppb on Apr 21 22:00																	Maximum Daily Average: 0.7 ppb on Apr 21																	Hours in Service: 720															
Minimum Value: 0 ppb on Apr 1 01:00																	Minimum Daily Average: 0.1 ppb on Apr 22																	Hours of Data: 673															
Maximum Diurnal Average: 0.8 ppb at hour 22																	Minimum Diurnal Average: 0.0 ppb at hour 3																	Hours of Missing Data: 47															
Monthly Average: 0.2 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 3																	Hours of Calibration: 47															
																																		Percent Operational Time: 100.0															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	0	0	0	0	0	0	Z	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0.2	2																							
2-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.2	1																							
3-Apr	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	Z	0	0	0.1	1																							
4-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0.1	2																							
5-Apr	0	0	0	0	Z	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																							
6-Apr	0	0	0	0	0	0	1	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.2	1																							
7-Apr	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
8-Apr	0	Z	0	0	0	2	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	2																							
9-Apr	0	0	Z	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.2	1																							
10-Apr	0	0	0	0	0	0	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	6	0	0	0.4	6																							
11-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1																							
12-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
13-Apr	Z	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0.2	3																							
14-Apr	0	Z	0	0	0	0	0	0	1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	0	-	1																							
15-Apr	C	C	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
16-Apr	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	3	1	0	0	0	0	0	0.3	3																							
17-Apr	0	1	1	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
18-Apr	0	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.2	1																							
19-Apr	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1																							
20-Apr	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.2	1																							
21-Apr	0	0	Z	3	1	0	0	1	2	1	0	0	1	0	0	0	0	0	0	0	0	7	0	0	0.7	7																							
22-Apr	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
23-Apr	2	0	0	0	Z	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2																							
24-Apr	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
25-Apr	Z	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.2	3																							
26-Apr	0	Z	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
27-Apr	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0.4	6																							
28-Apr	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
29-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0.2	2																							
30-Apr	0	0	0	0	0	Z	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
																								0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.1	0.1	0.1	0.8	0.1	0.1	Diurnal Average	
																								2	1	1	3	1	2	1	3	2	1	2	3	2	1	1	1	2	3	1	1	1	7	1	2	Diurnal Maximum	
Z - zerospan C - Calibration																																																	



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Anzac - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	673	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: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Anzac - April 2015**

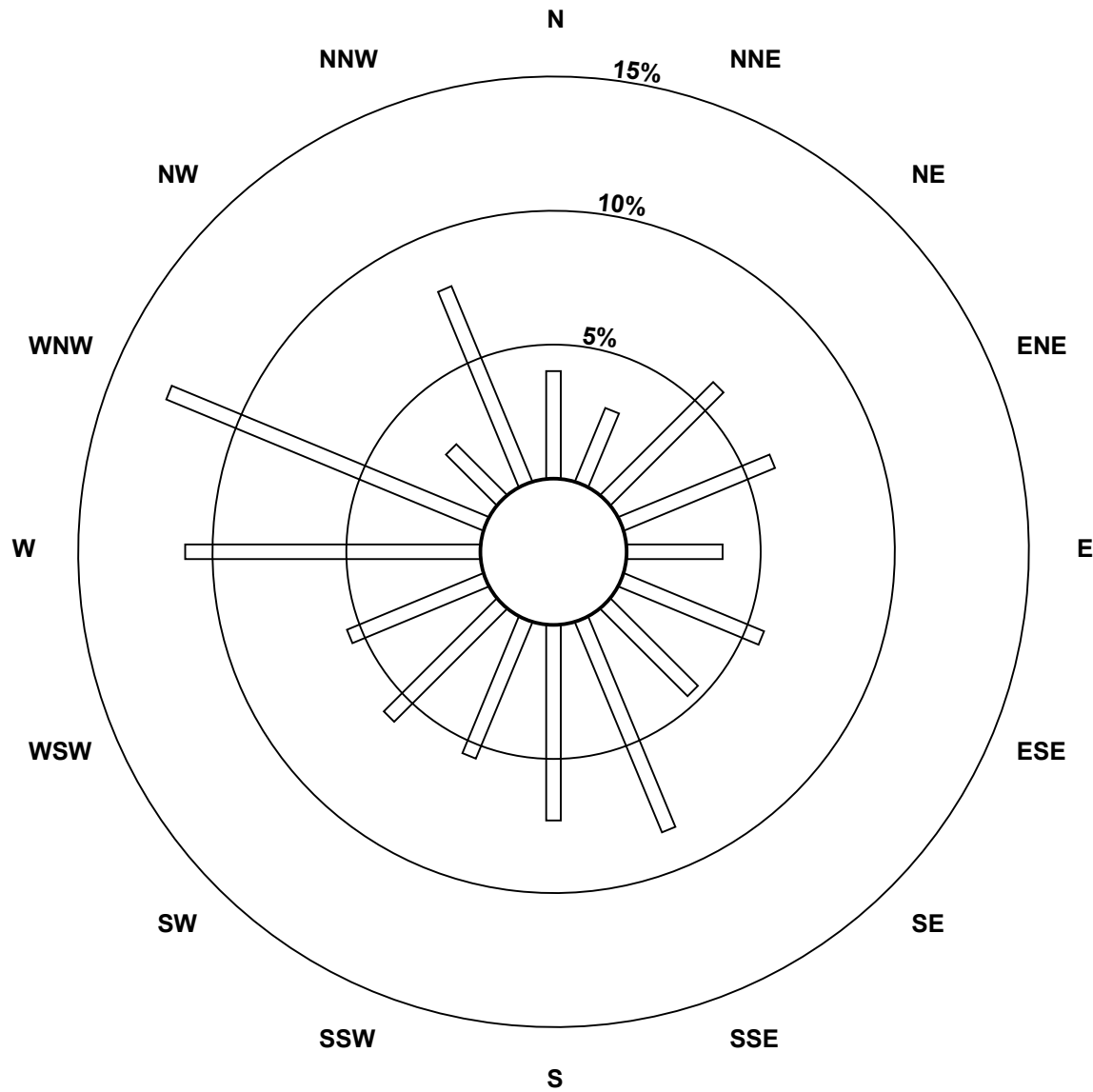
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	20	40	41	24	38	31	57	49	37	40	37	74	86	18	53	672
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	20	40	41	24	38	31	57	49	37	40	37	74	86	18	53	672

Total Number of Valid Hours: 672

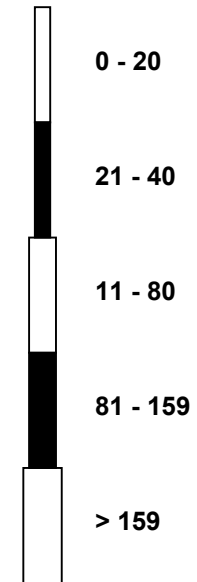
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitric Oxide (NO) - ppb  
Anzac (AMS 14)



Classes (ppb)

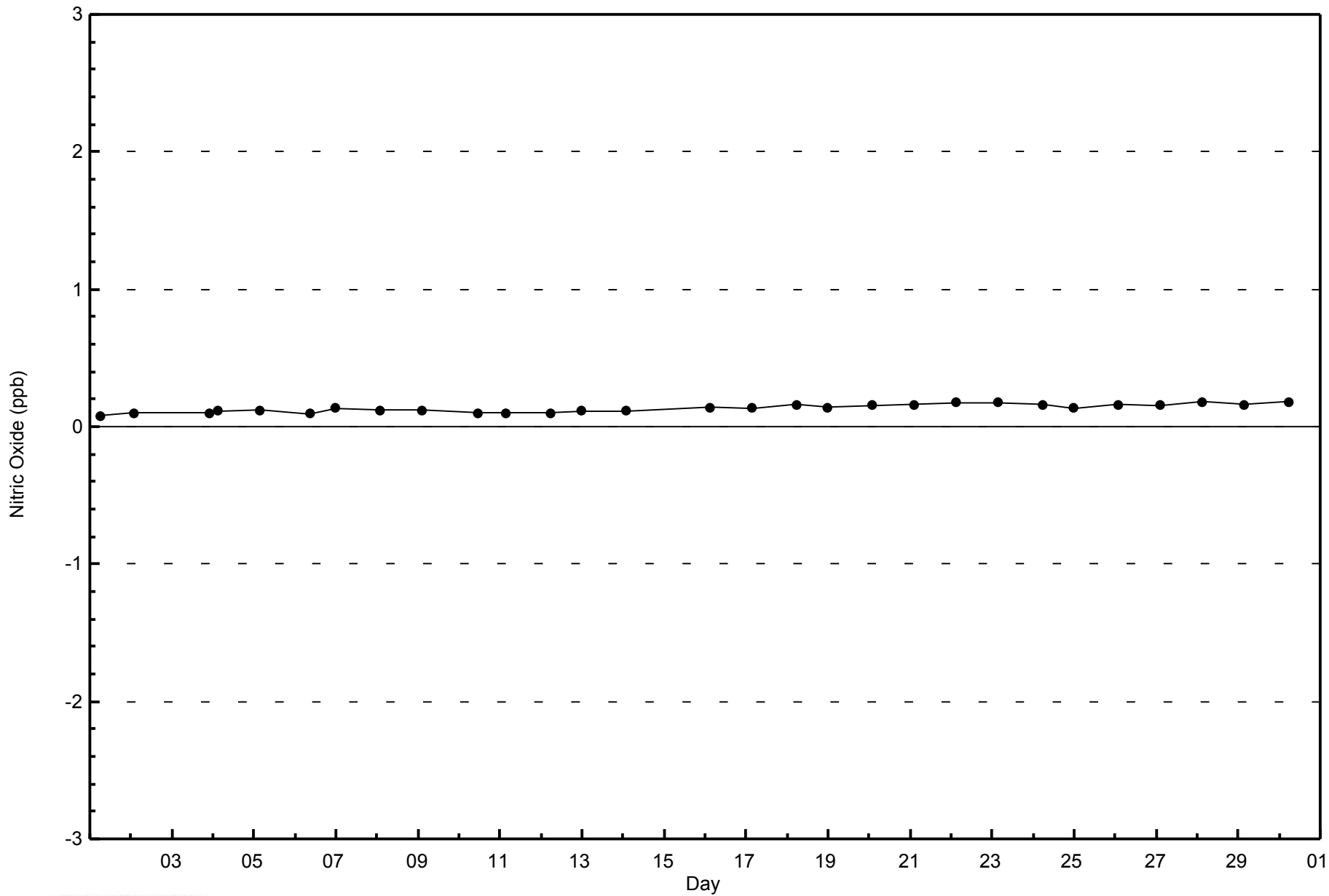


Total Number of Valid Hours: 672



WBEA  
Zero Responses

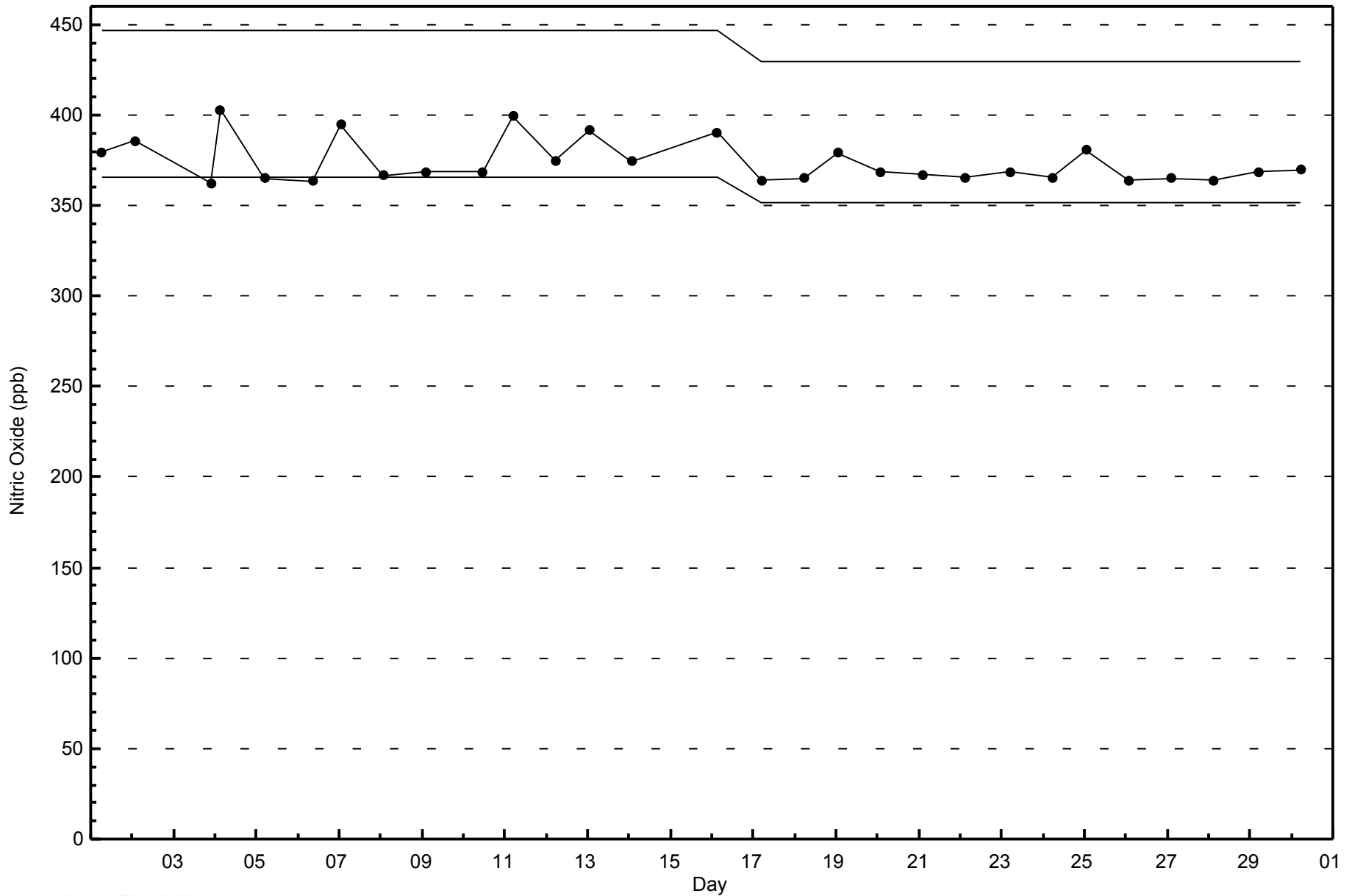
Nitric Oxide (NO) - ppb  
Anzac - April 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Anzac - April 2015







Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 9 ppb on Apr 21 04:00	Maximum Daily Average: 1.8 ppb on Apr 5		Hours of Data:	673
Minimum Value: 0 ppb on Apr 1 04:00	Minimum Daily Average: 0.3 ppb on Apr 24		Hours of Missing Data:	47
Maximum Diurnal Average: 1.5 ppb at hour 8	Minimum Diurnal Average: 0.7 ppb at hour 2		Hours of Calibration:	47
Monthly Average: 1.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 6		Percent Operational Time:	100.0

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

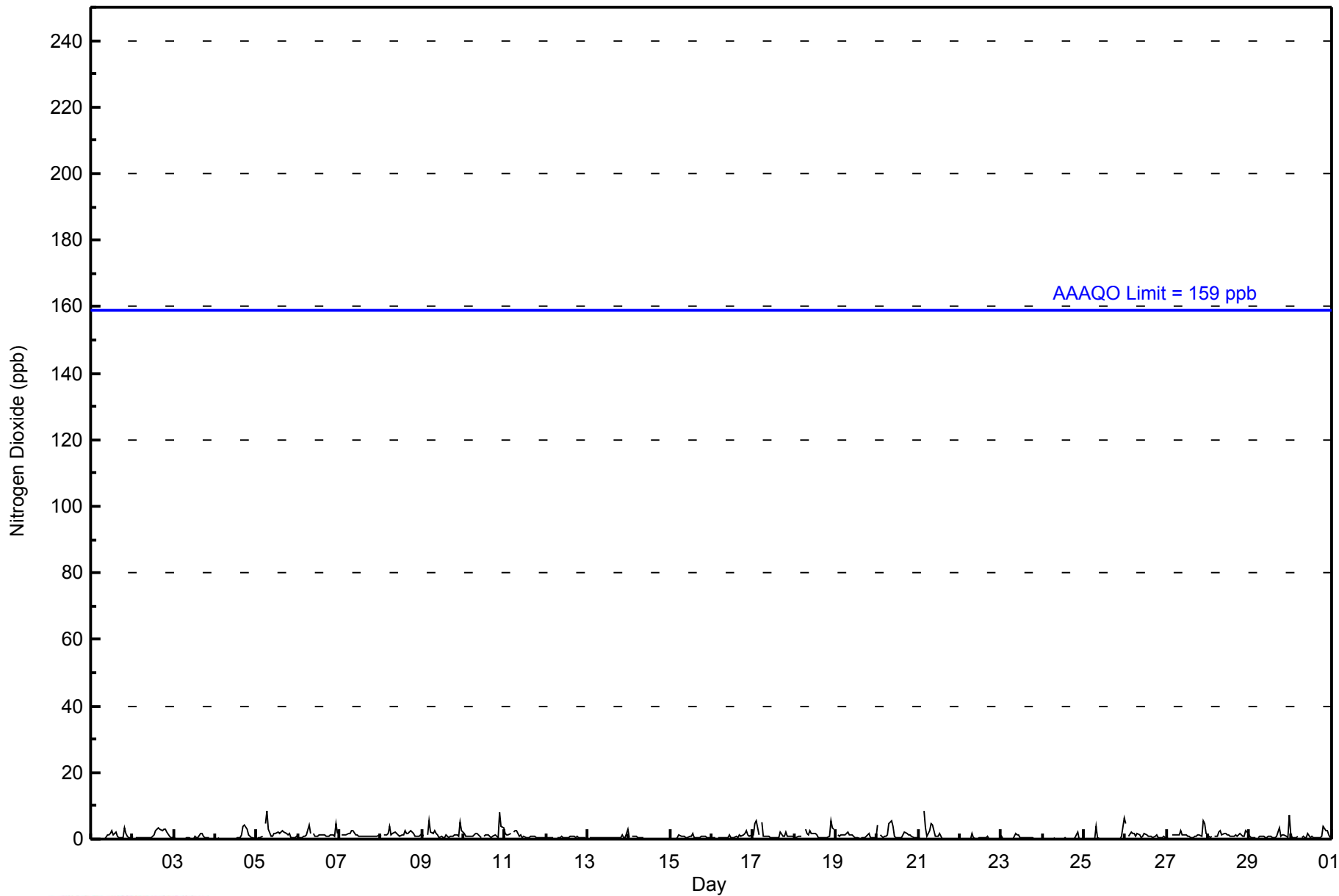
1.0	0.7	0.8	1.0	1.0	1.3	1.4	1.5	1.2	1.0	0.8	0.7	0.9	0.8	0.9	0.9	1.0	1.1	1.0	1.2	1.0	1.3	1.3	1.4	Diurnal Average	
5	5	5	9	6	5	8	5	6	4	2	2	2	3	3	3	4	4	4	3	4	3	8	5	7	Diurnal Maximum

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	673	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: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - April 2015**

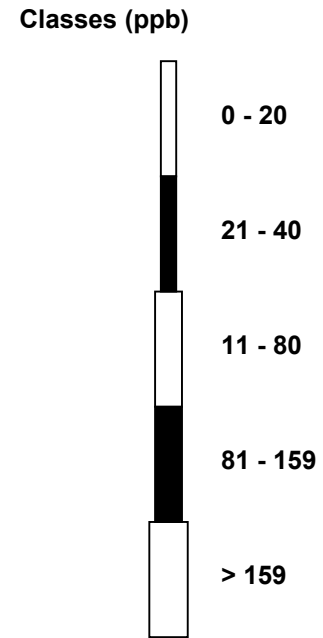
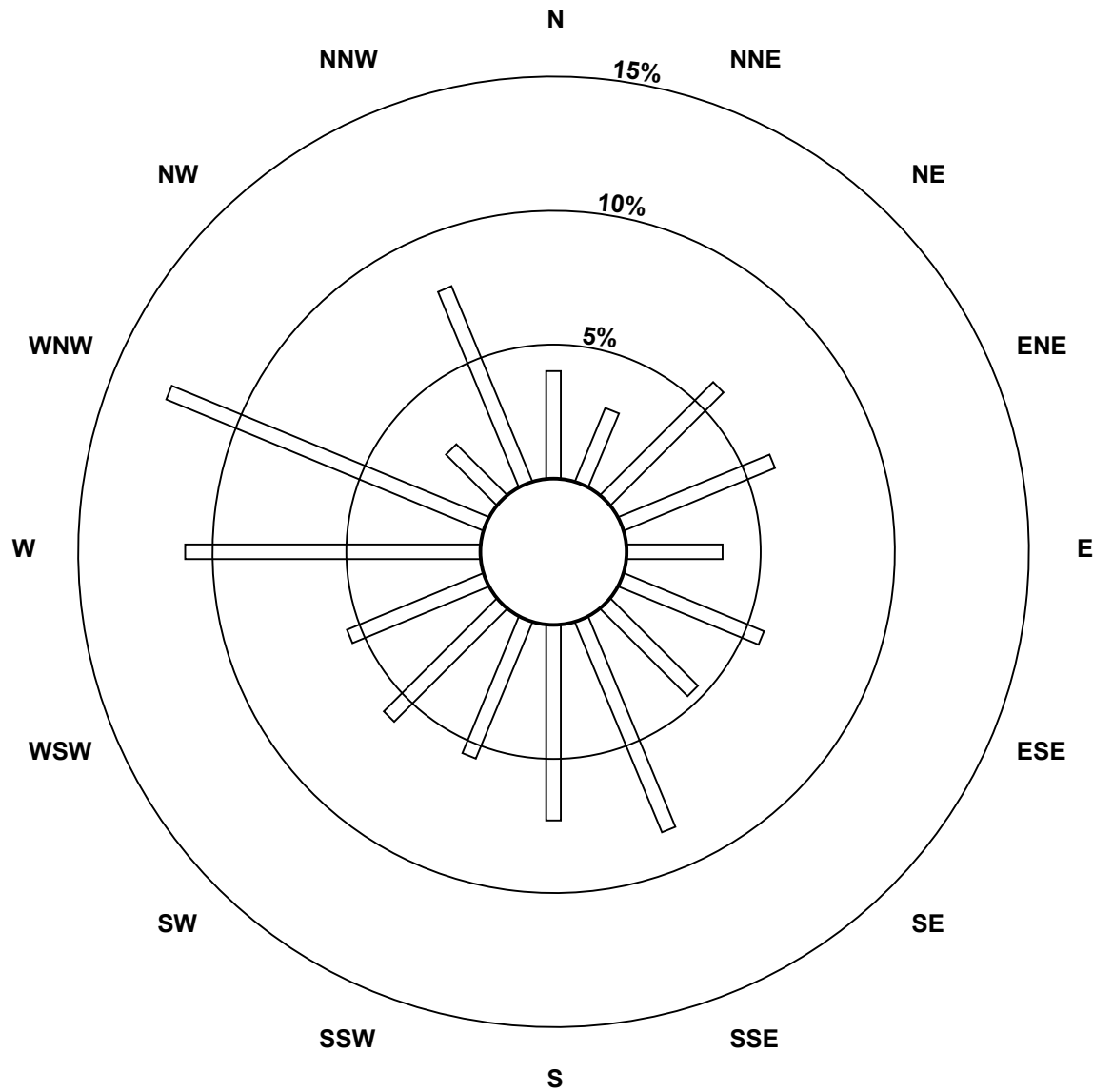
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	20	40	41	24	38	31	57	49	37	40	37	74	86	18	53	672
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	20	40	41	24	38	31	57	49	37	40	37	74	86	18	53	672

Total Number of Valid Hours: 672

Total Number of Hours: 720

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac (AMS 14)**

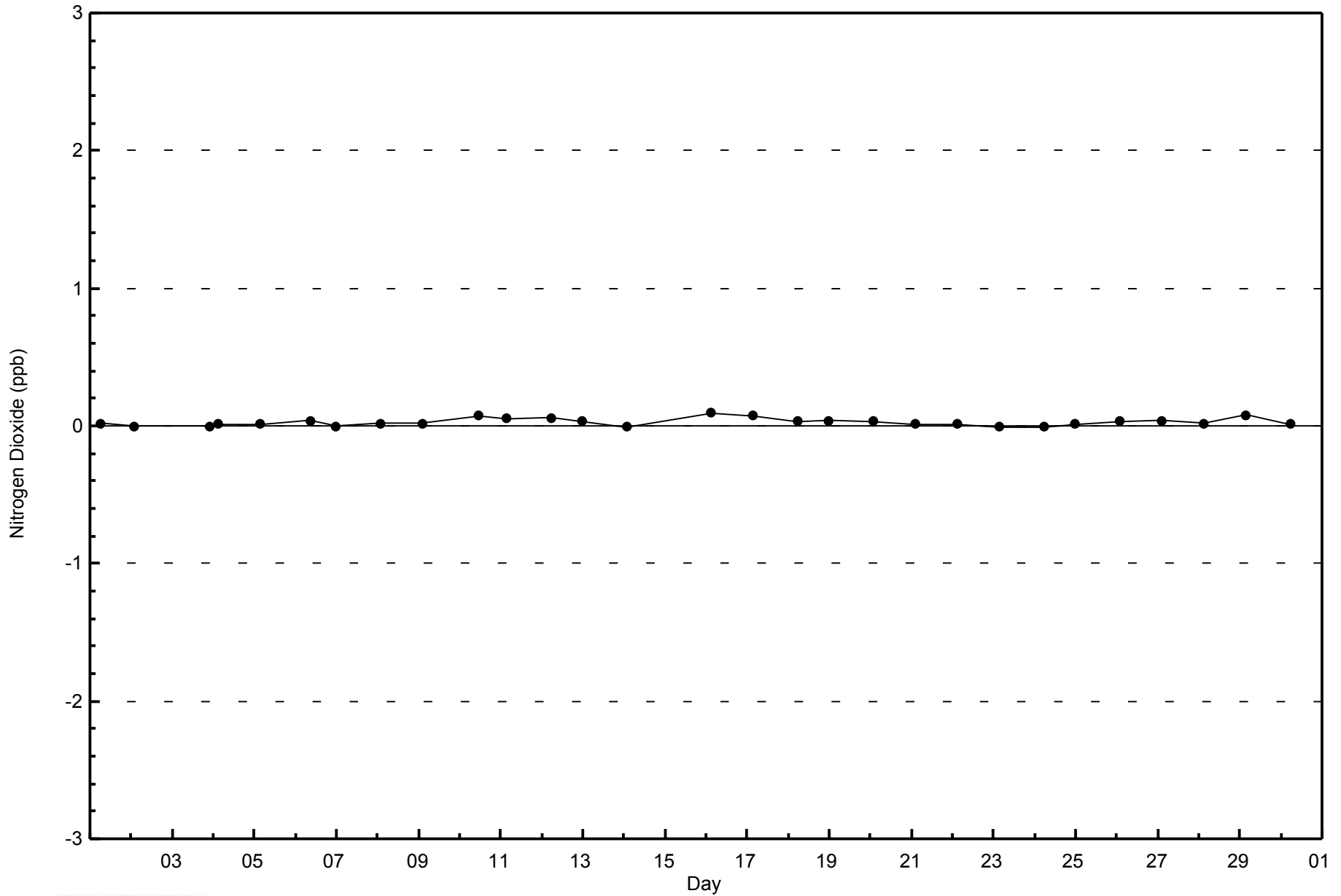


**Total Number of Valid Hours: 672**



WBEA  
Zero Responses

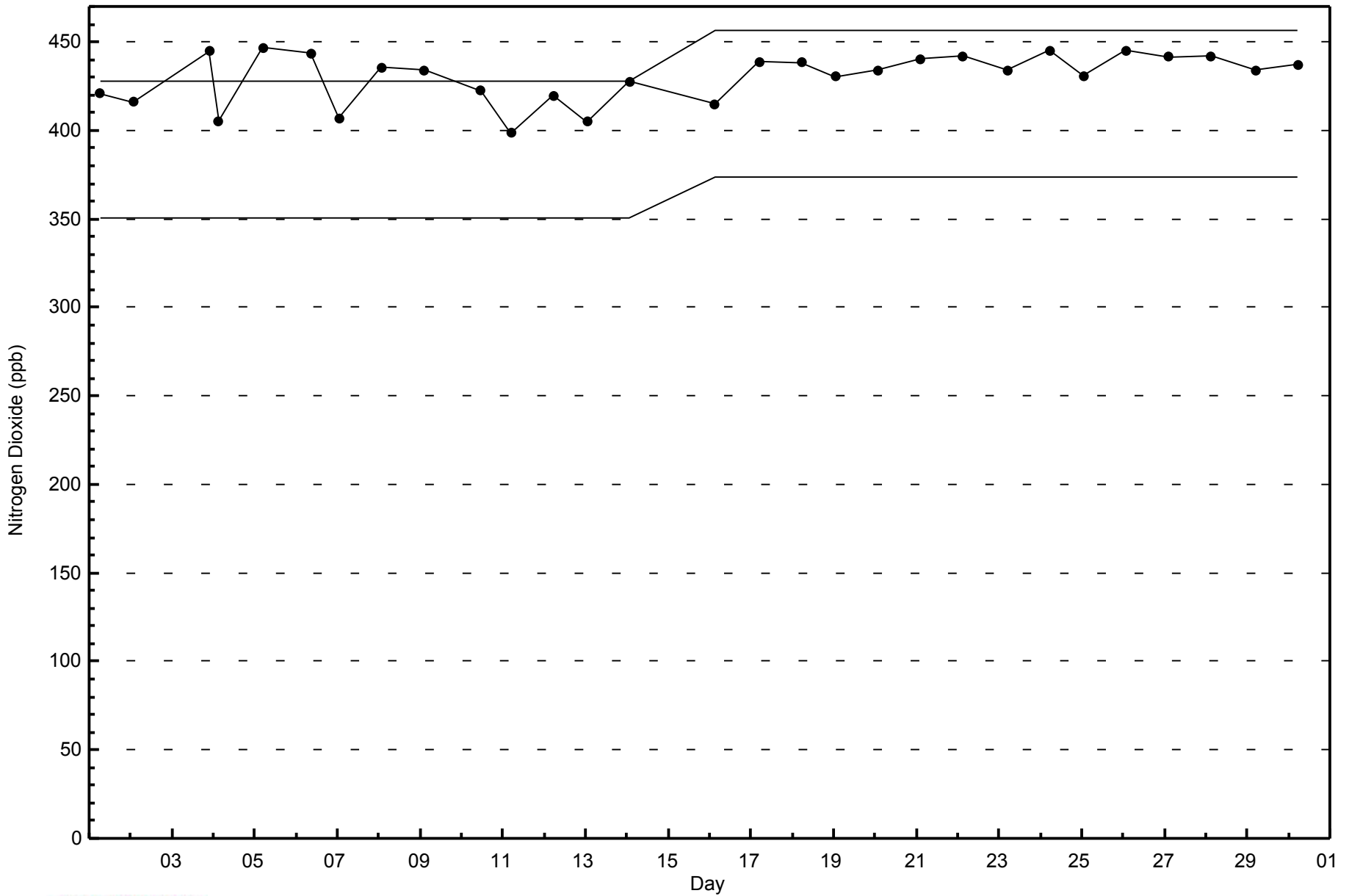
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - April 2015





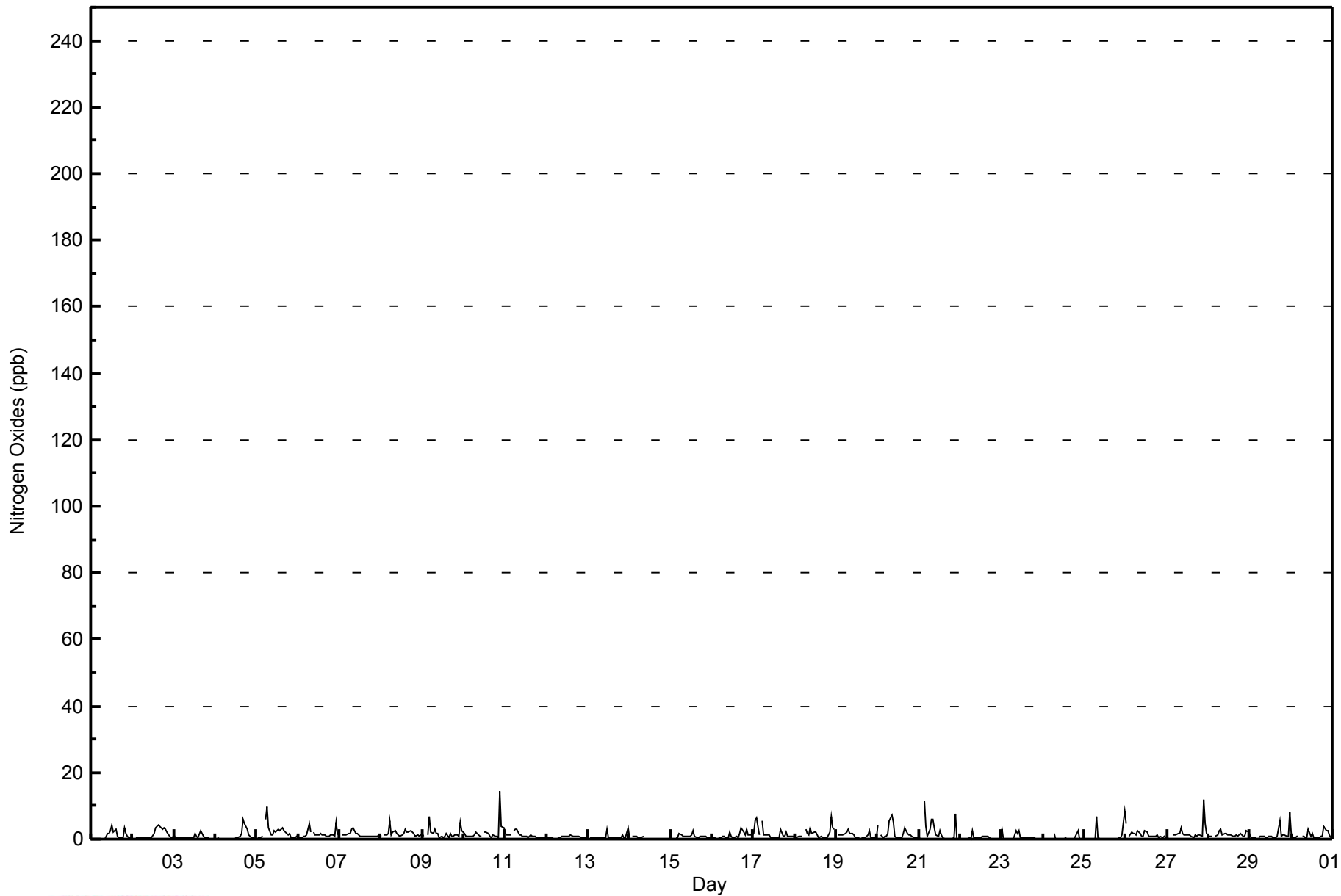
Maximum Value: 14 ppb on Apr 10 22:00																	Maximum Daily Average: 2.2 ppb on Apr 21																	Hours in Service: 720														
Minimum Value: 0 ppb on Apr 4 07:00																	Minimum Daily Average: 0.3 ppb on Apr 24																	Hours of Data: 673														
Maximum Diurnal Average: 2.0 ppb at hour 22																	Minimum Diurnal Average: 0.7 ppb at hour 2																	Hours of Missing Data: 47														
Monthly Average: 1.3 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 8																	Hours of Calibration: 47														
																	Percent Operational Time: 100.0																															
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Apr	0	0	0	0	0	0	Z	0	0	2	2	2	4	2	3	1	1	0	1	3	2	1	1	1																								
2-Apr	1	Z	0	0	0	0	0	0	0	0	0	1	2	3	4	4	4	3	3	3	2	1	0	0																								
3-Apr	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	1	0	0	0	Z	0	0																								
4-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	2	6	5	3	1	1	1	0	0																								
5-Apr	0	0	1	1	Z	6	10	4	1	1	3	2	3	3	3	3	3	2	1	2	0	0	0	1																								
6-Apr	1	1	0	1	1	1	5	2	Z	2	1	1	1	2	1	1	1	1	1	1	1	1	5	1																								
7-Apr	Z	1	1	1	1	2	2	3	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1																								
8-Apr	1	Z	1	1	2	6	1	2	3	2	1	1	1	2	3	2	2	3	2	2	1	1	1	1																								
9-Apr	2	1	Z	1	7	2	2	3	2	2	1	1	1	1	2	1	2	1	1	1	1	1	5	2																								
10-Apr	1	1	1	1	1	1	1	2	2	1	1	Z	2	2	2	1	1	1	1	1	1	14	4	4																								
11-Apr	1	1	1	1	Z	2	3	3	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0																								
12-Apr	0	0	0	1	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0																								
13-Apr	Z	0	0	0	0	1	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	0	4																								
14-Apr	1	Z	1	1	1	1	0	0	1	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C																								
15-Apr	C	C	Z	0	0	2	1	1	1	1	1	1	3	1	0	0	0	1	1	1	1	1	1	1																								
16-Apr	0	0	0	Z	0	1	1	1	1	0	2	1	0	1	0	2	4	2	1	3	1	1	1	1																								
17-Apr	2	6	6	1	Z	5	1	1	1	1	0	0	0	1	0	3	1	1	2	1	1	1	1	1																								
18-Apr	1	0	1	1	1	Z	3	2	1	3	2	2	2	1	1	0	1	0	0	2	7	3	3	3																								
19-Apr	Z	1	1	1	1	2	2	3	2	2	1	0	0	0	0	0	1	1	1	2	1	1	0	0																								
20-Apr	4	Z	1	1	1	1	2	5	7	5	1	0	0	0	1	2	3	2	1	1	1	0	0	0																								
21-Apr	0	0	Z	12	4	1	3	6	6	4	1	1	3	1	0	0	0	0	0	0	0	8	0	0																								
22-Apr	0	0	0	Z	0	0	0	3	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0																								
23-Apr	3	0	0	0	Z	0	0	0	2	2	3	0	0	0	0	0	0	1	0	0	0	0	0	0																								
24-Apr	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0																								
25-Apr	Z	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	8																								
26-Apr	5	Z	1	2	2	2	1	2	2	1	1	3	2	1	1	1	1	1	1	1	1	0	1	0																								
27-Apr	0	0	Z	1	1	1	2	2	4	2	1	1	1	1	1	1	1	1	1	1	1	12	5	2																								
28-Apr	1	1	1	Z	1	1	2	3	1	2	2	1	1	1	1	1	1	1	2	1	1	1	2	2																								
29-Apr	1	1	0	0	Z	1	1	1	1	1	1	1	1	1	0	1	1	6	1	1	1	1	1	8																								
30-Apr	2	1	0	1	1	Z	1	1	1	1	3	1	2	1	1	0	0	1	1	4	3	2	1	1																								
																								1.1	0.7	0.8	1.2	1.1	1.5	1.6	1.9	1.6	1.3	1.1	1.0	1.2	1.0	1.0	1.0	1.3	1.3	1.1	1.2	1.0	2.0	1.3	1.5	Diurnal Average
																								5	6	6	12	7	6	10	7	7	5	3	3	4	3	4	4	6	6	3	4	3	14	5	8	Diurnal Maximum
Z - zerospan C - Calibration																																																





**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	673	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: 673

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - April 2015**

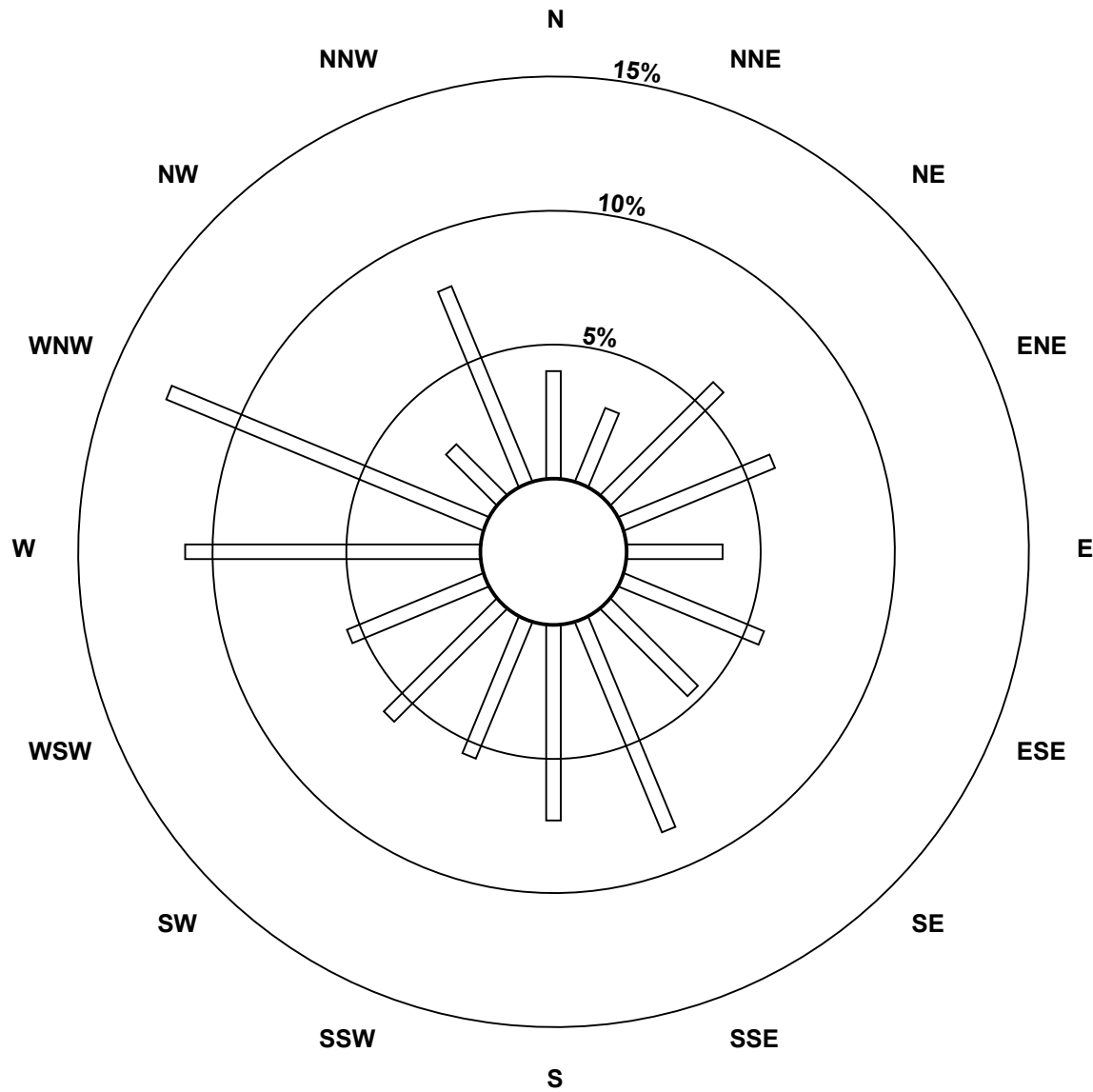
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	27	20	40	41	24	38	31	57	49	37	40	37	74	86	18	53	672
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	27	20	40	41	24	38	31	57	49	37	40	37	74	86	18	53	672

Total Number of Valid Hours: 672

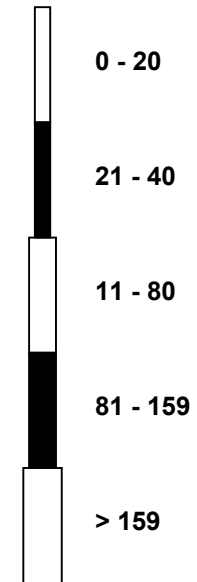
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

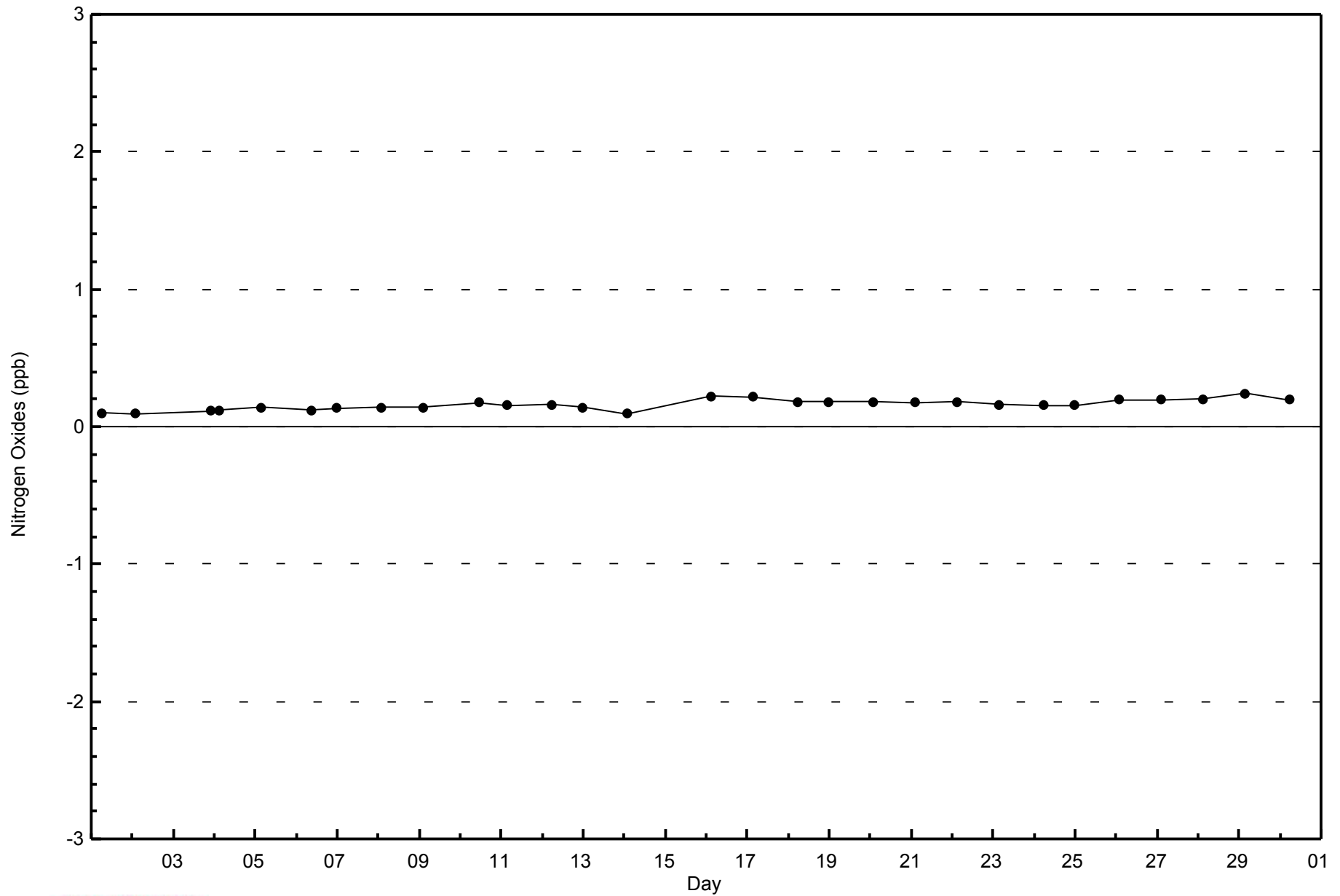
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac (AMS 14)



Classes (ppb)



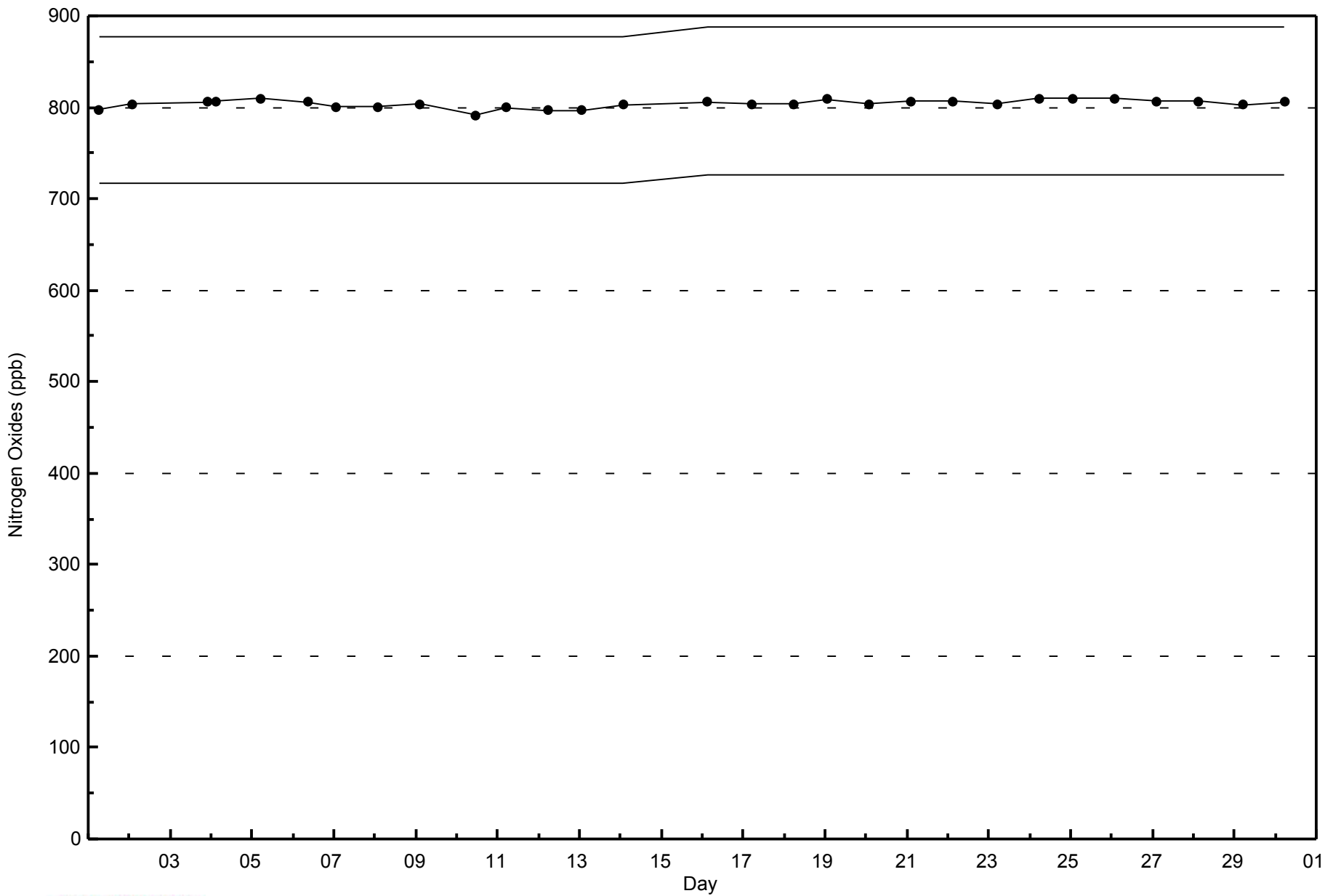
Total Number of Valid Hours: 672





**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - April 2015**





# Wood Buffalo Environmental Association

## Summary of Hour Averages

Ozone (O<sub>3</sub>) - ppb

Anzac - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 59 ppb on Apr 10 16:00	Maximum Daily Average: 46.2 ppb on Apr 10		Hours of Data:	676
Minimum Value: 5 ppb on Apr 19 06:00	Minimum Daily Average: 29.4 ppb on Apr 19		Hours of Missing Data:	44
Maximum Diurnal Average: 45.2 ppb at hour 17	Minimum Diurnal Average: 31.3 ppb at hour 6		Hours of Calibration:	34
Monthly Average: 38.5 ppb	Percentiles: P <sub>1</sub> = 13 P <sub>10</sub> = 28 Q <sub>1</sub> = 36 Median = 40 Q <sub>3</sub> = 43 P <sub>90</sub> = 47 P <sub>99</sub> = 55		Percent Operational Time:	98.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	44	43	43	42	41	40	37	37	Z	29	29	29	29	31	31	34	38	40	41	34	36	37	37	35	36.4	44	
2-Apr	35	35	37	Z	38	37	37	40	40	41	40	40	39	37	37	38	39	40	39	36	30	37	40	40	37.8	41	
3-Apr	41	41	42	42	41	41	42	42	43	43	43	42	43	43	42	43	43	43	43	38	38	39	39	Z	41.5	43	
4-Apr	M	M	M	M	M	Z	33	33	36	39	40	40	41	41	41	39	38	38	35	30	31	34	35	36.9	41		
5-Apr	28	24	24	23	23	19	Z	25	36	37	38	41	43	44	44	46	47	47	45	38	35	37	41	40	35.9	47	
6-Apr	40	41	41	40	37	31	31	36	38	39	Z	43	42	43	43	45	46	45	44	42	40	37	34	37	39.8	46	
7-Apr	35	36	Z	34	33	32	30	35	36	40	42	43	45	46	47	46	46	44	42	40	32	31	30	25	37.8	47	
8-Apr	25	21	23	Z	29	25	28	30	32	37	38	40	42	44	43	45	45	44	42	35	30	28	26	30	34.1	45	
9-Apr	34	37	38	37	Z	36	38	38	40	42	46	46	46	45	45	47	48	49	48	42	39	41	36	37	41.6	49	
10-Apr	39	43	42	44	43	42	42	43	44	50	52	53	54	Z	58	59	57	55	51	45	40	34	36	37	46.2	59	
11-Apr	44	42	34	39	40	35	Z	39	44	44	45	45	47	48	48	48	48	47	46	47	48	46	45	42	44.1	48	
12-Apr	41	42	41	40	39	40	40	Z	40	41	42	42	42	43	43	43	42	42	42	42	42	42	42	41	41.4	43	
13-Apr	41	40	Z	40	39	39	38	39	41	42	42	42	43	44	45	46	47	47	46	39	33	28	26	37	40.1	47	
14-Apr	37	37	37	Z	36	37	37	38	38	39	42	44	PF	PF	PF	PF	PF	43	39	39	37	37	35	32	37.9	44	
15-Apr	27	29	22	8	Z	14	32	37	37	39	C	C	C	C	46	47	47	45	45	38	37	44	44	44	35.9	47	
16-Apr	44	44	43	42	41	Z	40	41	41	42	44	46	47	49	50	48	47	47	47	39	38	43	44	44	43.9	50	
17-Apr	43	33	25	24	24	27	Z	38	42	47	47	47	47	48	47	46	43	41	38	38	36	32	18	16	36.9	48	
18-Apr	31	27	28	27	28	30	32	Z	37	36	36	34	37	40	41	42	43	41	37	34	23	13	10	10	31.1	43	
19-Apr	13	13	Z	12	7	5	9	25	36	41	42	43	43	43	44	44	44	44	44	35	29	22	25	15	29.4	44	
20-Apr	20	34	36	Z	42	40	37	34	34	37	43	45	46	46	46	46	46	47	46	35	31	35	32	24	38.4	47	
21-Apr	25	23	20	22	Z	23	21	28	32	38	41	43	44	47	47	47	47	46	44	43	41	40	40	39	36.5	47	
22-Apr	38	37	35	34	33	Z	33	33	35	36	37	37	39	41	43	45	44	40	39	39	38	38	38	38	37.8	45	
23-Apr	37	37	37	37	37	37	Z	37	37	38	39	39	41	42	43	42	42	41	41	41	41	39	37	36	39.0	43	
24-Apr	36	36	35	37	38	38	38	Z	37	37	36	38	40	42	43	43	42	42	41	39	34	38	36	33	38.4	43	
25-Apr	30	33	Z	23	19	19	29	28	30	32	34	36	38	39	40	40	40	40	39	40	36	31	27	22	18	31.4	40
26-Apr	18	19	22	Z	17	14	19	32	39	40	41	41	42	44	44	44	45	45	44	41	39	38	36	35	34.7	45	
27-Apr	35	34	31	26	Z	26	31	39	41	43	44	46	46	47	47	49	49	48	47	44	35	30	30	35	39.3	49	
28-Apr	35	36	38	36	29	Z	38	45	46	45	48	50	53	56	56	54	55	55	53	48	48	47	42	36	45.6	56	
29-Apr	41	39	42	45	47	46	Z	43	42	43	44	41	39	43	47	46	46	43	46	40	32	30	29	29	41.0	47	
30-Apr	41	44	43	41	41	41	40	Z	43	44	43	48	50	50	49	49	49	49	49	43	36	31	38	48	43.9	50	

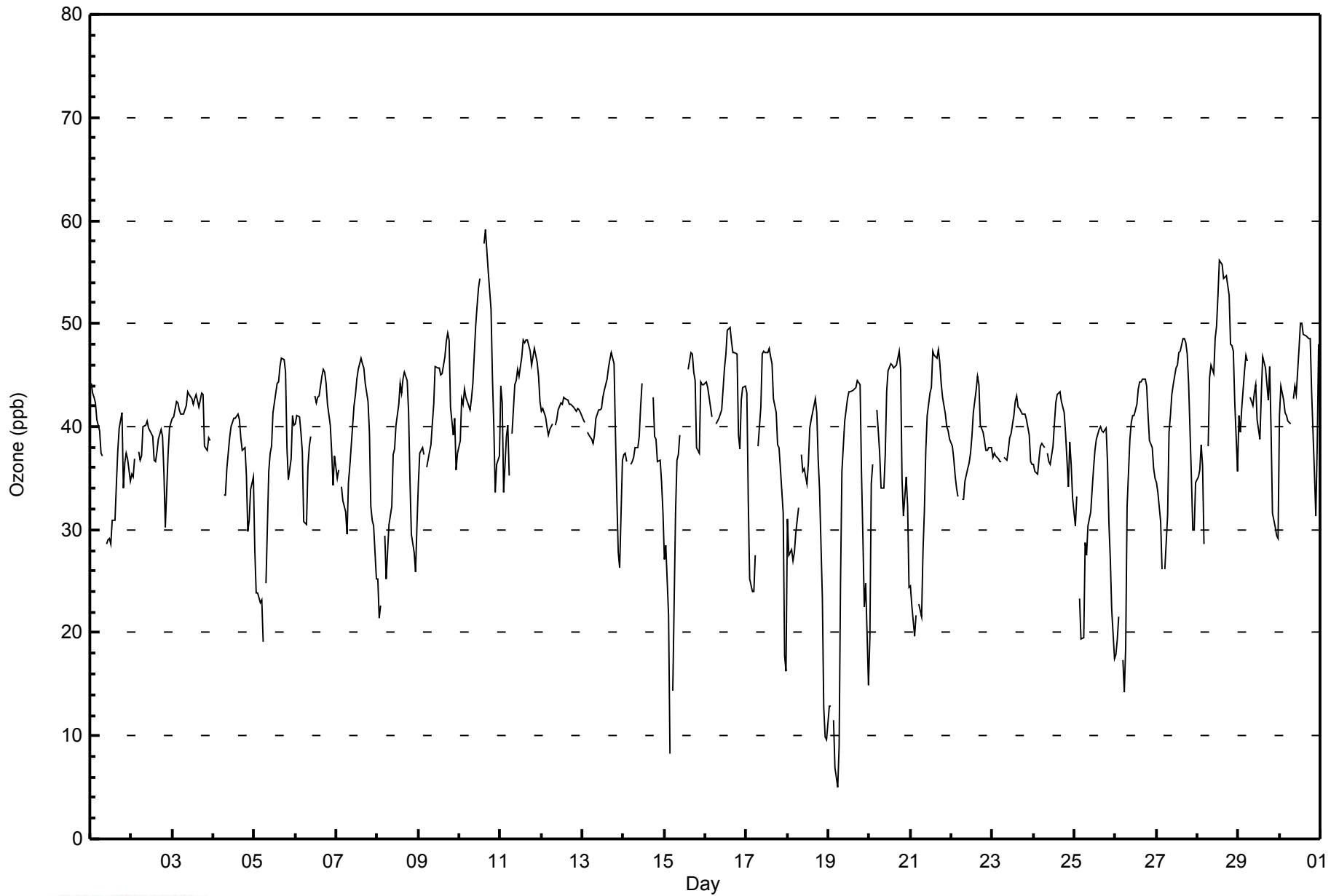
34.5	34.5	34.3	33.1	33.7	31.3	33.3	36.0	38.5	40.0	41.3	42.3	43.1	43.9	44.8	45.2	45.2	44.6	43.6	39.5	35.9	35.1	34.1	33.4	Diurnal Average	
44	44	43	45	47	46	42	45	46	50	52	53	54	56	58	59	57	55	53	48	48	47	45	48	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	25	3.70	3.70
21 - 50	636	94.08	97.78
51 - 82	15	2.22	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 676

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - April 2015**

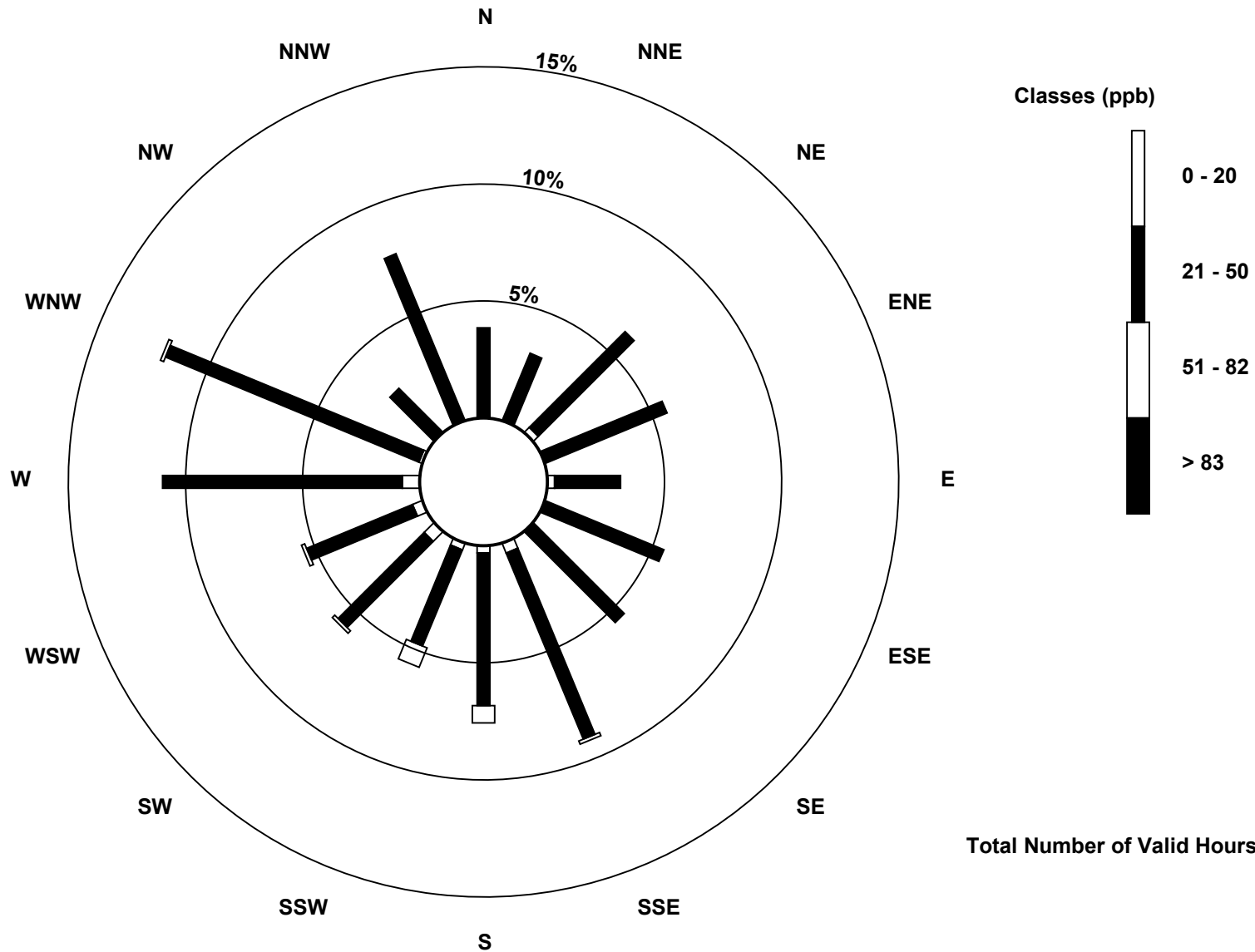
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	0	0	2	0	2	0	0	3	2	2	4	3	5	1	0	0	24
21 - 50	26	21	39	38	19	37	37	58	44	30	35	33	69	79	18	52	635
51 - 82	0	0	0	0	0	0	0	1	5	6	1	1	0	1	0	0	15
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	26	21	41	38	21	37	37	62	51	38	40	37	74	81	18	52	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Ozone (O<sub>3</sub>) - ppb  
Anzac (AMS 14)

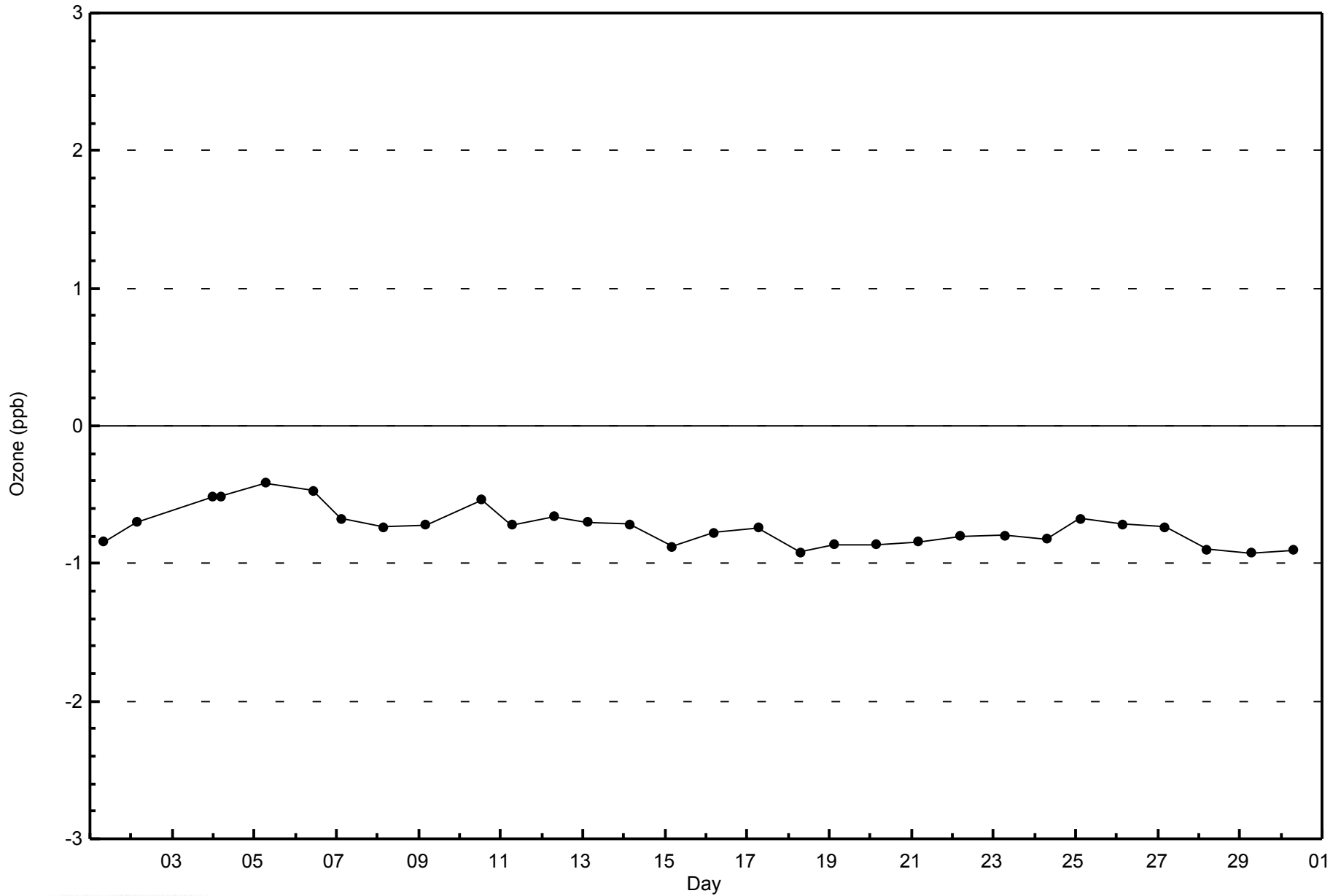


Total Number of Valid Hours: 674



WBEA  
Zero Responses

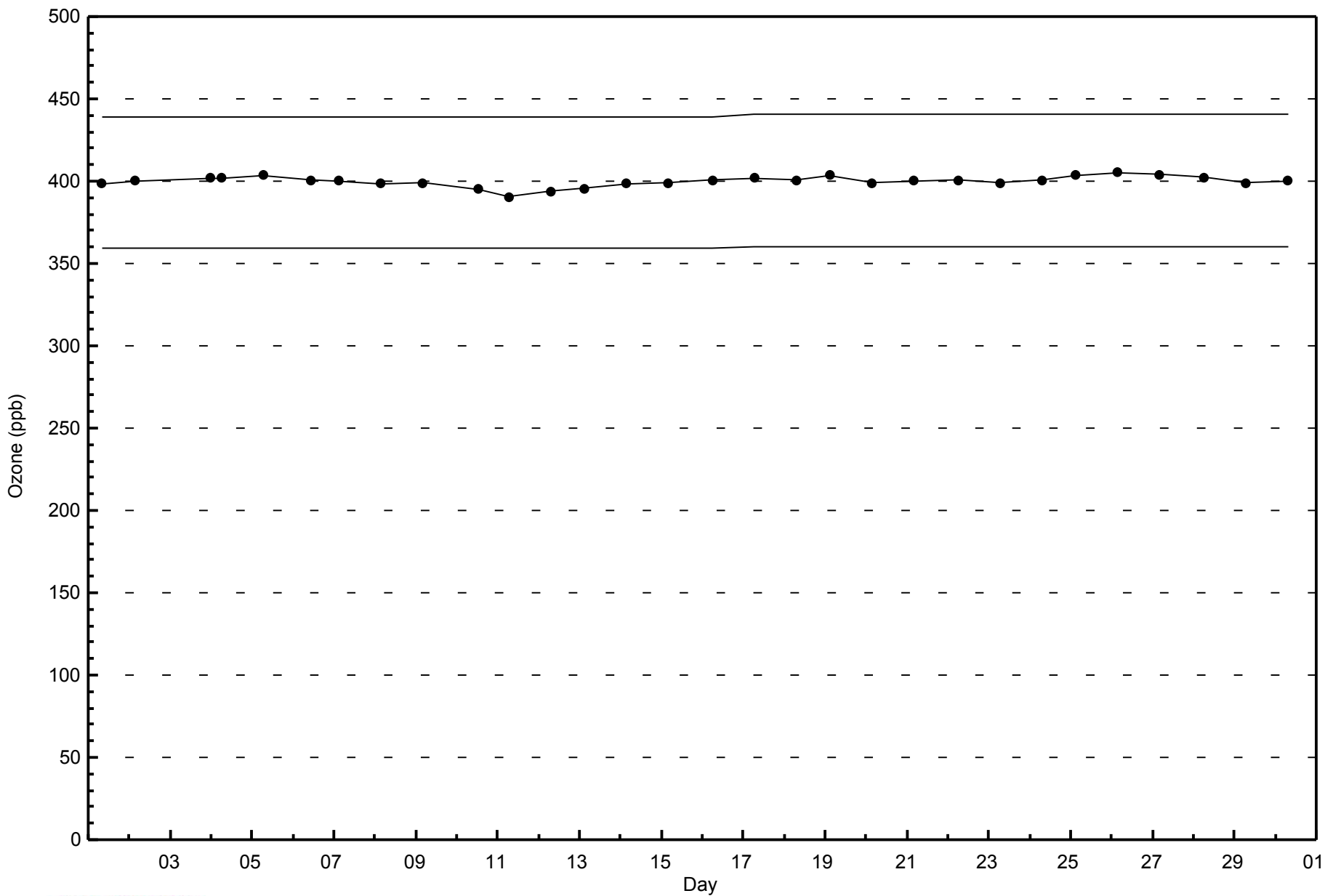
Ozone (O<sub>3</sub>) - ppb  
Anzac - April 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Anzac - April 2015





Summary of Hour Averages

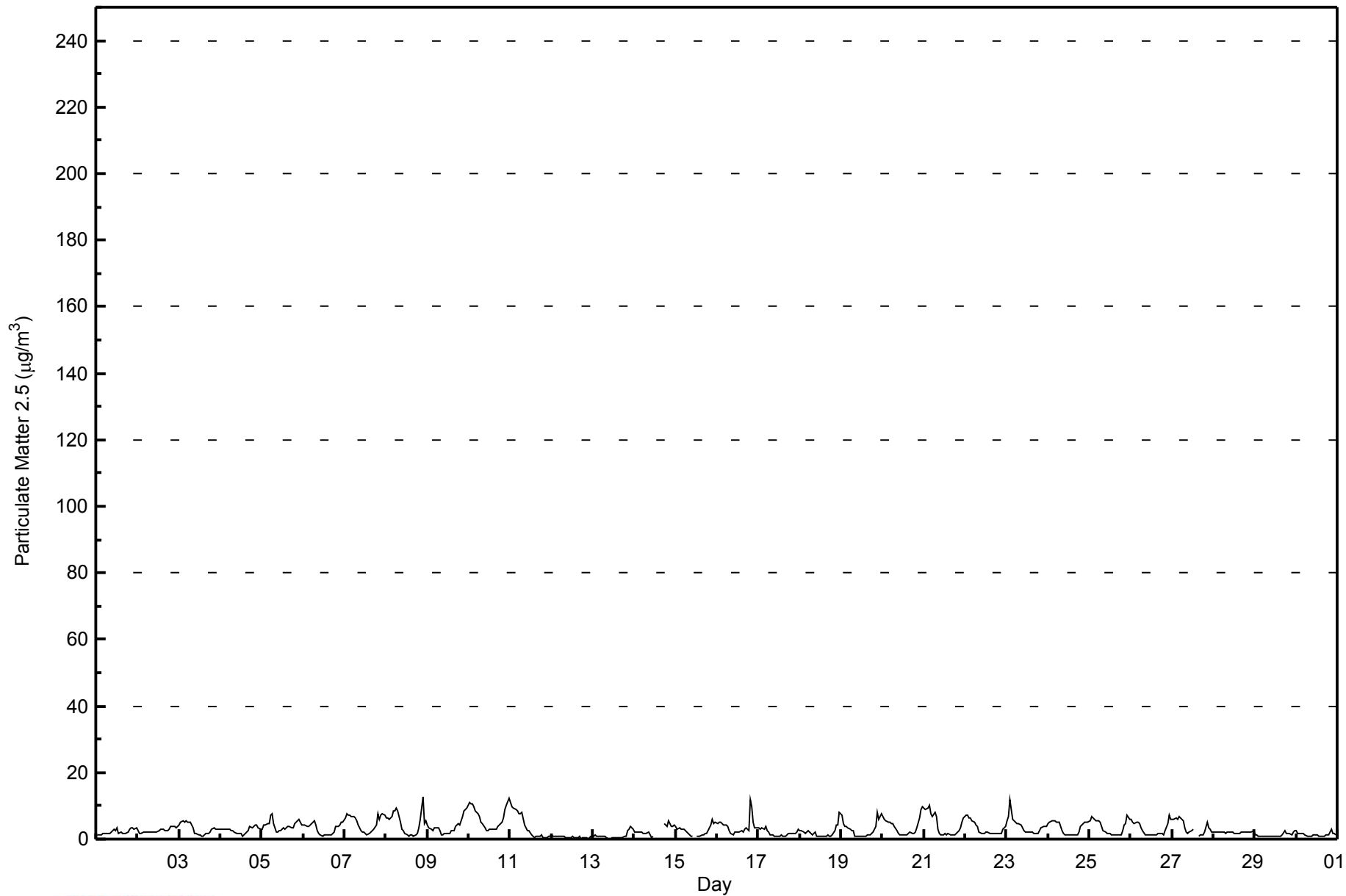
Anzac - April 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 12.6 µg/m <sup>3</sup> on Apr 8 22:00 Minimum Value: 0.1 µg/m <sup>3</sup> on Apr 13 11:00 Maximum Diurnal Average: 4.7 µg/m <sup>3</sup> at hour 24 Monthly Average: 3.07 µg/m <sup>3</sup>															Maximum Daily Average: 6.2 µg/m <sup>3</sup> on Apr 10 Minimum Daily Average: 0.6 µg/m <sup>3</sup> on Apr 12 Minimum Diurnal Average: 1.4 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 0.3 P <sub>10</sub> = 0.9 Q <sub>1</sub> = 1.4 Median = 2.3 Q <sub>3</sub> = 4.2 P <sub>90</sub> = 6.2 P <sub>99</sub> = 10.6															Hours in Service: 720 Hours of Data: 712 Hours of Missing Data: 8 Hours of Calibration: 0 Percent Operational Time: 98.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Apr	1.5	1.5	1.5	1.5	1.6	1.9	1.7	1.7	1.8	2.7	2.8	2.6	3.3	1.9	2.0	1.8	1.6	1.8	2.1	3.1	3.3	3.5	3.1	3.2	2.2	3.5					
2-Apr	2.4	1.8	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.6	2.8	3.0	3.0	2.7	2.5	2.8	3.6	3.8	3.8	3.4	3.7	2.6	3.8					
3-Apr	4.0	5.2	5.6	5.3	5.3	5.2	5.1	4.4	3.4	1.8	1.6	1.5	1.1	0.9	0.9	1.7	1.5	1.7	2.1	3.1	3.6	3.2	3.0	2.9	3.1	5.6					
4-Apr	2.9	3.0	2.9	3.1	3.1	2.8	2.7	2.4	2.1	1.7	1.5	1.6	1.7	1.0	1.5	2.2	2.5	3.7	3.5	4.0	4.4	4.3	3.6	3.2	2.7	4.4					
5-Apr	3.1	4.0	4.1	4.6	4.8	7.1	7.8	4.5	1.9	2.0	2.4	2.5	3.2	3.1	3.2	3.8	3.9	3.6	3.4	4.5	4.9	5.8	4.9	4.3	4.1	7.8					
6-Apr	4.2	4.1	3.8	3.9	4.2	4.6	5.5	4.3	2.4	1.8	1.1	0.9	1.2	1.3	1.4	1.3	1.3	1.6	1.9	3.7	3.9	4.2	5.1	5.3	3.1	5.5					
7-Apr	6.2	7.6	7.1	7.0	6.7	7.0	6.2	5.7	4.2	2.5	2.2	2.1	1.8	1.4	1.7	2.1	2.7	2.9	4.1	7.6	6.0	7.2	7.4	7.1	4.9	7.6					
8-Apr	6.2	6.3	6.1	6.7	8.6	8.4	9.5	8.4	5.0	3.0	2.6	1.8	1.4	1.0	1.3	1.1	1.0	1.2	1.8	3.2	6.1	12.6	4.8	5.3	4.7	12.6					
9-Apr	4.2	3.2	2.9	2.7	3.3	3.6	3.3	2.7	1.3	1.3	1.5	1.7	1.7	1.7	2.5	2.7	3.7	4.4	4.8	4.3	6.9	8.5	8.9	9.3	3.8	9.3					
10-Apr	10.8	10.7	10.5	9.6	8.3	7.6	7.0	5.1	4.6	3.4	2.5	2.7	2.8	3.0	3.1	2.9	3.1	3.9	4.6	5.3	6.3	8.8	10.0	12.1	6.2	12.1					
11-Apr	11.0	9.9	9.3	8.8	8.3	7.5	7.6	8.0	4.1	3.4	2.4	2.3	1.2	1.0	0.6	0.6	0.7	1.0	1.2	0.6	0.2	0.4	0.9	0.9	3.8	11.0					
12-Apr	1.4	1.0	1.0	1.0	1.0	1.0	1.1	0.8	0.3	0.3	0.3	0.3	0.7	0.4	0.3	0.6	0.6	0.6	0.2	0.5	0.2	0.3	0.2	0.3	1.0	0.6	1.4				
13-Apr	1.0	1.1	0.9	0.7	0.8	0.9	0.9	0.8	0.3	0.2	0.1	0.4	0.3	0.4	0.6	0.5	0.6	0.5	0.7	1.0	2.4	3.1	3.9	2.9	1.0	3.9					
14-Apr	2.3	2.3	2.2	2.3	2.0	1.9	1.9	1.9	2.1	1.2	0.6	0.8	PF	PF	PF	PF	PF	4.8	4.1	3.8	5.3	3.9	3.7	4.4	2.7	5.3					
15-Apr	3.7	3.0	3.2	3.1	2.9	2.9	2.3	1.8	1.1	0.8	0.9	M	0.9	0.9	0.9	1.1	1.1	1.6	1.8	2.5	4.3	6.0	4.5	5.2	2.5	6.0					
16-Apr	4.8	5.2	4.9	4.7	4.4	4.2	3.7	2.4	1.7	1.4	2.2	2.1	2.3	2.1	2.5	2.3	2.9	3.4	2.7	12.1	9.6	5.0	3.4	3.5	3.9	12.1					
17-Apr	3.4	2.8	3.2	3.0	3.6	2.6	2.1	1.4	1.1	0.8	0.9	0.9	1.0	1.1	1.0	0.8	0.9	1.6	1.5	1.8	1.8	1.8	2.0	2.8	1.8	3.6					
18-Apr	2.6	2.4	2.1	1.8	2.3	2.4	1.7	1.4	1.6	2.1	0.8	0.9	0.9	0.8	0.7	1.0	1.3	0.9	0.7	1.5	2.5	4.2	4.4	7.9	2.0	7.9					
19-Apr	7.1	4.7	4.0	3.7	3.3	3.1	2.5	2.4	0.9	0.8	0.9	0.8	0.8	1.0	0.9	1.2	1.2	1.5	2.2	3.1	3.8	7.9	6.1	7.7	3.0	7.9					
20-Apr	6.9	6.0	5.4	5.1	5.0	4.8	4.5	3.8	2.5	1.6	1.1	1.1	1.1	1.1	1.3	1.5	2.0	1.8	1.8	2.1	3.5	6.5	9.0	9.8	3.7	9.8					
21-Apr	9.4	9.0	9.4	10.0	7.5	6.8	8.0	7.0	3.1	1.8	1.3	1.4	1.7	1.4	1.5	1.4	1.4	1.3	1.3	1.6	2.6	3.4	5.2	6.5	4.3	10.0					
22-Apr	7.1	7.2	6.5	6.3	5.5	5.0	4.4	3.8	2.3	1.6	1.5	1.9	2.1	2.0	1.9	1.8	1.9	1.7	1.7	1.7	1.8	1.8	3.0	4.0	3.3	7.2					
23-Apr	5.7	6.7	11.8	5.9	5.7	5.0	4.8	4.5	4.1	3.5	2.3	2.1	2.2	2.2	2.1	1.9	1.8	1.8	1.8	2.6	3.4	3.9	3.6	3.9	3.9	11.8					
24-Apr	4.6	5.1	5.4	5.3	5.3	5.0	5.1	4.0	2.7	1.8	1.4	1.4	1.3	1.2	1.2	1.2	1.2	1.2	2.0	3.7	4.7	5.0	5.0	5.2	3.3	5.4					
25-Apr	5.5	6.8	6.4	5.9	5.6	5.7	4.9	3.8	2.4	2.1	1.7	1.7	1.5	1.5	1.4	1.4	1.4	1.4	1.4	2.5	4.1	4.8	7.2	6.0	3.6	7.2					
26-Apr	5.8	4.9	4.8	5.2	5.1	4.8	3.5	2.4	1.4	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.5	1.5	1.5	1.4	2.7	4.7	7.0	5.9	3.0	7.0					
27-Apr	5.7	5.9	6.3	6.1	6.8	6.3	5.7	3.6	2.0	1.9	1.9	2.5	2.8	M	M	1.0	1.2	1.3	1.3	2.1	4.9	3.2	3.1	2.0	3.5	6.8					
28-Apr	1.9	1.9	2.0	2.1	2.2	2.2	2.0	1.6	2.0	2.0	2.0	2.1	1.8	1.7	1.8	1.8	1.9	2.0	2.3	2.3	2.2	2.2	2.3	2.4	2.0	2.4					
29-Apr	1.4	1.1	0.7	0.6	0.7	0.7	0.8	0.9	0.8	0.7	0.7	0.8	0.9	0.8	0.9	1.0	1.3	2.6	1.6	1.7	1.5	1.3	2.0	2.5	1.2	2.6					
30-Apr	2.3	1.9	1.6	1.5	1.5	1.3	0.9	0.9	0.9	0.8	1.2	1.4	1.1	1.0	1.1	1.0	0.9	1.1	1.2	1.2	2.9	1.6	1.6	1.3	1.3	2.9					
																								Diurnal Average							
																								Diurnal Maximum							
4.6 4.5 4.6 4.3 4.3 4.1 4.0 3.3 2.2 1.7 1.5 1.6 1.6 1.4 1.5 1.6 1.7 2.0 2.2 3.1 3.8 4.4 4.4 4.7 11.0 10.7 11.8 10.0 8.6 8.4 9.5 8.4 5.0 3.5 2.8 2.7 3.3 3.1 3.2 3.8 3.9 4.8 4.8 12.1 9.6 12.6 10.0 12.1																															
M - Maintenance PF - Power Failure Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																															



**WBEA**  
**Hourly Averages**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	514	72.19	72.19
6 - 15	100	14.04	86.24
16 - 25	0	0.00	86.24
26 - 80	0	0.00	86.24
> 81.0	0	0.00	86.24

Total Number of Valid Hours: 712

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - April 2015**

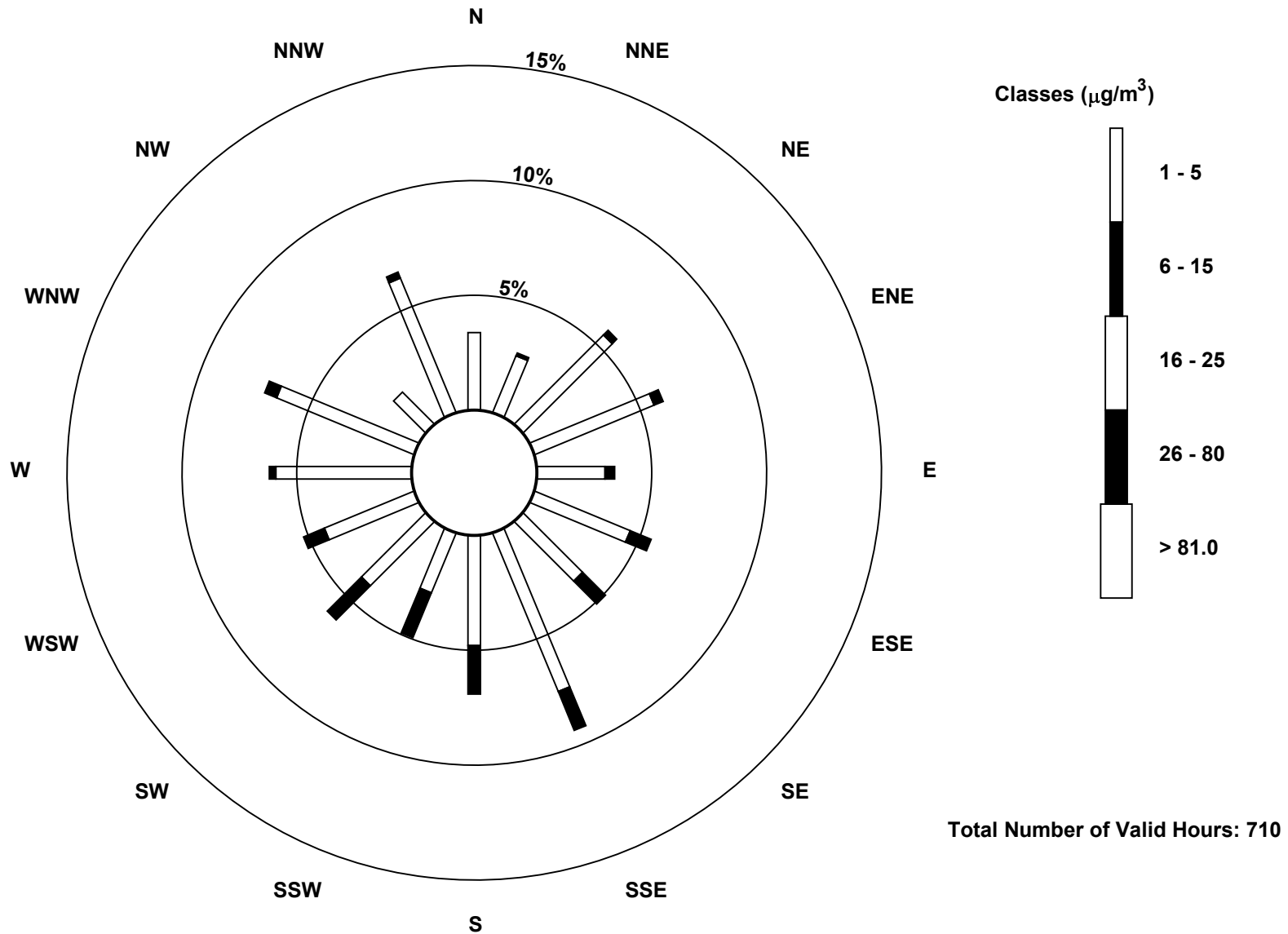
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	24	19	39	40	21	32	26	53	34	20	28	30	42	46	14	45	513
6 - 15	0	1	2	3	3	7	10	13	15	15	15	7	2	4	0	2	99
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	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
<b>Totals</b>	24	20	41	43	24	39	36	66	49	35	43	37	44	50	14	47	612

Total Number of Valid Hours: 710

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Anzac (AMS 14)



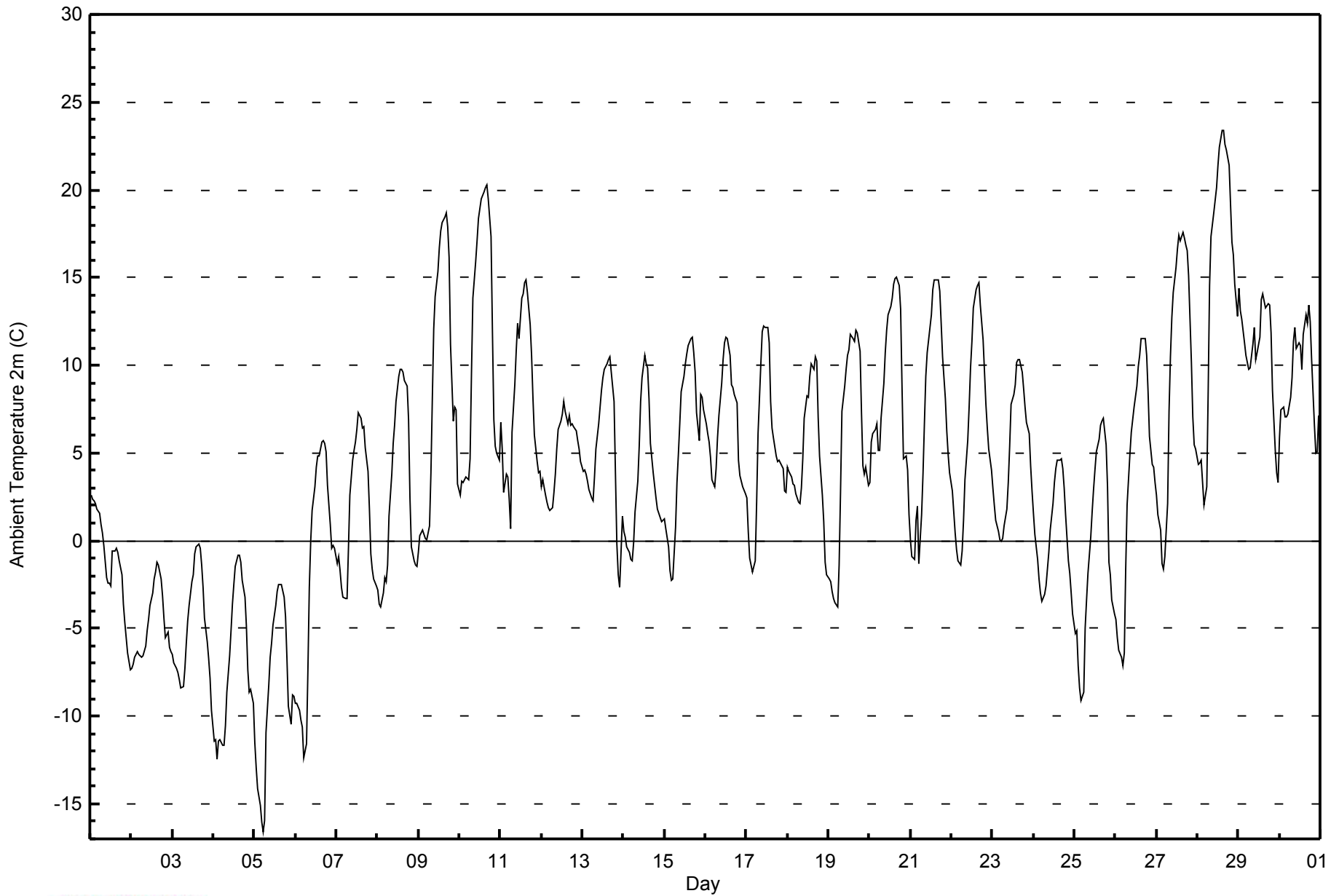


Maximum Value: 23.4 C on Apr 28 16:00																				Maximum Daily Average: 14.9 C on Apr 28					Hours in Service: 720																								
Minimum Value: -16.6 C on Apr 5 06:00																				Minimum Daily Average: -8.5 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 9.6 C at hour 15																				Minimum Diurnal Average: -1.6 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 4.06 C																				Percentiles: P <sub>1</sub> = -12.6 P <sub>10</sub> = -5.6 Q <sub>1</sub> = -1.1 Median = 4.0 Q <sub>3</sub> = 9.3 P <sub>90</sub> = 13.4 P <sub>99</sub> = 21.4					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-Apr	2.6	2.3	2.2	2.1	1.8	1.5	0.9	0.5	-0.2	-2.1	-2.4	-2.4	-2.5	-0.6	-0.6	-0.4	-0.7	-1.1	-1.9	-3.6	-4.6	-5.6	-6.4	-7.3	-1.2	2.6																							
2-Apr	-7.2	-7.1	-6.6	-6.3	-6.5	-6.6	-6.6	-6.6	-6.0	-5.1	-4.5	-3.7	-2.9	-2.2	-1.8	-1.2	-1.4	-2.2	-3.2	-4.4	-5.5	-5.2	-6.1	-6.3	-4.8	-1.2																							
3-Apr	-6.5	-7.0	-7.3	-7.5	-7.9	-8.4	-8.3	-7.3	-5.8	-4.6	-3.7	-2.4	-1.9	-0.8	-0.4	-0.2	-0.4	-1.4	-2.6	-4.4	-5.8	-6.7	-7.9	-9.7	-5.0	-0.2																							
4-Apr	-11.4	-11.4	-12.5	-11.4	-11.3	-11.7	-11.7	-10.5	-8.7	-6.5	-5.1	-3.6	-2.5	-1.5	-0.9	-0.9	-1.2	-2.3	-3.2	-4.9	-7.4	-8.6	-8.5	-9.3	-7.0	-0.9																							
5-Apr	-11.5	-12.9	-14.2	-15.1	-16.0	-16.6	-15.9	-11.0	-8.3	-6.6	-5.8	-4.8	-3.7	-2.9	-2.5	-2.5	-3.2	-3.2	-4.3	-6.7	-9.5	-10.5	-8.8	-8.9	-8.5	-2.5																							
6-Apr	-9.3	-9.3	-9.7	-10.2	-10.6	-12.4	-11.6	-7.3	-2.6	0.0	1.7	3.0	4.2	4.9	4.9	5.6	5.7	5.5	5.1	3.2	0.9	-0.4	-0.2	-0.4	-1.6	5.7																							
7-Apr	-1.3	-0.9	-1.7	-2.6	-3.2	-3.3	-3.3	-0.4	2.6	4.6	5.1	5.6	6.4	7.3	7.0	6.4	6.5	5.3	3.9	1.8	-0.7	-1.6	-2.1	-2.6	1.6	7.3																							
8-Apr	-2.8	-3.6	-3.8	-3.0	-2.1	-2.3	-1.4	1.4	3.8	5.5	6.6	7.9	9.3	9.7	9.8	9.6	9.2	8.8	6.9	2.4	-0.3	-1.1	-1.4	-1.4	2.8	9.8																							
9-Apr	-0.7	0.3	0.6	0.4	0.2	0.1	0.8	3.9	8.1	12.0	13.9	15.4	16.7	17.6	18.1	18.5	18.7	17.9	16.1	11.2	6.8	7.6	7.5	3.3	9.0	18.7																							
10-Apr	2.6	3.4	3.3	3.5	3.6	3.4	4.7	9.5	13.8	15.9	17.1	18.4	19.0	19.5	19.9	20.1	20.3	19.5	17.3	11.9	6.9	5.4	5.0	4.6	11.2	20.3																							
11-Apr	6.7	5.2	2.7	3.8	3.6	2.3	0.7	6.2	8.9	10.8	12.4	11.5	13.8	14.1	14.7	14.9	14.1	12.3	10.5	8.1	6.0	4.5	3.9	3.9	8.2	14.9																							
12-Apr	3.1	3.5	2.6	2.2	1.9	1.7	1.9	2.7	3.8	5.2	6.3	6.8	7.2	7.9	7.4	6.6	7.1	6.6	6.7	6.5	6.2	5.7	5.3	4.5	5.0	7.9																							
13-Apr	3.9	4.0	3.8	3.4	2.9	2.5	2.2	3.6	5.2	6.6	7.6	8.6	9.3	9.8	10.1	10.4	10.5	9.6	7.9	3.8	-0.2	-1.9	-2.6	1.4	5.1	10.5																							
14-Apr	0.6	0.2	-0.4	-0.6	-1.1	-1.1	-0.1	1.7	3.4	5.4	7.9	9.3	10.6	10.1	9.9	8.1	5.5	3.9	3.1	2.4	1.8	1.3	1.1	1.1	3.5	10.6																							
15-Apr	1.2	0.7	-0.4	-1.7	-2.2	-2.2	0.8	3.4	4.9	6.7	8.5	9.3	10.1	10.6	11.2	11.5	11.6	10.7	9.6	7.3	5.7	8.3	8.2	7.5	5.9	11.6																							
16-Apr	6.6	6.1	5.6	4.7	3.5	3.1	4.1	5.8	7.2	9.0	10.3	11.3	11.6	11.5	10.5	8.9	8.7	8.4	7.8	4.6	3.7	3.4	3.1	2.7	6.8	11.6																							
17-Apr	2.4	0.5	-1.0	-1.8	-1.5	-1.2	2.2	6.1	10.1	12.0	12.2	12.2	12.1	11.2	7.9	6.4	5.9	4.8	4.5	4.6	4.4	4.1	2.8	2.7	5.2	12.2																							
18-Apr	4.2	3.9	3.7	3.3	3.1	2.7	2.2	2.1	3.0	4.7	7.0	8.3	8.1	9.4	10.1	9.8	10.4	10.2	7.1	4.8	2.6	1.1	-1.2	-2.0	4.9	10.4																							
19-Apr	-2.2	-2.4	-2.9	-3.3	-3.6	-3.8	-1.4	2.8	7.4	8.8	9.8	10.6	10.9	11.7	11.6	11.4	12.0	11.8	10.8	7.3	4.3	3.8	4.2	3.1	5.1	12.0																							
20-Apr	3.3	5.7	6.1	6.3	6.7	5.2	5.2	7.0	9.0	10.7	12.0	12.9	13.4	13.9	14.6	14.9	15.0	14.5	13.2	8.7	4.7	4.8	4.0	1.5	8.9	15.0																							
21-Apr	0.1	-0.9	-1.1	1.1	2.0	-1.3	1.5	3.8	6.6	9.4	10.7	12.1	12.9	14.3	14.8	14.9	14.9	14.2	12.4	10.5	8.1	6.2	4.9	3.9	7.3	14.9																							
22-Apr	2.9	1.7	0.4	-0.5	-1.2	-1.4	-0.6	1.2	3.4	5.7	7.6	9.8	11.3	13.3	14.3	14.5	14.7	13.4	11.5	9.6	7.8	6.4	5.2	4.1	6.5	14.7																							
23-Apr	3.0	2.0	1.2	0.5	0.1	0.0	0.1	0.8	1.8	3.3	5.4	7.8	8.3	8.9	10.1	10.3	10.3	9.6	8.6	7.6	6.7	6.1	4.3	2.9	5.0	10.3																							
24-Apr	1.5	0.4	-1.1	-2.2	-3.0	-3.4	-3.0	-2.6	-1.6	-0.7	0.6	2.1	3.3	4.1	4.6	4.6	4.7	4.1	3.0	1.4	-1.1	-1.9	-3.0	-4.2	0.3	4.7																							
25-Apr	-5.3	-5.1	-7.1	-8.4	-9.1	-8.6	-5.0	-3.4	-1.8	0.2	1.6	2.9	4.0	5.0	5.8	6.6	6.8	7.0	5.5	3.1	-1.2	-2.0	-3.4	-4.2	-0.7	7.0																							
26-Apr	-4.5	-5.5	-6.3	-6.7	-7.2	-6.4	-1.6	2.1	4.9	6.2	6.9	7.7	8.8	9.9	10.6	11.5	11.5	11.5	10.5	8.5	6.0	4.4	4.2	3.3	3.8	11.5																							
27-Apr	2.6	1.5	0.6	-1.3	-1.6	-0.9	2.1	7.4	10.5	12.7	14.1	15.6	16.6	17.4	17.1	17.6	17.3	16.9	16.6	15.1	10.2	7.1	5.5	5.2	9.4	17.6																							
28-Apr	4.4	4.4	4.6	3.3	2.1	3.1	8.5	14.6	17.3	18.7	19.4	20.1	21.4	22.4	23.4	23.4	22.6	22.3	21.4	19.2	17.0	16.3	14.6	12.8	14.9	23.4																							
29-Apr	14.4	13.1	12.6	11.3	10.6	10.1	9.8	9.8	11.2	12.1	10.4	10.7	11.6	13.7	14.1	13.7	13.3	13.5	13.4	11.9	8.6	5.2	3.9	3.3	10.9	14.4																							
30-Apr	5.8	7.4	7.6	7.0	7.1	7.2	8.1	9.3	11.3	12.2	11.0	11.3	11.1	9.8	11.7	12.8	12.4	13.4	12.5	10.3	6.6	5.0	5.1	7.1	9.3	13.4																							
																								0.3	0.0	-0.6	-1.0	-1.3	-1.6	-0.5	1.9	4.1	5.8	6.8	7.8	8.6	9.3	9.6	9.6	9.4	8.9	7.7	5.4	3.0	2.0	1.4	0.8	Diurnal Average	
																								14.4	13.1	12.6	11.3	10.6	10.1	9.8	14.6	17.3	18.7	19.4	20.1	21.4	22.4	23.4	23.4	22.6	22.3	21.4	19.2	17.0	16.3	14.6	12.8	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	217	30.14	30.14
0 - 10	343	47.64	77.78
10 - 20	150	20.83	98.61
> 20	10	1.39	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Summary of Hour Averages

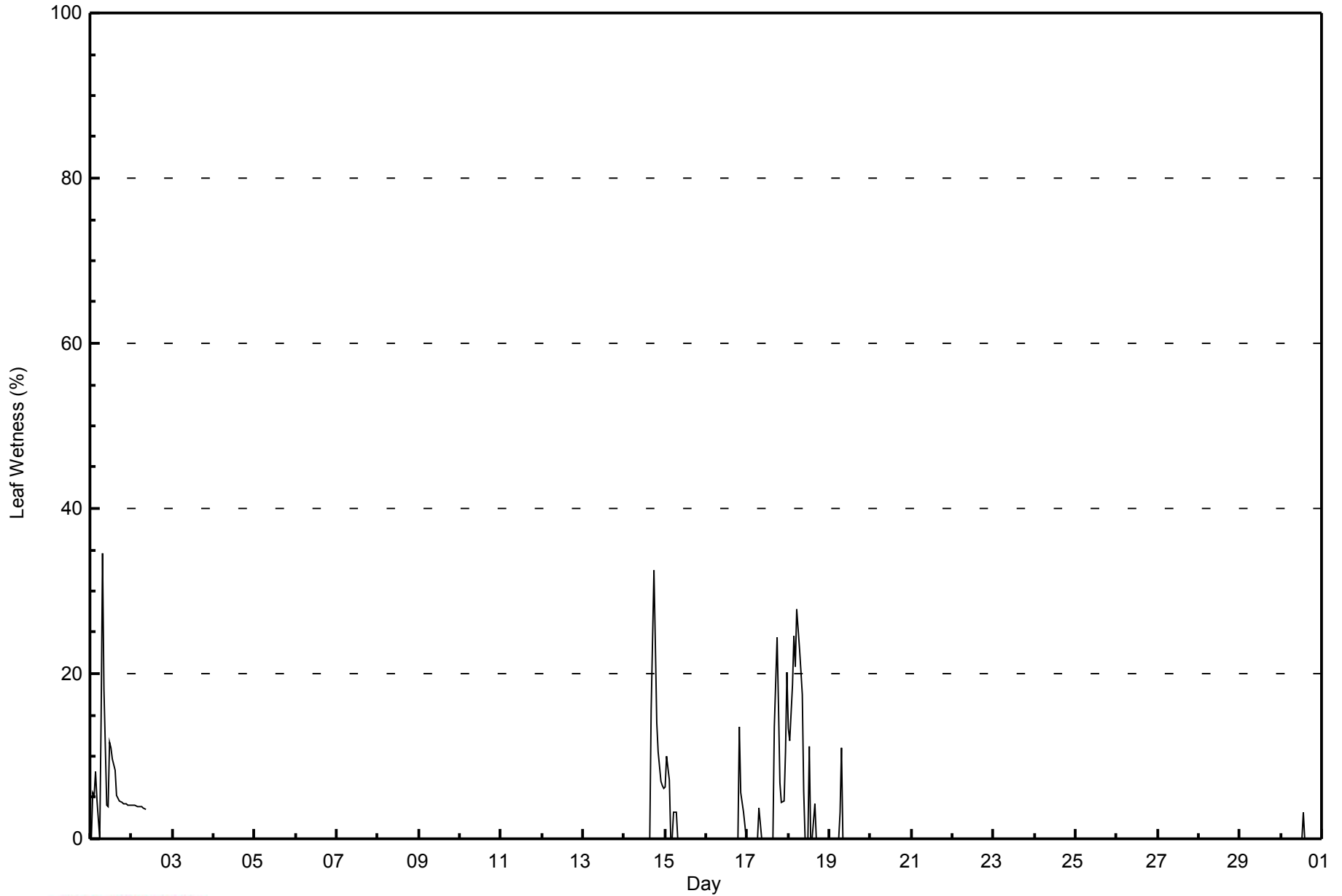
Anzac - April 2015

Maximum Value: 35 % on Apr 1 08:00																	Maximum Daily Average: 8.3 % on Apr 18																	Hours in Service: 720	
Minimum Value: 0 % on Apr 1 01:00																	Minimum Daily Average: 0.0 % on Apr 12																	Hours of Data: 500	
Maximum Diurnal Average: 3.5 % at hour 8																	Minimum Diurnal Average: 0.2 % at hour 11																	Hours of Missing Data: 220	
Monthly Average: 1.4 %																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 4 P <sub>99</sub> = 24																	Hours of Calibration: 0	
																																		Percent Operational Time: 69.4	
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-Apr	0	6	5	8	5	0	15	35	18	4	4	12	11	10	8	5	5	5	4	4	4	4	4	4	7.5	35									
2-Apr	4	4	4	4	4	4	4	4	4	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	4										
3-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
4-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
5-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
6-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
7-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
8-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
9-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
10-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--										
11-Apr	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	M	0	0	0	0	0	0	0	0	0	0	--	0										
12-Apr	0	0	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-Apr	0	0	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-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	32	23	14	10	7	6	4.8	32										
15-Apr	6	10	7	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	10										
16-Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	6	4	3	0	1.1	14										
17-Apr	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	14	24	16	7	4	5	10	20	4.3	24										
18-Apr	13	12	19	25	21	28	23	20	18	6	0	11	0	0	4	0	0	0	0	0	0	0	0	8.3	28										
19-Apr	0	0	0	0	0	0	3	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	11										
20-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	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-Apr	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0.1	3										
																	1.1 1.5 1.7 1.7 1.4 1.7 2.3 3.5 1.9 0.5 0.2 0.6 1.1 0.6 0.4 0.5 1.6 2.9 2.1 1.8 1.2 1.0 1.2 1.4																	Diurnal Average	
																	13 12 19 25 21 28 23 35 18 6 4 12 11 10 8 5 16 32 23 14 10 7 10 20																	Diurnal Maximum	
M - Maintenance																	AF - Analyzer Failure																		



**WBEA**  
**Hourly Averages**

**Leaf Wetness (SW) - %**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Leaf Wetness (SW) - %**  
**Anzac - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	428	85.60	85.60
0.4 - 0.5	0	0.00	85.60
0.6 - 0.7	0	0.00	85.60
0.8 - 1.4	0	0.00	85.60
1.5 - 10	45	9.00	94.60
> 10	27	5.40	100.00

Total Number of Valid Hours: 500

Total Number of Hours: 720



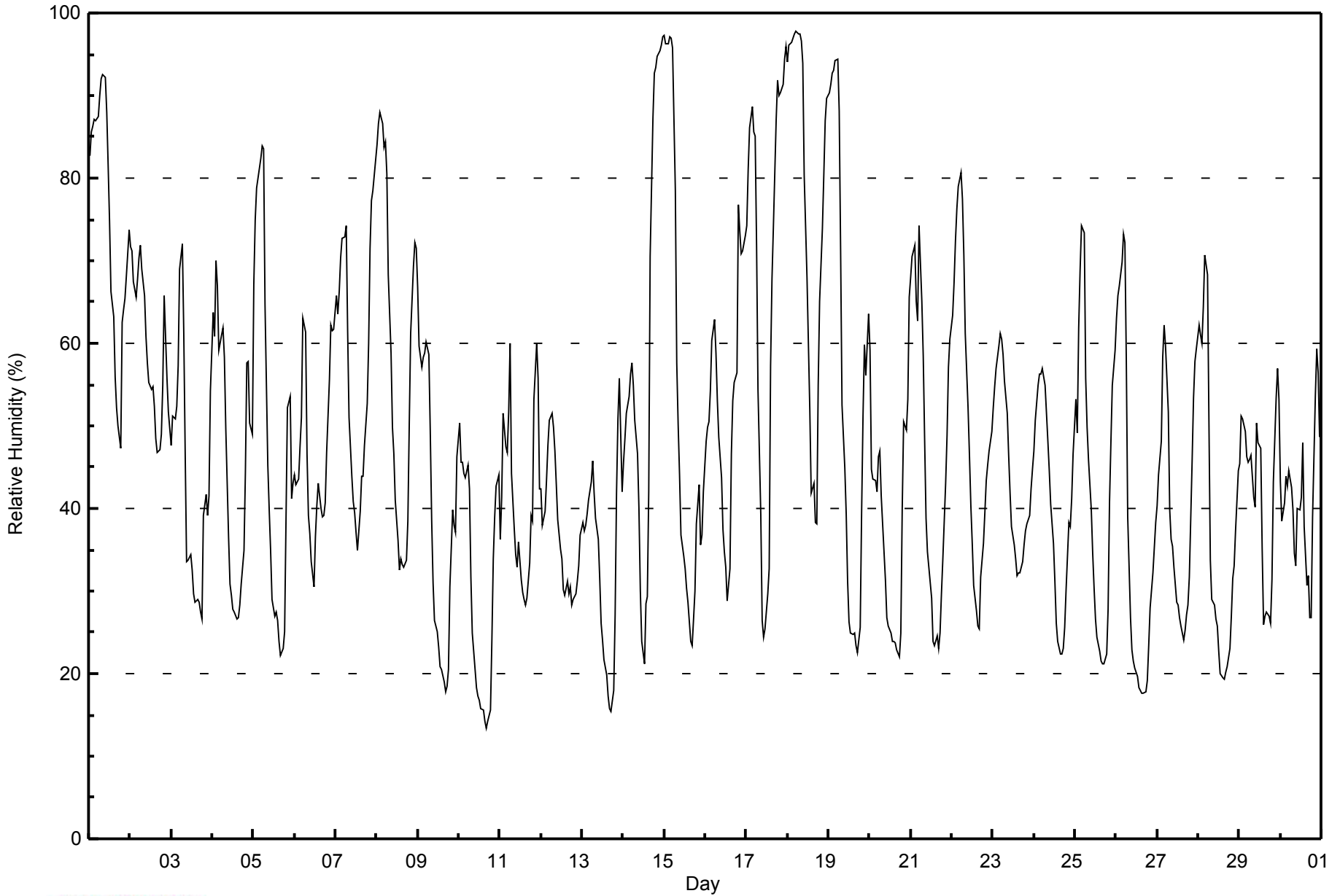


Maximum Value: 98 % on Apr 18 06:00																			Maximum Daily Average: 76.6 % on Apr 18						Hours in Service: 720																								
Minimum Value: 13 % on Apr 10 17:00																			Minimum Daily Average: 30.0 % on Apr 10						Hours of Data: 720																								
Maximum Diurnal Average: 67.3 % at hour 6																			Minimum Diurnal Average: 30.8 % at hour 15						Hours of Missing Data: 0																								
Monthly Average: 48.1 %																			Percentiles: P <sub>1</sub> = 15 P <sub>10</sub> = 24 Q <sub>1</sub> = 32 Median = 45 Q <sub>3</sub> = 60 P <sub>90</sub> = 78 P <sub>99</sub> = 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-Apr	83	86	86	87	87	87	90	92	92	92	88	81	75	66	63	56	52	50	47	63	64	65	68	74	74.8	92																							
2-Apr	72	71	68	66	68	70	72	69	66	61	58	55	54	55	52	48	47	47	49	55	66	56	52	50	59.4	72																							
3-Apr	48	51	51	52	57	69	72	61	47	34	34	34	33	30	29	29	29	28	27	39	42	39	41	54	42.8	72																							
4-Apr	64	61	70	67	59	61	62	58	50	36	31	29	28	27	27	27	28	31	35	44	58	58	50	49	46.3	70																							
5-Apr	67	75	79	81	82	84	84	65	45	40	35	29	27	28	26	24	22	23	25	39	52	54	41	43	48.7	84																							
6-Apr	44	43	44	47	51	63	61	47	39	37	34	31	37	40	43	40	39	39	41	47	56	62	62	62	46.1	63																							
7-Apr	66	64	66	70	73	73	74	62	51	44	41	39	37	35	40	44	44	48	53	60	71	77	79	82	58.0	82																							
8-Apr	84	87	88	87	84	84	80	68	59	50	47	41	36	33	34	33	33	34	39	50	61	69	72	71	59.3	88																							
9-Apr	67	60	57	58	59	60	59	49	39	31	26	25	23	21	20	19	18	18	20	30	40	38	37	46	38.4	67																							
10-Apr	50	46	46	44	44	45	42	32	25	20	18	17	17	16	16	14	13	14	16	24	34	39	43	44	30.0	50																							
11-Apr	36	41	51	47	47	52	60	44	37	34	33	36	31	30	29	28	29	33	39	39	53	60	56	42	41.3	60																							
12-Apr	42	38	40	43	48	51	52	50	47	43	39	35	34	30	29	31	30	31	28	29	30	31	33	37	37.5	52																							
13-Apr	38	37	38	39	41	43	46	42	39	36	32	26	24	22	20	17	16	15	18	27	42	51	56	42	33.6	56																							
14-Apr	46	48	52	53	56	58	55	51	47	40	30	24	21	29	29	42	71	87	93	93	95	95	96	97	58.6	97																							
15-Apr	97	96	96	97	97	96	78	58	50	44	37	34	33	30	29	24	23	27	30	38	43	36	37	42	53.0	97																							
16-Apr	48	50	51	54	60	63	59	53	49	44	37	35	33	29	33	47	53	55	57	77	74	71	71	73	53.1	77																							
17-Apr	74	81	86	89	86	85	72	54	39	27	24	25	30	33	57	68	74	87	92	90	90	91	94	96	68.6	96																							
18-Apr	94	96	97	97	98	98	98	97	97	94	80	68	60	52	42	43	38	38	55	65	74	80	87	90	76.6	98																							
19-Apr	90	91	93	93	94	94	88	71	52	45	39	31	26	25	25	25	23	22	26	39	51	60	56	64	55.2	94																							
20-Apr	59	45	44	43	42	46	47	41	35	31	27	26	25	24	24	24	23	22	25	40	50	50	53	66	38.0	66																							
21-Apr	68	70	72	65	63	74	65	58	48	39	35	31	29	24	23	25	23	25	30	34	43	49	57	60	46.3	74																							
22-Apr	63	67	72	76	79	81	77	71	61	52	46	40	36	31	28	26	25	32	36	39	43	45	47	49	51.0	81																							
23-Apr	52	55	57	60	61	61	59	55	52	46	42	38	36	34	32	32	32	33	36	37	38	39	42	45	44.7	61																							
24-Apr	47	51	55	56	56	57	55	52	48	45	41	36	31	26	24	22	22	23	26	30	38	38	41	47	40.3	57																							
25-Apr	53	49	62	69	74	73	56	50	46	40	35	30	27	24	23	22	21	21	22	28	41	48	55	59	42.8	74																							
26-Apr	63	66	67	70	73	72	58	39	27	23	22	21	20	18	18	18	18	18	19	23	28	32	35	38	36.9	73																							
27-Apr	40	44	48	58	62	60	52	40	36	35	33	29	28	27	26	24	25	27	28	32	46	53	58	59	40.5	62																							
28-Apr	62	61	60	64	71	68	50	34	29	28	27	26	23	20	19	19	20	21	23	27	31	33	37	45	37.5	71																							
29-Apr	45	51	51	49	46	46	46	46	41	40	50	48	47	35	26	27	27	27	26	31	43	53	57	53	42.3	57																							
30-Apr	43	38	41	44	43	45	43	40	35	33	40	40	41	48	38	31	32	27	27	39	54	59	56	49	41.0	59																							
																								60.2	60.6	62.8	64.3	65.3	67.3	63.7	55.0	47.6	42.2	38.6	35.4	33.4	31.3	30.8	30.9	31.7	33.5	36.2	43.7	51.7	54.4	55.7	57.6	Diurnal Average	
																								97	96	97	97	98	98	98	97	97	94	88	81	75	66	63	68	74	87	93	93	95	95	96	97	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Anzac - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	26	3.61	3.61
20 - 40	268	37.22	40.83
40 - 60	245	34.03	74.86
60 - 80	110	15.28	90.14
80 - 100	71	9.86	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 22 km/h on Apr 13 08:00	Maximum Daily Speed Average: 15.8 km/h on Apr 22	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 5 03:00	Minimum Daily Speed Average: 1.6 km/h on Apr 20	Hours of Data: 718
Maximum Diurnal Speed Average: 3.6 km/h at hour 15	Minimum Diurnal Speed Average: 0.5 km/h at hour 20	Hours of Missing Data: 2
Monthly Average Velocity: 1.5 km/h 246.4 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 6 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 16 P <sub>99</sub> = 20	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-Apr	NE10	NE10	NE11	NE12	NE13	NNE14	NNE12	NNE14	N14	NNW15	NNW16	NNW16	NNW14	NNW13	NNW17	NNW18	N17	NNW14	NNW12	NNW11	NNW9	NNW8	N7	N4	N11.3	NNW18
2-Apr	NNW4	NNW3	NNW5	NNW6	NNW5	NNW5	NNW6	N6	NNE6	NE5	NNE7	NW6	W8	WNW7	NNW8	NNW9	NNW10	N10	NNW8	N3	NNE5	NE5	ENE7	NE3	N5.0	NNW10
3-Apr	ENE7	ENE8	ENE7	ENE7	ENE7	ENE6	E4	E5	ENE6	ENE7	E7	NNE7	NNE9	N7	N7	NNW12	NNW12	N9	NNE6	NE5	NE6	NE8	NE8	ENE4	NE5.9	NNW12
4-Apr	ENE6	E6	E4	ENE5	ENE5	ENE4	ENE4	ENE2	NE5	ENE6	ENE7	NNW5	NW6	WNW6	NW7	NNW10	NNW10	N8	NNE7	NE3	ENE2	NE6	NNE8	N5	NNE3.9	NNW10
5-Apr	NNW3	NW2	WNW1	NNW1	AF	AF	W2	WNW3	NNW5	NW5	N9	NNW11	NNW9	NNW9	NNW9	NNW9	NNW7	N6	NE3	E5	E7	SE8	SE8	NNW3.7	NNW11	
6-Apr	SSE9	SSE11	SSE11	SSE10	SE8	SSE5	SSE6	SSE4	SSE7	SSE8	SSE10	SSE12	S11	S8	SSE8	SW9	SSW11	SSW11	SSW9	S8	S8	S8	S9	S8	S8.1	SSE12
7-Apr	SSW8	SW11	SSW8	S8	S7	SSE7	SSE7	SSE7	SSE9	S12	S14	S15	S14	S14	S14	S14	S14	S13	S10	S8	SSE7	S7	S5	SSW5	S9.6	S15
8-Apr	SSW6	SSW5	SW4	SW8	SSW10	SSW9	SSW8	SSW8	WSW5	WNW10	WNW11	WNW13	NNW11	N15	N15	N14	N14	N9	N5	ENE3	E5	SE6	SSE7	SSE7	WNW2.7	N15
9-Apr	S8	S10	SSE10	SSE9	SSE9	SSE9	SSE9	S6	SSE7	S8	SW12	WSW12	SW14	WSW14	WSW14	W15	WSW14	WSW15	WSW11	SW8	SW8	WSW9	WSW8	WSW3	SW7.9	WSW15
10-Apr	SSW6	SSW6	SSW6	SSW7	SW8	SW7	SW7	SW6	WSW5	WNW6	WNW5	WSW8	SSW13	SW13	SW13	SSW12	SSW11	SSW13	SSW9	SSW6	S6	S7	S7	S9	SSW7.4	SW13
11-Apr	S10	S8	SW6	SW9	SW9	SW6	SW4	WNW10	WNW12	WNW11	WNW13	WNW10	WNW11	WNW10	WNW10	WNW11	WNW9	WNW11	W18	W20	WNW14	WNW10	WNW10	WNW14	W9.2	W20
12-Apr	WNW12	W13	W13	W14	W15	W16	W15	W16	W16	W15	W15	W17	W17	W17	W14	W15	W16	WNW15	W17	W15	W16	W18	W18	W18	W15.4	W18
13-Apr	W18	W21	W20	W20	W19	WNW19	WNW18	WNW22	WNW21	NW21	NW22	WNW21	WNW18	WNW16	WNW14	NW13	NW12	NW13	NNW9	NNW4	S1	SSE2	SE4	SSE11	WNW13.0	WNW22
14-Apr	SSE10	SSE11	SSE10	SSE11	SSE11	SSE12	SSE13	SSE14	SE12	SE12	SSE13	SE15	SE14	SSE12	ESE12	SSE16	ESE9	SE10	SSE8	SSE9	SE8	SSE9	SE9	SSE10	SE11.1	SSE16
15-Apr	SSE8	S8	SSE5	E2	NW3	W5	W8	WNW13	WNW13	W10	WNW13	WNW13	WNW13	WNW14	WNW13	W14	WNW12	W12	W7	SW6	SSW9	WSW12	W11	W13	W8.2	WNW14
16-Apr	W16	W14	W14	W14	WNW13	WNW13	W13	W11	W11	WNW9	WSW13	W15	W13	WNW14	W15	W12	WSW7	WSW12	W10	NNW10	WNW8	WNW9	WNW9	WNW8	W11.3	W16
17-Apr	WNW7	W5	W5	WSW5	SW7	SW8	SW9	SW6	SSW5	SSW12	SSW16	SSW15	SSW16	SW20	SW19	S13	S11	SSE8	SE9	SE10	SSE9	S6	SSW4	W5	SSW8.0	SW20
18-Apr	WNW9	NW9	NW10	NW10	NW12	NW14	NNW16	NNW17	NNW17	NNW15	NNW17	NNW14	NNW15	NNW15	N13	N13	N12	NNE12	ENE5	WNW5	N3	WSW2	W3	W4	NNW10.0	NNW17
19-Apr	WNW4	W4	WSW3	WSW2	SW2	SW3	SW4	WSW3	SW4	W6	W7	W9	W7	W8	WNW6	WSW5	W5	W5	WNW6	SSW3	S4	S5	S5	SSW5	WSW3.8	W9
20-Apr	SW6	SW9	WSW7	WNW6	WNW9	WNW9	WNW8	NW6	N6	NE6	NE9	NE8	NNE7	NE8	WNW5	WSW5	WNW4	N7	NNE5	ENE4	ESE5	SE8	SSE7	S6	NNW1.6	NE9
21-Apr	S4	SW5	WSW6	WSW9	WSW5	NNE2	NNW4	WNW6	NW6	NNE7	N9	NW7	W9	NNE7	NNE9	NE11	NE9	ENE10	E13	E11	E12	ESE10	SE11	SE12	NE2.5	E13
22-Apr	ESE11	SE12	SE9	SE10	ESE12	ESE13	ESE15	SE16	ESE16	ESE16	ESE18	SE18	SE20	SE19	SE19	SE19	SE18	ESE15	ESE16	ESE17	ESE16	ESE19	SE19	ESE18	ESE15.8	SE20
23-Apr	ESE16	ESE16	ESE16	ESE17	ESE16	ESE16	ESE16	ESE16	ESE14	E17	ESE19	ESE17	ESE19	ESE21	ESE19	ESE16	E16	E15	ENE13	ENE13	E13	E14	E17	E15	ESE15.6	ESE21
24-Apr	E14	E11	ENE11	ENE11	ENE11	ENE9	ENE12	ENE11	ENE10	NE11	NE11	NE12	NE11	NE12	NE11	NE11	NE11	NE10	NE8	NE7	NE7	NE6	NE6	NE9.9	E14	
25-Apr	ENE6	ENE6	E4	ENE4	NE3	NE3	E6	ESE5	NE6	NE8	ENE9	ENE7	ENE8	ENE7	ENE7	ESE6	ESE6	ESE6	SE8	ESE5	SE5	SSE5	SSW3	SSE6	E4.7	ENE9
26-Apr	S6	S5	ESE5	SSE5	SSE4	SSE4	E2	SSW3	SSW5	NNE6	ESE3	NNW2	NE6	NNE8	NNE5	NW3	N5	ENE4	ESE5	E7	E7	ESE9	SE10	SE11	ESE2.8	SE11
27-Apr	SSE11	SE10	SSE8	SE6	SSE7	SSE8	SSE8	SE9	SSE12	SSE12	SE14	S15	SW17	WSW12	W11	WSW14	WSW11	SW14	SW12	WSW6	SSW4	SSW5	SW5	SSW5	SSW6.8	SW17
28-Apr	SSW6	SW6	SW7	SW7	S4	SSE8	SSE9	SSE9	SE11	SE11	SE14	SSE15	SSE15	S16	S17	S16	SSW14	S14	S10	SSE8	SSE9	S10	S9	WSW8	S9.5	S17
29-Apr	WNW11	WNW9	WNW12	WNW10	WNW10	WNW12	WNW13	WNW11	WNW12	WNW15	WNW12	WNW10	WNW8	WNW11	WNW12	WNW9	W7	WSW7	W8	SW6	SW7	SW4	SW5	WSW6	WNW8.7	WNW15
30-Apr	W8	W9	WNW10	W9	W10	W9	W12	W10	WNW9	W13	W17	WSW20	WNW16	WSW12	WNW13	WNW14	WNW11	WNW10	W9	N8	SSE2	SW7	WSW8	WSW10	W9.8	WSW20

SSW2.2	SSW2.5	SW1.8	SW1.8	SW1.7	SW1.7	WSW1.5	WSW1.7	NNW1.1	NW1.4	W1.5	W3.4	W3.5	W3.4	NNW3.6	W3.1	NNW2.8	NNW1.8	W1.3	SSE0.5	SE2.1	SSE2.4	S2.4	S2.8	Diurnal Average
W18	W21	W20	W20	W19	WNW19	WNW18	WNW22	WNW21	NW21	NW22	WNW21	SE20	ESE21	SW19	SE19	SE18	WSW15	W18	W20	ESE16	ESE19	SE19	ESE18	Diurnal Maximum

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



Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 km/h on Apr 13 11:00			Hours of Data:	718
Minimum Value: 0 km/h on Apr 19 06:00			Hours of Missing Data:	2
			Hours of Calibration:	0
			Percent Operational Time:	99.7
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 6 P <sub>99</sub> = 8				

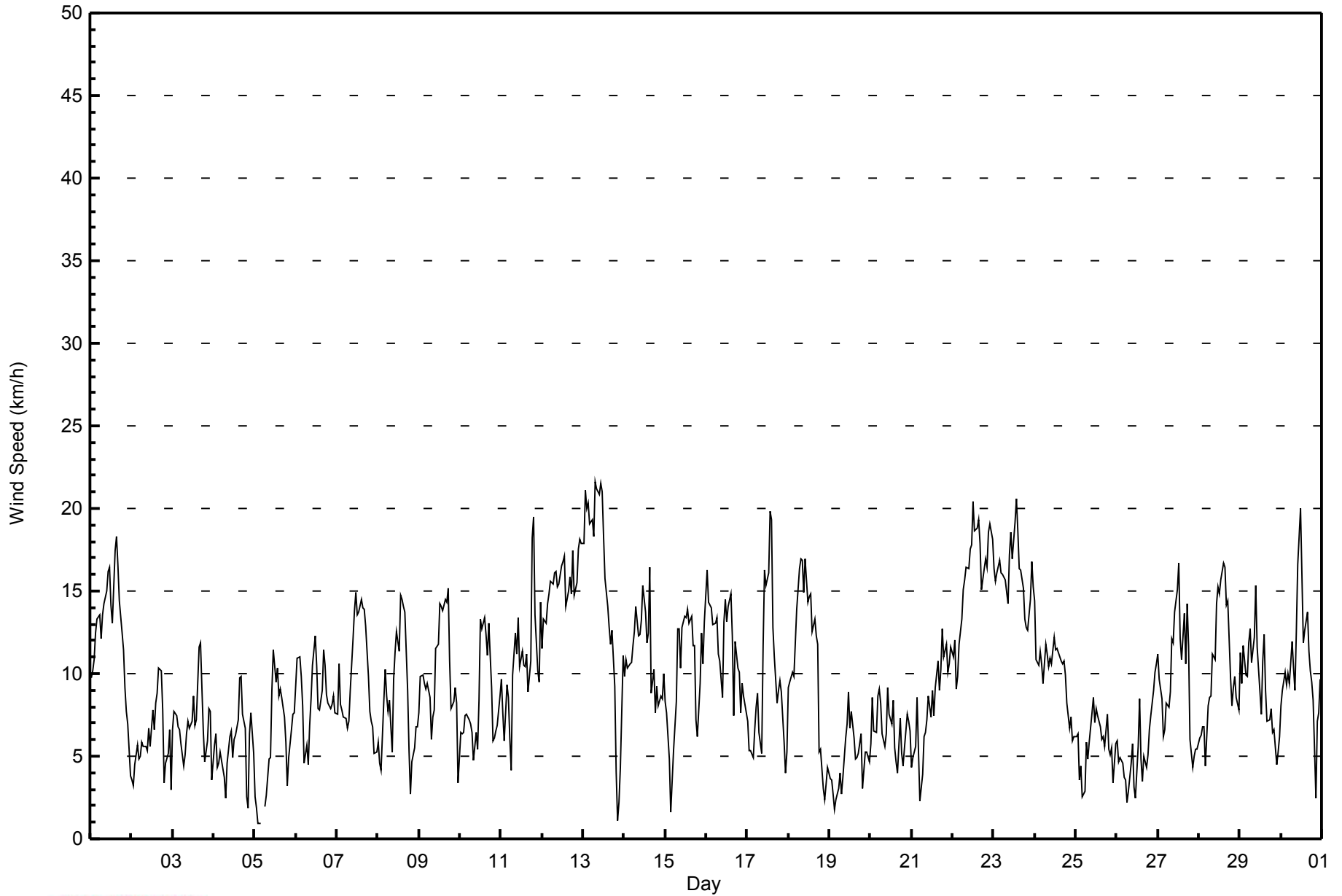
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	3	3	4	4	5	5	4	5	4	4	5	5	4	4	5	6	5	4	4	3	3	2	2	1	6
2-Apr	1	2	1	2	1	1	2	1	2	2	2	2	3	3	3	3	3	3	3	1	1	1	2	1	3
3-Apr	2	2	2	2	2	2	1	1	2	3	3	3	3	3	3	4	3	3	3	1	1	2	2	1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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Anzac - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Anzac - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	130	18.11	18.11
6 - 11	352	49.03	67.13
12 - 19	223	31.06	98.19
20 - 28	13	1.81	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 718

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Anzac - April 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	4	9	13	7	6	2	9	8	12	10	11	9	8	4	12	130
6 - 11	13	13	28	27	8	7	20	50	28	19	26	15	24	44	8	22	352
12 - 19	8	4	4	4	9	27	15	11	15	8	7	12	41	33	5	20	223
20 - 28	0	0	0	0	0	1	1	0	0	0	1	1	4	3	2	0	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
<b>Totals</b>	27	21	41	44	24	41	38	70	51	39	44	39	78	88	19	54	718

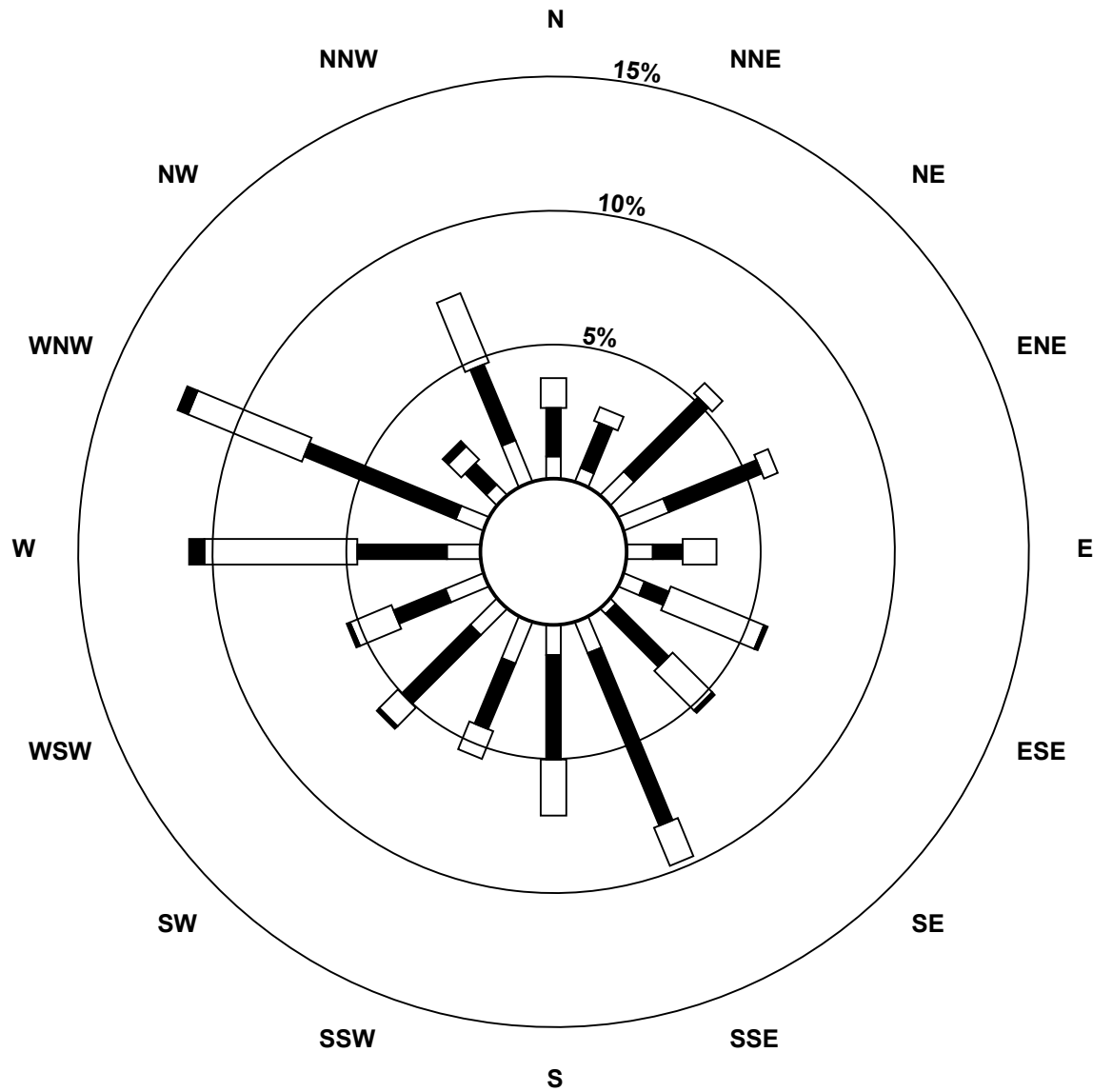
Total Number of Valid Hours: 718

Total Number of Hours: 720

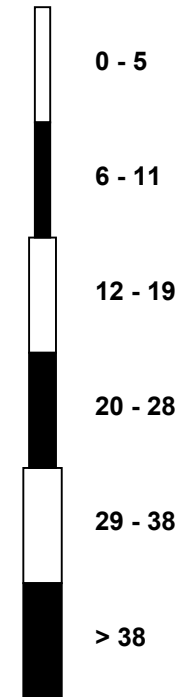


**Wood Buffalo Environmental Association  
Wind Rose Apr 2015**

**Wind Speed (WS) - km/h  
Anzac (AMS 14)**



Classes (km/h)



Total Number of Valid Hours: 718



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Anzac - April 2015**

Direction of Maximum Speed: 297 deg on Apr 13 08:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 122.3 deg on Apr 22	Hours of Data: 718
Direction of Minimum Speed: 295 deg on Apr 5 03:00	Direction of Minimum Daily Speed Average: 1.6 deg on Apr 20
Direction of Minimum Speed: 295 deg on Apr 5 03:00	Hours of Missing Data: 2
Monthly Average Direction: 268.4 deg	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	54	45	42	47	39	29	22	22	7	347	344	338	330	336	338	346	349	346	341	333	345	343	352	359	359.7
2-Apr	342	346	337	339	348	344	348	2	13	46	25	322	262	300	330	339	342	353	345	355	22	41	58	49	350.7
3-Apr	58	61	62	60	59	74	93	79	64	67	88	27	19	349	4	348	339	7	27	34	41	48	52	73	38.7
4-Apr	72	82	89	68	69	72	59	66	50	69	77	336	307	297	314	337	341	2	16	51	75	36	26	10	25.1
5-Apr	335	324	295	327	AF	AF	268	302	336	310	349	334	335	331	331	336	337	341	350	48	80	96	128	146	345.7
6-Apr	154	156	155	151	146	148	153	153	149	159	159	160	171	170	165	225	199	200	207	190	178	179	184	188	171.5
7-Apr	208	215	198	176	172	168	166	162	163	169	174	174	178	181	173	171	183	190	187	176	167	170	177	195	178.9
8-Apr	210	194	224	226	213	212	211	211	240	287	291	302	343	357	356	355	356	7	357	64	90	128	166	168	296.9
9-Apr	169	169	166	165	166	162	161	177	163	170	220	238	235	254	256	260	254	252	254	232	230	239	258	242	219.7
10-Apr	193	207	203	209	217	216	215	228	239	293	300	240	208	216	221	196	192	202	210	193	170	177	178	169	208.8
11-Apr	177	181	224	228	223	224	229	282	288	289	291	291	293	291	293	291	293	291	275	276	289	291	289	293	275.5
12-Apr	295	279	280	276	279	274	274	271	277	278	272	276	274	280	278	266	270	283	271	270	272	274	274	276	275.5
13-Apr	269	269	280	280	276	282	292	297	299	308	305	301	297	296	299	309	313	325	330	332	183	161	129	151	292.5
14-Apr	155	151	147	148	149	150	151	151	142	138	148	145	141	153	123	148	115	145	155	148	137	148	143	158	145.6
15-Apr	165	172	155	81	326	266	277	283	285	279	283	288	285	283	282	278	285	267	271	222	213	252	268	259	268.0
16-Apr	276	273	275	281	290	289	280	272	272	298	250	269	281	285	277	277	249	244	267	340	300	284	293	289	278.5
17-Apr	282	271	281	241	231	218	223	223	203	212	209	207	211	217	228	191	178	161	137	139	159	176	201	268	208.0
18-Apr	296	304	316	313	319	324	327	338	346	331	327	327	332	343	353	355	351	18	62	293	357	245	264	273	332.1
19-Apr	301	279	257	244	215	218	235	240	219	272	272	262	279	278	289	257	274	266	290	205	183	172	186	209	253.0
20-Apr	219	231	250	290	295	299	303	316	2	34	55	37	25	54	283	248	293	9	24	68	111	142	150	170	335.9
21-Apr	183	218	253	239	249	20	340	297	306	24	3	320	271	18	17	55	47	65	82	84	100	108	124	126	55.2
22-Apr	118	124	128	127	119	120	121	126	122	120	117	125	126	127	129	137	129	107	109	114	116	123	125	123	122.3
23-Apr	119	115	116	115	115	118	118	113	110	100	103	104	108	109	110	104	92	83	77	76	81	80	81	79	102.0
24-Apr	82	79	69	70	74	72	67	75	68	56	34	47	50	40	41	48	49	40	45	45	42	44	38	45	56.2
25-Apr	66	76	79	71	49	35	79	102	48	48	59	63	59	76	67	102	113	103	127	116	125	158	193	160	86.5
26-Apr	174	170	118	147	162	160	90	213	193	30	109	333	35	23	32	326	1	60	108	93	100	119	145	145	109.0
27-Apr	149	144	148	145	157	165	160	146	148	147	139	190	231	254	275	255	256	236	233	246	206	211	224	198	195.7
28-Apr	213	224	226	225	189	162	159	157	141	143	135	150	163	177	178	180	195	177	179	168	158	170	177	250	173.7
29-Apr	294	299	302	298	302	298	299	301	300	297	289	291	292	292	297	284	271	251	268	226	226	225	220	253	285.9
30-Apr	270	274	285	278	271	268	276	279	290	279	264	252	288	250	296	283	297	289	275	357	154	223	241	248	274.1
195.0 202.2 221.4 223.8 229.2 229.3 243.7 258.2 289.9 316.4 279.3 267.7 267.7 279.0 290.3 279.1 294.2 292.5 275.5 149.2 143.8 162.3 171.2 191.0																									
Diurnal Average																									

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



Summary of Hour Standard Deviations

Anzac - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 99 deg on Apr 26 11:00			Hours of Data:	718
Minimum Value: 9 deg on Apr 11 05:00			Hours of Missing Data:	2
			Hours of Calibration:	0
			Percent Operational Time:	99.7
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 15 Q <sub>1</sub> = 19 Median = 24 Q <sub>3</sub> = 30 P <sub>90</sub> = 38 P <sub>99</sub> = 69				

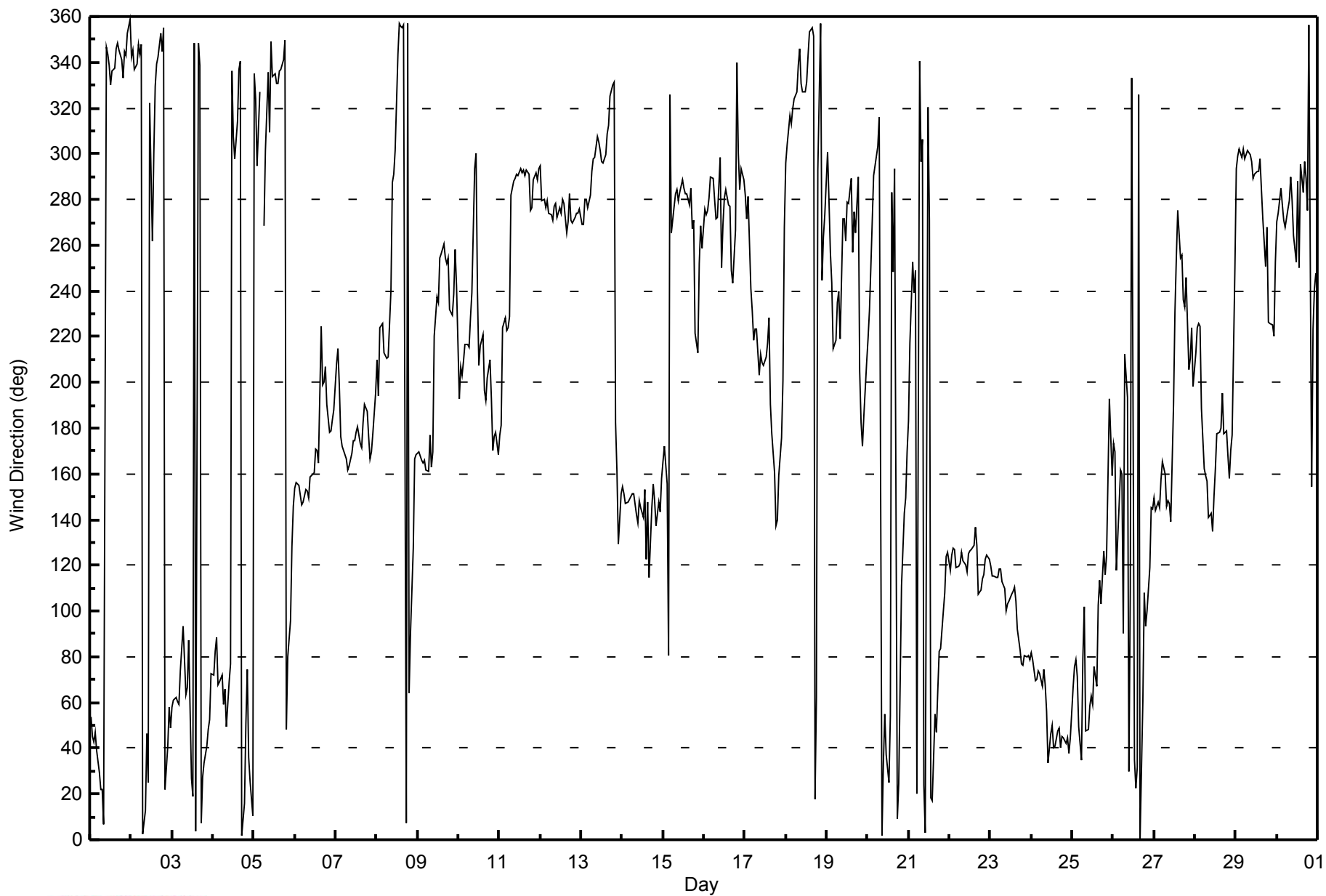
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	20	20	21	21	21	22	20	22	20	18	18	20	18	18	18	17	18	17	17	16	17	15	13	17	22
2-Apr	22	14	18	17	17	16	19	24	32	44	36	48	38	45	33	25	21	20	17	15	15	17	18	34	48
3-Apr	17	16	18	19	17	21	27	33	35	41	49	51	37	52	43	26	21	28	24	16	15	14	13	32	52
4-Apr	11	13	14	14	17	31	29	46	43	43	44	63	51	61	47	30	28	27	20	33	24	17	14	29	63
5-Apr	24	29	34	20	AF	AF	17	36	52	66	30	24	35	33	33	31	27	25	23	28	15	17	20	17	66
6-Apr	17	15	14	12	15	21	17	18	20	29	32	25	37	38	29	37	34	28	25	22	17	16	19	20	38
7-Apr	17	13	21	16	13	14	14	16	20	23	29	29	33	32	26	23	28	25	24	17	12	13	19	25	33
8-Apr	21	19	40	14	11	11	15	16	41	28	28	24	27	23	21	21	19	24	16	24	13	16	12	11	41
9-Apr	12	11	12	13	15	15	18	26	19	28	23	32	24	32	30	29	29	28	26	15	13	16	20	29	32
10-Apr	13	12	12	10	11	11	14	23	35	35	48	48	29	32	32	36	33	27	21	23	17	14	14	16	48
11-Apr	17	18	38	16	9	18	23	23	28	27	27	27	27	28	27	29	26	32	29	29	26	24	29	26	38
12-Apr	27	31	29	28	29	28	31	29	30	28	30	31	33	31	34	33	31	30	31	29	28	26	28	28	34
13-Apr	29	30	29	26	27	27	27	23	25	24	26	26	28	30	31	29	29	25	17	14	78	21	29	17	78
14-Apr	15	17	16	16	17	17	17	18	21	21	23	23	27	31	22	24	36	20	17	19	20	20	20	17	36
15-Apr	19	20	26	64	37	17	24	28	28	32	31	31	30	29	29	32	32	29	34	26	17	29	29	27	64
16-Apr	29	28	29	28	27	26	27	31	28	25	36	34	33	30	30	30	31	28	26	23	29	22	24	24	36
17-Apr	22	15	18	20	9	12	12	22	39	28	24	26	27	21	21	28	25	26	19	21	39	22	20	26	39
18-Apr	26	22	21	21	20	18	17	18	18	18	19	19	20	22	28	34	22	37	34	37	37	57	13	14	57
19-Apr	19	24	31	36	18	17	13	31	37	41	49	37	47	43	40	60	54	35	28	30	11	13	16	21	60
20-Apr	19	15	23	21	25	22	23	25	42	44	33	57	55	42	71	67	66	29	22	28	27	14	13	16	71
21-Apr	23	22	20	24	48	23	25	25	38	39	35	47	33	69	38	29	32	31	23	20	26	26	19	18	69
22-Apr	21	19	18	18	19	19	21	21	23	24	26	25	24	27	24	25	23	25	24	22	22	19	19	17	27
23-Apr	18	20	20	19	21	19	20	23	25	24	27	29	28	25	28	29	28	26	23	19	19	20	20	21	29
24-Apr	20	22	19	19	19	19	24	27	34	30	30	30	34	37	31	32	30	27	23	18	18	19	18	16	37
25-Apr	19	17	28	13	29	25	32	37	40	38	42	66	58	58	56	68	68	56	31	17	26	13	35	11	68
26-Apr	10	12	15	20	9	37	41	29	47	43	99	89	64	36	70	90	54	52	47	20	21	18	17	17	99
27-Apr	14	14	13	14	20	17	14	19	19	24	25	35	34	41	35	31	33	21	19	28	14	14	15	15	41
28-Apr	14	15	14	11	20	13	13	19	22	26	21	22	26	26	28	25	28	22	20	16	14	16	23	38	38
29-Apr	23	23	23	23	22	24	22	24	23	24	23	29	30	31	24	32	32	29	31	17	16	18	16	21	32
30-Apr	24	26	29	27	27	26	27	28	34	31	28	27	33	39	28	32	35	30	31	37	60	21	20	24	60
	29	31	40	64	48	37	41	46	52	66	99	89	64	69	71	90	68	56	47	37	78	57	35	38	
	Diurnal Maximum																								

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Anzac - April 2015**



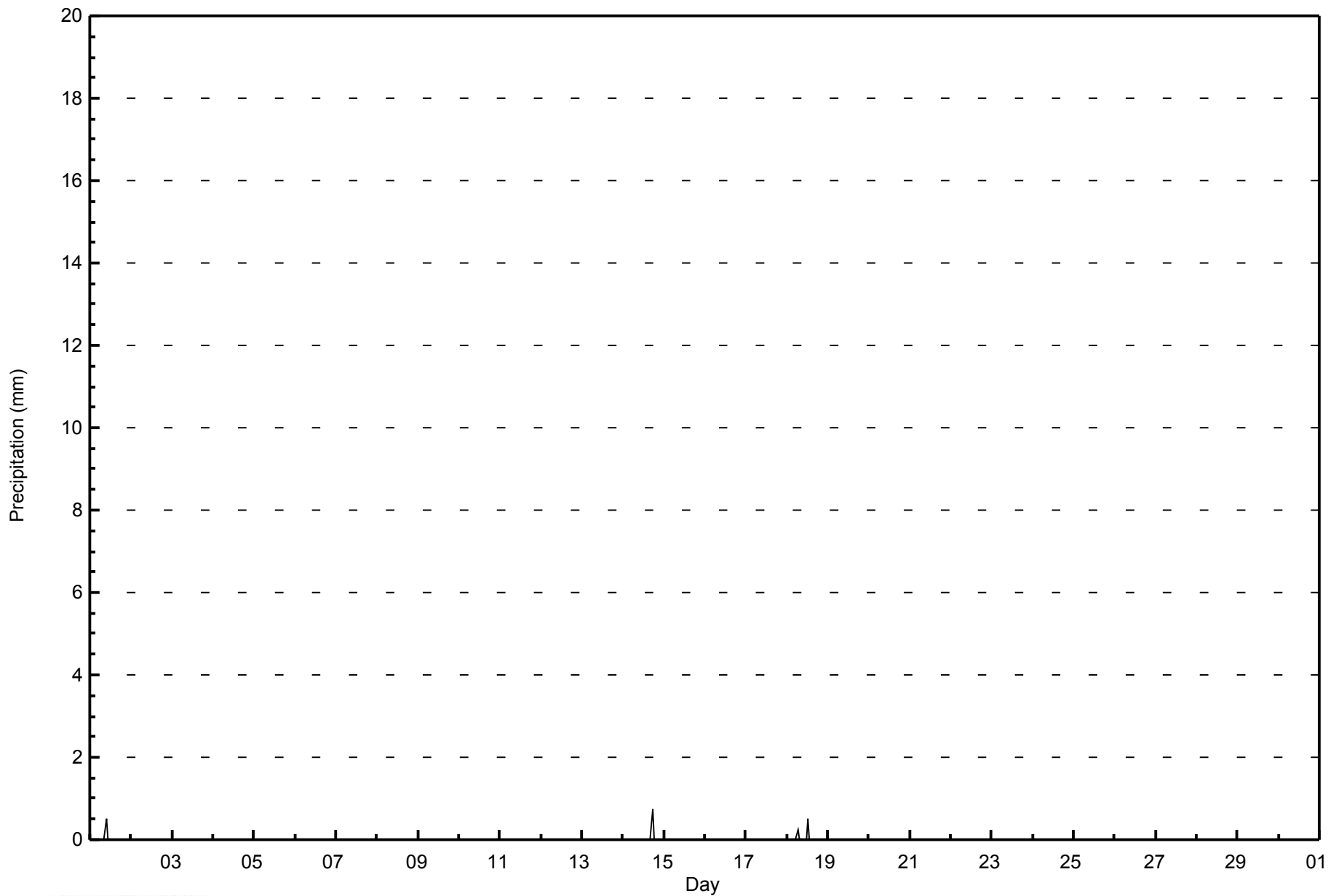


Maximum Value: 0.8 mm on Apr 14 18:00																			Maximum Daily Total: 0.8 mm on Apr 14						Hours in Service: 720		
Minimum Value: 0.0 mm on Apr 1 01:00																			Minimum Daily Total: 0.0 mm on Apr 2						Hours of Data: 720		
Maximum Diurnal Total: 0.8 mm at hour 18																			Minimum Diurnal Total: 0.0 mm at hour 1						Hours of Missing Data: 0		
Monthly Total: 2.03 mm																			Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0						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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	
2-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.8
15-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.5
19-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
																			0.0 0.0 0.0 0.0 0.0 0.0 0.3 0.0 0.0 0.5 0.0 0.0 0.5 0.0 0.0 0.0 0.0 0.8 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 0.3 0.0 0.0 0.5 0.0 0.0 0.5 0.0 0.0 0.0 0.0 0.8 0.0 0.0 0.0 0.0 0.0 0.0						Diurnal Maximum		



Wood Buffalo Environmental Association  
Hourly Averages

Precipitation (PC) - mm  
Anzac - April 2015





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 14, 2015	Last Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:20
Gas Cert Reference	SA130026A	Station temp.	20 Deg C
Cal Gas Concentration	47.2 ppm	Cal Gas Exp Date	12/12/2016
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
ZAG Make/Model	API 701	Serial Number	764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		HVPS voltage	524	524
Analyzer IP address	192.168.1.43		Lamp voltage	3384	3197
Calculated slope	0.997962	0.995403	Chamber temp	50.0	43.0
Calculated intercept	-0.084515	0.151600	Pressure	25.3	25.2
Analyzer Background	19.7	19.7	Flow	651	643
Analyzer Coefficient	0.967	0.973	Intensity	NA	78.9

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	-0.1	----
as found span	5000	74.9	707.1	701.0	1.009
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	74.9	707.1	710.4	0.995
second point	5000	37.5	354.0	354.8	0.998
third point	5000	18.7	176.5	177.6	0.994
as left zero					
as left span					
Average Correction Factor					0.996

Corrected As found	701.1	Previous response	708.6	% change	1.1%
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**Notes:**

Small adjustment to Span. As Found Zero used as Calibrator Zero. No As Lefts as there was a power outage at the station just before leaving.

Calibration Performed By: Ryan Power



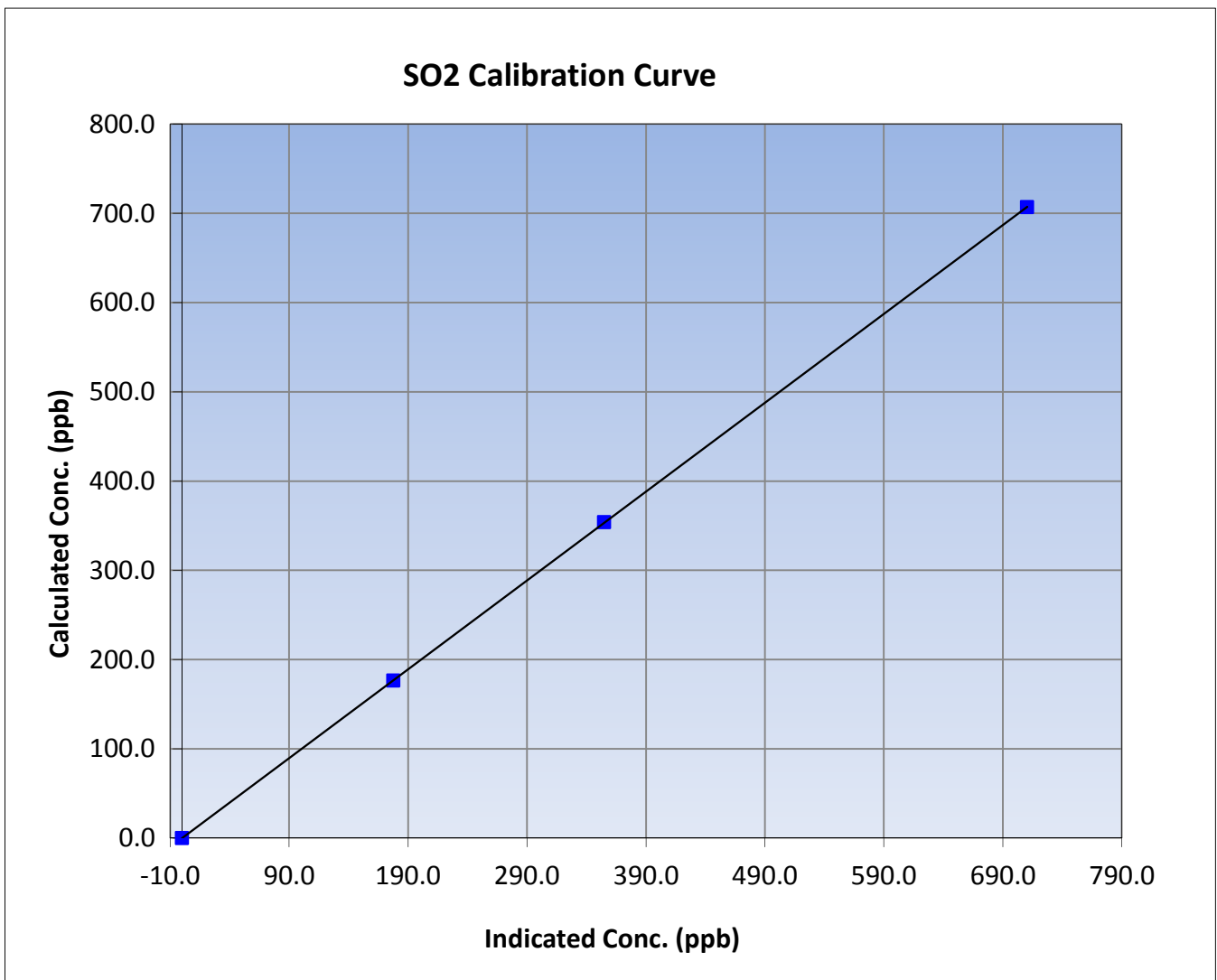
# Wood Buffalo Environmental Association SO<sub>2</sub> Calibration Report

## Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:20
Analyzer make	API T100	Analyzer serial #	723

## Calibration Data

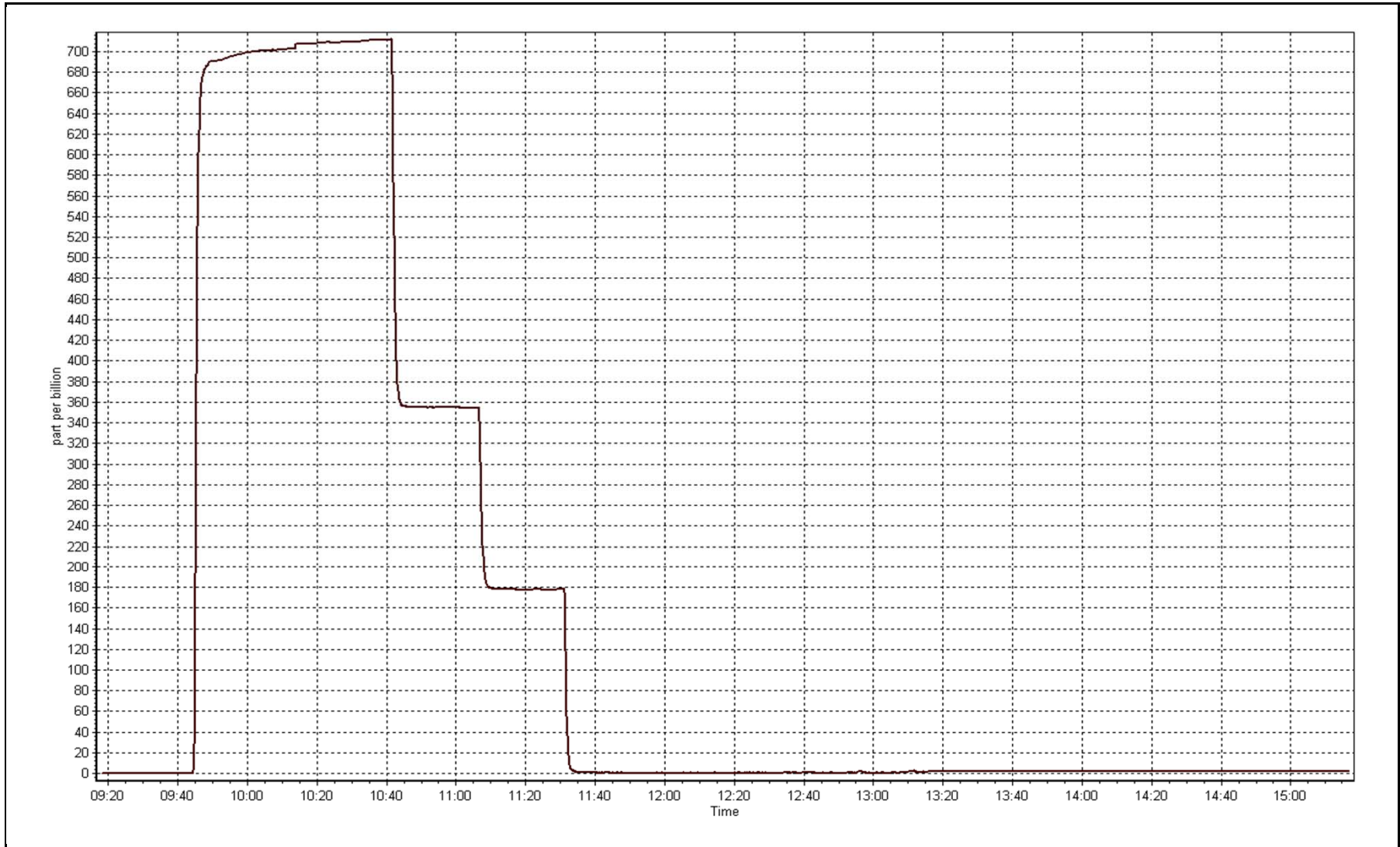
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999998
707.1	710.4	0.9953		
354.0	354.8	0.9977	Slope	0.995403
176.5	177.6	0.9940		
			Intercept	0.151600





SO2 Calibration Plot

Date: April 14, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	April 13, 2016	Last Calibration	March 23, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	13:12
Gas Cert Reference	LL82745	Station temp.	22 Deg C
Cal Gas Concentration	9.6 ppm	Cal Gas Exp Date	12/21/2012
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Dil air Make/Model	API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8790
SO2 gas concentration	47.2 ppm	SO2 gas cert/exp	SA130026A 12/Dec/16

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-731	-731
Analyzer IP address	192.168.1.42		Lamp voltage	1007	999
Calculated slope	0.990899	0.995279	Chamber temp	45	45
Calculated intercept	-0.298340	-0.242307	Pressure	658.0	652.6
Analyzer Background	1.62	1.62	Flow	0.388	0.388
Analyzer Coefficient	1.117	1.117	Intensity	98	95
			Converter temp.	800	800
Analyzer make/model	Thermo 43i-TLE		Analyzer serial #	1300156232	
Converter make/model	CDN-101		Converter serial #	510	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	----
as found span	5000	39.1	75.1	75.4	0.995
SO2 scrubber check	5000	18.7	176.5	0.6	----
calibrator zero	5000	0.0	0.0	-0.1	----
high point	5000	39.1	75.1	75.4	0.995
second point	5000	20.8	39.9	40.7	0.981
third point	5000	10.4	20.0	20.5	0.974
as left zero	5000	0.0	0.0	0.1	----
as left span	5000	39.1	75.1	75.2	0.998
Average Correction Factor					0.983

Corrected As found	75.5	Previous response	76.1	% change	0.8%
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**Notes:**

No adjustments. Filter changed after As Finds. Scrubber check after filter change. As finds used as Calibrator Zero and High Point. 10 minute reference point after scrubber check

Calibration Performed By:

Ryan Power



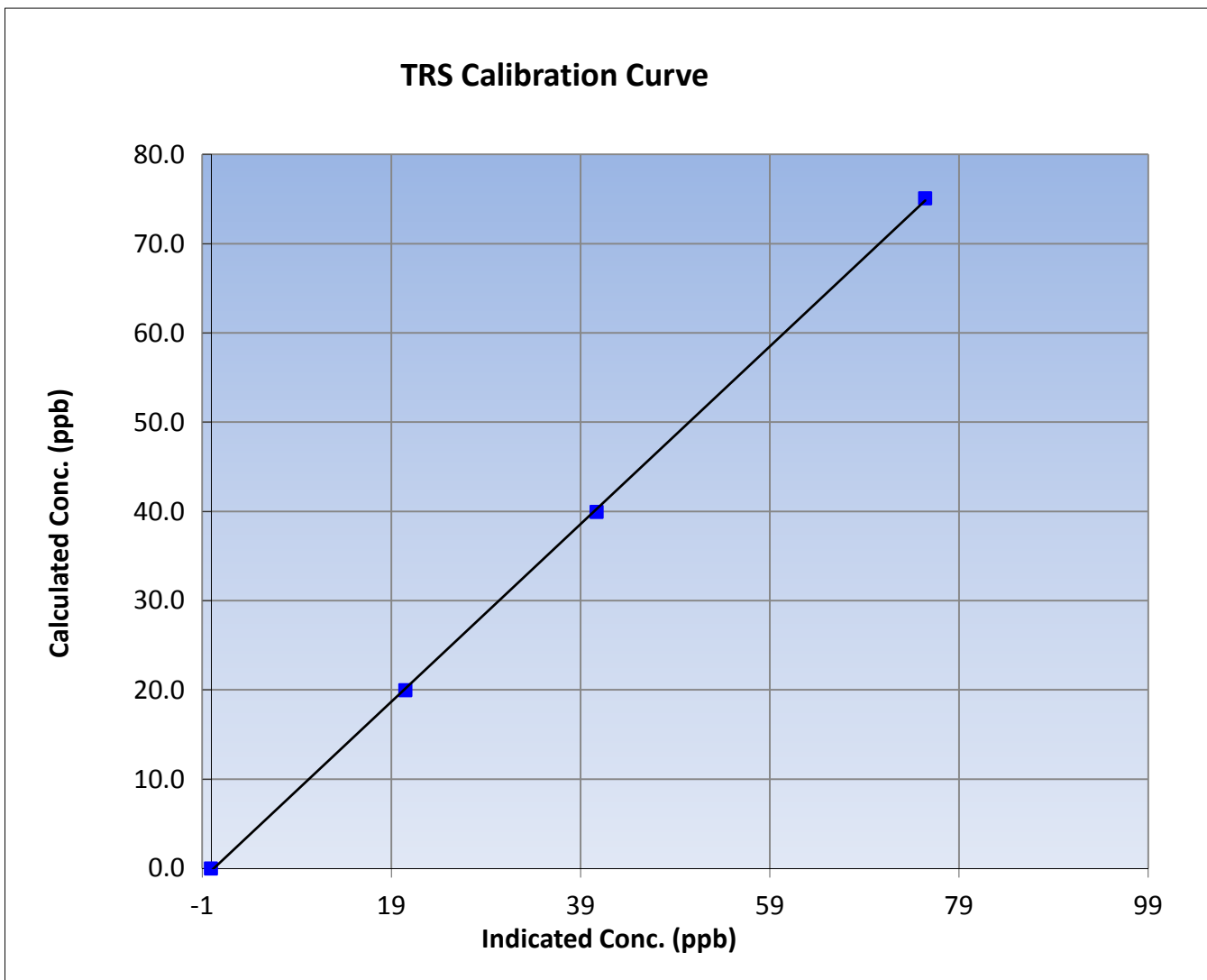
# Wood Buffalo Environmental Association TRS Calibration Report

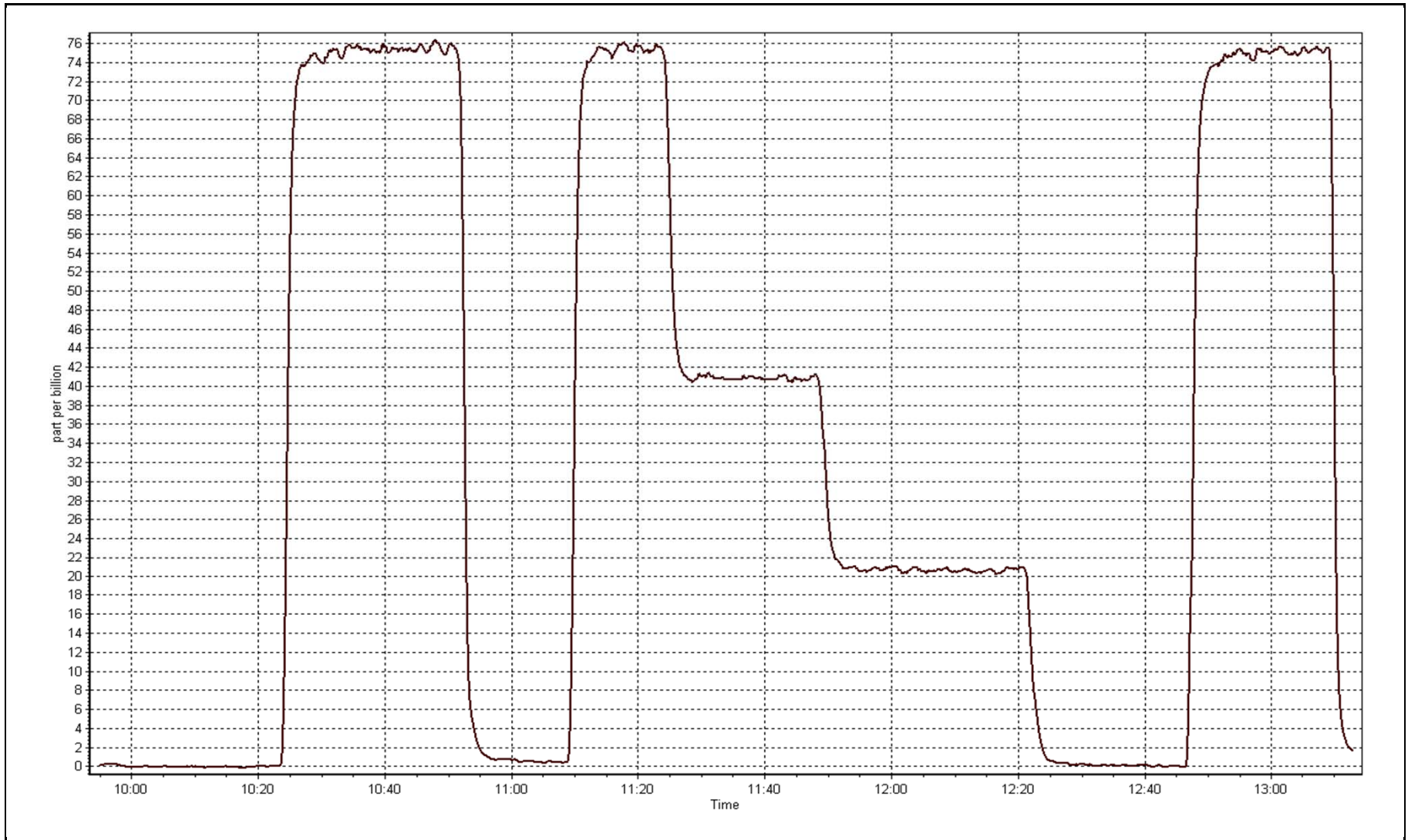
## Station Information

Calibration Date	April 13, 2016	Previous Calibration	March 23, 2015
Station Name	AMS 14	Station Number	AMS 14
Start Time (MST)	9:55	End Time (MST)	13:12
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1300156232

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999908
75.1	75.4	0.9951		
39.9	40.7	0.9812	Slope	0.995279
20.0	20.5	0.9740		
			Intercept	-0.242307







# Wood Buffalo Environmental Association THC / NMHC Calibration Report

## Station Information

Calibration Date	Tuesday, April 14, 2015	Last Calibration	Tuesday, March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	11:40
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	Station temp.	20 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
ZAG make/model	Teledyne API 701	Serial Number	4764
DACS make/model	Campbell Scientific CR3000	Serial Number	8790

## Analyzer Information

	Before	After		Before	After
THC Range (ppm)	0 - 50 ppm		Column Temp	NA	75.1
NMHC Range (ppm)	0 - 25 ppm		Detector Temp	36.1	175.0
Analyzer IP address	192.168.1.55		Flame Temp	405.0	405.0
THC Calc slope	0.999927	0.996459	Carrier Pressure	31.8	31.8
THC Calc intercept	0.020218	0.010103	Fuel Pressure	41.4	41.4
NMHC Calc slope	1.001311	0.996719	Air Pressure	32.5	32.5
NMHC Calc intercept	-0.003947	-0.003929			

Analyzer make Thermo 55i Analyzer serial # 1218153355

## THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	----
as found span	5000	74.9	16.36	16.24	1.008
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	16.36	16.43	0.996
second point	5000	37.5	8.19	8.16	1.004
third point	5000	18.7	4.09	4.11	0.994
as left zero					
as left span					
Average Correction Factor					0.998

Corrected As found 16.24 Previous response 16.34 % change 0.6%

**Notes:**

Span with a small adjustment. As Found Zero used as Calibrator Zero. No as lefts due to a power outage at the end of calibration.

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	----
as found span	5000	74.9	8.69	8.64	1.006
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	8.69	8.73	0.996
second point	5000	37.5	4.35	4.35	1.000
third point	5000	18.7	2.17	2.20	0.986
as left zero					
as left span					
Average Correction Factor					0.994

Corrected As found      8.64      Previous response      8.68      % change      0.5%

### 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	----
as found span	5000	74.9	7.67	7.60	1.009
calibrator zero	5000	0.0	0.00	0.00	----
high point	5000	74.9	7.67	7.70	0.996
second point	5000	37.5	3.84	3.80	1.011
third point	5000	18.7	1.91	1.90	1.008
as left zero					
as left span					
Average Correction Factor					1.005

Corrected As found      7.60      Previous response      7.66      % change      0.8%



# Wood Buffalo Environmental Association

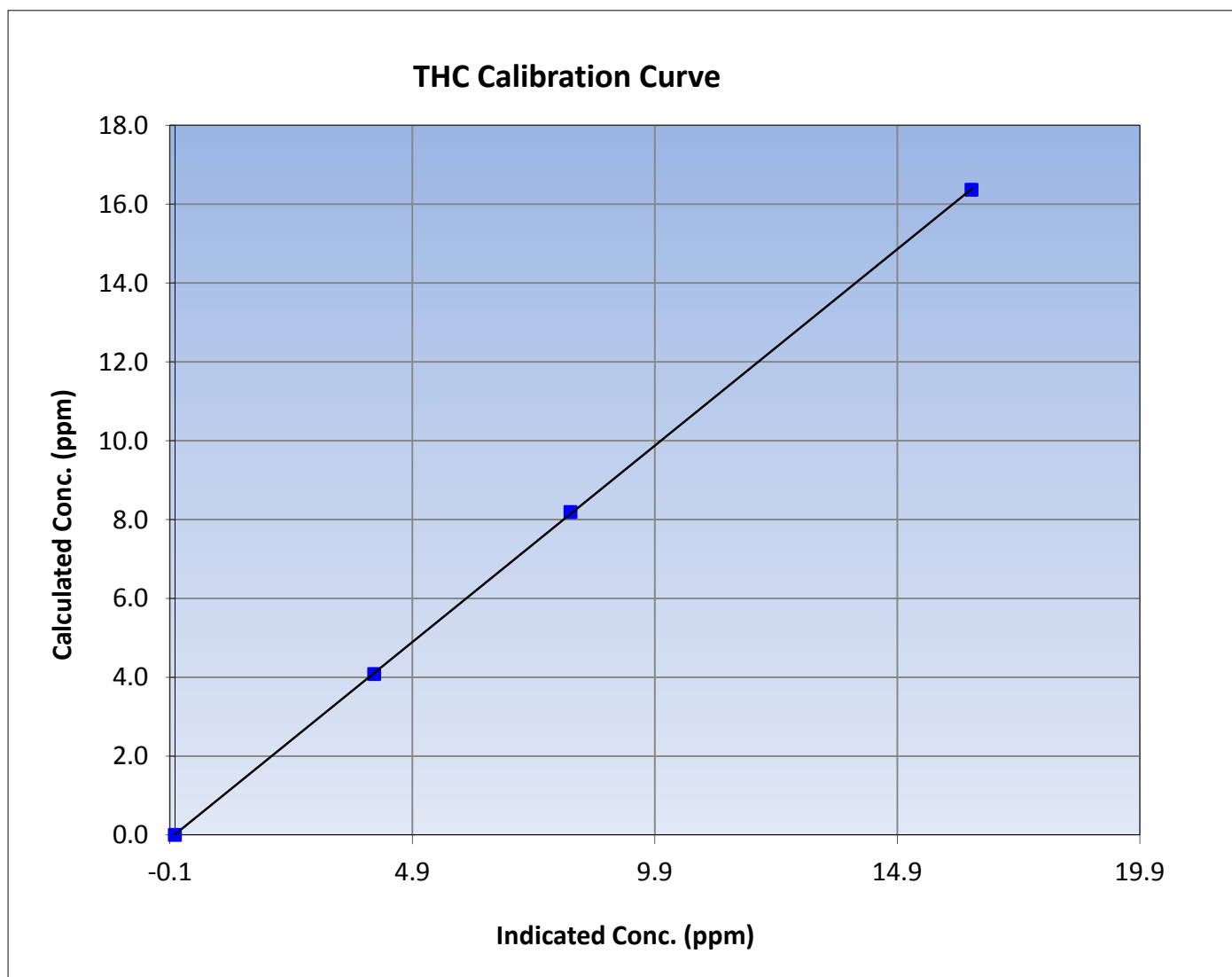
## THC Calibration Summary

### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	11:40
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999976
16.36	16.43	0.9959		
8.19	8.16	1.0039	Slope	0.996459
4.09	4.11	0.9939		
			Intercept	0.010103





# Wood Buffalo Environmental Association

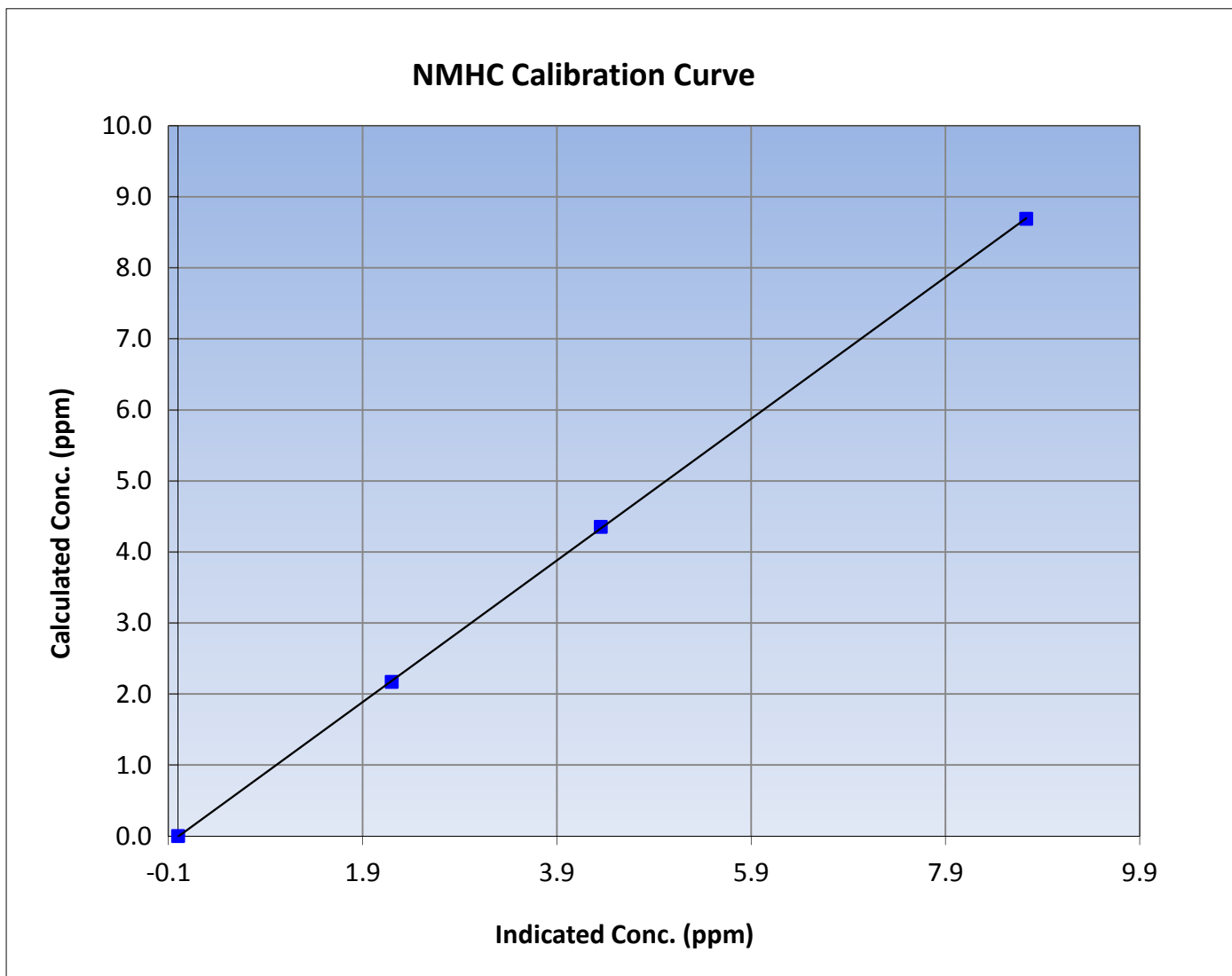
## NMHC Calibration Summary

### Station Information

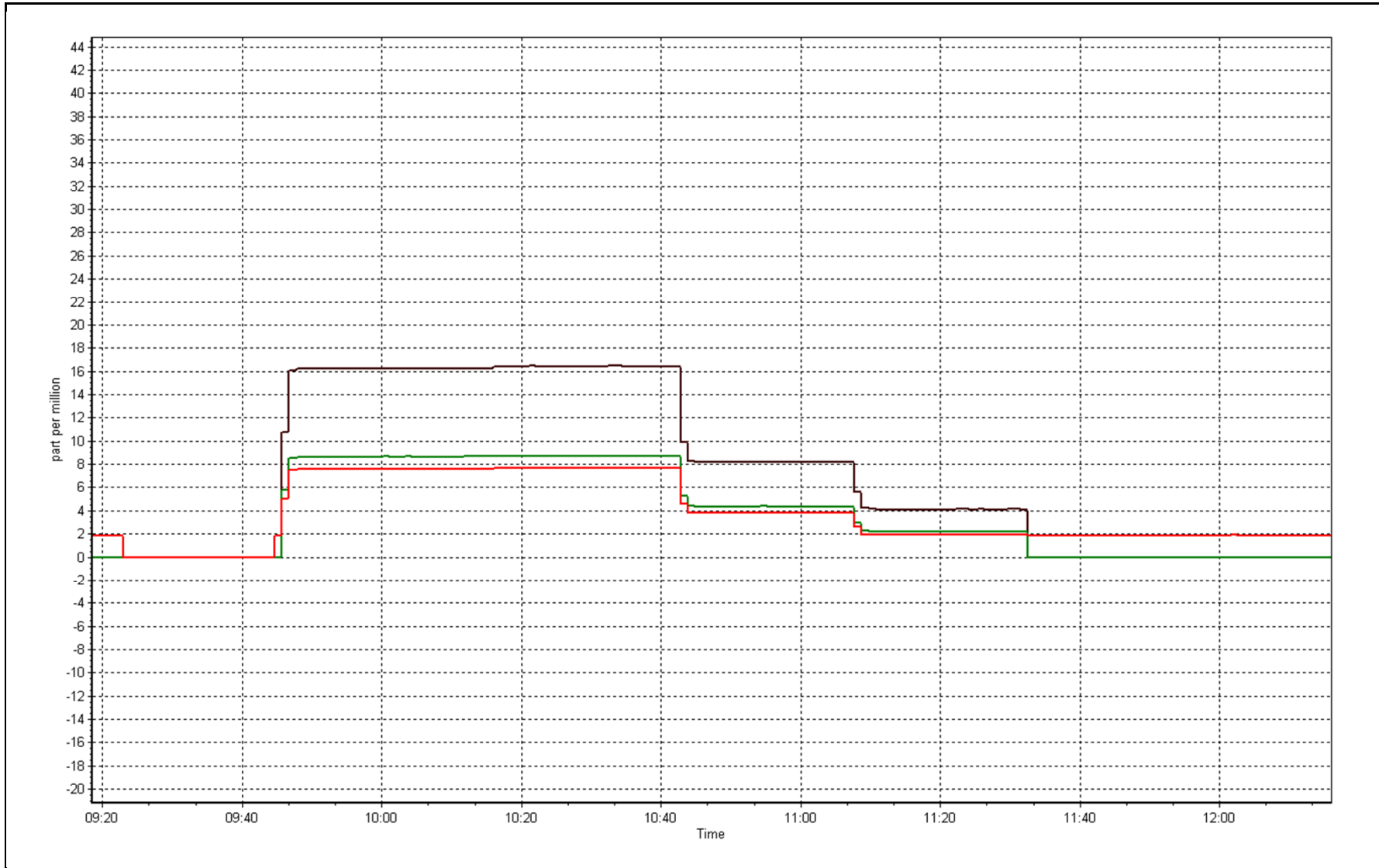
Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	11:40
Analyzer make	Thermo 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	----	Correlation Coefficient	0.999981
8.69	8.73	0.9957		
4.35	4.35	1.0004	Slope	0.996719
2.17	2.20	0.9864		
			Intercept	-0.003929









# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:12	End Time (MST)	12:45
NO2 GPT Ref date	Tuesday, April 14, 2015	Transfer Standard	
Calibrator Make/Model	Sabio 4010	Station temp.	23 Deg C
ZAG make/model	Teledyne API 701	Serial Number	8400311
DACS make/model	Campbell Scientific CR3000	Serial Number	4764
		Serial Number	8790

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.6	27.8
Analyzer IP address	192.168.1.48		Lamp temp.	53.8	53.8
Calculated slope	0.997467	0.995707	Pressure	668.6	656.4
Calculated intercept	0.427053	0.691864	Flow cell A	0.709	0.702
Analyzer Background	-0.7	-0.8	Flow cell B	0.714	0.705
Analyzer Coefficient	0.970	0.970	Cell A Intensity	133300	132490
			Cell B Intensity	139500	137600

Analyzer make	Thermo 49i	Analyzer serial #	1426262596
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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	0.0	----
as found span	5000	1.190	391.6	392.9	0.997
calibrator zero	5000	0.00	0.0	0.0	----
high point	5000	1.190	391.6	392.9	0.997
second point	5000	0.847	268.7	269.4	0.998
third point	5000	0.505	142.1	140.9	1.009
as left zero	5000	0.00	0.0	0.3	----
as left span	5000	1.190	391.6	399.9	0.979
Average Correction Factor					1.001

Corrected As found	392.9	Previous response	392.2	% change	-0.2%
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**Notes:**

No adjustments. As Found used as Calibrator Zero and High Point

Calibration Performed By: Ryan Power



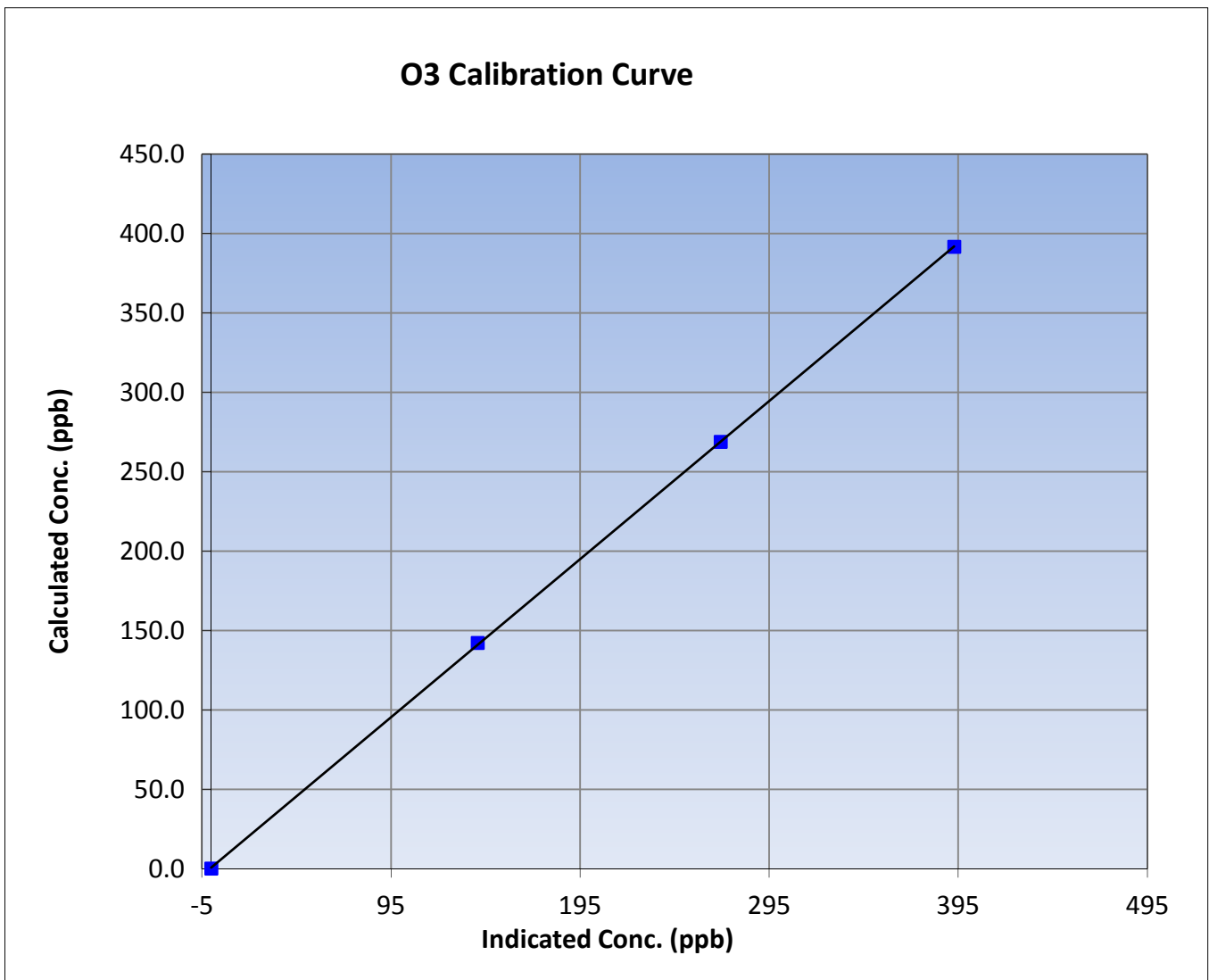
# Wood Buffalo Environmental Association O3 Calibration Report

## Station Information

Calibration Date	Tuesday, April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:12	End Time (MST)	12:45
Analyzer make	Thermo 49i	Analyzer serial #	1426262596

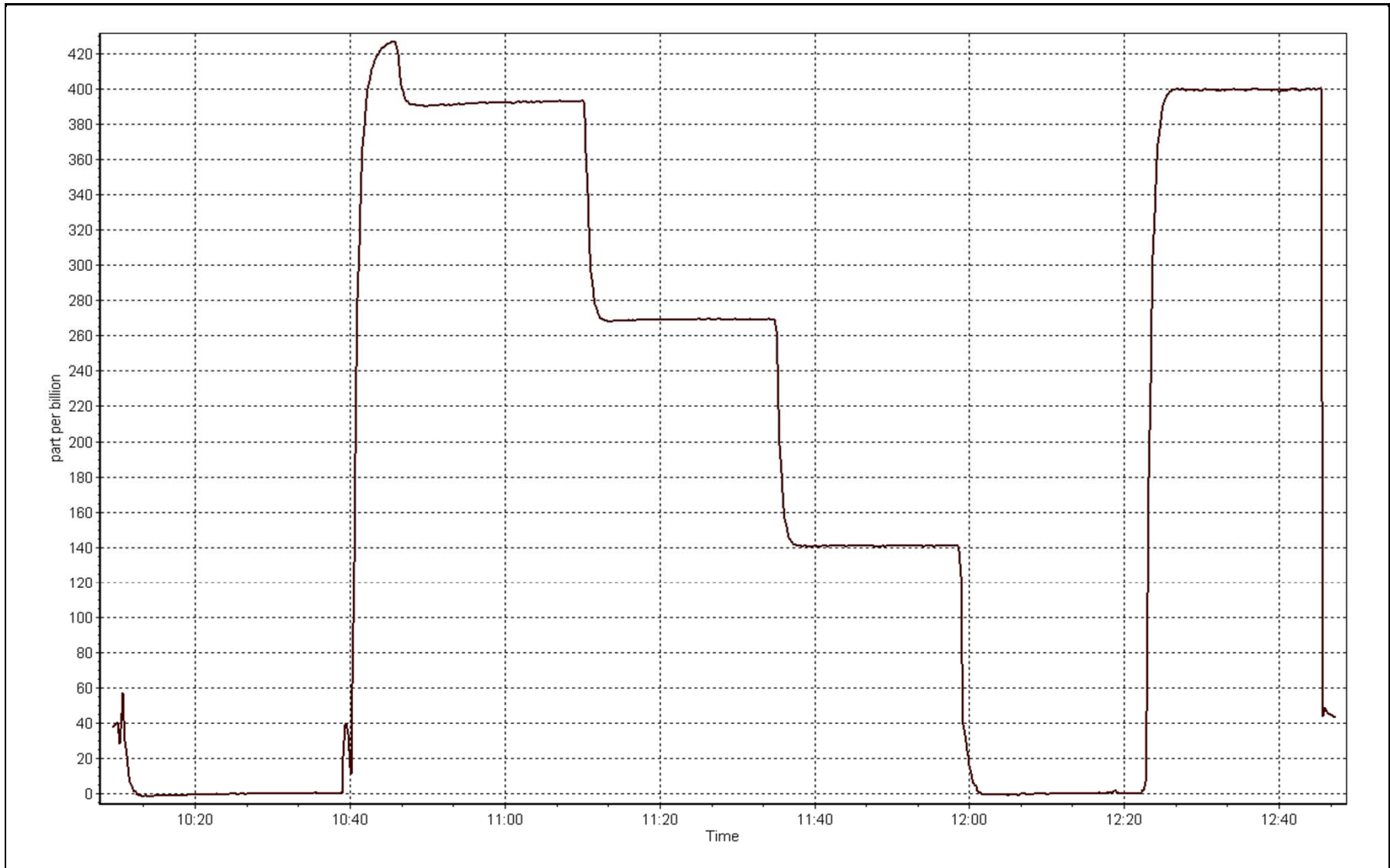
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999978
391.6	392.9	0.9968		
268.7	269.4	0.9975	Slope	0.995707
142.1	140.9	1.0087		
			Intercept	0.691864



O3 Calibration Plot

Date: April 14, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:20
NO Cal Gas Conc	53.4 ppm	Gas Cert Reference	SA130026A
NOx Cal Gas Conc	53.4 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	Sabio 4010	Serial Number	8400311
Zero air Generator	Teledyne API T701	Serial Number	4764

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8790
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999468	0.999369	1.000462
	Data Offset	0.108229	0.170348	0.605779
Current Calibration	Data Slope	0.992212	0.991625	0.998643
	Data Offset	0.738723	0.868626	0.773924

## Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262592
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.682		0.682	
NOX coefficient	0.998		0.998	
NO2 coefficient	1.000		1.000	
NO bkgrnd	2.8		2.8	
NOX bkgrnd	2.9		2.9	
Chamber Temp	49.9	Deg C	50.4	Deg C
Moly Temp	326	Deg C	327.4	Deg C
PMT voltage	NA	V	-845	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	160.9	mmHg	159.1	mmHg
R Cell Press Nox	160.9	mmHg	159.1	mmHg
NO sample flow	0.845	lpm	0.838	lpm
Nox sample Flow	0.845	lpm	0.840	lpm

**Notes:**

No adjustments. As Finds used as Calibrator Zero and High Point. Power outage at the end of the third GPT point, analyzers left flagged, no As Lefts.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 14, 2015

Station Number:

AMS 14

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	----	----
as found span	5000	74.9	799.9	799.9	0.0	806.2	806.7	-0.5	0.9922	0.9916
calibrator zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	-0.1	----	----
high point	5000	74.9	799.9	799.9	0.0	806.2	806.7	-0.5	0.9922	0.9916
second point	5000	37.5	400.5	400.5	0.0	401.5	401.3	0.2	0.9976	0.9981
third point	5000	18.7	199.7	199.7	0.0	200.4	200.4	0.1	0.9965	0.9968
as left zero										
as left span										
Average Correction Factor									0.9954	0.9955

Corrected As found

NO<sub>x</sub>= 806.1

NO= 806.6

Percent Change

NO<sub>x</sub>= -0.7%

NO= -0.8%

Previous Response

NO<sub>x</sub>= 800.2

NO= 800.3

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

74.9

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	412.0	391.6	803.6	412.0	391.7	0.9807	1.0000	0.9998	100.0%
2nd NO2 (200)	----	534.9	268.7	803.3	534.9	268.4	0.9811	1.0000	1.0009	99.9%
3rd NO2 (100)	----	661.5	142.1	801.8	661.5	140.3	0.9830	1.0000	1.0128	98.7%
4th NO2 (0)	803.6	----	-0.1	803.5	803.6	-0.1	0.9809	1.0000	N/A	----
Average Correction Factor							0.9814	1.0000	1.0045	99.6%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

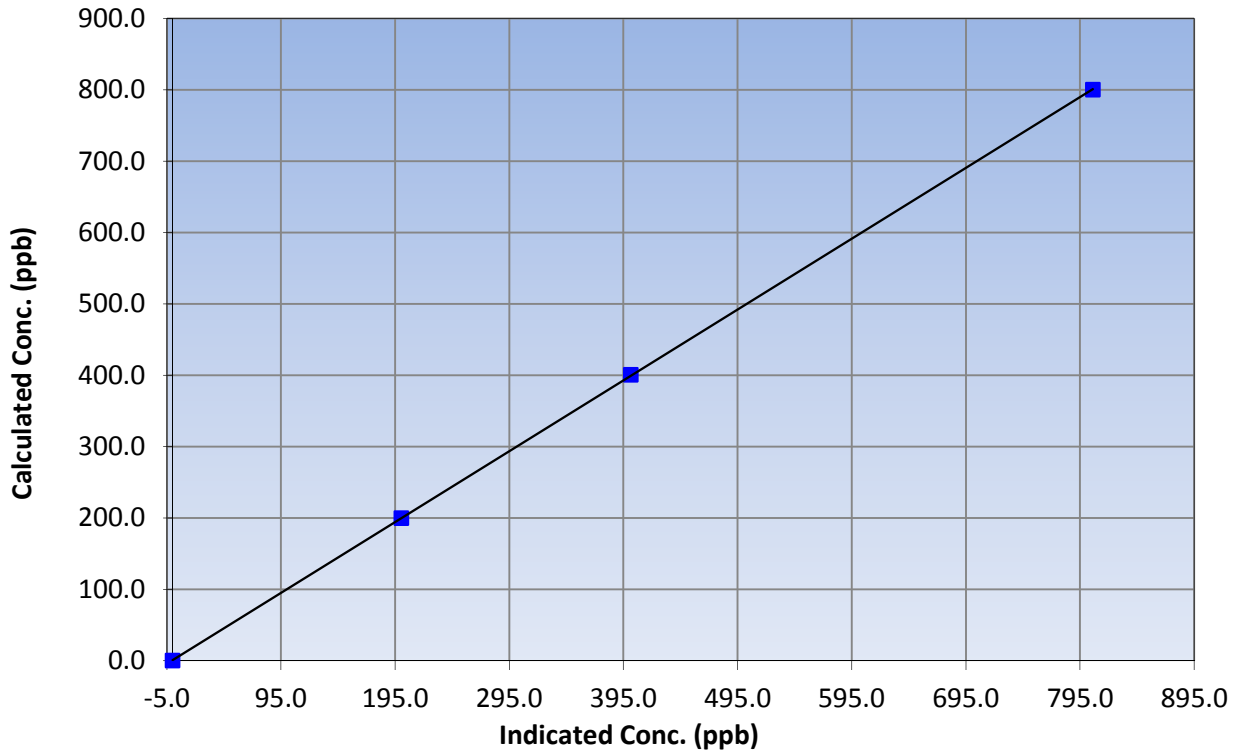
### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	----	Correlation Coefficient	0.999991
799.9	806.2	0.9922		
400.5	401.5	0.9976	Slope	0.992212
199.7	200.4	0.9965		
			Intercept	0.738723

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

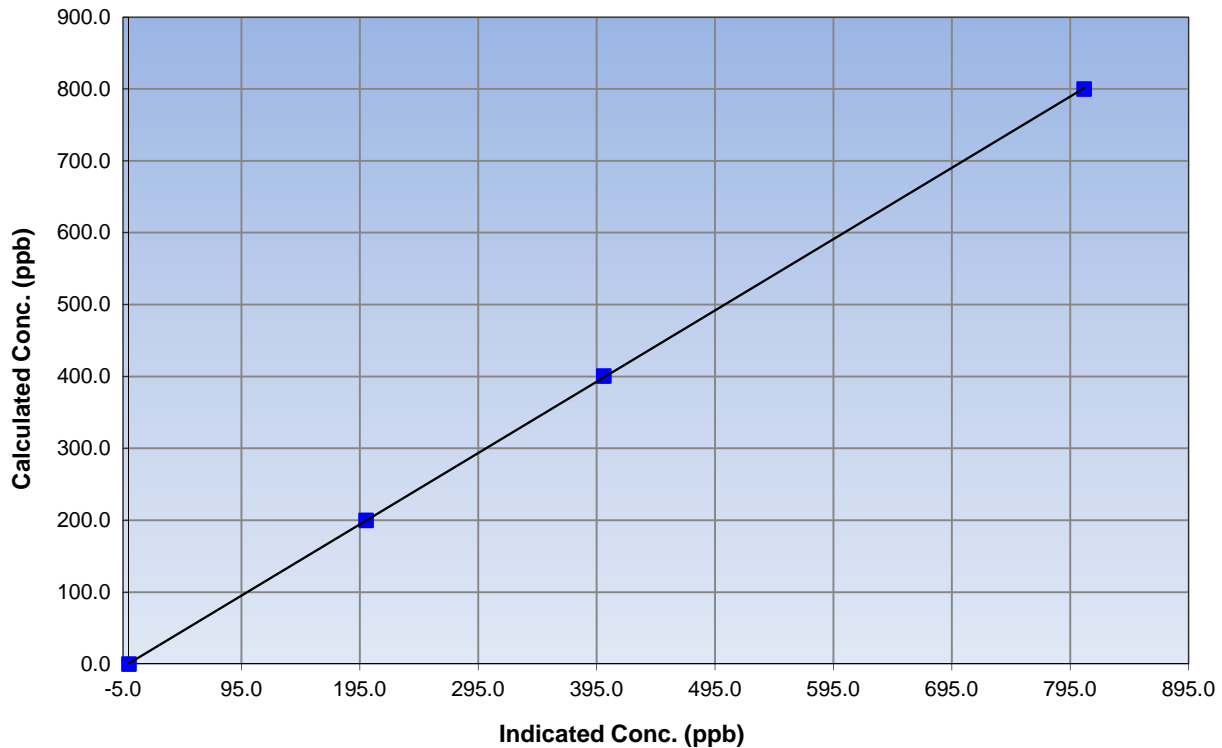
### Station Information

Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999986
799.9	806.7	0.9916		
400.5	401.3	0.9981	Slope	0.991625
199.7	200.4	0.9968		
			Intercept	0.868626

### NO Calibration Curve







# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

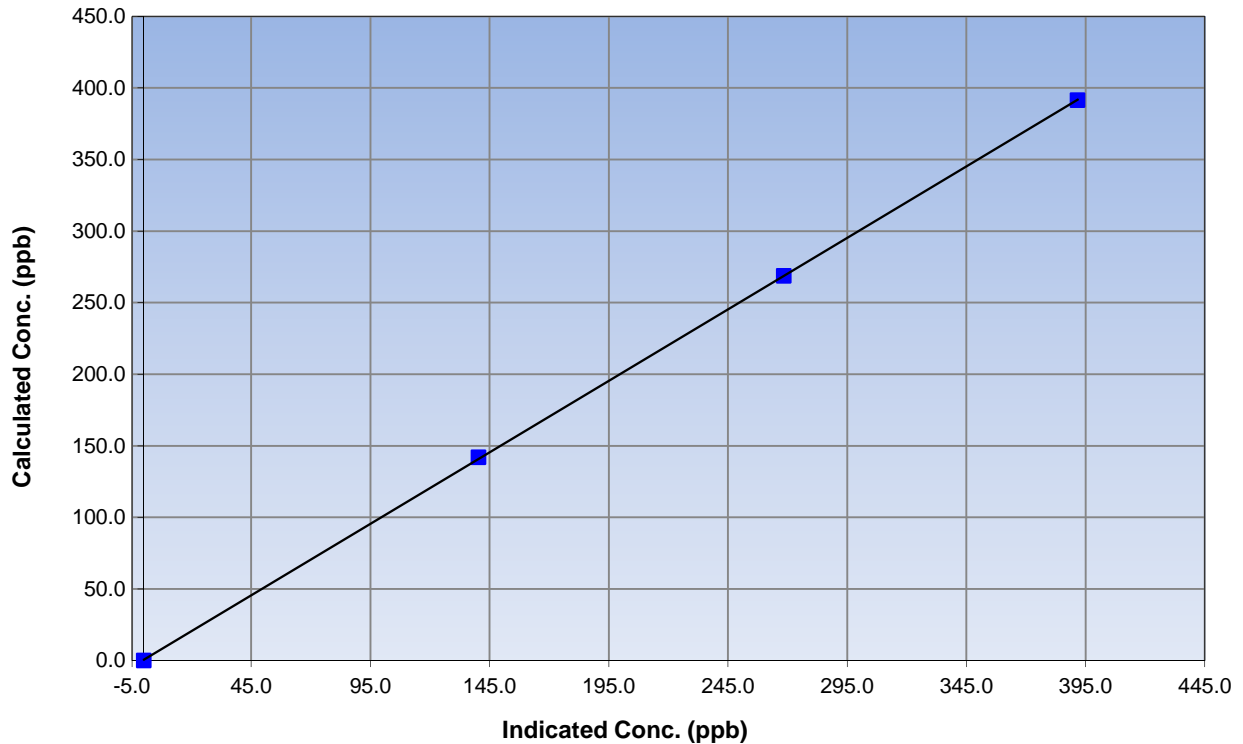
### Station Information

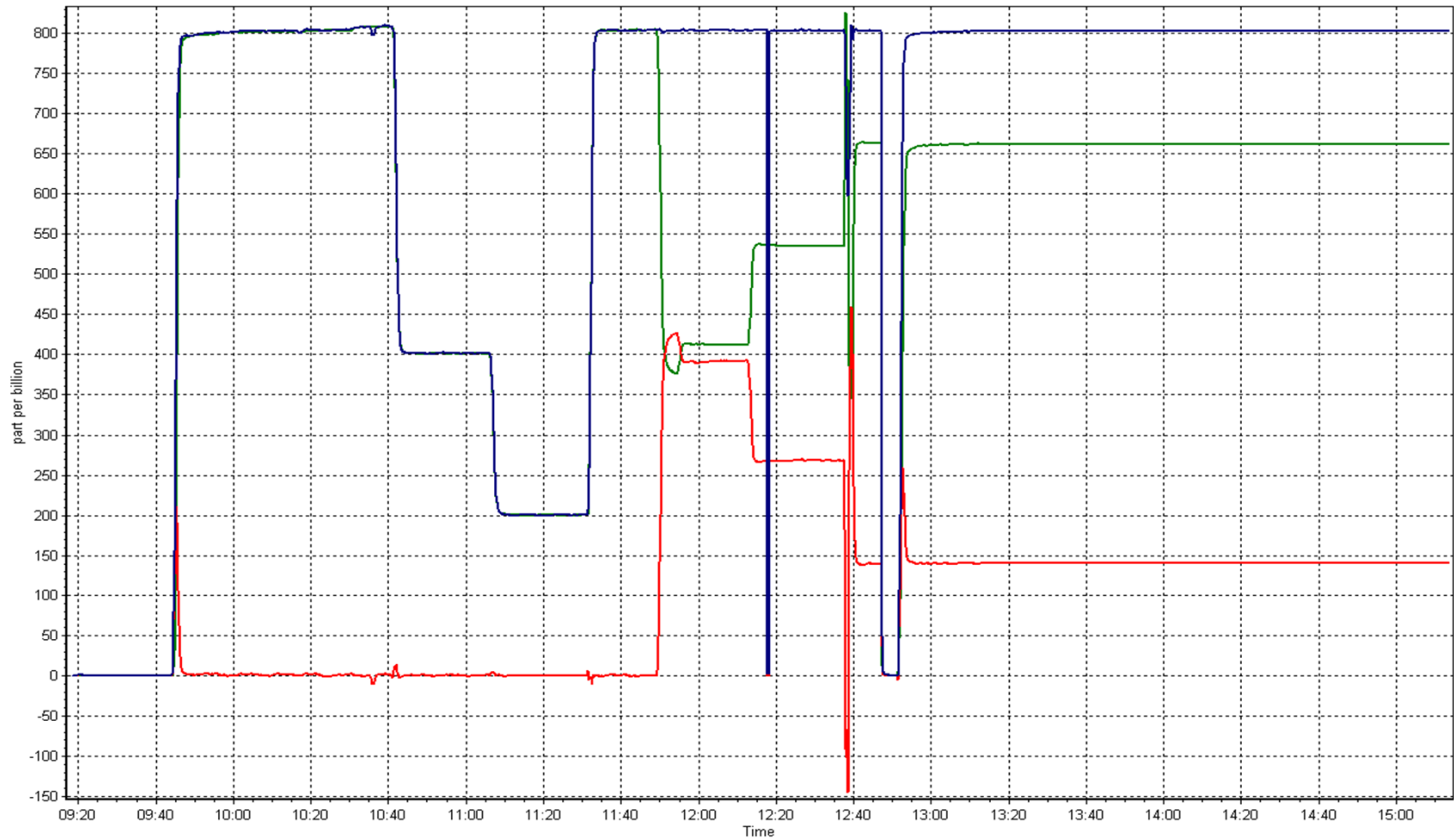
Calibration Date	April 14, 2015	Previous Calibration	March 17, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:20	End Time (MST)	13:20
Analyzer make	Thermo 42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999975
391.6	391.7	0.9998		
268.7	268.4	1.0009	Slope	0.998643
142.1	140.3	1.0128		
			Intercept	0.773924

### NO<sub>2</sub> Calibration Curve





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 15  
CNRL HORIZON  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)

April 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	27	0	3	0
TRS (ppb) Average	684	34	36	99.72	1	0	0	0
THC (ppm) Average	683	37	37	100.00	4.2	-	2.5	-
NO2 (ppb) Average	683	37	37	100.00	36	0	8	-
NO (ppb) Average	683	37	37	100.00	37	-	5	-
NOX (ppb) Average	683	37	37	100.00	73	-	13	-
PM2.5 (ug/m3) Average	710	0	10	98.61	51	-	11.2	0
Temperature 2 m (C) Average	720	0	0	100.00	24.3	-	15.5	-
Wind Speed 10 m (km/h) Average	709	0	11	98.47	25	-	17.0	-
Wind Direction 10 m (deg) Average	709	0	11	98.47	-	-	-	-
Precipitation (mm) Total	720	0	0	100.00	0.8	-	1.3	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	72	-
Global Solar Radiation (W/m2) Average	720	0	0	100.00	810	-	298	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
 APRIL 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	0.5	2	-	0	0	0	0	0	1	27
TRS (ppb) Average	684	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	683	2.26	0.2	-	2	2.1	2.2	2.2	2.3	2.4	4.2
NO2 (ppb) Average	683	3.8	6	-	0	0	1	2	4	11	36
NO (ppb) Average	683	0.9	3	-	0	0	0	0	0	2	37
NOX (ppb) Average	683	4.7	8	-	0	0	1	2	5	14	73
PM2.5 (ug/m3) Average	710	4.58	5.2	-	0.3	1	2	3.1	5.1	8.9	51
Temperature 2 m (C) Average	720	4.41	8.1	-	-16.8	-5.6	-1.7	4.4	10.5	14.5	24.3
Wind Speed 10 m (km/h) Average	709	10.2	5	-	1	5	7	9	13	18	25
Wind Direction 10 m (deg) Average	709	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	720	-	-	2.03	0	0	0	0	0	0	0.8
Relative Humidity (%) Average	720	47.3	20	-	13	23	31	44	61	80	98
Global Solar Radiation (W/m2) Average	720	225.8	262	-	0	0	0	86	462	643	810

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	22 Apr 2015 12:00	22 Apr 2015 13:00	2	Maintenance - cleaned glass manifold
PM2.5	08 Apr 2015 05:00	08 Apr 2015 13:00	9	Analyzer failure - sample pump flow interrupted
PM2.5	08 Apr 2015 14:00	08 Apr 2015 14:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	01 Apr 2015 03:00	01 Apr 2015 13:00	11	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:	720
Maximum Value: 27 ppb on Apr 28 11:00	Maximum Daily Average: 3.2 ppb on Apr 28		Hours of Data:	683
Minimum Value: 0 ppb on Apr 1 05:00	Minimum Daily Average: 0.0 ppb on Apr 12		Hours of Missing Data:	37
Maximum Diurnal Average: 1.4 ppb at hour 11	Minimum Diurnal Average: 0.2 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 7		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	1
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
6-Apr	Z	0	0	0	0	0	0	0	2	1	0	0	1	1	0	1	1	1	1	1	2	1	0	0	0.7	2
7-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	0	2	1	0	0	1	3	2	0	0	0	0	0	0	0	0	0.5	3
9-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	2	0	0	0	0.4	4
11-Apr	0	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-Apr	Z	0	0	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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	6	8	10	8	2	2	1	5	7	3	1	1	1	2.5	10
15-Apr	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0.2	4
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Apr	Z	2	7	5	1	4	1	0	0	0	2	1	1	1	2	0	0	0	0	0	0	0	0	0	1.3	7
19-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.1	1
21-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	0
23-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Apr	0	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-Apr	2	0	Z	0	0	0	0	0	0	1	1	0	2	5	4	2	3	3	5	3	2	2	1	0	1.6	5
27-Apr	0	0	0	Z	0	1	2	6	8	9	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1.5	9
28-Apr	0	0	0	0	Z	0	1	2	2	5	27	17	7	3	1	2	1	0	0	2	1	1	0	0	3.2	27
29-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

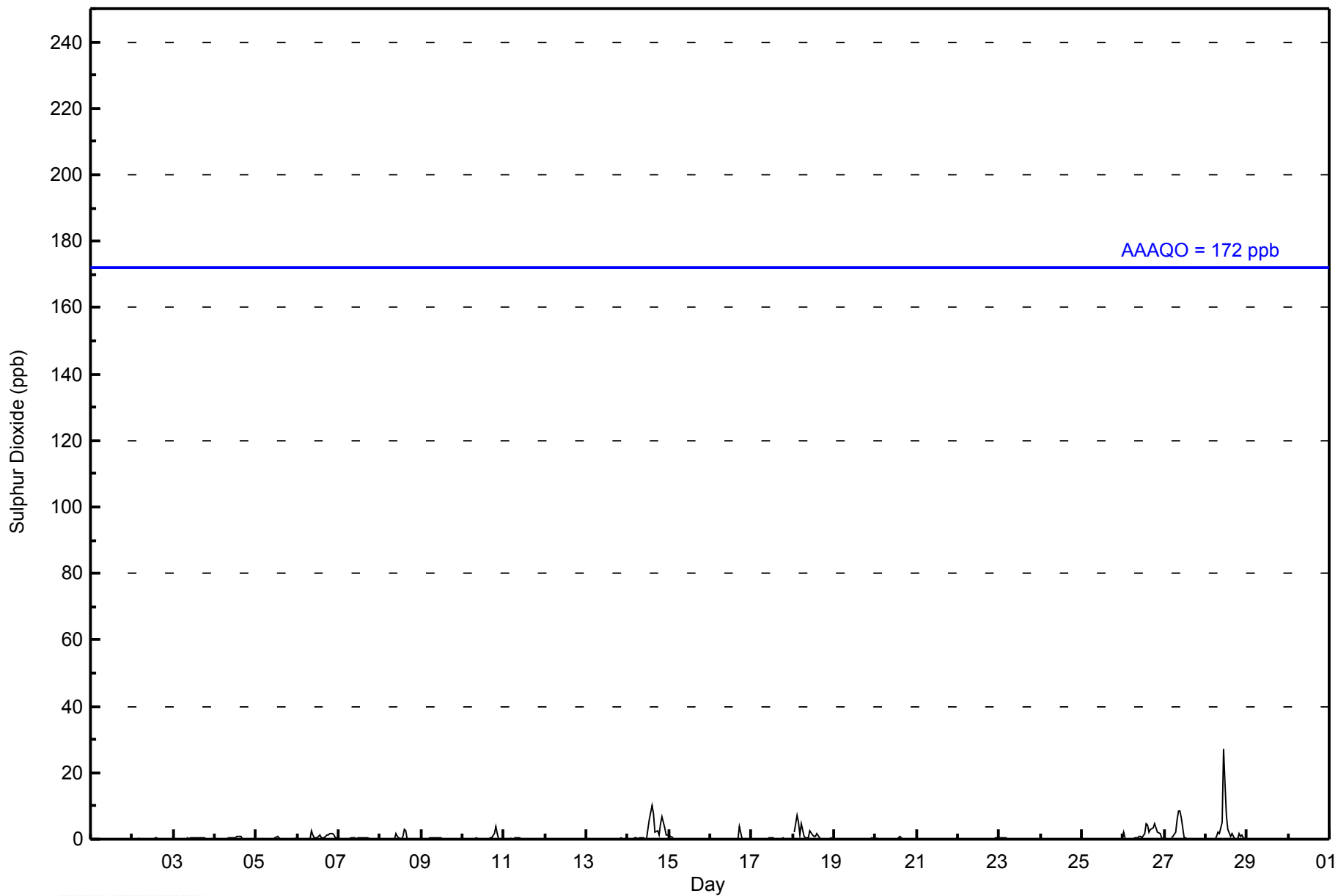
0.3	0.2	0.4	0.3	0.2	0.3	0.2	0.4	0.6	0.7	1.4	0.8	0.7	0.8	0.9	0.6	0.3	0.5	0.4	0.6	0.5	0.3	0.2	0.2	Diurnal Average	
2	2	7	5	1	4	2	6	8	9	27	17	7	8	10	8	3	4	5	5	7	3	1	1	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	681	99.71	99.71
11 - 20	1	0.15	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: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - April 2015**

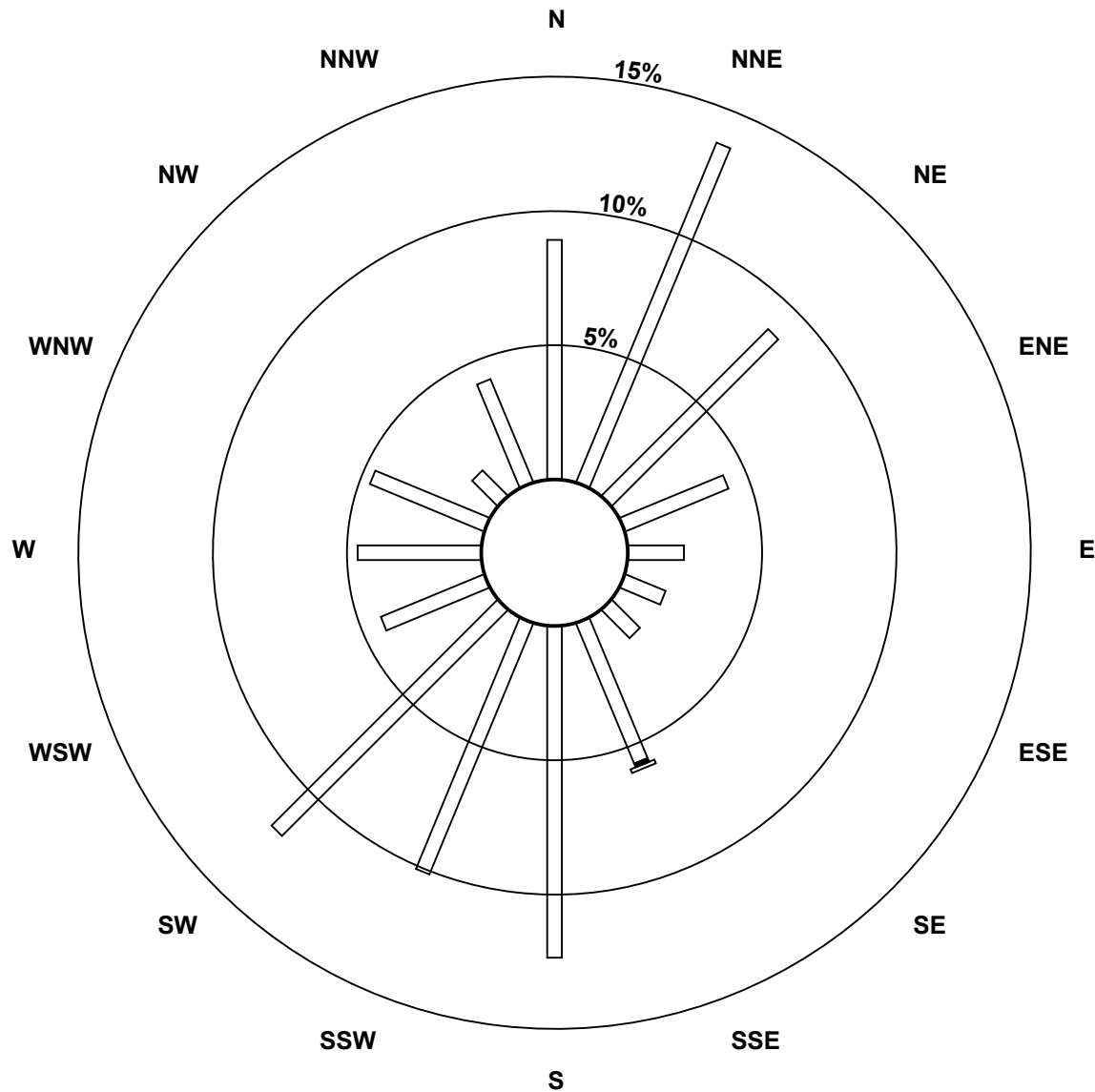
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	60	92	59	28	14	11	10	38	83	68	80	28	31	31	9	28	670
11 - 20	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	92	59	28	14	11	10	40	83	68	80	28	31	31	9	28	672

Total Number of Valid Hours: 672

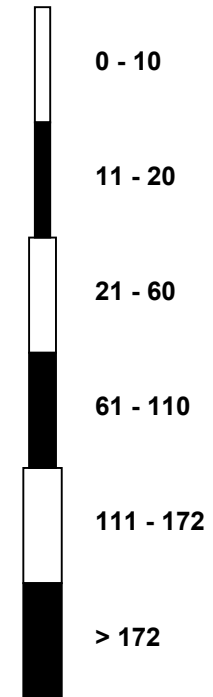
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)



Classes (ppb)

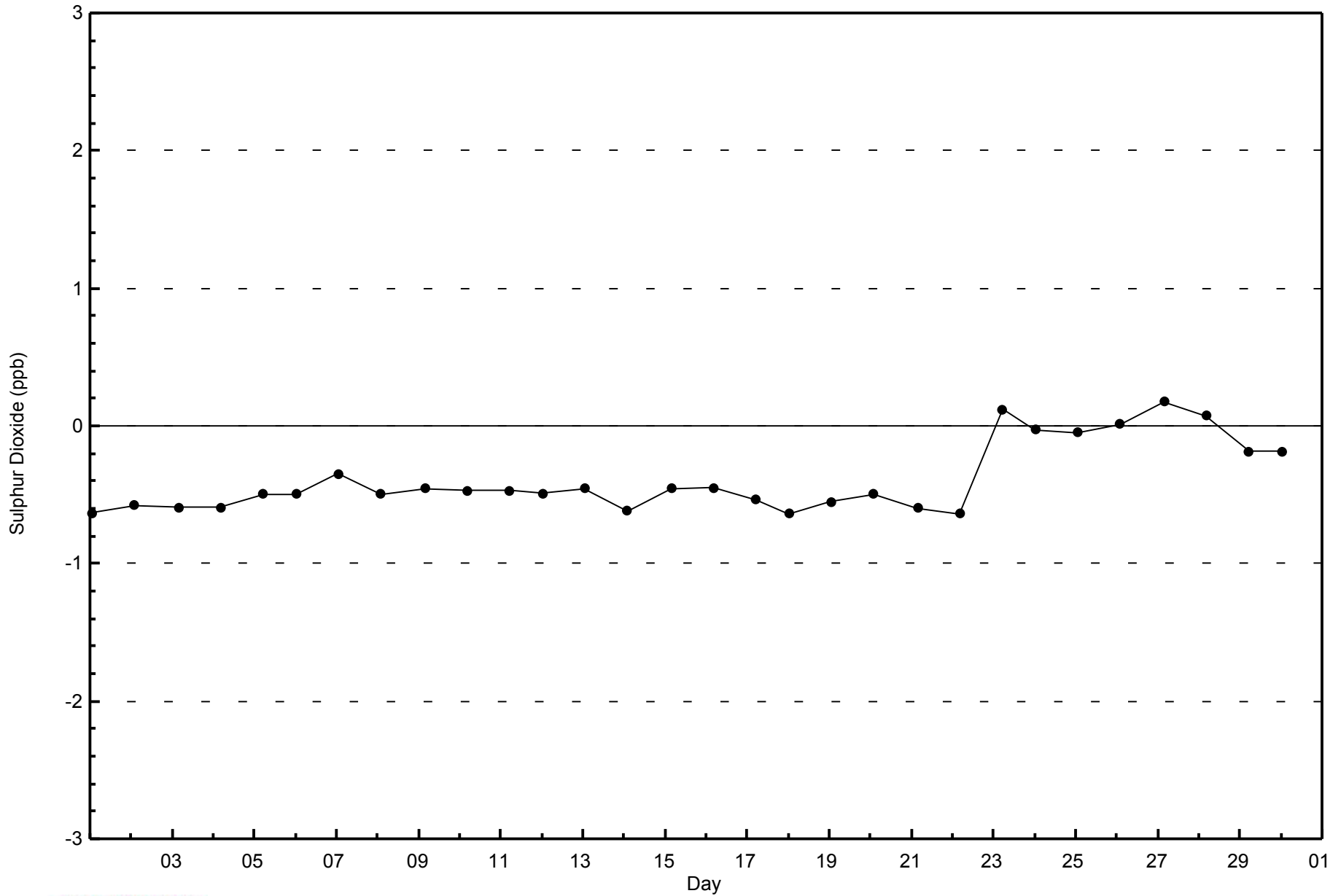


Total Number of Valid Hours: 672



WBEA  
Zero Responses

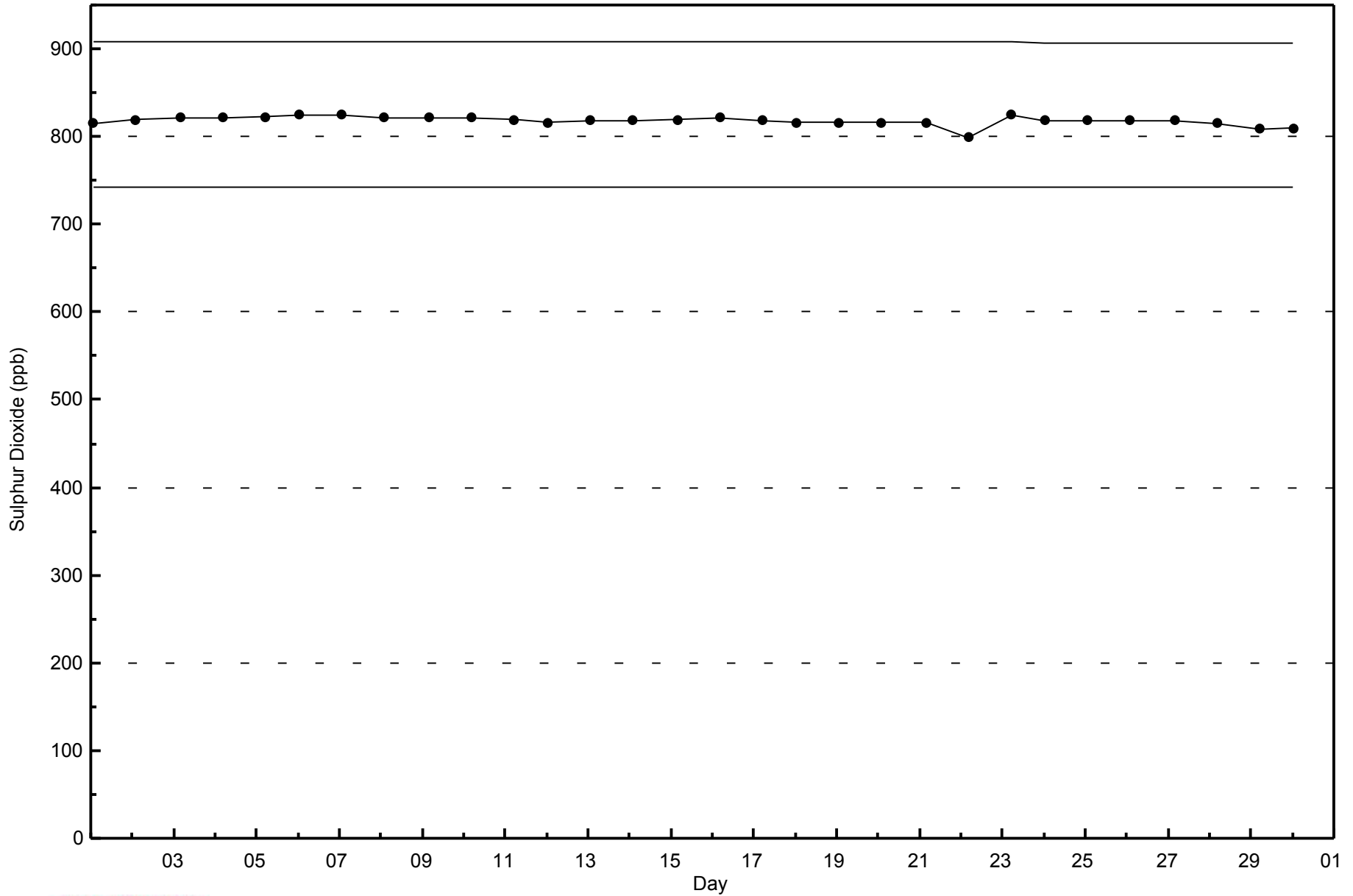
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 1 ppb on Apr 28 08:00	Maximum Daily Average: 0.5 ppb on Apr 28		Hours of Data:	684
Minimum Value: 0 ppb on Apr 24 21:00	Minimum Daily Average: 0.1 ppb on Apr 21		Hours of Missing Data:	36
Maximum Diurnal Average: 0.3 ppb at hour 8	Minimum Diurnal Average: 0.2 ppb at hour 18		Hours of Calibration:	34
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		Percent Operational Time:	99.7

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

0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	Diurnal Average	
0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	Diurnal Maximum	

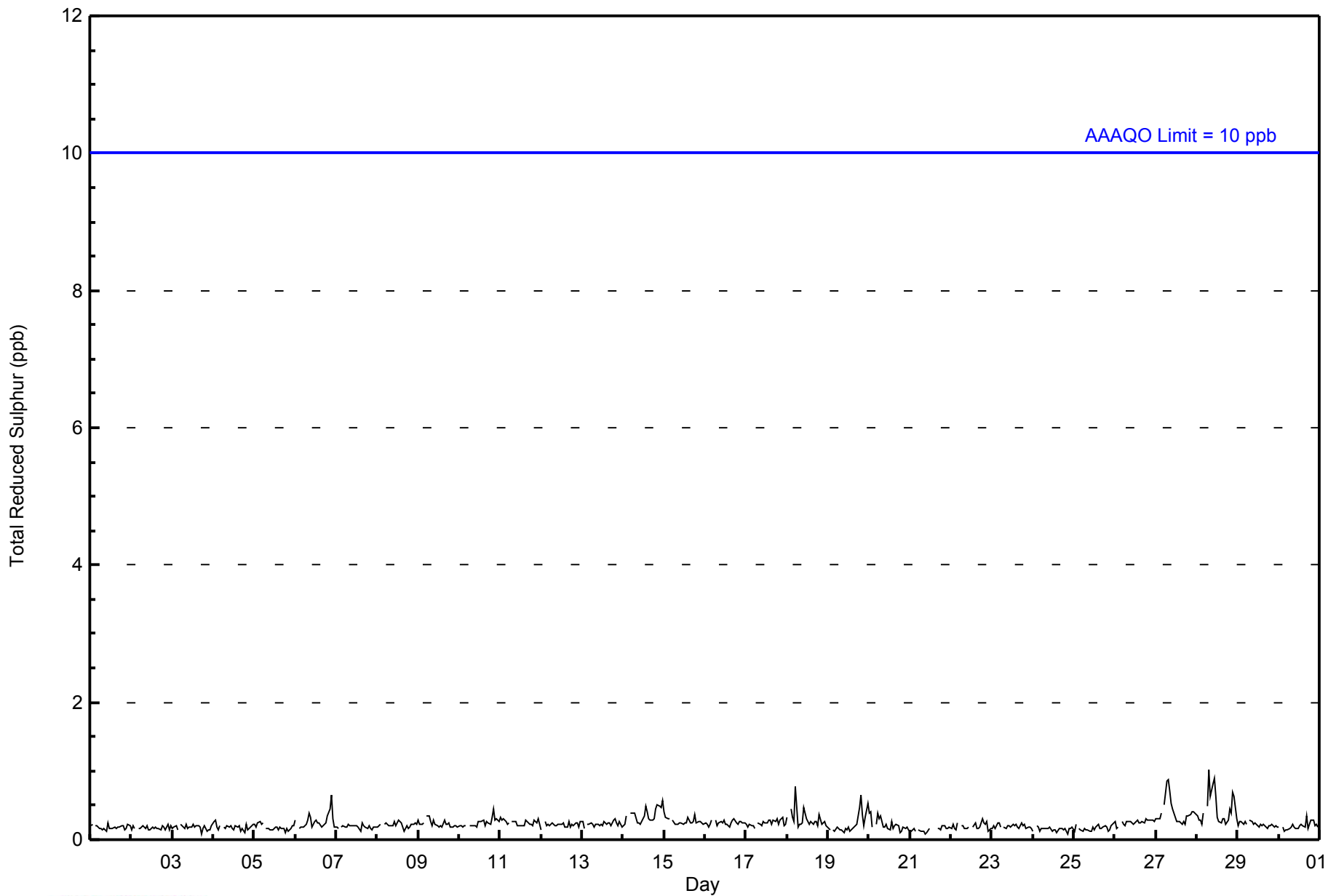
Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb





WBEA  
Hourly Averages

Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	684	100.00	100.00
3 - 4	0	0.00	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - April 2015**

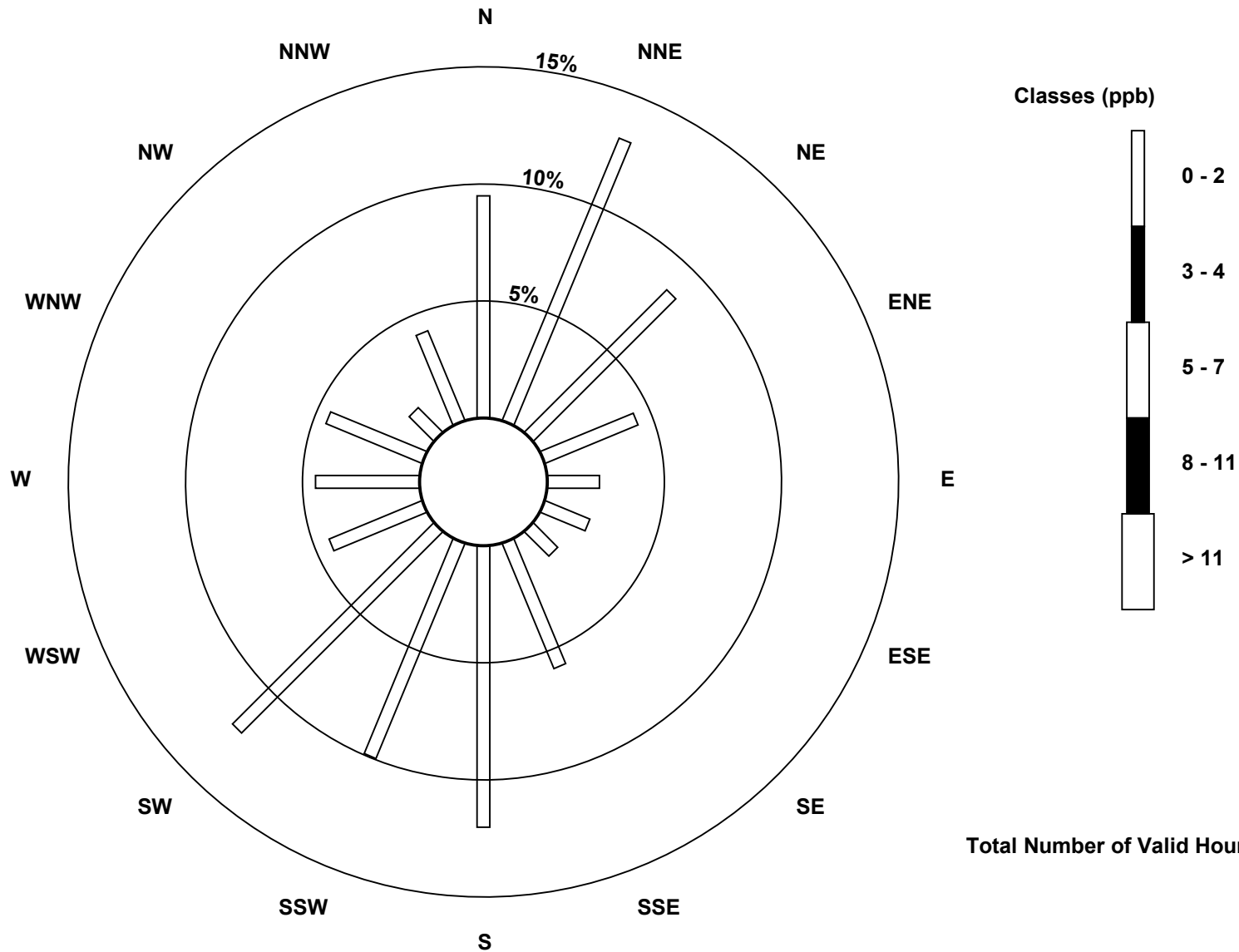
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	64	88	58	29	15	14	10	39	81	67	82	29	30	30	10	28	674
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	64	88	58	29	15	14	10	39	81	67	82	29	30	30	10	28	674

Total Number of Valid Hours: 674

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon (AMS 15)

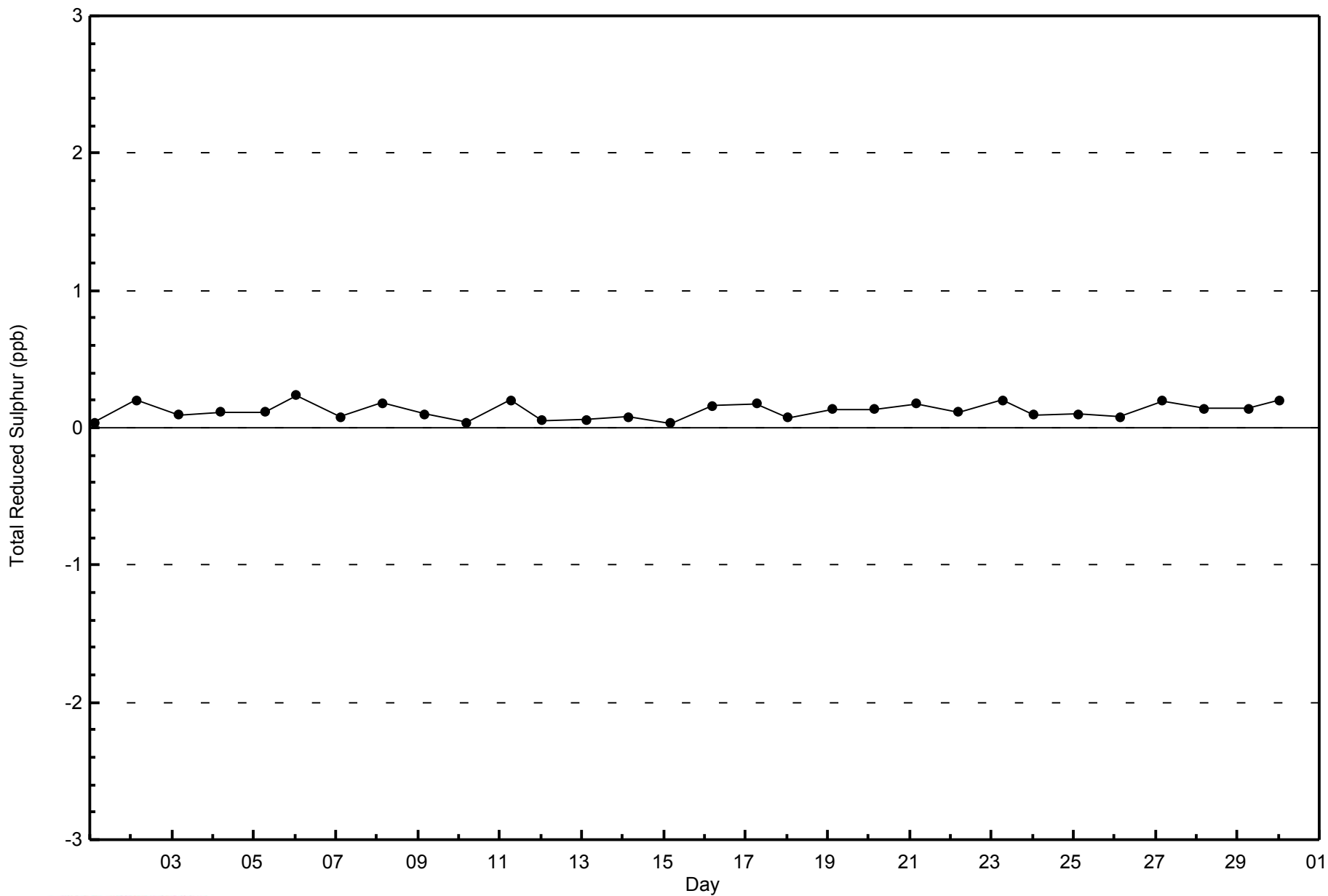


Total Number of Valid Hours: 674



WBEA  
Zero Responses

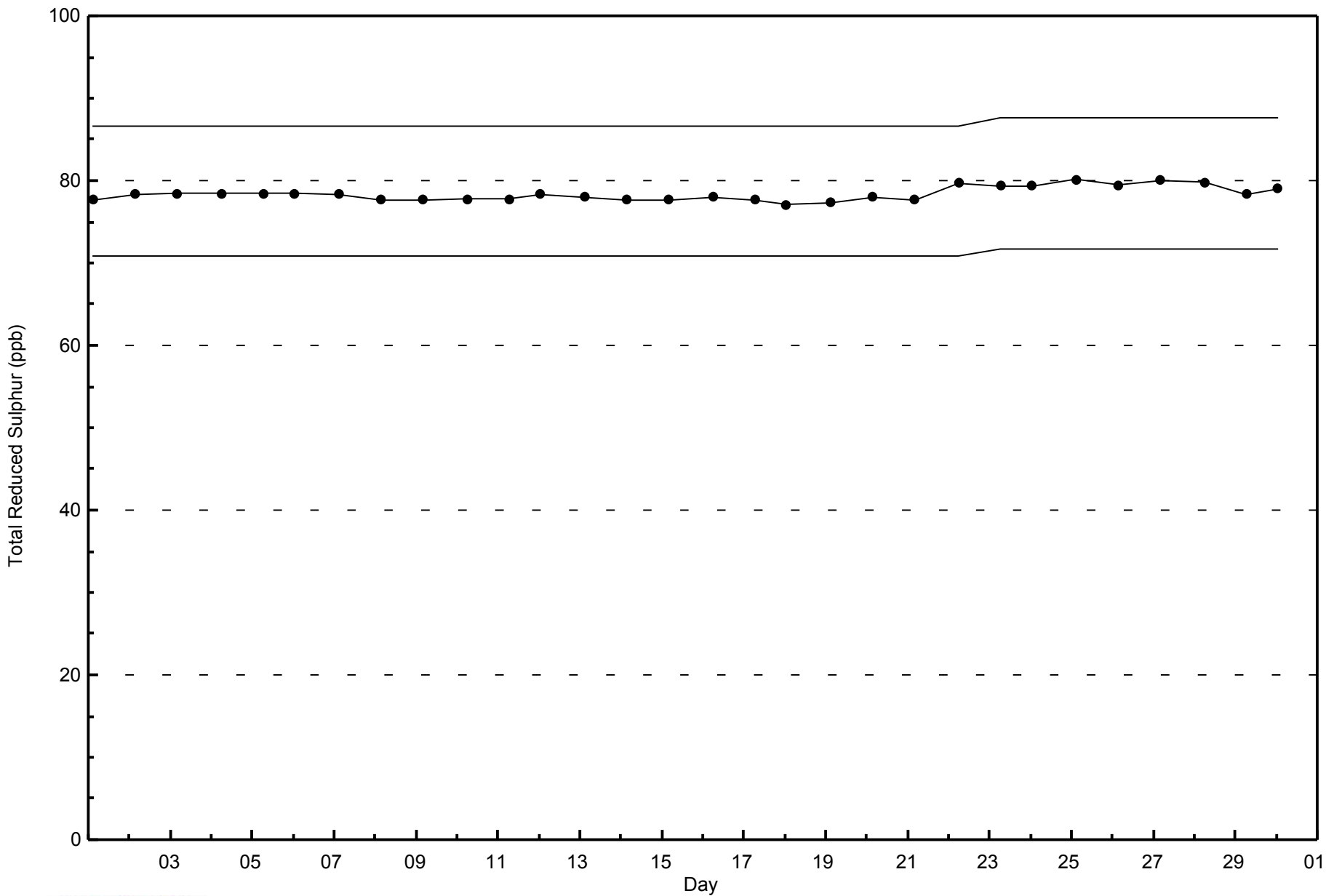
Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon - April 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - April 2015**

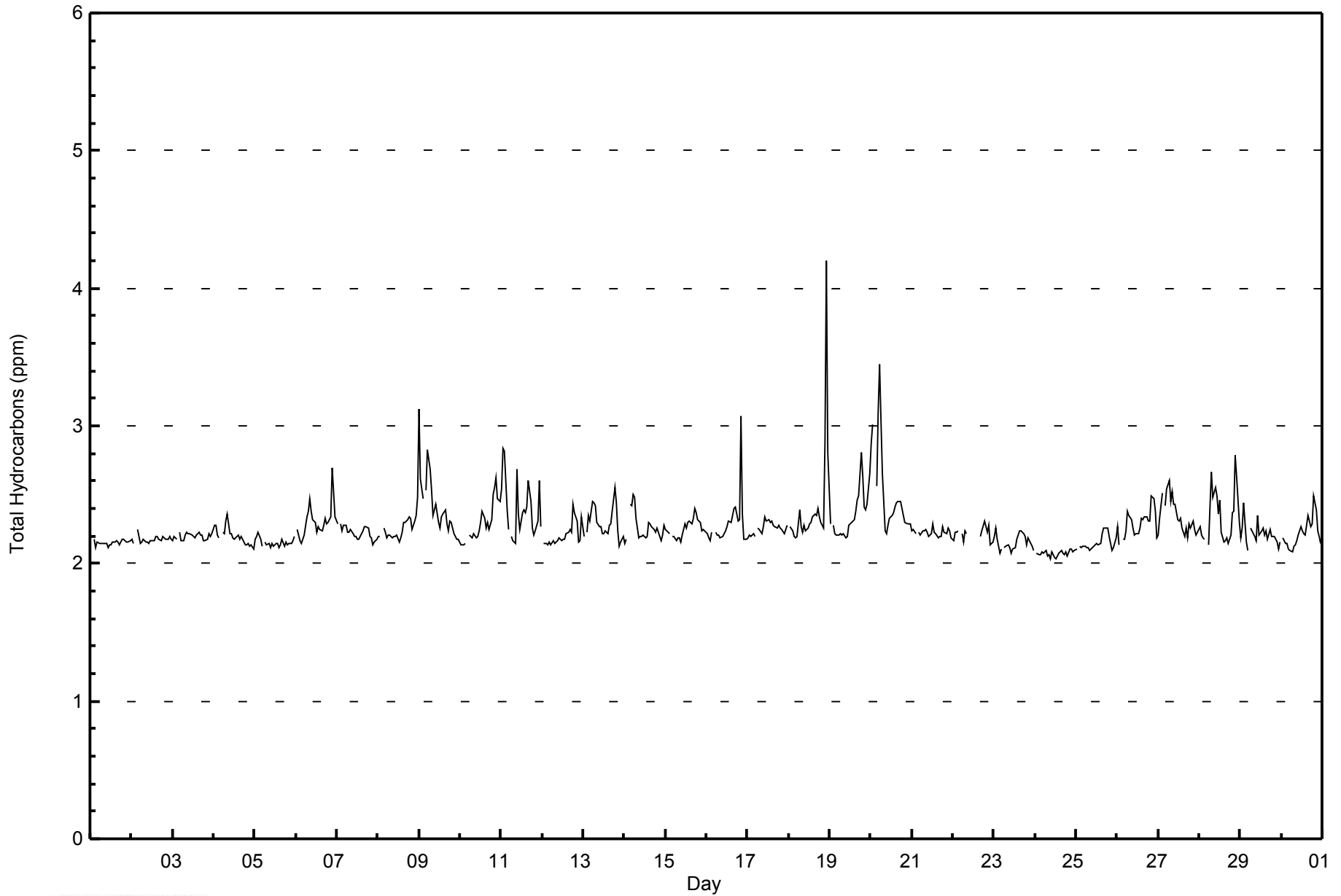






WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
CNRL Horizon - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	3	0.44	0.44
2.1 - 3.0	675	98.83	99.27
3.1 - 10.0	5	0.73	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - April 2015**

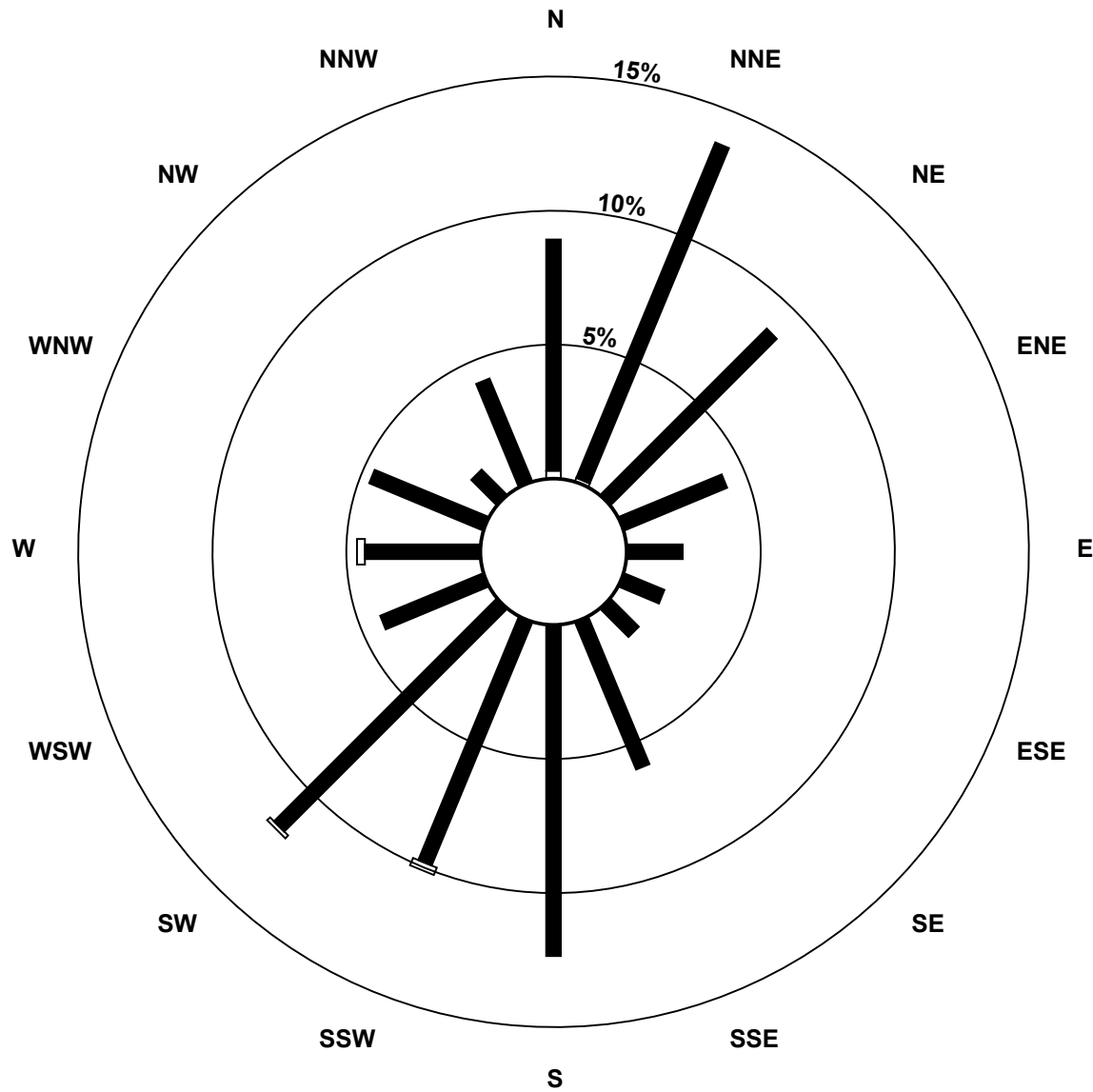
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2.1 - 3.0	58	91	59	28	14	11	10	40	83	66	79	28	29	31	9	28	664
3.1 - 10.0	0	0	0	0	0	0	0	0	0	2	1	0	2	0	0	0	5
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	92	59	28	14	11	10	40	83	68	80	28	31	31	9	28	672

Total Number of Valid Hours: 672

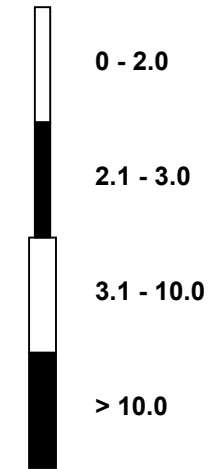
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Total Hydrocarbons (THC) - ppm  
CNRL Horizon (AMS 15)



Classes (ppm)

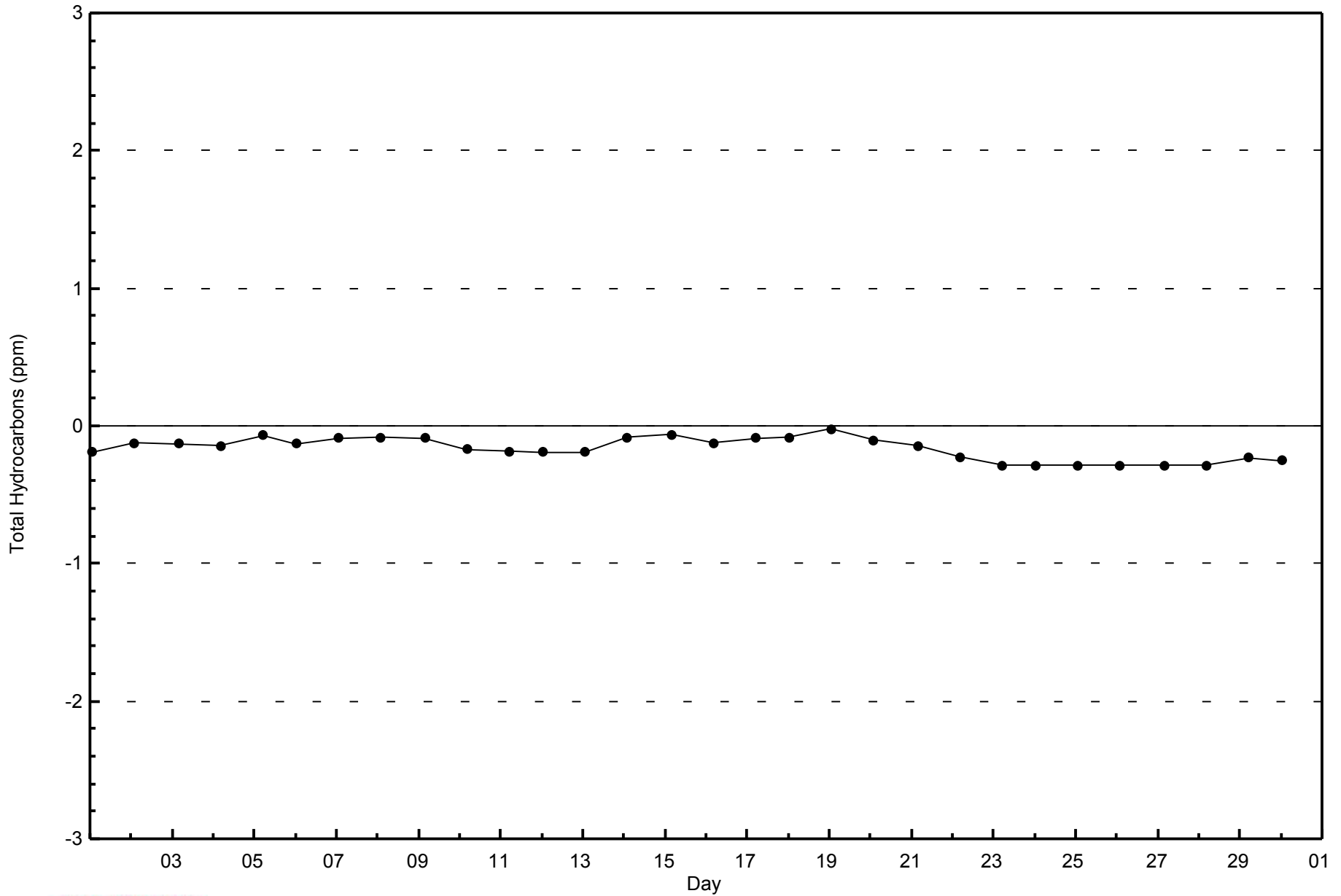


Total Number of Valid Hours: 672



WBEA  
Zero Responses

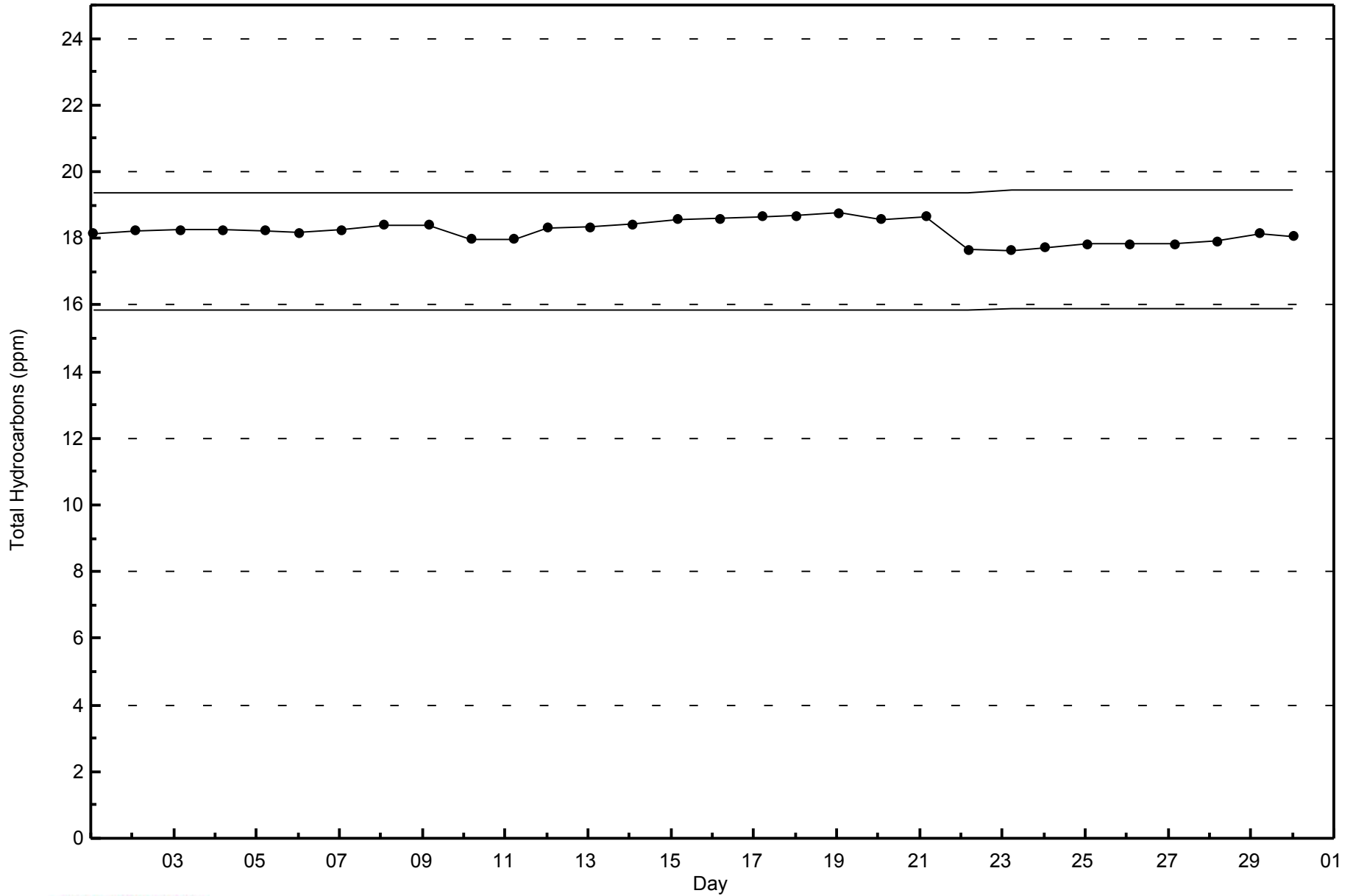
Total Hydrocarbons (THC) - ppm  
CNRL Horizon - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
CNRL Horizon - April 2015





Maximum Value: 37 ppb on Apr 18 23:00	Maximum Daily Average: 4.9 ppb on Apr 20	Hours in Service: 720
Minimum Value: 0 ppb on Apr 3 22:00	Minimum Daily Average: 0.0 ppb on Apr 24	Hours of Data: 683
Maximum Diurnal Average: 2.8 ppb at hour 6	Minimum Diurnal Average: 0.1 ppb at hour 21	Hours of Missing Data: 37
Monthly Average: 0.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 2 P <sub>99</sub> = 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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	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-Apr	0	0	0	Z	0	0	0	1	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5
4-Apr	0	0	0	0	Z	0	0	3	8	5	2	0	0	1	0	1	0	0	0	0	0	0	0	0	0.9	8
5-Apr	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0.2	1
6-Apr	Z	0	0	0	0	0	2	5	8	8	4	3	1	1	1	0	0	0	0	0	0	0	0	0	1.5	8
7-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	0	1	1	2	0	0	1	1	0	0	0	0	0	0	0	4	0.5	4
9-Apr	18	1	0	Z	2	26	21	15	6	6	6	2	0	0	0	0	0	0	0	0	0	0	0	0	4.5	26
10-Apr	0	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-Apr	1	5	6	2	0	Z	0	0	0	8	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1.3	8
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.1	1
13-Apr	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0.4	1
14-Apr	0	0	Z	3	5	4	7	3	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1.4	7
15-Apr	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1
17-Apr	0	0	0	0	0	Z	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	3
18-Apr	Z	0	0	0	0	0	0	0	0	1	2	2	1	1	1	0	0	0	0	0	0	16	37	11	3.2	37
19-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	3	0	0.3	3
20-Apr	3	22	Z	0	18	33	17	12	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	4.9	33
21-Apr	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
22-Apr	0	0	1	0	Z	1	1	4	2	C	C	C	C	C	C	C	0	0	0	0	0	0	0	0	--	4
23-Apr	0	0	0	0	0	Z	1	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
24-Apr	Z	0	0	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-Apr	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0.3	1
26-Apr	1	0	Z	0	0	2	7	6	4	3	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1.3	7
27-Apr	0	0	8	Z	1	2	4	4	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	8
28-Apr	0	0	0	0	Z	0	4	5	1	4	4	3	1	0	0	0	0	0	0	0	0	0	0	0	1.0	5
29-Apr	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
30-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0

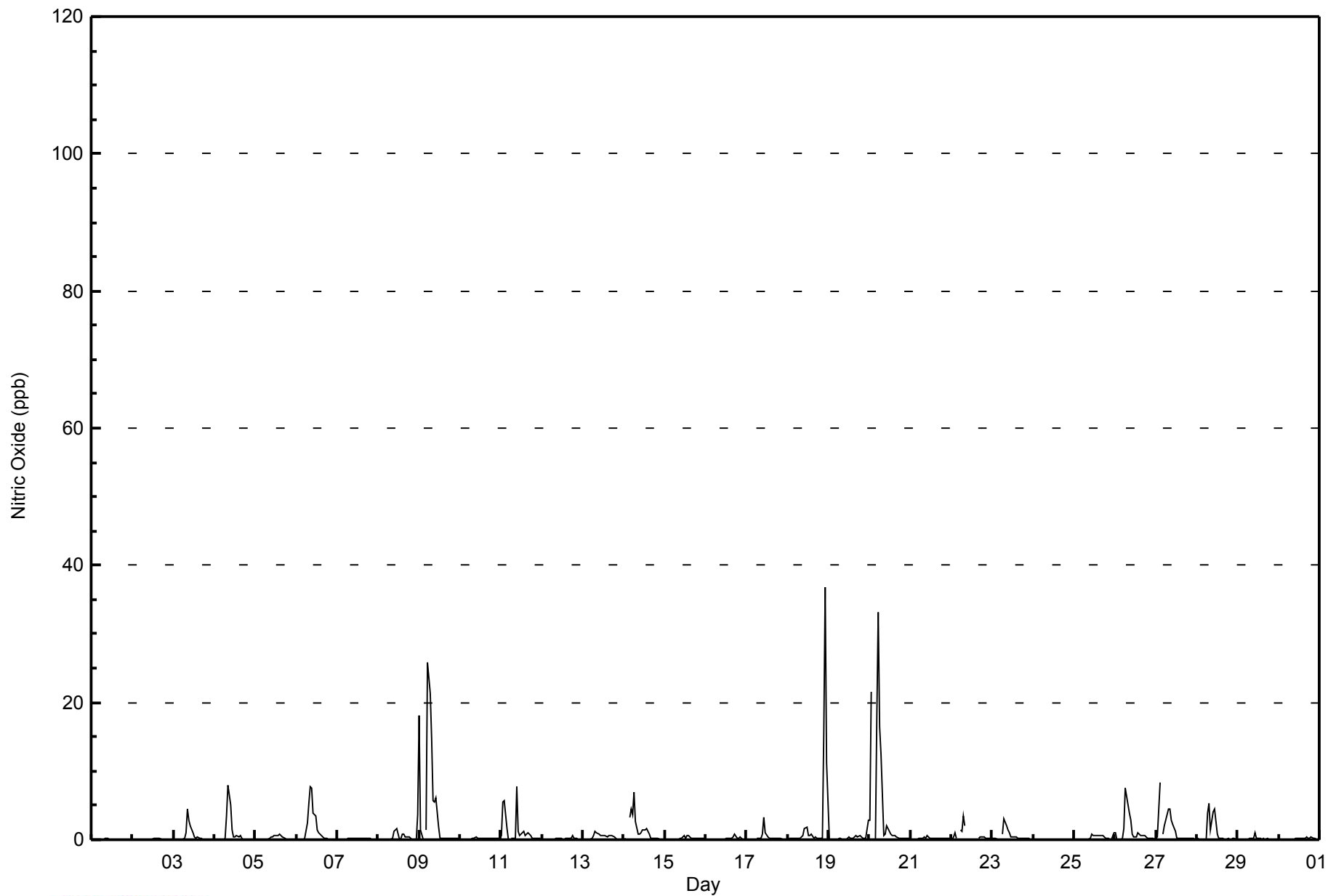
1.0	1.2	0.6	0.2	1.0	2.8	2.2	2.2	1.5	1.6	1.3	0.8	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1	0.6	1.3	0.7	Diurnal Average		
18	22	8	3	18	33	21	15	8	8	6	3	1	2	1	1	1	1	1	1	0	0	16	37	11	Diurnal Maximum	

Z - zerospan      C - Calibration



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
CNRL Horizon - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	99.27	99.27
21 - 40	5	0.73	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - April 2015**

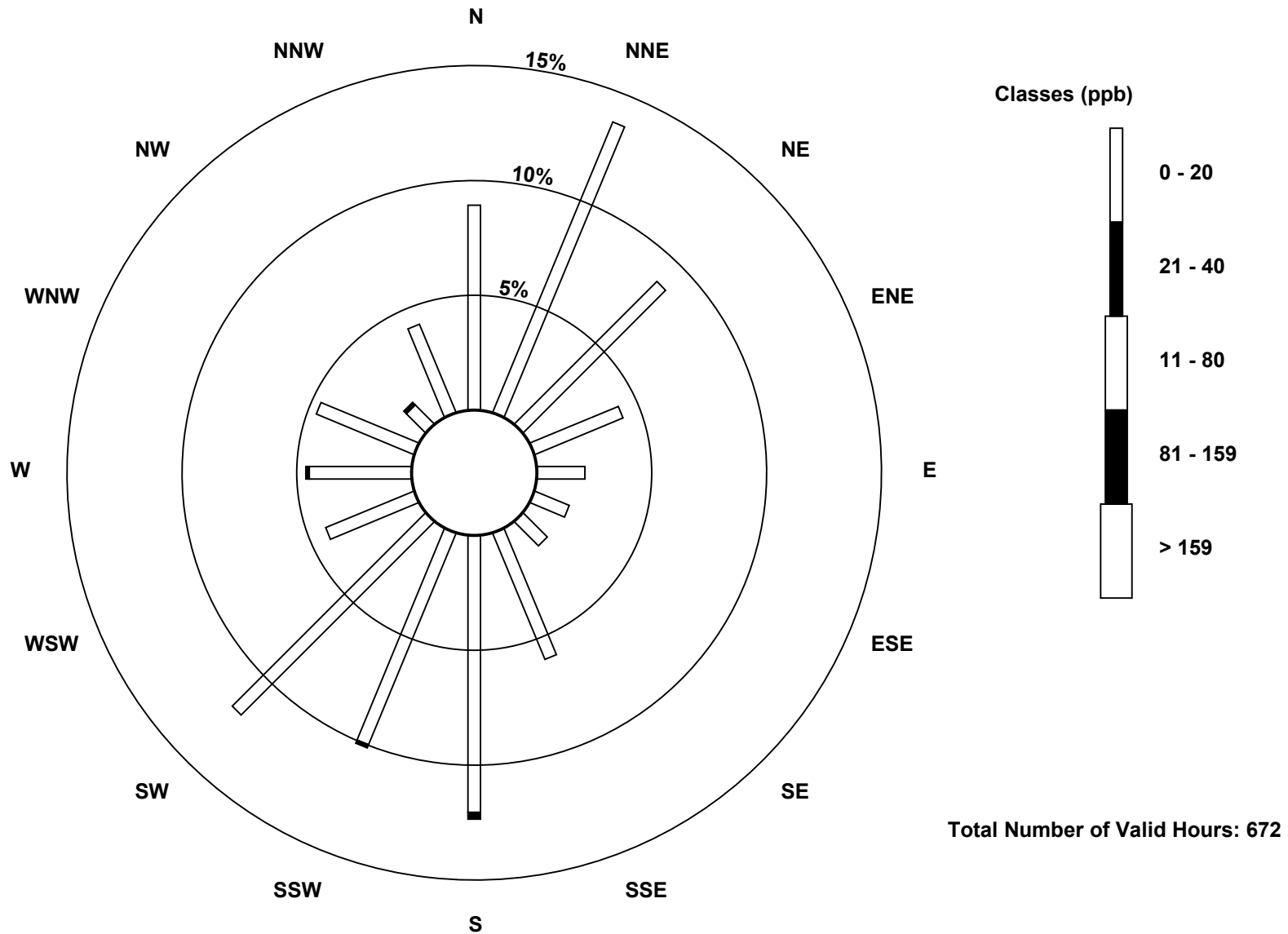
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	60	92	59	28	14	11	10	40	81	67	80	28	30	31	8	28	667
21 - 40	0	0	0	0	0	0	0	0	2	1	0	0	1	0	1	0	5
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	92	59	28	14	11	10	40	83	68	80	28	31	31	9	28	672

Total Number of Valid Hours: 672

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

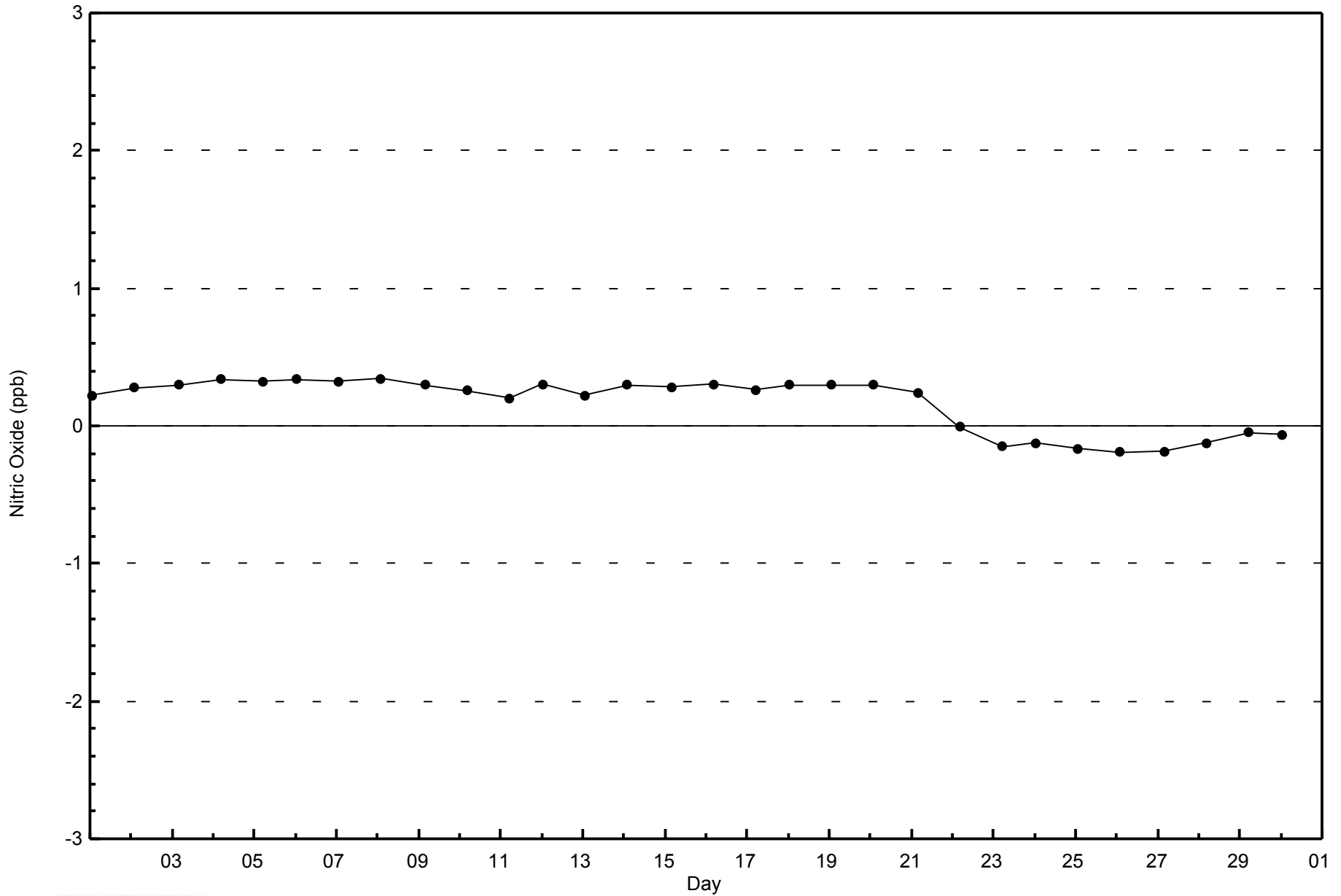
Nitric Oxide (NO) - ppb  
CNRL Horizon (AMS 15)





WBEA  
Zero Responses

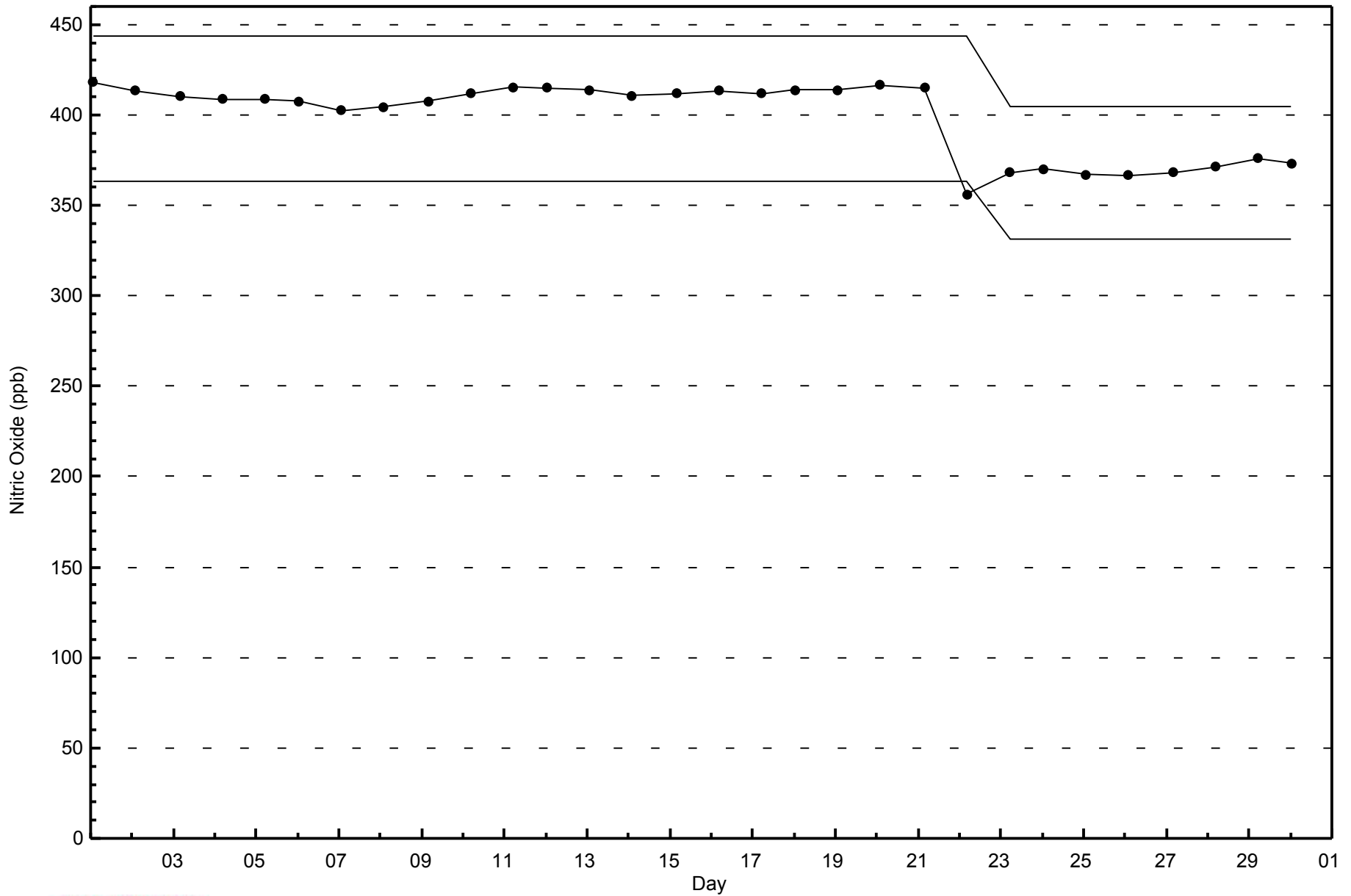
Nitric Oxide (NO) - ppb  
CNRL Horizon - April 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
CNRL Horizon - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 36 ppb on Apr 18 23:00	Maximum Daily Average: 8.2 ppb on Apr 9		Hours of Data:	683
Minimum Value: 0 ppb on Apr 19 11:00	Minimum Daily Average: 0.4 ppb on Apr 1		Hours of Missing Data:	37
Maximum Diurnal Average: 7.2 ppb at hour 3	Minimum Diurnal Average: 1.3 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 3.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 11 P <sub>99</sub> = 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-Apr	1	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0.4	2
2-Apr	2	0	Z	3	1	1	0	0	1	1	0	0	1	0	1	1	1	1	1	3	2	3	2	3	1.2	3
3-Apr	1	1	5	Z	3	1	3	4	10	7	5	2	1	1	1	1	1	1	2	3	2	1	4	2.6	10	
4-Apr	8	8	4	4	Z	4	3	10	14	9	3	1	1	1	1	2	1	0	0	1	5	3	1	2	3.7	14
5-Apr	4	4	7	4	2	Z	1	1	1	1	1	2	2	1	2	2	2	1	2	1	1	2	3	8	2.3	8
6-Apr	Z	6	4	5	8	10	10	12	14	12	8	7	4	3	3	2	1	2	3	6	12	11	16	5	7.0	16
7-Apr	2	Z	1	1	2	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	4
8-Apr	1	1	Z	1	1	1	1	1	1	3	4	4	1	1	3	3	2	2	4	8	8	15	16	10	3.9	16
9-Apr	22	15	9	Z	16	33	31	22	12	11	11	4	0	0	0	0	0	0	0	0	0	1	1	1	8.2	33
10-Apr	0	0	1	1	Z	1	1	1	1	1	1	0	0	0	0	1	1	1	3	9	7	14	11	16	3.1	16
11-Apr	20	23	24	16	3	Z	1	1	1	11	5	3	3	4	2	4	8	5	1	1	0	2	14	3	6.6	24
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	7	5	1	1	5	1.4	7
13-Apr	3	Z	3	7	6	9	8	8	4	2	2	2	2	1	2	2	3	4	5	5	4	7	8	4.3	9	
14-Apr	3	8	Z	27	28	23	16	8	4	4	3	5	6	6	6	5	2	2	4	6	6	7	4	8.0	28	
15-Apr	2	3	6	Z	1	1	1	0	0	0	1	3	1	2	2	0	0	0	1	1	0	0	0	0	1.2	6
16-Apr	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	1	2	7	1	2	28	7	1	0	2.3	28	
17-Apr	0	0	0	0	0	Z	1	1	1	2	7	3	1	0	0	0	1	1	2	3	2	2	3	9	1.8	9
18-Apr	Z	10	9	9	5	7	4	2	2	2	3	3	2	2	2	0	1	1	1	2	2	29	36	17	6.5	36
19-Apr	5	Z	2	1	1	1	1	1	0	0	0	1	2	0	1	2	3	4	10	7	2	1	2	17	2.7	17
20-Apr	22	31	Z	12	19	25	18	14	2	2	5	5	3	2	2	2	1	0	0	1	2	3	4	2	7.6	31
21-Apr	2	4	5	Z	2	2	2	0	1	0	2	1	1	1	1	1	1	1	1	2	14	13	3	1	2.5	14
22-Apr	2	16	31	27	Z	17	6	8	4	C	C	C	C	C	C	C	1	1	3	5	5	13	1	1	--	31
23-Apr	5	15	21	14	14	Z	6	11	6	4	3	2	1	1	1	1	1	1	1	4	3	1	0	0	5.1	21
24-Apr	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	3	0.6	3
25-Apr	4	Z	2	3	3	1	1	0	0	1	2	1	2	2	2	2	2	2	1	1	0	1	6	13	2.2	13
26-Apr	18	6	Z	1	6	9	10	10	7	6	2	2	2	3	3	2	2	2	3	3	3	4	3	2	4.7	18
27-Apr	10	22	34	Z	24	17	13	12	11	8	8	4	1	1	1	1	0	0	0	0	0	0	1	1	7.3	34
28-Apr	1	1	1	1	Z	2	14	15	6	13	16	11	5	2	2	2	2	1	4	3	3	7	14	3	5.5	16
29-Apr	1	3	11	1	0	Z	1	1	0	1	4	1	0	0	0	0	0	0	0	0	0	1	1	1	1.2	11
30-Apr	Z	0	1	0	0	0	0	0	1	1	0	1	0	0	0	2	2	1	2	8	7	2	1	1	1.3	8

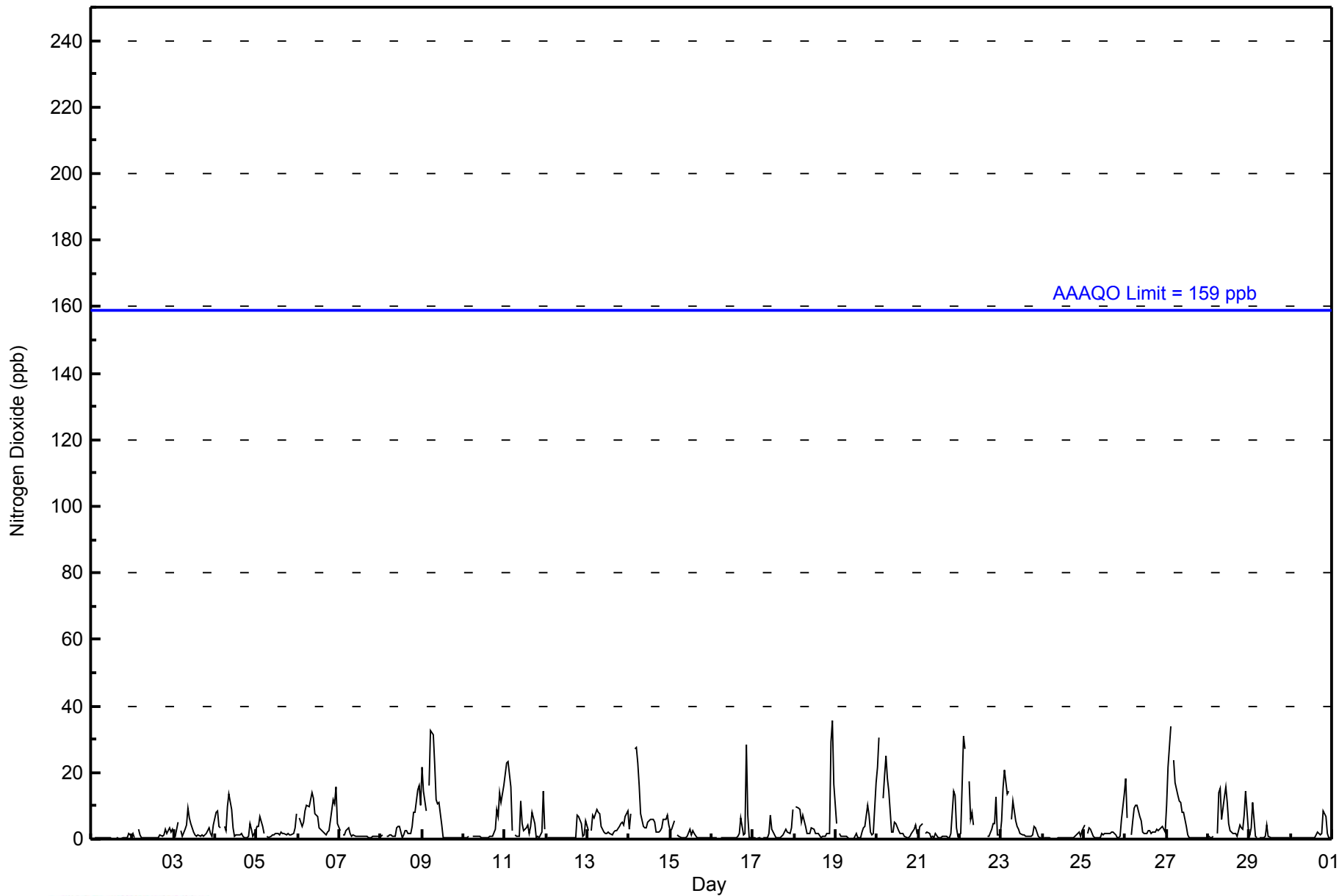
5.5	7.1	7.2	5.6	5.9	6.8	5.1	4.9	3.4	3.5	3.4	2.3	1.5	1.4	1.3	1.3	1.4	1.4	2.0	3.0	4.3	5.0	5.3	4.7	Diurnal Average	
22	31	34	27	28	33	31	22	14	13	16	11	6	6	6	5	8	7	10	9	28	29	36	17	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	662	96.93	96.93
21 - 40	21	3.07	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: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - April 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	92	56	28	14	11	10	39	79	65	80	27	29	31	8	23	651
21 - 40	1	0	3	0	0	0	0	1	4	3	0	1	2	0	1	5	21
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
<b>Totals</b>	60	92	59	28	14	11	10	40	83	68	80	28	31	31	9	28	672

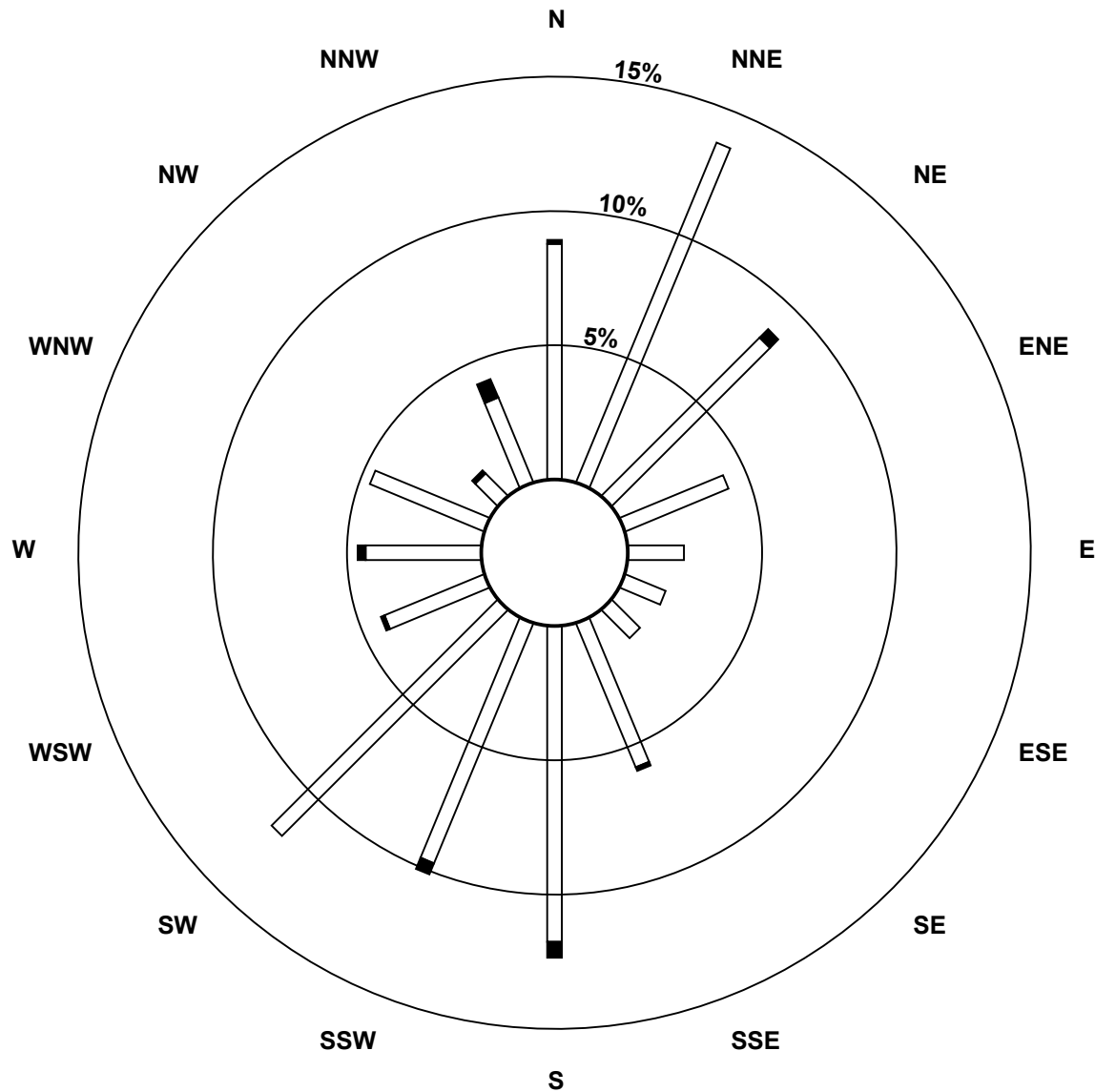
Total Number of Valid Hours: 672

Total Number of Hours: 720

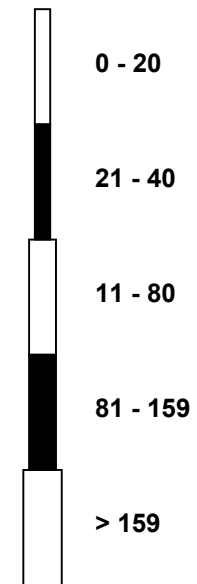


**Wood Buffalo Environmental Association  
Wind Rose Apr 2015**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)**



Classes (ppb)

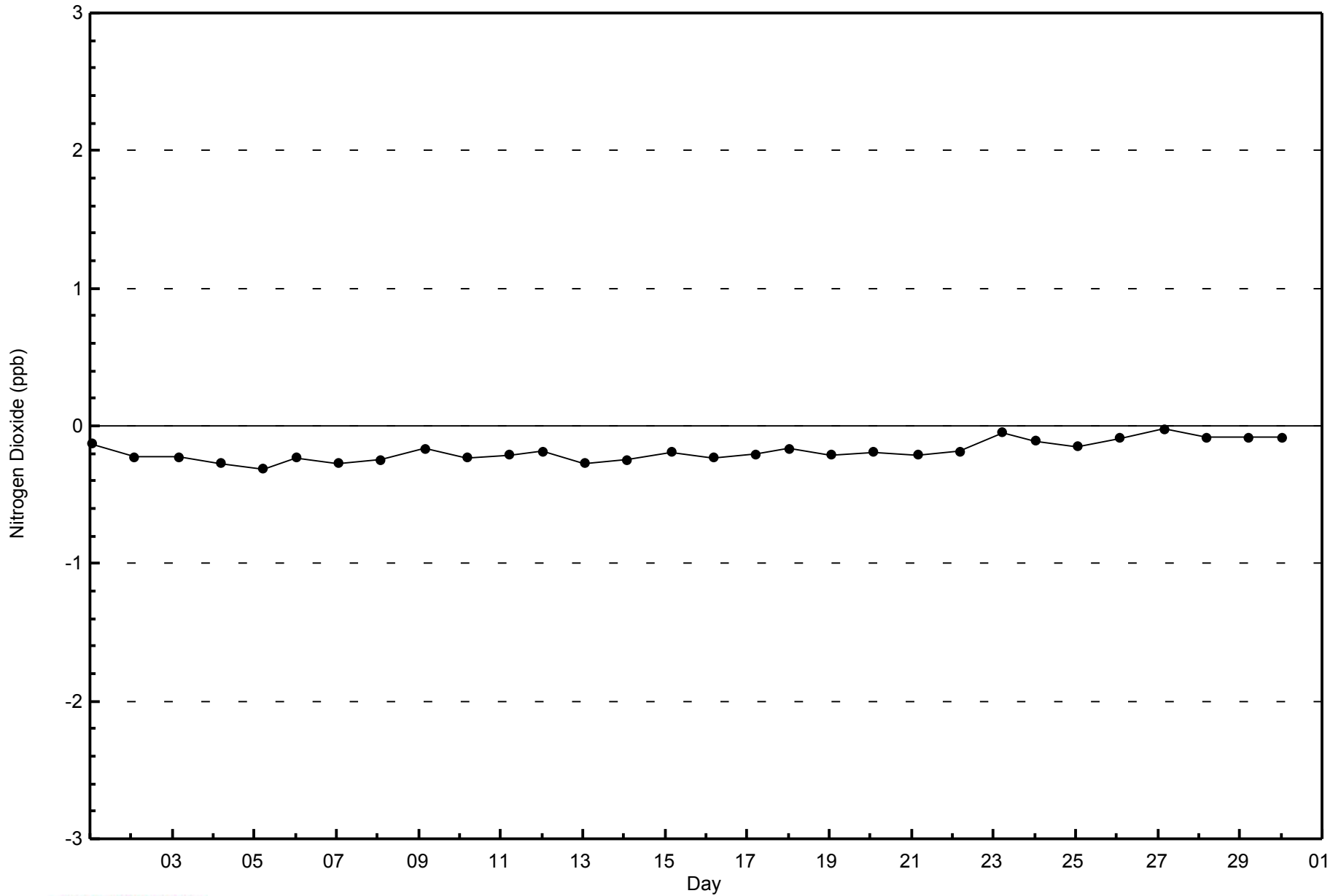


Total Number of Valid Hours: 672



WBEA  
Zero Responses

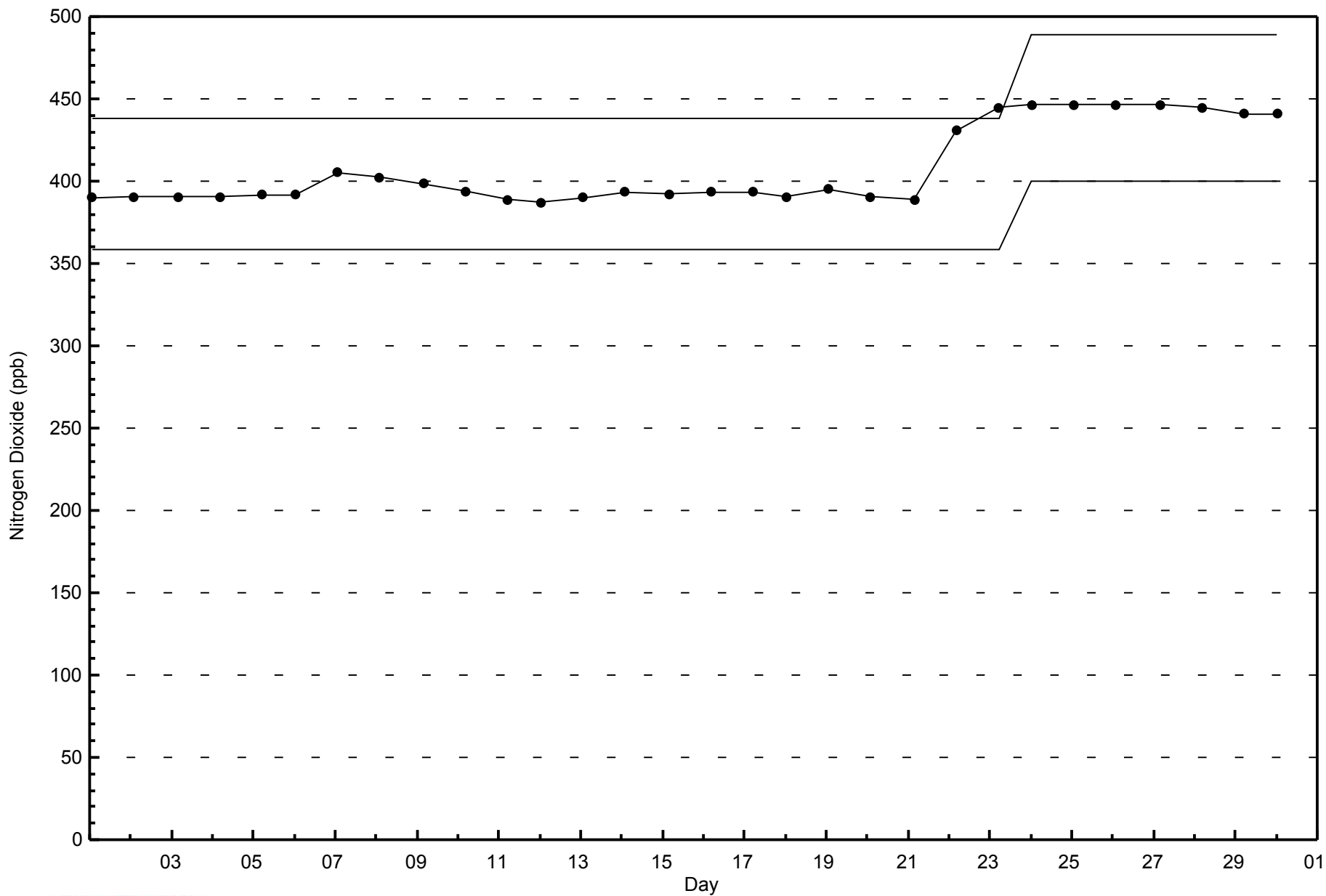
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - April 2015





Maximum Value: 73 ppb on Apr 18 23:00	Maximum Daily Average: 12.8 ppb on Apr 9	Hours in Service: 720
Minimum Value: 0 ppb on Apr 24 06:00	Minimum Daily Average: 0.5 ppb on Apr 1	Hours of Data: 683
Maximum Diurnal Average: 9.5 ppb at hour 6	Minimum Diurnal Average: 1.7 ppb at hour 15	Hours of Missing Data: 37
Monthly Average: 4.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 14 P <sub>99</sub> = 42	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-Apr	1	Z	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0.5	2
2-Apr	2	0	Z	3	2	1	0	0	0	1	0	0	1	0	1	1	1	1	1	3	2	3	2	3	1.3	3
3-Apr	1	1	5	Z	3	1	3	5	14	9	7	3	2	1	1	1	1	1	1	2	3	1	1	4	3.2	14
4-Apr	8	8	4	4	Z	4	3	13	22	14	5	1	2	2	2	2	1	1	0	1	5	3	1	2	4.7	22
5-Apr	4	4	7	4	2	Z	1	1	1	2	2	2	2	2	3	2	2	2	1	2	1	2	3	8	2.5	8
6-Apr	Z	7	4	5	8	10	12	17	22	20	11	10	5	4	3	2	2	2	3	6	12	11	16	5	8.5	22
7-Apr	2	Z	1	1	2	4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	4
8-Apr	1	1	Z	1	1	1	1	1	1	5	5	6	1	1	4	4	2	2	4	8	8	15	16	14	4.5	16
9-Apr	40	16	9	Z	18	59	52	37	18	16	17	6	0	0	1	1	1	0	1	1	1	1	1	1	12.8	59
10-Apr	1	0	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	3	9	7	14	11	16	3.3	16
11-Apr	20	28	29	17	3	Z	1	1	1	19	6	3	4	5	2	4	9	5	1	1	1	2	15	3	7.9	29
12-Apr	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	8	7	5	1	1	5	1.5	8
13-Apr	3	Z	3	7	6	9	9	9	5	3	3	3	3	2	2	2	3	3	4	5	5	4	7	8	4.7	9
14-Apr	3	8	Z	31	32	27	23	10	5	4	4	6	7	7	6	3	2	3	4	6	6	7	4	4	9.4	32
15-Apr	2	3	5	Z	1	1	1	0	1	1	1	3	1	3	2	1	0	1	1	1	1	1	0	0	1.4	5
16-Apr	0	0	1	0	Z	0	0	0	0	0	0	0	1	1	1	2	7	1	2	29	7	1	0	2.5	29	
17-Apr	0	0	0	0	0	Z	1	1	1	3	11	4	2	1	1	1	1	1	2	3	2	2	3	9	2.1	11
18-Apr	Z	10	9	9	5	7	4	2	2	2	5	5	2	2	3	1	1	1	1	2	2	45	73	28	9.6	73
19-Apr	5	Z	2	1	1	1	1	1	0	0	0	1	2	1	1	2	4	4	11	8	2	2	2	20	3.1	20
20-Apr	25	52	Z	12	37	58	35	27	3	3	7	6	3	2	2	2	1	1	1	1	2	3	4	2	12.6	58
21-Apr	2	4	5	Z	2	2	2	1	1	1	2	1	1	1	1	1	1	1	1	2	14	13	3	1	2.7	14
22-Apr	2	16	32	27	Z	19	7	12	7	C	C	C	C	C	C	C	1	1	3	5	5	13	1	1	--	32
23-Apr	5	15	21	14	14	Z	7	14	8	5	4	2	2	2	1	1	1	1	2	4	3	1	0	0	5.6	21
24-Apr	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	1	3	0.6	3
25-Apr	4	Z	2	3	3	1	1	0	0	1	2	2	2	2	2	3	3	3	1	1	0	1	6	14	2.5	14
26-Apr	19	6	Z	1	6	11	18	16	11	8	3	2	2	4	4	2	3	3	3	3	3	4	3	2	6.0	19
27-Apr	10	22	42	Z	25	19	17	16	16	11	10	5	1	1	1	1	1	0	1	1	1	1	1	1	8.8	42
28-Apr	1	1	1	1	Z	2	18	21	8	17	20	14	5	3	2	2	2	1	4	3	3	7	14	3	6.5	21
29-Apr	1	3	11	1	0	Z	1	1	1	1	5	1	0	0	0	0	0	0	0	0	0	1	0	1	1.4	11
30-Apr	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	1	2	9	7	2	1	1	1.4	9

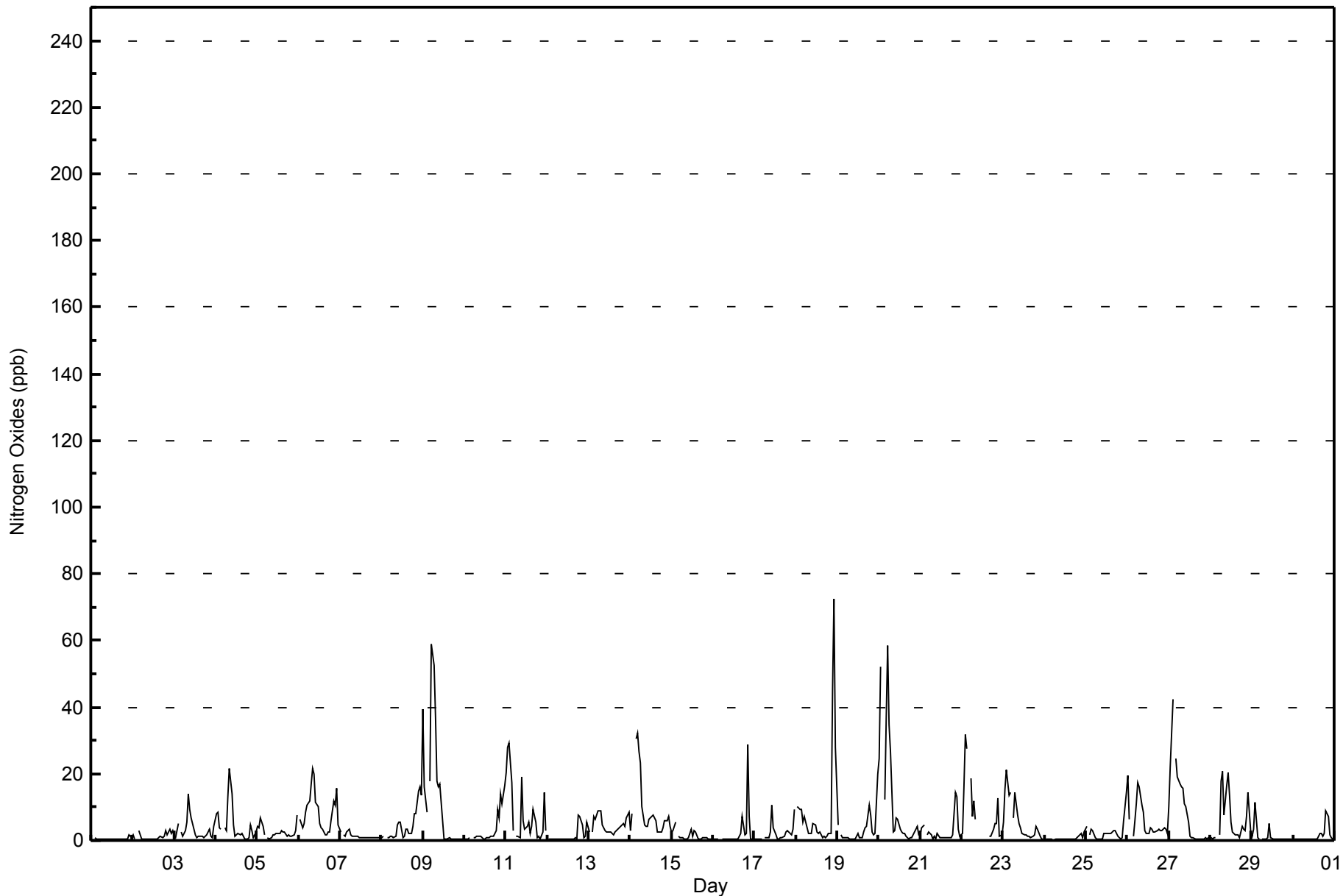
6.5	8.3	7.8	5.8	6.9	9.5	7.4	7.0	4.9	5.2	4.7	3.1	1.9	1.8	1.7	1.7	1.7	1.7	2.3	3.1	4.4	5.6	6.6	5.4	Diurnal Average	
40	52	42	31	37	59	52	37	22	20	20	14	7	7	7	6	9	7	11	9	29	45	73	28	Diurnal Maximum	

Z - zerospan      C - Calibration



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	654	95.75	95.75
21 - 40	22	3.22	98.98
41 - 80	7	1.02	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - April 2015**

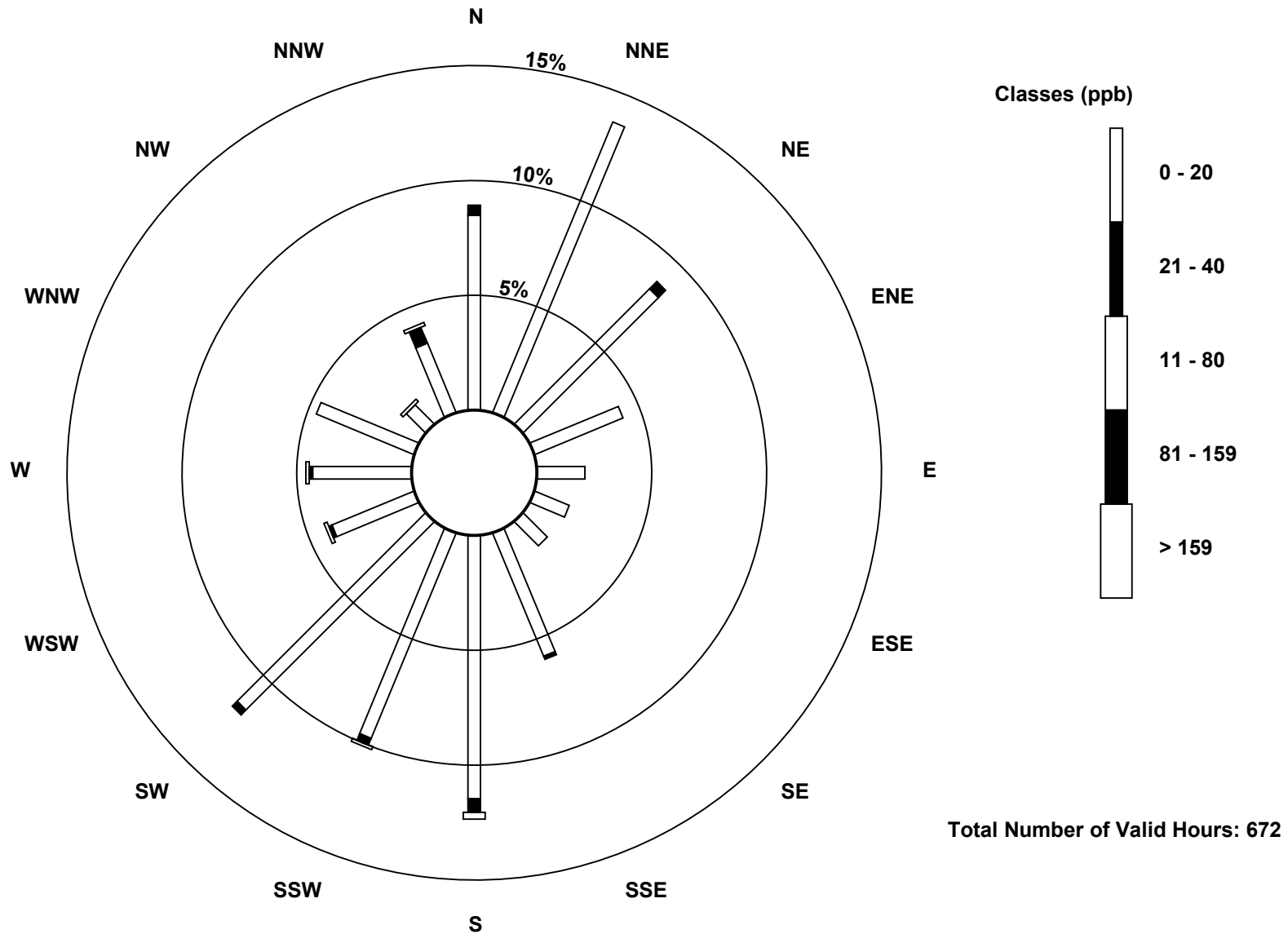
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	57	92	56	28	14	11	10	39	77	65	78	26	29	31	8	22	643
21 - 40	3	0	3	0	0	0	0	1	4	2	2	1	1	0	0	5	22
11 - 80	0	0	0	0	0	0	0	0	2	1	0	1	1	0	1	1	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	60	92	59	28	14	11	10	40	83	68	80	28	31	31	9	28	672

Total Number of Valid Hours: 672

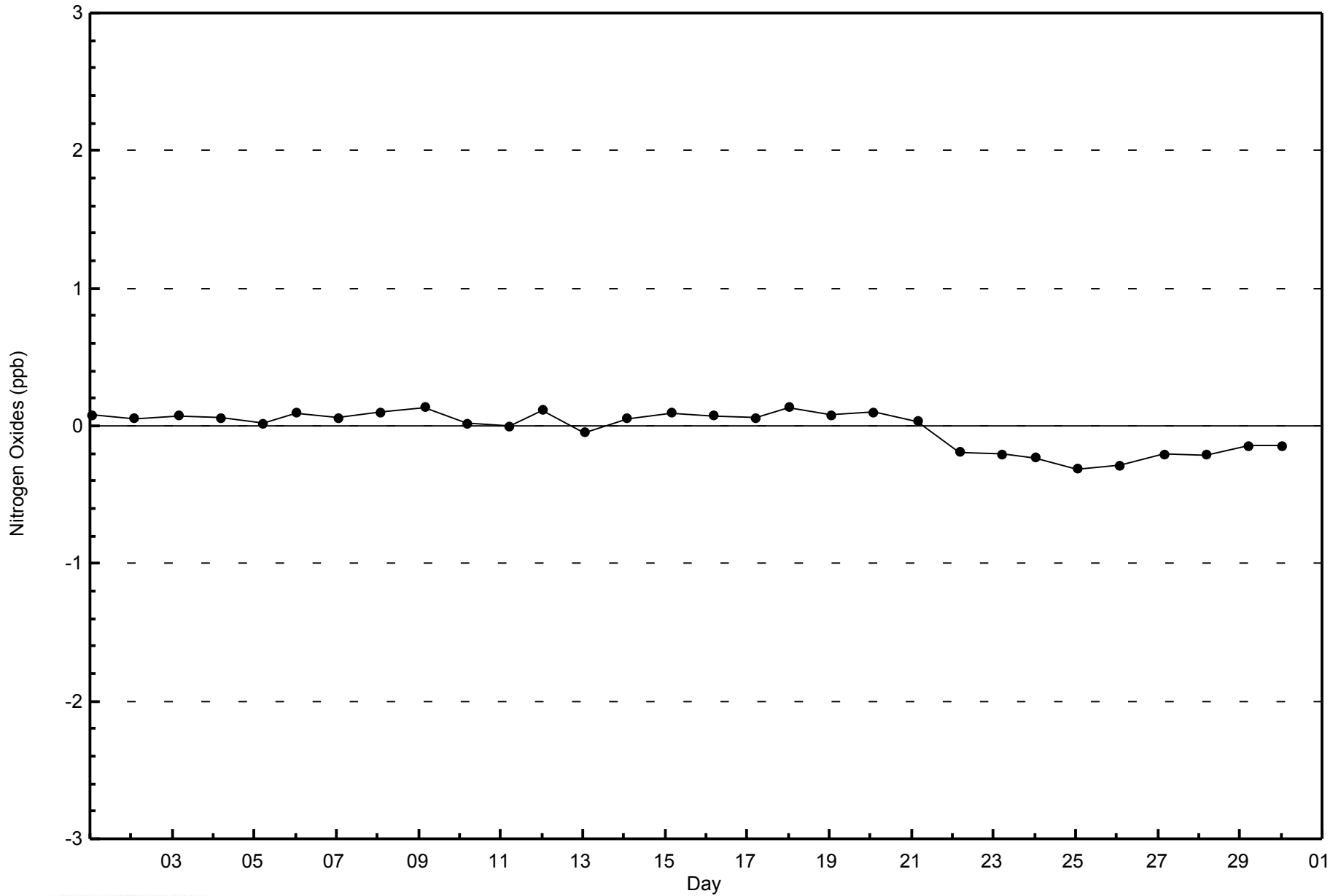
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon (AMS 15)



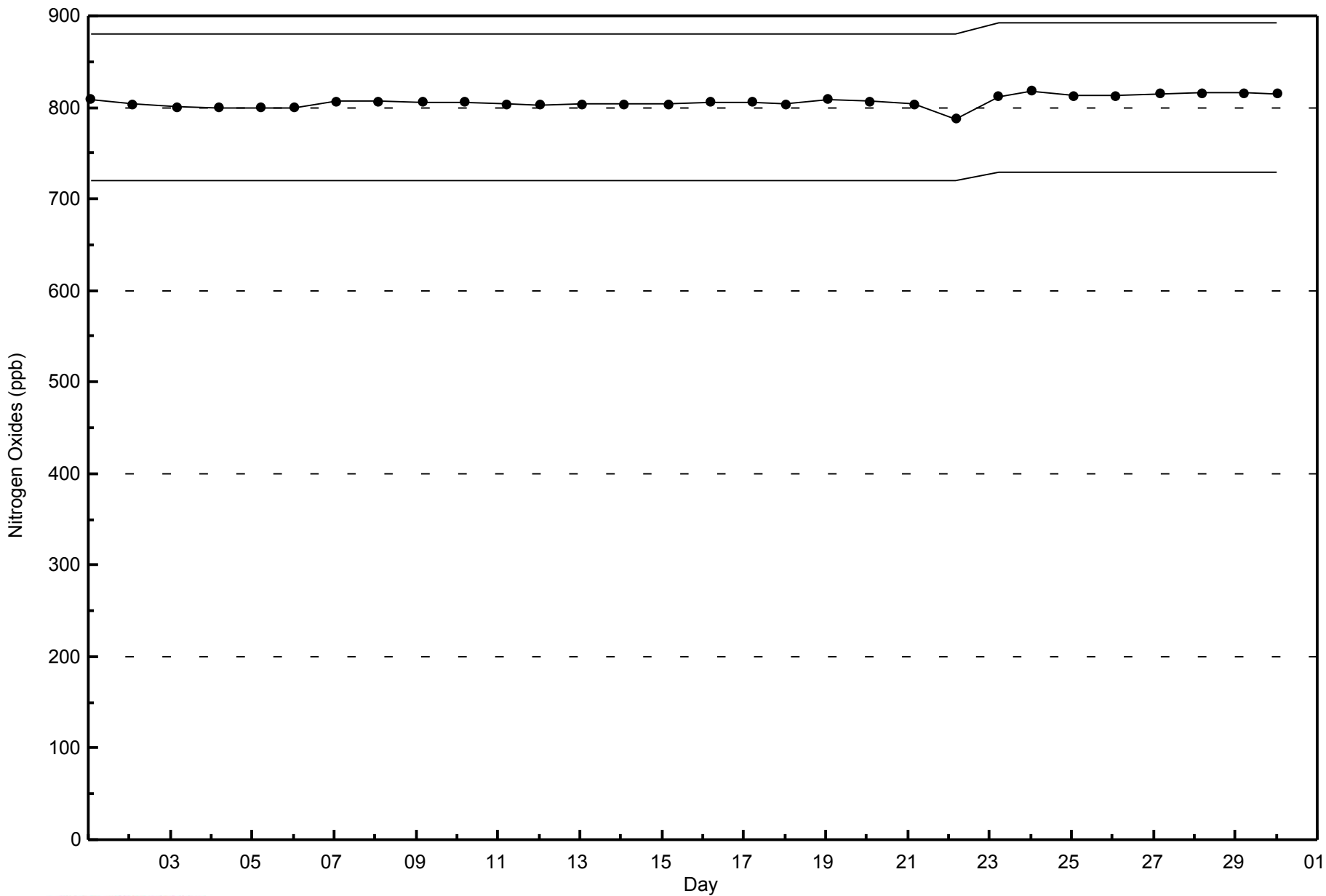






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon - April 2015





Summary of Hour Averages

CNRL Horizon - April 2015

Number of Exceedences (AAAQO):	24-hr: 0	Hours in Service:	720
Maximum Value: 51.0 µg/m <sup>3</sup> on Apr 26 07:00	Maximum Daily Average: 11.2 µg/m <sup>3</sup> on Apr 27	Hours of Data:	710
Minimum Value: 0.3 µg/m <sup>3</sup> on Apr 18 05:00	Minimum Daily Average: 0.7 µg/m <sup>3</sup> on Apr 1	Hours of Missing Data:	10
Maximum Diurnal Average: 10.0 µg/m <sup>3</sup> at hour 6	Minimum Diurnal Average: 3.0 µg/m <sup>3</sup> at hour 15	Hours of Calibration:	0
Monthly Average: 4.58 µg/m <sup>3</sup>	Percentiles: P <sub>1</sub> = 0.5 P <sub>10</sub> = 1.0 Q <sub>1</sub> = 2.0 Median = 3.1 Q <sub>3</sub> = 5.1 P <sub>90</sub> = 8.9 P <sub>99</sub> = 27.2	Percent Operational Time:	98.6

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Apr	0.4	0.3	0.3	0.5	0.6	0.7	0.8	0.9	0.9	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.7	0.9	
2-Apr	0.9	0.8	0.7	0.9	0.9	0.9	1.0	1.2	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.1	1.2	1.3	1.4	1.6	1.9	2.3	2.3	2.4	1.2	2.4	
3-Apr	2.3	2.1	2.2	2.3	2.3	2.6	2.3	2.5	3.3	2.6	2.6	2.3	2.0	1.7	1.7	1.6	1.5	1.3	1.1	0.9	0.9	0.7	0.6	1.5	1.9	3.3	
4-Apr	1.9	1.5	0.9	1.3	2.0	1.9	1.6	1.9	3.2	2.7	1.3	0.8	0.9	0.9	0.7	0.8	0.6	0.5	0.4	0.3	0.7	0.6	0.5	0.8	1.2	3.2	
5-Apr	1.4	1.5	2.7	1.8	1.3	1.1	1.0	0.9	1.1	1.5	1.5	1.6	1.7	1.8	2.0	1.5	1.5	1.2	1.3	1.1	1.5	2.2	1.9	2.0	1.6	2.7	
6-Apr	2.7	2.1	2.6	2.2	2.2	22.9	21.2	3.6	4.1	4.3	3.1	3.4	2.9	2.6	2.9	2.6	3.0	3.3	2.6	3.1	4.2	4.0	3.7	2.0	4.6	22.9	
7-Apr	1.6	1.6	1.6	1.6	2.2	2.1	1.7	1.5	1.5	1.8	2.1	2.1	2.7	2.5	2.5	2.8	3.2	2.6	2.6	3.3	2.3	2.0	2.3	2.1	2.2	3.3	
8-Apr	2.1	2.2	2.1	2.2	AF	AF	AF	AF	AF	AF	AF	AF	AF	M	2.9	3.0	2.9	2.5	2.6	3.4	8.3	16.7	17.2	16.9	--	17.2	
9-Apr	17.7	9.9	8.5	8.6	12.3	13.2	9.7	7.2	5.0	5.3	5.5	4.3	3.6	3.6	3.8	4.3	5.8	7.0	8.2	10.7	14.9	13.9	10.3	9.3	8.4	17.7	
10-Apr	8.3	7.3	7.3	7.3	7.7	7.4	6.8	6.4	5.7	5.2	4.7	5.0	5.6	5.7	6.3	7.4	8.0	8.1	9.0	12.6	14.6	15.3	13.3	14.7	8.3	15.3	
11-Apr	18.3	19.0	13.1	12.9	16.9	24.4	8.5	7.6	6.8	6.1	4.3	3.3	3.3	3.2	2.3	2.3	3.4	3.0	1.6	3.5	1.8	3.1	3.5	1.8	7.2	24.4	
12-Apr	0.7	0.5	0.6	0.7	1.0	1.4	1.1	1.2	1.3	2.0	1.9	1.9	1.8	1.7	2.3	2.3	2.1	2.1	4.8	4.0	3.0	3.2	1.9	3.0	1.9	4.8	
13-Apr	2.0	1.3	1.1	1.5	1.5	1.8	1.9	2.1	1.7	3.0	3.2	2.9	2.6	3.0	2.4	2.7	2.9	3.3	4.7	9.7	8.1	4.1	4.0	4.6	3.2	9.7	
14-Apr	2.6	4.3	8.1	8.9	8.4	8.0	7.0	3.4	1.9	2.3	4.1	9.3	4.7	4.2	4.3	4.8	7.6	5.8	4.4	4.3	4.5	3.5	5.6	5.4	5.3	9.3	
15-Apr	4.4	6.3	7.6	4.4	6.2	5.2	4.5	2.9	2.7	2.4	3.1	2.6	2.6	3.2	3.5	3.1	5.3	5.7	11.4	16.4	28.0	2.3	2.2	3.2	5.8	28.0	
16-Apr	3.4	1.9	1.8	2.7	5.3	9.2	4.8	2.9	2.6	2.1	2.8	2.5	2.2	3.5	2.9	2.6	27.5	11.9	3.1	2.4	7.2	4.6	1.4	1.0	4.7	27.5	
17-Apr	1.5	1.0	1.0	1.9	2.1	2.5	1.7	1.5	2.2	2.8	3.9	3.4	3.2	2.6	2.6	1.9	2.1	2.4	2.4	2.4	2.5	1.6	1.8	3.1	2.3	3.9	
18-Apr	2.9	2.2	1.0	0.4	0.3	1.2	1.3	1.0	1.4	1.8	2.1	2.4	2.0	1.9	2.0	2.0	2.3	2.2	1.9	1.8	2.2	14.1	10.5	4.6	2.7	14.1	
19-Apr	1.3	1.5	0.9	0.8	0.9	0.8	0.8	0.7	1.2	2.0	2.0	2.3	2.6	2.3	2.8	3.6	3.7	3.3	4.7	14.2	6.9	5.5	5.5	13.6	3.5	14.2	
20-Apr	16.2	28.5	10.0	7.8	18.5	12.3	11.8	8.5	3.5	3.1	4.6	3.7	3.1	3.1	3.0	3.4	3.2	2.8	3.1	3.2	4.1	7.2	5.6	3.7	7.2	28.5	
21-Apr	2.6	2.5	2.3	2.1	2.1	2.4	2.1	1.8	2.4	3.0	3.5	3.2	3.2	3.4	3.6	4.2	3.8	3.2	3.0	4.2	10.5	6.1	3.2	2.7	3.4	10.5	
22-Apr	2.9	7.6	10.0	8.2	6.4	6.2	4.0	4.1	2.8	3.1	2.8	3.2	3.5	3.3	3.4	3.7	3.6	4.1	5.2	6.3	5.3	5.1	2.6	2.7	4.6	10.0	
23-Apr	3.0	6.3	8.1	4.9	4.8	3.7	3.8	5.4	4.4	4.4	4.4	4.7	5.4	4.7	3.7	3.8	3.6	3.9	4.2	5.7	4.2	2.5	2.3	2.4	4.3	8.1	
24-Apr	2.4	2.6	2.5	2.5	2.6	2.6	2.4	2.2	2.1	2.3	2.9	3.4	3.4	3.9	4.0	3.4	4.1	4.1	4.1	4.1	4.3	6.0	6.8	4.2	4.4	3.5	6.8
25-Apr	3.2	2.7	2.7	3.5	3.4	3.4	3.5	3.3	3.3	3.6	5.3	4.2	4.0	4.4	4.1	3.9	4.0	4.2	4.0	2.9	2.5	2.6	8.2	16.3	4.3	16.3	
26-Apr	13.2	4.6	3.7	2.2	10.1	25.2	51.0	5.6	3.6	3.3	2.7	2.7	3.0	3.4	3.9	3.9	4.1	4.1	3.9	4.3	5.3	6.5	6.7	4.7	7.6	51.0	
27-Apr	15.2	22.1	31.5	16.1	18.9	49.0	23.0	8.1	8.6	8.3	7.8	5.9	4.2	3.3	3.0	3.3	3.7	3.7	3.6	8.6	4.2	4.7	5.1	6.0	11.2	49.0	
28-Apr	5.3	3.3	3.1	12.3	24.2	50.9	8.4	7.2	4.7	5.9	6.0	5.8	6.3	6.3	5.5	6.2	6.7	6.3	11.0	8.3	9.7	12.7	15.5	6.0	9.9	50.9	
29-Apr	2.8	2.4	3.4	3.8	14.6	10.7	6.3	4.6	2.8	2.8	3.0	2.1	2.3	2.4	2.9	3.7	5.5	6.7	3.4	3.3	7.6	3.8	4.5	3.6	4.5	14.6	
30-Apr	4.8	6.0	6.7	8.4	10.0	17.7	5.4	2.8	3.5	2.1	2.7	2.5	2.4	2.1	2.0	5.1	2.6	3.0	3.0	5.3	5.6	4.3	2.3	2.5	4.7	17.7	

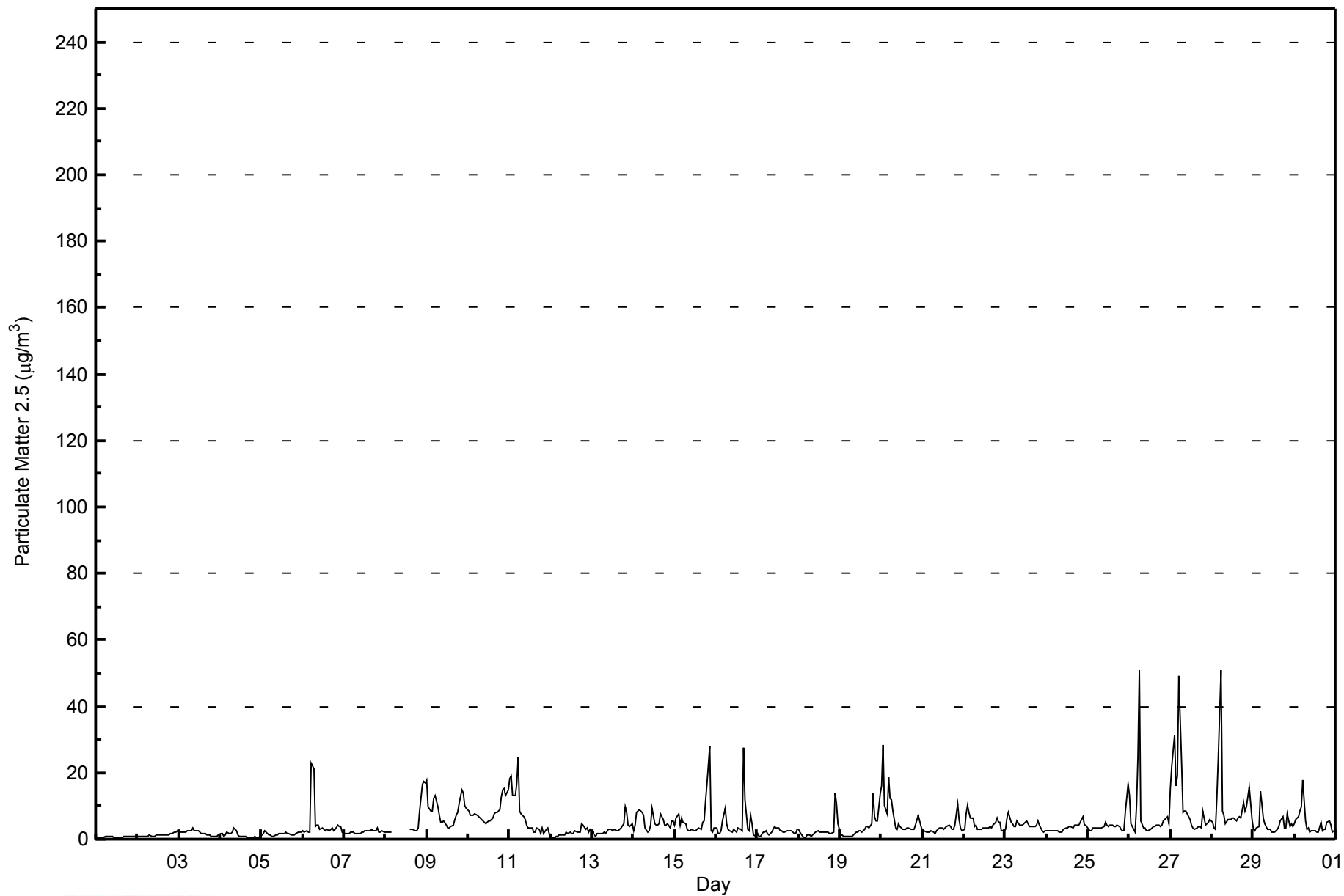
4.9	5.2	4.9	4.5	6.5	10.0	6.9	3.5	3.1	3.2	3.3	3.2	3.0	3.0	3.0	3.2	4.3	3.8	3.9	5.1	6.0	5.4	5.0	4.9	Diurnal Average	
18.3	28.5	31.5	16.1	24.2	50.9	51.0	8.5	8.6	8.3	7.8	9.3	6.3	6.3	6.3	7.4	27.5	11.9	11.4	16.4	28.0	16.7	17.2	16.9	Diurnal Maximum	

M - Maintenance AF - Analyzer Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m<sup>3</sup>



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
CNRL Horizon - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**CNRL Horizon - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	482	67.89	67.89
6 - 15	128	18.03	85.92
16 - 25	22	3.10	89.01
26 - 80	7	0.99	90.00
> 81.0	0	0.00	90.00

Total Number of Valid Hours: 710

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**CNRL Horizon - April 2015**

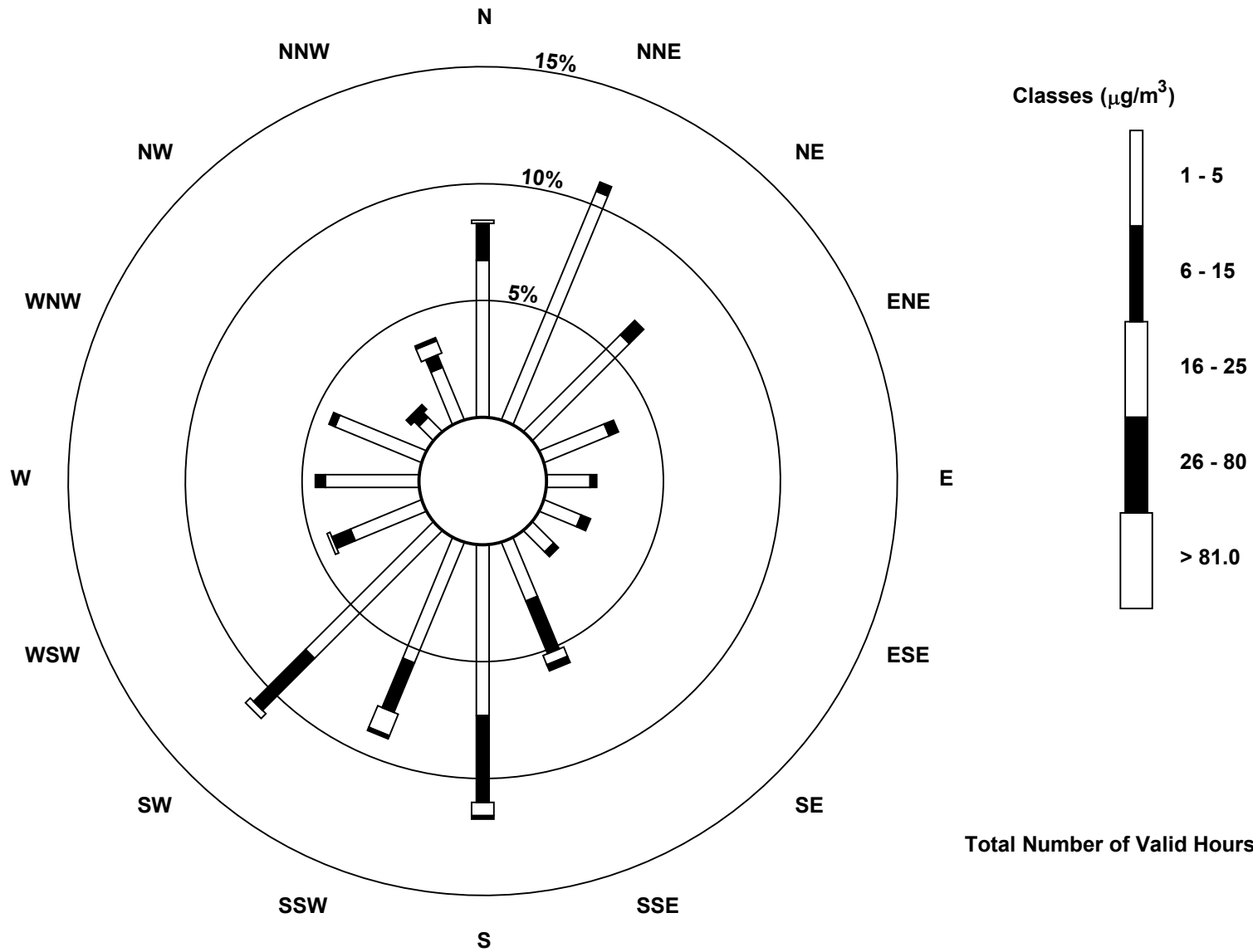
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	47	74	41	21	13	12	9	19	51	39	54	23	28	28	6	17	482
6 - 15	11	3	6	3	2	3	2	17	26	16	22	6	3	2	2	4	128
16 - 25	1	0	0	0	0	0	0	3	4	7	2	1	0	0	0	4	22
26 - 80	0	0	0	0	0	0	0	2	1	1	0	0	0	0	2	1	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	59	77	47	24	15	15	11	41	82	63	78	30	31	30	10	26	639

Total Number of Valid Hours: 699

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 CNRL Horizon (AMS 15)



Total Number of Valid Hours: 699



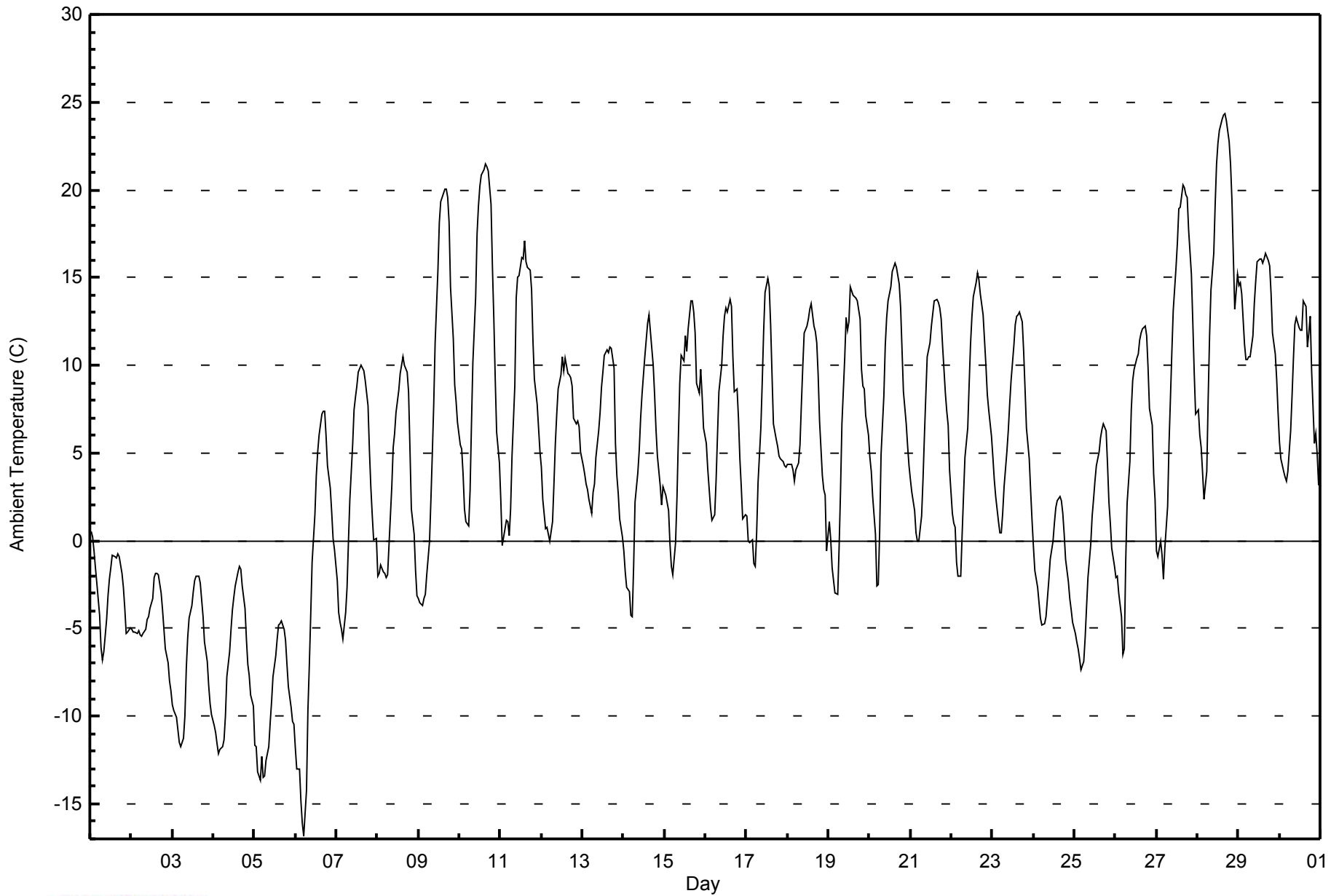
Maximum Value: 24.3 C on Apr 28 17:00																				Maximum Daily Average: 15.5 C on Apr 28					Hours in Service: 720	
Minimum Value: -16.8 C on Apr 6 06:00																				Minimum Daily Average: -9.3 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 10.7 C at hour 16																				Minimum Diurnal Average: -2.6 C at hour 5					Hours of Missing Data: 0	
Monthly Average: 4.41 C																				Percentiles: P <sub>1</sub> = -13.2 P <sub>10</sub> = -5.6 Q <sub>1</sub> = -1.7 Median = 4.4 Q <sub>3</sub> = 10.5 P <sub>90</sub> = 14.5 P <sub>99</sub> = 22.7					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-Apr	0.6	0.2	-0.6	-1.5	-2.4	-4.3	-6.1	-6.8	-6.3	-4.5	-3.2	-2.2	-1.5	-0.8	-0.9	-1.0	-0.7	-0.9	-1.8	-2.7	-3.9	-5.3	-5.2	-5.0	-2.8	0.6
2-Apr	-5.1	-5.2	-5.2	-5.3	-5.1	-5.3	-5.5	-5.3	-5.1	-4.5	-4.3	-3.8	-3.3	-2.1	-1.9	-1.8	-1.9	-3.0	-3.9	-5.1	-6.2	-6.9	-8.0	-8.6	-4.7	-1.8
3-Apr	-9.4	-9.7	-10.1	-10.8	-11.5	-11.7	-11.2	-10.0	-7.3	-5.5	-4.5	-3.7	-2.9	-2.3	-2.0	-2.0	-2.4	-3.4	-4.4	-5.8	-6.9	-8.2	-9.3	-9.9	-6.9	-2.0
4-Apr	-10.5	-11.0	-11.6	-12.2	-11.9	-11.7	-11.3	-10.0	-7.7	-6.3	-5.1	-3.9	-3.2	-2.6	-1.8	-1.5	-1.7	-2.6	-3.9	-5.6	-7.0	-7.7	-8.8	-9.5	-7.0	-1.5
5-Apr	-11.7	-11.7	-13.2	-13.6	-12.3	-13.5	-13.4	-12.5	-11.7	-10.4	-9.2	-7.8	-6.6	-5.6	-4.8	-4.7	-4.6	-5.0	-5.7	-7.0	-8.3	-9.5	-10.3	-10.4	-9.3	-4.6
6-Apr	-11.8	-13.0	-13.0	-14.8	-16.1	-16.8	-14.2	-9.7	-7.1	-4.3	-1.2	1.5	3.7	5.1	6.0	7.2	7.4	7.4	5.9	4.3	3.0	1.7	0.2	-0.5	-2.9	7.4
7-Apr	-2.2	-4.1	-4.7	-5.0	-5.6	-4.1	-2.6	0.0	2.3	5.5	7.5	8.2	8.8	9.6	10.0	9.8	9.7	9.1	7.7	5.1	3.1	1.5	0.0	0.1	2.9	10.0
8-Apr	-2.0	-1.8	-1.4	-1.8	-1.9	-2.1	-1.9	-0.3	3.1	5.3	6.1	7.3	8.6	9.5	10.0	10.5	10.0	9.6	8.5	5.2	1.8	0.4	-1.7	-3.1	3.2	10.5
9-Apr	-3.3	-3.6	-3.7	-3.3	-3.1	-2.0	-0.1	2.3	5.0	7.8	11.3	15.4	18.1	19.3	19.5	20.0	20.1	19.6	18.1	14.5	11.5	8.9	7.9	6.8	8.6	20.1
10-Apr	5.5	5.2	3.8	1.8	1.1	0.9	2.8	6.7	10.2	13.9	17.5	19.1	20.2	20.8	21.2	21.5	21.3	21.1	19.2	15.6	12.7	9.2	6.2	4.4	11.7	21.5
11-Apr	2.3	-0.3	0.2	1.2	1.1	0.3	1.8	4.9	8.8	13.8	15.0	15.1	16.2	16.1	17.1	15.9	15.6	15.4	14.3	11.4	9.2	7.8	6.4	5.1	8.9	17.1
12-Apr	4.2	2.3	0.7	0.8	0.3	0.0	1.1	3.3	5.5	7.2	8.7	9.5	10.5	9.7	10.4	9.6	9.4	9.3	8.8	7.0	6.7	6.8	6.5	5.1	6.0	10.5
13-Apr	4.3	3.8	3.2	2.9	2.4	1.6	2.7	3.2	4.8	6.3	7.3	8.8	9.6	10.5	10.9	10.8	11.0	11.0	9.9	5.5	3.7	2.7	1.2	0.2	5.8	11.0
14-Apr	-0.6	-1.8	-2.6	-2.9	-4.2	-4.3	-1.5	2.2	3.8	5.2	7.0	8.4	10.5	11.5	12.4	12.9	11.9	10.0	8.3	6.3	4.8	3.1	2.0	3.0	4.4	12.9
15-Apr	2.8	2.6	1.7	-0.2	-1.4	-2.0	-0.1	2.4	5.8	9.0	10.5	10.2	11.6	10.8	12.1	13.7	13.6	13.1	11.8	9.0	8.4	9.8	8.2	6.4	7.1	13.7
16-Apr	5.6	4.1	3.0	1.9	1.2	1.5	3.5	6.0	8.5	10.0	11.7	12.8	13.3	13.1	13.8	13.4	10.5	8.5	8.7	7.0	4.6	3.1	1.3	1.5	7.0	13.8
17-Apr	1.4	-0.1	-0.1	0.1	-1.3	-1.5	0.5	3.3	6.4	9.1	12.0	14.2	14.9	14.5	12.4	9.4	6.7	5.8	5.4	4.8	4.7	4.5	4.3	4.2	5.6	14.9
18-Apr	4.4	4.4	4.3	4.0	3.4	4.0	4.4	5.4	7.7	9.9	11.8	12.3	12.7	13.2	13.5	12.2	11.9	11.3	9.4	6.8	3.7	2.9	2.6	-0.6	7.3	13.5
19-Apr	1.1	0.0	-1.5	-2.3	-2.9	-3.0	-0.3	2.9	6.6	10.4	12.8	12.0	12.5	14.4	14.0	13.9	13.8	13.7	12.6	9.8	8.8	8.7	7.2	6.0	7.1	14.4
20-Apr	4.7	4.0	2.5	0.3	-2.6	-2.5	0.6	4.9	8.3	11.1	12.7	13.7	14.4	15.3	15.6	15.8	15.6	14.6	13.3	10.9	8.5	6.7	5.4	4.3	8.3	15.8
21-Apr	3.4	2.8	1.7	0.5	0.0	0.0	1.4	3.5	5.9	8.2	10.4	11.3	12.2	12.9	13.7	13.7	13.6	13.3	12.6	11.1	8.4	7.4	6.5	4.1	7.5	13.7
22-Apr	1.6	1.0	0.8	-1.3	-2.0	-2.1	0.3	2.6	4.7	6.4	8.9	11.2	12.8	13.9	14.7	15.2	14.8	14.1	12.9	11.4	10.0	8.4	7.5	5.9	7.3	15.2
23-Apr	4.7	3.5	2.5	1.1	0.4	0.4	1.6	3.1	5.1	6.3	7.8	9.1	11.1	12.3	12.8	12.9	13.1	12.5	10.8	8.7	6.4	4.7	2.8	1.2	6.4	13.1
24-Apr	-0.4	-1.7	-2.7	-3.5	-4.4	-4.8	-4.7	-4.3	-3.3	-2.3	-1.1	0.0	1.0	1.9	2.3	2.5	2.3	1.6	0.4	-1.1	-2.3	-3.3	-3.9	-4.7	-1.5	2.5
25-Apr	-5.3	-5.7	-6.1	-6.8	-7.3	-6.9	-5.5	-3.8	-2.1	-0.2	1.4	2.3	3.4	4.2	5.0	5.9	6.3	6.7	6.2	4.3	2.2	1.0	-0.4	-1.4	-0.1	6.7
26-Apr	-2.1	-2.0	-3.0	-4.4	-6.5	-6.2	-1.2	2.1	4.5	7.5	9.2	9.7	10.4	10.6	11.4	11.8	12.0	12.2	11.7	9.9	7.5	6.6	3.8	2.3	4.9	12.2
27-Apr	-0.6	-0.9	0.0	-0.8	-2.2	-0.4	1.9	5.5	8.1	10.7	13.1	15.6	17.0	18.9	19.0	20.3	20.1	19.7	19.5	17.7	15.2	12.5	9.6	7.2	10.3	20.3
28-Apr	7.5	6.0	5.3	3.9	2.4	3.9	8.1	11.7	14.3	16.4	19.2	21.4	22.7	23.4	24.1	24.3	24.3	23.9	22.7	21.5	19.4	16.2	13.2	15.2	15.5	24.3
29-Apr	14.5	14.7	14.1	11.2	10.3	10.4	10.5	10.5	11.7	13.5	14.8	15.9	16.1	16.1	15.9	16.0	16.4	16.0	15.7	14.1	11.9	10.6	9.2	7.3	13.2	16.4
30-Apr	5.7	4.7	3.9	3.7	3.4	3.9	6.3	8.2	10.4	12.3	12.7	12.2	12.0	12.0	13.7	13.4	11.1	11.8	12.8	9.7	5.5	6.1	4.9	3.2	8.5	13.7
																								Diurnal Average		
																								Diurnal Maximum		





**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**CNRL Horizon - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**CNRL Horizon - April 2015**

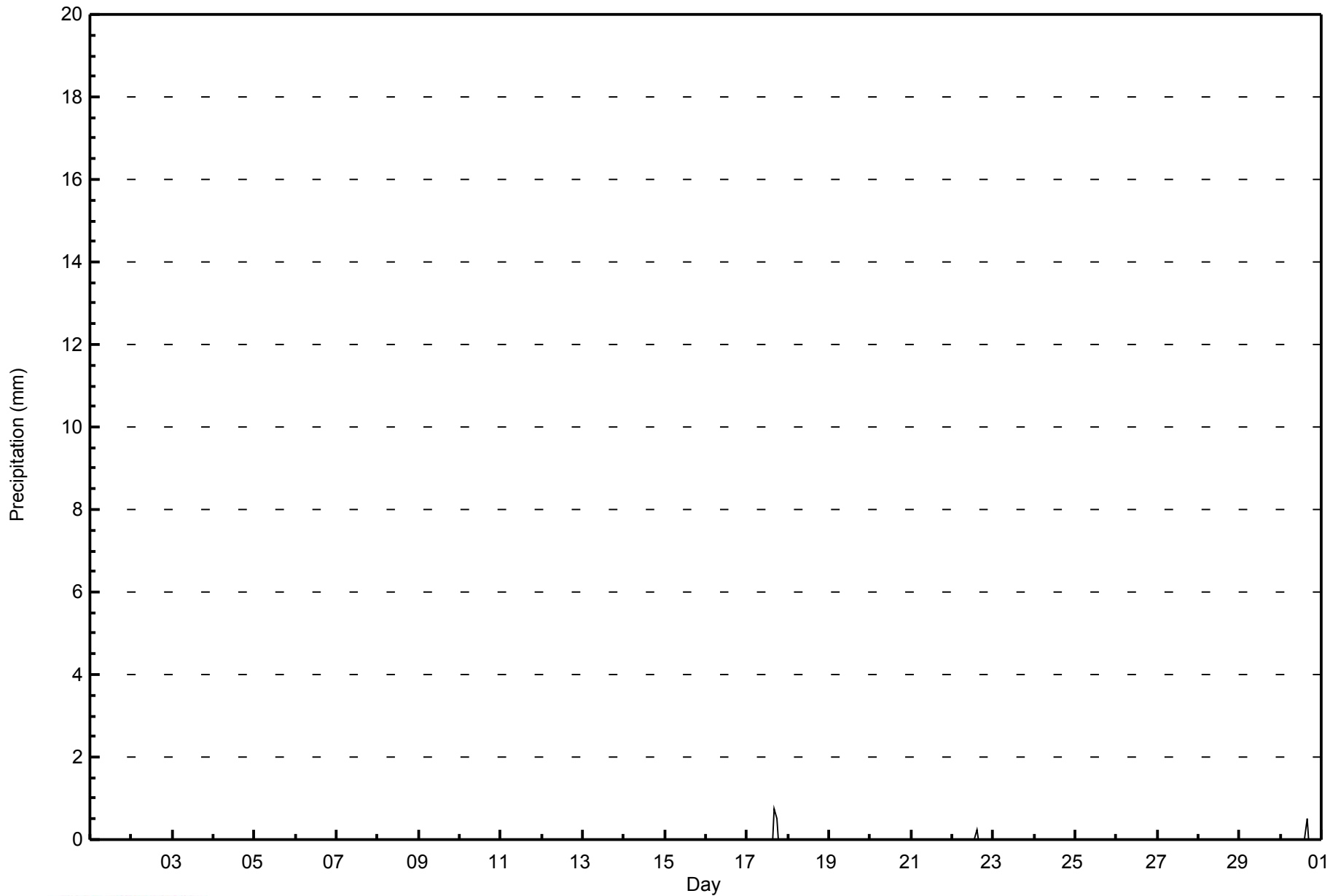
<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	227	31.53	31.53
0 - 10	296	41.11	72.64
10 - 20	178	24.72	97.36
> 20	19	2.64	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Value: 0.8 mm on Apr 17 17:00																	Maximum Daily Total: 1.3 mm on Apr 17																	Hours in Service: 720	
Minimum Value: 0.0 mm on Apr 1 01:00																	Minimum Daily Total: 0.0 mm on Apr 1																	Hours of Data: 720	
Maximum Diurnal Total: 0.8 mm at hour 17																	Minimum Diurnal Total: 0.0 mm at hour 1																	Hours of Missing Data: 0	
Monthly Total: 2.03 mm																	Percentiles: P <sub>1</sub> = 0.0 P <sub>10</sub> = 0.0 Q <sub>1</sub> = 0.0 Median = 0.0 Q <sub>3</sub> = 0.0 P <sub>90</sub> = 0.0 P <sub>99</sub> = 0.0																	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.0	0.0	0.0	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
18-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
23-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Apr	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
																								Diurnal Average											
																								Diurnal Maximum											



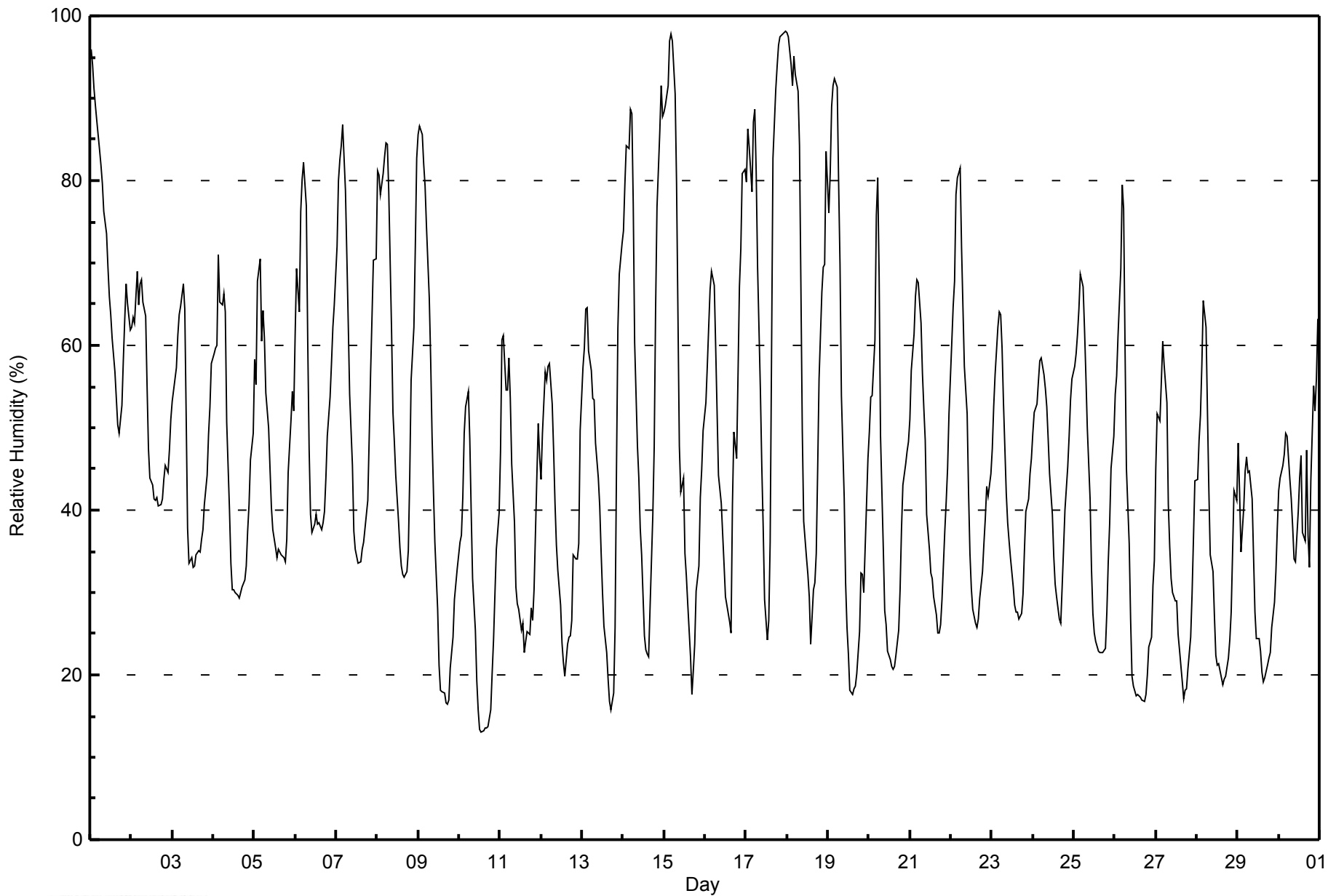


Maximum Value: 98 % on Apr 18 00:00														Maximum Daily Average: 71.8 % on Apr 17														Hours in Service: 720	
Minimum Value: 13 % on Apr 10 14:00														Minimum Daily Average: 29.1 % on Apr 10														Hours of Data: 720	
Maximum Diurnal Average: 71.3 % at hour 5														Minimum Diurnal Average: 27.6 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 47.3 %														Percentiles: P <sub>1</sub> = 16 P <sub>10</sub> = 23 Q <sub>1</sub> = 31 Median = 44 Q <sub>3</sub> = 61 P <sub>90</sub> = 80 P <sub>99</sub> = 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-Apr	96	94	91	89	87	84	82	80	76	74	70	66	64	61	57	54	50	49	53	58	63	67	65	62	70.5	96			
2-Apr	62	63	63	69	65	67	68	65	64	55	47	44	43	41	41	42	40	41	41	44	46	45	47	51	52.3	69			
3-Apr	53	55	57	61	64	65	68	64	51	38	34	34	33	33	35	35	35	37	38	41	44	49	53	58	47.2	68			
4-Apr	59	60	60	71	65	65	66	64	51	40	34	30	30	30	30	29	30	31	31	33	37	41	46	49	45.1	71			
5-Apr	58	55	68	71	61	64	61	54	50	45	40	38	35	34	35	35	35	34	34	36	45	51	54	52	47.7	71			
6-Apr	61	69	64	76	80	82	77	61	48	40	37	38	40	38	38	38	38	40	44	49	54	58	62	65	54.1	82			
7-Apr	72	80	82	84	87	79	71	63	54	45	37	35	34	34	34	35	36	38	41	49	57	63	70	71	56.3	87			
8-Apr	81	81	78	81	83	85	84	79	62	52	48	44	39	35	33	32	32	33	35	44	56	62	72	83	58.9	85			
9-Apr	86	87	86	82	79	74	66	58	49	42	36	28	21	18	18	18	17	16	17	21	25	29	31	33	43.2	87			
10-Apr	36	37	42	49	53	54	49	40	32	25	19	16	13	13	13	14	14	14	16	20	24	30	35	40	29.1	54			
11-Apr	47	61	61	55	55	58	54	46	38	31	29	28	25	26	23	24	25	25	28	27	30	44	51	47	39.0	61			
12-Apr	44	49	57	56	57	58	53	47	41	36	33	28	24	22	20	24	25	25	27	35	34	34	36	50	38.0	58			
13-Apr	57	60	64	65	59	57	54	53	48	44	40	35	30	26	23	19	17	16	18	26	45	62	69	72	44.1	72			
14-Apr	74	80	84	84	89	88	77	60	48	44	38	35	25	23	23	22	28	39	48	64	77	86	92	88	58.9	92			
15-Apr	88	89	91	97	98	97	91	80	64	48	42	44	35	32	29	22	18	21	24	30	33	42	45	50	54.5	98			
16-Apr	53	57	62	67	69	67	60	52	44	41	37	33	30	28	26	25	41	49	46	56	67	72	81	81	51.9	81			
17-Apr	80	86	84	79	87	89	81	70	55	45	38	29	24	27	36	59	83	91	94	96	97	98	98	98	71.8	98			
18-Apr	98	98	94	92	95	93	91	84	67	50	39	34	32	29	24	30	31	35	45	56	67	69	70	84	62.8	98			
19-Apr	76	81	89	92	92	91	80	70	54	41	31	26	23	18	18	18	19	20	25	32	32	30	35	46	47.5	92			
20-Apr	50	54	54	61	76	80	68	49	35	28	26	23	22	21	21	21	22	25	30	38	43	46	47	48	41.2	80			
21-Apr	51	57	61	66	68	68	63	57	52	49	40	35	32	32	30	27	25	25	26	29	37	41	45	52	44.5	68			
22-Apr	60	65	68	78	80	82	72	65	57	52	42	35	31	28	26	26	27	29	33	36	39	43	42	44	48.3	82			
23-Apr	47	53	57	62	64	64	60	53	42	38	36	34	31	29	28	28	27	27	30	35	40	41	44	46	42.3	64			
24-Apr	49	52	53	56	58	58	56	55	52	49	44	39	34	31	30	27	26	31	35	40	45	49	53	56	45.0	58			
25-Apr	58	59	61	64	69	67	62	56	50	41	33	28	25	24	23	23	23	23	23	28	34	38	45	49	41.9	69			
26-Apr	54	56	61	69	80	77	60	45	36	27	20	19	17	18	17	17	17	17	18	20	23	24	31	34	35.7	80			
27-Apr	45	52	51	56	61	58	53	41	36	32	30	29	29	25	23	19	17	18	18	21	25	30	37	44	35.2	61			
28-Apr	44	48	52	58	66	62	52	43	35	33	27	22	21	21	20	19	19	20	22	24	28	35	42	41	35.5	66			
29-Apr	48	42	35	40	45	46	45	45	41	34	28	24	24	23	20	19	20	21	22	23	26	29	33	38	32.1	48			
30-Apr	42	44	45	47	49	49	44	41	38	34	34	40	44	47	37	36	47	37	33	44	55	52	56	63	44.1	63			
																												Diurnal Average	
61.0														64.1														Diurnal Maximum	
98														98															



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**CNRL Horizon - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**CNRL Horizon - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	44	6.11	6.11
20 - 40	263	36.53	42.64
40 - 60	222	30.83	73.47
60 - 80	121	16.81	90.28
80 - 100	70	9.72	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



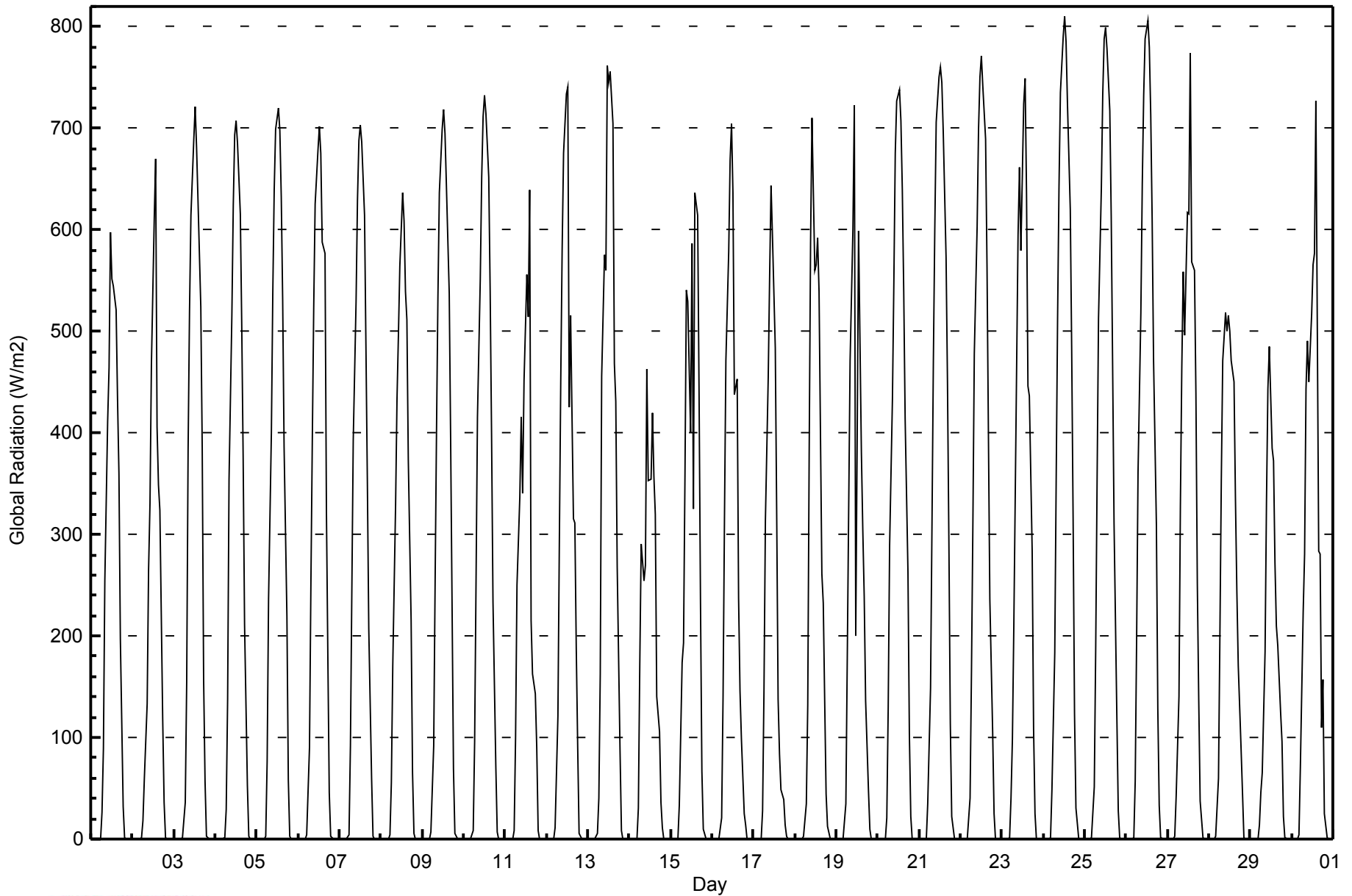
Maximum Value: 810 W/m2 on Apr 24 13:00																			Maximum Daily Average: 298.3 W/m2 on Apr 24						Hours in Service: 720	
Minimum Value: 0 W/m2 on Apr 1 01:00																			Minimum Daily Average: 135.2 W/m2 on Apr 29						Hours of Data: 720	
Maximum Diurnal Average: 644.6 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 1						Hours of Missing Data: 0	
Monthly Average: 225.8 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 86 Q <sub>3</sub> = 462 P <sub>90</sub> = 643 P <sub>99</sub> = 784						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-Apr	0	0	0	0	0	0	27	89	254	412	464	597	551	545	521	434	360	197	32	1	0	0	0	0	186.9	597
2-Apr	0	0	0	0	0	1	18	60	133	265	330	467	610	670	406	348	324	118	36	1	0	0	0	0	157.9	670
3-Apr	0	0	0	0	0	2	37	155	384	520	614	688	721	681	630	525	385	157	57	3	0	0	0	0	231.6	721
4-Apr	0	0	0	0	0	1	30	137	354	516	624	693	707	685	616	506	376	212	53	3	0	0	0	0	229.6	707
5-Apr	0	0	0	0	0	3	77	237	400	538	640	699	720	698	632	531	386	220	58	3	0	0	0	0	243.4	720
6-Apr	0	0	0	0	0	3	90	252	393	523	626	678	701	675	588	577	323	181	45	3	0	0	0	0	235.8	701
7-Apr	0	0	0	0	0	5	92	244	393	529	629	687	704	686	614	483	352	207	59	3	0	0	0	0	237.1	704
8-Apr	0	0	0	0	0	4	55	171	330	434	496	564	637	609	540	512	374	215	65	5	0	0	0	0	208.8	637
9-Apr	0	0	0	0	0	7	92	253	403	535	636	700	718	696	644	538	394	232	70	6	0	0	0	0	246.8	718
10-Apr	0	0	0	0	0	8	96	254	416	552	652	712	733	714	651	540	398	233	72	7	0	0	0	0	251.6	733
11-Apr	0	0	0	0	0	9	100	250	336	415	341	452	555	515	639	216	162	143	90	8	0	0	0	0	176.3	639
12-Apr	0	0	0	0	0	10	121	290	450	580	675	733	741	426	515	316	312	187	92	6	0	0	0	0	227.3	741
13-Apr	0	0	0	0	0	6	41	163	455	576	561	761	745	756	704	468	431	269	87	8	0	0	0	0	251.3	761
14-Apr	0	0	0	0	0	30	173	290	254	270	463	352	355	420	356	319	141	106	37	11	0	0	0	0	149.1	463
15-Apr	0	0	0	0	0	34	173	193	356	540	529	400	586	325	636	614	439	234	66	9	0	0	0	0	214.0	636
16-Apr	0	0	0	0	0	21	140	316	471	578	668	704	637	438	453	238	146	99	24	14	0	0	0	0	206.2	704
17-Apr	0	0	0	0	0	27	148	313	454	555	643	593	484	319	138	84	48	39	14	3	0	0	0	0	160.9	643
18-Apr	0	0	0	0	0	3	35	133	379	588	710	560	565	592	539	261	232	136	44	13	0	0	0	0	199.6	710
19-Apr	0	0	0	0	0	34	178	325	471	601	723	200	392	599	381	304	239	137	48	9	0	0	0	0	193.5	723
20-Apr	0	0	0	0	0	21	130	289	434	548	675	727	737	707	639	539	414	262	102	22	0	0	0	0	260.3	737
21-Apr	0	0	0	0	0	35	149	308	471	600	705	750	760	745	696	572	448	291	114	23	0	0	0	0	277.9	760
22-Apr	0	0	0	0	0	40	166	311	478	603	699	750	771	743	689	564	398	236	106	24	0	0	0	0	274.2	771
23-Apr	0	0	0	0	1	40	99	210	467	595	662	579	724	749	635	446	436	283	109	25	0	0	0	0	252.6	749
24-Apr	0	0	0	0	2	48	184	352	513	642	736	790	810	786	725	620	481	316	124	30	1	0	0	0	298.3	810
25-Apr	0	0	0	0	2	51	186	354	513	640	734	787	800	778	718	613	465	312	120	28	1	0	0	0	296.0	800
26-Apr	0	0	0	0	2	58	198	362	518	645	732	788	805	779	713	610	471	310	129	34	2	0	0	0	298.2	805
27-Apr	0	0	0	0	3	42	141	328	464	558	497	617	616	775	569	561	439	252	137	38	1	0	0	0	251.6	775
28-Apr	0	0	0	0	2	60	201	355	471	518	500	515	500	472	450	336	245	171	89	46	1	0	0	0	205.5	518
29-Apr	0	0	0	0	1	13	46	65	184	332	443	484	385	373	272	210	191	124	96	22	1	0	0	0	135.2	484
30-Apr	0	0	0	0	4	71	224	280	443	490	450	517	566	577	727	284	281	109	157	25	1	0	0	0	217.0	727
																								Diurnal Average		
																								Diurnal Maximum		





WBEA  
Hourly Averages

Global Radiation (GR) - W/m<sup>2</sup>  
CNRL Horizon - April 2015





**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - April 2015**

Maximum Speed: 25 km/h on Apr 16 17:00	Maximum Daily Speed Average: 17.1 km/h on Apr 24	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 8 10:00	Minimum Daily Speed Average: 2.0 km/h on Apr 8	Hours of Data: 709
Maximum Diurnal Speed Average: 2.9 km/h at hour 2	Minimum Diurnal Speed Average: 0.5 km/h at hour 21	Hours of Missing Data: 11
Monthly Average Velocity: 1.2 km/h 253.9 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 18 P <sub>99</sub> = 23	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-Apr	N17	N20	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	NNE20	NNE22	NNE19	NNE17	NNE16	NNE13	NNE9	NNE7	NE6	NNE5	NNE8		
2-Apr	N7	NNE5	N3	W2	N6	NNE7	NE7	NE7	NE8	N12	NNE12	NNE10	NNE8	NNE9	NNE7	NNE9	NE10	ENE10	ENE10	NNE10	NE7	NNE8	NNE6	N7		
3-Apr	N7	NNE6	N6	N6	N6	N6	N5	N5	NNW4	N5	NNE8	NNE7	NNE7	NE10	NE12	ENE13	NE13	NE13	NE12	NE10	NE8	NNE8	NNE6	N5		
4-Apr	N6	N7	N6	NNE4	N4	N5	NNE4	NE3	NNW4	NNW5	N3	ENE5	ENE6	ENE6	NE6	NE7	ENE12	ENE14	NNE13	NE9	NE7	NNE8	NNE6	N6		
5-Apr	WNN7	WNN6	NW5	NNE5	NNE7	NNE8	NNE9	NE11	NE10	NE10	NE9	NE6	NE7	ENE9	NE10	ENE11	NE11	NE11	NE9	NNE8	NNE7	NNE6	N6	NNW7		
6-Apr	NNW5	NNE6	N6	N5	NNE2	SSW4	SSW5	S6	S9	S9	S9	SSE9	SSE12	S13	S11	SSE11	S12	SSE9	SE7	SSE10	SSE11	SSE9	S8	S8		
7-Apr	S4	SW3	S6	S6	S8	SSW8	SSW6	S7	S8	S11	SSW17	SSW18	S18	SSW16	SSW15	S17	S14	SSW12	SSW10	SSW7	SSW8	S9	S8	SSW8		
8-Apr	SSW5	SSW8	S10	S12	S11	S12	S12	S11	SSW6	NNW1	NE8	NE10	NNE10	N7	N3	NE8	NE11	ENE8	E7	ENE5	ENE2	NNW2	WSW2	SSW3		
9-Apr	SSW5	SSW7	SSW7	S8	S9	S10	S10	S12	S13	S13	S13	S13	SSW17	SW18	WSW17	SW15	SW16	SW15	SW10	SSW8	SW8	SW8	SW10	SW8		
10-Apr	SW9	SW12	SSW11	SSW9	SSW9	SSW9	SSW8	SSW9	S10	S12	SSW12	SW13	SW13	SW11	SSW11	S10	SSE9	SSE6	ESE7	ESE7	SSE8	SSW6	S2	SSW2		
11-Apr	SSE4	SSW5	S9	S11	S9	S10	S10	S10	S10	W8	W13	W12	WNN17	WNN16	W14	WNN12	WNN13	W13	W14	W17	WSW17	W23	WNN10	SW8		
12-Apr	SW8	SW6	SSW7	SW10	SW10	SW10	SW14	SW15	SW15	SW14	SW16	SW21	WSW21	WSW19	WSW22	SW21	WSW18	WSW16	W17	W15	W18	WSW23	W22	W22		
13-Apr	W22	W18	W14	WNN17	WNN18	WNN9	WNN14	W15	WNN22	WNN23	WNN24	WNN24	WNN24	WNN22	WNN19	WNN19	WNN16	WNN12	WNN8	WNN5	N8	N8	N6	N6		
14-Apr	N6	NNW6	N6	NNW6	N4	NNW4	N3	E1	SE5	NE2	ENE6	ENE7	SSE14	SSE14	S13	S13	S18	SSE21	SSE16	SSE16	SSE13	SSE7	S7	S9		
15-Apr	S8	S7	SSW6	SW7	S8	S9	SSW9	SSW9	SSW9	SSW9	SSW9	SSW6	WNN14	W16	WNN18	S13	SW13	SW16	WSW15	SW11	S6	SSW10	WSW15	SW8	SW9	
16-Apr	SSW9	SSW9	SSW10	SSW9	S10	S11	S10	SSW12	SSW12	SSW14	SSW16	SSW17	SW18	SW18	WSW16	W15	NW25	NW19	W14	W11	W7	SW7	SSW8	SW11		
17-Apr	SW13	SW12	SW14	SW10	SSW11	S10	S9	S12	S13	SSE10	SSE10	S13	S15	SSW18	S20	SSW16	S12	SE6	ESE7	E5	ESE3	NE4	NNE4	NNW4		
18-Apr	NNW7	NNW9	NNW13	NNW16	NNW14	N17	NNW13	WNN12	NW19	NW20	NNW20	NNW21	NNW18	NNW14	NNW15	NNE17	NNW14	NW18	NNE11	SE2	W4	WSW6	W5	SW7		
19-Apr	WSW7	SW4	SSW6	SSW6	SSW6	SSW6	S5	S6	S8	S8	S11	W7	NW6	SW10	W10	WNN11	WNN9	WNN8	W3	SSE4	SSE5	SSE5	SSW2	NNE5		
20-Apr	NNW2	NW6	NW7	WNN3	SW3	SSW2	WSW1	N5	NNE6	NE9	ENE10	E10	ENE6	E4	NE3	NE7	NNE13	NNE15	NNE15	NNE17	N13	N9	N10	N8		
21-Apr	N8	NNW7	N6	NNE6	N7	N7	N8	NNE10	NNE11	NNE11	NE13	NNE13	NNE13	NNE13	NE13	NE15	NE15	NNE13	NE12	NE7	E9	ESE8	E5			
22-Apr	NE6	NNE5	NE6	NE4	N5	NNE5	NNE5	NNE5	E8	ENE10	E12	ESE13	SE14	ESE15	ESE14	ESE13	E17	E16	E15	E12	E9	E8	E8	ENE7		
23-Apr	ENE7	NE6	NE7	NNE6	NNE6	NNE6	NNE6	NNE8	ENE12	NE14	NE15	NE18	NE20	NE18	ENE17	ENE15	ENE19	ENE18	NE19	NE13	NE11	NNE13	NNE14	NNE16		
24-Apr	NNE15	NNE15	NNE15	NNE13	NNE14	NNE17	NNE18	NNE19	NNE18	NNE19	NNE19	N20	N20	NNE19	N19	N19	N21	N21	N20	N18	N16	N15	NNE13	N10		
25-Apr	N10	N10	N10	N8	N7	N10	NNE11	NNE10	NNE10	NNE9	NE9	NE7	NNE7	NE8	ENE6	NE5	NNE4	NE2	NNE5	NNE6	NNE7	NNE7	N6	NNW6		
26-Apr	NNW7	N7	NNE5	NNE4	NNW2	SSW4	SSE2	S5	S7	S6	S7	SSW8	SSE7	SSE5	ESE8	ESE5	SE7	SE7	ESE9	SE7	ESE7	ESE8	SE7	SE4		
27-Apr	ENE2	NNW4	NNW4	N3	SSE4	SSE6	S6	S8	S8	S9	S11	SSW11	S14	SSW21	SW19	SW20	WSW17	WSW16	WSW14	SW10	SW8	SSW7	SW6	SW8		
28-Apr	SW9	SW8	SSW9	SSE7	SSE6	S9	S8	S8	S5	SE5	SSE10	SSE14	SSE16	SSE16	SSE19	SSE19	SSE17	S19	SSE12	SSE10	SSE9	S7	SSW7	WSW10		
29-Apr	SW8	WSW13	W8	SW8	SW10	WSW12	SW8	SW11	SW8	WSW11	W12	WSW11	WSW12	WSW13	WSW12	SW9	SW8	SW10	SSW9	SW10	SW9	SSW8	SW11	SW8		
30-Apr	WSW7	WSW7	SW11	SW13	SW13	SW11	SW11	SW13	SW15	SW15	SW18	SW21	SW17	SW16	SW13	W14	NW10	WSW14	W9	WNN2	S5	SW8	SSW8	SW7		

WNN2.5	WNN2.9	W2.2	WSW1.9	WSW1.8	SW1.5	SSW1.5	SSW2.3	SSW2.1	WSW0.8	SW0.9	WSW1.7	WSW2.9	WSW2.5	WSW2.2	SW1.2	N1.0	NNW0.6	NE1.4	NE1.2	SE0.5	W1.1	W1.3	W2.1	Diurnal Average	
W22	N20	NNE15	WNN17	WNN18	N17	NNE18	NNE19	WNN22	WNN23	WNN24	WNN24	WNN24	WNN24	WNN22	NNE22	SW21	NW25	SSE21	N20	N18	W18	WSW23	W22	W22	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 - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 10 km/h on Apr 16 17:00	Hours in Service: 720 Hours of Data: 709 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 0 km/h on Apr 22 05:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 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-Apr	4	5	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	5	6	5	4	4	4	3	1	2	1	2	6
2-Apr	2	1	2	1	2	2	1	2	2	4	3	3	3	4	3	3	3	3	2	2	2	2	2	2	4
3-Apr	1	2	1	1	1	1	1	1	1	1	3	3	3	3	4	4	4	3	3	2	2	2	1	1	4
4-Apr	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	3	3	4	3	2	1	1	1	1	4
5-Apr	1	1	1	3	2	2	2	3	3	3	3	3	2	3	3	4	3	3	2	2	1	1	1	1	4
6-Apr	1	1	1	1	1	1	1	2	2	2	2	3	4	4	4	3	3	3	1	3	2	2	1	1	4
7-Apr	1	1	1	1	1	1	1	2	2	5	5	5	5	6	4	5	4	4	3	1	1	2	1	2	6
8-Apr	1	2	2	2	2	2	3	3	3	1	2	3	3	3	2	4	3	2	2	1	1	1	1	1	4
9-Apr	1	1	1	1	1	1	2	3	3	3	3	4	5	6	6	5	5	5	3	1	1	1	2	2	6
10-Apr	2	2	2	1	1	1	2	2	3	3	4	4	5	4	4	4	4	3	1	1	1	2	1	2	5
11-Apr	2	3	1	2	2	2	2	2	2	4	4	4	4	4	5	3	4	5	5	7	5	7	6	2	7
12-Apr	2	1	2	4	3	3	4	4	4	4	5	7	7	6	8	7	7	6	5	5	7	8	8	8	8
13-Apr	8	7	5	6	6	4	5	5	6	6	6	6	7	6	5	5	5	4	3	1	2	2	2	2	8
14-Apr	1	1	1	1	1	1	2	2	2	1	2	2	5	4	4	7	5	4	4	4	2	2	2	3	7
15-Apr	2	2	1	1	2	2	2	2	3	3	3	4	5	5	5	5	5	5	5	1	6	6	3	2	6
16-Apr	2	2	2	1	2	1	2	4	3	4	4	5	6	6	6	6	10	7	7	4	2	2	1	3	10
17-Apr	3	3	3	3	2	2	2	3	3	2	3	6	5	5	6	6	4	3	2	1	1	1	1	2	6
18-Apr	1	3	3	4	3	6	3	4	4	5	6	5	5	5	4	6	6	4	5	1	1	1	2	1	6
19-Apr	1	1	1	2	1	1	1	1	2	2	3	4	4	5	4	4	4	3	2	1	1	1	1	1	5
20-Apr	2	1	1	2	2	1	2	2	2	3	3	3	3	3	3	3	3	3	4	4	3	2	2	2	4
21-Apr	2	2	1	1	1	2	2	3	3	3	4	5	4	4	4	4	4	3	3	2	1	2	3	1	5
22-Apr	1	1	1	2	0	1	1	1	3	3	4	4	5	5	5	4	5	5	4	4	3	2	2	2	5
23-Apr	1	1	2	1	1	1	1	2	3	3	4	4	5	5	5	4	5	5	4	3	2	3	4	4	5
24-Apr	3	4	4	3	4	5	5	4	5	5	5	6	5	6	5	6	6	5	5	4	4	4	3	2	6
25-Apr	2	2	2	2	2	2	3	3	2	3	3	3	4	4	3	3	2	2	2	1	1	1	1	1	4
26-Apr	1	1	1	1	1	1	1	2	2	3	3	4	4	3	4	3	4	3	3	1	1	1	1	2	4
27-Apr	1	1	1	1	2	1	1	2	2	3	3	4	5	7	7	7	6	6	5	3	1	1	2	1	7
28-Apr	1	1	2	1	1	1	2	2	2	2	4	4	5	5	5	5	4	5	3	2	2	1	1	3	5
29-Apr	1	4	3	2	2	3	2	3	2	3	3	4	4	4	4	4	3	3	3	2	2	1	2	3	4
30-Apr	2	2	3	3	3	3	3	4	5	6	6	6	5	7	5	9	7	7	3	1	2	1	1	1	9
	8	7	5	6	6	6	5	5	6	6	6	7	7	7	8	9	10	7	7	7	7	8	8	8	

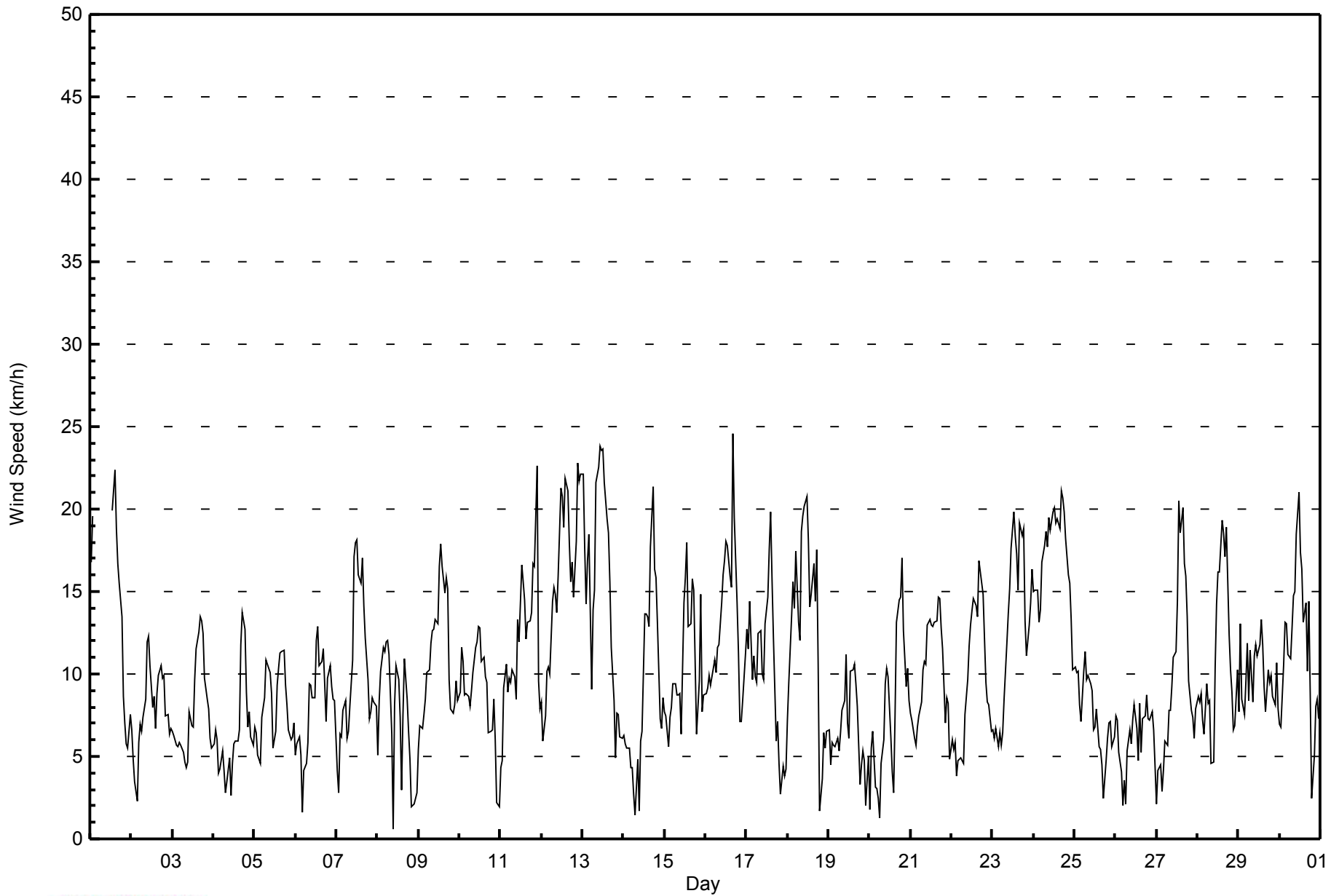
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	100	14.10	14.10
6 - 11	362	51.06	65.16
12 - 19	214	30.18	95.35
20 - 28	33	4.65	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: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - April 2015**

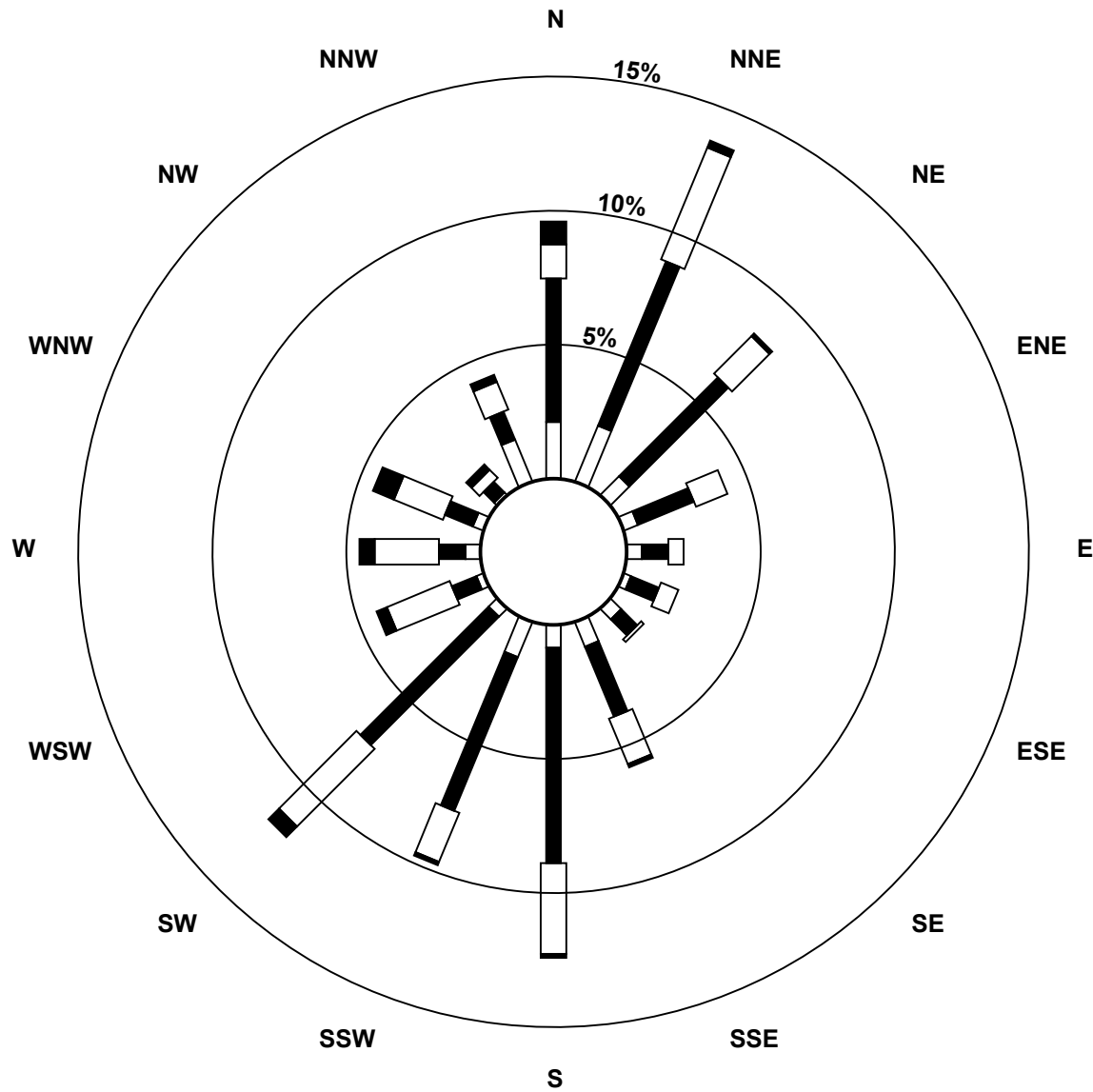
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	15	16	7	4	4	2	4	7	6	10	3	2	4	3	1	12	100
6 - 11	38	47	37	16	7	8	6	20	57	44	48	7	7	8	4	8	362
12 - 19	9	32	14	9	4	5	1	13	24	14	29	18	17	14	3	8	214
20 - 28	6	2	1	0	0	0	0	1	1	1	4	3	4	6	2	2	33
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
<b>Totals</b>	68	97	59	29	15	15	11	41	88	69	84	30	32	31	10	30	709

Total Number of Valid Hours: 709

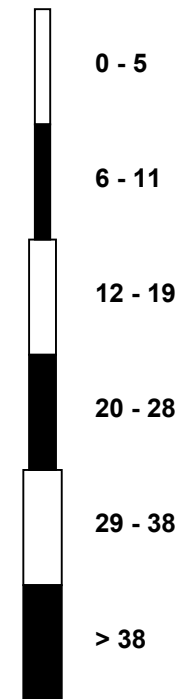
Total Number of Hours: 720

**Wood Buffalo Environmental Association  
Wind Rose Apr 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 - April 2015**

Direction of Maximum Speed: 321 deg on Apr 16 17:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 12.6 deg on Apr 24	Hours of Data: 709
Direction of Minimum Speed: 337 deg on Apr 8 10:00	Hours of Missing Data: 11
Direction of Minimum Daily Speed Average: 2.0 deg on Apr 8	Percent Operational Time: 98.5
Monthly Average Direction: 234.6 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	10	7	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	20	24	23	25	20	17	20	27	35	23	12	--
2-Apr	3	23	9	272	7	28	44	41	34	6	20	22	32	23	25	26	52	65	59	27	38	30	15	6	28.1
3-Apr	8	13	1	6	8	6	3	9	340	357	21	30	21	45	54	57	46	44	46	46	34	21	15	4	28.5
4-Apr	5	7	8	23	1	5	19	35	330	347	351	76	76	60	43	55	62	61	23	37	44	27	16	352	31.3
5-Apr	293	293	316	27	18	25	28	39	46	43	41	49	39	66	53	63	56	53	38	25	17	18	1	345	31.9
6-Apr	348	12	9	7	29	204	193	182	181	176	174	165	165	174	169	161	172	163	143	151	156	166	182	183	167.2
7-Apr	191	232	188	190	183	195	194	190	190	181	192	192	187	195	192	189	191	197	208	212	200	189	176	197	192.2
8-Apr	202	192	189	181	182	182	183	188	199	337	39	39	19	10	358	36	53	66	83	75	71	330	256	213	135.5
9-Apr	210	209	199	189	170	173	178	179	177	179	178	185	208	225	238	219	222	225	218	208	215	216	224	227	204.4
10-Apr	230	229	208	202	207	204	202	194	182	181	203	214	218	218	203	191	164	159	122	106	159	194	183	193	195.8
11-Apr	150	198	189	187	184	178	174	178	191	266	271	280	292	286	273	290	286	268	259	260	245	278	286	228	251.3
12-Apr	232	221	212	227	230	234	229	233	234	219	219	230	238	246	240	234	253	250	272	274	262	257	260	278	243.9
13-Apr	262	262	264	284	286	285	284	274	289	303	303	301	296	299	299	296	291	291	299	298	3	3	356	358	293.1
14-Apr	11	348	356	343	9	347	4	87	140	45	76	76	163	158	180	173	169	168	152	155	155	158	177	170	153.6
15-Apr	172	174	202	221	184	181	198	210	218	230	201	294	265	289	280	231	229	247	228	184	213	251	227	219	231.4
16-Apr	211	204	204	194	191	169	174	211	211	196	193	207	235	228	242	263	321	319	259	264	268	229	206	231	229.4
17-Apr	230	215	224	218	200	191	171	176	178	159	163	171	188	198	188	212	182	142	123	85	105	40	22	335	187.7
18-Apr	332	343	346	348	346	349	333	302	314	325	334	335	327	339	343	20	335	321	23	136	259	257	281	215	333.5
19-Apr	251	234	199	204	204	196	185	174	179	178	180	268	309	232	278	296	293	296	269	162	147	163	192	33	225.9
20-Apr	338	310	305	282	219	194	242	4	21	48	68	84	69	79	46	46	27	22	14	13	6	4	356	356	20.2
21-Apr	357	348	358	29	357	4	11	15	19	25	36	23	12	26	31	48	38	35	30	37	52	91	118	93	29.6
22-Apr	48	14	41	35	352	17	14	19	89	68	83	107	125	116	106	110	101	96	89	97	93	90	97	77	87.7
23-Apr	69	53	41	12	19	12	23	30	72	54	35	35	44	49	71	67	61	58	56	40	39	29	20	17	44.8
24-Apr	14	12	13	13	18	21	30	21	15	14	8	11	12	7	9	9	10	9	7	4	6	12	8		12.6
25-Apr	4	5	7	10	5	8	15	15	22	23	35	51	21	48	71	37	15	54	15	23	29	23	0	347	19.4
26-Apr	338	352	20	13	341	197	152	186	188	170	187	192	163	147	118	114	127	144	121	125	120	117	145	126	138.9
27-Apr	59	328	348	5	162	165	173	176	174	172	185	205	182	206	230	227	239	244	246	226	220	209	234	231	214.3
28-Apr	231	231	194	166	159	170	169	174	175	126	155	149	162	163	165	163	168	173	165	159	161	191	206	245	172.6
29-Apr	224	258	270	218	226	247	234	232	219	243	281	251	253	251	244	231	222	222	198	222	224	205	220	235	236.2
30-Apr	248	240	229	222	225	226	217	220	230	232	234	234	234	234	225	259	315	249	267	289	190	218	211	223	234.3

296.1 297.3 272.0 253.0 240.6 219.3 207.7 210.7 210.2 242.4 219.7 245.1 239.0 243.1 238.3 232.4 351.8 332.6 35.0 54.5 137.3 273.7 266.9 278.6

Diurnal Average

AF - Analyzer Failure

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





**Wood Buffalo Environmental Association**  
**Summary of Hour Standard Deviations**

**Wind Direction (WD) - deg**  
**CNRL Horizon - April 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Apr 8 10:00	Hours in Service: 720 Hours of Data: 709 Hours of Missing Data: 11 Hours of Calibration: 0 Percent Operational Time: 98.5
Minimum Value: 7 deg on Apr 5 01:00	
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 16 Median = 20 Q <sub>3</sub> = 27 P <sub>90</sub> = 39 P <sub>99</sub> = 82	

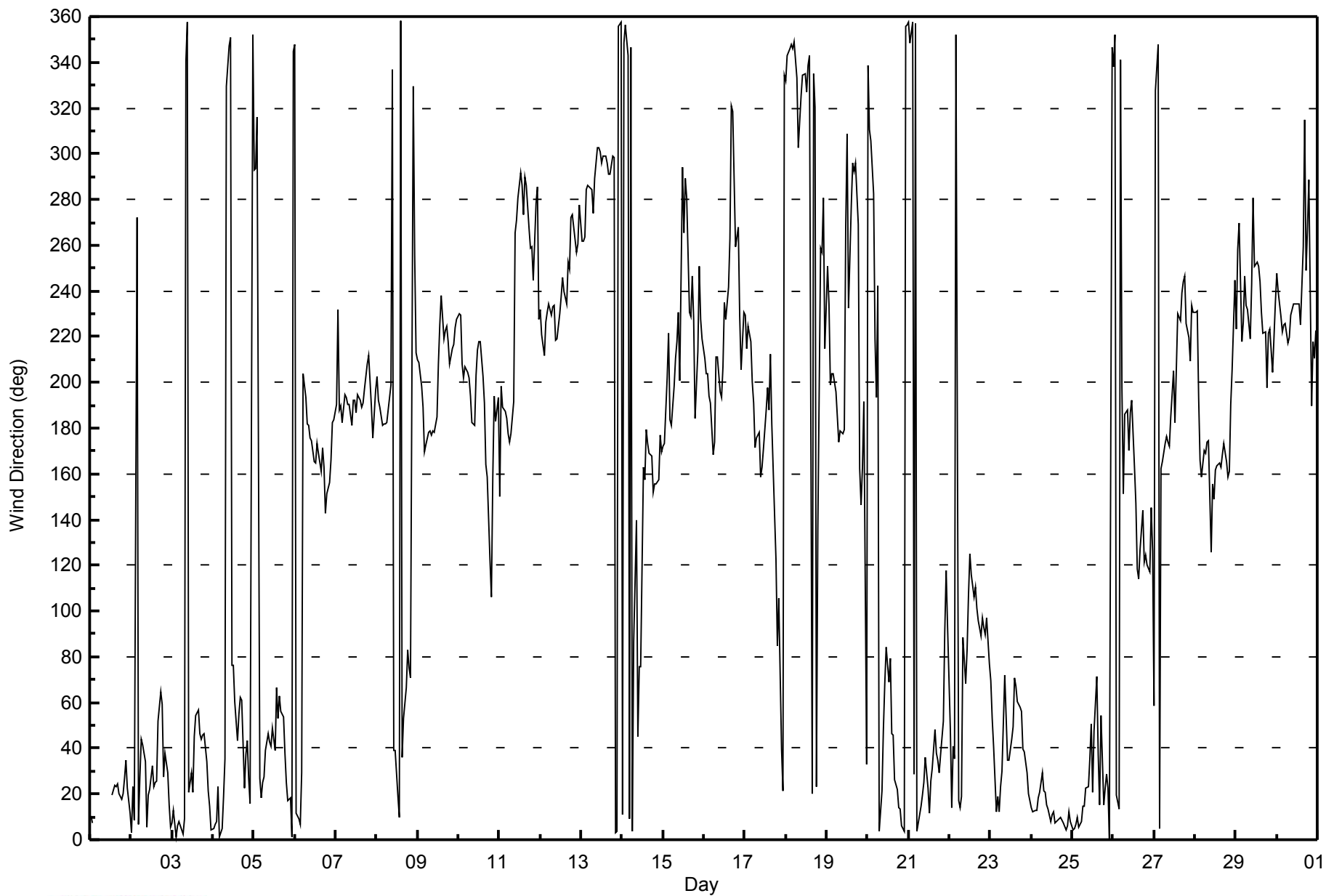
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	19	18	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	21	19	19	19	19	18	18	15	20	14	18	21
2-Apr	19	18	23	39	19	20	15	16	18	24	24	30	40	36	51	34	31	24	18	20	17	15	19	18	51
3-Apr	16	18	18	15	13	16	20	20	36	46	34	64	57	32	30	25	19	19	17	15	15	14	16	16	64
4-Apr	13	12	14	15	18	14	20	32	51	43	81	75	56	57	66	53	27	18	19	14	15	14	13	30	81
5-Apr	7	7	31	53	15	17	18	19	18	30	30	65	53	31	29	29	22	21	17	13	12	11	14	16	65
6-Apr	20	9	7	9	62	13	14	21	21	21	28	30	27	24	29	29	23	25	14	14	14	13	12	8	62
7-Apr	15	43	11	12	9	11	12	20	24	26	21	20	21	25	22	20	21	20	19	15	15	13	12	11	43
8-Apr	13	12	14	13	13	13	14	18	34	98	30	24	28	41	87	53	21	21	22	23	25	49	30	30	98
9-Apr	10	9	11	8	9	9	12	15	16	18	18	24	23	25	26	24	23	19	18	12	10	14	12	12	26
10-Apr	12	12	16	8	9	10	14	18	18	18	25	30	27	36	31	35	28	43	15	12	21	33	54	73	73
11-Apr	38	49	10	11	19	14	15	14	17	46	26	27	20	28	31	24	18	22	21	22	22	28	34	15	49
12-Apr	14	18	20	22	20	20	16	19	22	28	27	24	27	24	25	24	28	28	20	21	23	22	24	21	28
13-Apr	23	25	26	20	18	26	20	22	19	16	17	17	20	22	21	21	22	24	18	19	14	13	11	12	26
14-Apr	10	21	10	19	15	28	34	79	43	83	45	30	25	26	21	23	22	18	18	17	16	15	13	19	83
15-Apr	18	15	19	15	16	14	20	18	26	34	59	20	32	20	34	34	24	21	21	19	29	22	23	16	59
16-Apr	16	12	11	12	13	11	13	22	23	21	22	27	27	25	27	35	17	32	23	24	29	20	16	17	35
17-Apr	16	16	13	24	14	15	14	15	18	24	26	25	28	23	20	24	23	32	22	20	79	12	17	30	79
18-Apr	15	17	17	18	16	21	22	14	16	16	22	23	26	29	25	27	32	17	32	47	24	11	29	12	47
19-Apr	14	28	13	21	14	9	15	20	20	25	23	62	60	45	32	37	25	25	38	10	9	13	67	28	67
20-Apr	83	16	12	62	25	23	82	29	33	20	24	36	68	75	91	39	22	22	19	19	17	17	16	14	91
21-Apr	16	12	18	13	15	17	20	20	21	23	24	28	29	28	27	23	19	18	18	15	11	22	17	20	29
22-Apr	12	12	22	47	12	13	15	41	34	31	31	32	27	32	31	30	21	20	18	19	21	18	18	15	47
23-Apr	14	12	14	23	10	14	18	19	25	21	23	18	18	22	22	23	21	18	16	17	14	14	18	17	25
24-Apr	18	19	17	19	18	18	18	20	20	21	23	22	24	24	23	23	22	21	21	20	19	18	18	18	24
25-Apr	17	16	16	16	16	18	19	22	22	27	39	67	62	51	73	69	69	87	29	12	11	8	16	13	87
26-Apr	14	11	10	21	64	31	35	30	31	47	42	51	68	80	53	64	61	30	21	12	7	8	20	14	80
27-Apr	53	30	23	37	54	11	15	23	26	30	24	29	25	26	28	26	26	25	23	19	12	10	14	11	54
28-Apr	12	15	14	14	9	12	17	23	53	52	25	21	20	22	19	19	17	16	17	14	11	20	22	20	53
29-Apr	17	23	21	19	13	18	18	18	21	30	25	32	32	28	24	26	34	21	21	22	15	14	14	25	34
30-Apr	19	21	14	14	15	16	22	22	24	25	24	23	24	30	33	39	38	27	27	34	25	22	11	22	39
83 49 31 62 64 31 82 79 53 98 81 75 68 80 91 69 69 87 38 47 79 49 67 73																									
Diurnal Maximum																									

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**CNRL Horizon - April 2015**





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Last Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	15:45
Gas Cert Reference	LL107945	Station temp.	21 Deg C
Cal Gas Concentration	50.3 ppm	Cal Gas Exp Date	11/6/2014
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG Make/Model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-622	-622
Analyzer IP address	192.168.1.43		Lamp voltage	845	844
Calculated slope	0.998903	0.998596	Chamber temp	45.3	44.9
Calculated intercept	1.118328	0.517985	Pressure	709.7	703.0
Analyzer Background	17.6	17.6	Flow	0.428	0.424
Analyzer Coefficient	0.943	0.966	Intensity	91	91

Analyzer make Thermo 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	----
as found span	5000	82.3	827.9	807.2	1.026
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	82.3	827.9	828.8	0.999
second point	5000	41.2	414.5	414.7	1.000
third point	5000	20.6	207.2	206.0	1.006
as left zero	5000	0.0	0.0	0.5	----
as left span	5000	82.3	827.9	826.0	1.002
Average Correction Factor					1.001

Corrected As found 807.6 Previous response 827.7 % change 2.5%

**Notes:**

Zero and Span adjusted. Filter changed after As Found. Long Calibrator Zero due to THC pump change

Calibration Performed By: Ryan Power



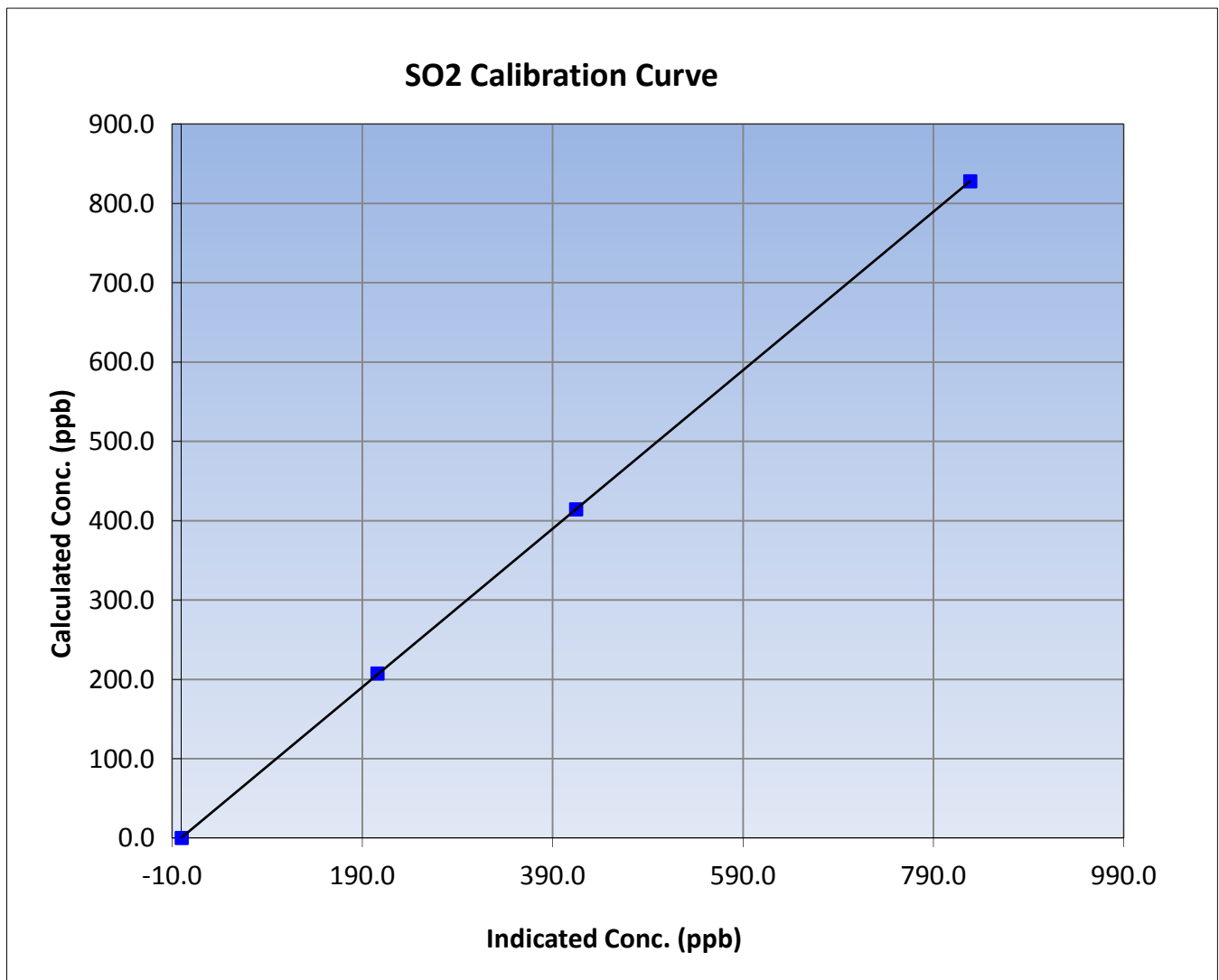
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	15:45
Analyzer make	Thermo 43i	Analyzer serial #	10710321322

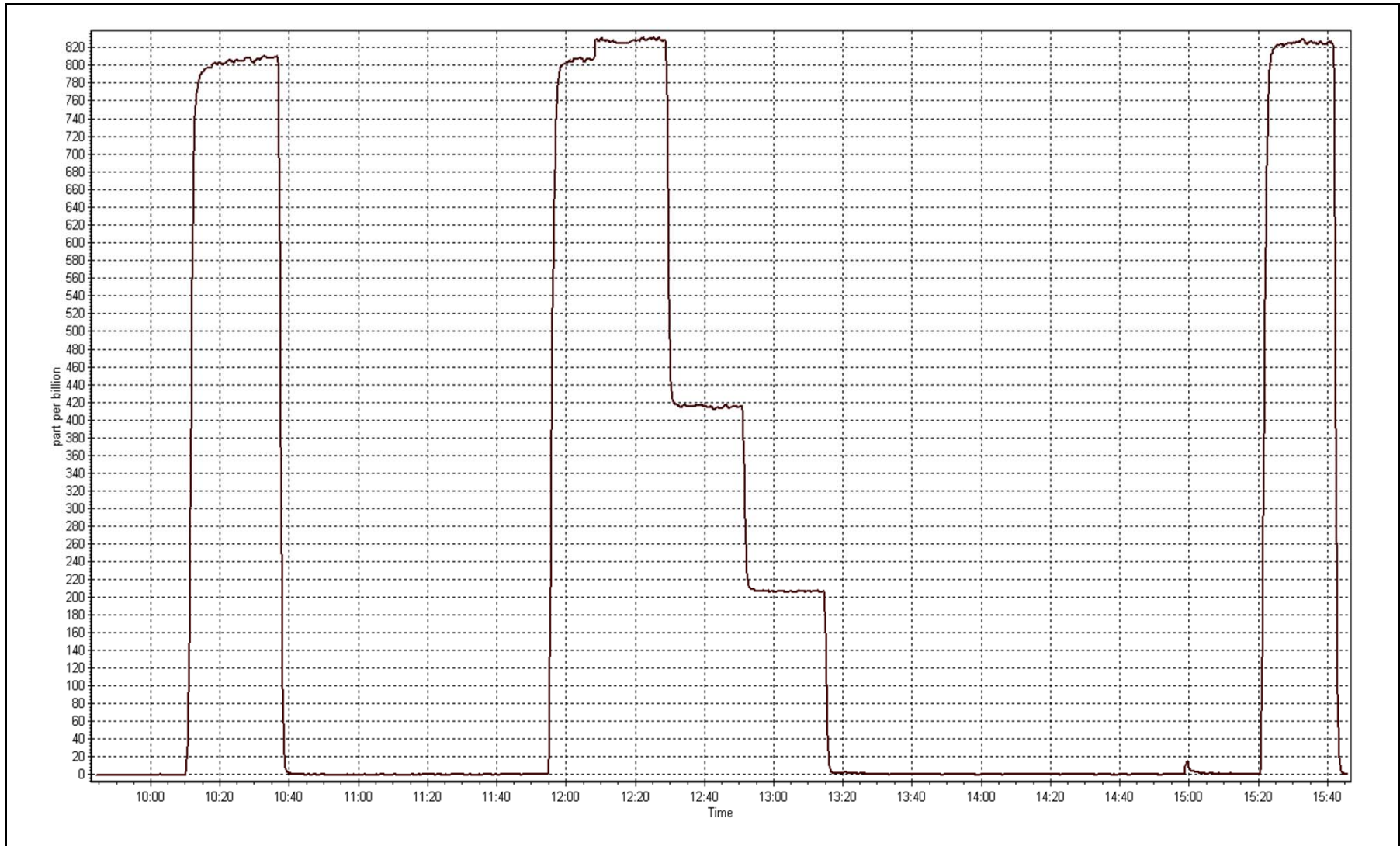
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999996
827.9	828.8	0.9990		
414.5	414.7	0.9995	Slope	0.998596
207.2	206.0	1.0059		
			Intercept	0.517985



SO2 Calibration Plot

Date: April 22, 2015





# Wood Buffalo Environmental Association TRS Calibration Report

## Station Information

Calibration Date	April 21, 2015	Last Calibration	March 24, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	11:50	End Time (MST)	15:00
Gas Cert Reference	LL155297	Station temp.	21 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	5/30/2013
Calibrator Make/Model	API T700	Serial Number	1223
Dil air Make/Model	API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
SO2 gas concentration	50.3 ppm	SO2 gas cert/exp	LL107945      Wednesday, June 11, 2014

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-672	-672
Analyzer IP address	192.168.1.42		Lamp voltage	766	763
Calculated slope	1.007428	1.001422	Chamber temp	45	45
Calculated intercept	0.021579	-0.276777	Pressure	690.9	691.8
Analyzer Background	8.9	9.1	Flow	0.419	0.421
Analyzer Coefficient	0.889	0.917	Intensity	90	89
			Converter temp.	809	809
Analyzer make/model	Thermo 43i		Analyzer serial #	0710321323	
Converter make/model	CDN-101		Converter serial #	363	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	0.2	----
as found span	6000	46.2	80.1	77.2	1.037
SO2 scrubber check	6000	24.7	207.1	0.8	----
calibrator zero	6000	0.0	0.0	0.2	----
high point	6000	46.2	80.1	80.2	0.999
second point	6000	23.1	40.0	40.3	0.994
third point	6000	11.5	19.9	20.3	0.981
as left zero	6000	0.0	0.0	0.1	----
as left span	6000	46.2	80.1	79.9	1.002
Average Correction Factor					0.991

Corrected As found      77.1      Previous response      79.5      % change      3.1%

**Notes:**

Filter changed after As Found. Scrubber check after filter change. As Found Zero used as Calibrator Zero

Calibration Performed By: \_\_\_\_\_ Ryan Power



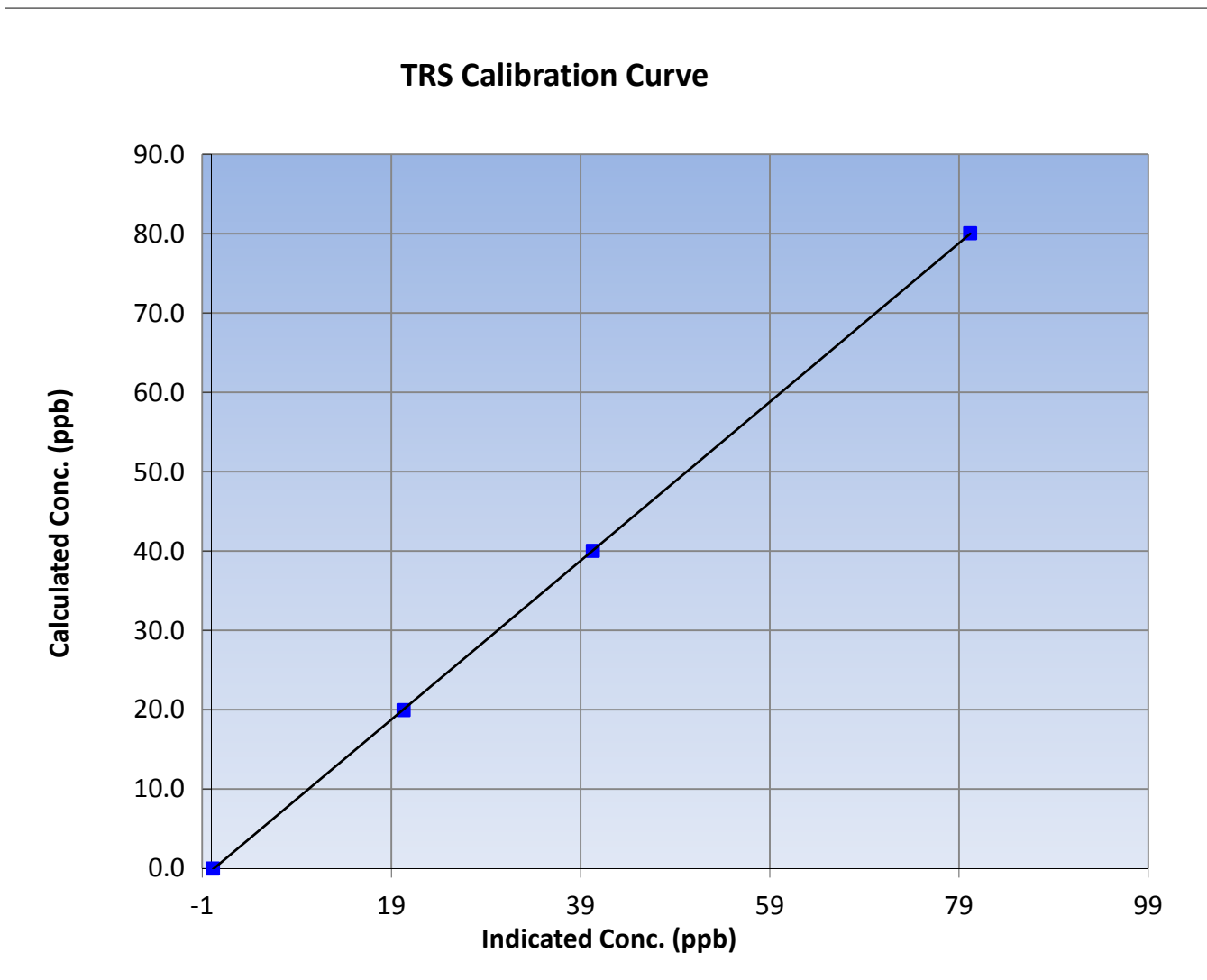
# Wood Buffalo Environmental Association TRS Calibration Report

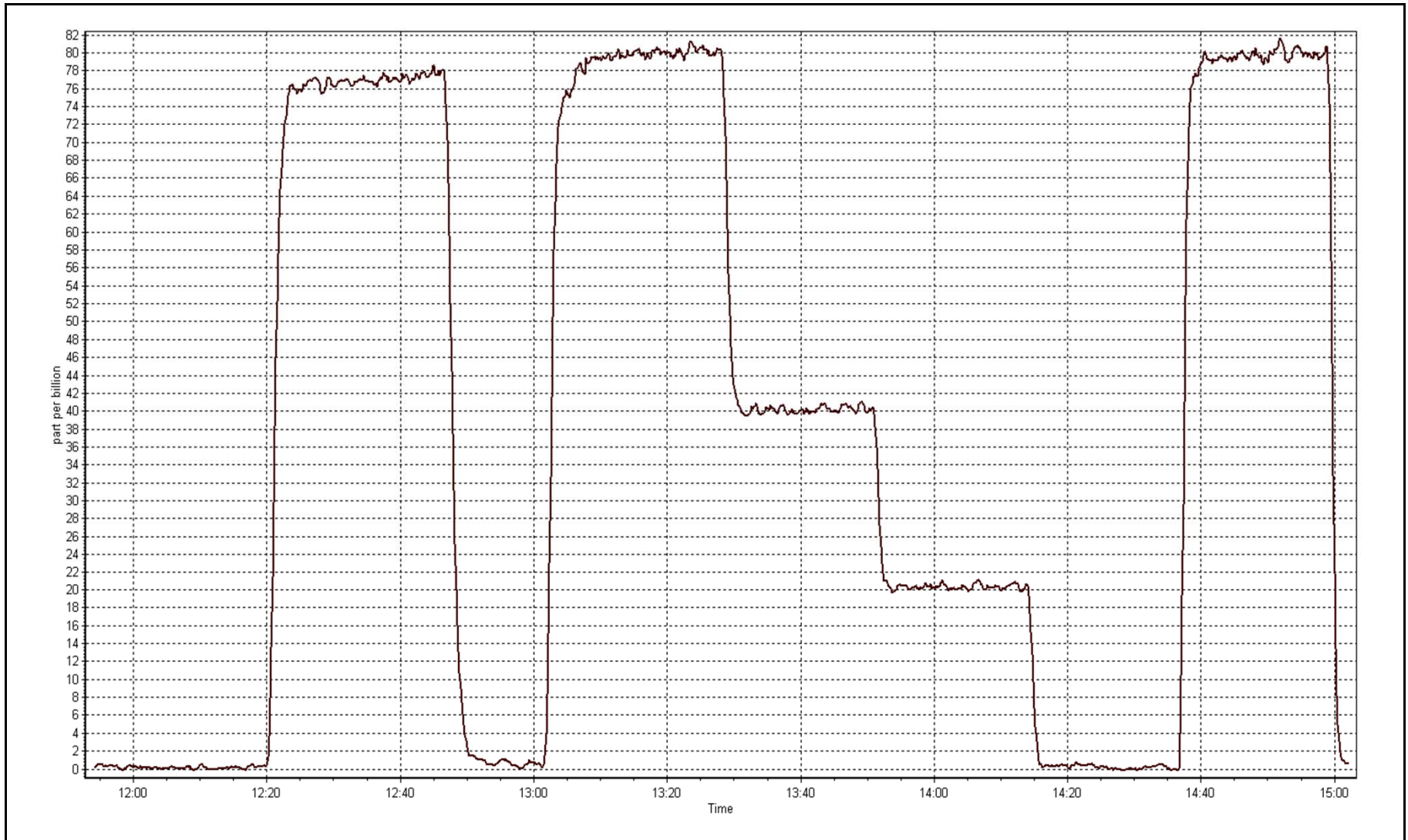
## Station Information

Calibration Date	April 21, 2015	Previous Calibration	March 24, 2015
Station Name	AMS 15	Station Number	AMS 15
Start Time (MST)	11:50	End Time (MST)	15:00
Analyzer make	Thermo 43i	Analyzer serial #	0710321323

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999990
80.1	80.2	0.9986		
40.0	40.3	0.9935	Slope	1.001422
19.9	20.3	0.9815		
			Intercept	-0.276777









# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Wednesday, April 22, 2015	Last Calibration	Wednesday, March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	15:45
Gas Cert Reference	LL107945	Cal Gas Expiry Date	11/6/2014
CH4 Cal Gas Conc.	490 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	1223
ZAG make/model	Teledyne API 701	Serial Number	1004
DACS make/model	Campbell Scientific CR3000	Serial Number	2580

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.7	8.7
Analyzer IP address	192.168.1.51		Air or Bypass Press	38.0	38.0
Calculated slope	0.988361	1.001600	Fuel Pressure	26.3	26.3
Calculated intercept	0.122866	-0.045586	Analyzer Coeff	0.20	0.28
			Analyzer BKG	3.258	3.289

Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295
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## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.22	----
as found span	5000	82.3	17.48	17.71	0.987
calibrator zero	5000	0.0	0.00	0.02	----
high point	5000	82.3	17.48	17.47	1.001
second point	5000	41.2	8.75	8.84	0.990
third point	5000	20.6	4.38	4.41	0.992
as left zero	5000	0.0	0.00	-0.24	----
as left span	5000	82.3	17.48	17.44	1.002
Average Correction Factor					0.994

Corrected As found	17.93	Previous response	17.56	% change	-2.0%
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**Notes:**

Annual pump changed for preventative maintenance. Zero and Span with adjustments. Filter changed after As Finds.

Calibration Performed By:

\_\_\_\_\_  
Ryan Power



# Wood Buffalo Environmental Association THC Calibration Report

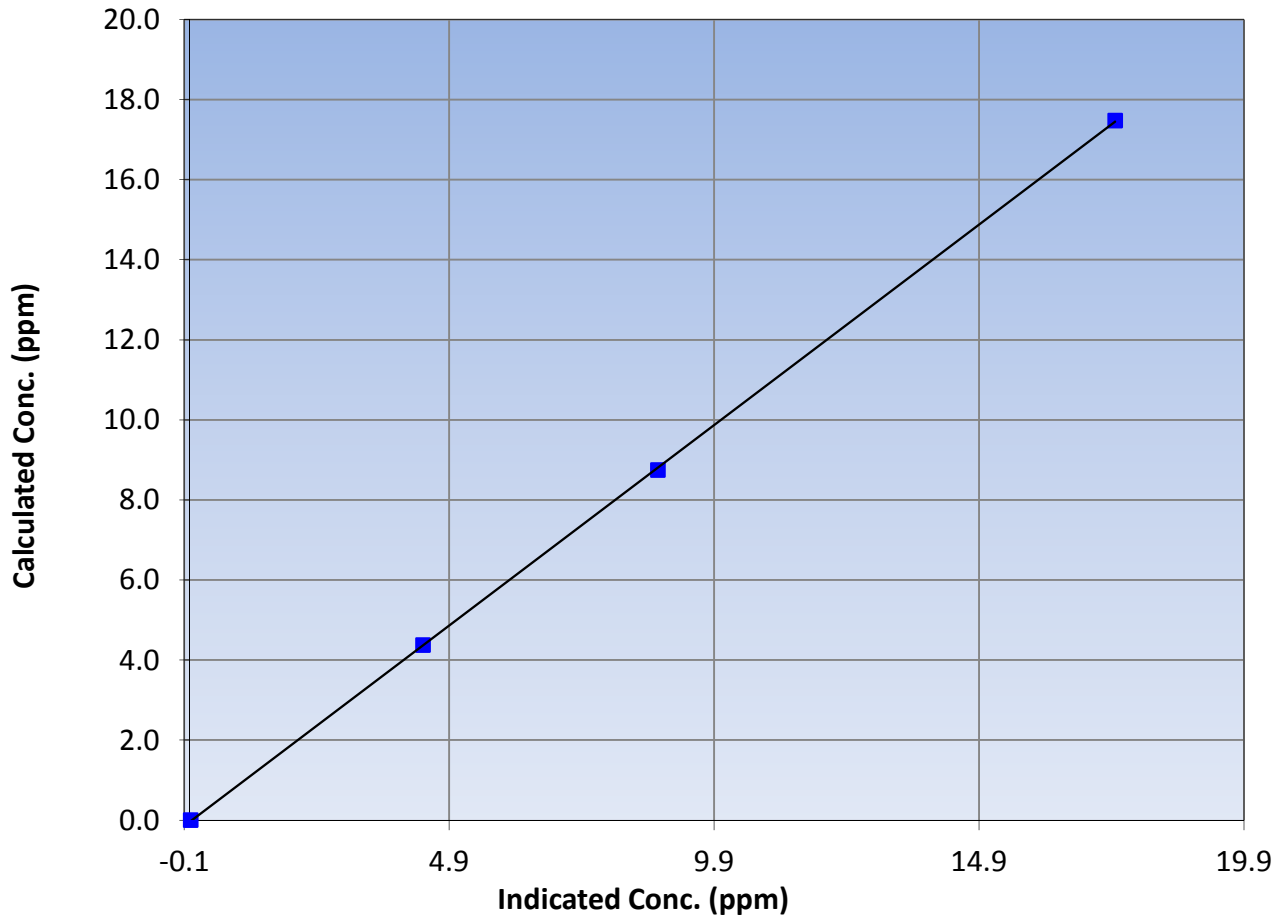
## Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:15	End Time (MST)	15:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059295

## Calibration Data

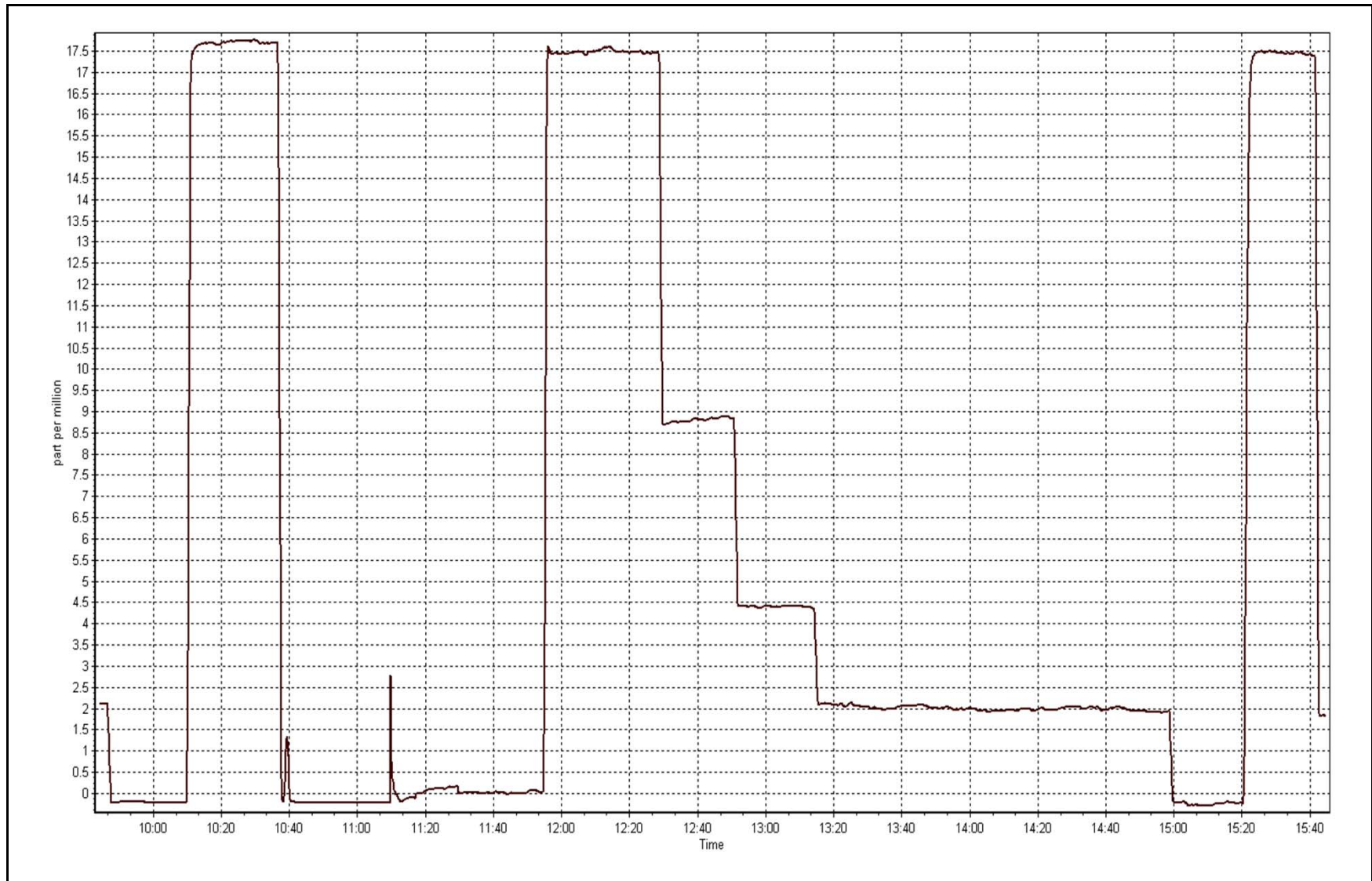
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	----	Correlation Coefficient	0.999971
17.48	17.47	1.0006		
8.75	8.84	0.9899		
4.38	4.41	0.9922		
			Slope	1.001600
			Intercept	-0.045586

### THC Calibration Curve



THC Calibration Plot

Date: April 22, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	15:45
NO Cal Gas Conc	48.6 ppm	Gas Cert Reference	LL107945
NOx Cal Gas Conc	48.6 ppm	Cal Gas Expiry Date	11/6/2014
Calibrator	Teledyne API T700	Serial Number	1223
Zero air Generator	Teledyne API T701	Serial Number	1004

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2580
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.999350	1.001452	0.991875
	Data Offset	0.332939	0.395866	-1.126356
Current Calibration	Data Slope	0.998595	1.001349	0.996774
	Data Offset	0.332651	0.396779	-1.352615

## Analyzer Information

Analyzer make/model	Termo 42i	Analyzer serial #	710321429
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.795		0.819	
NOx coefficient	1.003		1.003	
NO2 coefficient	1.000		1.000	
NO bkgrnd	9.5		10.0	
NOx bkgrnd	9.8		10.2	
Chamber Temp	50	Deg C	49.8	Deg C
Moly Temp	325.5	Deg C	326	Deg C
PMT voltage	NA	V	-784	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	168.6	mmHg	164.1	mmHg
R Cell Press Nox	168.6	mmHg	164.5	mmHg
NO sample flow	0.734	lpm	0.711	lpm
Nox sample Flow	0.734	lpm	0.713	lpm

**Notes:**

Filter changed after As Finds. Long calibrator zero due to THC pump change. Zero and Span with adjustments.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 22, 2015

Station Number:

AMS 15

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.1	-0.3	----	----
as found span	5000	82.3	800.0	800.0	0.0	781.0	778.5	2.5	1.0243	1.0275
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1	----	----
high point	5000	82.3	800.0	800.0	0.0	800.5	798.4	2.1	0.9993	1.0020
second point	5000	41.2	400.5	400.5	0.0	401.7	400.3	1.4	0.9969	1.0005
third point	5000	20.6	200.2	200.2	0.0	199.2	198.5	0.7	1.0054	1.0089
as left zero	5000	0.0	0.0	0.0	0.0	2.9	2.9	0.0	----	----
as left span	5000	82.3	800.0	369.4	430.5	799.3	368.6	430.7	1.0008	1.0022
Average Correction Factor									1.0006	1.0038

Corrected As found  
Previous Response

NO<sub>x</sub>= 781.2  
NO<sub>x</sub>= 800.1

NO= 778.5  
NO= 798.4

Percent Change

NO<sub>x</sub>= 2.4%

NO= 2.6%

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

82.30

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.1			N/A	
1st NO2 (300)	----	369.4	424.1	794.4	369.4	425.0	0.9906	1.0000	0.9979	100.2%
2nd NO2 (200)	----	505.7	287.9	797.7	505.7	292.1	0.9866	1.0000	0.9854	101.5%
3rd NO2 (100)	----	642.8	150.7	796.7	642.8	153.9	0.9878	1.0000	0.9793	102.1%
4th NO2 (0)	793.6	----	4.2	797.7	793.6	4.2	0.9866	1.0000	N/A	----
Average Correction Factor							0.9879	1.0000	0.9875	101.3%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

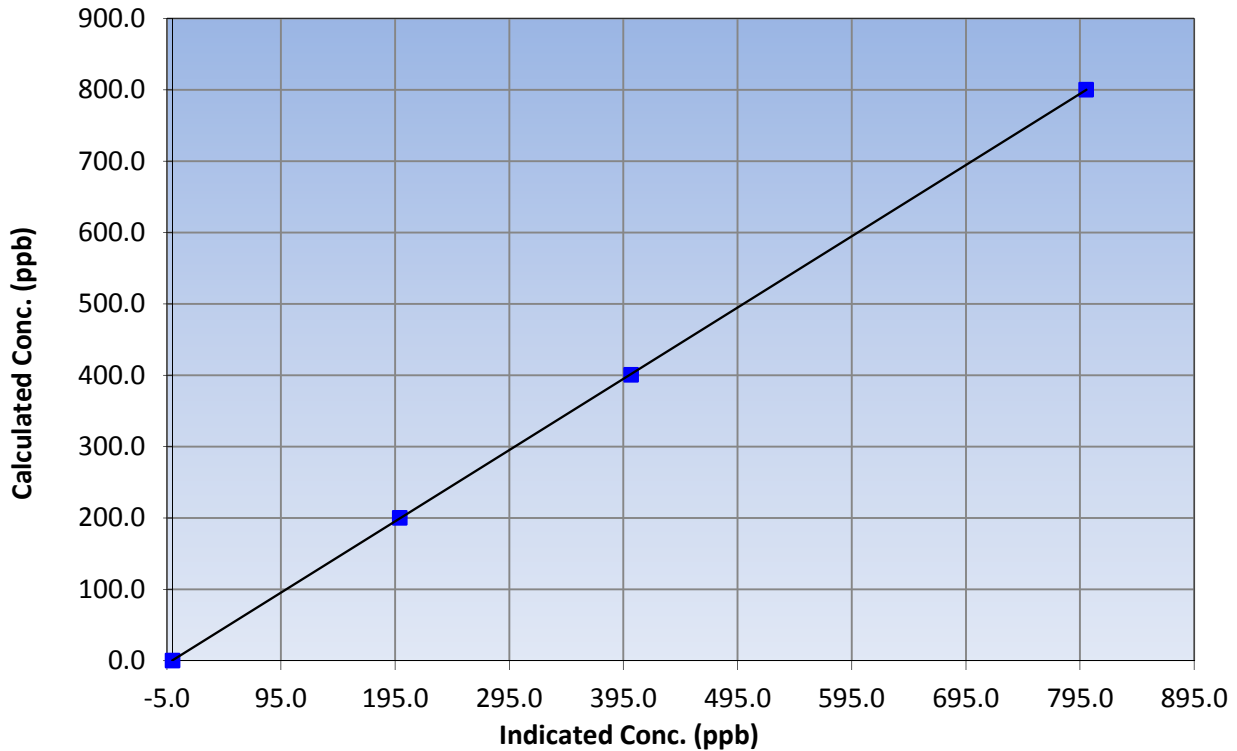
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	15:45
Analyzer make	Termo 42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	----	Correlation Coefficient	0.999994
800.0	800.5	0.9993		
400.5	401.7	0.9969	Slope	0.998595
200.2	199.2	1.0054		
			Intercept	0.332651

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

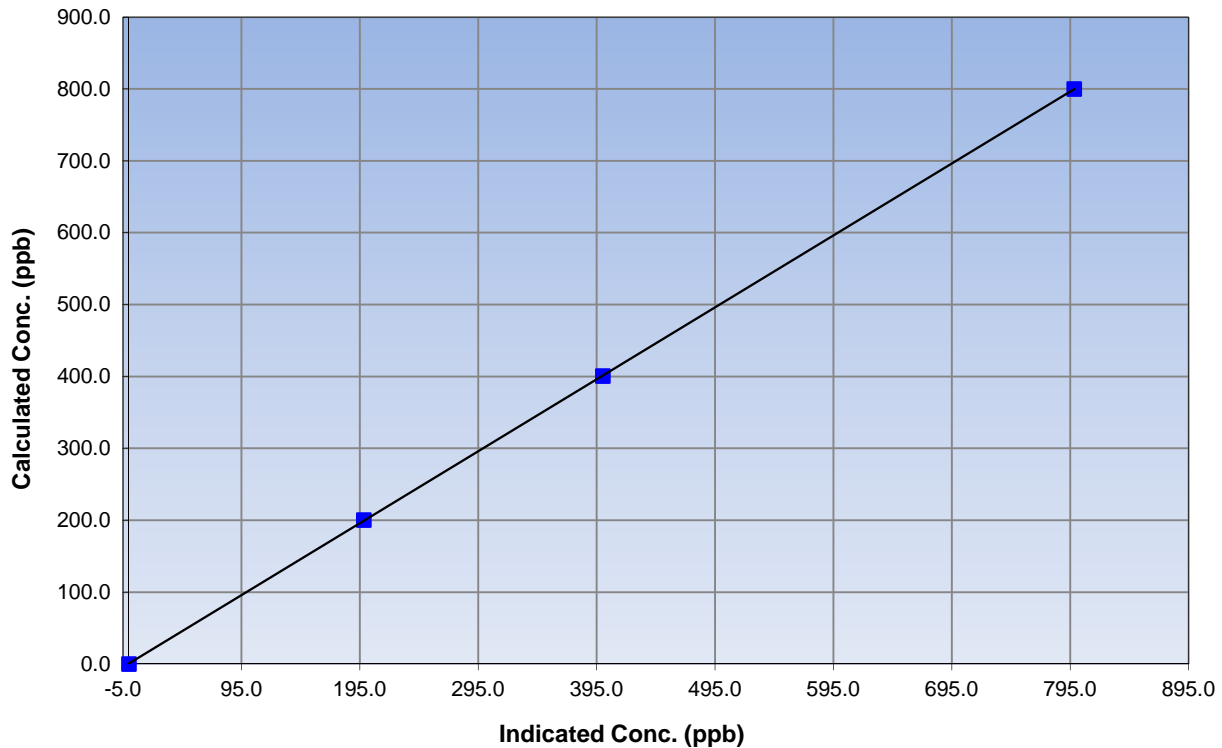
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	15:45
Analyzer make	Termo 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	0.999994
800.0	798.4	1.0020		
400.5	400.3	1.0005	Slope	1.001349
200.2	198.5	1.0089		
			Intercept	0.396779

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

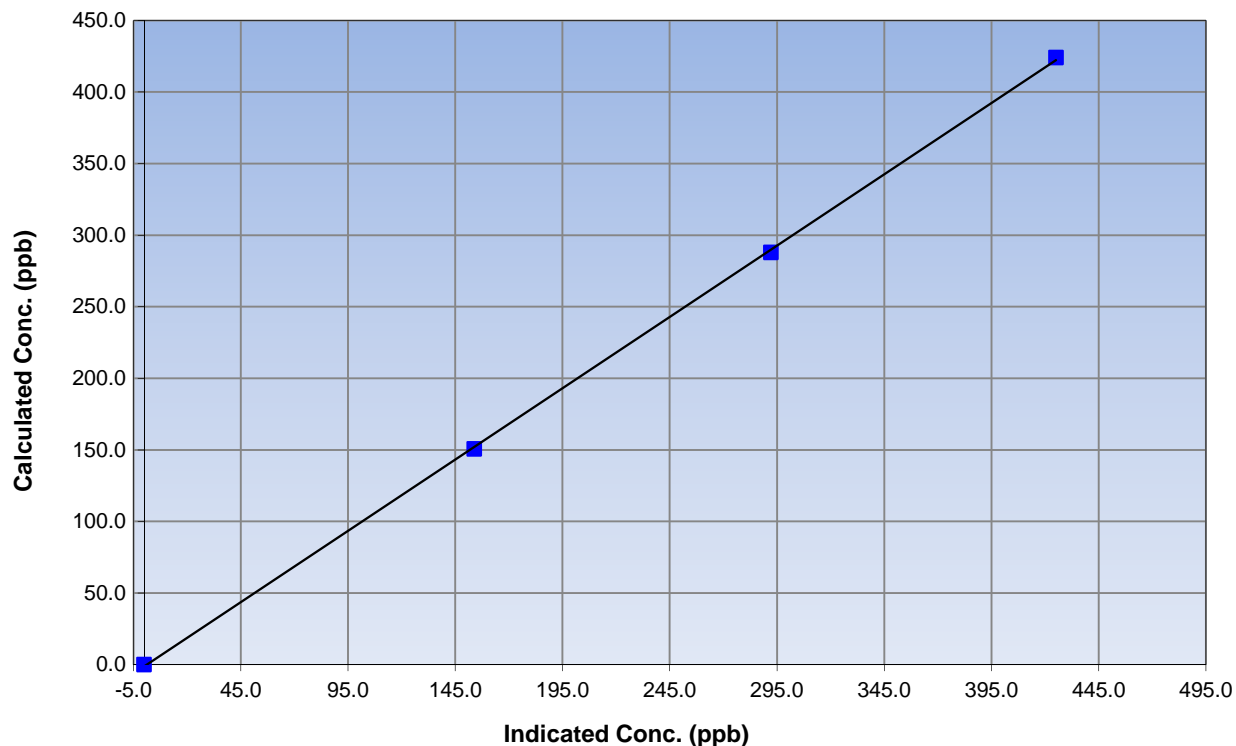
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 25, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	9:45	End Time (MST)	15:45
Analyzer make	Termo 42i	Analyzer serial #	710321429

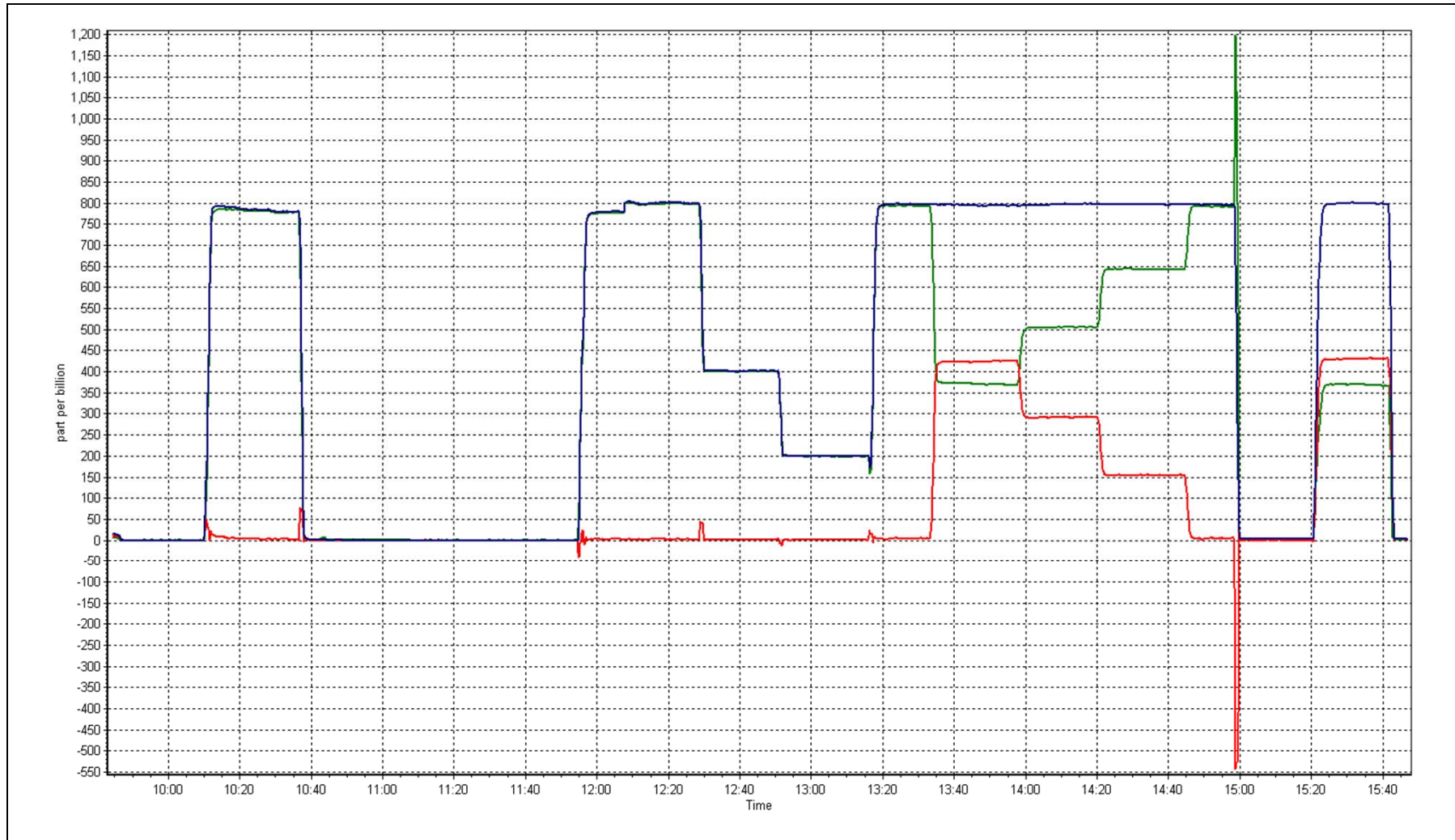
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999887
424.1	425.0	0.9979		
287.9	292.1	0.9854	Slope	0.996774
150.7	153.9	0.9793		
			Intercept	-1.352615

### NO<sub>2</sub> Calibration Curve







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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 16  
SHELL MUSKEG RIVER  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
 APRIL 2015

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	25	0	5	0
THC (ppm) Average	683	37	37	100.00	4.6	-	3.1	-
NO2 (ppb) Average	683	37	37	100.00	42	0	18	-
NO (ppb) Average	683	37	37	100.00	100	-	22	-
NOX (ppb) Average	683	37	37	100.00	138	-	37	-
PM2.5 (ug/m3) Average	718	0	2	99.72	62.3	-	15.2	0
Temperature 2 m (C) Average	720	0	0	100.00	24.8	-	14.9	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	75	-
Barometric Pressure (inHg) Average	720	0	0	100.00	29.2	-	29.2	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	33	-	23	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
 APRIL 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	1	3	-	0	0	0	0	1	2	25
THC (ppm) Average	683	2.29	0.4	-	1.8	2	2.1	2.2	2.4	2.7	4.6
NO2 (ppb) Average	683	7.9	8	-	0	1	2	5	12	19	42
NO (ppb) Average	683	3.8	8	-	0	0	0	0	4	12	100
NOX (ppb) Average	683	11.7	14	-	0	1	2	6	18	29	138
PM2.5 (ug/m3) Average	718	6.52	5.3	-	1	2	3.3	5.2	8.1	11.8	62.3
Temperature 2 m (C) Average	720	4.43	7.9	-	-15.2	-5.3	-1.7	4.5	10.7	14.1	24.8
Relative Humidity (%) Average	720	49.4	20	-	15	26	35	45	63	81	98
Barometric Pressure (inHg) Average	720	28.83	0.2	-	28.1	28.6	28.7	28.8	29	29.2	29.2
Wind Speed 10 m (km/h) Average	720	13	7	-	1	5	8	12	17	22	33
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	10 Apr 2015 14:00	10 Apr 2015 15:00	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: 720	
Maximum Value: 25 ppb on Apr 6 12:00		Maximum Daily Average: 4.5 ppb on Apr 6	
Minimum Value: 0 ppb on Apr 30 04:00		Hours of Data: 683	
Maximum Diurnal Average: 3.3 ppb at hour 11		Hours of Missing Data: 37	
Monthly Average: 1.0 ppb		Hours of Calibration: 37	
Minimum Daily Average: 0.1 ppb on Apr 29		Percent Operational Time: 100.0	
Minimum Diurnal Average: 0.3 ppb at hour 21		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 19	

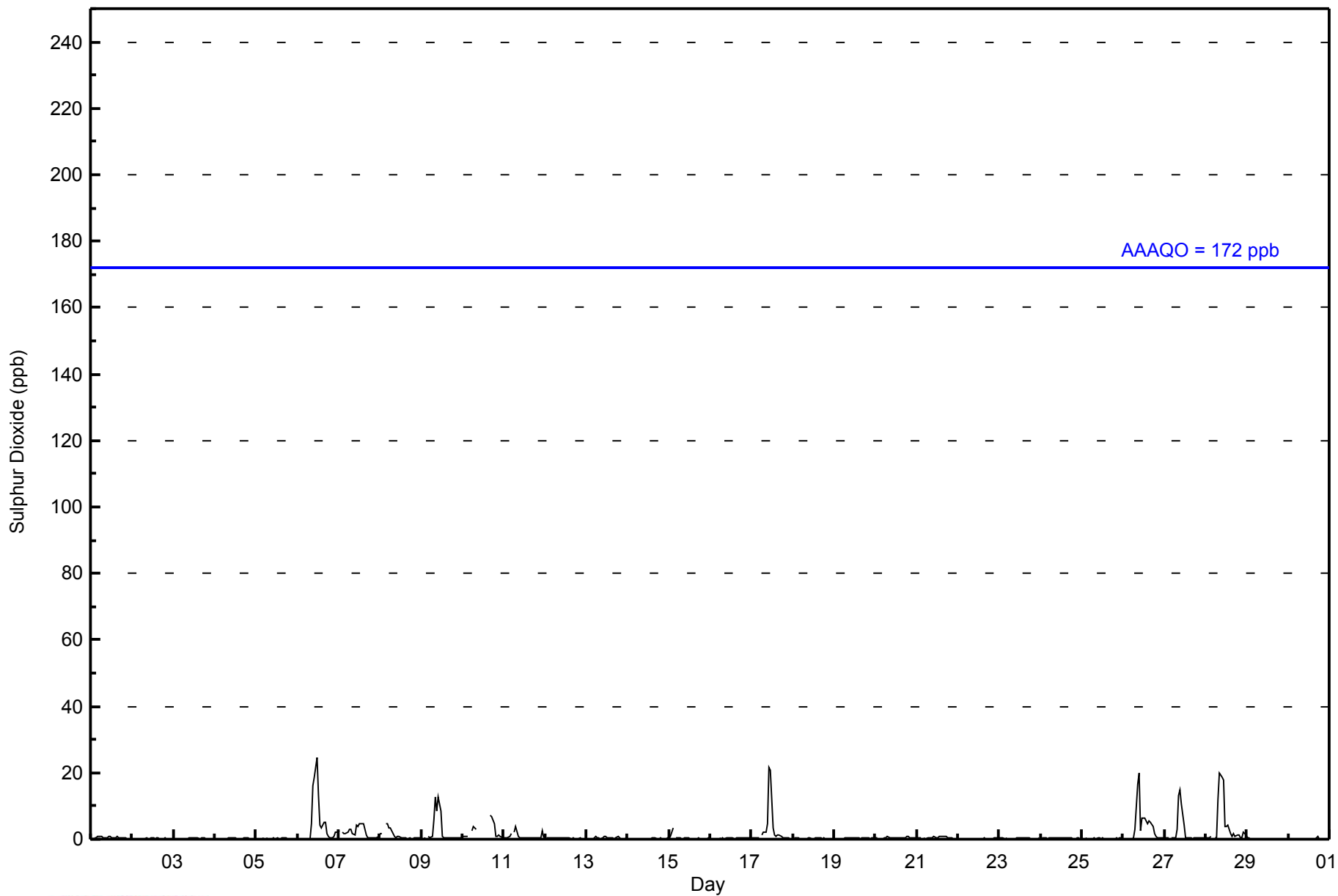
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0	Z	0	1	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0	0	0	0	0	0	0.5	1
2-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
3-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
4-Apr	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	Z	0	0	0	0	0	0	0	4	16	19	25	13	4	3	5	5	2	1	1	1	1	2	2	4.5	25
7-Apr	3	Z	2	2	2	2	3	3	2	1	4	4	5	5	5	3	1	0	0	0	0	0	1	1	2.1	5
8-Apr	2	2	Z	5	5	3	4	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1.3	5
9-Apr	0	0	0	Z	1	1	1	6	13	9	13	9	1	0	0	0	0	0	0	0	0	1	1	1	2.5	13
10-Apr	1	1	1	1	Z	3	4	3	3	C	C	C	C	C	C	C	7	7	4	1	1	1	1	1	--	7
11-Apr	1	1	1	1	2	Z	2	4	1	1	1	0	0	0	0	0	1	0	0	0	0	0	2	0	0.8	4
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Apr	0	Z	0	0	0	1	1	0	0	0	1	1	0	1	1	0	0	0	1	0	0	0	0	0	0.4	1
14-Apr	0	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-Apr	0	1	3	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
16-Apr	0	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-Apr	0	0	0	0	0	Z	1	2	2	5	22	21	3	1	1	1	1	1	1	0	0	0	0	0	2.8	22
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Apr	0	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-Apr	0	0	Z	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0.4	1
21-Apr	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0.4	1
22-Apr	0	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-Apr	0	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-Apr	Z	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
25-Apr	0	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-Apr	0	0	Z	0	0	0	0	3	17	20	3	6	6	6	5	6	5	4	2	1	1	0	0	0	3.7	20
27-Apr	0	0	0	Z	0	0	0	3	13	15	11	4	1	1	0	0	0	0	0	0	0	0	0	0	2.3	15
28-Apr	0	0	0	1	Z	0	0	12	20	19	18	4	4	4	2	1	2	1	1	1	0	0	2	1	4.1	20
29-Apr	0	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-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1
																								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 (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	666	97.51	97.51
11 - 20	14	2.05	99.56
21 - 60	3	0.44	100.00
61 - 110	0	0.00	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - April 2015**

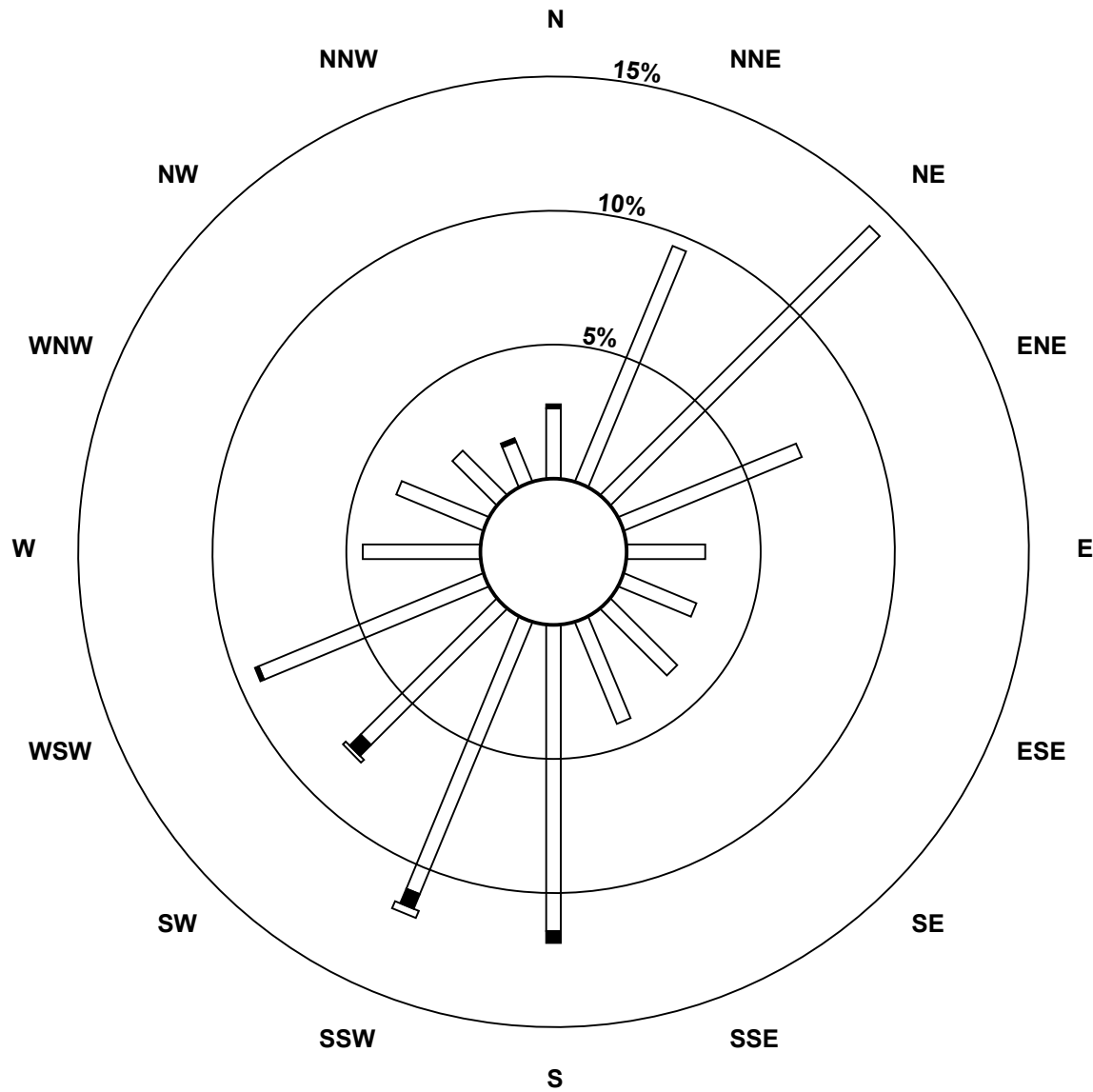
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	18	65	97	49	20	20	24	28	78	75	49	62	30	24	16	11	666
11 - 20	1	0	0	0	0	0	0	0	3	4	4	1	0	0	0	1	14
21 - 60	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	65	97	49	20	20	24	28	81	81	54	63	30	24	16	12	683

Total Number of Valid Hours: 683

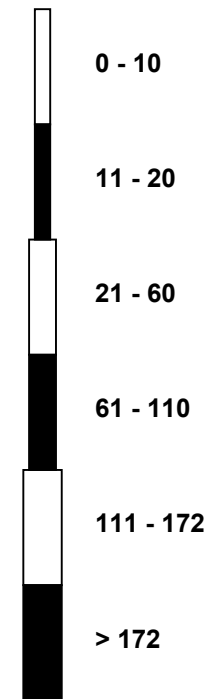
Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)**



**Classes (ppb)**

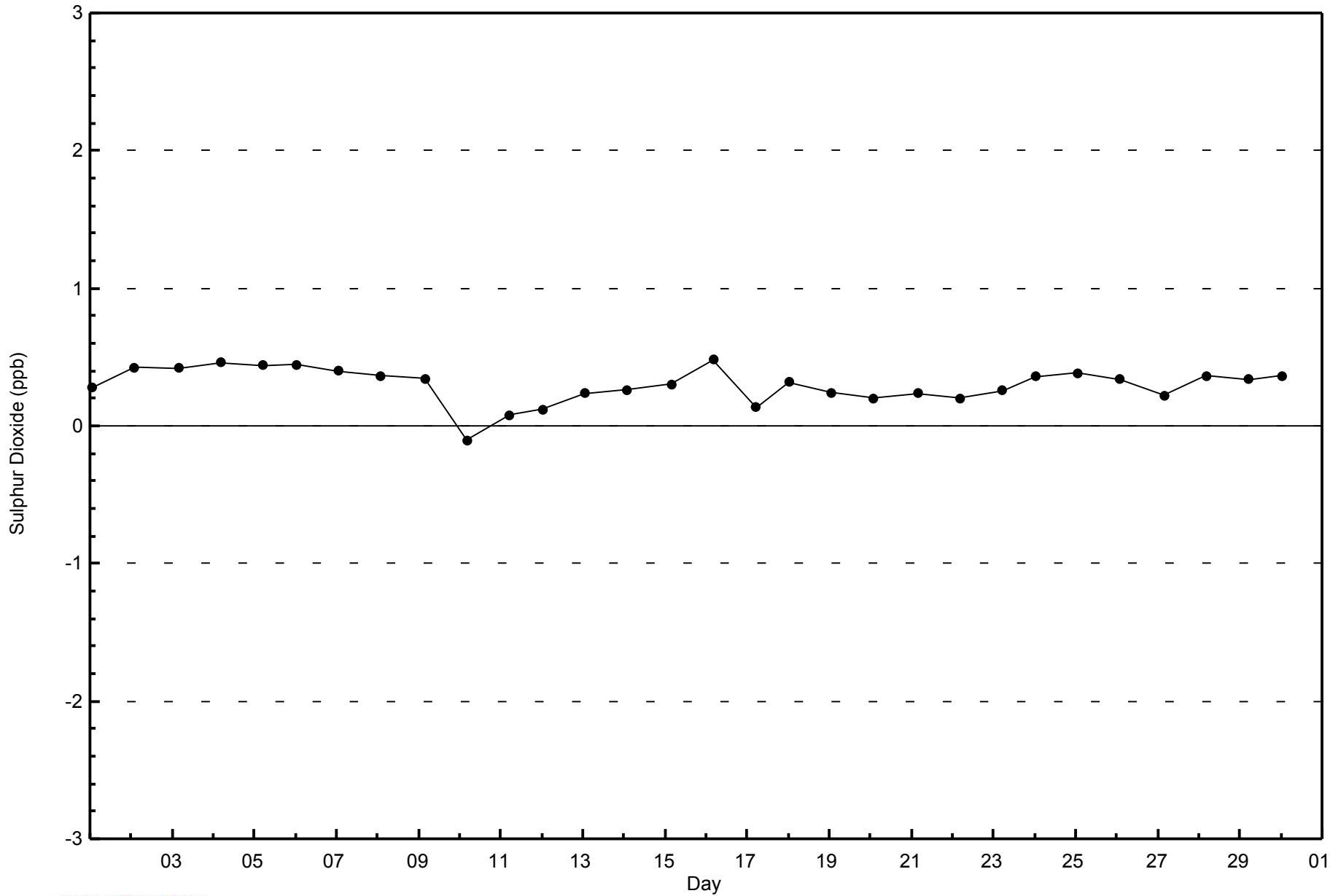


**Total Number of Valid Hours: 683**



WBEA  
Zero Responses

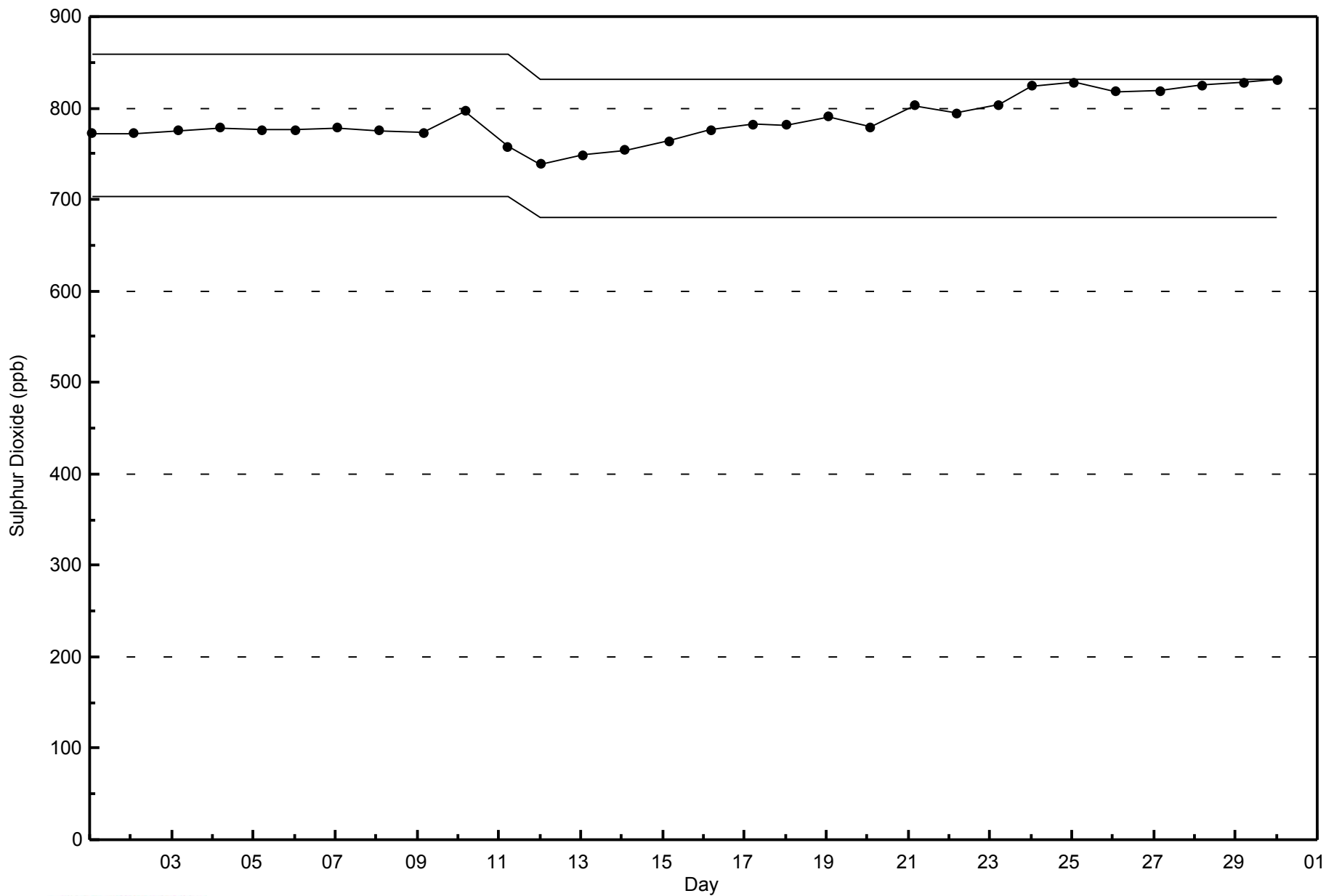
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River - April 2015





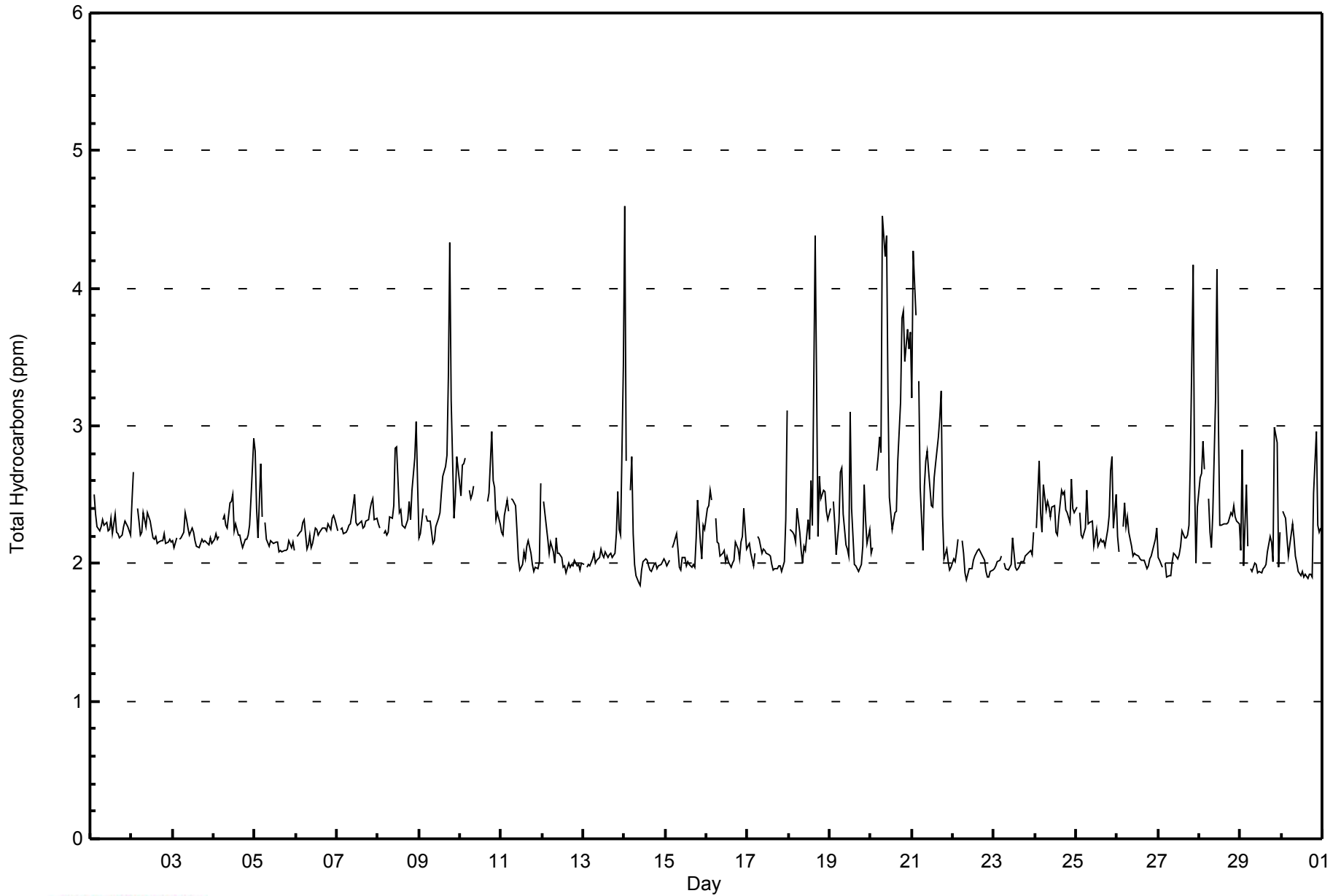
Maximum Value: 4.6 ppm on Apr 14 01:00																				Maximum Daily Average: 3.1 ppm on Apr 20					Hours in Service: 720		
Minimum Value: 1.8 ppm on Apr 14 10:00																				Minimum Daily Average: 2.0 ppm on Apr 22					Hours of Data: 683		
Maximum Diurnal Average: 2.4 ppm at hour 21																				Minimum Diurnal Average: 2.2 ppm at hour 15					Hours of Missing Data: 37		
Monthly Average: 2.29 ppm																				Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.1 Median = 2.2 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 2.7 P <sub>99</sub> = 4.2					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-Apr	2.5	Z	2.5	2.4	2.3	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.4	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.3	2.3	2.5
2-Apr	2.4	2.7	Z	2.4	2.3	2.2	2.2	2.4	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.7
3-Apr	2.2	2.1	2.2	Z	2.2	2.2	2.2	2.4	2.3	2.3	2.2	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.2	2.4	
4-Apr	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.5	2.9	2.3	2.9	
5-Apr	2.8	2.4	2.2	2.7	2.3	Z	2.3	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.8	
6-Apr	Z	2.2	2.2	2.2	2.3	2.3	2.1	2.1	2.2	2.1	2.1	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.3	2.2	2.4	
7-Apr	2.2	Z	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.3	2.3	2.3	2.5	
8-Apr	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.8	2.8	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.3	2.5	2.8	3.0	2.6	2.4	3.0	
9-Apr	2.2	2.2	2.4	Z	2.4	2.3	2.3	2.2	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.7	2.8	3.4	4.3	3.2	2.3	2.5	2.8	2.7	2.6	4.3	
10-Apr	2.5	2.7	2.7	2.8	Z	2.5	2.5	2.5	2.6	C	C	C	C	C	C	C	2.4	2.5	3.0	2.6	2.6	2.3	2.4	2.3	--	3.0	
11-Apr	2.2	2.2	2.4	2.5	2.4	Z	2.5	2.5	2.4	2.2	2.0	2.0	2.0	2.1	2.0	2.1	2.2	2.1	2.0	1.9	2.0	2.0	2.0	2.6	2.2	2.6	
12-Apr	Z	2.5	2.3	2.2	2.1	2.2	2.1	2.0	2.2	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5	
13-Apr	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.0	2.1	2.2	2.5	2.3	2.2	3.4	2.1	3.4	
14-Apr	4.6	2.7	Z	2.5	2.8	2.2	2.0	1.9	1.9	1.8	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	4.6	
15-Apr	2.0	2.0	2.0	Z	2.1	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	2.5	2.2	2.0	2.3	2.1	2.5	
16-Apr	2.4	2.4	2.5	2.5	Z	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.2	2.2	2.4	2.1	2.2	2.5	
17-Apr	2.1	2.1	2.1	2.0	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.3	3.1	2.1	3.1	
18-Apr	Z	2.3	2.2	2.2	2.2	2.4	2.2	2.1	2.0	2.1	2.1	2.3	2.2	2.6	2.3	4.4	3.3	2.2	2.6	2.5	2.5	2.5	2.4	2.3	2.4	4.4	
19-Apr	2.4	Z	2.4	2.3	2.1	2.3	2.7	2.7	2.4	2.1	2.1	2.1	3.1	2.4	2.0	2.0	2.0	1.9	2.0	2.1	2.6	2.3	2.1	2.2	2.3	3.1	
20-Apr	2.1	2.1	Z	2.7	2.8	2.9	2.8	4.5	4.2	4.4	3.2	2.5	2.3	2.3	2.4	2.4	2.7	3.2	3.8	3.8	3.5	3.7	3.6	3.7	3.1	4.5	
21-Apr	3.2	4.3	3.8	Z	3.3	2.6	2.1	2.6	2.7	2.8	2.7	2.4	2.4	2.6	2.7	2.9	3.1	3.3	2.3	2.0	2.1	2.0	2.0	2.0	2.7	4.3	
22-Apr	2.0	2.0	2.1	2.2	Z	2.2	2.1	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.2	
23-Apr	2.0	2.0	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.2	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.2	2.0	2.2	
24-Apr	Z	2.3	2.7	2.4	2.2	2.6	2.4	2.5	2.4	2.3	2.4	2.4	2.2	2.2	2.3	2.5	2.5	2.5	2.4	2.4	2.3	2.6	2.4	2.4	2.4	2.7	
25-Apr	2.4	Z	2.4	2.2	2.2	2.3	2.5	2.3	2.3	2.3	2.1	2.2	2.3	2.1	2.2	2.2	2.2	2.1	2.3	2.4	2.7	2.8	2.3	2.5	2.3	2.8	
26-Apr	2.2	2.1	Z	2.3	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.3	2.1	2.4	
27-Apr	2.0	2.0	2.0	Z	2.0	1.9	1.9	1.9	2.0	2.1	2.1	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.8	4.2	2.6	2.0	2.4	2.2	4.2
28-Apr	2.6	2.7	2.9	2.7	Z	2.5	2.2	2.1	2.4	3.2	4.1	3.0	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.3	2.3	2.3	2.5	4.1
29-Apr	2.1	2.8	2.0	2.6	2.1	Z	2.0	1.9	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.2	2.2	2.0	3.0	2.9	2.0	2.2	2.2	3.0	
30-Apr	Z	2.4	2.3	2.2	2.1	2.1	2.3	2.2	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.5	3.0	2.3	2.2	2.3	2.1	3.0	
																								Diurnal Average			
																								Diurnal Maximum			
2.4 2.4 2.3 2.3 2.3 2.3 2.2 2.3 2.3 2.3 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.3 2.3 2.4 2.3 2.3 2.4 2.1 2.4																											
4.6 4.3 3.8 2.8 3.3 2.9 2.8 4.5 4.2 4.4 4.1 3.0 3.1 2.6 2.7 4.4 3.3 3.4 4.3 3.8 4.2 3.7 3.6 3.7 2.1 4.6																											
Z - zerospan C - Calibration																											





**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	161	23.57	23.57
2.1 - 3.0	493	72.18	95.75
3.1 - 10.0	29	4.25	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - April 2015**

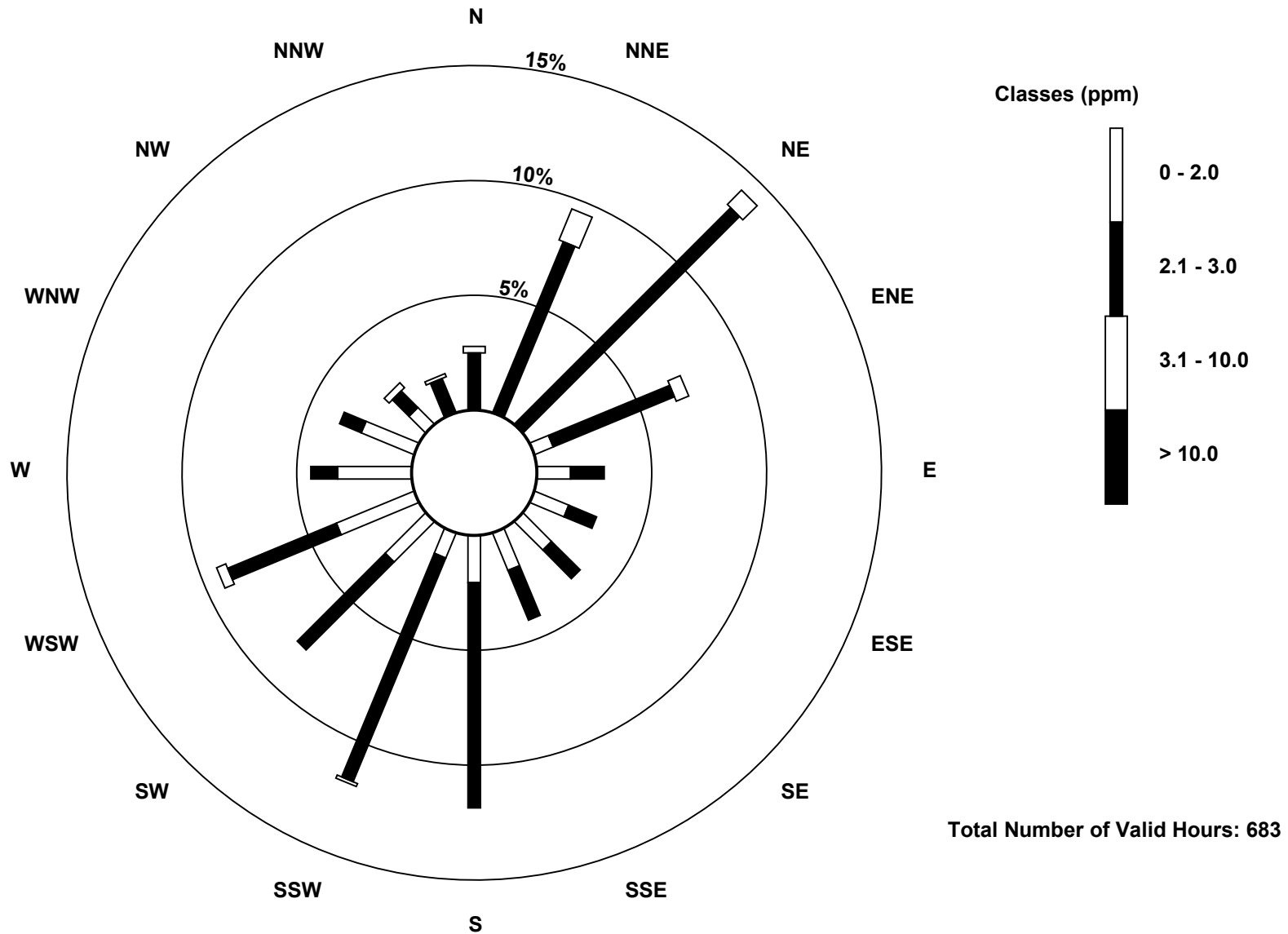
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	6	10	11	12	12	14	8	17	25	22	17	7	0	161
2.1 - 3.0	17	55	91	39	10	9	12	16	67	72	37	35	8	7	7	11	493
3.1 - 10.0	2	10	6	4	0	0	0	0	0	1	0	3	0	0	2	1	29
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	65	97	49	20	20	24	28	81	81	54	63	30	24	16	12	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

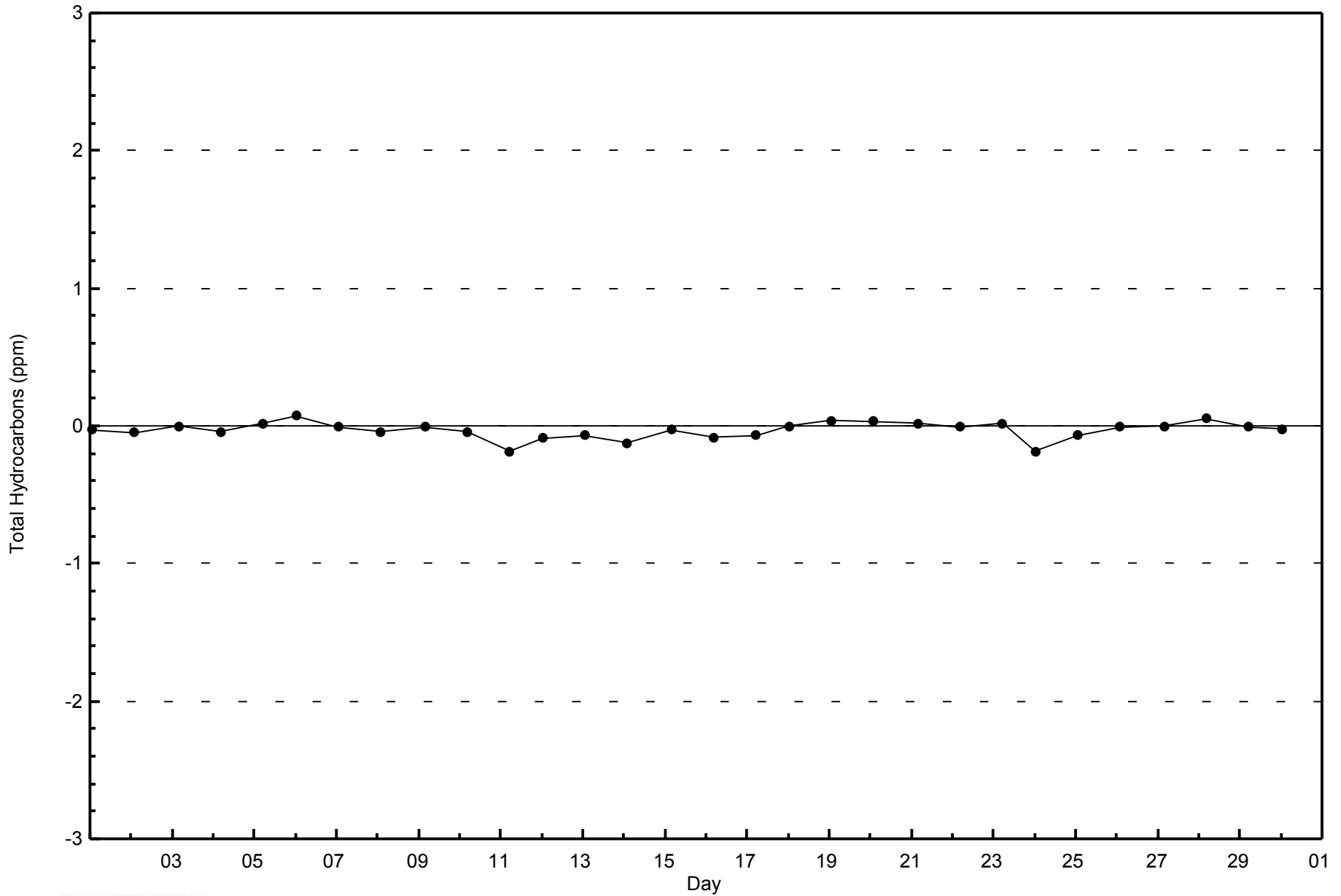
Total Hydrocarbons (THC) - ppm  
Shell Muskeg River (AMS 16)





WBEA  
Zero Responses

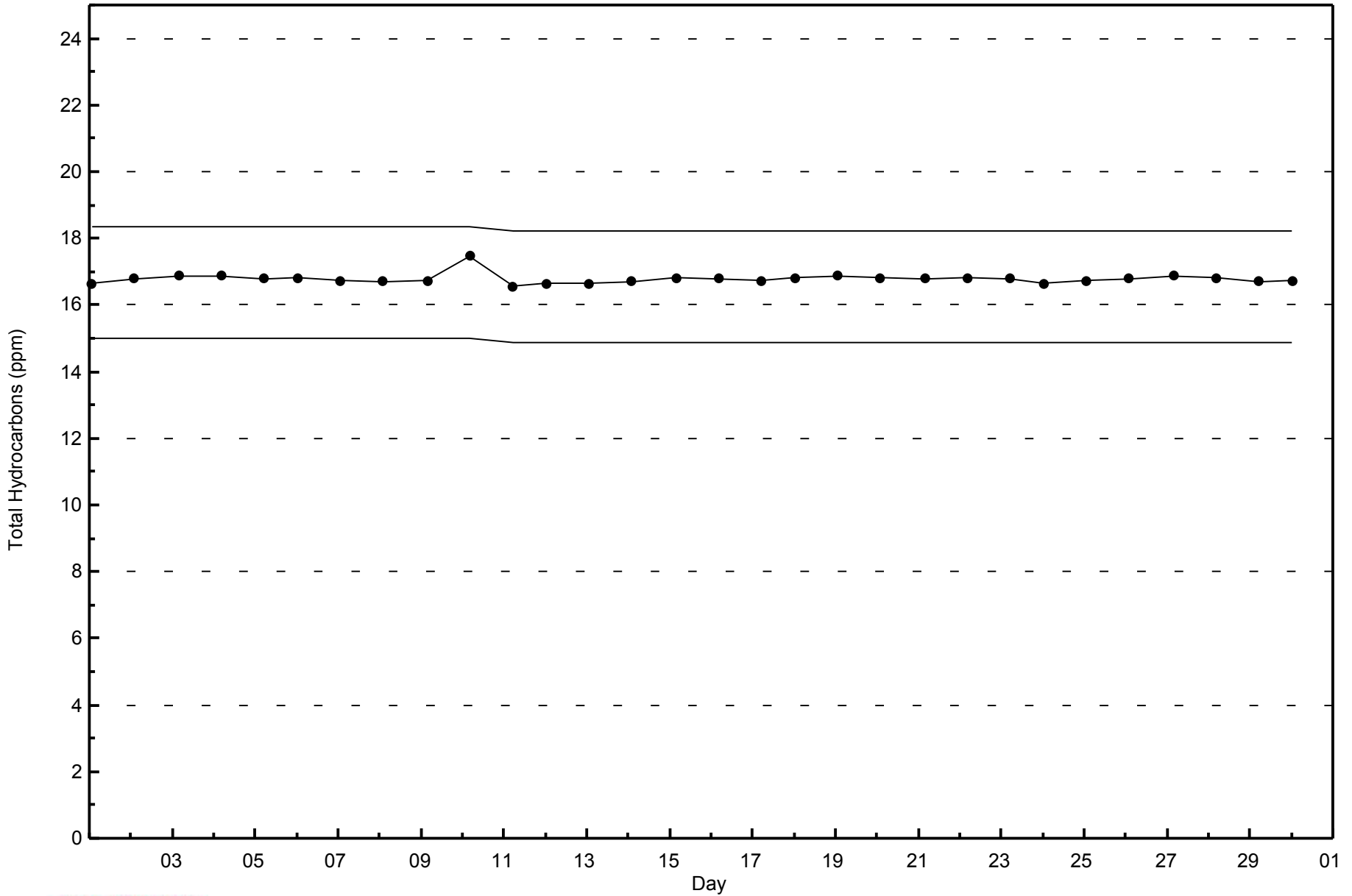
Total Hydrocarbons (THC) - ppm  
Shell Muskeg River - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Shell Muskeg River - April 2015





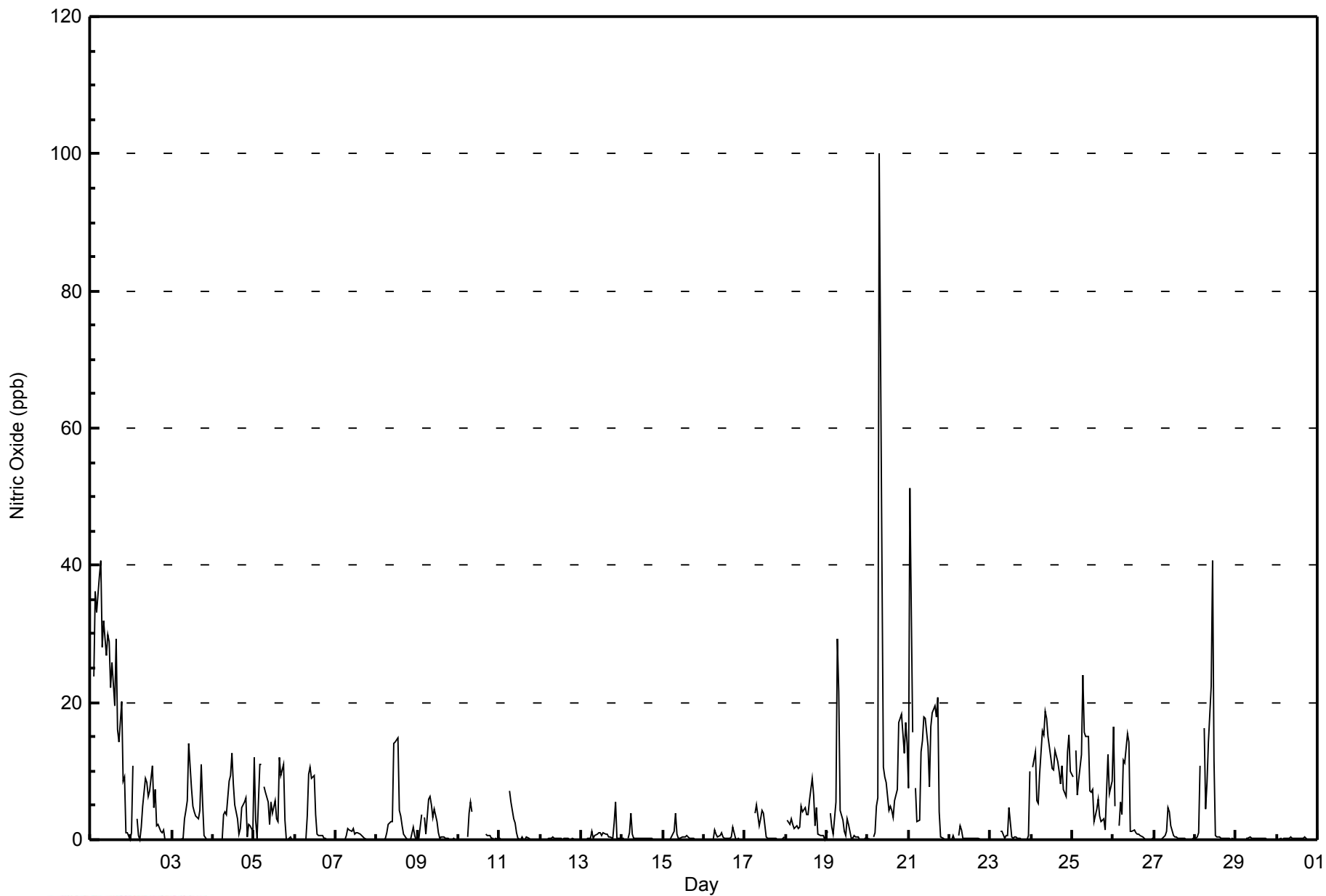
Maximum Value: 100 ppb on Apr 20 08:00																		Maximum Daily Average: 21.8 ppb on Apr 1						Hours in Service: 720		
Minimum Value: 0 ppb on Apr 2 06:00																		Minimum Daily Average: 0.1 ppb on Apr 29						Hours of Data: 683		
Maximum Diurnal Average: 9.1 ppb at hour 8																		Minimum Diurnal Average: 1.5 ppb at hour 23						Hours of Missing Data: 37		
Monthly Average: 3.8 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 4 P <sub>90</sub> = 12 P <sub>99</sub> = 35						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-Apr	15	Z	24	36	33	39	41	28	32	27	30	29	22	26	20	29	16	14	20	9	9	1	1	0	21.8	41
2-Apr	1	11	Z	3	1	0	2	5	9	8	6	7	11	5	7	2	2	1	1	2	0	0	0	0	3.6	11
3-Apr	0	0	0	Z	0	0	0	3	4	6	14	8	5	4	3	3	4	11	5	1	0	0	0	0	3.1	14
4-Apr	0	0	0	0	Z	0	4	4	4	8	9	13	8	5	3	1	2	5	6	6	0	2	2	1	3.6	13
5-Apr	12	3	0	11	11	Z	8	7	5	2	5	4	6	3	3	12	9	11	3	0	0	0	0	0	5.0	12
6-Apr	Z	0	0	0	0	0	0	3	9	11	9	9	4	1	1	1	1	0	0	0	0	0	0	0	2.1	11
7-Apr	0	Z	0	0	0	0	1	2	1	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0.5	2
8-Apr	0	0	Z	0	0	0	1	2	3	3	14	14	15	4	3	2	1	0	0	0	0	2	1	0	2.8	15
9-Apr	0	0	4	Z	3	1	6	6	5	3	4	3	1	0	0	0	0	0	0	0	0	0	0	0	1.7	6
10-Apr	0	0	0	0	Z	0	4	5	4	C	C	C	C	C	C	C	1	1	1	0	0	0	0	0	--	5
11-Apr	0	0	0	0	0	Z	7	5	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	7
12-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
13-Apr	0	Z	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0	2	5	0	0	0	0.8	5
14-Apr	0	0	Z	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	4
15-Apr	0	0	0	Z	0	0	1	4	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	4
16-Apr	0	0	0	0	Z	0	2	1	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0.4	2
17-Apr	0	0	0	0	0	Z	4	5	2	3	4	4	0	0	0	0	0	0	0	0	0	0	0	0	1.1	5
18-Apr	Z	3	2	3	2	2	2	2	2	5	4	5	4	4	6	9	7	2	5	1	1	1	1	0	3.0	9
19-Apr	1	Z	4	2	1	6	29	22	4	3	1	1	3	2	0	0	1	0	0	0	0	0	0	0	3.5	29
20-Apr	0	0	Z	0	1	5	6	100	39	11	9	8	4	5	4	3	6	7	17	18	18	13	17	14	13.4	100
21-Apr	8	51	16	Z	7	3	3	13	14	18	18	14	8	16	19	19	18	21	4	0	0	0	0	0	11.7	51
22-Apr	0	0	1	0	Z	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
23-Apr	0	0	0	0	0	Z	1	1	0	1	1	5	0	0	0	0	0	0	0	0	0	1	10	0.9	10	
24-Apr	Z	11	13	6	5	10	16	15	19	18	15	12	10	10	13	11	10	8	11	7	6	13	15	10	11.5	19
25-Apr	9	Z	13	7	9	13	24	16	15	15	7	7	7	3	5	6	4	3	3	1	7	12	7	9	8.7	24
26-Apr	16	5	Z	2	5	4	12	11	16	14	1	1	1	1	1	1	1	0	0	0	0	0	0	0	4.1	16
27-Apr	0	0	0	Z	0	0	1	1	5	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.7	5
28-Apr	0	0	1	11	Z	16	5	8	14	22	41	12	1	0	0	0	0	0	0	0	0	0	0	0	5.8	41
29-Apr	0	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-Apr	Z	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
																		Diurnal Average		Diurnal Maximum						
																		2.6		16						
																		3.4		51						
																		3.1		24						
																		3.3		36						
																		3.2		33						
																		4.1		39						
																		6.1		41						
																		9.1		100						
																		7.1		39						
																		6.5		27						
																		7.0		41						
																		5.5		29						
																		3.9		22						
																		3.3		26						
																		3.2		20						
																		3.6		29						
																		2.8		18						
																		3.0		21						
																		2.6		20						
																		1.6		18						
																		1.6		18						
																		1.5		13						
																		1.5		17						
																		1.5		14						

Z - zerspan C - Calibration



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Shell Muskeg River - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	661	96.78	96.78
21 - 40	18	2.64	99.41
41 - 80	3	0.44	99.85
81 - 159	1	0.15	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - April 2015**

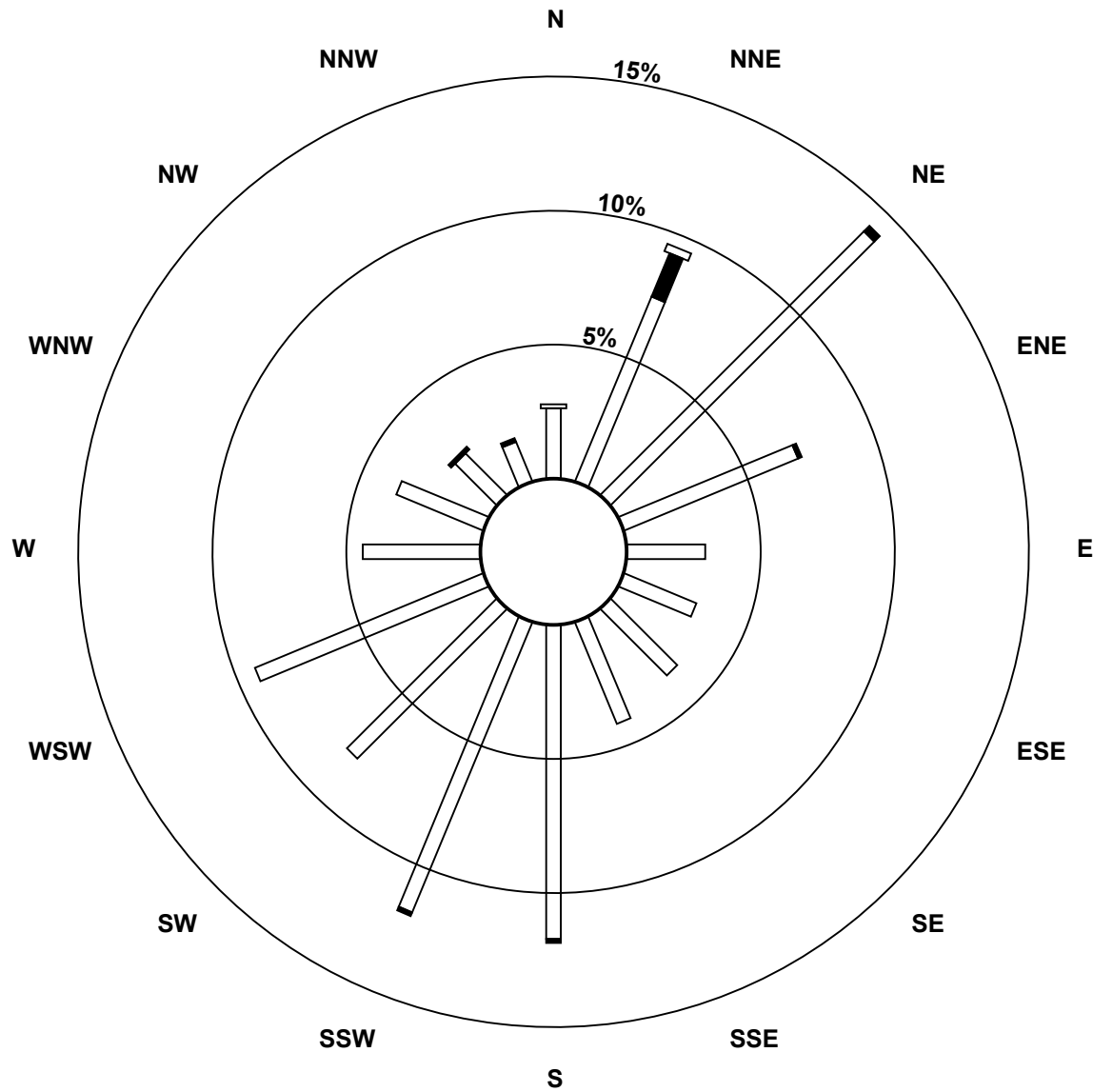
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	18	51	95	48	20	20	24	28	80	80	54	63	30	24	15	11	661
21 - 40	0	12	2	1	0	0	0	0	1	1	0	0	0	0	0	1	18
11 - 80	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	65	97	49	20	20	24	28	81	81	54	63	30	24	16	12	683

Total Number of Valid Hours: 683

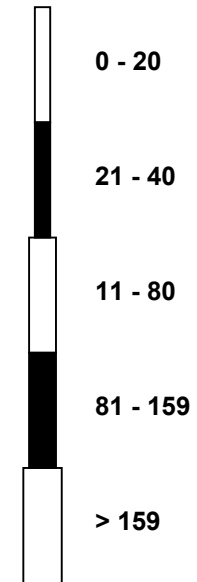
Total Number of Hours: 720

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

**Nitric Oxide (NO) - ppb  
Shell Muskeg River (AMS 16)**



Classes (ppb)

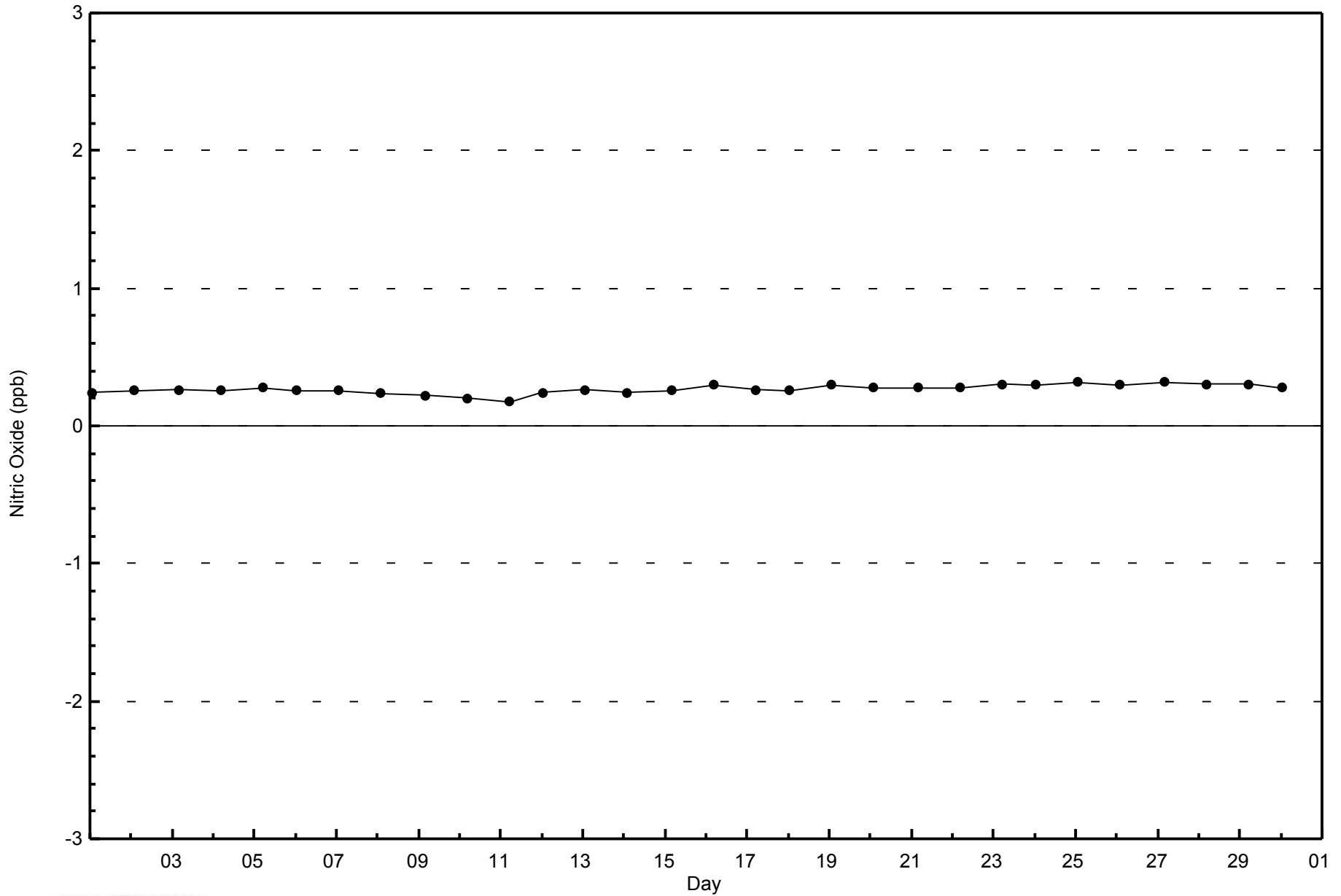


**Total Number of Valid Hours: 683**



WBEA  
Zero Responses

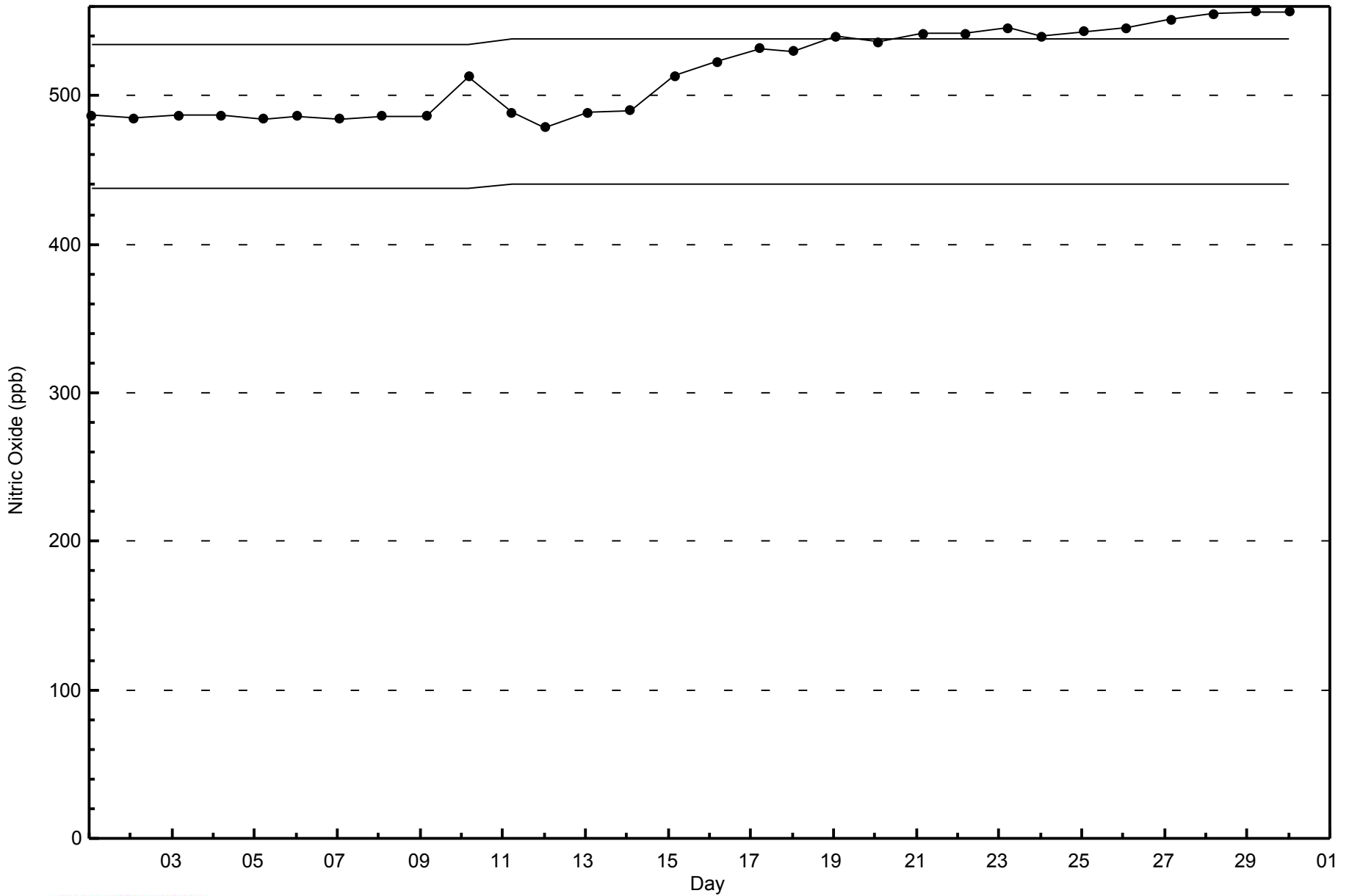
Nitric Oxide (NO) - ppb  
Shell Muskeg River - April 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Shell Muskeg River - April 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

Shell Muskeg River - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 42 ppb on Apr 28 11:00	Maximum Daily Average: 17.6 ppb on Apr 20		Hours of Data:	683
Minimum Value: 0 ppb on Apr 12 23:00	Minimum Daily Average: 0.7 ppb on Apr 12		Hours of Missing Data:	37
Maximum Diurnal Average: 11.7 ppb at hour 5	Minimum Diurnal Average: 3.7 ppb at hour 15		Hours of Calibration:	37
Monthly Average: 7.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 5 Q <sub>3</sub> = 12 P <sub>90</sub> = 19 P <sub>99</sub> = 35		Percent Operational Time:	100.0

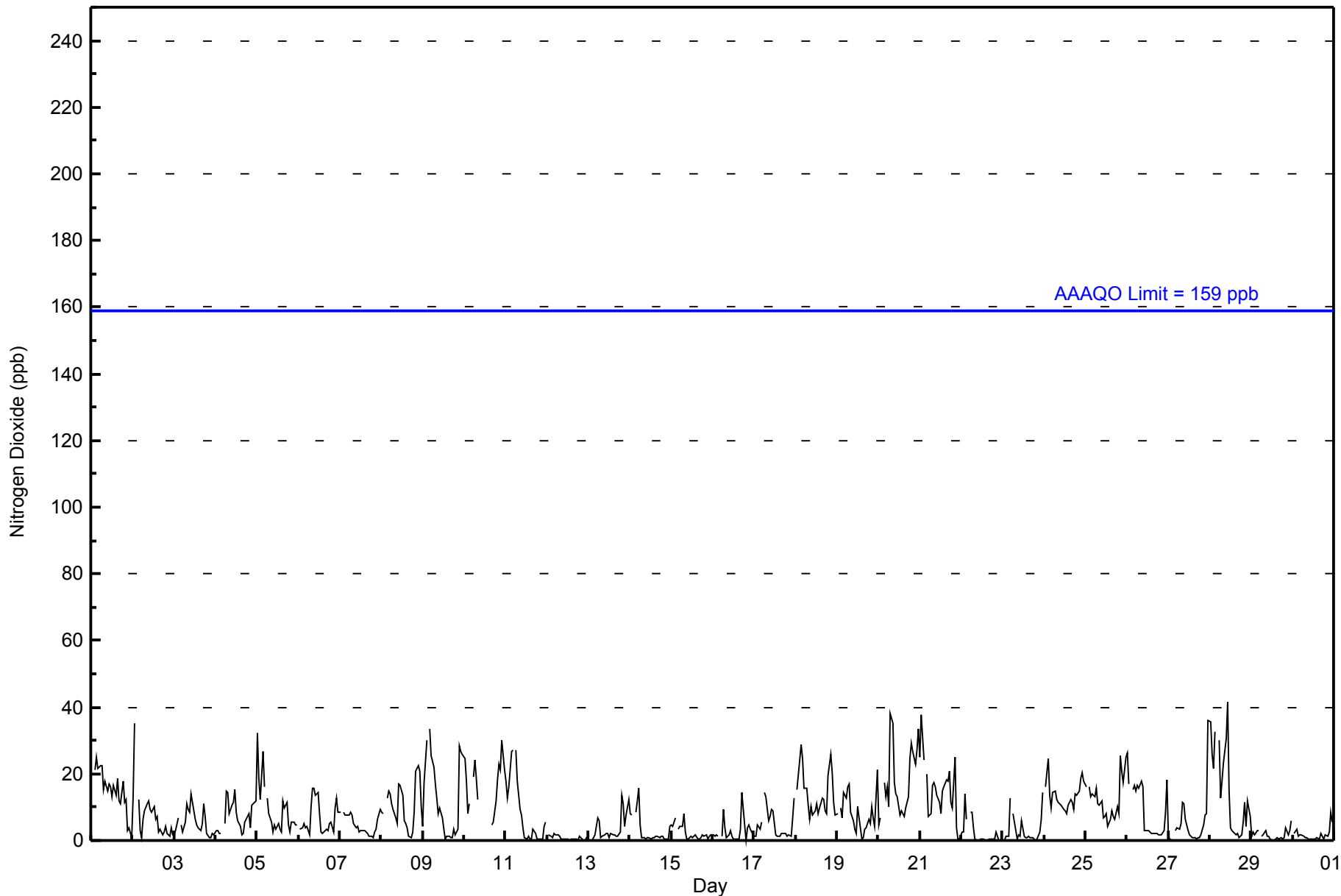
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Apr	18	Z	21	25	22	23	22	15	18	15	17	16	13	17	13	19	12	11	18	12	12	3	4	1	15.1	25																							
2-Apr	13	35	Z	12	3	1	6	9	11	12	9	8	10	6	7	3	3	2	2	4	2	1	4	2	7.2	35																							
3-Apr	2	3	7	Z	5	3	5	11	9	8	14	9	6	5	4	3	5	11	7	2	1	1	2	2	5.4	14																							
4-Apr	3	3	2	2	Z	5	15	15	8	11	11	15	9	6	4	2	2	6	7	8	4	11	11	12	7.4	15																							
5-Apr	32	19	12	27	16	Z	13	8	5	3	5	4	5	3	4	3	12	10	11	5	3	5	5	5	9.3	32																							
6-Apr	Z	3	4	5	4	4	2	10	16	16	14	14	8	3	2	3	3	3	5	6	2	10	13	8	6.8	16																							
7-Apr	8	Z	9	8	8	8	8	8	5	4	4	3	3	3	3	3	2	1	1	1	2	3	6	9	4.8	9																							
8-Apr	8	8	Z	13	15	14	11	9	7	5	17	17	14	6	5	4	1	1	3	8	21	22	21	10	10.4	22																							
9-Apr	4	17	30	Z	34	25	22	17	13	8	10	7	3	0	1	1	1	1	4	2	3	28	27	26	12.3	34																							
10-Apr	24	18	8	11	Z	19	24	19	12	C	C	C	C	C	C	C	5	6	12	18	23	21	30	21	--	30																							
11-Apr	18	13	16	27	27	Z	27	18	9	8	4	1	1	1	0	1	4	2	0	1	1	0	4	5	8.1	27																							
12-Apr	Z	2	1	1	2	2	2	1	1	0	0	1	0	0	0	1	0	0	0	1	1	0	0	1	0.7	2																							
13-Apr	0	Z	0	1	2	7	6	1	1	2	2	2	1	2	2	2	1	1	3	13	11	4	8	12	3.7	13																							
14-Apr	8	8	Z	9	12	16	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	4	3.2	16																							
15-Apr	5	4	7	Z	4	4	4	8	2	1	0	1	1	1	1	2	0	1	1	2	1	2	0	1	2	2.3	8																						
16-Apr	2	1	2	1	Z	1	10	4	1	2	3	1	0	0	1	1	4	15	5	0	4	5	3	2	2.9	15																							
17-Apr	1	1	5	3	6	Z	15	13	6	7	9	9	2	1	1	1	2	2	2	1	2	1	7	13	4.8	15																							
18-Apr	Z	15	24	29	25	16	16	11	6	10	8	9	11	8	10	13	12	9	8	20	26	20	12	8	14.1	29																							
19-Apr	8	Z	10	7	14	13	16	17	9	6	3	2	10	7	1	1	3	4	6	5	10	7	4	21	8.0	21																							
20-Apr	5	7	Z	18	13	16	10	38	35	17	14	13	8	9	8	7	10	13	25	29	27	23	27	33	17.6	38																							
21-Apr	25	38	24	Z	20	7	8	17	18	16	14	12	8	15	16	18	18	21	11	10	25	4	0	1	14.9	38																							
22-Apr	3	3	14	7	Z	8	8	4	0	0	0	0	0	0	0	0	0	0	1	1	2	1	0	0	2.3	14																							
23-Apr	0	0	1	1	13	Z	8	6	0	2	1	6	1	1	1	1	1	1	0	0	0	3	6	14	3.0	14																							
24-Apr	Z	16	24	14	10	14	15	12	11	11	11	9	9	8	11	12	11	10	14	14	15	19	21	18	13.4	24																							
25-Apr	16	Z	16	13	14	13	16	11	11	12	7	7	8	4	7	9	7	6	10	8	26	21	17	25	12.3	26																							
26-Apr	26	17	Z	15	17	15	16	16	18	16	3	3	3	3	2	2	2	2	2	2	2	3	9	18	9.2	26																							
27-Apr	1	1	0	Z	3	4	3	5	11	11	7	3	2	1	1	1	1	1	1	2	5	8	8	36	5.0	36																							
28-Apr	36	26	22	33	Z	30	13	18	23	30	42	15	4	3	2	2	2	2	1	2	6	11	4	12	7	14.9	42																						
29-Apr	1	3	2	3	3	Z	1	2	3	1	1	1	0	0	0	1	1	1	0	1	4	2	3	6	1.7	6																							
30-Apr	Z	2	3	1	2	2	1	1	1	1	0	1	0	0	1	1	2	1	1	2	1	3	9	5	1.7	9																							
																								10.7	10.4	10.6	11.4	11.7	10.8	10.9	10.7	9.1	8.1	7.9	6.5	4.9	4.0	3.7	4.2	4.3	4.8	5.2	6.0	8.3	7.8	9.1	10.9	Diurnal Average	
																								36	38	30	33	34	30	27	38	35	30	42	17	14	17	16	19	18	21	25	29	27	28	30	36	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	624	91.36	91.36
21 - 40	58	8.49	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - April 2015**

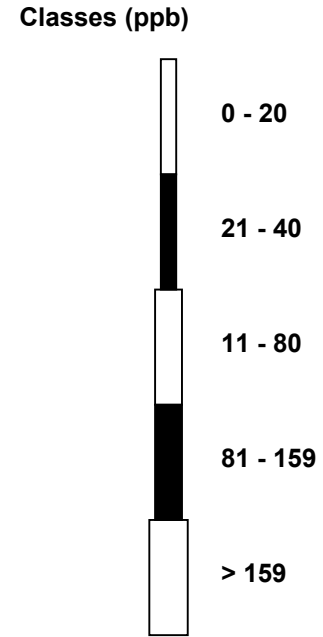
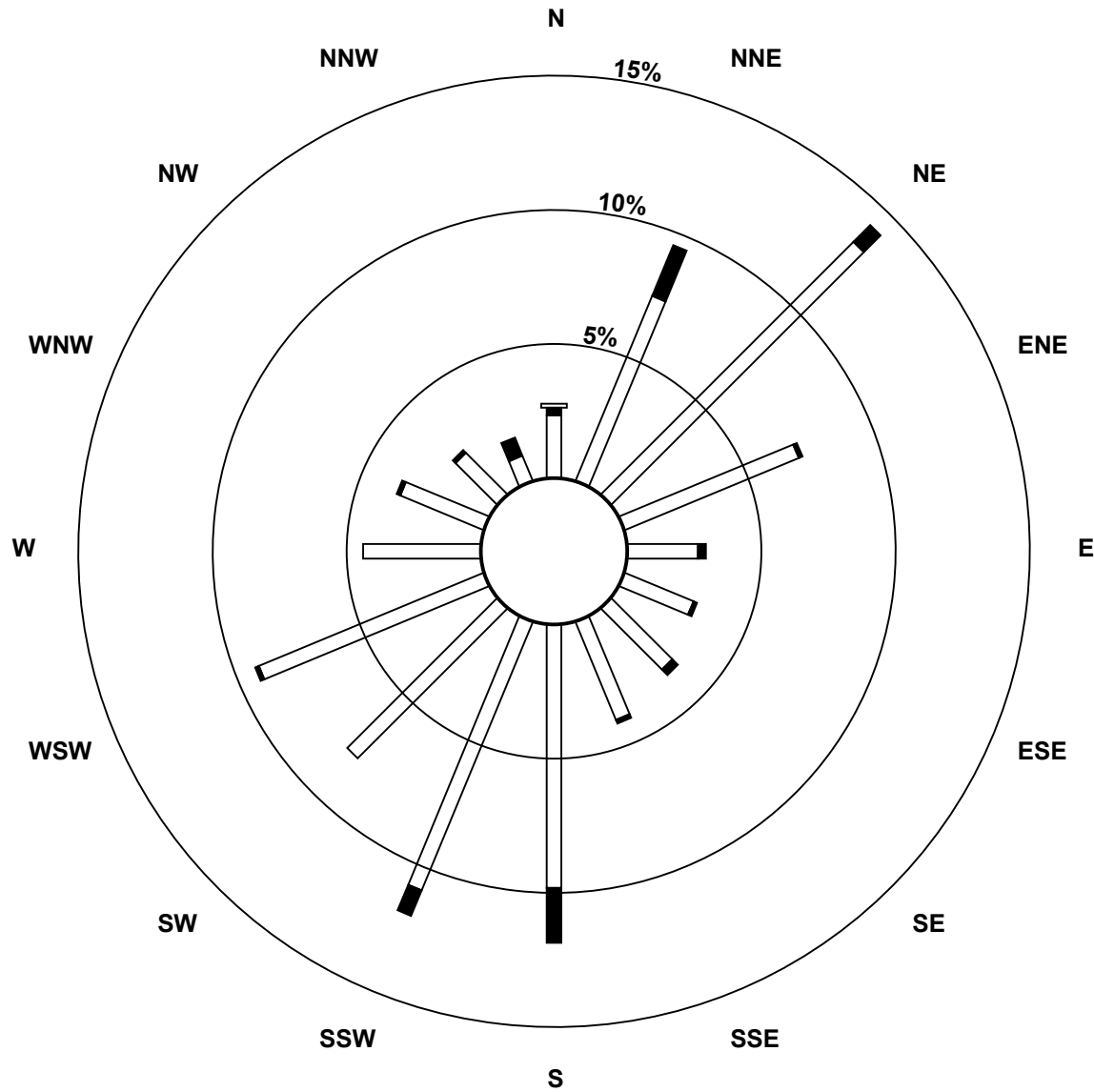
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	16	51	91	48	18	19	22	27	67	74	54	62	30	23	15	7	624
21 - 40	2	14	6	1	2	1	2	1	14	7	0	1	0	1	1	5	58
11 - 80	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	65	97	49	20	20	24	28	81	81	54	63	30	24	16	12	683

Total Number of Valid Hours: 683

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)

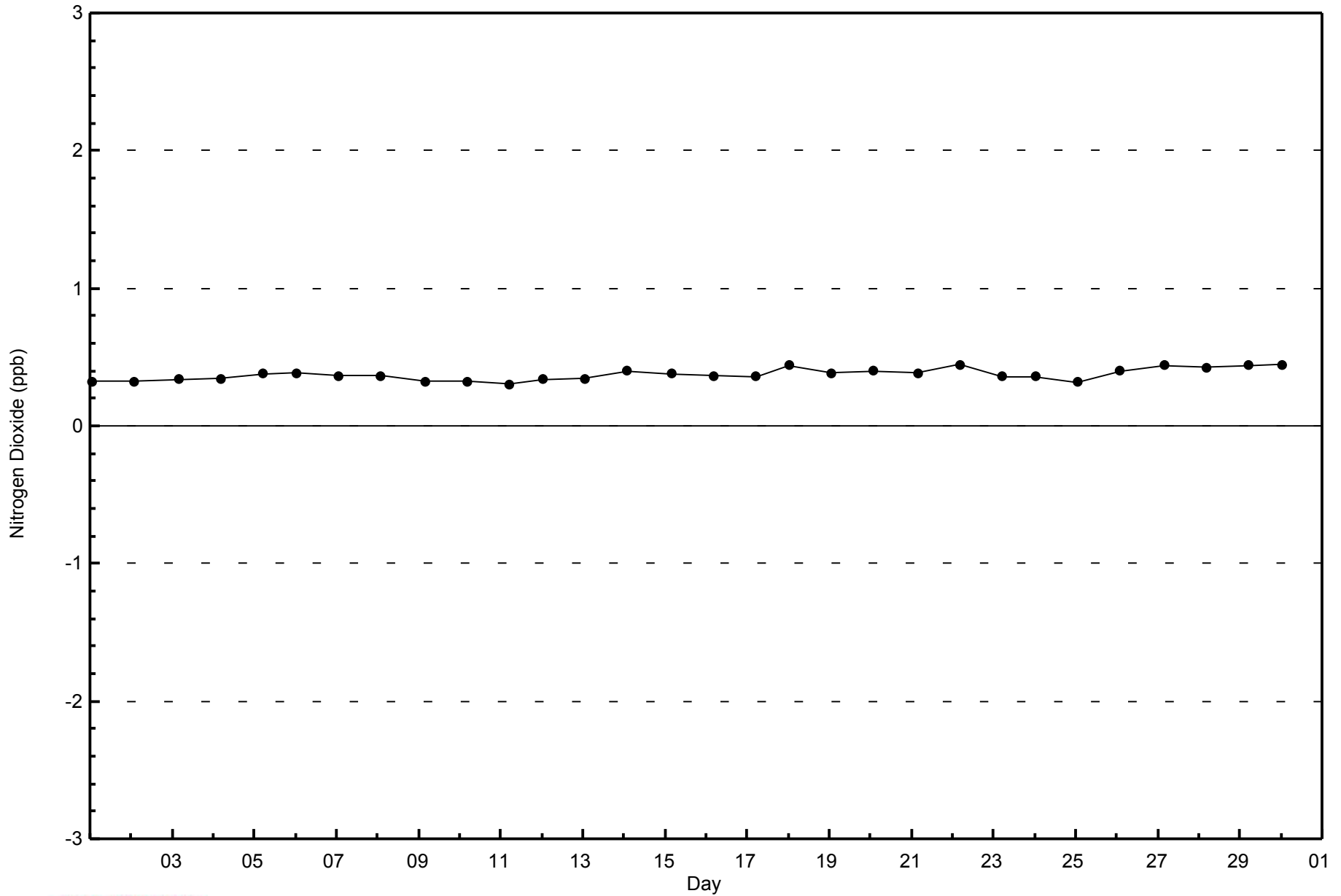


Total Number of Valid Hours: 683



WBEA  
Zero Responses

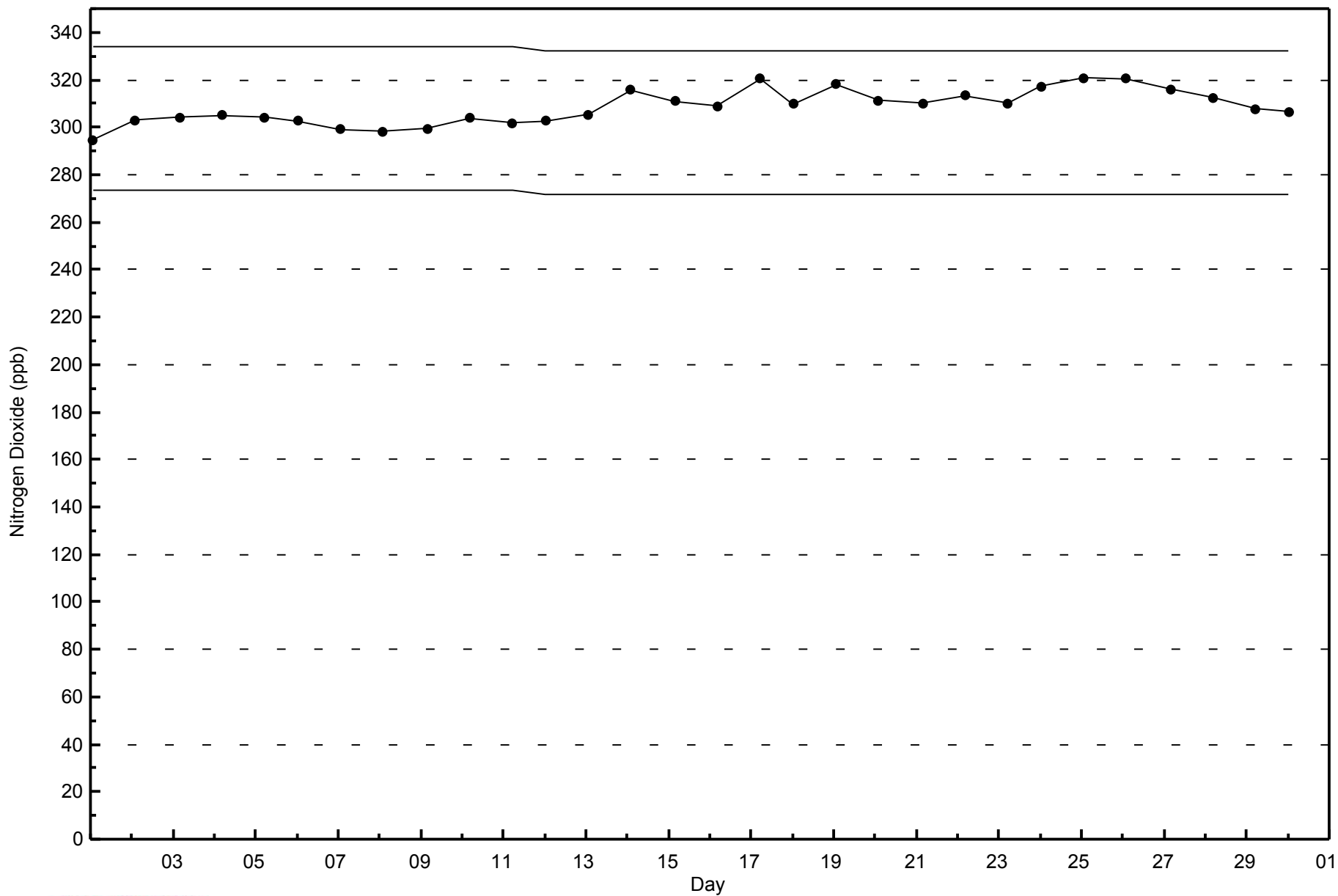
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River - April 2015



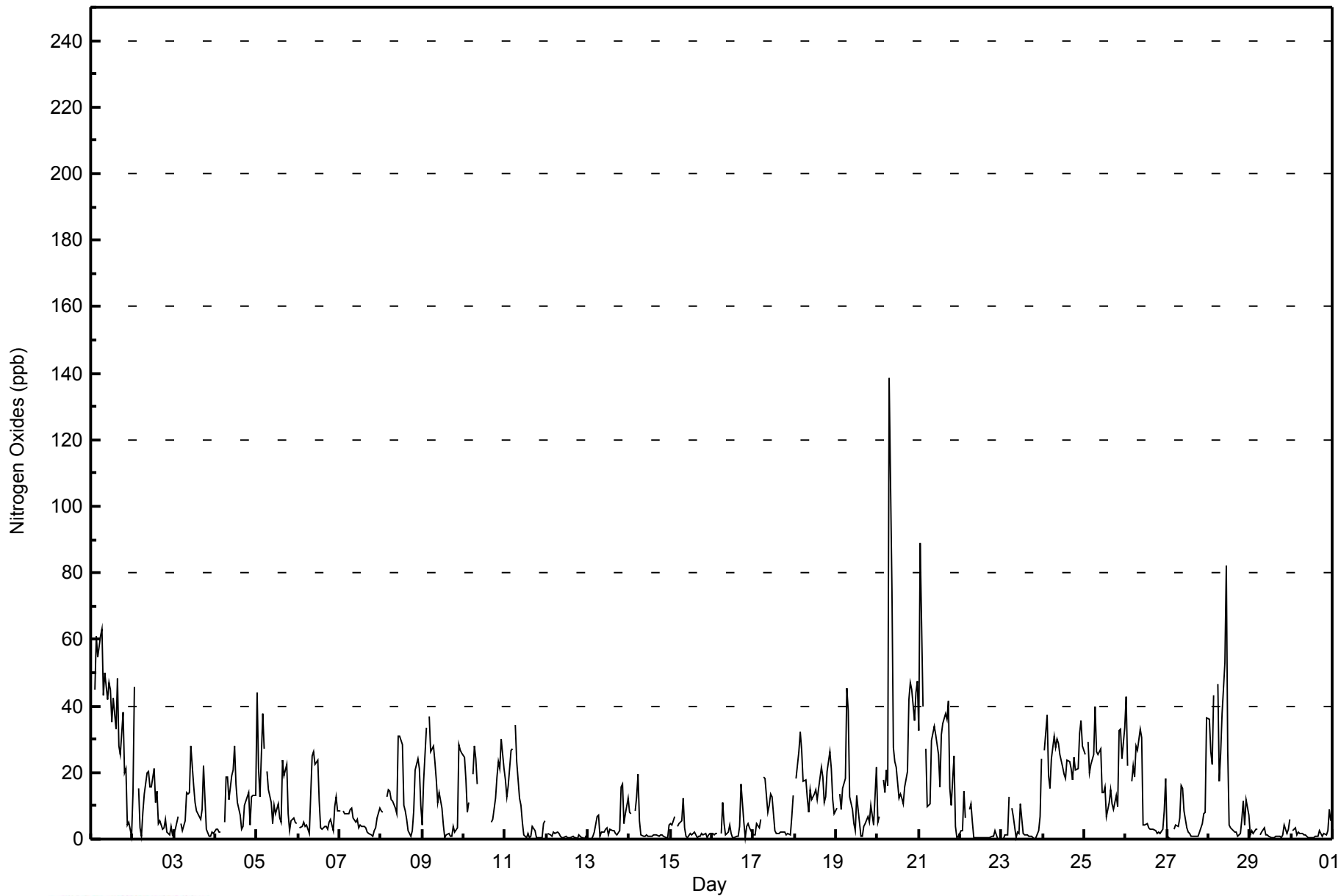


Maximum Value: 138 ppb on Apr 20 08:00																			Maximum Daily Average: 36.8 ppb on Apr 1						Hours in Service: 720		
Minimum Value: 0 ppb on Apr 22 23:00																			Minimum Daily Average: 0.9 ppb on Apr 12						Hours of Data: 683		
Maximum Diurnal Average: 19.8 ppb at hour 8																			Minimum Diurnal Average: 6.9 ppb at hour 15						Hours of Missing Data: 37		
Monthly Average: 11.7 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 6 Q <sub>3</sub> = 18 P <sub>90</sub> = 29 P <sub>99</sub> = 61						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-Apr	34	Z	45	61	55	61	63	43	50	42	47	45	35	42	33	48	28	25	38	20	21	4	5	1	36.8	63	
2-Apr	14	46	Z	15	3	1	8	14	20	20	16	16	21	11	15	5	5	3	3	6	2	1	4	1	10.9	46	
3-Apr	2	3	7	Z	5	3	6	14	13	14	28	16	11	8	7	6	9	22	12	3	1	1	2	2	8.5	28	
4-Apr	3	3	2	2	Z	5	19	19	12	19	21	28	17	11	7	3	4	10	13	14	4	13	13	13	11.1	28	
5-Apr	44	21	13	38	27	Z	20	15	11	5	10	8	11	6	5	24	19	22	8	2	5	6	5	5	14.4	44	
6-Apr	Z	3	4	5	4	4	2	14	25	26	22	24	12	3	3	4	4	3	5	6	2	10	13	8	8.9	26	
7-Apr	8	Z	9	8	8	8	9	9	6	5	6	4	4	4	4	3	2	2	1	1	2	3	6	9	5.3	9	
8-Apr	8	8	Z	13	15	14	12	11	9	8	31	31	28	10	8	6	2	1	3	8	21	24	21	10	13.2	31	
9-Apr	4	17	34	Z	37	26	28	23	18	11	14	9	4	1	1	2	1	1	4	2	3	28	27	26	14.0	37	
10-Apr	25	18	8	11	Z	20	28	24	16	C	C	C	C	C	C	C	5	6	12	19	23	21	30	21	--	30	
11-Apr	18	13	16	27	27	Z	35	23	12	10	5	1	1	2	0	1	4	3	0	1	1	0	5	5	9.1	35	
12-Apr	Z	2	1	1	2	2	2	2	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	1	0.9	2	
13-Apr	0	Z	0	1	2	7	7	1	2	2	3	3	1	3	3	3	2	1	3	16	17	5	8	12	4.4	17	
14-Apr	8	8	Z	9	13	20	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	4	3.6	20	
15-Apr	5	4	7	Z	4	5	5	12	3	1	0	2	1	1	2	2	0	1	1	2	1	2	0	1	2	2.8	12
16-Apr	2	1	2	1	Z	2	11	5	1	2	4	2	0	1	1	1	4	16	5	0	4	5	4	2	3.2	16	
17-Apr	1	1	5	3	6	Z	18	18	8	10	14	13	2	2	2	2	2	2	2	1	2	1	7	13	5.9	18	
18-Apr	Z	18	26	32	27	17	18	12	8	15	12	14	15	12	15	22	19	11	13	20	26	21	12	8	17.1	32	
19-Apr	9	Z	14	9	15	18	45	39	13	9	5	3	13	9	1	1	4	5	7	5	10	7	4	22	11.5	45	
20-Apr	5	7	Z	18	14	21	16	138	75	28	23	21	12	14	12	10	16	21	42	47	45	35	44	47	31.0	138	
21-Apr	33	89	40	Z	27	10	11	30	32	34	31	25	16	31	35	38	36	42	15	10	25	4	0	1	26.7	89	
22-Apr	3	3	15	7	Z	9	10	5	1	0	0	1	1	0	0	0	0	1	1	1	2	1	0	0	2.6	15	
23-Apr	0	0	1	1	13	Z	9	7	0	2	2	10	2	1	1	1	1	1	0	0	0	3	7	24	3.9	24	
24-Apr	Z	27	37	19	15	24	31	27	30	29	26	21	19	18	24	23	21	18	25	21	21	32	36	28	24.9	37	
25-Apr	25	Z	29	20	23	26	40	26	26	27	14	14	15	7	11	15	11	9	13	10	33	33	24	33	21.0	40	
26-Apr	43	22	Z	17	22	19	28	27	33	30	4	4	4	4	3	3	3	2	2	2	2	3	9	18	13.2	43	
27-Apr	1	1	0	Z	3	4	4	6	16	15	9	4	2	2	1	1	1	1	1	2	5	8	8	36	5.7	36	
28-Apr	36	26	23	43	Z	46	17	26	38	53	82	27	4	4	2	2	2	1	2	6	11	4	12	7	20.7	82	
29-Apr	1	3	2	3	3	Z	1	2	3	1	1	1	0	0	1	1	1	1	1	1	1	4	2	3	6	1.8	6
30-Apr	Z	2	3	1	2	2	1	1	1	1	0	1	1	0	1	1	3	2	1	2	1	3	9	5	1.9	9	
																								Diurnal Average			
																								Diurnal Maximum			
13.3 13.8 13.7 14.7 14.9 14.9 17.0 19.8 16.2 14.5 14.9 12.0 8.8 7.2 6.9 7.8 7.1 7.8 7.8 7.6 9.9 9.3 10.6 12.4																											
44 89 45 61 55 61 63 138 75 53 82 45 35 42 35 48 36 42 42 47 45 35 44 47																											
Z - zerospan C - Calibration																											



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	537	78.62	78.62
21 - 40	117	17.13	95.75
41 - 80	26	3.81	99.56
81 - 159	3	0.44	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - April 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	17	63	44	18	19	21	26	62	68	49	62	30	23	14	7	537
21 - 40	4	32	30	4	2	1	3	1	17	13	5	1	0	1	1	2	117
11 - 80	0	15	4	1	0	0	0	1	2	0	0	0	0	0	0	3	26
81 - 159	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	65	97	49	20	20	24	28	81	81	54	63	30	24	16	12	683

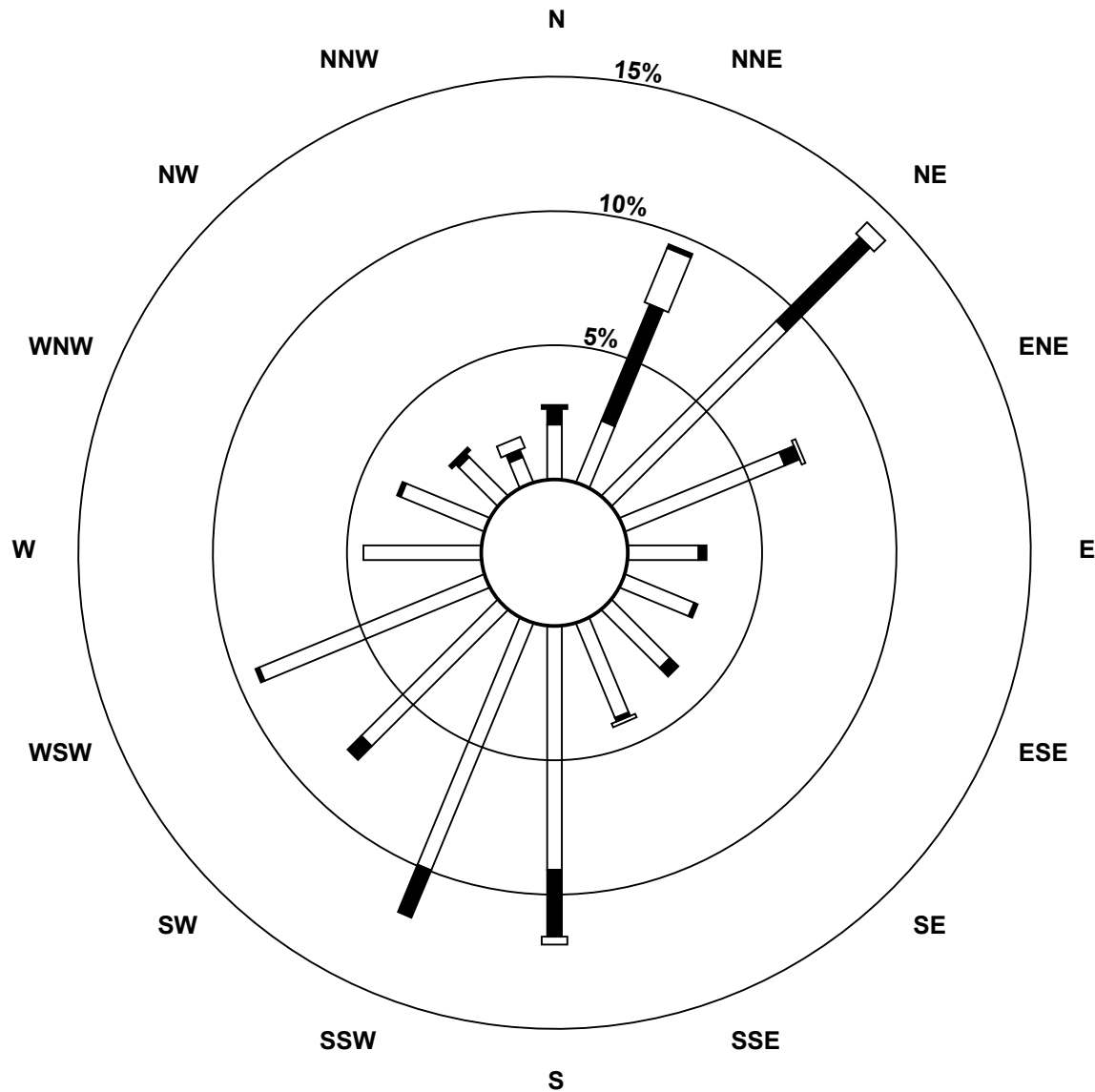
Total Number of Valid Hours: 683

Total Number of Hours: 720

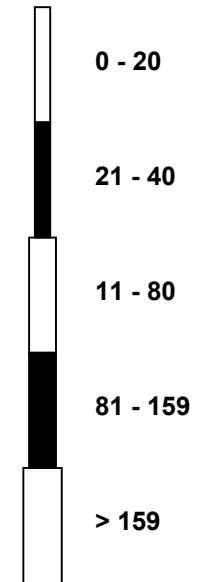


Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

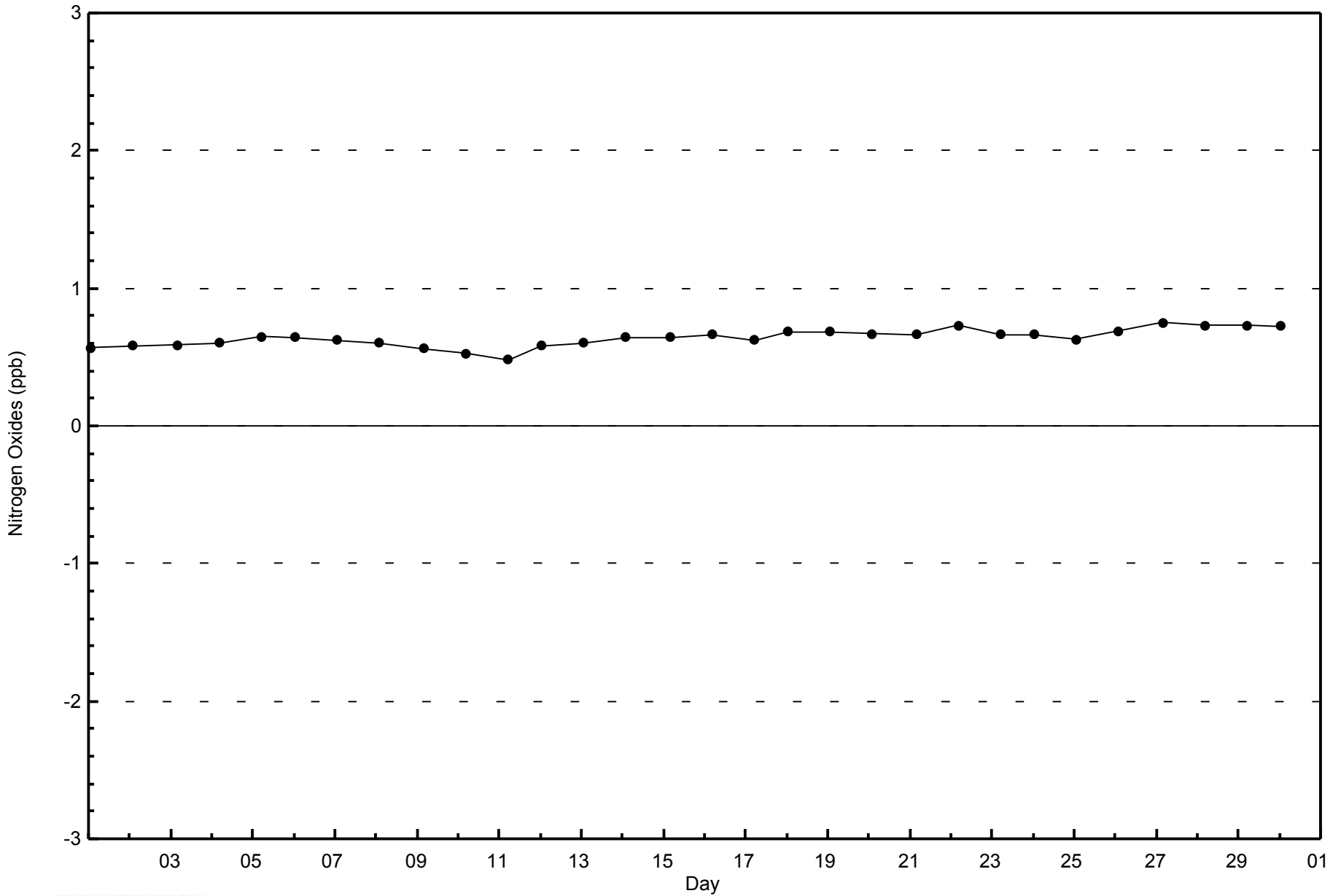
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 Shell Muskeg River (AMS 16)



Classes (ppb)



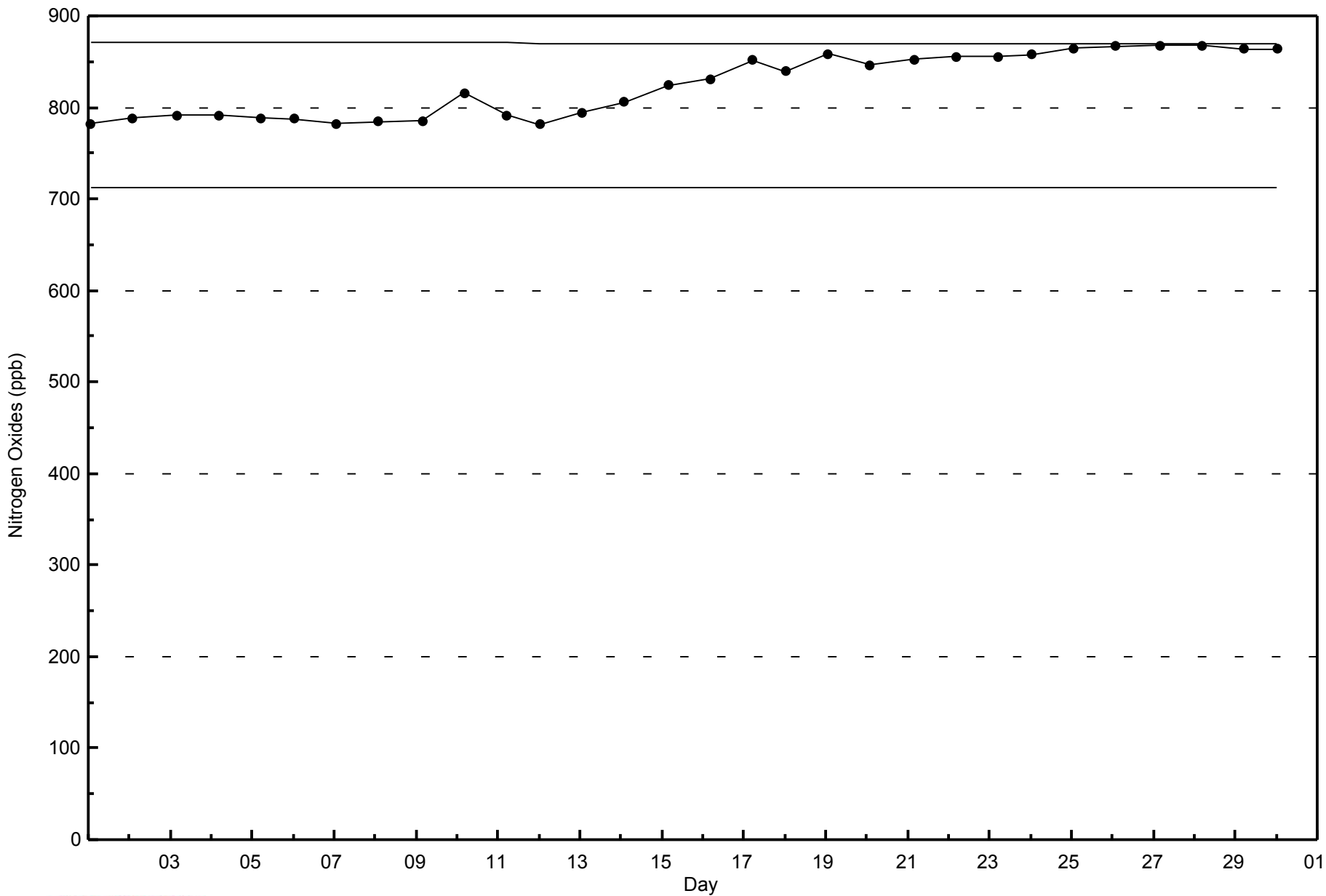
Total Number of Valid Hours: 683





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River - April 2015





Summary of Hour Averages

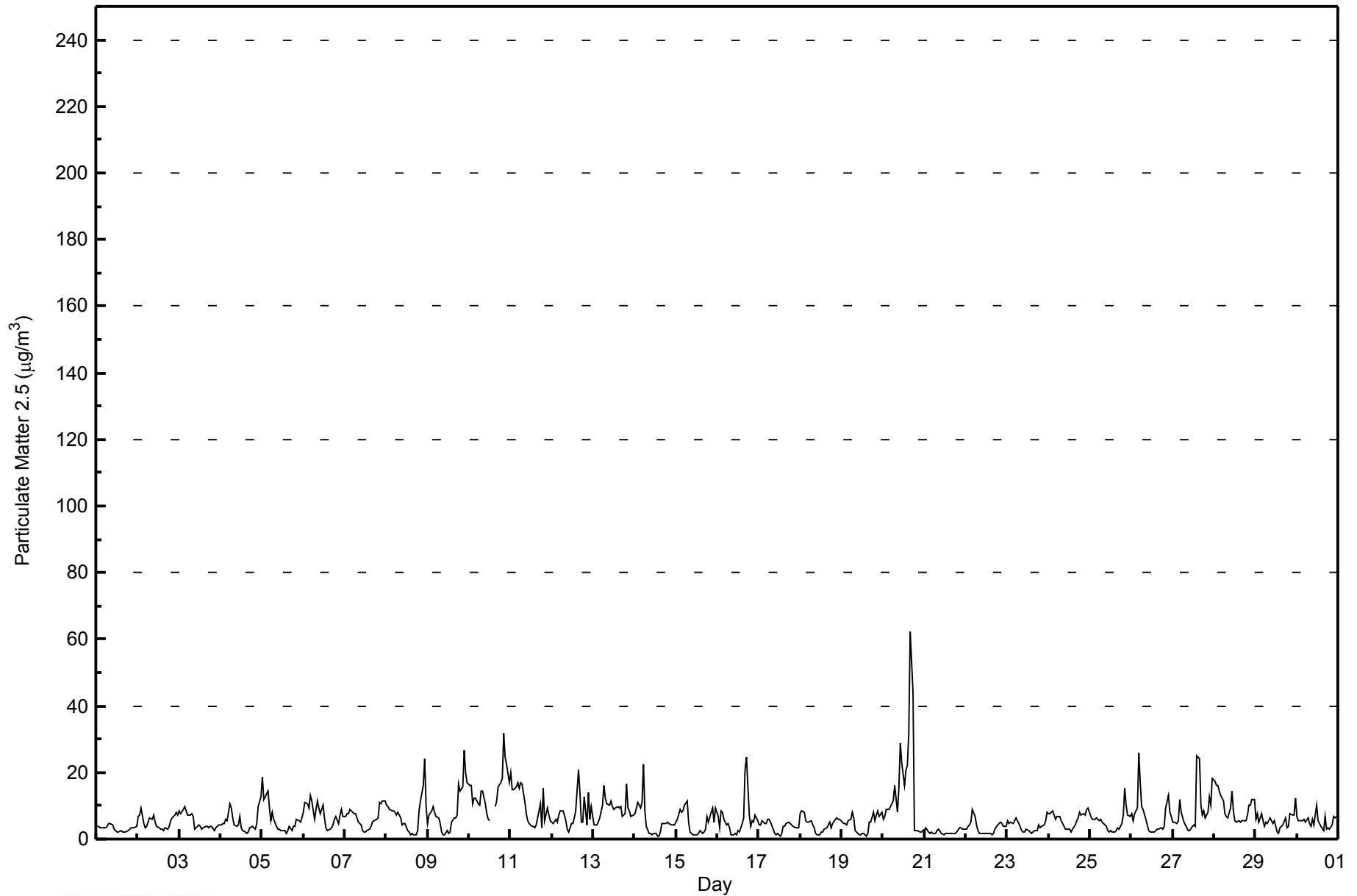
Shell Muskeg River - April 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 62.3 µg/m <sup>3</sup> on Apr 20 17:00 Maximum Daily Average: 15.2 µg/m <sup>3</sup> on Apr 20		Hours in Service: 720 Hours of Data: 718 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																								
Minimum Value: 1.0 µg/m <sup>3</sup> on Apr 14 15:00 Maximum Diurnal Average: 8.7 µg/m <sup>3</sup> at hour 22 Monthly Average: 6.52 µg/m <sup>3</sup>		Minimum Daily Average: 2.2 µg/m <sup>3</sup> on Apr 21 Minimum Diurnal Average: 3.4 µg/m <sup>3</sup> at hour 14 Percentiles: P <sub>1</sub> = 1.2 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 3.3 Median = 5.2 Q <sub>3</sub> = 8.1 P <sub>90</sub> = 11.8 P <sub>99</sub> = 25.4																								
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-Apr	3.8	3.8	3.6	3.3	3.4	3.5	3.9	4.6	4.6	4.4	3.1	2.4	2.3	2.1	2.4	1.9	1.9	2.1	2.6	3.0	3.5	3.5	3.3	3.8	3.2	4.6
2-Apr	6.6	7.2	9.2	4.6	3.5	3.6	5.1	6.6	6.0	7.1	5.0	3.9	3.3	3.0	2.8	2.6	3.6	3.1	3.8	5.7	6.3	7.3	8.2	7.4	5.2	9.2
3-Apr	8.4	7.6	8.8	9.7	8.5	7.0	7.0	7.4	7.0	3.1	3.3	4.2	3.9	3.0	3.3	3.7	3.7	3.5	3.8	3.7	2.6	3.5	3.8	4.4	5.2	9.7
4-Apr	4.4	4.7	4.5	5.7	10.6	9.5	6.5	4.4	3.7	4.4	6.6	3.3	2.4	2.1	1.6	2.1	3.2	3.6	3.5	3.0	4.7	9.9	12.6	5.1	12.6	
5-Apr	18.5	11.8	12.8	14.6	9.5	5.6	8.1	5.8	3.7	2.9	2.9	2.4	2.6	2.3	1.9	2.5	3.8	2.5	3.8	4.0	6.0	5.4	5.2	6.3	6.0	18.5
6-Apr	8.1	11.1	10.7	9.3	13.2	11.5	6.1	9.1	11.5	9.4	7.4	10.3	6.4	3.2	2.6	3.0	3.5	4.1	5.8	6.7	4.6	7.4	8.9	7.0	7.5	13.2
7-Apr	6.6	7.5	7.7	9.0	8.4	7.6	7.8	6.4	5.1	4.2	2.6	2.3	2.2	2.5	3.1	3.8	5.0	5.5	6.1	6.5	11.1	10.4	11.2	11.4	6.4	11.4
8-Apr	10.2	9.7	8.9	8.6	8.4	8.0	7.3	8.2	6.2	4.4	4.7	4.7	2.7	2.0	1.4	1.6	1.5	1.2	2.3	8.3	11.5	16.3	24.1	9.9	7.2	24.1
9-Apr	4.8	7.2	8.6	9.7	8.1	6.7	6.4	4.6	2.3	1.4	1.4	2.4	1.9	2.1	5.2	6.3	6.3	7.3	16.5	14.6	15.9	26.5	19.7	17.1	8.5	26.5
10-Apr	16.1	16.1	10.7	12.3	12.5	10.6	10.2	14.5	14.5	10.7	7.7	5.9	5.3	M	M	9.9	11.4	15.6	17.1	18.0	31.7	24.5	22.7	16.9	14.3	31.7
11-Apr	19.8	14.9	14.7	15.7	17.1	15.1	16.9	16.7	10.8	7.7	5.3	4.6	3.6	3.8	3.4	4.3	6.3	10.8	3.2	15.4	5.4	9.5	7.1	5.5	9.9	19.8
12-Apr	5.3	4.6	6.1	4.9	7.3	8.4	8.3	7.1	5.4	3.0	2.3	4.5	4.8	6.2	8.3	20.7	14.0	5.1	5.3	12.8	4.0	14.1	6.1	9.6	7.4	20.7
13-Apr	4.3	4.1	4.2	5.0	6.5	10.1	16.0	12.4	10.6	10.3	11.6	9.5	8.9	9.3	9.7	9.3	9.7	6.8	7.7	16.7	9.2	8.6	6.6	7.4	8.9	16.7
14-Apr	7.5	9.4	11.1	9.3	11.2	22.4	8.3	3.7	1.9	1.7	1.3	1.7	1.6	1.0	1.0	2.1	4.7	4.8	4.8	5.1	4.8	4.4	4.0	4.4	5.5	22.4
15-Apr	5.3	6.1	8.7	7.9	8.6	10.2	11.3	4.9	2.2	1.5	1.1	1.2	1.2	1.6	2.6	1.8	2.2	2.8	6.9	5.0	8.1	9.5	5.1	9.5	5.2	11.3
16-Apr	6.7	3.5	8.5	8.2	5.8	4.1	4.6	3.3	1.4	1.2	1.5	1.4	2.5	2.2	4.6	6.4	20.8	24.7	7.2	3.9	5.7	5.2	7.3	5.6	6.1	24.7
17-Apr	4.4	4.2	5.6	4.7	4.5	5.9	6.1	5.2	2.8	1.6	1.5	1.6	1.0	1.5	3.9	3.7	4.6	5.0	4.5	4.1	3.6	3.5	3.6	3.6	3.8	6.1
18-Apr	7.8	8.7	7.9	5.6	4.9	5.2	5.5	4.3	3.3	1.8	1.2	1.4	2.1	2.0	3.1	3.3	4.4	5.1	3.3	4.5	6.0	6.2	5.9	5.9	4.6	8.7
19-Apr	5.0	4.5	4.5	4.4	5.4	6.0	7.9	6.3	2.4	1.9	1.4	1.4	1.8	1.7	1.0	1.7	4.9	5.3	8.1	5.4	7.2	8.5	6.9	8.0	4.6	8.5
20-Apr	6.1	6.8	9.0	9.0	9.7	10.4	11.7	16.1	8.0	15.5	28.9	22.9	16.3	20.6	22.0	31.7	62.3	44.3	2.4	2.3	2.7	2.1	2.3	2.6	15.2	62.3
21-Apr	2.5	3.3	2.0	1.7	2.0	1.6	1.5	2.4	2.9	2.6	1.7	1.4	1.6	1.6	1.7	1.8	1.8	1.7	1.8	2.3	3.3	3.5	2.9	3.0	2.2	3.5
22-Apr	3.1	3.9	4.1	5.1	9.1	6.6	4.4	2.6	1.5	1.5	1.5	1.7	1.6	1.5	1.6	1.4	1.5	2.9	4.1	4.6	5.2	4.8	3.7	3.8	3.4	9.1
23-Apr	5.5	4.9	4.9	4.8	5.5	6.2	5.4	4.8	2.5	2.1	2.2	2.9	2.6	1.9	1.7	2.0	2.3	2.7	4.1	3.3	3.9	4.4	5.4	7.9	3.9	7.9
24-Apr	7.7	7.7	8.6	7.1	6.1	6.7	6.6	5.6	4.6	3.9	3.1	2.9	3.1	2.3	2.8	4.0	5.4	6.3	8.0	7.3	7.5	7.2	8.9	9.2	5.9	9.2
25-Apr	6.6	5.9	5.9	5.8	6.2	5.7	6.1	5.3	4.8	3.9	2.4	2.3	2.5	2.0	2.1	2.4	3.2	3.1	4.6	7.2	15.4	10.3	7.3	6.9	5.3	15.4
26-Apr	7.5	5.7	7.6	9.5	25.8	16.8	9.9	9.0	5.8	4.1	2.5	2.3	2.2	2.2	2.6	2.9	2.9	3.4	2.9	3.7	9.1	13.3	7.9	6.9	6.9	25.8
27-Apr	5.2	5.3	4.7	5.5	12.0	8.1	5.2	4.3	3.3	2.6	2.7	3.9	4.4	3.7	25.0	23.9	10.3	7.0	8.5	6.4	8.1	12.7	10.0	18.2	8.4	25.0
28-Apr	17.3	16.3	16.2	14.3	13.3	11.5	7.8	6.6	6.3	9.4	14.5	8.5	5.5	4.9	5.4	5.1	5.5	5.6	5.7	7.4	10.2	10.2	11.8	11.8	9.6	17.3
29-Apr	6.0	7.5	5.2	7.6	5.4	3.9	5.0	4.6	6.3	5.3	4.5	5.4	2.3	1.9	3.3	3.8	4.2	6.4	3.3	3.8	7.5	7.1	7.3	12.3	5.4	12.3
30-Apr	7.0	5.4	5.5	5.4	5.8	5.2	6.3	4.8	3.7	5.7	4.2	10.4	5.5	4.7	3.7	2.5	7.0	2.9	3.2	3.0	4.3	6.7	6.5	6.7	5.2	10.4
																								Diurnal Average		
																								Diurnal Maximum		
7.6 7.3 7.7 7.6 8.4 8.2 7.5 6.8 5.2 4.6 4.6 4.6 3.6 3.4 4.6 5.7 7.4 6.8 5.5 6.6 7.6 8.7 8.1 8.2																										
19.8 16.3 16.2 15.7 25.8 22.4 16.9 16.7 14.5 15.5 28.9 22.9 16.3 20.6 25.0 31.7 62.3 44.3 17.1 18.0 31.7 26.5 24.1 18.2																										
M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Shell Muskeg River - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	384	53.48	53.48
6 - 15	286	39.83	93.31
16 - 25	38	5.29	98.61
26 - 80	7	0.97	99.58
> 81.0	0	0.00	99.58

Total Number of Valid Hours: 718

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - April 2015**

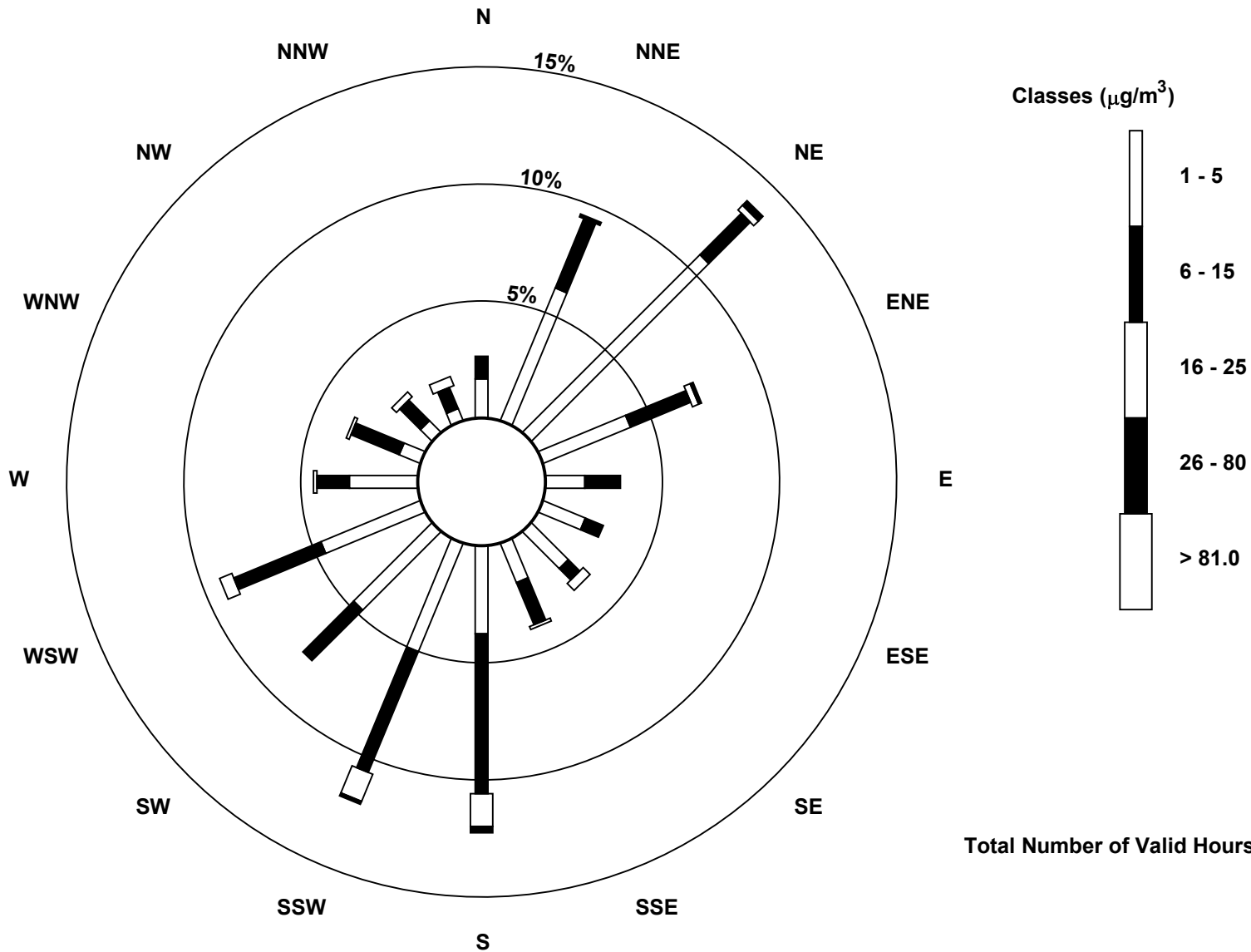
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	12	44	77	29	12	14	16	13	27	36	34	33	21	7	5	4	384
6 - 15	7	23	18	20	11	6	5	14	49	40	22	29	10	16	9	7	286
16 - 25	0	0	2	2	0	0	3	1	10	9	0	4	1	1	2	3	38
26 - 80	0	1	2	1	0	0	0	0	2	1	0	0	0	0	0	0	7
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	68	99	52	23	20	24	28	88	86	56	66	32	24	16	14	715

Total Number of Valid Hours: 718

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
 Shell Muskeg River (AMS 16)





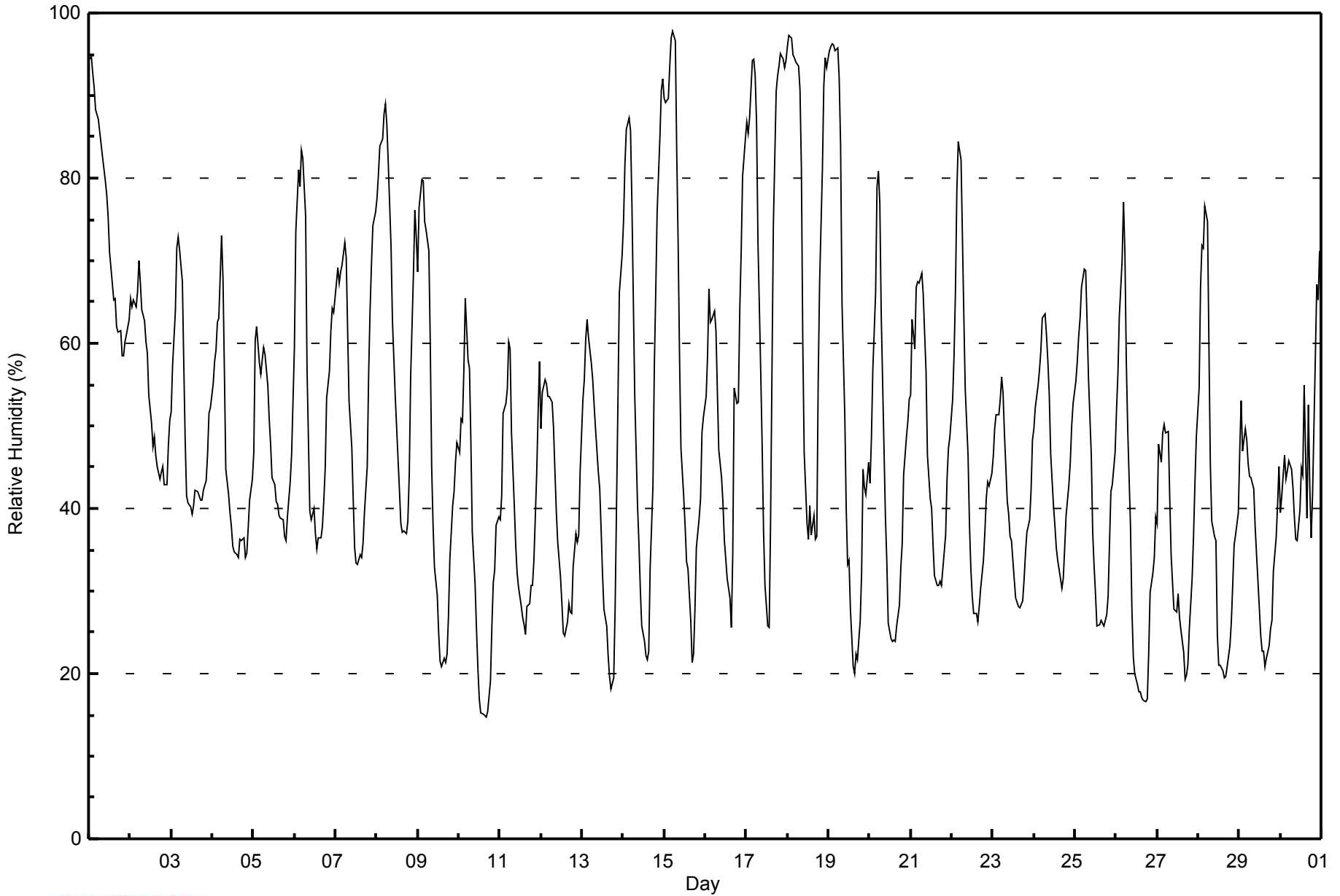


Maximum Value: 98 % on Apr 15 06:00																			Maximum Daily Average: 74.6 % on Apr 1						Hours in Service: 720	
Minimum Value: 15 % on Apr 10 17:00																			Minimum Daily Average: 34.4 % on Apr 10						Hours of Data: 720	
Maximum Diurnal Average: 71.1 % at hour 5																			Minimum Diurnal Average: 30.7 % at hour 16						Hours of Missing Data: 0	
Monthly Average: 49.4 %																			Percentiles: P <sub>1</sub> = 17 P <sub>10</sub> = 26 Q <sub>1</sub> = 35 Median = 45 Q <sub>3</sub> = 63 P <sub>90</sub> = 81 P <sub>99</sub> = 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-Apr	94	95	93	91	88	87	86	84	82	80	78	75	71	69	65	65	62	61	62	58	58	60	61	63	74.6	95
2-Apr	66	64	65	64	66	70	67	64	63	60	59	54	50	47	49	46	45	44	44	45	43	43	48	51	54.9	70
3-Apr	52	57	64	72	73	71	67	58	48	41	41	40	39	40	42	42	42	41	41	42	43	47	52	52	50.3	73
4-Apr	55	58	59	62	63	73	68	57	45	42	40	38	35	35	34	34	36	36	36	34	35	38	41	44	45.7	73
5-Apr	47	60	62	58	56	58	59	59	55	51	48	44	43	41	40	39	39	39	37	36	39	43	47	53	48.0	62
6-Apr	59	74	81	79	83	82	75	57	48	40	39	40	37	35	37	36	38	41	45	53	57	61	64	64	55.3	83
7-Apr	67	69	67	69	70	72	70	62	53	47	41	35	33	33	34	34	36	39	45	56	64	70	74	76	54.9	76
8-Apr	78	80	84	85	88	89	87	82	72	63	58	54	46	42	38	37	37	37	38	44	56	68	76	73	63.0	89
9-Apr	69	76	80	80	75	74	71	60	45	38	33	30	25	22	21	22	21	22	27	34	40	42	46	48	45.8	80
10-Apr	47	51	50	57	65	58	57	48	37	31	25	21	17	15	15	15	15	15	19	26	31	33	38	39	34.4	65
11-Apr	39	41	51	53	54	60	59	49	40	36	32	31	28	27	26	25	28	29	31	31	34	44	51	58	39.9	60
12-Apr	50	54	56	55	54	53	53	50	45	40	36	32	28	25	25	26	28	27	27	33	37	36	37	44	39.6	56
13-Apr	53	56	61	63	61	58	56	53	50	44	42	37	32	28	26	22	20	18	20	28	40	53	66	71	44.0	71
14-Apr	75	82	86	87	86	77	65	54	40	36	30	26	24	22	22	23	33	43	57	66	76	85	91	92	57.3	92
15-Apr	90	89	90	94	97	98	97	83	72	58	47	41	38	34	33	26	21	22	28	35	39	41	49	51	57.2	98
16-Apr	54	58	67	63	63	64	62	54	47	44	41	36	34	32	29	26	35	55	53	53	64	71	80	85	52.8	85
17-Apr	87	85	87	94	94	92	87	72	56	47	37	31	26	26	39	57	74	90	92	94	95	94	93	94	72.7	95
18-Apr	96	97	97	95	95	94	94	91	81	60	47	38	36	40	37	39	36	37	55	67	81	91	95	93	70.5	97
19-Apr	96	96	96	96	95	96	92	84	65	51	40	33	34	28	21	20	22	22	26	32	45	42	42	46	55.0	96
20-Apr	43	49	57	66	79	81	77	64	47	39	34	26	24	24	24	24	26	28	33	36	44	49	51	53	44.8	81
21-Apr	54	63	59	67	67	67	68	66	61	57	47	41	40	36	32	31	31	31	31	33	37	44	47	49	48.2	68
22-Apr	53	58	66	78	84	82	73	63	54	46	38	33	29	27	27	26	28	30	34	37	41	43	43	44	47.6	84
23-Apr	46	50	51	51	53	56	54	49	41	39	37	36	31	29	29	28	28	29	31	35	37	39	42	48	40.4	56
24-Apr	50	52	55	57	59	63	64	61	58	54	47	40	38	35	34	32	30	32	35	39	43	46	50	53	46.9	64
25-Apr	55	58	61	63	67	69	69	63	56	46	37	33	30	26	26	26	26	26	27	29	36	42	43	47	44.2	69
26-Apr	52	56	63	70	77	71	58	50	38	28	22	20	19	18	18	17	17	17	17	23	30	32	34	39	36.8	77
27-Apr	38	48	46	49	50	49	49	41	34	31	28	27	30	27	25	23	19	20	21	25	32	37	43	49	35.0	50
28-Apr	55	67	72	72	77	75	60	45	39	37	36	25	21	21	20	20	20	21	23	26	31	36	37	40	40.5	77
29-Apr	47	53	47	50	48	45	44	44	42	38	34	31	25	23	23	21	22	23	25	26	32	37	40	45	36.1	53
30-Apr	40	41	46	44	45	46	45	43	39	36	36	40	45	44	55	39	53	43	36	42	58	67	65	71	46.6	71
																			60.1 64.6 67.3 69.4 71.1 71.0 67.7 60.2 51.8 45.3 40.3 36.2 33.6 31.7 31.5 30.7 32.3 33.9 36.6 40.6 46.6 51.1 54.8 57.8						Diurnal Average	
																			96 97 97 96 97 98 97 91 82 80 78 75 71 69 65 65 74 90 92 94 95 94 95 94						Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Shell Muskeg River - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	23	3.19	3.19
20 - 40	251	34.86	38.06
40 - 60	245	34.03	72.08
60 - 80	127	17.64	89.72
80 - 100	74	10.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

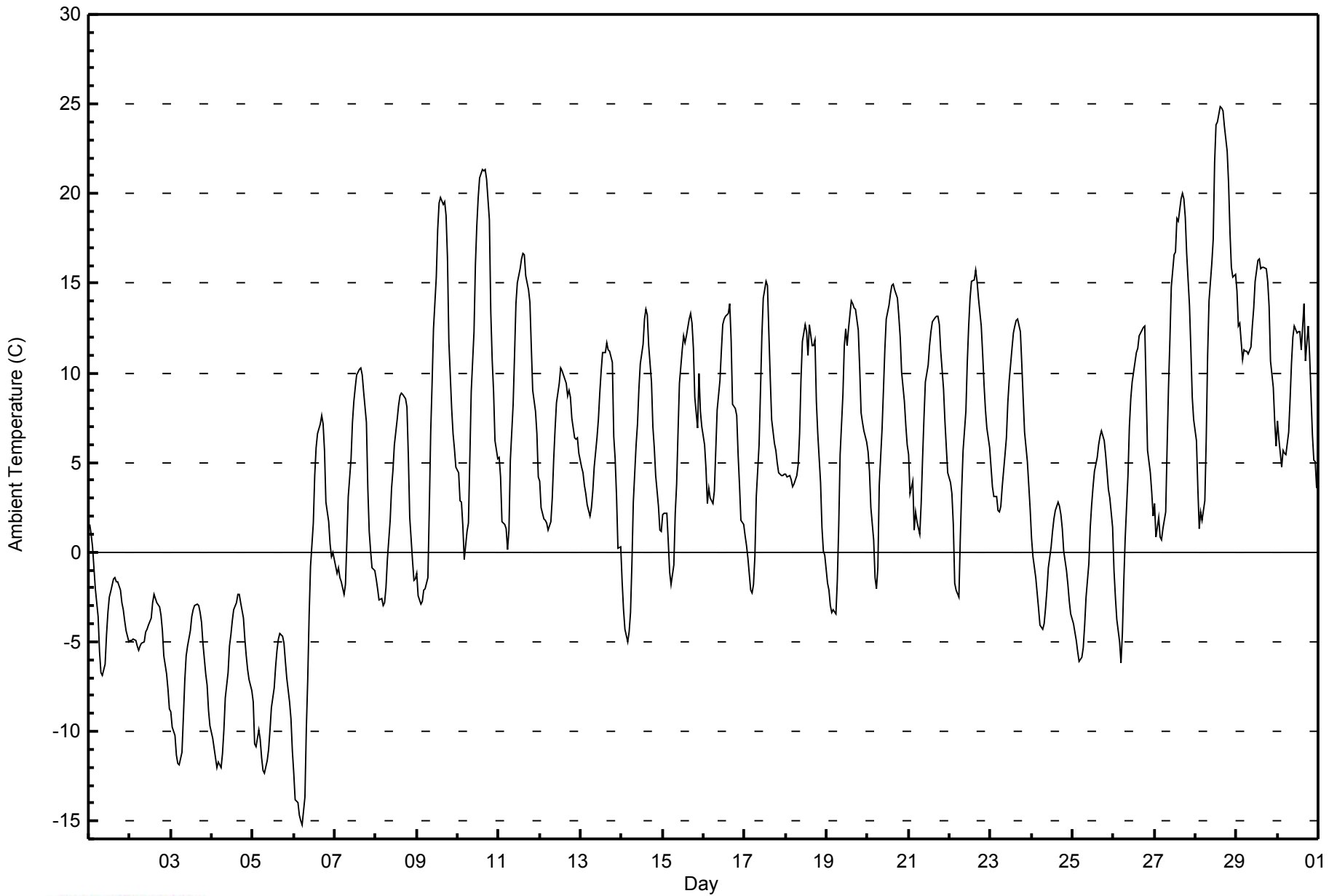
**Ambient Temperature (AT) - C**  
**Shell Muskeg River - April 2015**

Maximum Value: 24.8 C on Apr 28 15:00																				Maximum Daily Average: 14.9 C on Apr 28					Hours in Service: 720	
Minimum Value: -15.2 C on Apr 6 06:00																				Minimum Daily Average: -8.7 C on Apr 5					Hours of Data: 720	
Maximum Diurnal Average: 10.6 C at hour 16																				Minimum Diurnal Average: -2.0 C at hour 6					Hours of Missing Data: 0	
Monthly Average: 4.43 C																				Percentiles: P <sub>1</sub> = -12.3 P <sub>10</sub> = -5.3 Q <sub>1</sub> = -1.7 Median = 4.5 Q <sub>3</sub> = 10.7 P <sub>90</sub> = 14.1 P <sub>99</sub> = 21.3					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-Apr	1.6	1.0	0.3	-0.9	-2.1	-3.6	-5.6	-6.7	-6.9	-6.3	-4.6	-3.3	-2.5	-2.2	-1.5	-1.4	-1.6	-1.7	-2.1	-2.8	-3.2	-3.9	-4.4	-5.0	-2.9	1.6
2-Apr	-5.0	-4.9	-4.8	-4.9	-5.3	-5.5	-5.3	-5.1	-5.0	-4.5	-4.3	-4.1	-3.7	-2.8	-2.3	-2.6	-2.8	-3.1	-3.5	-4.4	-5.8	-6.8	-7.7	-8.7	-4.7	-2.3
3-Apr	-8.9	-9.8	-10.2	-11.3	-11.8	-11.9	-11.1	-9.2	-7.2	-5.8	-5.2	-4.4	-3.6	-3.2	-3.0	-2.9	-3.0	-3.4	-3.9	-5.1	-6.8	-7.4	-8.8	-9.7	-7.0	-2.9
4-Apr	-10.4	-10.9	-11.4	-12.0	-11.7	-12.0	-11.3	-9.9	-8.1	-6.7	-5.3	-4.6	-3.8	-3.2	-2.8	-2.4	-2.3	-2.9	-3.7	-4.8	-5.8	-6.6	-7.1	-7.8	-7.0	-2.3
5-Apr	-8.3	-10.7	-10.9	-9.9	-10.5	-11.5	-12.2	-12.3	-11.7	-11.0	-9.9	-8.7	-7.6	-6.4	-5.5	-4.8	-4.6	-4.7	-5.1	-6.1	-7.0	-8.4	-9.3	-11.1	-8.7	-4.6
6-Apr	-12.3	-13.8	-13.9	-14.7	-15.0	-15.2	-13.6	-9.8	-7.1	-3.6	-0.8	1.6	4.3	5.8	6.6	7.1	7.6	7.1	5.7	2.8	1.7	0.4	-0.3	0.0	-2.9	7.6
7-Apr	-0.8	-1.2	-0.9	-1.4	-1.7	-2.4	-1.8	0.6	3.1	5.2	7.2	8.4	9.2	9.9	10.2	10.3	9.9	9.0	7.2	3.5	1.1	0.0	-0.9	-1.0	3.5	10.3
8-Apr	-1.5	-2.0	-2.7	-2.6	-3.0	-2.9	-1.9	-0.4	1.8	3.5	4.6	6.0	7.4	8.1	8.7	8.9	8.8	8.6	8.1	5.4	1.9	-0.4	-1.5	-1.5	2.6	8.9
9-Apr	-1.2	-2.4	-2.9	-2.7	-2.1	-2.1	-1.4	2.4	6.7	9.4	12.5	15.3	18.0	19.5	19.8	19.4	19.5	18.8	16.5	11.8	8.0	6.6	5.8	4.7	8.3	19.8
10-Apr	4.5	2.9	2.8	1.4	-0.4	1.2	1.7	5.2	8.9	12.3	16.0	18.3	19.8	20.9	21.3	21.3	21.4	20.8	18.6	13.4	10.8	9.0	6.3	5.2	11.0	21.4
11-Apr	5.3	4.2	1.7	1.5	1.3	0.1	1.2	5.1	8.2	11.0	13.8	15.0	15.8	16.4	16.7	16.6	15.4	14.7	13.9	11.5	9.1	7.9	6.6	4.2	9.1	16.7
12-Apr	4.0	2.5	1.8	1.8	1.6	1.2	1.7	3.1	5.1	6.9	8.3	9.4	10.3	10.2	9.9	9.4	8.7	9.0	8.6	7.5	6.3	6.3	6.3	5.5	6.1	10.3
13-Apr	4.7	4.4	3.7	3.2	2.6	2.0	2.4	3.4	4.7	6.4	7.4	8.9	10.1	11.1	11.1	11.6	11.3	11.2	10.6	6.4	5.2	3.1	0.2	0.3	6.1	11.6
14-Apr	-1.6	-3.2	-4.3	-5.0	-4.5	-3.4	-0.6	2.8	6.0	7.2	9.1	10.5	11.6	13.0	13.6	13.2	11.6	9.5	7.0	5.8	4.3	2.5	1.2	1.1	4.5	13.6
15-Apr	2.1	2.2	2.2	0.6	-1.1	-1.8	-0.7	2.2	3.8	6.7	9.4	11.3	12.1	11.7	12.1	13.0	13.3	12.8	11.3	8.6	6.9	10.0	7.8	7.0	6.8	13.3
16-Apr	6.0	4.7	2.7	3.5	3.0	2.7	3.4	5.7	7.9	9.5	11.2	12.7	13.0	13.2	13.3	13.9	11.9	8.3	8.0	7.6	5.4	3.7	1.8	1.6	7.3	13.9
17-Apr	0.9	0.3	-0.3	-2.1	-2.3	-1.8	-0.3	3.1	6.0	8.9	12.0	14.2	15.1	14.9	12.2	9.7	7.4	6.0	5.7	5.0	4.5	4.3	4.3	4.4	5.5	15.1
18-Apr	4.3	4.2	4.2	4.0	3.7	3.8	4.3	4.9	6.6	9.7	11.8	12.7	12.3	11.0	12.7	11.5	11.5	11.9	8.4	6.6	3.9	1.4	0.0	-0.2	6.9	12.7
19-Apr	-1.8	-2.1	-2.9	-3.4	-3.2	-3.4	-1.6	1.5	5.5	8.8	11.5	12.5	11.5	12.4	14.0	13.9	13.7	13.6	12.4	10.2	7.8	7.2	6.8	6.2	6.3	14.0
20-Apr	5.6	4.5	2.5	0.7	-1.4	-2.0	-0.9	3.7	6.8	9.1	11.3	13.0	13.8	14.4	14.9	15.0	14.7	14.2	13.2	12.0	10.0	8.4	7.1	6.0	8.2	15.0
21-Apr	5.5	3.2	3.9	1.3	2.2	1.7	1.0	2.7	5.2	7.5	9.5	10.4	11.5	12.3	12.8	13.1	13.1	13.1	12.7	11.2	9.1	7.3	5.8	4.4	7.5	13.1
22-Apr	3.9	3.3	1.6	-1.7	-2.1	-2.5	0.8	3.5	5.7	7.9	10.6	12.6	14.1	15.1	15.2	15.7	15.1	14.2	12.6	11.1	9.4	7.9	6.9	5.8	7.8	15.7
23-Apr	4.8	3.7	3.1	3.1	2.4	2.2	2.6	3.7	5.4	6.4	8.3	9.6	11.4	12.2	12.6	12.9	13.0	12.3	10.5	8.5	6.7	5.0	3.7	2.4	6.9	13.0
24-Apr	0.8	-0.2	-1.4	-2.3	-3.1	-4.1	-4.3	-4.0	-3.2	-2.1	-0.9	0.3	1.1	1.9	2.4	2.8	2.6	2.1	1.3	0.1	-1.0	-1.8	-2.7	-3.4	-0.8	2.8
25-Apr	-4.0	-4.5	-4.9	-5.5	-6.1	-5.8	-5.3	-4.1	-2.5	-0.6	1.4	2.6	3.6	4.5	5.3	6.0	6.5	6.7	6.2	5.5	4.5	3.5	3.0	1.4	0.7	6.7
26-Apr	-1.0	-2.5	-3.8	-5.0	-6.2	-4.5	-1.7	0.8	4.3	7.0	8.5	9.5	10.6	11.2	11.4	12.0	12.2	12.5	12.6	9.1	5.7	4.4	3.3	2.0	4.7	12.6
27-Apr	2.7	0.8	1.9	0.8	0.7	1.3	2.3	5.8	9.2	11.8	14.8	16.6	16.7	18.6	18.5	19.7	20.0	19.7	18.7	16.7	13.8	11.3	8.6	7.4	10.8	20.0
28-Apr	6.2	3.6	1.3	2.2	1.8	2.9	6.3	11.0	14.1	16.1	17.5	21.7	23.9	24.0	24.8	24.8	24.6	23.8	22.4	20.6	17.8	15.9	15.3	15.5	14.9	24.8
29-Apr	14.6	12.6	12.8	10.7	11.2	11.2	11.2	11.0	11.5	12.6	13.6	15.1	16.3	16.3	15.8	15.9	15.9	15.8	15.1	13.7	10.7	9.2	7.3	5.9	12.8	16.3
30-Apr	7.3	6.3	4.7	5.6	5.5	5.5	6.7	8.5	10.5	12.0	12.7	12.2	12.3	12.3	11.3	13.9	10.6	11.7	12.6	11.0	6.5	5.1	5.0	3.6	8.9	13.9
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	218	30.28	30.28
0 - 10	307	42.64	72.92
10 - 20	180	25.00	97.92
> 20	15	2.08	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

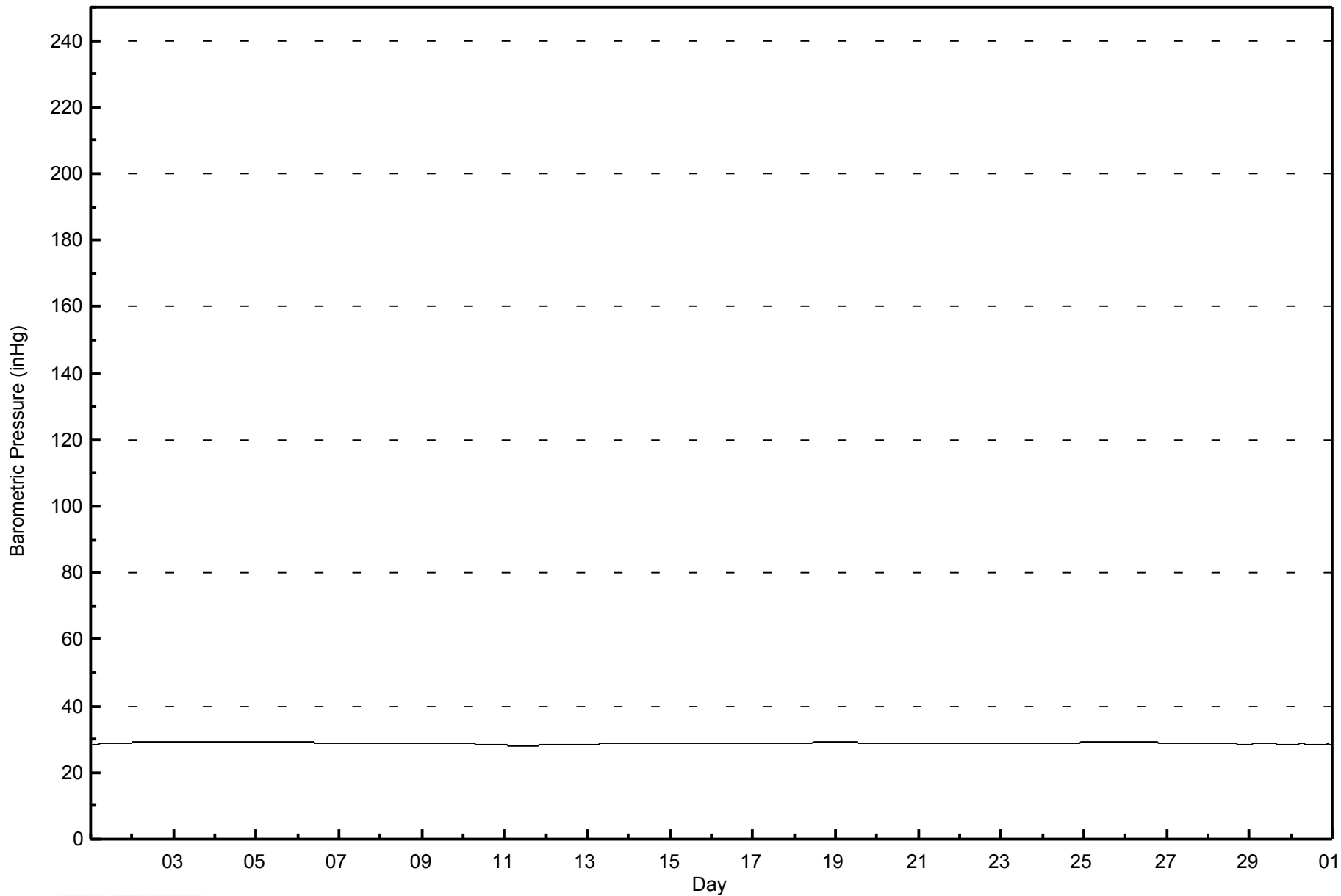


Maximum Value: 29.2 inHg on Apr 4 07:00		Maximum Daily Average: 29.2 inHg on Apr 4		Hours in Service: 720																						
Minimum Value: 28.1 inHg on Apr 11 16:00		Minimum Daily Average: 28.1 inHg on Apr 11		Hours of Data: 720																						
Maximum Diurnal Average: 28.9 inHg at hour 8		Minimum Diurnal Average: 28.8 inHg at hour 17		Hours of Missing Data: 0																						
Monthly Average: 28.83 inHg		Percentiles: P <sub>1</sub> = 28.1 P <sub>10</sub> = 28.6 Q <sub>1</sub> = 28.7 Median = 28.8 Q <sub>3</sub> = 29.0 P <sub>90</sub> = 29.2 P <sub>99</sub> = 29.2		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	28.8	29.0
2-Apr	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.2
3-Apr	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
4-Apr	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2
5-Apr	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2
6-Apr	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.1
7-Apr	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9
8-Apr	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
9-Apr	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	28.6	28.6	28.6	28.7	28.8
10-Apr	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	28.4	28.4	28.4	28.3	28.3	28.3	28.3	28.3	28.3	28.2	28.2	28.5
11-Apr	28.2	28.2	28.2	28.2	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.1	28.2
12-Apr	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.3	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.3	28.4
13-Apr	28.4	28.5	28.5	28.5	28.5	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.8
14-Apr	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	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
15-Apr	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
16-Apr	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	28.9	29.0
17-Apr	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	28.8	28.8	28.8	28.8	28.8	28.9	29.0
18-Apr	28.8	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.0	29.2
19-Apr	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	29.0
20-Apr	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8
21-Apr	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.8	28.9
22-Apr	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.9
23-Apr	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8
24-Apr	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	28.9	29.0
25-Apr	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	29.1
26-Apr	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1
27-Apr	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	28.9	28.9	28.9	28.9	29.0
28-Apr	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	28.6	28.6	28.6	28.6	28.6	28.5	28.5	28.5	28.6	28.7
29-Apr	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7	28.7	28.7	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.7
30-Apr	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6	28.6
																								28.8	28.8	
																								29.2	29.2	
																								28.8	28.8	
																								29.2	29.2	



**WBEA**  
**Hourly Averages**

**Barometric Pressure (BP) - inHg**  
**Shell Muskeg River - April 2015**







Maximum Speed: 33 km/h on Apr 12 16:00	Maximum Daily Speed Average: 22.9 km/h on Apr 1	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 14 02:00	Minimum Daily Speed Average: 3.3 km/h on Apr 8	Hours of Data: 720
Maximum Diurnal Speed Average: 2.9 km/h at hour 14	Minimum Diurnal Speed Average: 0.3 km/h at hour 6	Hours of Missing Data: 0
Monthly Average Velocity: 0.7 km/h 267.8 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 8 Median = 12 Q <sub>3</sub> = 17 P <sub>90</sub> = 22 P <sub>99</sub> = 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-Apr	NNE18	NNE20	NNE24	NNE27	NNE29	NNE31	NNE31	NNE29	NNE29	NNE28	NNE26	NNE25	NNE25	NNE24	NNE22	NE23	NE22	NE21	NE20	NE19	NE18	NE17	NE15	ENE15	NNE22.9	NNE31
2-Apr	NNE5	NNW5	NNW4	ENE7	ENE6	ESE2	NE6	NNE10	NNE14	N12	NNE12	NNE12	NNE12	NNE9	NE12	NE16	NE16	NE16	NE17	NE19	NE17	NE17	NE13	ENE8	NE10.6	NE19
3-Apr	ENE9	ENE6	ENE5	ENE6	E7	E6	E5	ENE4	ENE4	NE7	NE11	NE8	NNE11	NE14	NE17	NE18	NE18	NE19	NE19	NE18	ENE13	NE15	NE10	ENE9	NE10.5	NE19
4-Apr	ENE9	ENE8	ENE4	ENE6	E4	ESE3	E4	E4	NE5	NE6	N8	N6	NNE9	NE11	ENE11	ENE11	NE16	NE18	NE19	NE20	NE18	NE13	N12	N12	NE9.1	NE20
5-Apr	NNW8	NW5	WNW6	N11	NNE20	NNE22	NNE19	NNE17	NE15	NE15	NE12	ENE12	NE12	ENE12	NE14	NE15	NE15	NE16	NE15	ENE16	ENE17	NE16	NE15	ENE9	NE12.7	NNE22
6-Apr	E6	ESE4	SE4	SE7	SSE6	S8	S9	S9	SSW8	SW9	SW10	SW10	SSW11	SSW12	S11	S11	S12	S10	SSE9	SSE10	S10	S11	S12	S13	S8.2	S13
7-Apr	S13	S13	SSW10	SSW10	SSW10	S11	S11	S12	SSW13	SSW13	SSW16	SSW18	SSW18	SSW18	SSW16	SSW17	SW20	SW18	SW14	SSW8	S9	S9	S10	S10	SSW12.8	SW20
8-Apr	SSW9	SSW8	S9	SSW10	S12	S13	SSW12	SSW12	SW10	WSW6	NE7	NE10	NE14	NE12	NE10	NE11	NE14	NE14	ENE9	E6	ESE6	SE4	S5	SSW8	SE3.3	NE14
9-Apr	S6	S6	S6	SSW6	SSW7	S8	S7	S9	S13	SSW12	SSW14	SSW16	SSW17	SW25	WSW24	WSW22	SW21	WSW19	WSW12	SSW8	SSW8	SSW9	SSW7	S8	SSW11.3	SW25
10-Apr	S10	SSW9	SSW10	SSW8	SSW7	SSE7	S8	SSW7	SSW9	S11	SSW10	SW11	SW11	SW13	SSW12	SSW10	SW7	W2	SSE4	SE9	S7	SSW8	S7	S8	SSW8.0	SW13
11-Apr	SSW4	S8	S8	S9	S9	S9	S9	SSW9	SW13	SSW9	SSW11	W18	SW10	W10	W16	W14	NW13	WNW13	W23	W31	WSW29	W27	WNW14	WSW12	WSW11.0	W31
12-Apr	WSW16	WSW15	WSW16	WSW17	WSW19	WSW21	WSW21	WSW16	SW14	SW20	SW25	WSW32	WSW28	W29	WSW28	WSW33	W29	W26	W25	WNW22	W18	W25	W32	WNW29	WSW22.4	WSW33
13-Apr	W28	W29	W26	WNW26	WNW28	NW13	WNW14	WNW20	WNW26	NW27	NW24	NW24	WNW26	NW23	NW19	WNW18	WNW19	WNW16	NW10	NNW5	ENE11	ENE9	ENE6	NE6	WNW16.3	W29
14-Apr	ENE4	SSW1	SSE2	SSE3	SSE5	S4	SW5	S7	S9	SSE9	SE10	SE11	SSE15	SSE11	S13	S12	S23	SSE22	SSE18	SSE13	SSE12	SSE11	S9	S11	SSE9.5	S23
15-Apr	S9	S8	S8	SSW8	S8	S7	S9	SW10	SW13	WSW13	SE10	W12	WNW16	WNW17	WNW16	WSW21	WSW23	WSW22	WSW17	SW8	SSW8	W28	WSW14	WSW17	WSW11.3	W28
16-Apr	WSW18	WSW18	SW15	WSW19	WSW16	SW18	SSW9	SW11	SW14	SSW13	SSW16	SSW18	WSW26	WSW22	WSW24	W28	NW20	NNW19	WNW14	WNW21	W13	W13	SW11	SSW10	WSW14.2	WSW28
17-Apr	SW13	SW12	S5	SSW8	S8	S8	S9	SSW9	SSW11	SSW8	SSW11	SSW12	SSW15	SW19	SW21	SSW16	SSW14	SSE10	SE10	SE7	SSE5	ENE5	ENE9	N6	SSW8.2	SW21
18-Apr	NNW7	NNW10	NNW12	NNW14	N16	N16	N15	NW12	NW13	NNW15	NNW18	N21	N17	NNW16	N15	NE16	NE13	N10	NE17	N3	WNW4	SSW4	S7	SSW4	N10.0	N21
19-Apr	S5	S4	S4	S6	SSW5	SSW5	S6	SSW5	SSW8	SSW8	SSW10	SW10	NW5	ENE2	WSW9	WNW11	NW9	NW6	WNW3	SE3	SSE4	S5	SSW4	E5	SSW3.5	WNW11
20-Apr	SE4	SW3	ENE3	ENE2	S3	SE2	SE3	NW1	ENE7	ENE9	ENE9	ENE7	ENE8	NE7	NE8	NE7	NE14	NNE15	NE17	NNE21	NNE22	NNE18	NNE18	NNE14	NE8.2	NNE22
21-Apr	NNE15	NNE7	NNE17	NE8	NNE13	NE12	ENE9	NE11	NNE8	NE11	NE17	NE18	NE16	NE17	NE19	NNE19	NE19	NE18	NE19	E12	E11	ESE12	SE8	SE6	NE12.1	NE19
22-Apr	E6	ENE7	ENE8	ESE4	SSW2	E4	ENE6	ESE5	ESE9	ESE12	SE13	SE14	SE17	SE17	ESE16	SE17	SE17	ESE17	ESE17	ESE14	ESE9	ESE11	SE13	SE9	ESE10.5	SE17
23-Apr	ESE6	ESE6	E8	E9	E8	ENE10	ENE11	E9	ESE10	ENE15	ENE17	NE19	E18	E19	E18	E16	E20	ENE21	ENE27	ENE25	ENE22	ENE22	NE21	NE22	ENE15.1	ENE27
24-Apr	NE24	NE23	NNE20	NE23	NE22	NNE21	NE23	NE22	NE22	NNE22	NE21	NE21	NE21	NNE21	NNE20	NNE23	NNE25	NNE24	NNE23	NNE21	NNE22	NNE24	NNE22	NNE22	NNE21.9	NNE25
25-Apr	NNE20	NNE21	NNE21	NNE16	NNE15	NNE13	NNE14	NNE9	NNE9	NNE10	NNE11	NNE13	NNE12	N10	NNE9	N10	N10	NNE11	NE13	NE11	NE12	NE15	NE11	NNE12	NNE12.6	NNE21
26-Apr	NE10	ENE8	E5	S4	S5	S4	S3	SSW6	SW7	SW9	SW8	WSW9	SW11	SW11	W10	SW7	WSW6	SW3	SSE6	SE7	ESE7	ESE6	SSE6	SSE7	SSW3.5	SW11
27-Apr	S7	SSE10	S7	S5	SW5	SSW5	SW4	S8	S11	SSW12	SSW17	SSW19	SSW17	SSW21	WSW29	WSW29	WSW25	WSW24	WSW24	WSW16	WSW15	SW8	SSW5	SSW7	SW12.5	WSW29
28-Apr	SSW5	SE5	S9	SSE9	S7	S5	S7	S5	WSW5	NNW3	N5	SSE10	S16	S16	SSE17	SSE19	S17	S19	S13	SSE12	SSE7	SSW9	SSW10	WSW16	S8.8	SSE19
29-Apr	W11	W8	W9	WSW14	W13	W13	W11	WSW14	WSW13	WSW16	WSW11	WSW12	W18	W18	W16	WSW16	SW10	SW14	SW13	SW12	SW14	SW12	SW12	SW15	WSW12.6	W18
30-Apr	WSW16	WSW16	WSW16	WSW19	WSW20	WSW12	SW14	WSW25	WSW25	SW27	SW25	SW27	WSW24	WSW20	SW14	SW10	WNW18	W6	WSW10	SW6	SSW5	SSW9	SSW9	S8	WSW14.9	SW27

W0.6	WSW1.2	WSW0.9	WSW1.1	WSW0.9	SSW0.3	SE0.4	SW1.7	SW2.4	WSW1.5	WSW1.0	WSW2.3	WSW2.6	W2.9	W2.8	WSW2.5	NW2.2	N2.3	NE2.4	ENE2.5	ENE2.2	ENE0.9	E1.3	SSE0.7	Diurnal Average
W28	W29	W26	NNE27	NNE29	NNE31	NNE31	NNE29	NNE29	NNE28	NNE26	WSW32	WSW28	W29	WSW29	WSW33	W29	W26	ENE27	W31	WSW29	W28	W32	WNW29	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 Apr 30 17:00	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0
Minimum Value: 1 km/h on Apr 22 05:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 8	

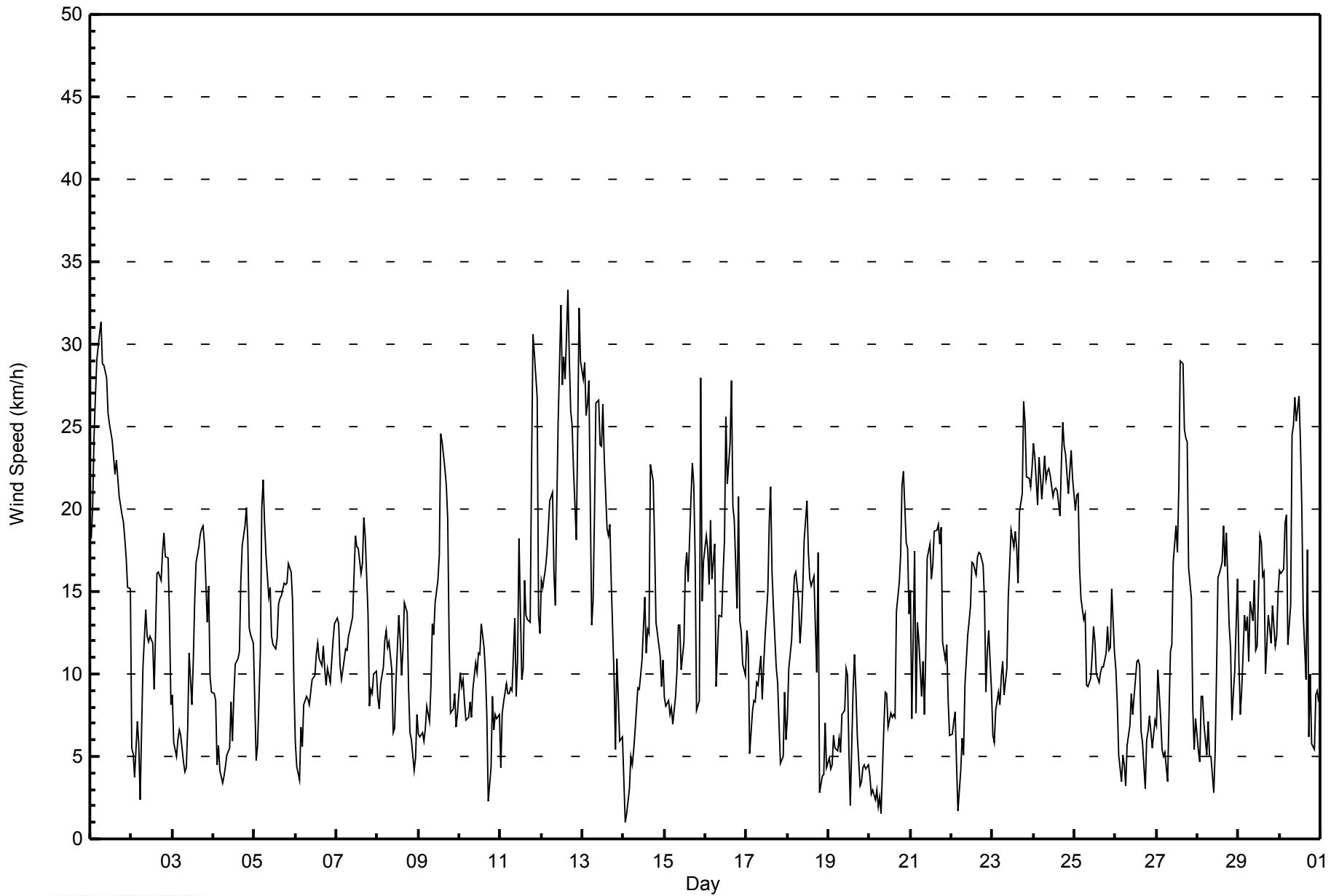
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	4	5	7	7	7	7	7	7	6	6	5	5	6	5	6	5	4	4	4	3	3	3	3	3	7
2-Apr	3	2	2	3	3	2	3	3	3	4	4	4	3	3	4	4	3	3	2	3	3	3	3	3	4
3-Apr	3	2	1	1	1	2	2	1	1	3	3	3	4	4	3	3	3	3	3	3	4	3	4	1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

Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	82	11.39	11.39
6 - 11	265	36.81	48.19
12 - 19	250	34.72	82.92
20 - 28	107	14.86	97.78
29 - 38	16	2.22	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - April 2015**

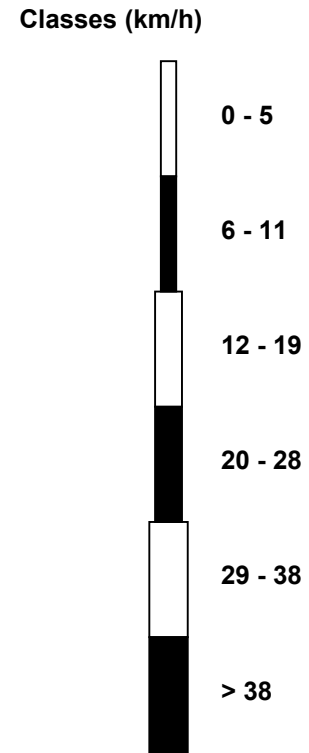
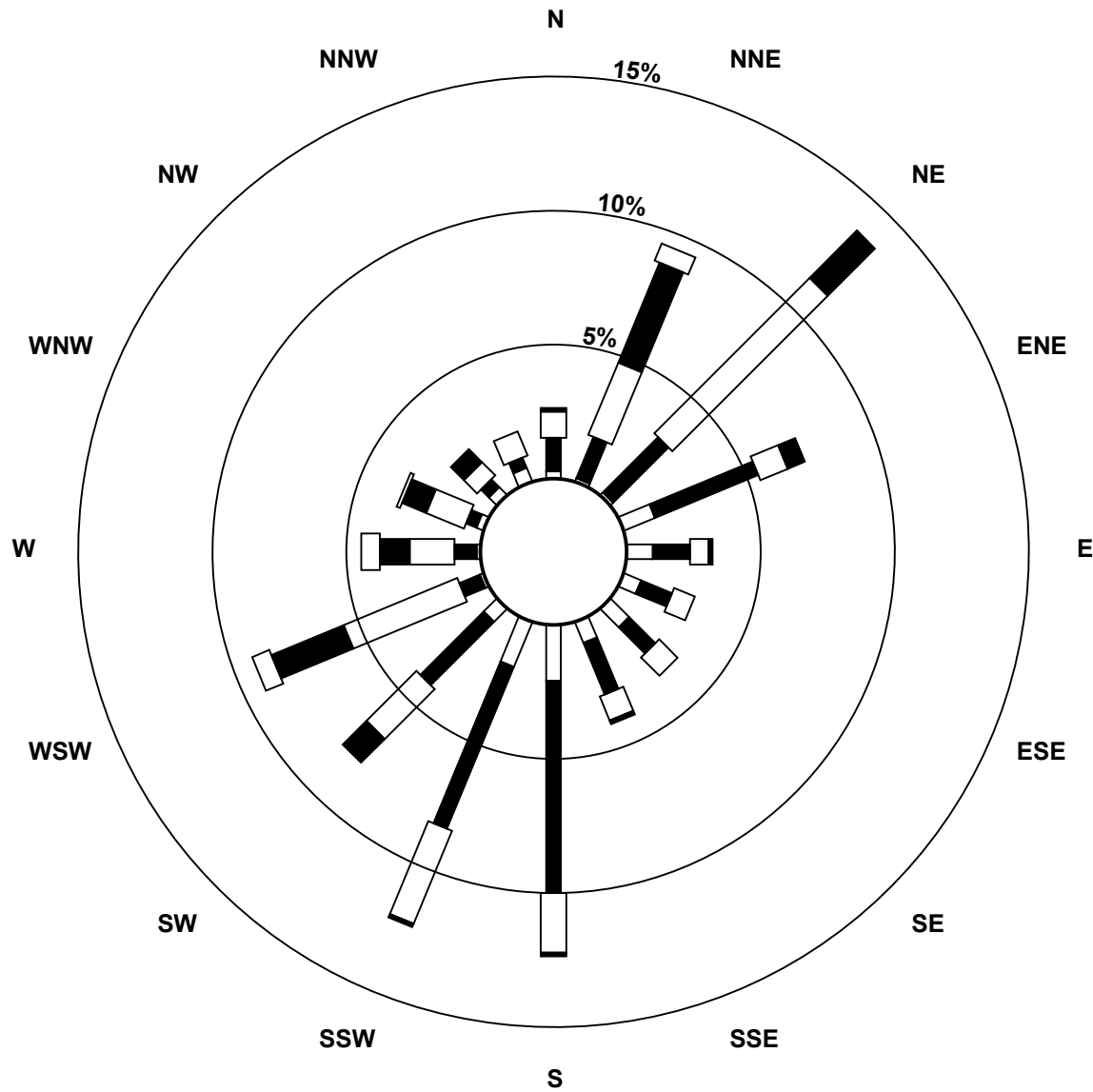
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	1	1	9	7	5	7	6	15	13	5	1	1	2	3	4	82
6 - 11	9	12	21	30	10	9	10	15	57	47	24	6	6	3	3	3	265
12 - 19	7	21	59	8	5	6	7	7	16	27	19	33	12	11	5	7	250
20 - 28	1	29	18	5	1	0	0	1	1	1	9	21	8	7	5	0	107
29 - 38	0	5	0	0	0	0	0	0	0	0	0	5	5	1	0	0	16
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	68	99	52	23	20	24	29	89	88	57	66	32	24	16	14	720

Total Number of Valid Hours: 720

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Wind Speed (WS) - km/h  
 Shell Muskeg River (AMS 16)



Total Number of Valid Hours: 720



**Wood Buffalo Environmental Association**  
**Summary of Hour Averages**

**Wind Direction (WD) - deg**  
**Shell Muskeg River - April 2015**

Direction of Maximum Speed: 254 deg on Apr 12 16:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 29.1 deg on Apr 1	Hours of Data: 720
Direction of Minimum Speed: 213 deg on Apr 14 02:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 3.3 deg on Apr 8	Percent Operational Time: 100.0
Monthly Average Direction: 225.1 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	17	17	16	21	22	26	25	25	26	24	30	29	22	25	17	35	42	40	36	36	41	54	55	57	29.1
2-Apr	25	344	344	65	73	102	39	25	28	9	12	20	33	27	39	56	52	54	51	51	52	47	54	76	41.4
3-Apr	68	75	78	76	87	82	81	72	67	41	40	36	32	46	50	52	49	39	45	53	68	55	56	69	54.3
4-Apr	69	72	73	70	86	114	83	81	49	45	350	360	32	49	61	62	55	48	48	49	55	52	11	2	48.4
5-Apr	342	310	296	357	30	31	25	33	48	55	56	59	56	61	55	42	38	45	53	63	57	49	52	64	41.9
6-Apr	80	114	145	136	157	172	171	185	205	214	217	227	202	197	187	191	181	172	158	157	181	189	188	188	182.6
7-Apr	181	184	195	195	194	186	185	186	193	192	193	205	203	199	213	211	228	230	227	209	183	187	183	184	200.0
8-Apr	193	196	186	192	187	186	194	195	223	246	50	40	45	46	55	54	55	50	66	96	114	124	184	192	127.6
9-Apr	179	187	187	205	196	191	187	185	185	192	195	199	213	231	239	242	232	239	239	212	208	205	205	175	213.2
10-Apr	190	193	192	201	196	166	177	195	199	185	193	221	227	217	195	202	221	281	152	144	179	198	170	184	194.5
11-Apr	197	174	185	189	191	188	187	197	221	210	209	270	236	270	275	268	310	284	268	262	257	274	302	246	249.6
12-Apr	251	246	248	245	246	244	243	241	228	235	236	247	255	261	258	254	263	265	271	290	274	264	267	291	256.7
13-Apr	280	269	275	294	290	305	296	285	295	307	313	311	302	307	310	303	301	299	311	336	59	71	68	50	300.2
14-Apr	71	213	158	150	156	188	221	180	169	161	136	143	153	157	171	178	182	164	148	160	158	163	176	183	164.3
15-Apr	186	183	189	197	182	188	191	216	224	239	228	265	286	290	303	248	252	250	247	218	211	263	241	249	242.0
16-Apr	239	239	236	244	243	230	204	221	218	205	201	210	238	253	251	259	310	343	289	282	274	262	233	209	247.0
17-Apr	225	229	191	202	174	183	184	193	195	194	207	206	195	217	223	207	196	157	143	132	147	64	58	11	194.7
18-Apr	330	331	342	345	352	6	357	326	318	339	345	358	349	338	10	39	38	355	48	357	285	197	191	212	353.1
19-Apr	186	179	180	182	193	197	175	192	195	205	194	224	312	57	249	293	314	314	295	146	161	174	194	96	213.1
20-Apr	137	222	70	67	181	137	126	305	59	59	57	60	57	50	40	43	43	32	39	31	31	31	30	28	42.3
21-Apr	31	25	32	50	32	40	66	54	20	34	40	43	35	39	34	32	36	41	48	85	89	111	126	136	46.8
22-Apr	96	74	61	102	198	80	67	119	119	108	133	137	138	135	121	126	126	117	112	115	102	119	125	124	117.8
23-Apr	114	104	93	91	79	57	59	82	104	66	62	54	83	89	87	89	80	72	66	68	66	58	51	45	71.3
24-Apr	47	44	31	44	48	25	38	37	41	40	33	34	36	38	32	21	21	24	23	20	19	24	23	23	32.0
25-Apr	22	23	24	20	19	18	25	17	16	19	14	19	25	3	13	8	8	8	23	35	34	34	47	48	22.5
26-Apr	48	66	99	183	186	187	185	210	223	231	235	241	225	236	263	224	240	232	147	125	118	118	149	153	195.0
27-Apr	176	167	185	189	216	198	214	189	187	204	206	204	211	212	237	238	252	257	252	243	238	222	202	204	222.7
28-Apr	200	134	171	164	169	190	183	184	247	328	9	163	176	176	163	168	174	183	177	163	163	200	192	247	179.7
29-Apr	262	260	263	249	259	270	274	255	247	249	243	237	259	266	267	250	229	235	226	222	235	230	224	236	248.2
30-Apr	255	244	239	247	246	238	231	241	244	235	227	228	240	256	227	222	296	281	255	233	196	213	200	186	239.3

276.0 238.0 258.0 249.5 253.4 198.2 138.6 224.9 228.8 251.7 240.5 256.2 257.3 265.3 271.7 256.6 318.5 351.9 34.6 60.4 77.5 73.7 101.2 164.0

Diurnal Average

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



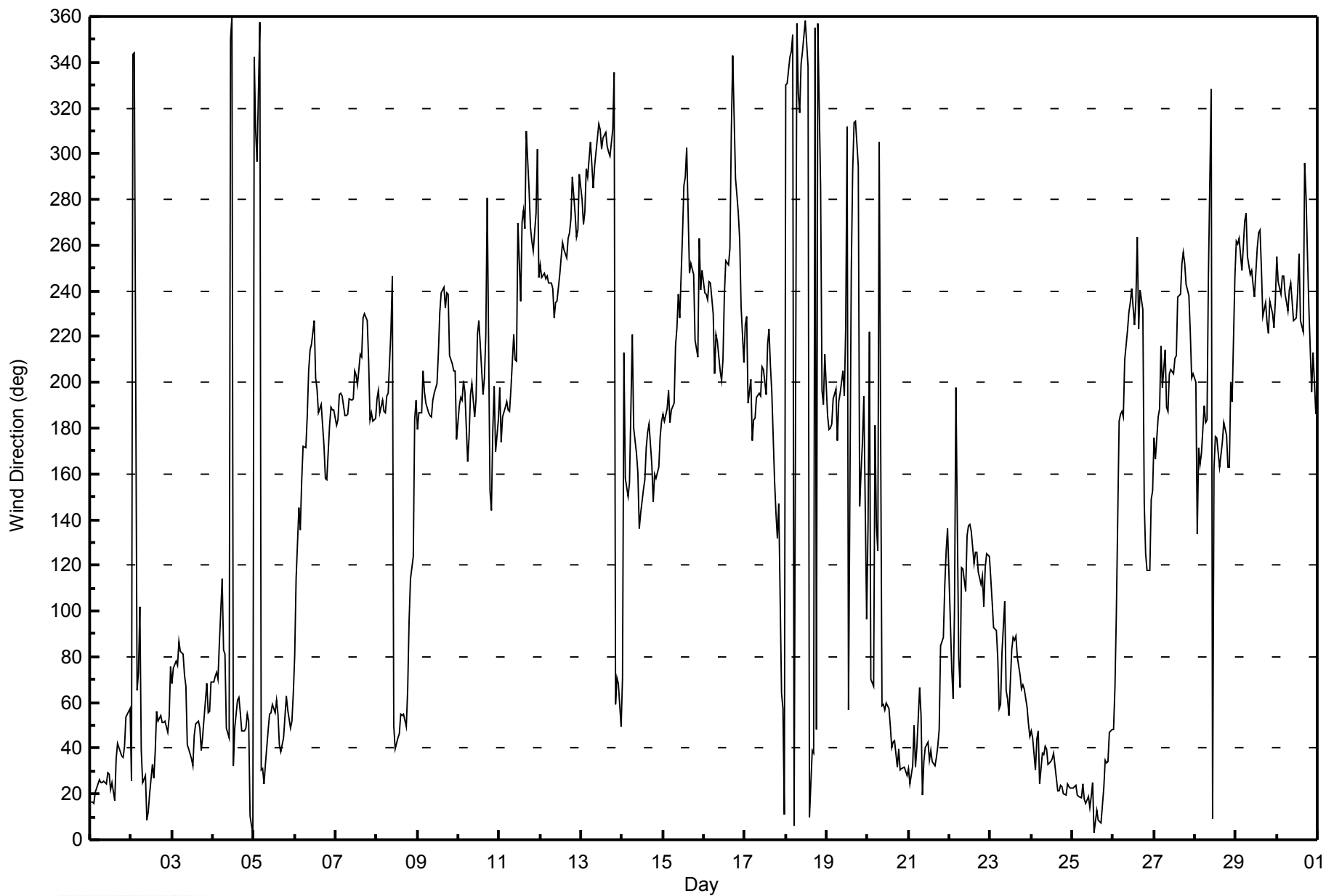
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 90 deg on Apr 19 14:00 Minimum Value: 4 deg on Apr 27 21:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 17 Q <sub>3</sub> = 23 P <sub>90</sub> = 32 P <sub>99</sub> = 66		Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	16	16	15	15	14	13	13	13	14	13	12	13	17	13	18	14	15	13	13	13	14	9	11	11	18	
2-Apr	45	42	53	28	38	84	36	24	19	26	28	28	28	41	26	14	12	12	10	10	15	10	13	16	84	
3-Apr	12	22	12	11	11	13	33	32	38	31	22	42	32	23	12	12	14	15	14	12	18	11	18	8	42	
4-Apr	9	13	38	19	33	32	20	27	19	39	36	59	47	28	22	20	10	12	11	10	12	22	17	18	59	
5-Apr	21	71	33	26	13	10	13	18	17	11	18	19	23	16	13	17	18	14	10	9	8	8	8	12	71	
6-Apr	16	27	19	9	12	7	9	18	21	22	27	29	32	30	29	27	20	17	14	13	18	12	12	12	32	
7-Apr	10	12	15	15	15	13	15	17	21	21	21	22	22	25	24	23	15	11	10	15	13	13	11	12	25	
8-Apr	15	14	12	12	13	12	15	17	25	38	40	36	19	19	21	16	11	7	20	35	11	12	21	14	40	
9-Apr	8	10	11	12	12	16	16	18	18	21	19	23	25	12	12	11	12	8	9	13	16	15	22	16	25	
10-Apr	11	12	15	18	26	14	10	21	20	22	25	22	22	26	30	33	32	58	48	10	21	15	15	11	58	
11-Apr	41	10	12	11	14	18	18	23	14	24	25	15	28	53	21	19	17	31	12	12	12	23	20	14	53	
12-Apr	10	7	7	7	10	9	9	16	19	12	13	11	14	15	12	13	14	15	15	14	16	13	13	14	19	
13-Apr	15	12	13	17	13	18	19	14	15	15	22	20	17	22	24	24	15	19	15	36	10	22	13	14	36	
14-Apr	27	81	51	25	19	24	19	31	21	25	21	23	17	29	19	26	18	18	16	16	16	14	13	20	81	
15-Apr	20	20	18	15	18	19	19	20	13	15	27	46	32	22	25	26	15	13	9	25	29	11	11	11	46	
16-Apr	7	7	8	5	8	8	17	18	22	25	22	26	13	16	11	14	26	23	19	17	13	7	17	17	26	
17-Apr	10	15	45	14	10	13	14	20	20	27	26	25	28	21	21	23	22	16	17	20	19	26	8	30	45	
18-Apr	18	20	18	19	20	18	22	21	17	25	23	22	22	34	43	25	24	50	13	56	64	17	20	8	64	
19-Apr	18	22	19	19	19	16	12	23	24	28	28	40	65	90	43	26	25	22	19	47	22	22	15	33	90	
20-Apr	19	60	49	59	29	63	33	71	30	9	14	27	29	35	43	40	22	19	13	10	10	12	11	13	71	
21-Apr	15	37	11	20	14	21	14	15	32	19	15	15	23	16	15	16	13	12	9	19	15	16	28	22	37	
22-Apr	24	13	10	24	53	37	13	33	25	24	25	24	22	21	23	23	22	18	17	16	18	19	17	17	53	
23-Apr	17	16	15	15	15	8	8	29	27	21	20	19	23	19	21	20	20	15	11	11	11	10	10	11	29	
24-Apr	9	11	13	14	13	12	14	15	14	14	17	20	19	17	21	20	18	13	14	14	14	13	11	10	21	
25-Apr	11	11	10	11	12	12	12	21	23	22	26	22	30	34	36	29	31	28	20	17	17	17	10	11	36	
26-Apr	9	12	24	17	22	18	26	29	27	30	56	45	38	37	30	48	68	79	27	12	11	18	16	15	79	
27-Apr	20	13	17	17	21	18	30	24	22	22	23	24	25	23	12	12	14	12	12	8	4	9	14	13	30	
28-Apr	24	22	11	8	7	14	13	35	47	66	33	52	21	20	20	17	18	17	15	13	12	22	15	31	66	
29-Apr	23	25	14	6	10	10	17	9	13	12	15	21	15	16	16	13	21	18	14	18	6	16	11	9	25	
30-Apr	7	9	7	8	8	21	16	9	9	10	13	14	24	20	30	30	32	35	22	19	30	27	16	14	35	
		45	81	53	59	53	84	36	71	47	66	56	59	65	90	43	48	68	79	48	56	64	27	28	33	
		Diurnal Maximum																								





**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Shell Muskeg River - April 2015**



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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 10, 2015	Last Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:05
Gas Cert Reference	LL107937	Station temp.	22 Deg C
Cal Gas Concentration	50.8 ppm	Cal Gas Exp Date	29-May-14
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	826	819
Calculated slope	1.007336	0.992320	Chamber temp	44.9	45.3
Calculated intercept	2.919281	-0.009923	Pressure	718.6	702.1
Analyzer Background	6.0	6.3	Flow	0.452	0.438
Analyzer Coefficient	1.221	1.228	Intensity	90	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	0.0	----
as found span	5000	78.7	799.6	805.8	0.992
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	78.7	799.6	805.8	0.992
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.992

Corrected As found 805.8 Previous response 790.8 % change -1.9%

**Notes:**

As founds done prior to cal cylinder change. See "CAL" sheet with same date for calibration.

Calibration Performed By: Michael Martineau



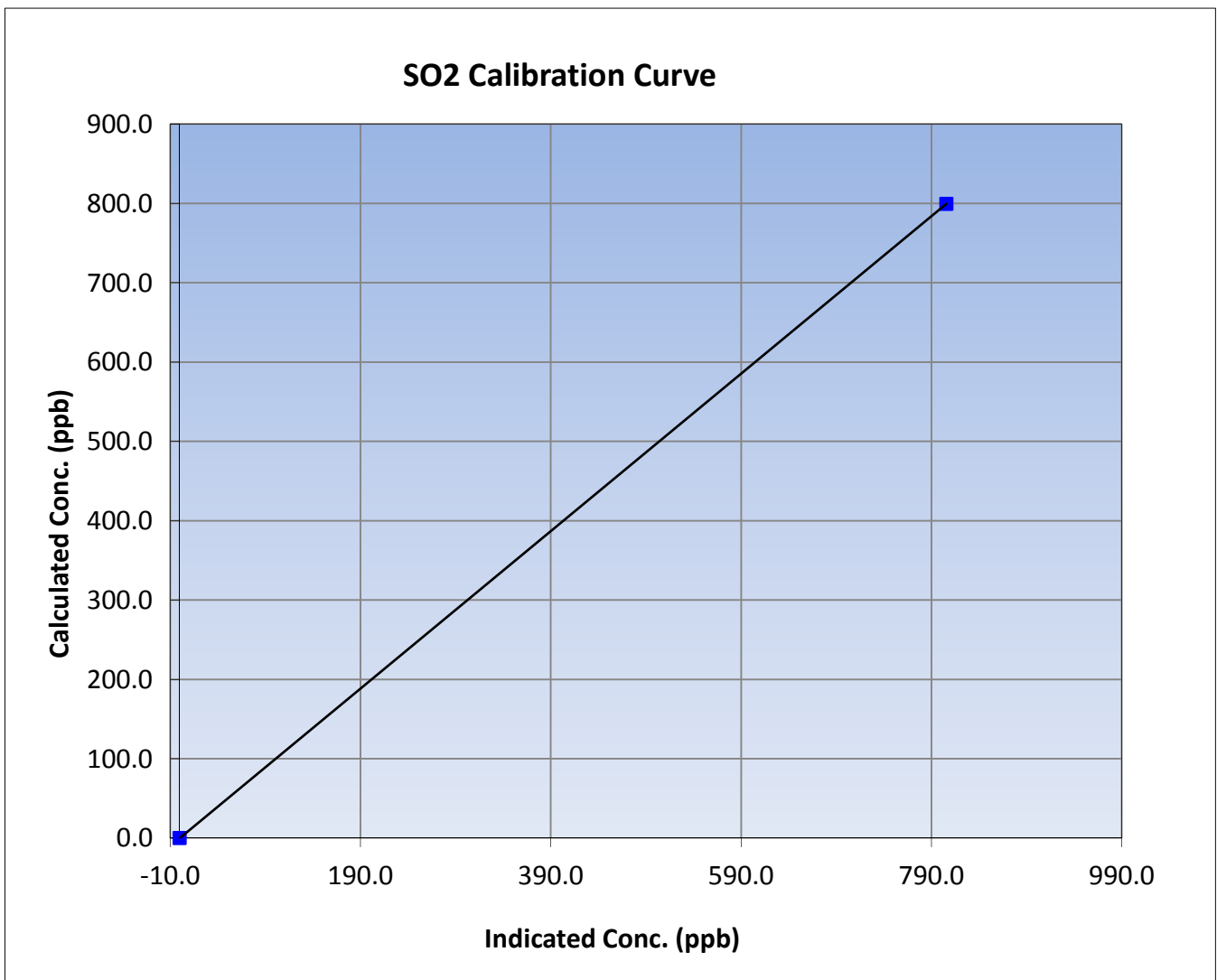
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

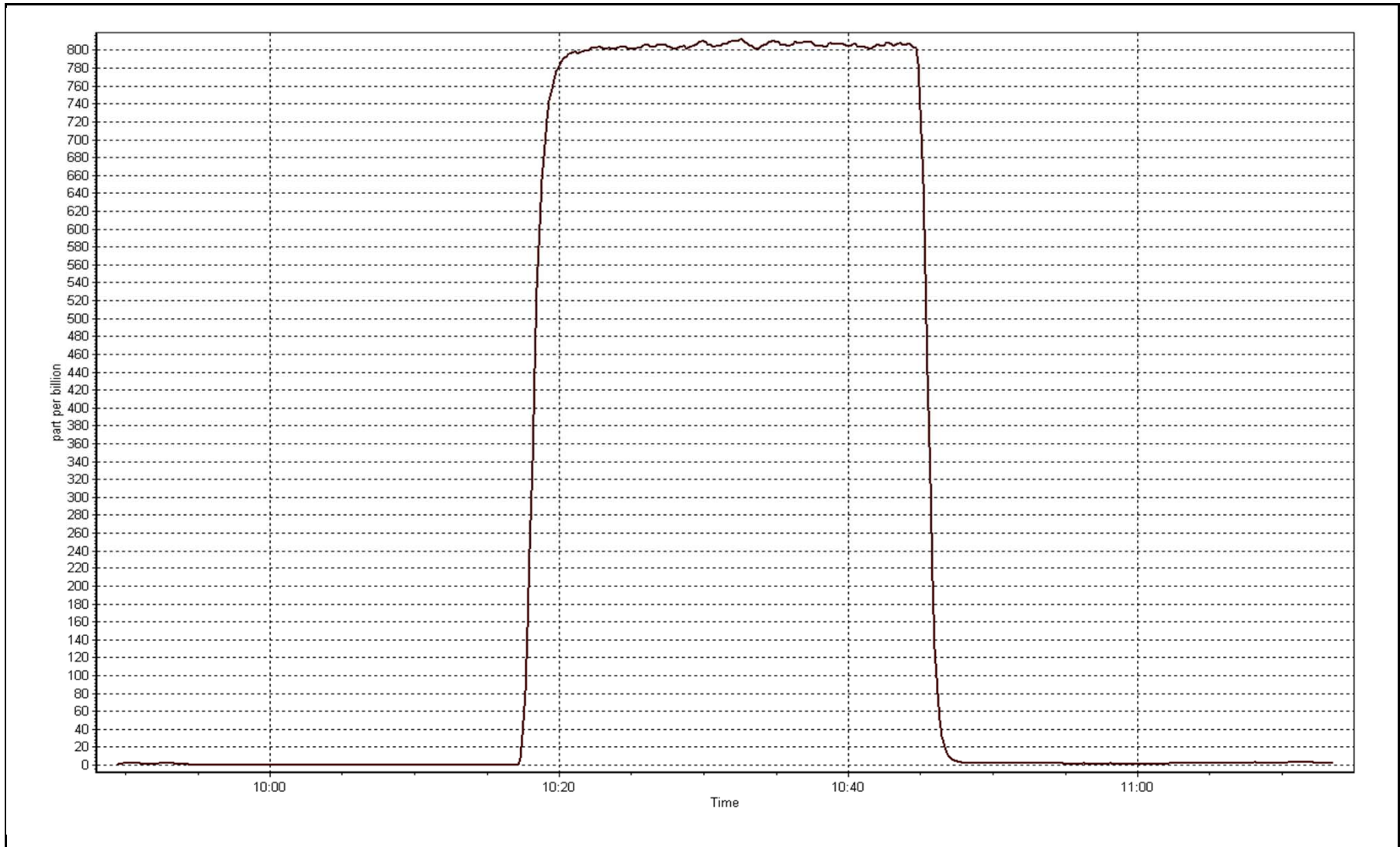
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	1.000000
799.6	805.8	0.9923		Slope
			Intercept	-0.009923



SO2 Calibration Plot

Date: April 10, 2015





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 10, 2015	Last Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:05
Gas Cert Reference	LL104193	Station temp.	22 Deg C
Cal Gas Concentration	48.3 ppm	Cal Gas Exp Date	12-Feb-18
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
ZAG Make/Model	API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-710	-710
Analyzer IP address	192.168.1.43		Lamp voltage	826	819
Calculated slope	1.007336	0.989228	Chamber temp	44.9	45.3
Calculated intercept	2.919281	3.834915	Pressure	718.6	702.1
Analyzer Background	6.0	6.3	Flow	0.452	0.438
Analyzer Coefficient	1.221	1.228	Intensity	90	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					
as found span					
calibrator zero	5000	0.0	0.0	0.0	----
high point	5000	82.8	799.8	806.9	0.991
second point	5000	41.4	399.9	397.3	1.007
third point	5000	20.7	200.0	195.2	1.024
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	82.8	799.8	828.0	0.966
Average Correction Factor					1.007

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

New calibration cylinder installed.Changed inlet filter after as founds. Changed cal cylinder and adjusted span.

Calibration Performed By:

\_\_\_\_\_  
Michael Martineau



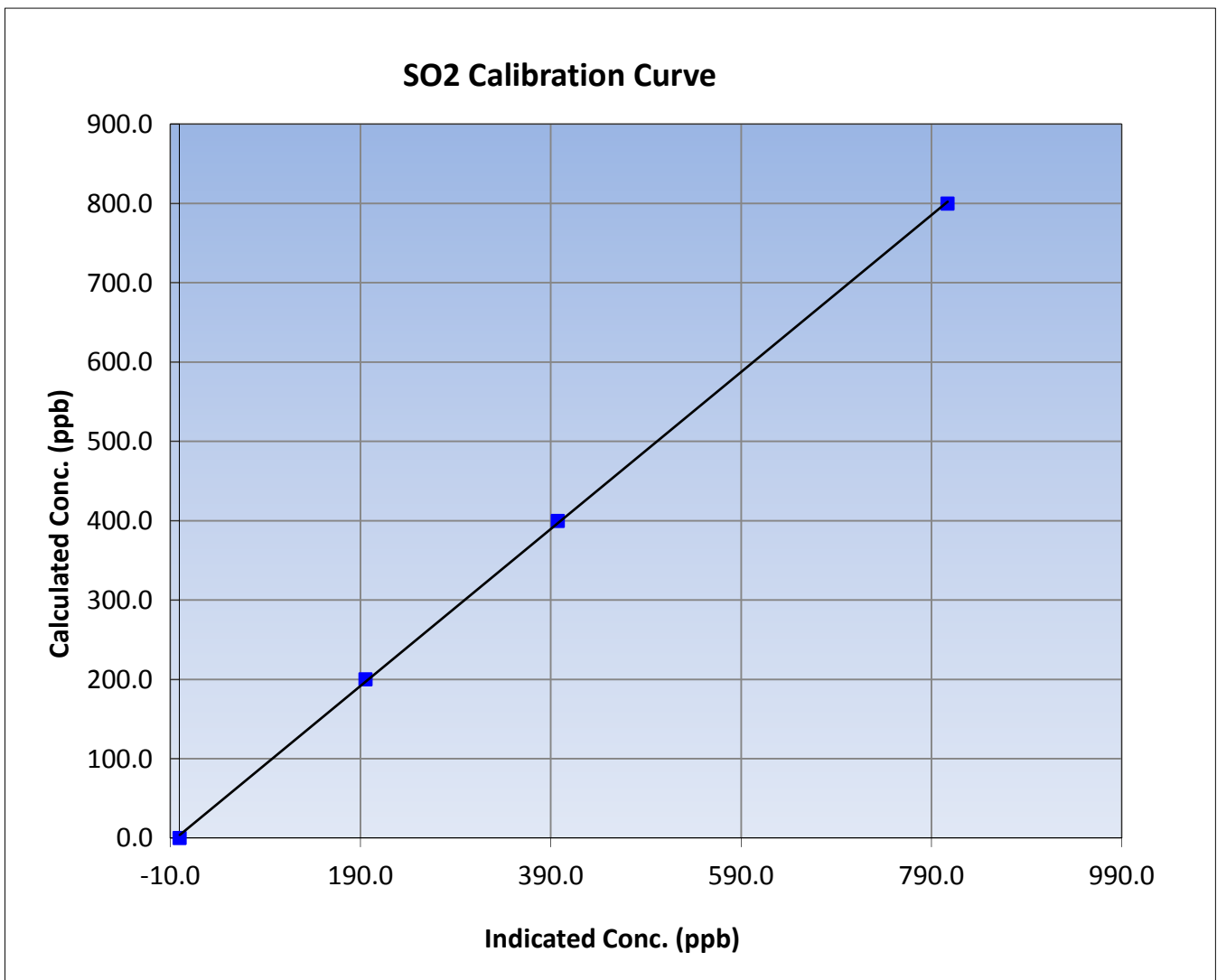
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

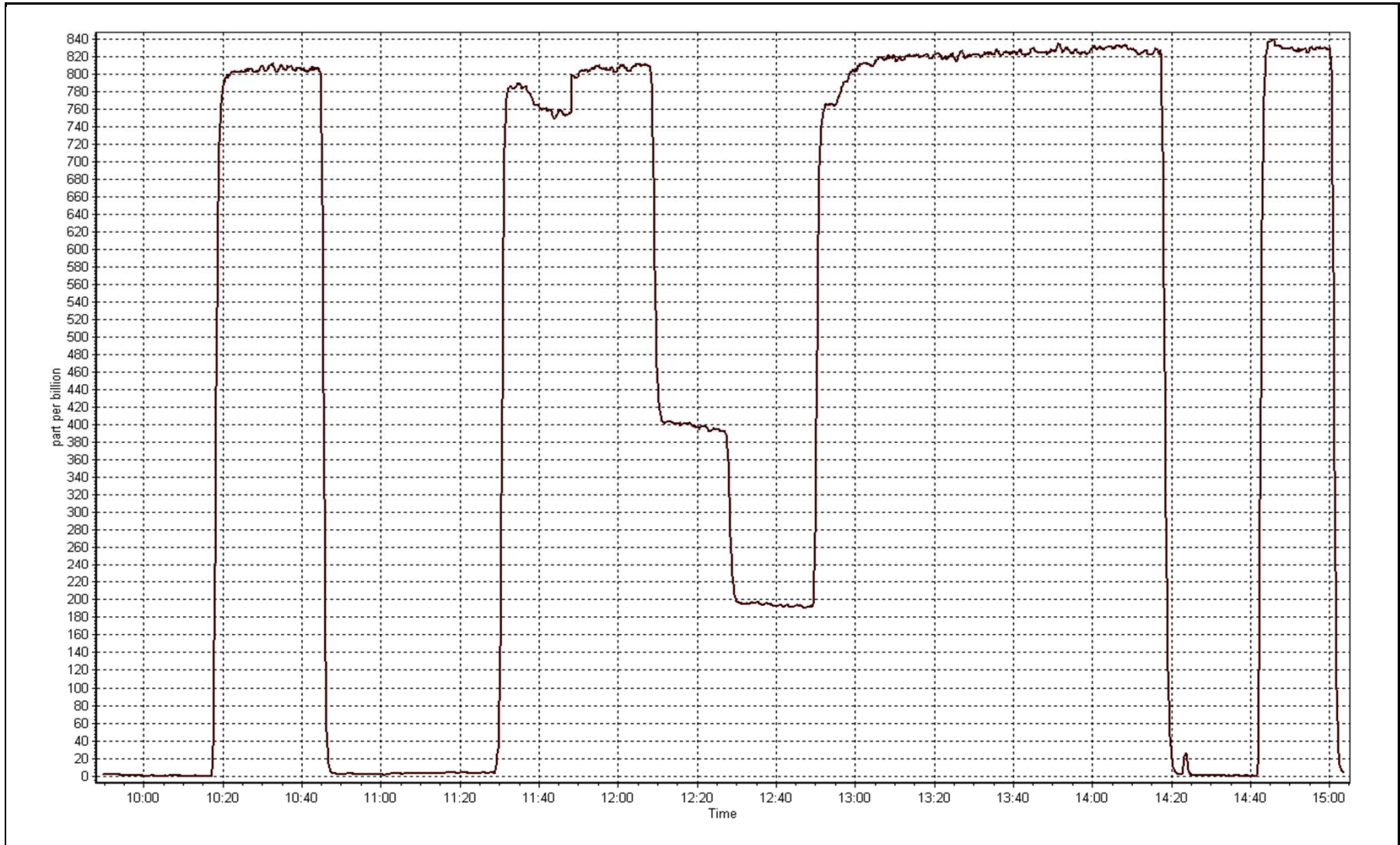
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999891
799.8	806.9	0.9912		
399.9	397.3	1.0066	Slope	0.989228
200.0	195.2	1.0244		
			Intercept	3.834915



SO2 Calibration Plot

Date: April 10, 2015







# Wood Buffalo Environmental Association THC Calibration Report

### Station Information

Calibration Date	Friday, April 10, 2015	Last Calibration	Tuesday, March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:05
Gas Cert Reference	LL107937	Cal Gas Expiry Date	29-May-14
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1078.8 ppm
C3H8 Cal Gas Conc.	205 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.8
Calculated slope	1.000234	0.961468	Fuel Pressure	24.2	24.2
Calculated intercept	0.040861	0.028844	Analyzer Coeff	4.6	4.3
			Analyzer BKG	2.930	2.750

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.03	----
as found span	5000	78.7	16.98	17.63	0.963
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	78.7	16.98	17.63	0.963
second point					
third point					
as left zero					
as left span					
Average Correction Factor					0.963

Corrected As found	17.66	Previous response	16.93	% change	-4.1%
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**Notes:**

Cal cylinder was changed after as founds; see "cal" file of same date for multipoint cal.

Calibration Performed By:

Michael Martineau



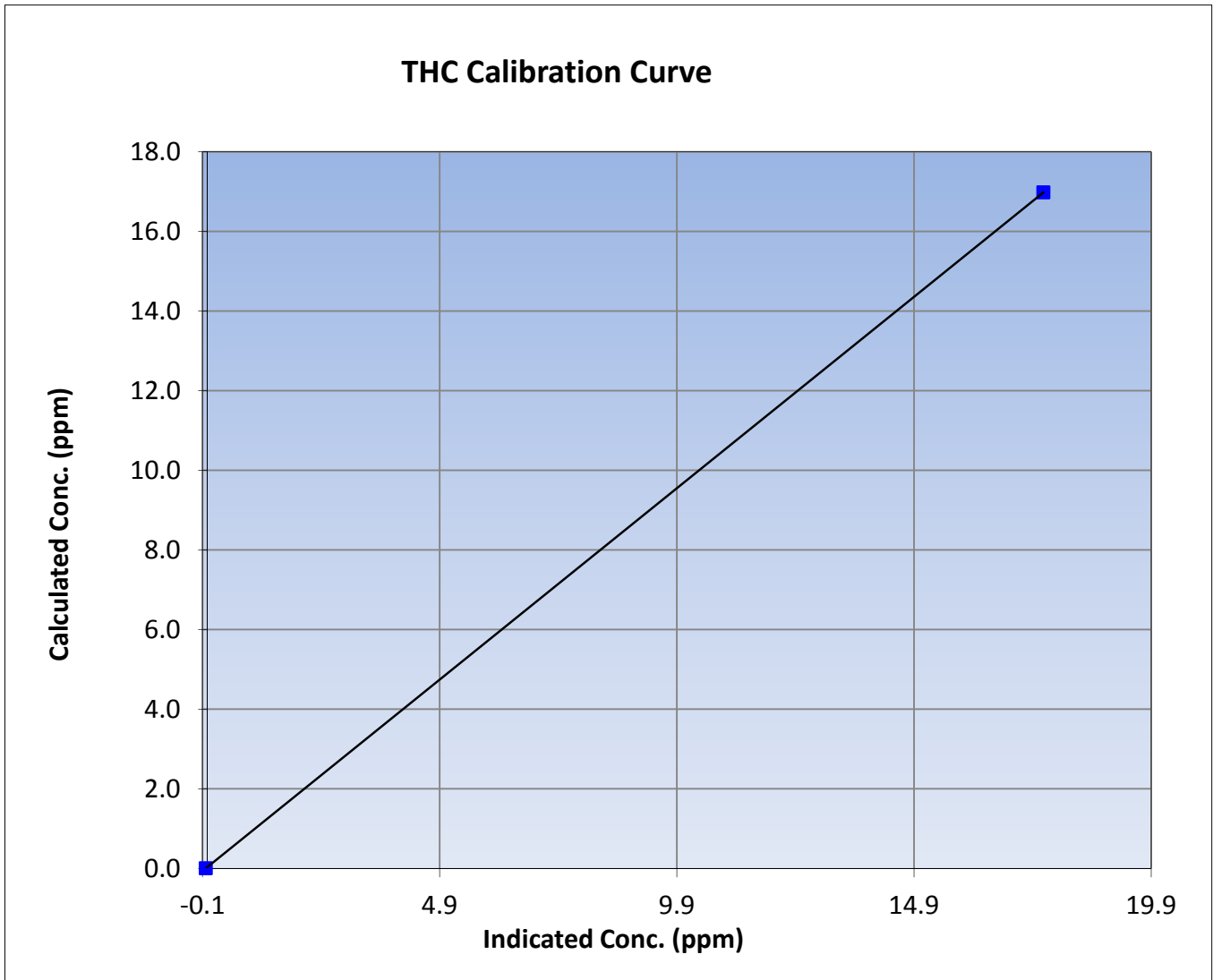
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

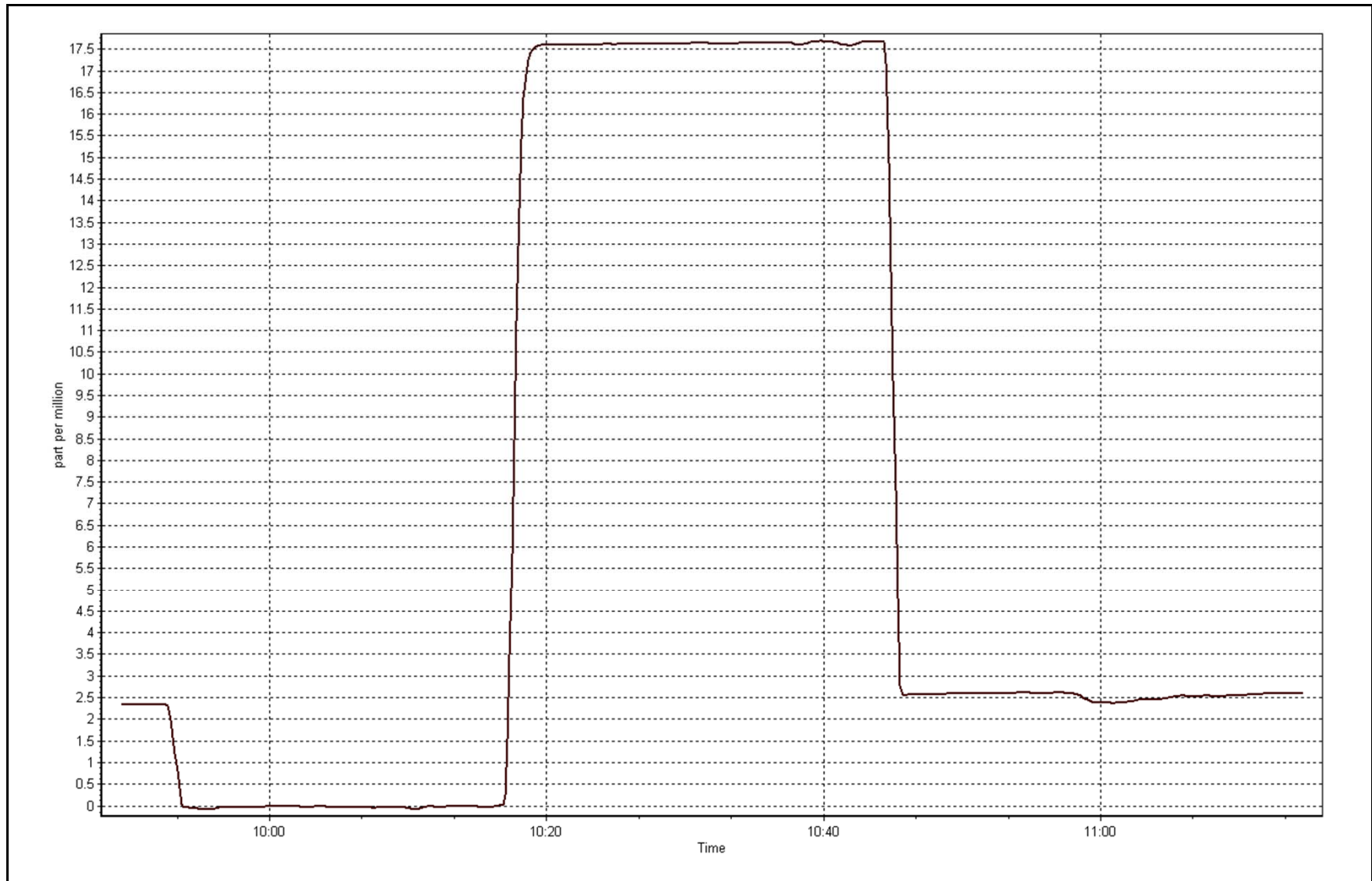
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	1.000000
16.98	17.63	0.9631		
			Slope	0.961468
			Intercept	0.028844



THC Calibration Plot

Date: April 10, 2015





# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Friday, April 10, 2015	Last Calibration	Tuesday, March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:05
Gas Cert Reference	LL104193	Cal Gas Expiry Date	12-Feb-18
CH4 Cal Gas Conc.	487 ppm	CH4 Equiv Conc.	1017.8 ppm
C3H8 Cal Gas Conc.	193 ppm	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
ZAG make/model	Teledyne API 701	Serial Number	2155
DACS make/model	Campbell Scientific CR3000	Serial Number	2632

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.2	8.2
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.8	34.8
Calculated slope	1.000234	1.003659	Fuel Pressure	24.2	24.2
Calculated intercept	0.040861	-0.088606	Analyzer Coeff	4.556	4.3
			Analyzer BKG	2.93	2.750

Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458
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## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	-0.03	----
high point	5000	82.8	16.85	16.82	1.002
second point	5000	41.4	8.43	8.54	0.987
third point	5000	20.7	4.21	4.41	0.955
as left zero	5000	0.0	0.00	0.30	----
as left span	5000	82.8	16.85	16.89	0.998
Average Correction Factor					0.981

Corrected As found	NA	Previous response	NA	% change	NA
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Notes:

Changed inlet filter after as founds. Changed cal cylinder and adjusted span.

Calibration Performed By: Michael Martineau



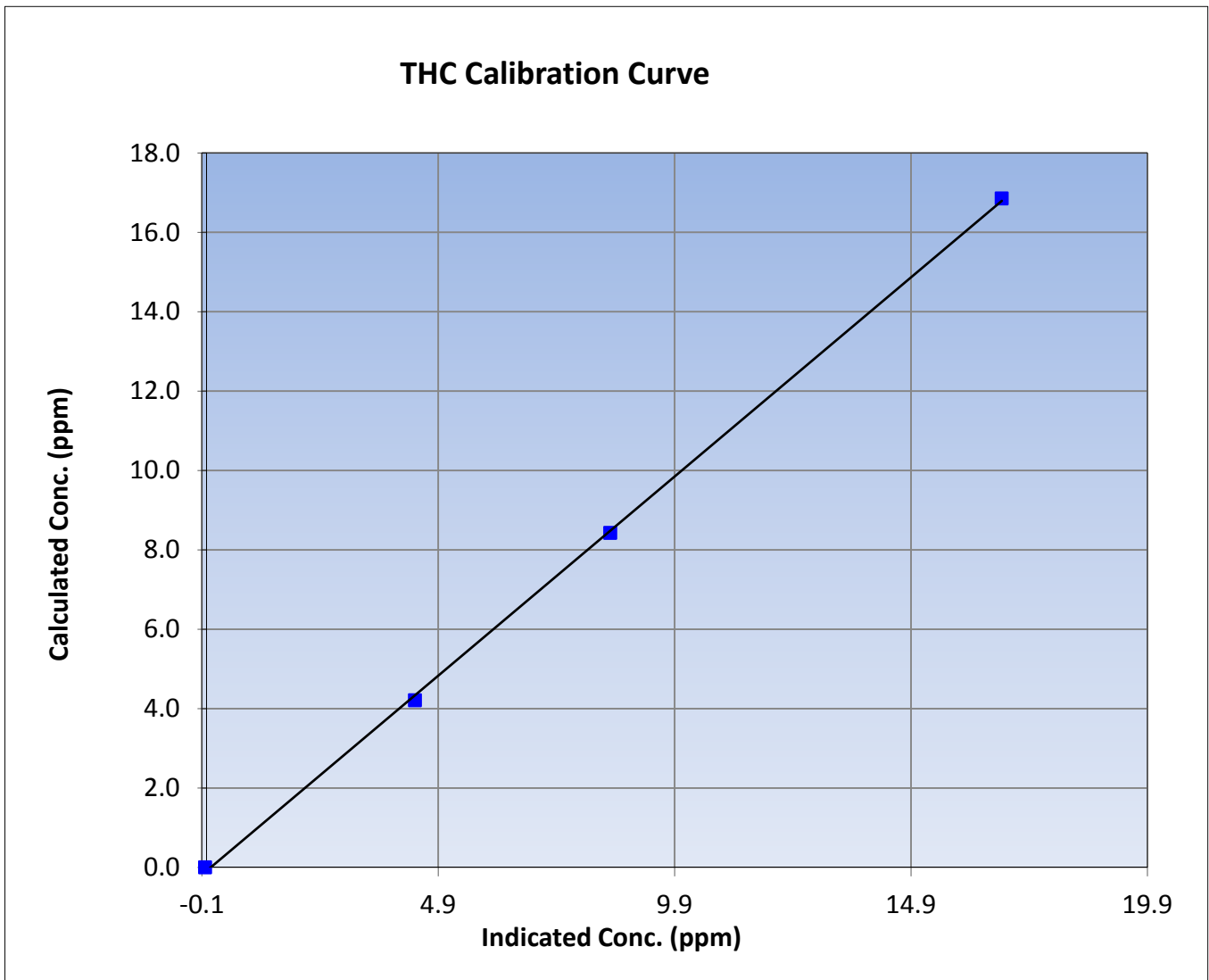
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

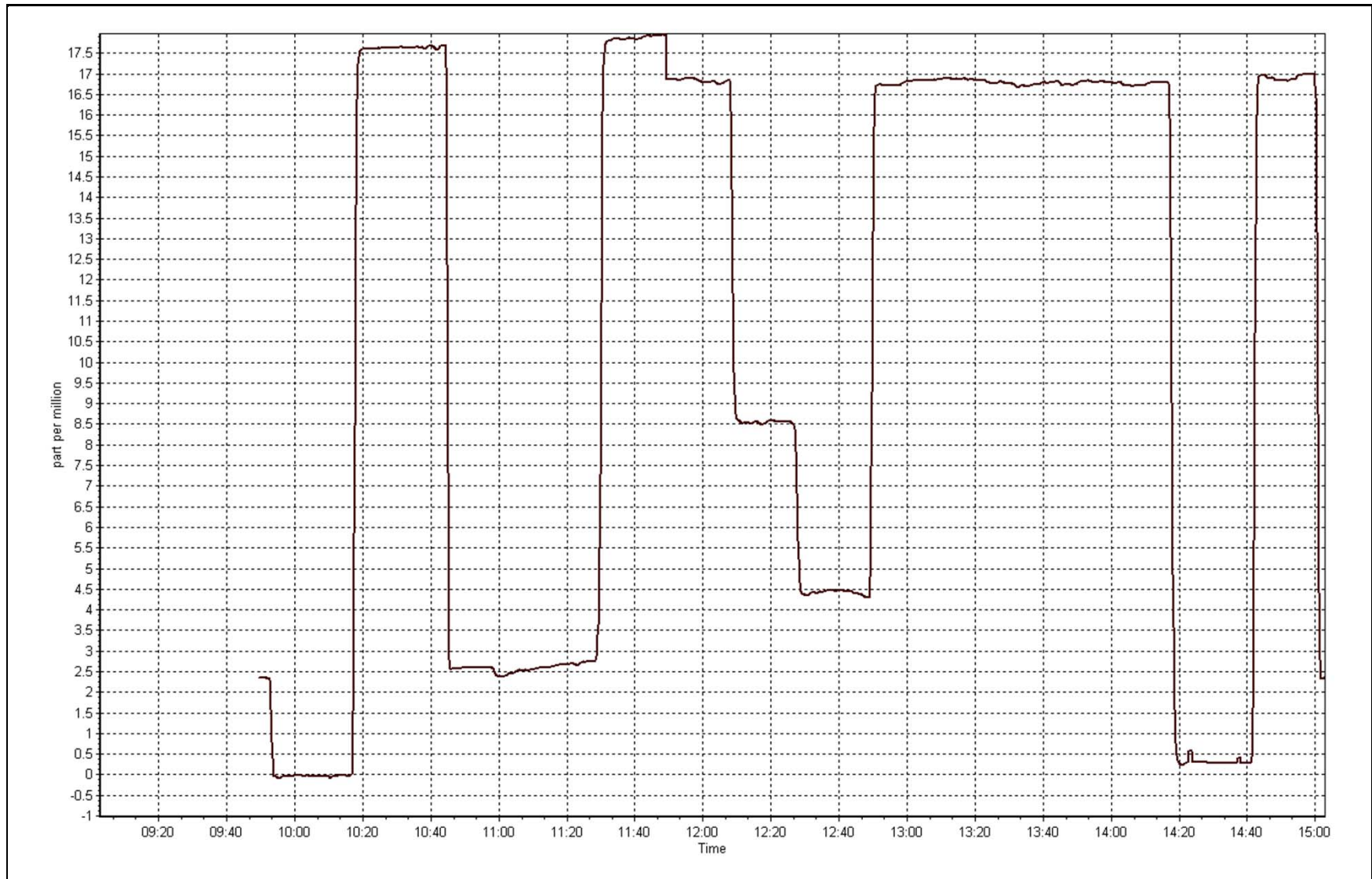
## Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.03	----	Correlation Coefficient	0.999766
16.85	16.82	1.0020		
8.43	8.54	0.9868	Slope	1.003659
4.21	4.41	0.9554		
			Intercept	-0.088606



THC Calibration Plot

Date: April 10, 2015





## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:05
NO Cal Gas Conc	51.2 ppm	Gas Cert Reference	LL107937
NOx Cal Gas Conc	51.3 ppm	Cal Gas Expiry Date	May 29, 2014
Calibrator	Sabio 4010	Serial Number	11081107
Zero air Generator	Teledyne API T701	Serial Number	2155

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2632
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.015754	1.014935	1.000486
	Data Offset	2.537000	2.754807	1.601965
Current Calibration	Data Slope	0.989937	0.990448	
	Data Offset	-0.494969	-0.217899	

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
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Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.812		0.827	
NOX coefficient	0.999		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.5		8.7	
NOX bkgrnd	8.6		8.7	
Chamber Temp	50.5	Deg C	50.1	Deg C
Moly Temp	323	Deg C	326	Deg C
PMT voltage	n/a	V	-774	V
PMT Temp	-3.1	Deg C	-2.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	172.8	mmHg	172.8	mmHg
R Cell Press Nox	n/a	mmHg	173.1	mmHg
NO sample flow	971	lpm	0.856	lpm
Nox sample Flow	n/a	lpm	0.856	lpm

**Notes:**

Data represents as founds prior to cal cylinder change. Full cal with new cylinder represented on separate sheet.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: April 10, 2015      Station Number: AMS 16

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3	----	----
as found span	5000	78.7	807.5	805.9	1.6	816.2	813.9	2.3	0.9893	0.9902
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3	----	----
high point	5000	78.7	807.5	805.9	1.6	816.2	813.9	2.3	0.9893	0.9902
second point										
third point										
as left zero										
as left span										
<b>Average Correction Factor</b>									<b>0.9893</b>	<b>0.9902</b>

Corrced As found    NO<sub>x</sub>=    815.7                      NO=    813.7                      Percent Change            NO<sub>x</sub>=    -2.9%                      NO=    -2.8%  
 Previous Response    NO<sub>x</sub>=    792.4                      NO=    791.3

### 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 NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.3			N/A	
1st NO2 (300)										
2nd NO2 (200)										
3rd NO2 (100)										
4th NO2 (0)										
<b>Average Correction Factor</b>										

Calibration Performed By: Michael Martineau





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

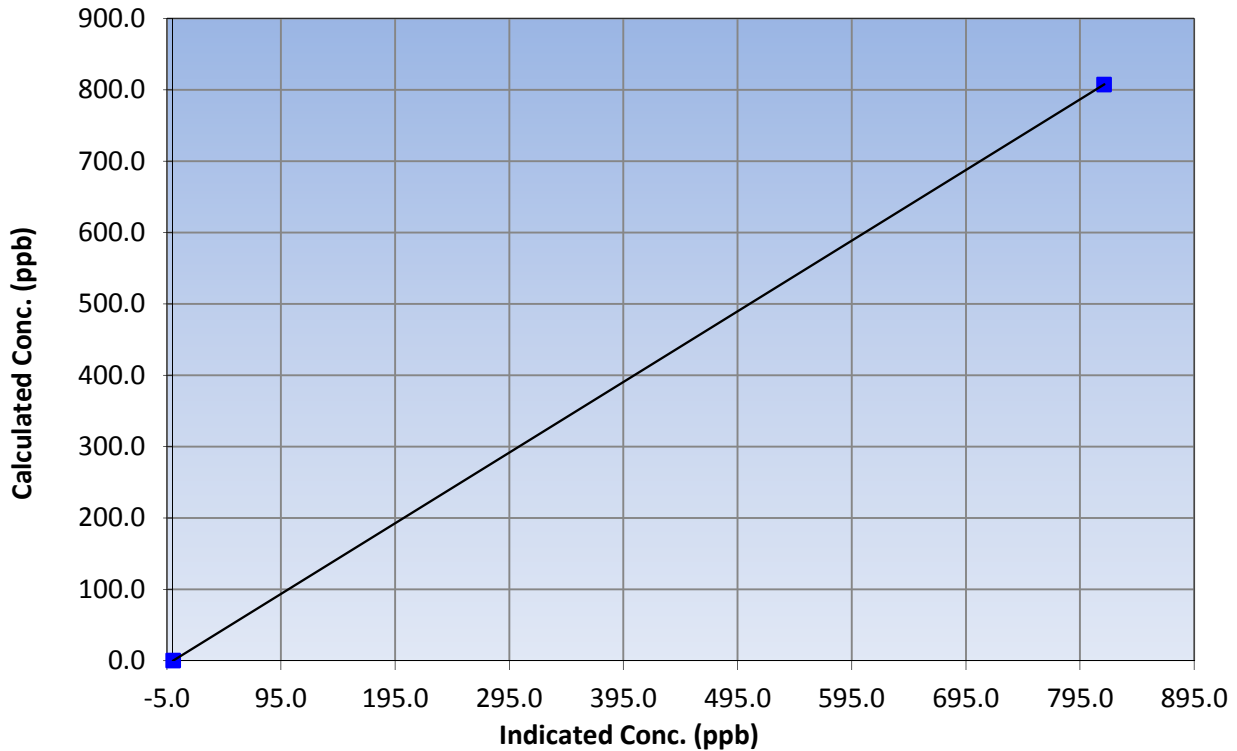
### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	1.000000
807.5	816.2	0.9893		
			Slope	0.989937
			Intercept	-0.494969

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

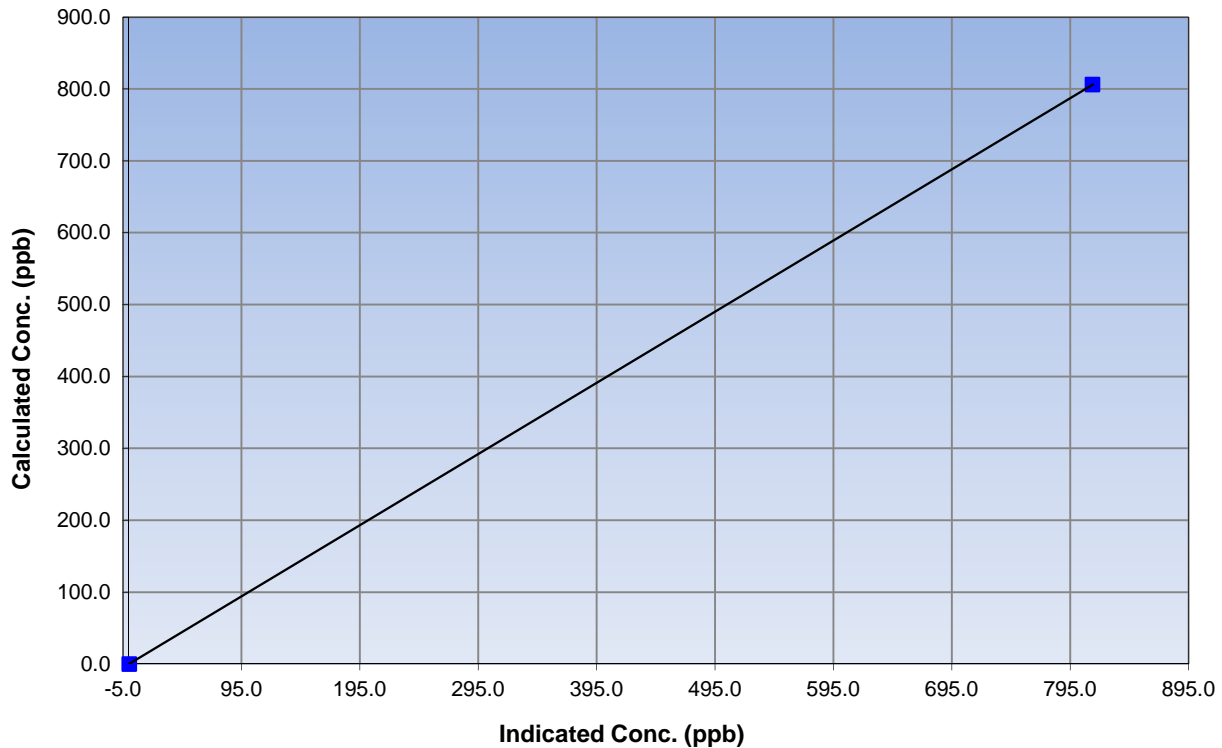
### Station Information

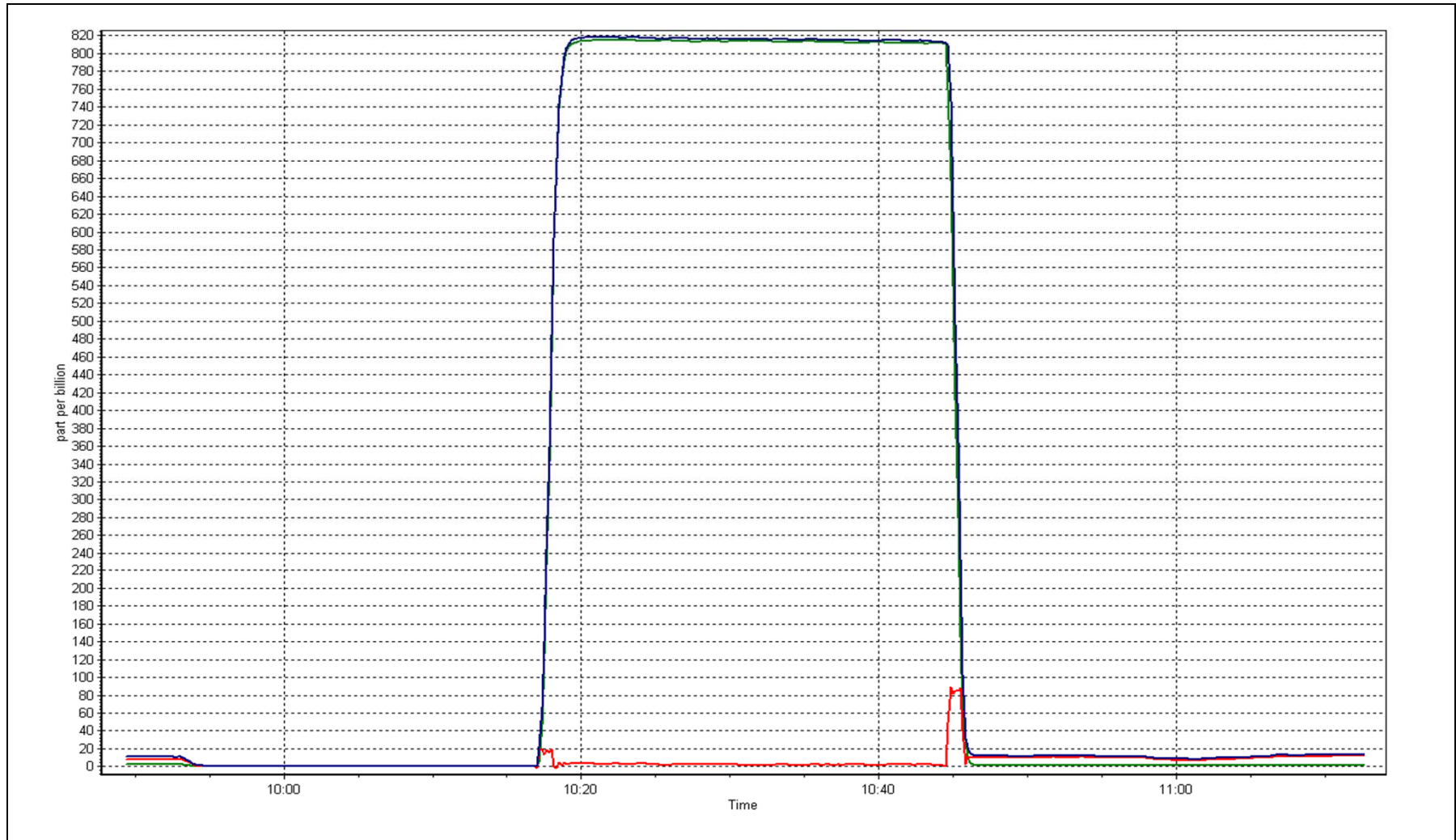
Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	1.000000
805.9	813.9	0.9902		
			Slope	0.990448
			Intercept	-0.217899

### NO Calibration Curve







## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	15:05
NO Cal Gas Conc	48 ppm	Gas Cert Reference	LL104193
NOx Cal Gas Conc	48 ppm	Cal Gas Expiry Date	February 12, 2018
Calibrator	Sabio 4010	Serial Number	11081107
Zero air Generator	Teledyne API T701	Serial Number	2155

### DACs Information

DACs make & model	Campbell Scientific CR3000	DACs serial No.	2632
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.015754	1.014935	1.000486
	Data Offset	2.537000	2.754807	1.601965
Current Calibration	Data Slope	0.994548	0.993476	0.998579
	Data Offset	1.918191	2.502309	-1.238249

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1426262593
---------------------	------------	-------------------	------------

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.812		0.827	
NOx coefficient	0.999		0.997	
NO2 coefficient	1.000		1.000	
NO bkgrnd	8.5		8.7	
NOx bkgrnd	8.6		8.7	
Chamber Temp	50.5	Deg C	50.1	Deg C
Moly Temp	323	Deg C	326	Deg C
PMT voltage	n/a	V	-774	V
PMT Temp	-3.1	Deg C	-2.6	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	172.8	mmHg	172.8	mmHg
R Cell Press Nox	n/a	mmHg	173.1	mmHg
NO sample flow	971	lpm	0.856	lpm
Nox sample Flow	n/a	lpm	0.856	lpm

**Notes:**

Changed inlet filter after as founds; cal cylinder replaced and span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: April 10, 2015      Station Number: AMS 16

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero										
as found span										
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3	----	----
high point	5000	82.8	794.9	794.9	0.0	798.6	799.1	-0.5	0.9954	0.9948
second point	5000	41.4	397.4	397.4	0.0	396.2	395.8	0.4	1.0031	1.0042
third point	5000	20.7	198.7	198.7	0.0	195.7	195.1	0.6	1.0156	1.0188
as left zero	5000	0.0	0.0	0.0	0.0	0.8	0.4	0.5	----	----
as left span	5000	82.8	794.9	504.5	290.4	805.6	513.4	292.1	0.9868	0.9826
<b>Average Correction Factor</b>									<b>1.0047</b>	<b>1.0059</b>

Corrected As found    NO<sub>x</sub>=    NA                      NO=    NA                      Percent Change    NO<sub>x</sub>=    N/A                      NO=    N/A  
 Previous Response    NO<sub>x</sub>=    NA                      NO=    NA

### GPT Calibration Data

Dilution Flow      5000      ccm      Source Gas Flow      82.80      ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.3			N/A	
1st NO2 (300)	----	504.5	296.0	801.5	504.5	297.0	0.9756	1.0000	0.9969	100.3%
2nd NO2 (200)	----	600.8	199.8	802.5	600.8	201.7	0.9744	1.0000	0.9902	101.0%
3rd NO2 (100)	----	699.2	101.3	803.2	699.2	104.0	0.9735	1.0000	0.9746	102.6%
4th NO2 (0)	800.6	----	-0.4	800.2	800.6	-0.4	0.9772	1.0000	N/A	----
<b>Average Correction Factor</b>							<b>0.9752</b>	<b>1.0000</b>	<b>0.9872</b>	<b>101.3%</b>

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

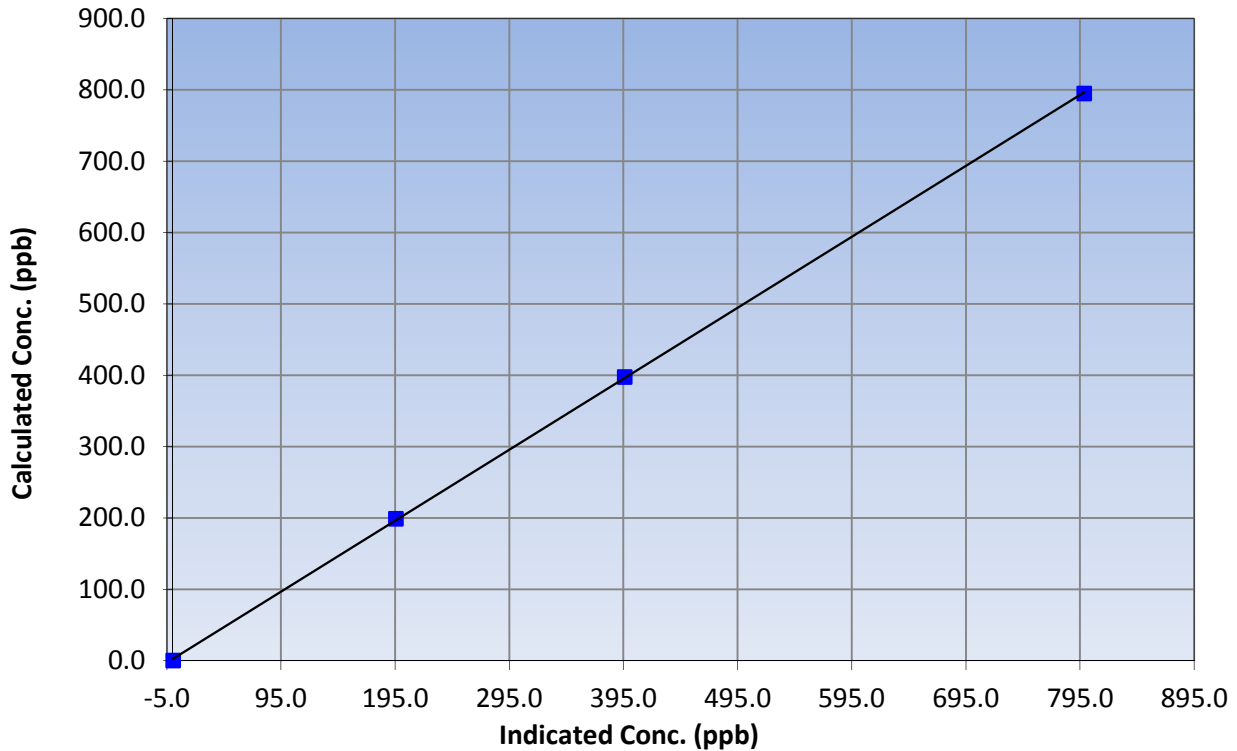
### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	----	Correlation Coefficient	0.999958
794.9	798.6	0.9954		
397.4	396.2	1.0031	Slope	0.994548
198.7	195.7	1.0156		
			Intercept	1.918191

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

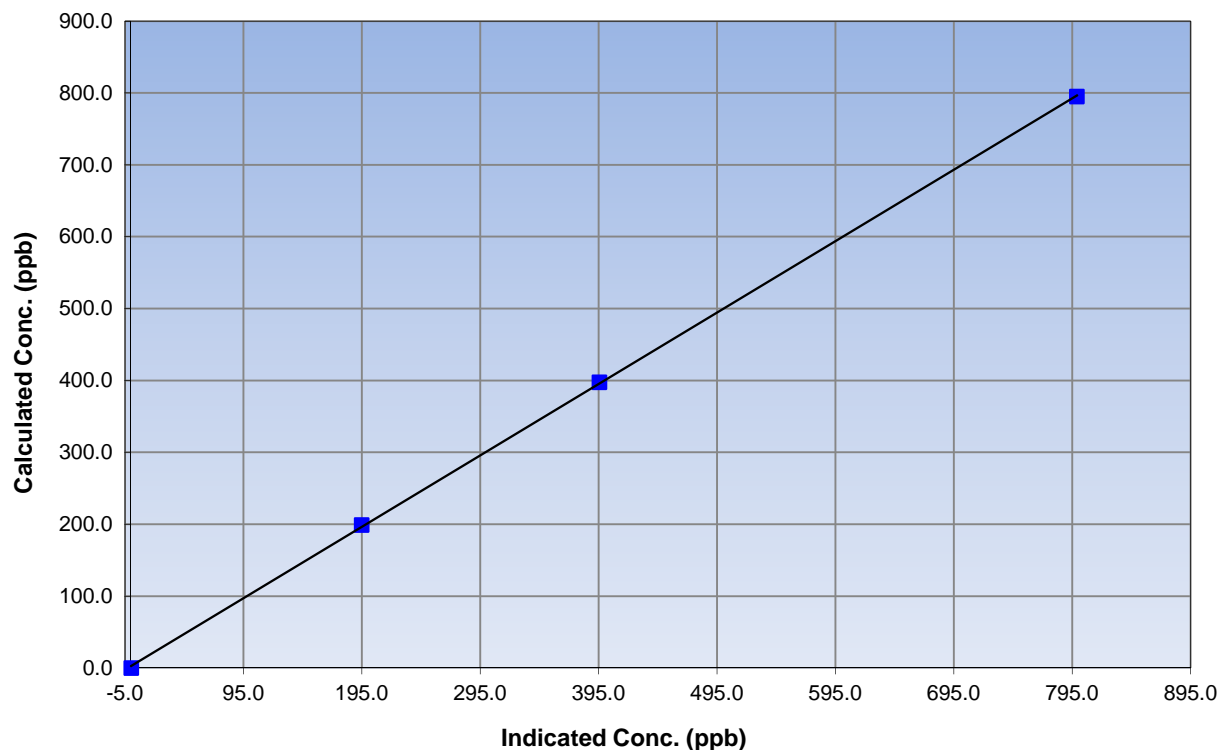
### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999946
794.9	799.1	0.9948		
397.4	395.8	1.0042	Slope	0.993476
198.7	195.1	1.0188		
			Intercept	2.502309

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

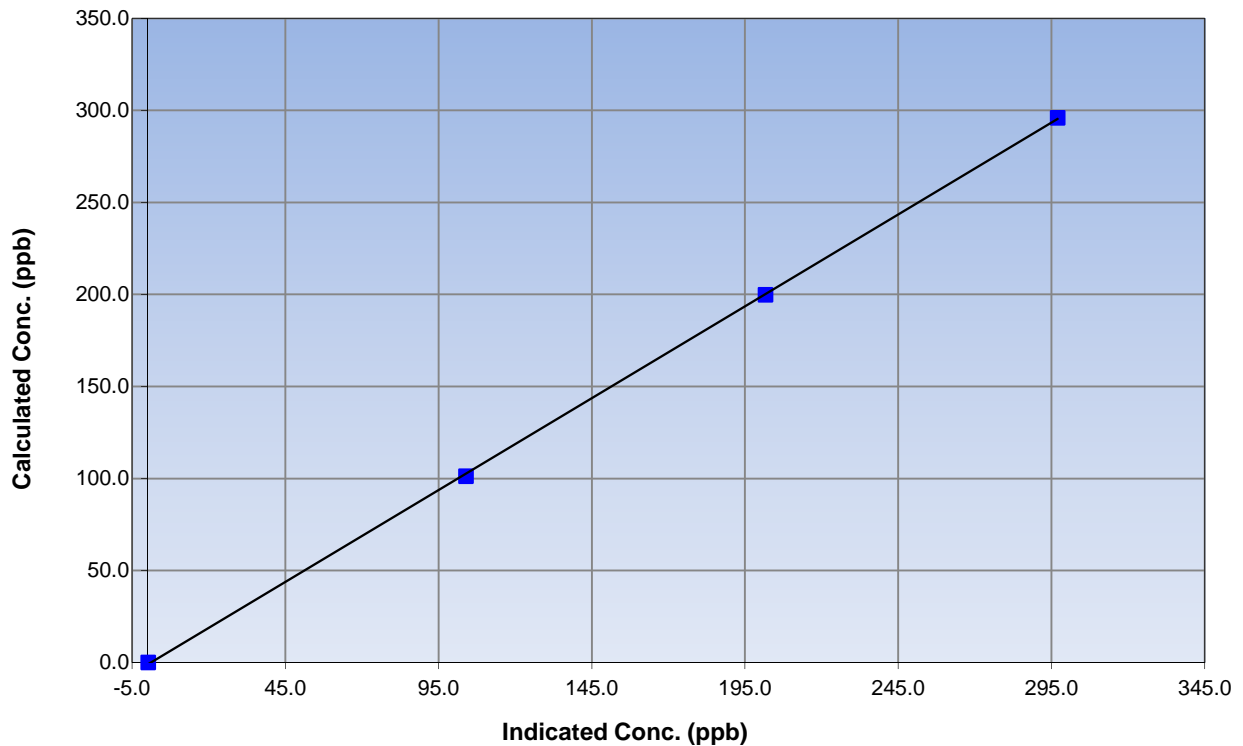
### Station Information

Calibration Date	April 10, 2015	Previous Calibration	March 17, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:00	End Time (MST)	15:05
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

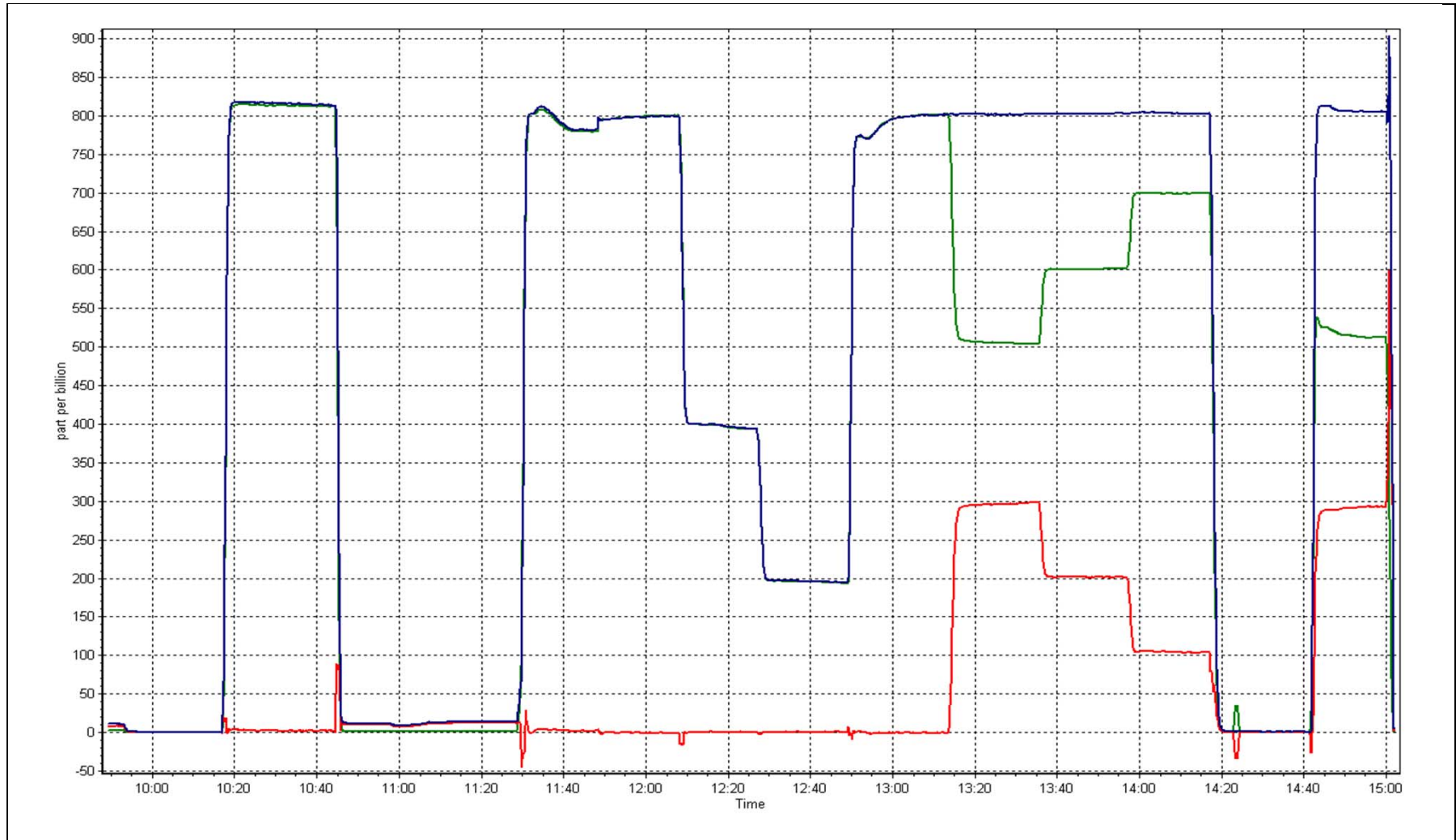
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999933
296.0	297.0	0.9969		
199.8	201.7	0.9902	Slope	0.998579
101.3	104.0	0.9746		
			Intercept	-1.238249

### NO<sub>2</sub> Calibration Curve







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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 17  
WAPASU  
APRIL 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

May 29, 2015

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## WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)

APRIL 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	680	36	40	99.44	19	0	4	0
H2S (ppb) Average	667	35	53	97.50	1	0	0	0
THC (ppm) Average	680	36	40	99.44	2.5	-	2.2	-
O3 (ppb) Average	683	33	37	99.44	58	0	48	-
NO2 (ppb) Average	680	36	40	99.44	18	0	7	-
NO (ppb) Average	680	36	40	99.44	10	-	1	-
NOX (ppb) Average	680	36	40	99.44	28	-	7	-
PM2.5 (ug/m3) Average	715	0	5	99.31	11	-	7.4	0
Temperature 2 m (C) Average	720	0	0	100.00	22	-	15.7	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	83	-
Wind Speed 10 m (km/h) Average	713	0	7	99.03	24	-	18	-
Wind Direction 10 m (deg) Average	713	0	7	99.03	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
 APRIL 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	680	0.7	2	-	0	0	0	0	0	1	19
H2S (ppb) Average	667	0.2	0	-	0	0	0	0	0	0	1
THC (ppm) Average	680	2.05	0.1	-	1.9	2	2	2	2.1	2.1	2.5
O3 (ppb) Average	683	37.8	8	-	5	28	34	39	43	46	58
NO2 (ppb) Average	680	2	3	-	0	0	0	1	2	5	18
NO (ppb) Average	680	0.6	1	-	0	0	0	0	1	1	10
NOX (ppb) Average	680	2.6	3	-	0	1	1	1	3	7	28
PM2.5 (ug/m3) Average	715	3.31	1.8	-	1.1	1.7	2	2.7	4.1	6	11
Temperature 2 m (C) Average	720	3.28	8.2	-	-21.9	-7.7	-1.3	3.9	9.1	12.9	22
Relative Humidity (%) Average	720	48.1	21	-	15	25	31	44	62	80	99
Wind Speed 10 m (km/h) Average	713	9.8	4	-	1	5	7	9	13	16	24
Wind Direction 10 m (deg) Average	713	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	08 Apr 2015 12:00	08 Apr 2015 15:00	4	Station power failure
H2S	05 Apr 2015 20:00	05 Apr 2015 20:00	1	Intermittent unstable operation - excessive baseline drift
H2S	13 Apr 2015 14:00	13 Apr 2015 14:00	1	Intermittent unstable operation - excessive baseline drift
H2S	14 Apr 2015 16:00	14 Apr 2015 16:00	1	Intermittent unstable operation - excessive baseline drift
H2S	15 Apr 2015 12:00	15 Apr 2015 13:00	2	Intermittent unstable operation - excessive baseline drift
H2S	15 Apr 2015 16:00	15 Apr 2015 17:00	2	Intermittent unstable operation - excessive baseline drift
H2S	27 Apr 2015 05:00	27 Apr 2015 05:00	1	Intermittent unstable operation - excessive baseline drift
H2S	27 Apr 2015 07:00	27 Apr 2015 07:00	1	Intermittent unstable operation - excessive baseline drift
H2S	27 Apr 2015 10:00	27 Apr 2015 10:00	1	Intermittent unstable operation - excessive baseline drift
H2S	28 Apr 2015 09:00	28 Apr 2015 10:00	2	Intermittent unstable operation - excessive baseline drift
H2S	28 Apr 2015 13:00	28 Apr 2015 14:00	2	Intermittent unstable operation - excessive baseline drift
PM2.5	02 Apr 2015 10:00	02 Apr 2015 10:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	01 Apr 2015 05:00	01 Apr 2015 11:00	7	Flat line in sensor output signal -sensor frozen

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Summary of Hour Averages

Wapasu - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 19 ppb on Apr 19 08:00	Maximum Daily Average: 3.9 ppb on Apr 10		Hours of Data:	680
Minimum Value: 0 ppb on Apr 14 01:00	Minimum Daily Average: 0.1 ppb on Apr 13		Hours of Missing Data:	40
Maximum Diurnal Average: 2.1 ppb at hour 8	Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Calibration:	36
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 1 P <sub>99</sub> = 9		Percent Operational Time:	99.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	0
2-Apr	0	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
3-Apr	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
5-Apr	0	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Apr	0	0	0	0	0	0	1	1	1	0	Z	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
7-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	2	1	2	2	1	0	0.6	2
8-Apr	0	Z	0	0	0	1	1	3	6	4	1	PF	PF	PF	PF	0	0	0	0	0	0	0	0	0	1.0	6
9-Apr	0	0	Z	0	0	0	1	1	1	1	0	0	1	4	2	3	1	0	1	1	2	2	4	3	1.3	4
10-Apr	4	9	8	Z	6	6	5	9	13	9	4	4	6	3	1	1	0	0	1	1	1	0	0	1	3.9	13
11-Apr	1	1	1	1	Z	2	3	6	10	14	4	1	0	0	1	0	1	0	0	0	0	0	0	0	2.0	14
12-Apr	0	0	0	0	0	Z	1	1	0	0	1	2	1	0	0	0	0	0	0	0	1	0	0	0	0.4	2
13-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
14-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	0	0	Z	0	1	2	3	8	4	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1.1	8
16-Apr	0	0	0	Z	0	0	1	1	0	5	8	5	2	1	0	0	0	0	0	0	0	0	0	0	1.1	8
17-Apr	0	0	0	0	Z	4	5	7	6	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	7
18-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
19-Apr	Z	0	0	0	0	0	3	19	12	4	2	1	1	1	1	0	0	0	0	0	0	0	1	0	2.1	19
20-Apr	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.2	1
22-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.2	1
23-Apr	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
24-Apr	0	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-Apr	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
26-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	0	1	1	0	0.5	2
27-Apr	0	0	Z	0	0	0	1	0	1	0	1	0	1	1	1	2	2	0	0	0	0	1	1	1	0.7	2
28-Apr	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	0	1	1	0.6	1
29-Apr	1	1	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	2	0.6	2
30-Apr	1	1	2	1	1	Z	1	1	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	1	0.7	2

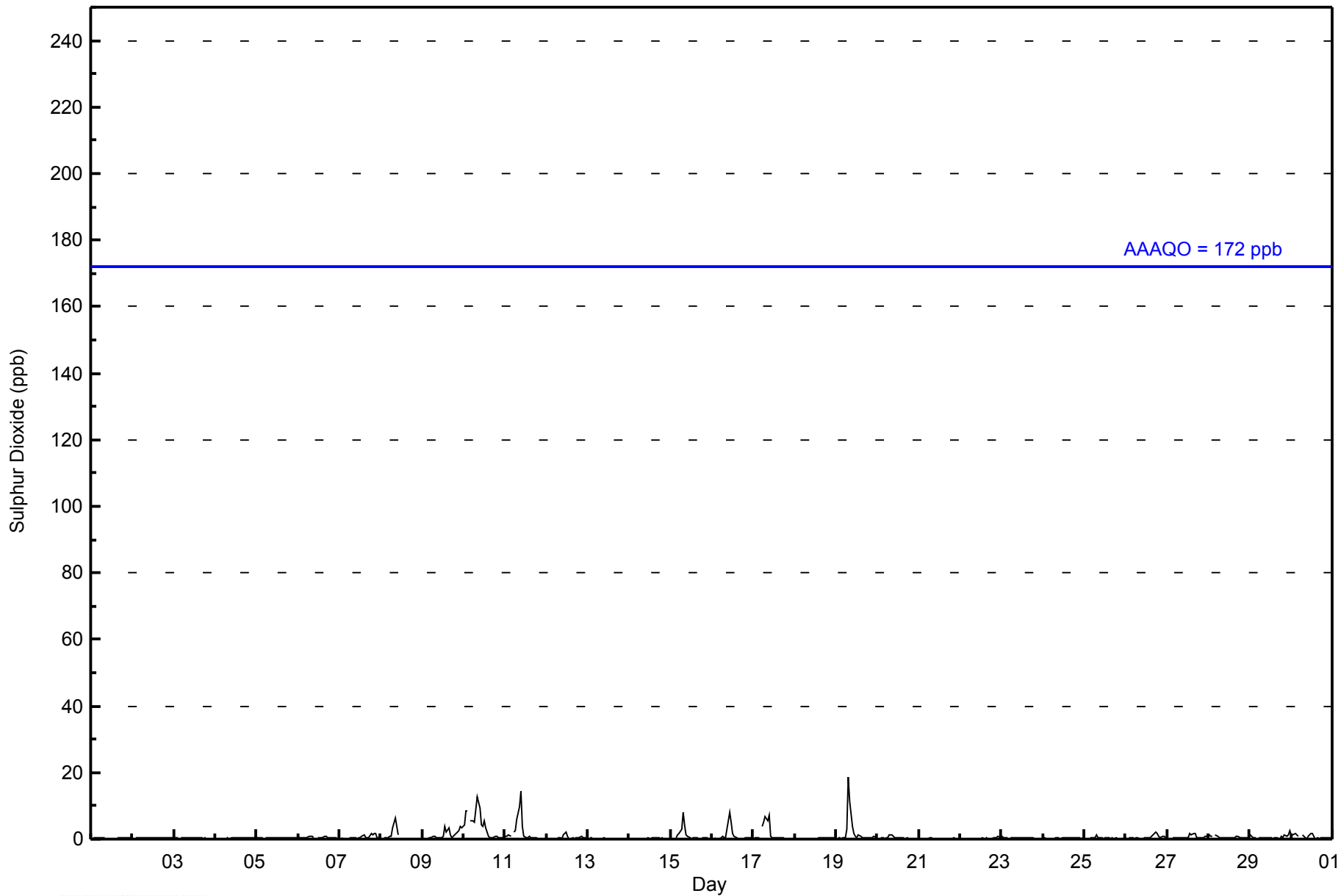
0.5	0.7	0.7	0.3	0.6	0.8	1.0	2.1	1.9	1.8	1.0	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	Diurnal Average	
4	9	8	1	6	6	5	19	13	14	8	5	6	4	2	3	2	2	2	2	1	2	2	4	3	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	676	99.41	99.41
11 - 20	4	0.59	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: 680

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - April 2015**

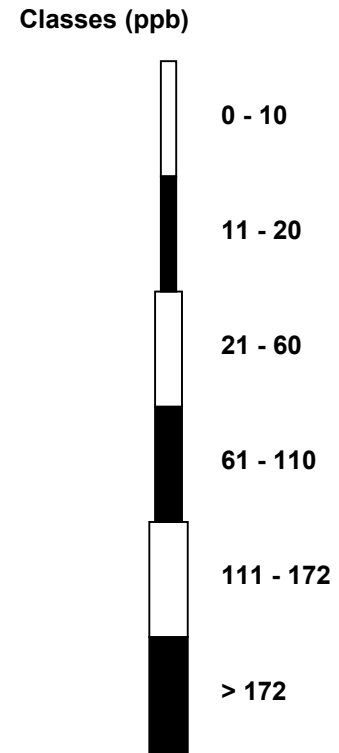
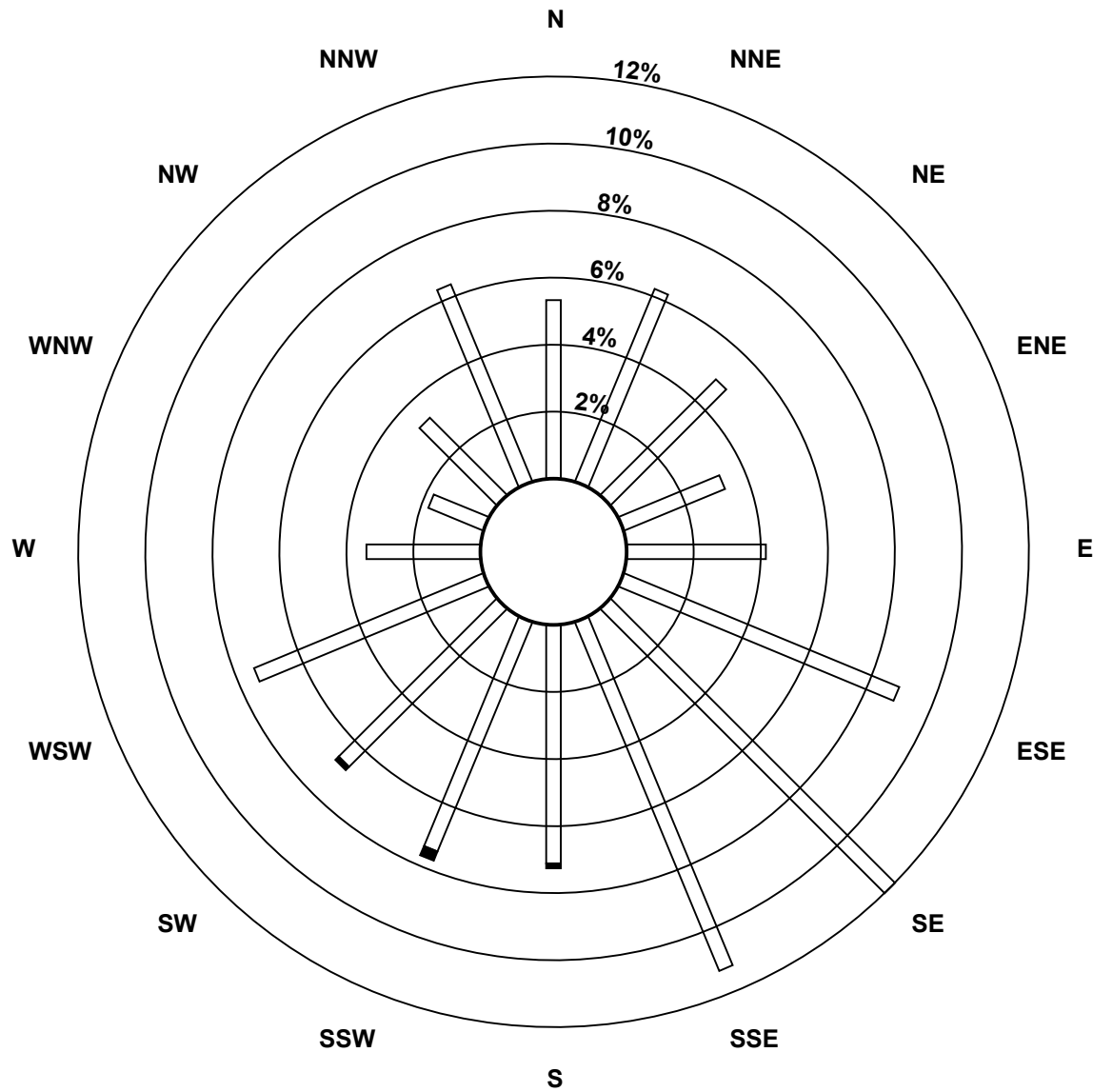
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	42	33	22	28	60	81	76	48	50	45	50	23	12	22	43	671
11 - 20	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	4
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675

Total Number of Valid Hours: 675

Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu (AMS 17)**

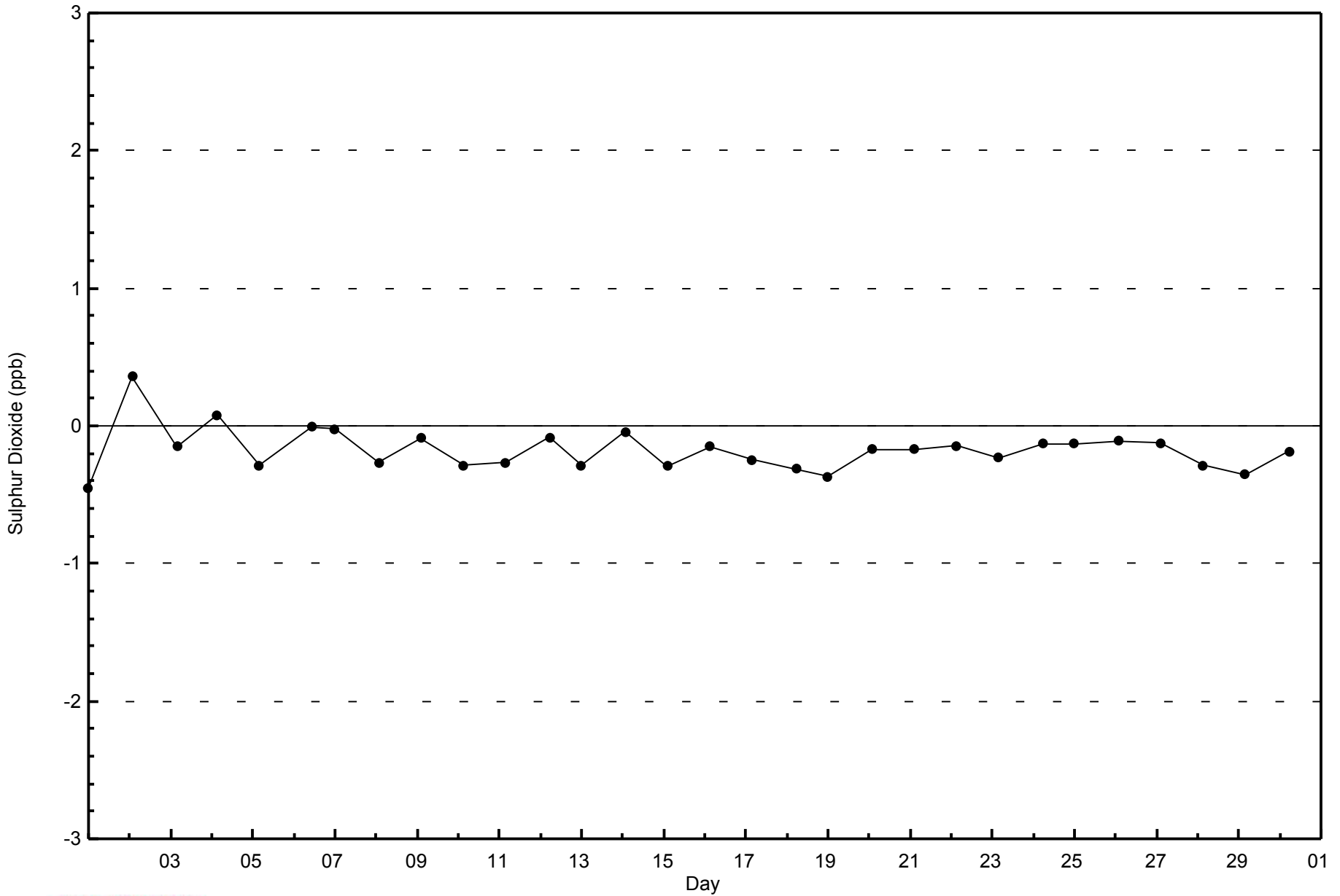


**Total Number of Valid Hours: 675**



WBEA  
Zero Responses

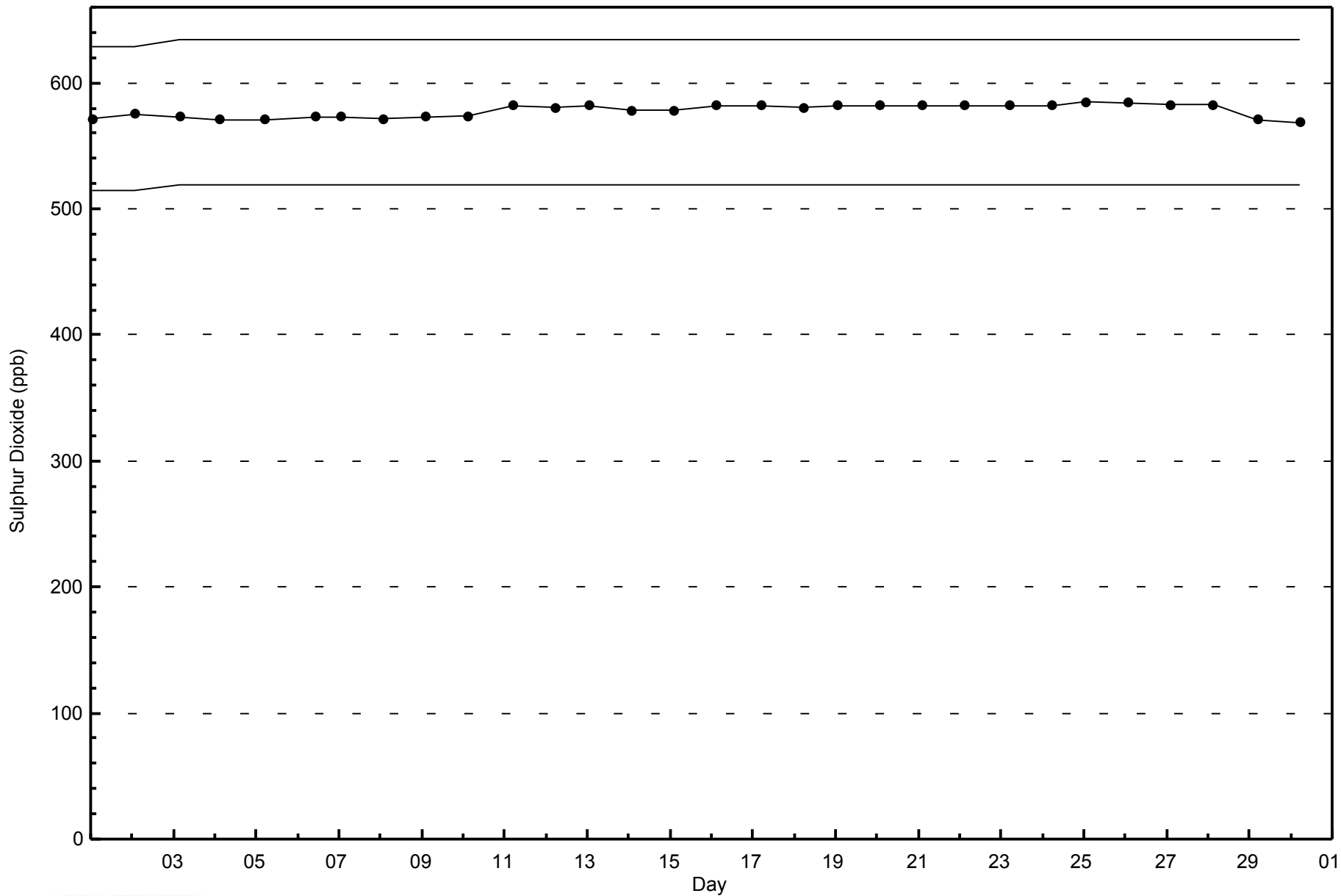
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - April 2015



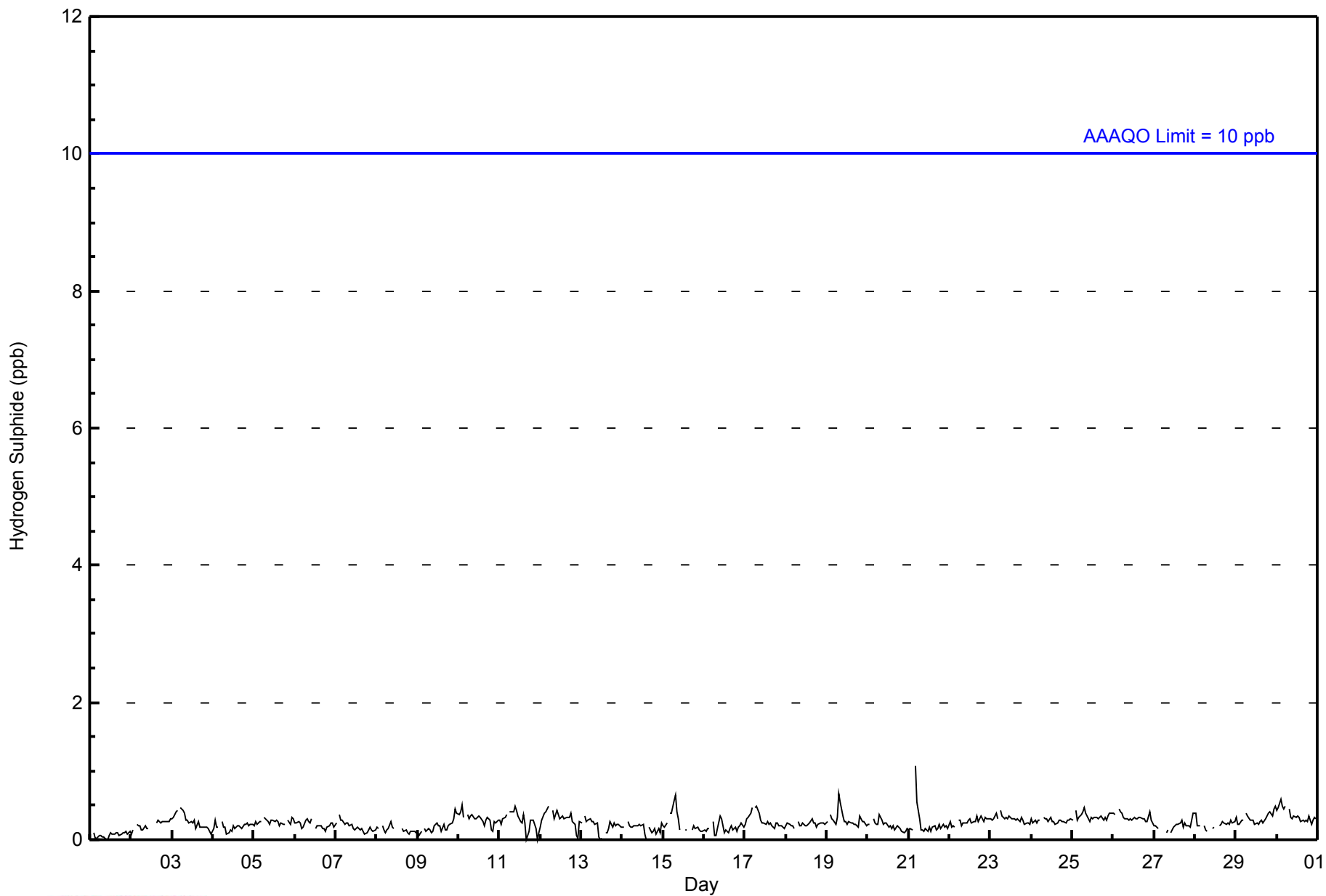






WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	667	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: 667

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - April 2015**

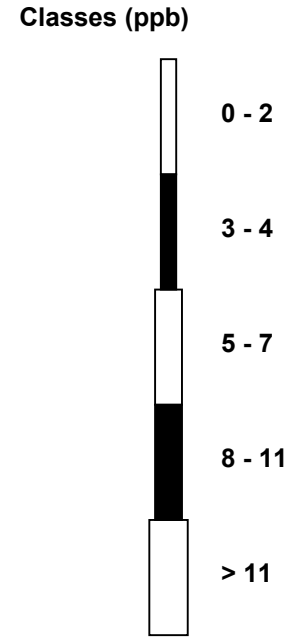
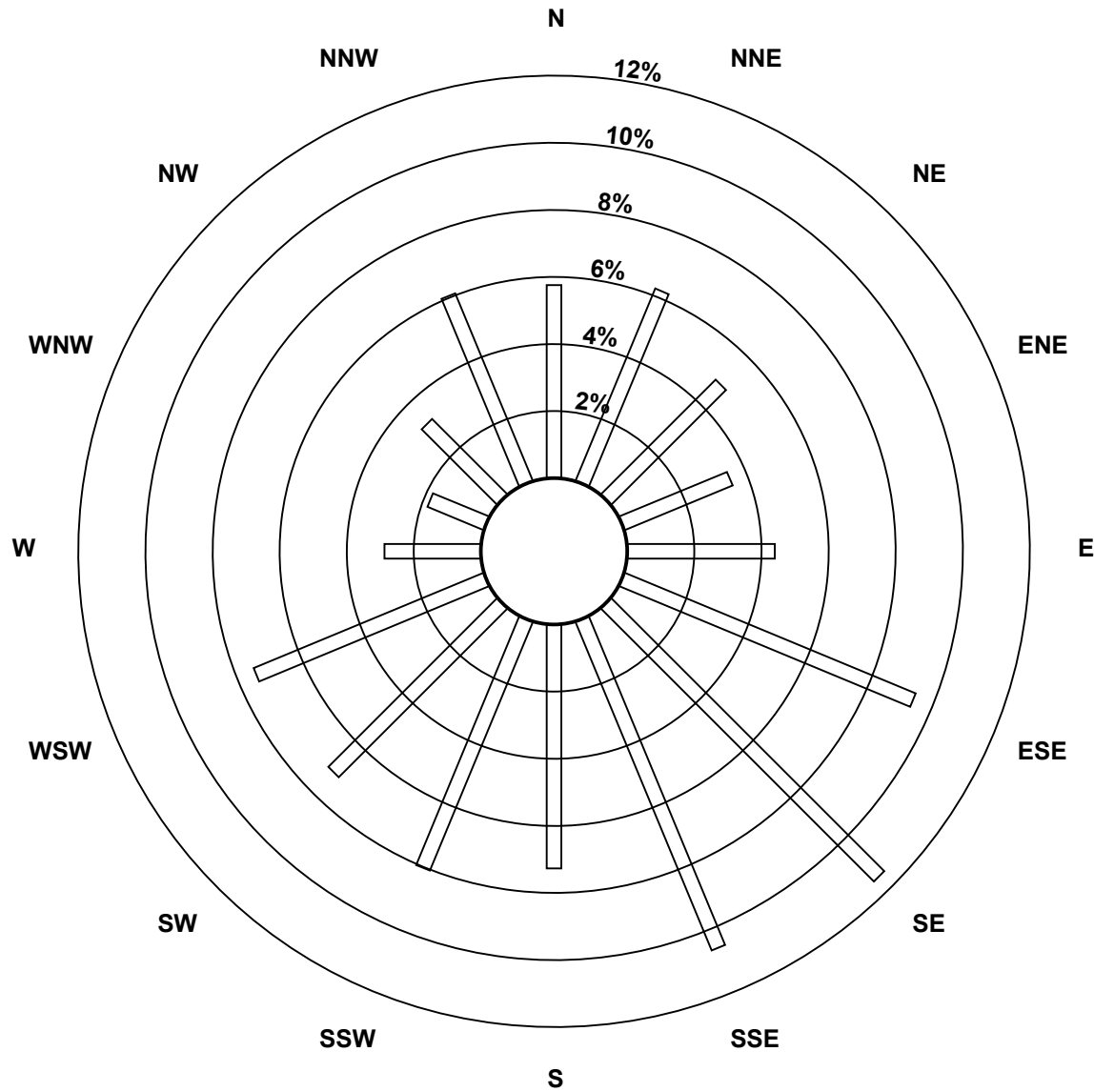
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	38	41	32	23	29	62	76	70	48	53	47	49	19	12	21	40	660
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	38	41	32	23	29	62	76	70	48	53	47	49	19	12	21	40	660

Total Number of Valid Hours: 660

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu (AMS 17)

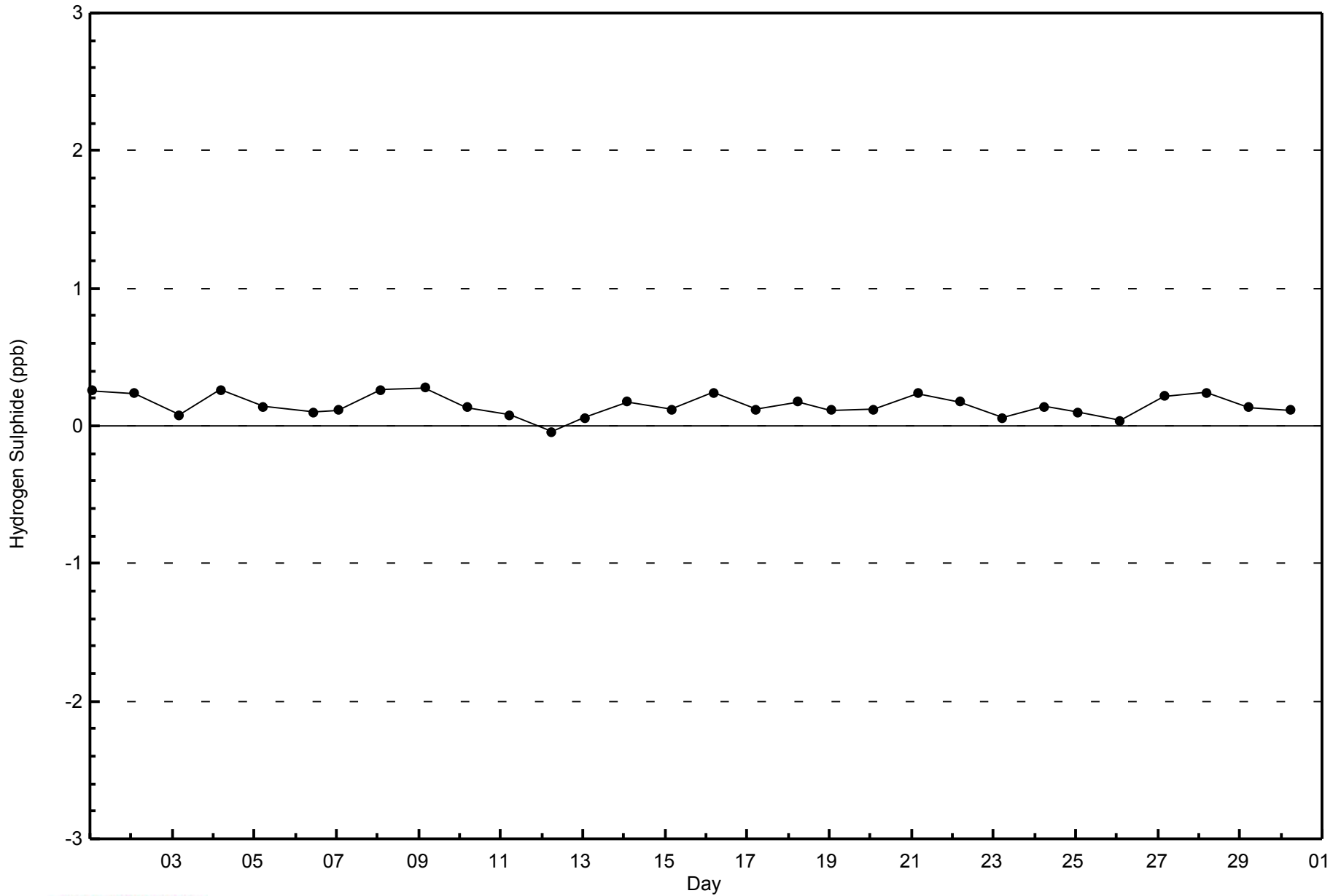


Total Number of Valid Hours: 660



WBEA  
Zero Responses

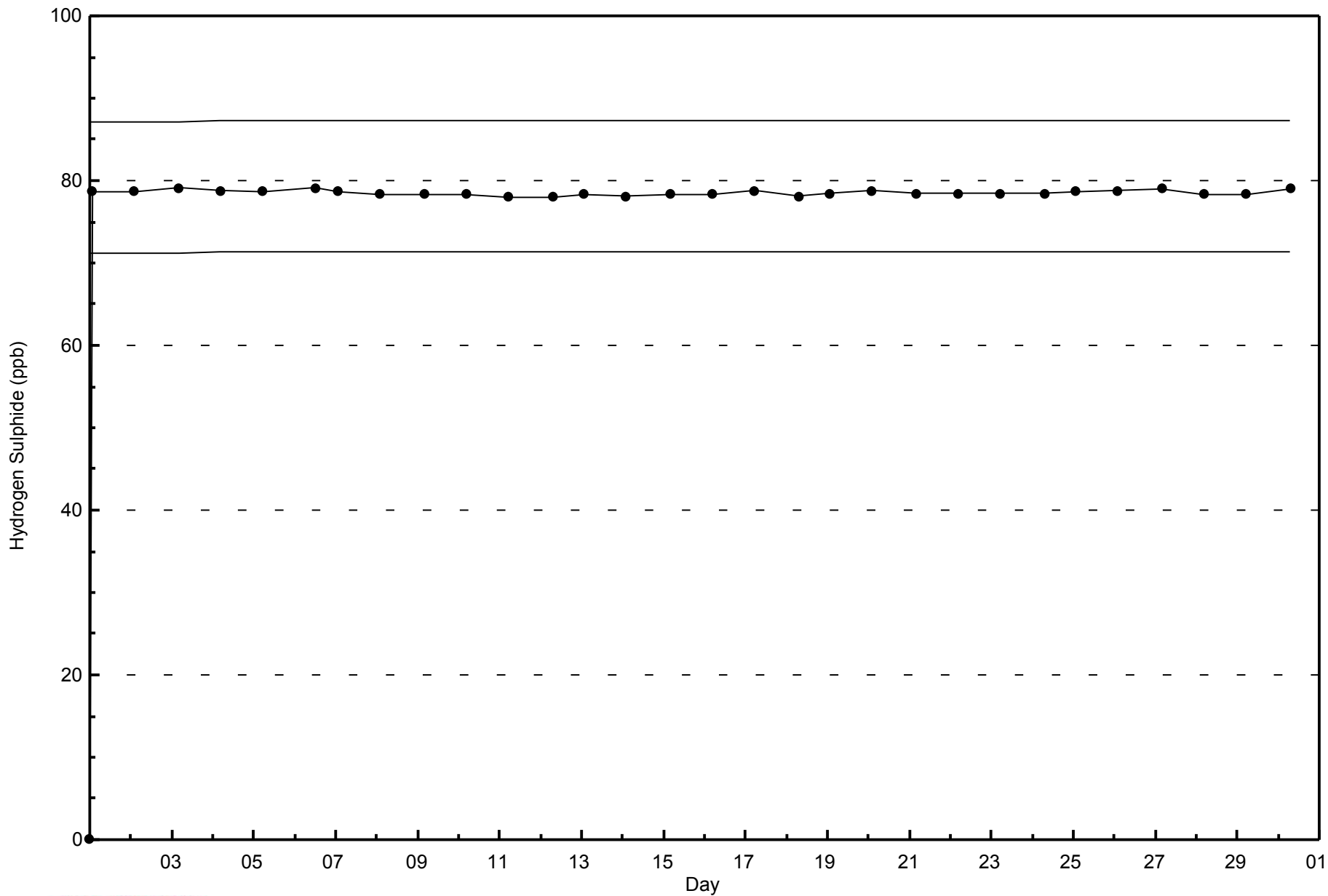
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - April 2015



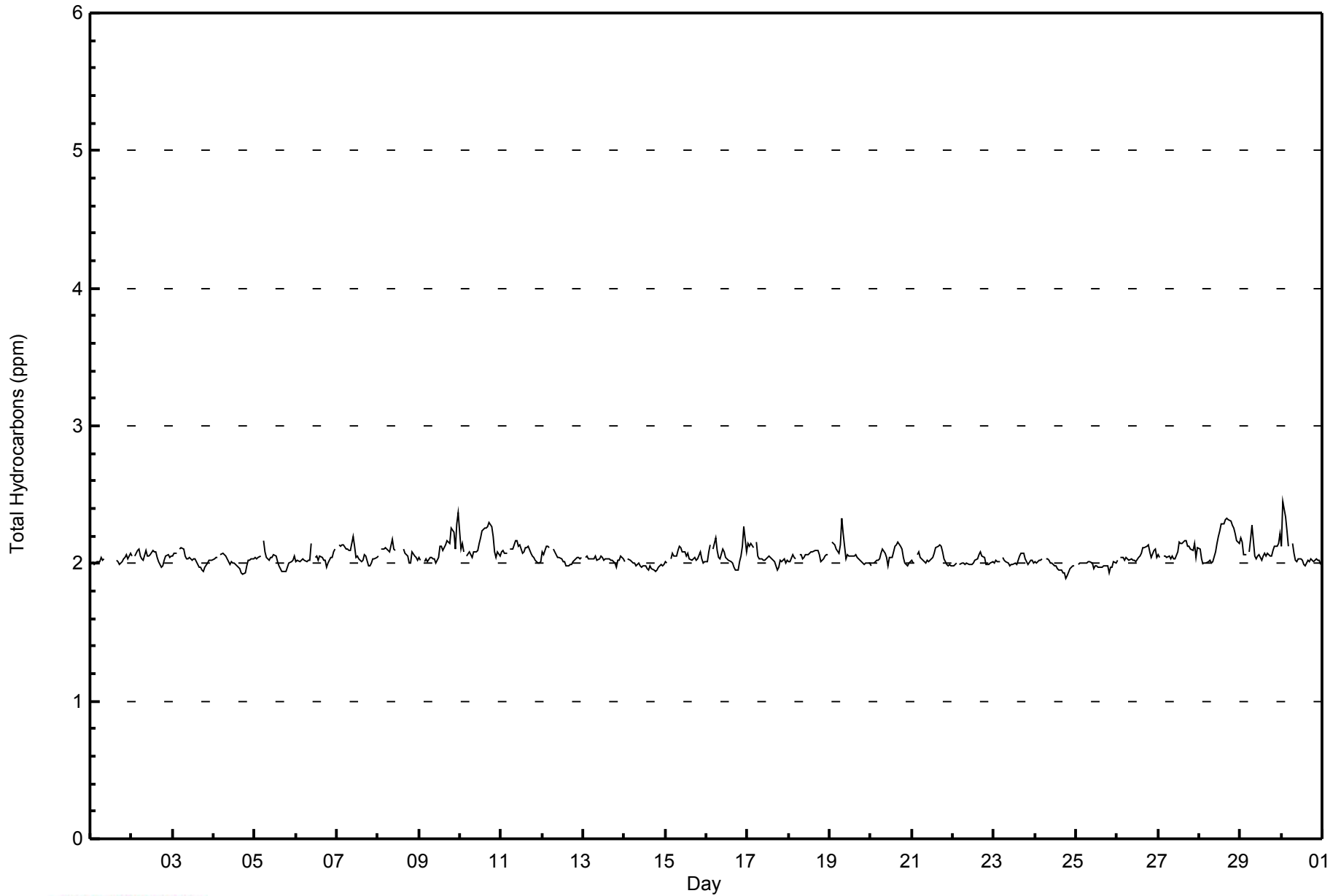


Maximum Value: 2.5 ppm on Apr 30 02:00		Maximum Daily Average: 2.2 ppm on Apr 28		Hours in Service: 720																						
Minimum Value: 1.9 ppm on Apr 24 19:00		Minimum Daily Average: 2.0 ppm on Apr 24		Hours of Data: 680																						
Maximum Diurnal Average: 2.1 ppm at hour 2		Minimum Diurnal Average: 2.0 ppm at hour 19		Hours of Missing Data: 40																						
Monthly Average: 2.05 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.0 Median = 2.0 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.3		Hours of Calibration: 36																						
				Percent Operational Time: 99.4																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	--	2.1
2-Apr	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.1
3-Apr	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
4-Apr	2.0	2.0	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.1
5-Apr	2.0	2.0	2.0	2.1	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.0	2.2
6-Apr	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	Z	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.2
7-Apr	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.0	2.1	2.0	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2
8-Apr	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	PF	PF	PF	PF	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.1	2.2
9-Apr	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.3	2.2	2.1	2.3	2.4	2.1	2.4
10-Apr	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.0	2.1	2.1	2.1	2.3
11-Apr	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2
12-Apr	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
13-Apr	Z	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1
14-Apr	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	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
15-Apr	2.0	2.0	Z	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.1	2.1
16-Apr	2.0	2.1	2.1	Z	2.1	2.2	2.1	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.3	2.1	2.1	2.3
17-Apr	2.1	2.1	2.2	2.1	Z	2.2	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2
18-Apr	2.0	2.0	2.1	2.0	2.0	Z	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1
19-Apr	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
20-Apr	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.2
21-Apr	2.0	2.0	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1
22-Apr	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	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
23-Apr	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1
24-Apr	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
25-Apr	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	1.9	2.0	2.0	2.0	2.0	2.0	2.0
26-Apr	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	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.1	2.1
27-Apr	2.1	2.0	Z	2.1	2.1	2.0	2.1	2.0	2.1	2.0	2.0	2.1	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.2
28-Apr	2.1	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.3
29-Apr	2.2	2.2	2.1	2.1	Z	2.1	2.2	2.3	2.1	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.3
30-Apr	2.1	2.5	2.3	2.2	2.1	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.5
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      PF - Power Failure																										



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Wapasu - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	401	58.97	58.97
2.1 - 3.0	279	41.03	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - April 2015**

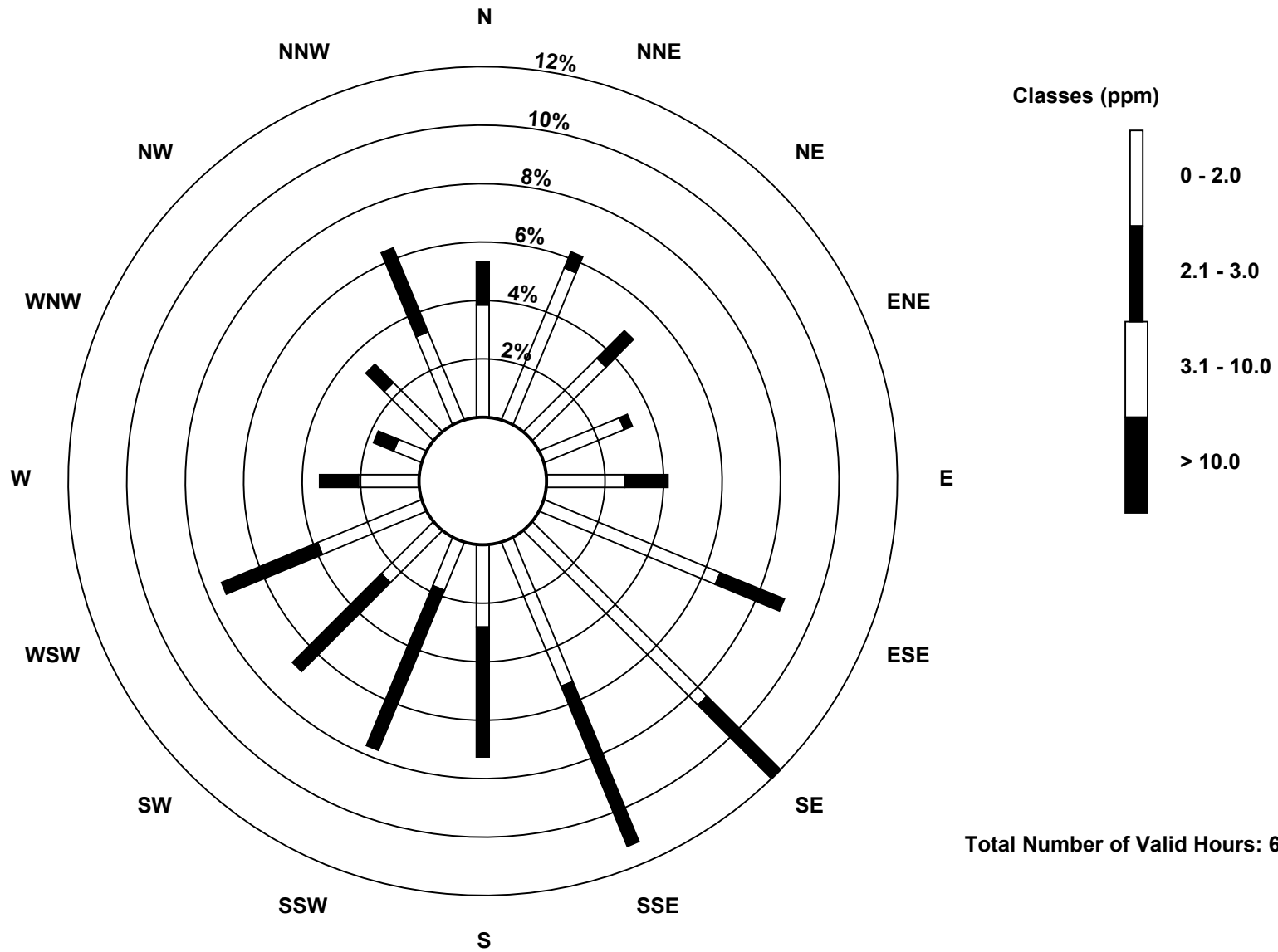
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	26	38	24	20	18	44	57	36	19	12	17	26	14	7	16	22	396
2.1 - 3.0	10	4	9	2	10	16	24	40	30	40	29	24	9	5	6	21	279
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675

Total Number of Valid Hours: 675

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

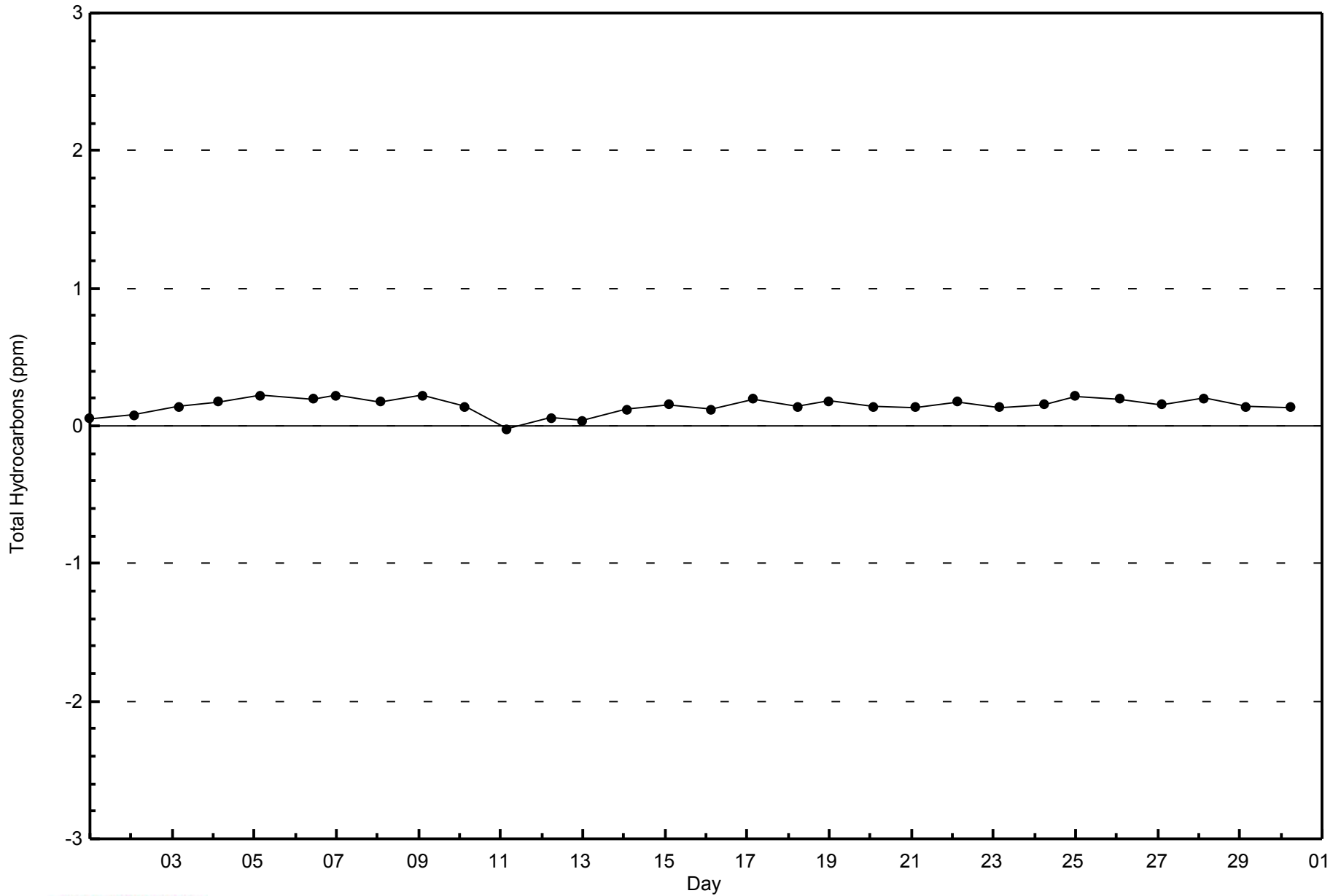
Total Hydrocarbons (THC) - ppm  
 Wapasu (AMS 17)





WBEA  
Zero Responses

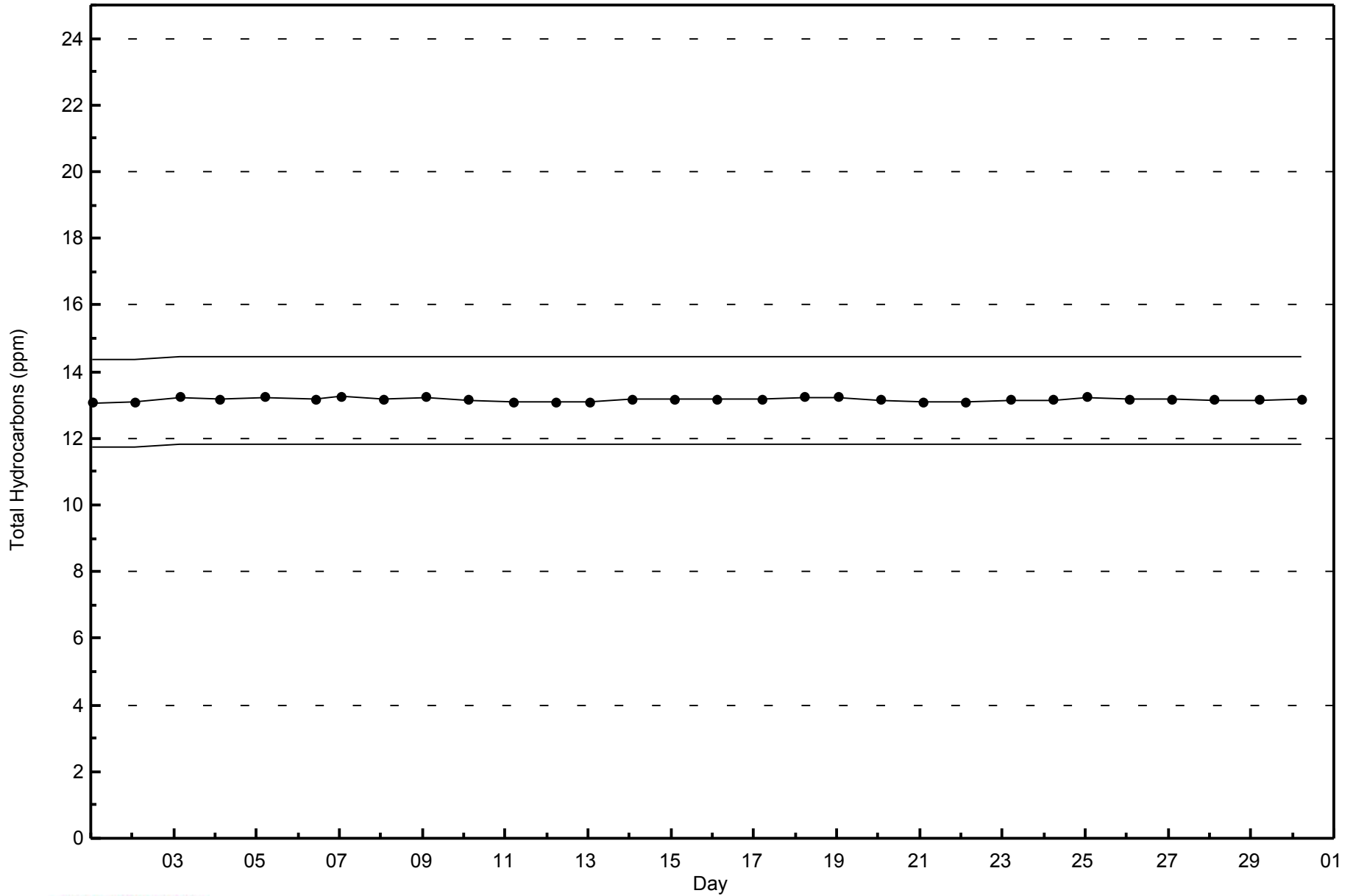
Total Hydrocarbons (THC) - ppm  
Wapasu - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Wapasu - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 58 ppb on Apr 10 19:00	Maximum Daily Average: 48.2 ppb on Apr 28		Hours of Data:	683
Minimum Value: 5 ppb on Apr 19 02:00	Minimum Daily Average: 29.5 ppb on Apr 25		Hours of Missing Data:	37
Maximum Diurnal Average: 44.5 ppb at hour 17	Minimum Diurnal Average: 30.2 ppb at hour 6		Hours of Calibration:	33
Monthly Average: 37.8 ppb	Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 28 Q <sub>1</sub> = 34 Median = 39 Q <sub>3</sub> = 43 P <sub>90</sub> = 46 P <sub>99</sub> = 54		Percent Operational Time:	99.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	38	36	Z	34	34	34	31	30	30	30	31	32	32	33	35	36	37	38	39	38	35	34	32	31	33.8	39
2-Apr	31	32	28	Z	22	27	30	35	32	C	C	C	37	41	42	43	44	44	45	44	41	40	40	39	36.8	45
3-Apr	40	37	33	32	29	Z	31	38	42	43	43	43	44	44	43	43	42	41	40	38	36	34	35	39.0	44	
4-Apr	32	29	29	29	27	Z	28	34	39	39	39	39	39	39	40	40	39	39	39	39	37	31	22	18	34.3	40
5-Apr	17	17	17	16	15	15	Z	35	36	38	39	39	41	42	45	45	45	45	45	45	42	36	35	38	34.0	45
6-Apr	39	41	42	42	42	42	41	41	42	42	42	44	Z	44	43	44	44	44	43	42	42	42	41	41	42.3	44
7-Apr	40	40	Z	39	38	38	38	38	38	40	42	44	44	46	47	47	47	46	46	44	42	40	40	39	41.9	47
8-Apr	38	36	35	Z	32	31	30	28	26	30	35	PF	PF	PF	PF	43	43	43	43	38	26	26	35	38	34.5	43
9-Apr	39	41	41	41	Z	40	40	41	41	43	44	44	44	42	46	46	46	46	45	33	32	36	28	27	40.3	46
10-Apr	32	30	31	32	34	Z	36	37	36	39	46	49	49	51	53	53	55	56	58	51	53	52	51	50	44.9	58
11-Apr	49	48	46	42	41	39	Z	40	38	32	41	43	46	47	47	48	48	46	46	44	43	46	46	41	43.8	49
12-Apr	37	38	33	30	24	23	28	Z	37	38	39	40	41	43	42	43	42	41	41	39	38	39	41	40	37.2	43
13-Apr	40	40	Z	33	34	35	40	40	43	41	44	43	42	40	40	41	39	39	39	37	32	34	34	35	38.5	44
14-Apr	36	36	37	Z	39	40	40	41	41	41	41	42	42	43	45	45	45	44	43	41	39	38	35	35	40.8	45
15-Apr	35	34	32	28	Z	22	18	17	23	29	35	37	38	40	42	42	45	47	46	40	34	40	44	43	35.3	47
16-Apr	42	37	36	37	34	Z	32	37	39	36	34	39	44	45	45	48	48	48	45	41	38	30	22	29	38.6	48
17-Apr	28	27	27	27	24	21	Z	32	35	39	46	47	48	48	48	42	41	40	39	39	37	35	31	24	35.9	48
18-Apr	19	17	21	28	36	38	39	Z	36	35	34	37	39	39	42	42	42	41	42	37	23	12	9	7	31.2	42
19-Apr	6	5	Z	7	12	19	21	18	28	38	39	41	43	42	43	44	44	43	42	33	32	36	36	37	30.9	44
20-Apr	37	37	35	Z	16	12	11	26	34	40	44	45	46	46	46	46	45	43	43	42	40	37	35	33	36.5	46
21-Apr	29	33	29	24	Z	19	30	37	36	38	40	44	44	43	45	45	44	44	43	41	39	41	40	39	37.7	45
22-Apr	39	38	36	35	34	Z	34	35	35	37	38	40	42	42	44	45	44	43	41	39	38	39	39	39	38.9	45
23-Apr	39	38	37	37	38	38	Z	37	38	38	38	40	40	40	41	41	40	38	37	37	37	37	36	36	38.4	41
24-Apr	38	39	39	39	38	36	35	Z	37	36	38	39	40	39	39	41	43	42	38	37	35	30	26	25	36.4	43
25-Apr	23	21	Z	15	20	29	24	22	25	30	36	36	35	34	34	35	35	35	35	35	33	29	28	30	29.5	36
26-Apr	33	33	34	Z	35	33	33	37	39	39	39	40	40	41	41	41	42	43	43	39	27	25	36	38	36.9	43
27-Apr	36	36	37	38	Z	38	39	41	42	44	47	48	47	46	48	50	50	54	53	52	44	34	35	24	42.8	54
28-Apr	24	35	39	39	41	Z	42	47	51	52	53	53	54	54	54	56	57	56	52	50	53	52	51	46	48.2	57
29-Apr	36	29	39	39	37	29	Z	24	36	29	33	37	43	45	47	46	47	43	40	34	32	35	33	29	36.6	47
30-Apr	34	30	27	27	27	26	29	Z	39	42	43	43	44	45	47	46	47	45	43	38	31	35	35	37	37.5	47

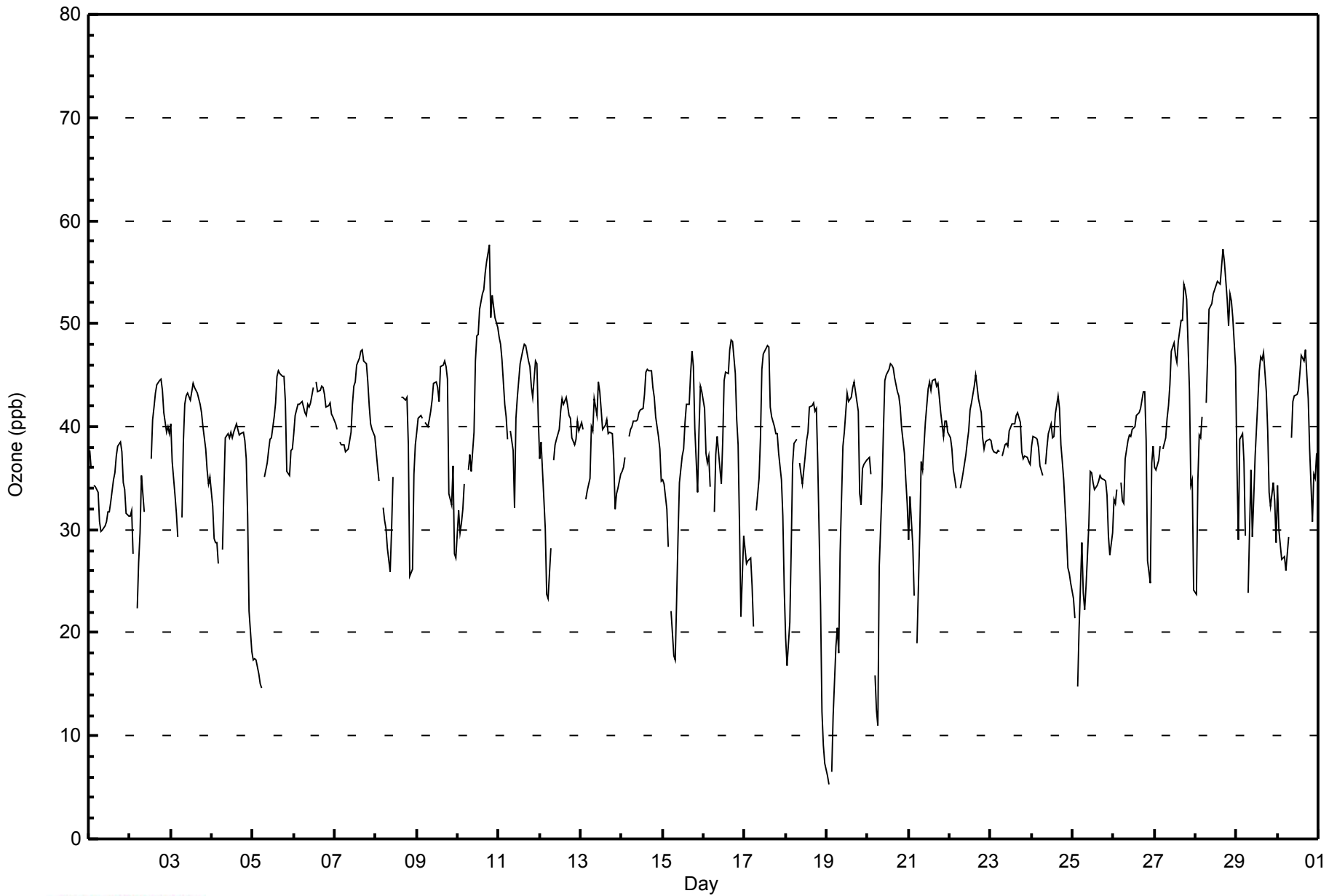
33.6	33.0	33.6	31.6	30.9	30.2	31.9	34.1	36.4	38.0	40.3	40.3	41.7	42.3	43.1	44.0	44.3	44.5	44.1	43.1	40.1	36.8	35.8	35.2	34.1	Diurnal Average	
49	48	46	42	42	42	42	42	47	51	52	53	53	54	54	54	56	57	56	58	52	53	52	51	50	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	26	3.81	3.81
21 - 50	630	92.24	96.05
51 - 82	27	3.95	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - April 2015**

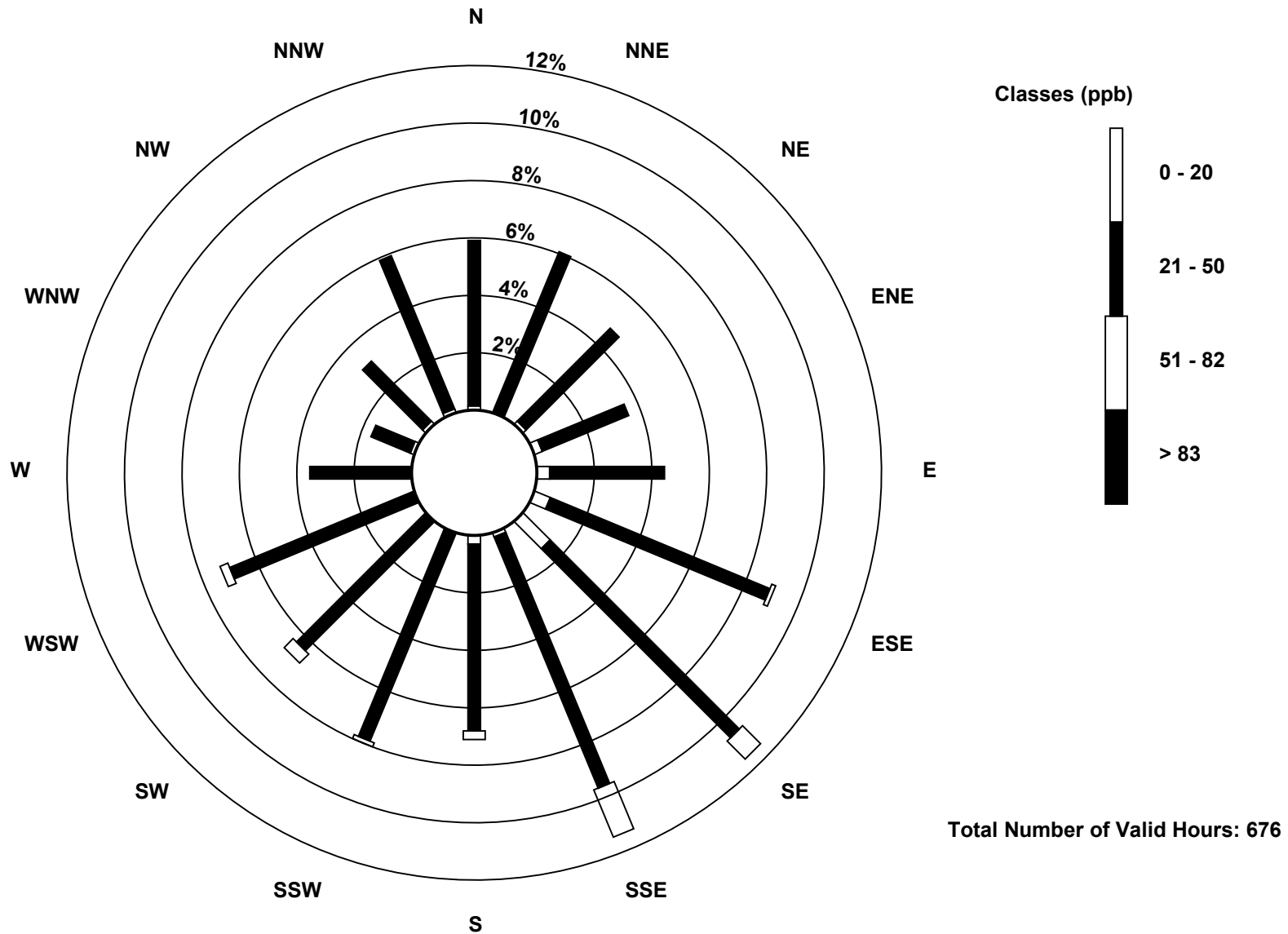
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	1	0	1	2	3	4	9	1	2	0	0	0	0	1	1	1	26
21 - 50	39	41	31	22	27	56	63	64	44	53	43	47	24	10	20	39	623
51 - 82	0	0	0	0	0	1	6	12	2	1	3	2	0	0	0	0	27
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	40	41	32	24	30	61	78	77	48	54	46	49	24	11	21	40	676

Total Number of Valid Hours: 676

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

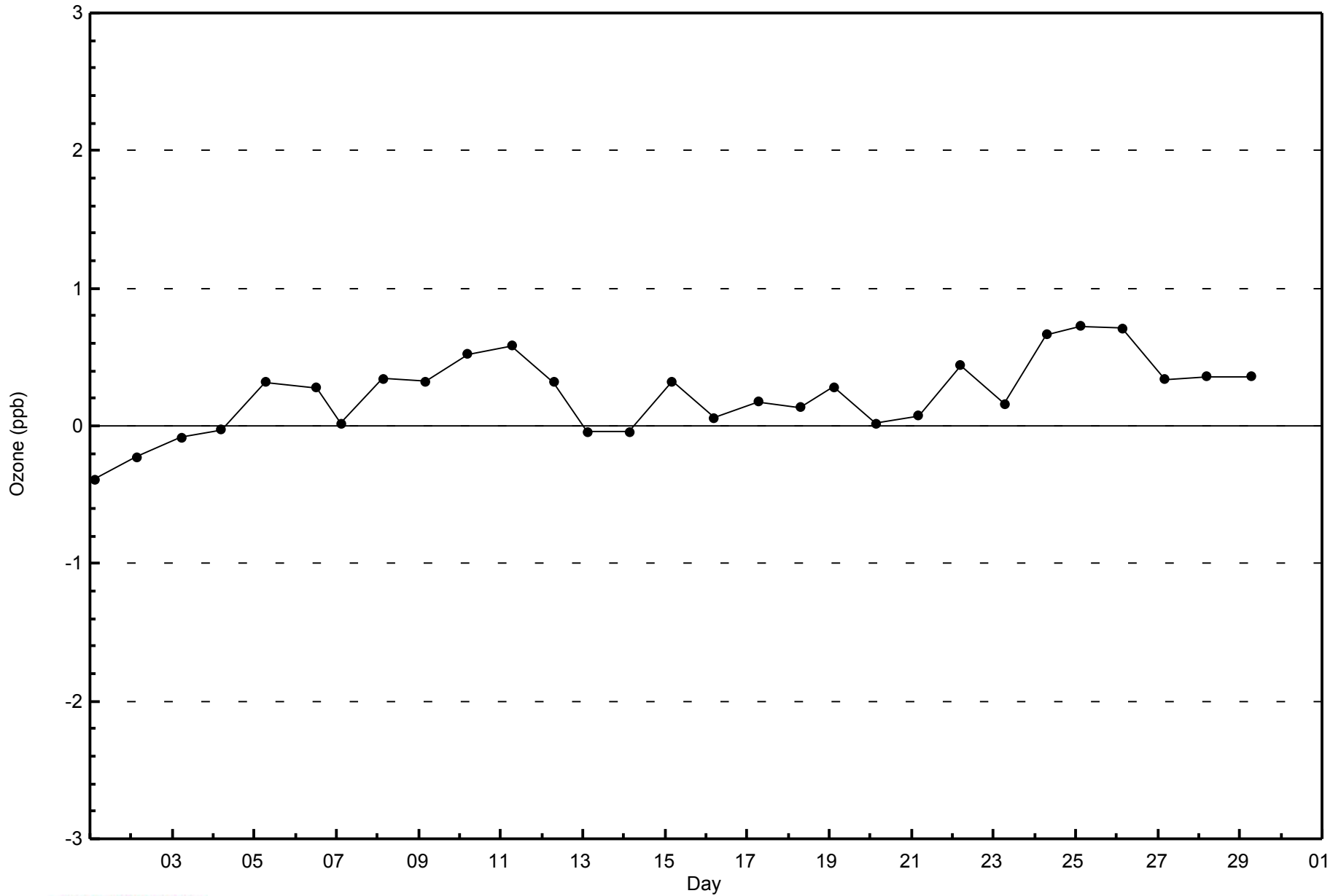
Ozone (O<sub>3</sub>) - ppb  
 Wapasu (AMS 17)





WBEA  
Zero Responses

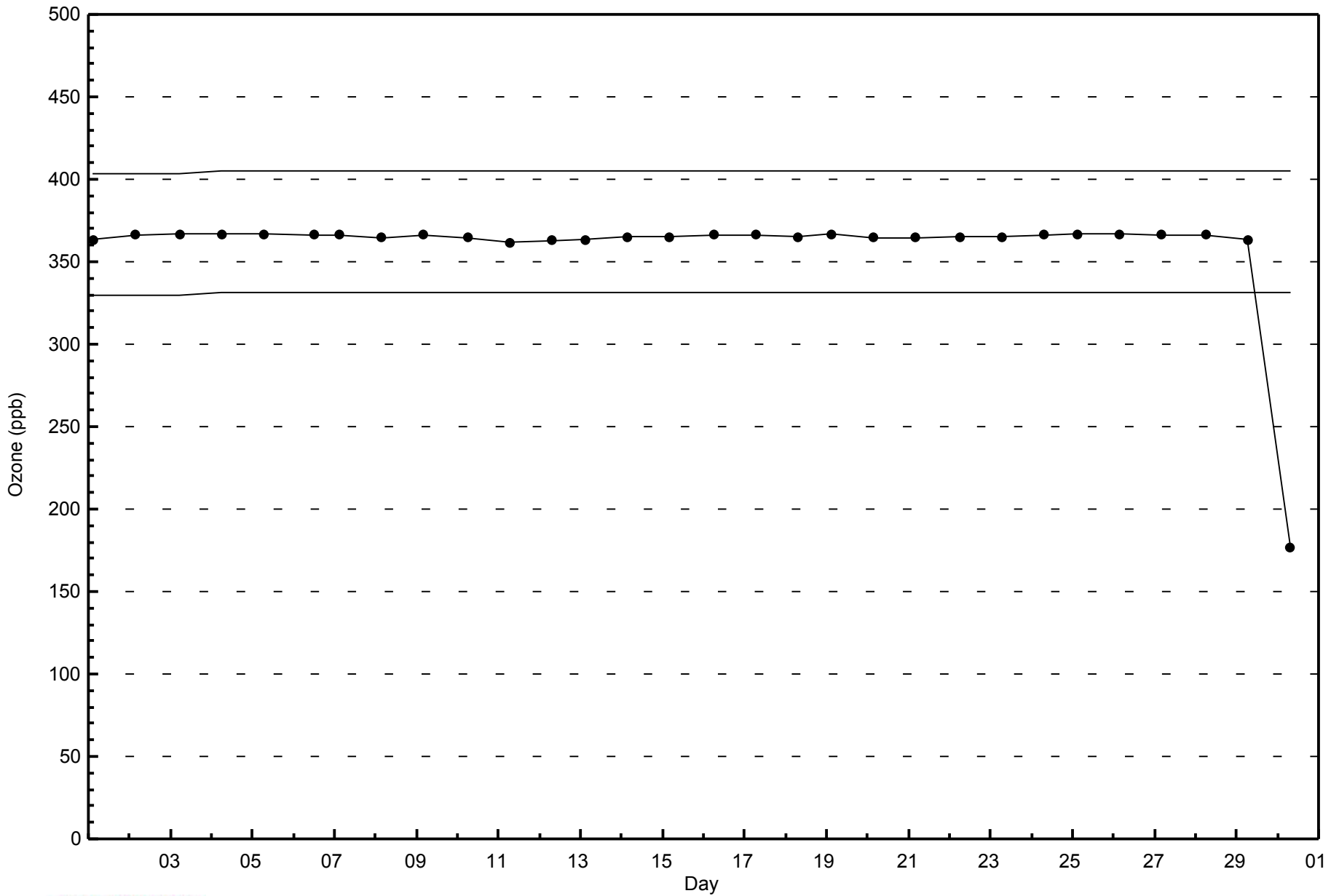
Ozone (O<sub>3</sub>) - ppb  
Wapasu - April 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Wapasu - April 2015



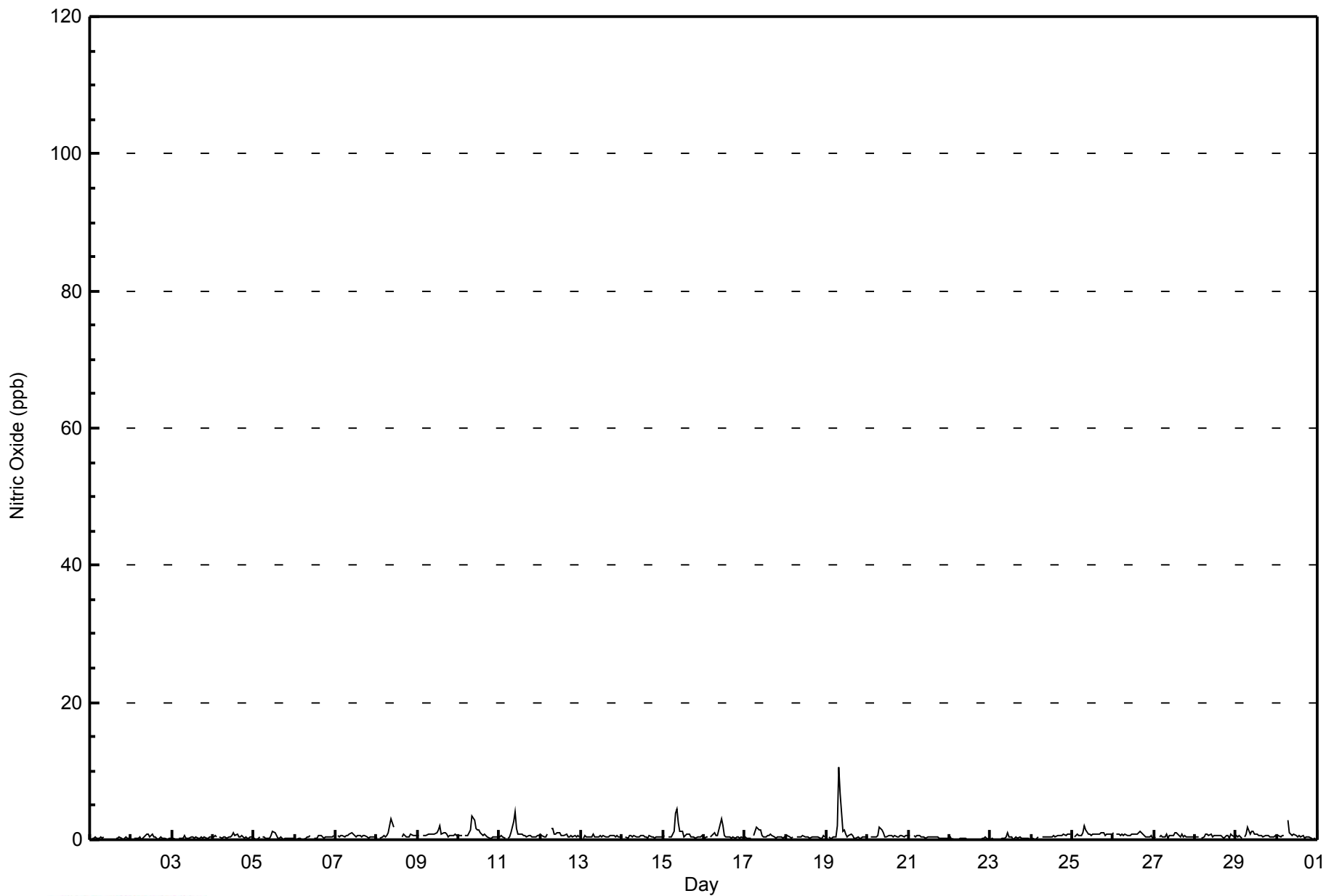


Maximum Value: 10 ppb on Apr 19 08:00																		Maximum Daily Average: 1.3 ppb on Apr 19						Hours in Service: 720		
Minimum Value: 0 ppb on Apr 22 11:00																		Minimum Daily Average: 0.1 ppb on Apr 22						Hours of Data: 680		
Maximum Diurnal Average: 1.3 ppb at hour 8																		Minimum Diurnal Average: 0.3 ppb at hour 3						Hours of Missing Data: 40		
Monthly Average: 0.6 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 3						Hours of Calibration: 36		
																		Percent Operational Time: 99.4								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	0	0	0	0	0	0	0	1	C	C	C	C	C	C	0	0	0	0	0	0	0	0	0	--	1
2-Apr	0	Z	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
3-Apr	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
4-Apr	0	1	0	Z	0	0	0	1	0	0	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0.5	1
5-Apr	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
6-Apr	0	0	0	0	0	0	0	0	0	1	Z	0	0	0	1	1	0	0	0	0	1	0	0	1	0.3	1
7-Apr	Z	1	0	1	1	0	1	1	1	1	1	1	0	1	1	0	1	1	0	0	0	0	0	0	0.6	1
8-Apr	0	Z	0	0	1	0	1	1	3	2	2	PF	PF	PF	PF	0	1	0	0	0	1	1	1	1	0.8	3
9-Apr	1	1	Z	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	0	1	1	1	1	1	0.8	2
10-Apr	1	1	1	Z	1	1	1	1	3	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0.9	3
11-Apr	0	1	0	0	Z	0	0	1	3	4	2	1	1	1	1	1	0	1	1	0	1	0	1	1	0.8	4
12-Apr	1	1	0	0	1	Z	2	2	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1	0	0.7	2
13-Apr	Z	0	1	1	0	0	0	1	0	0	0	1	0	1	0	0	0	1	1	1	1	0	1	0	0.5	1
14-Apr	0	Z	0	0	1	1	0	1	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0.4	1
15-Apr	0	1	Z	0	0	0	1	4	4	2	1	1	0	1	1	1	0	0	0	0	0	0	0	1	1.0	4
16-Apr	0	1	0	Z	0	1	1	1	1	2	3	2	1	0	0	0	0	1	0	0	0	0	0	0	0.7	3
17-Apr	0	0	0	0	Z	1	1	2	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0.6	2
18-Apr	0	1	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1
19-Apr	Z	0	0	0	0	0	2	10	7	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	1.3	10
20-Apr	0	Z	0	0	0	0	1	2	1	1	0	0	1	1	1	0	1	0	0	1	1	0	1	1	0.6	2
21-Apr	1	1	Z	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
22-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
24-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0.5	1
25-Apr	Z	0	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2
26-Apr	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0.7	1
27-Apr	0	0	Z	0	1	1	0	1	0	1	1	1	1	1	1	0	1	0	1	0	0	1	0	0	0.6	1
28-Apr	0	0	0	Z	0	0	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	1	1	0	0.5	1
29-Apr	1	0	1	0	Z	0	1	2	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0.7	2
30-Apr	0	1	0	1	1	Z	3	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0.6	3
																		Diurnal Average						Diurnal Maximum		
																		1						1		
Z - zerospan			C - Calibration			PF - Power Failure																				



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Wapasu - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	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: 680

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Wapasu - April 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675
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
<b>Totals</b>	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675

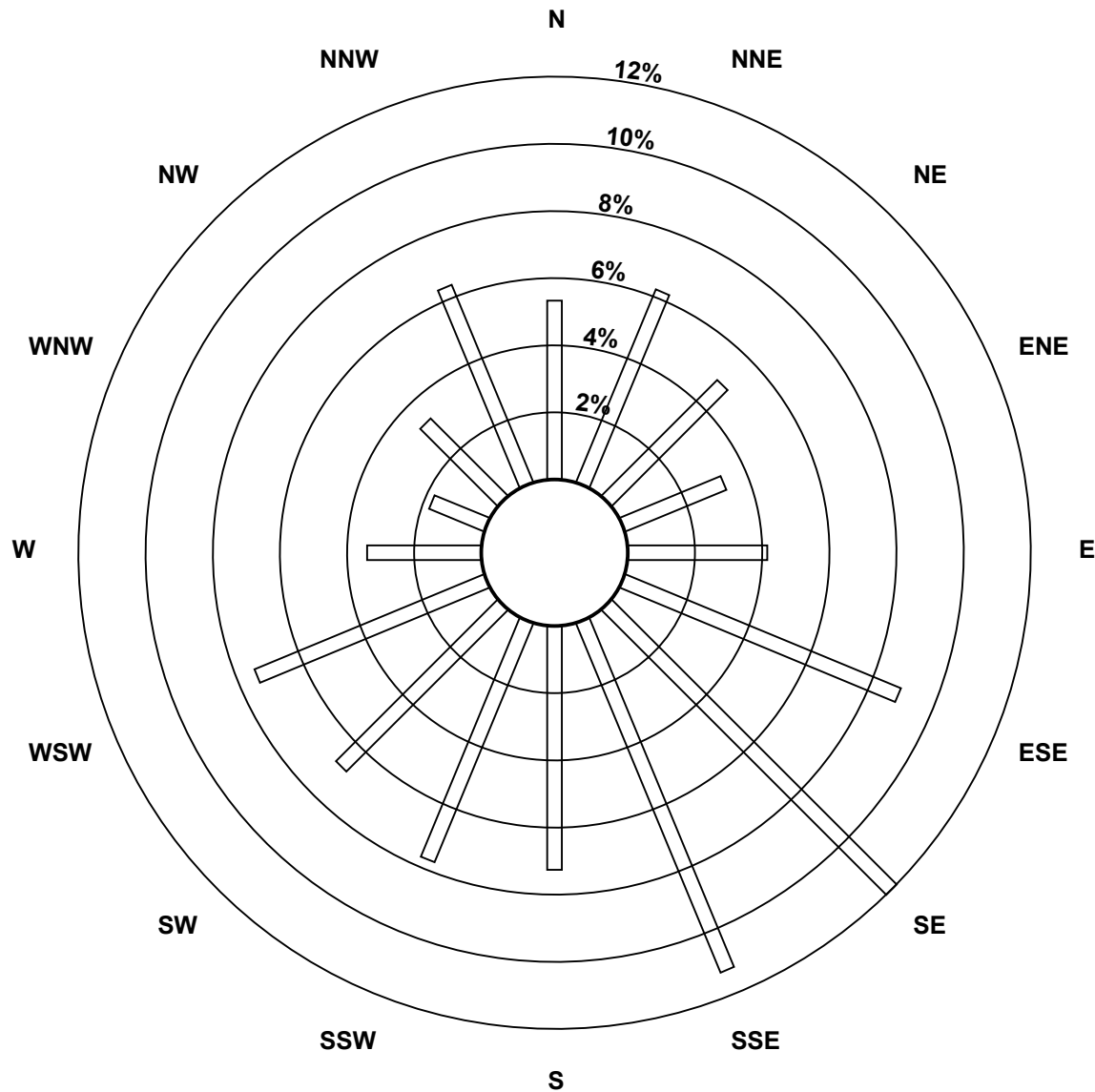
Total Number of Valid Hours: 675

Total Number of Hours: 720

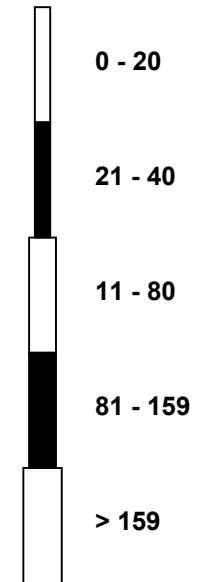


**Wood Buffalo Environmental Association  
Wind Rose Apr 2015**

**Nitric Oxide (NO) - ppb  
Wapasu (AMS 17)**



**Classes (ppb)**

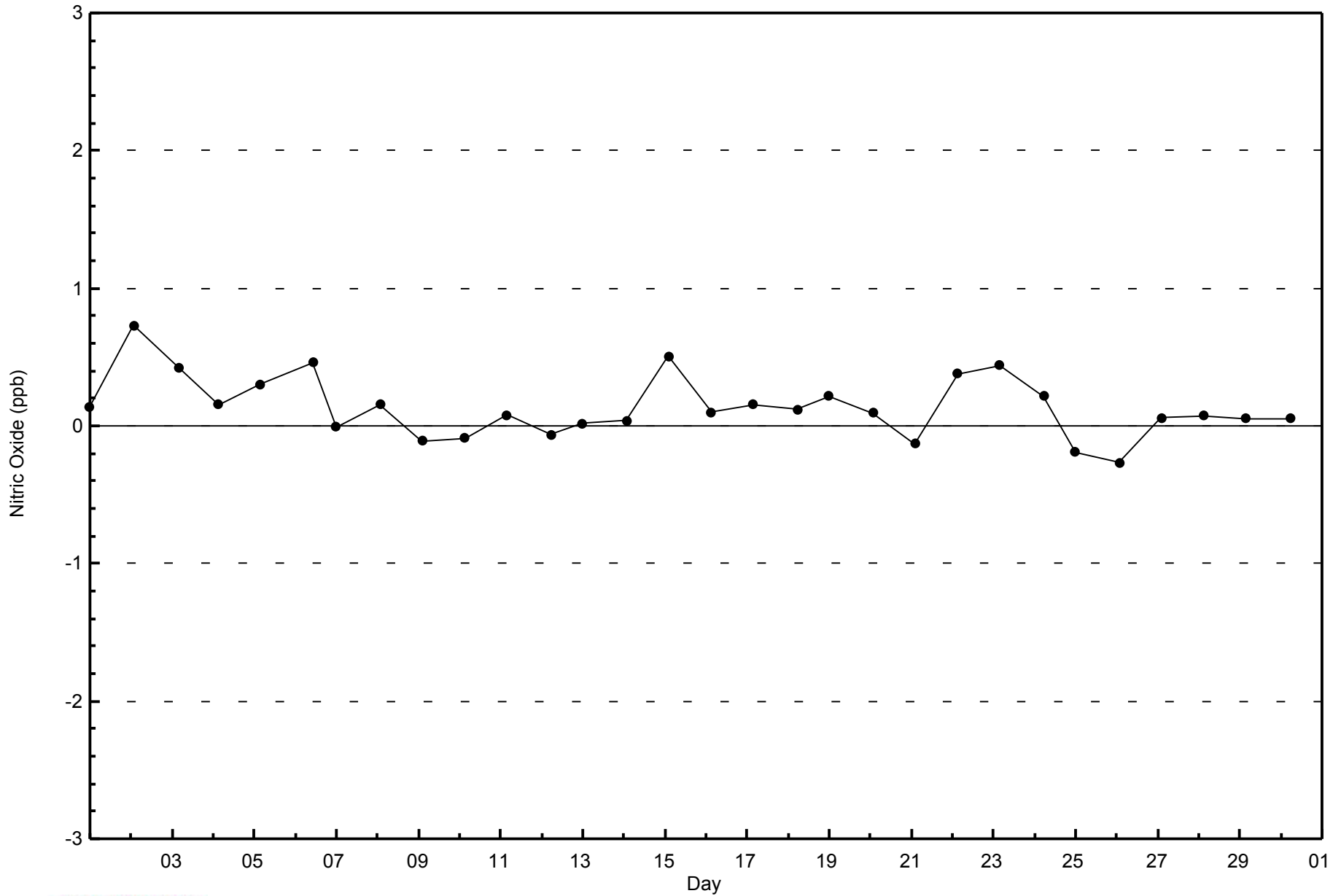


**Total Number of Valid Hours: 675**



WBEA  
Zero Responses

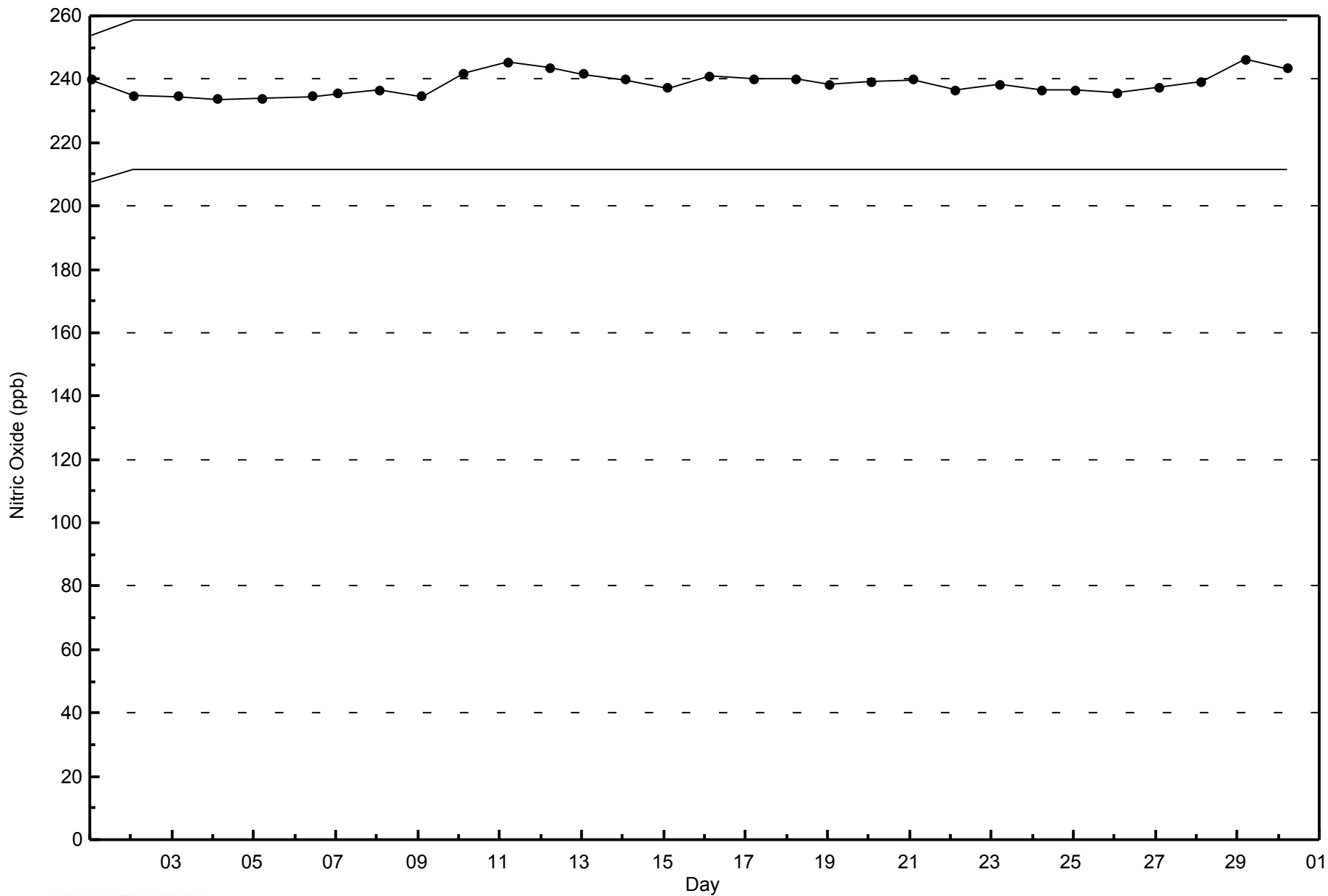
Nitric Oxide (NO) - ppb  
Wapasu - April 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Wapasu - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 18 ppb on Apr 10 00:00	Maximum Daily Average: 6.5 ppb on Apr 29		Hours of Data:	680
Minimum Value: 0 ppb on Apr 9 01:00	Minimum Daily Average: 0.1 ppb on Apr 24		Hours of Missing Data:	40
Maximum Diurnal Average: 3.4 ppb at hour 8	Minimum Diurnal Average: 1.0 ppb at hour 15		Hours of Calibration:	36
Monthly Average: 2.0 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 2 P <sub>90</sub> = 5 P <sub>99</sub> = 17		Percent Operational Time:	99.4

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	0	0	0	0	0	0	0	0	1	--	1
2-Apr	1	Z	1	3	5	1	0	0	3	3	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1.4	5
3-Apr	1	1	2	Z	2	2	2	3	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0.9	3
4-Apr	0	1	1	Z	2	3	2	2	1	0	1	2	2	1	1	1	1	1	0	0	0	0	0	0	1.0	3
5-Apr	0	0	0	1	Z	4	2	1	0	0	1	2	2	2	1	1	1	1	1	1	0	1	1	3	1.1	4
6-Apr	1	1	1	1	1	1	2	2	2	2	Z	1	1	1	2	2	2	1	1	2	1	1	1	1	1.2	2
7-Apr	Z	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	3	1	1	2	1	1	1	1.2	3
8-Apr	1	Z	1	1	1	2	2	3	7	5	3	PF	PF	PF	PF	1	1	1	0	0	0	1	1	0	1.6	7
9-Apr	0	0	Z	1	2	1	2	2	1	1	1	2	2	4	1	2	2	1	1	13	14	7	16	18	4.1	18
10-Apr	11	11	10	Z	6	7	7	6	10	8	4	3	4	3	2	2	1	1	1	2	1	1	1	1	4.4	11
11-Apr	1	1	2	5	Z	7	4	4	8	14	6	3	2	2	2	2	2	2	2	3	3	1	1	3	3.4	14
12-Apr	4	3	6	8	15	Z	10	5	2	1	2	2	1	0	1	1	1	1	1	3	2	3	1	1	3.1	15
13-Apr	Z	2	2	1	1	2	1	1	1	1	0	0	0	1	0	0	1	1	1	1	0	0	1	1	0.9	2
14-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	1	1	Z	2	6	4	5	9	8	5	3	2	1	2	1	1	1	0	1	3	7	4	1	1	2.9	9
16-Apr	1	3	4	Z	4	14	7	2	2	5	9	5	2	1	1	1	1	0	1	4	5	6	12	9	4.3	14
17-Apr	8	7	4	4	Z	13	9	6	4	4	1	1	1	1	1	5	5	1	1	0	0	1	1	1	3.4	13
18-Apr	1	1	4	2	0	Z	0	2	1	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0.7	4
19-Apr	Z	2	3	2	2	2	6	18	14	4	3	2	1	1	1	1	1	2	1	1	4	1	1	1	3.1	18
20-Apr	0	Z	0	0	0	0	1	5	5	2	0	0	0	1	1	1	1	0	0	0	0	0	0	1	0.8	5
21-Apr	0	0	Z	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.5	4
22-Apr	0	1	1	Z	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0.5	1
23-Apr	1	0	1	1	Z	1	0	1	1	1	2	2	2	1	1	1	1	1	0	0	0	0	0	0	0.7	2
24-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Apr	Z	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	2
26-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	2	3	2	3	2	0	0.9	3
27-Apr	0	0	Z	0	1	1	1	2	1	1	1	1	3	3	2	1	2	1	1	1	6	12	7	17	2.8	17
28-Apr	17	7	3	Z	2	1	3	3	1	1	0	1	1	1	1	1	1	1	1	2	1	1	1	3	2.2	17
29-Apr	8	10	7	4	Z	10	11	17	5	7	5	3	1	1	1	1	1	3	5	10	11	8	10	14	6.5	17
30-Apr	11	16	17	17	15	Z	11	3	2	1	2	2	2	2	1	2	1	3	5	8	5	2	4	3	5.9	17

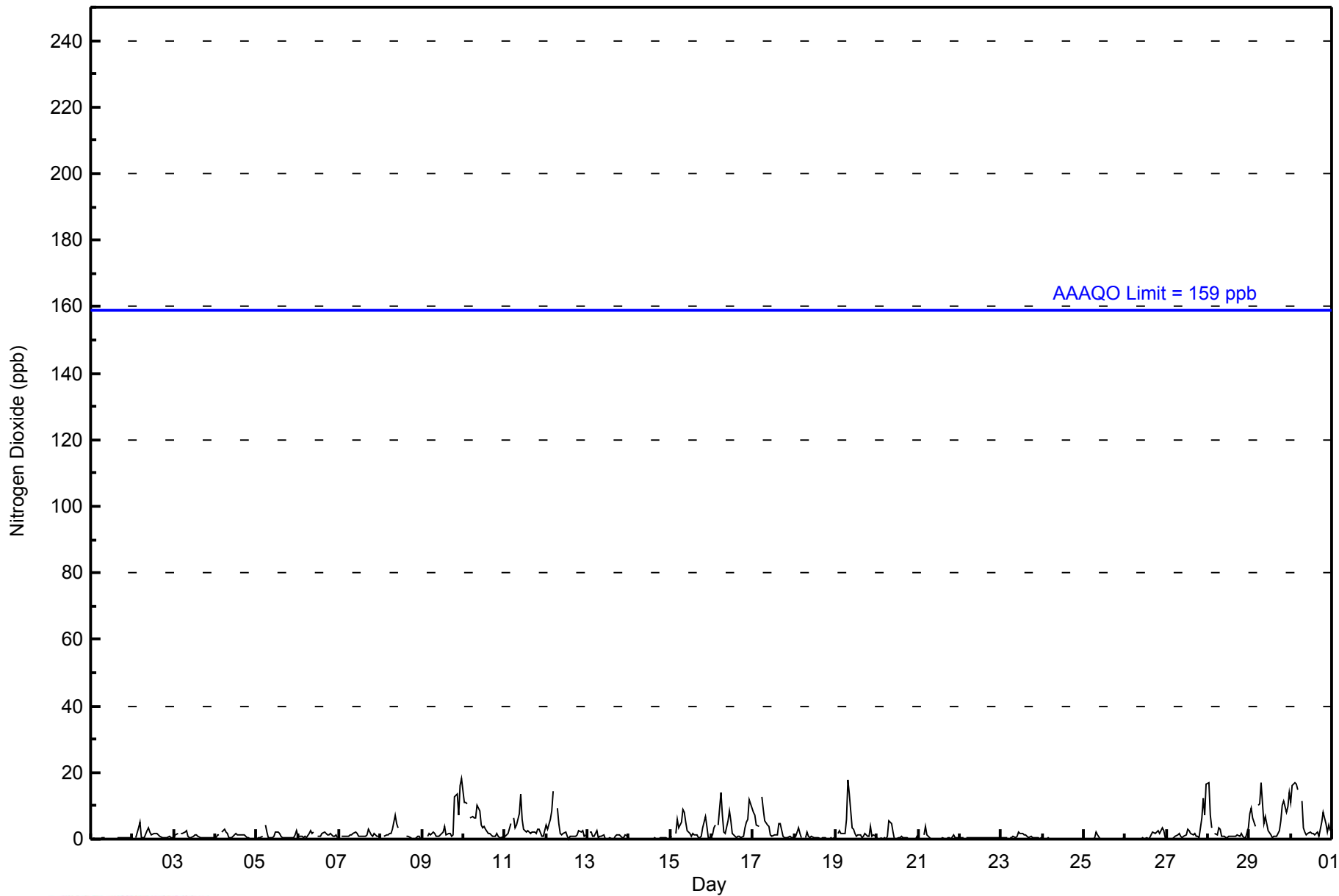
2.7	2.8	2.7	2.2	2.8	2.9	3.0	3.4	2.7	2.4	1.8	1.3	1.2	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.9	2.2	1.9	2.2	2.7	Diurnal Average	
17	16	17	17	15	14	11	18	14	14	9	5	4	4	2	5	5	3	5	13	14	12	16	18	Diurnal Maximum		

Z - zeronspan      C - Calibration      PF - Power Failure  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	680	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: 680

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - April 2015**

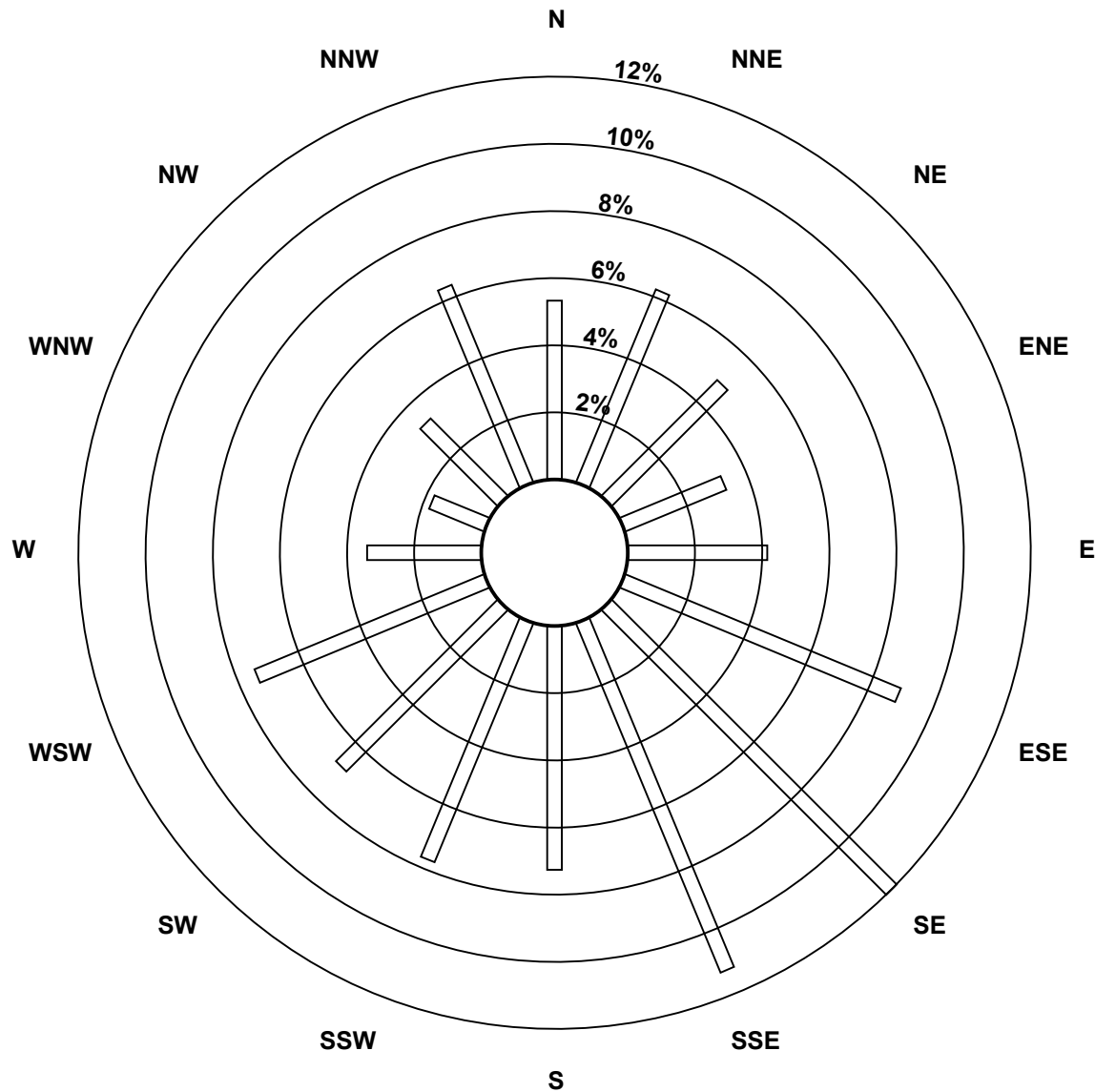
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675

Total Number of Valid Hours: 675

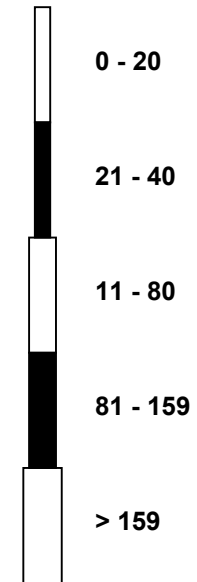
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu (AMS 17)



Classes (ppb)



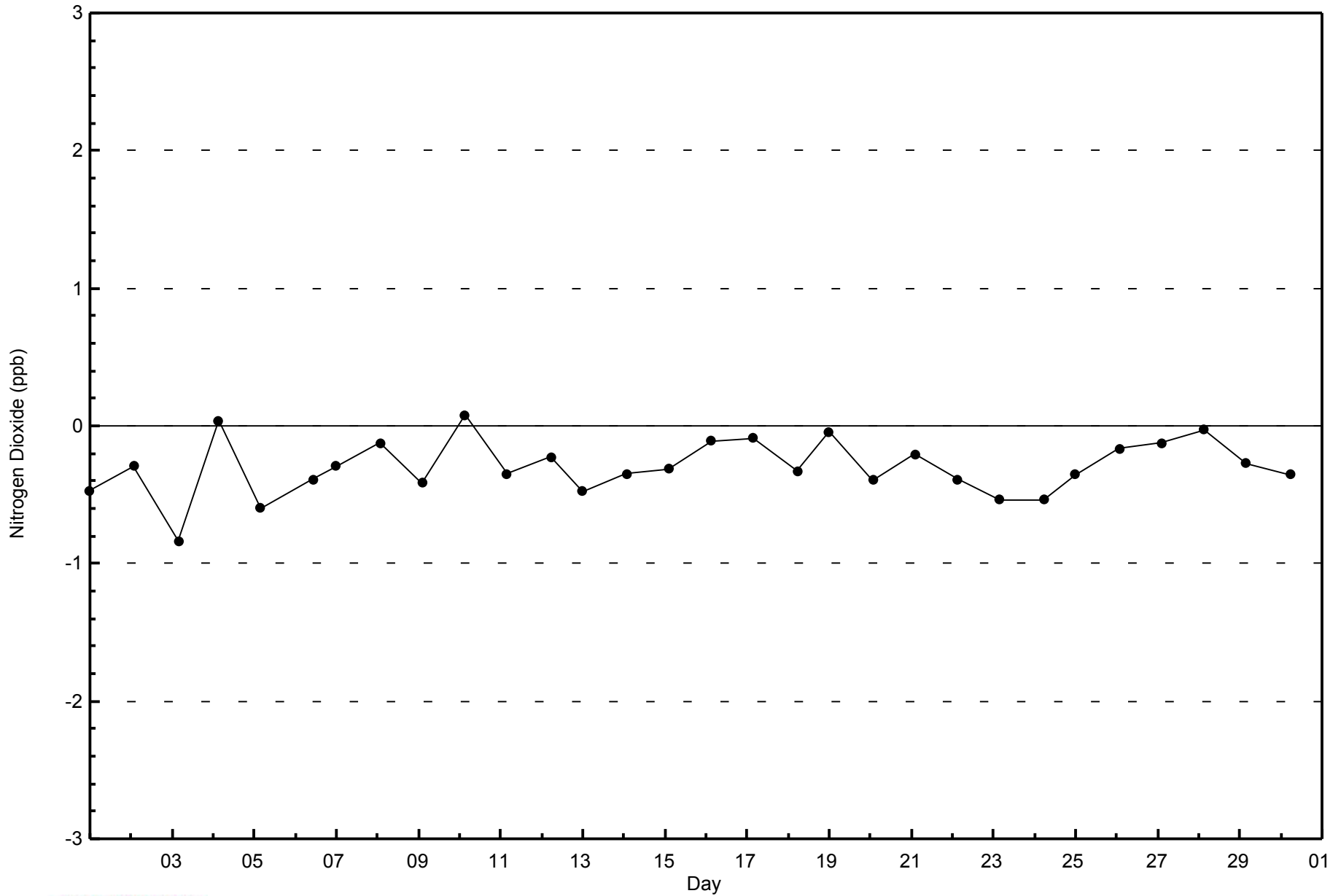
Total Number of Valid Hours: 675





WBEA  
Zero Responses

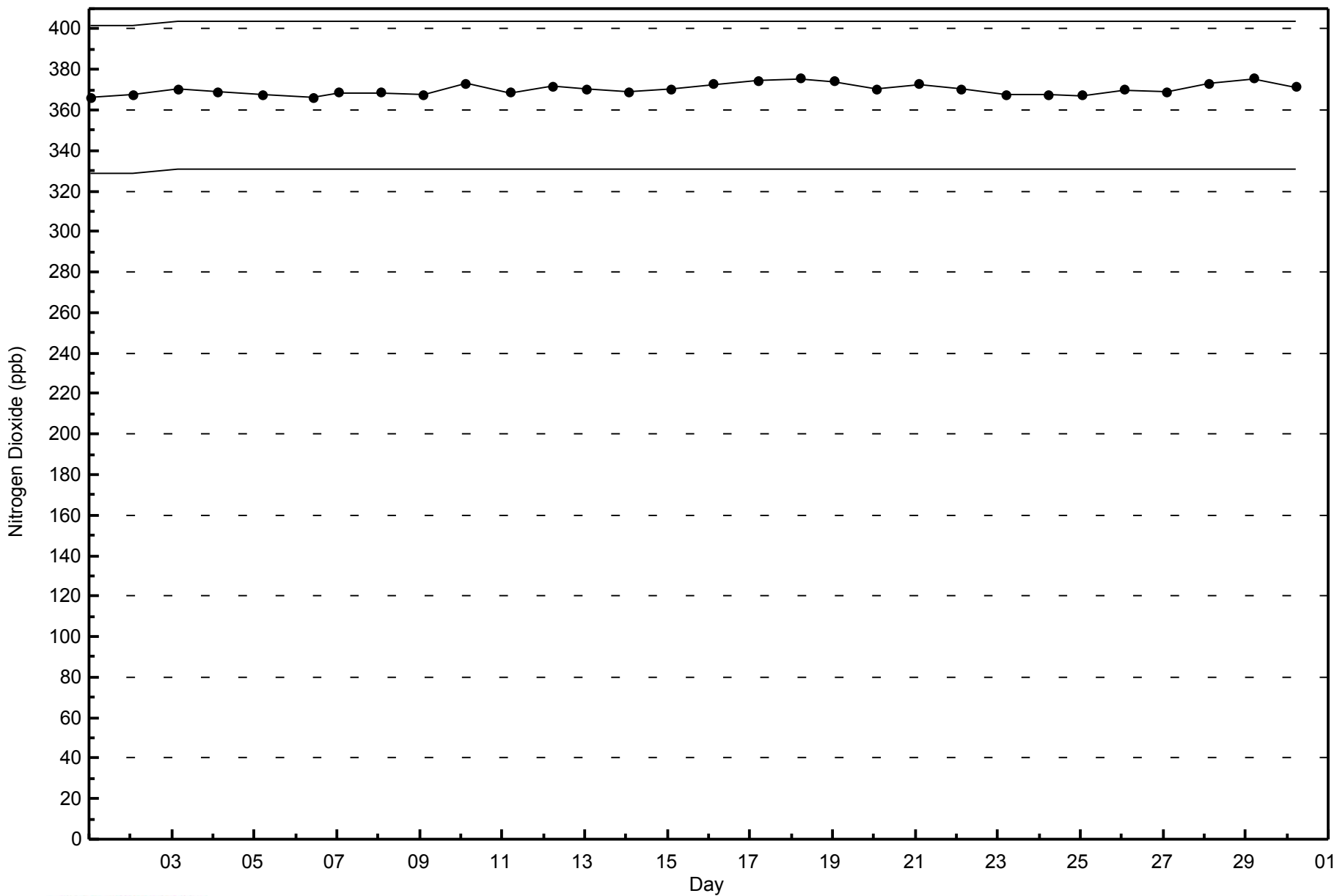
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - April 2015



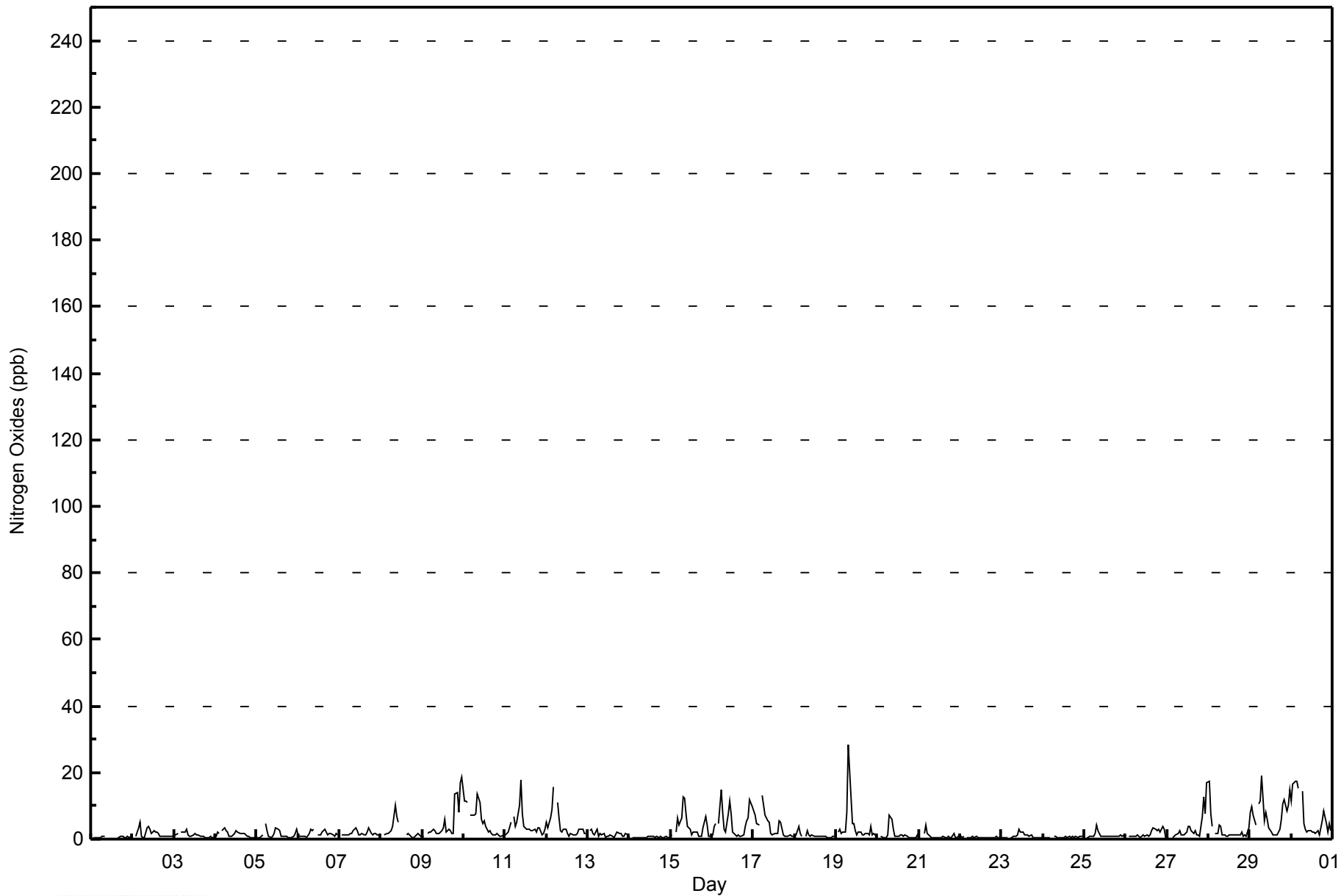


Maximum Value: 28 ppb on Apr 19 08:00																		Maximum Daily Average: 7.2 ppb on Apr 29						Hours in Service: 720		
Minimum Value: 0 ppb on Apr 24 03:00																		Minimum Daily Average: 0.6 ppb on Apr 22						Hours of Data: 680		
Maximum Diurnal Average: 4.6 ppb at hour 8																		Minimum Diurnal Average: 1.4 ppb at hour 19						Hours of Missing Data: 40		
Monthly Average: 2.6 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 3 P <sub>90</sub> = 7 P <sub>99</sub> = 17						Hours of Calibration: 36		
																		Percent Operational Time: 99.4								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	1	0	1	0	0	1	1	1	C	C	C	C	C	C	1	1	1	1	0	1	1	0	1	--	1
2-Apr	1	Z	1	3	5	1	1	1	3	4	3	2	3	2	2	2	1	1	1	1	1	1	1	1	1.7	5
3-Apr	1	1	2	Z	2	2	2	3	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1.2	3	
4-Apr	1	2	2	Z	2	3	3	2	1	1	1	2	3	2	2	2	2	2	1	1	1	0	0	1.5	3	
5-Apr	0	1	0	1	Z	5	3	1	1	1	2	3	3	2	1	1	1	1	1	1	1	1	2	1.4	5	
6-Apr	1	1	1	1	1	1	2	3	2	3	Z	1	1	1	2	3	2	1	2	2	1	1	2	1.5	3	
7-Apr	Z	1	1	1	1	1	2	2	2	3	2	1	1	2	1	1	2	3	2	1	2	2	1	1.7	3	
8-Apr	1	Z	1	2	2	2	2	4	10	7	5	PF	PF	PF	PF	1	2	1	0	1	1	2	1	2.4	10	
9-Apr	1	1	Z	2	2	2	3	3	2	2	2	3	3	6	2	3	3	2	2	13	14	8	17	4.9	19	
10-Apr	12	12	11	Z	7	7	7	8	14	11	6	5	5	4	2	2	2	1	1	2	1	1	1	5.3	14	
11-Apr	1	2	2	5	Z	7	4	5	10	18	8	4	3	3	3	2	2	3	2	3	3	1	2	4.2	18	
12-Apr	5	3	6	9	16	Z	11	6	3	2	3	3	2	1	2	1	1	1	2	3	3	3	2	3.9	16	
13-Apr	Z	2	3	2	1	3	1	2	1	2	1	1	1	1	1	1	1	2	2	1	1	1	2	1.4	3	
14-Apr	1	Z	1	0	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
15-Apr	1	1	Z	2	6	4	6	13	12	8	4	3	1	2	2	2	1	1	1	3	7	4	1	3.8	13	
16-Apr	1	4	5	Z	5	15	8	3	2	8	11	8	2	1	1	1	1	1	4	5	6	12	10	5.0	15	
17-Apr	8	7	5	4	Z	13	10	7	6	5	2	1	2	2	2	5	5	1	1	1	1	1	1	4.0	13	
18-Apr	1	1	4	2	1	Z	1	3	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1.1	4	
19-Apr	Z	2	3	2	2	2	8	28	20	5	4	2	1	2	2	1	1	2	1	1	4	1	2	4.3	28	
20-Apr	1	Z	1	1	1	1	1	7	6	3	1	1	1	1	1	1	1	1	0	1	1	0	1	1.4	7	
21-Apr	1	1	Z	2	4	2	1	1	1	1	0	1	1	0	1	1	1	1	1	0	2	1	1	0.9	4	
22-Apr	1	1	1	Z	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	0	0.6	1	
23-Apr	1	1	0	1	Z	1	1	1	1	1	3	2	2	1	1	1	1	1	1	1	0	0	0	0.9	3	
24-Apr	0	1	0	0	0	Z	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
25-Apr	Z	0	1	1	1	1	2	4	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	4	
26-Apr	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	2	4	3	1.6	4	
27-Apr	0	0	Z	1	1	1	2	2	1	1	1	2	4	4	3	2	3	1	1	1	7	13	8	3.3	17	
28-Apr	17	7	4	Z	2	2	4	4	1	1	1	1	1	1	1	1	1	1	1	2	1	1	4	2.8	17	
29-Apr	8	10	7	4	Z	10	12	19	6	8	6	3	2	1	1	1	1	3	6	11	12	8	10	7.2	19	
30-Apr	11	17	17	17	15	Z	14	5	3	2	3	3	2	2	2	3	1	3	5	8	5	2	5	6.4	17	
																		Diurnal Average								
																		Diurnal Maximum								
Z - zerspan																		C - Calibration						PF - Power Failure		



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	679	99.85	99.85
21 - 40	1	0.15	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 680

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - April 2015**

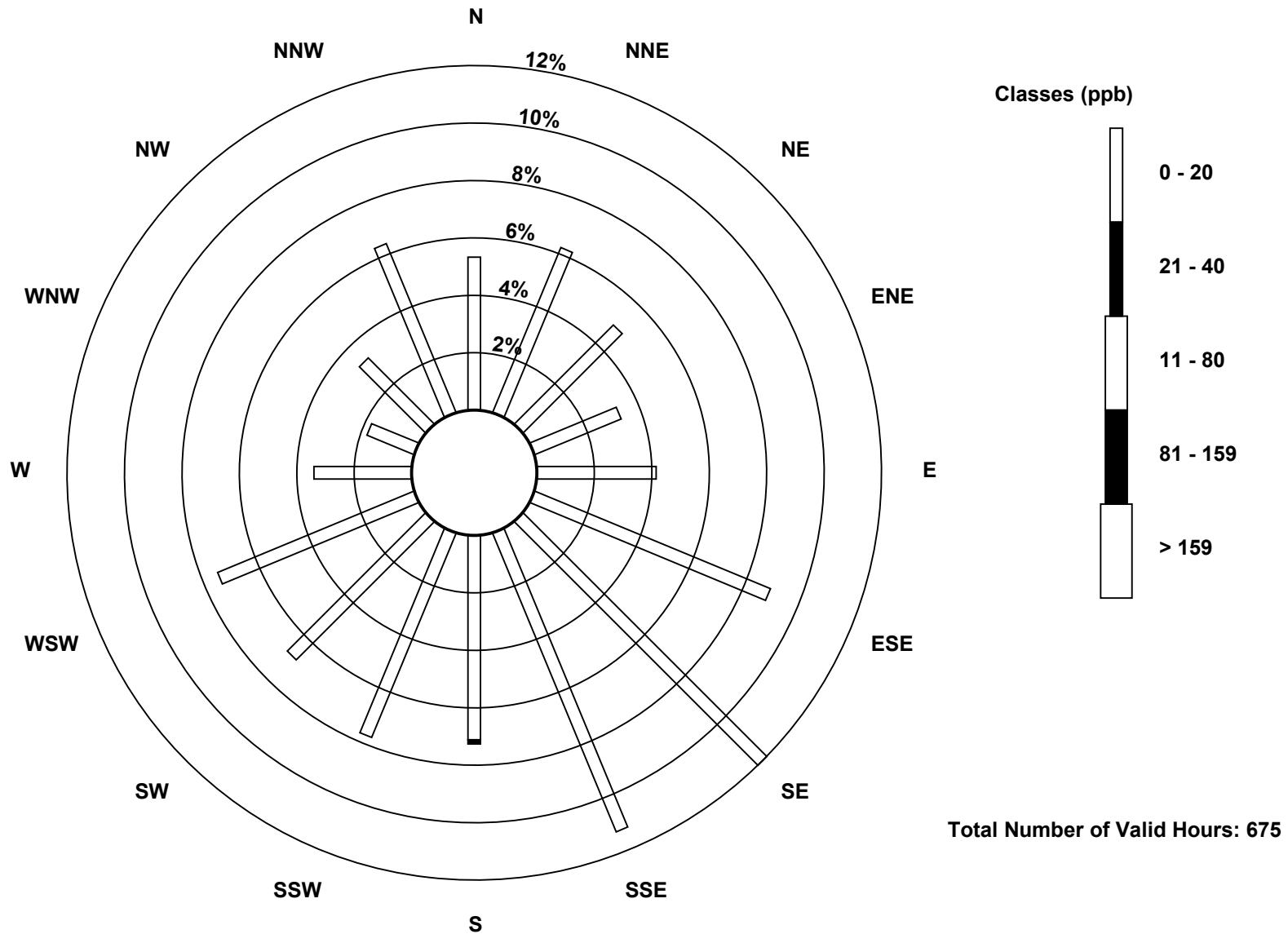
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	36	42	33	22	28	60	81	76	48	52	46	50	23	12	22	43	674
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	42	33	22	28	60	81	76	49	52	46	50	23	12	22	43	675

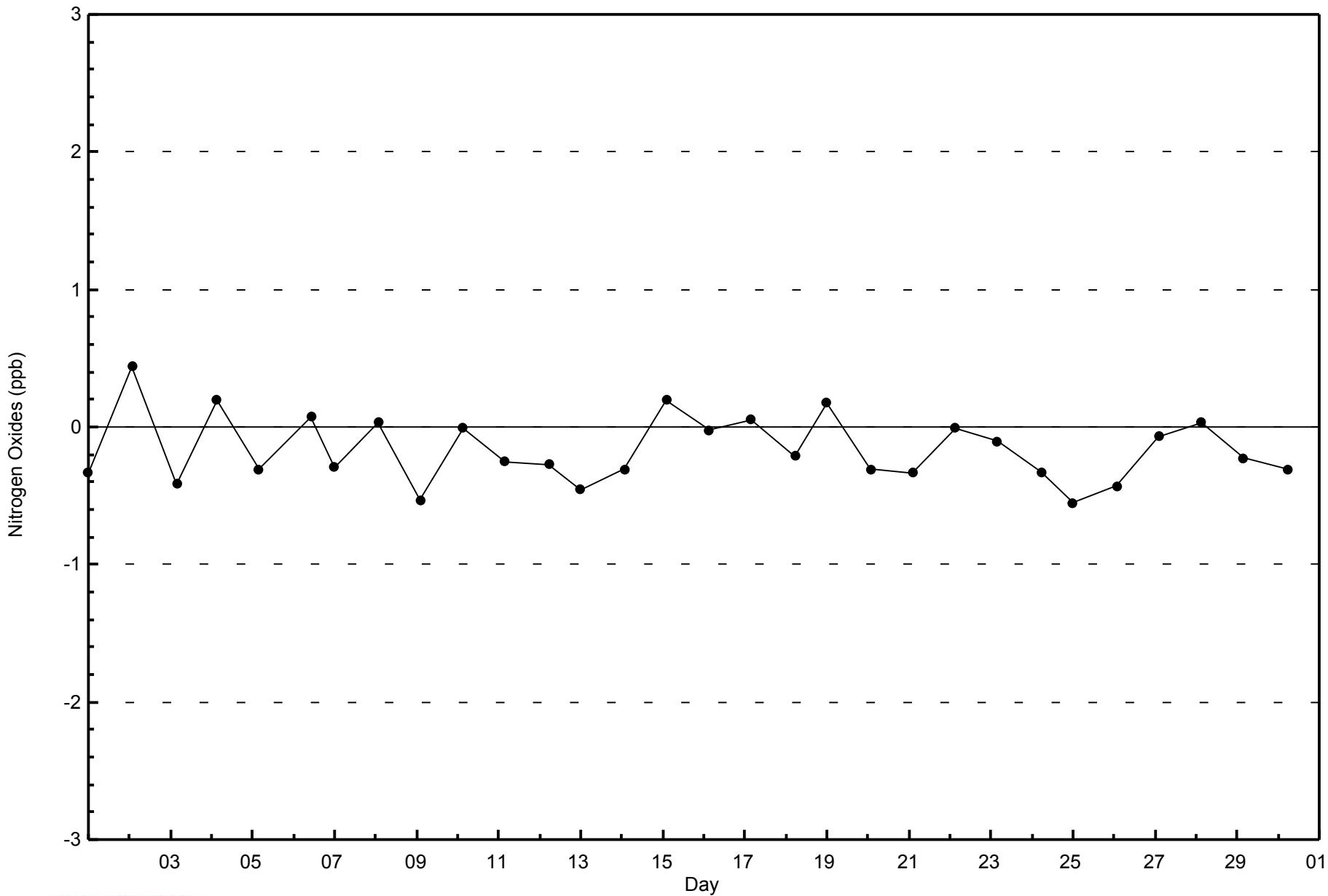
Total Number of Valid Hours: 675

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 Wapasu (AMS 17)



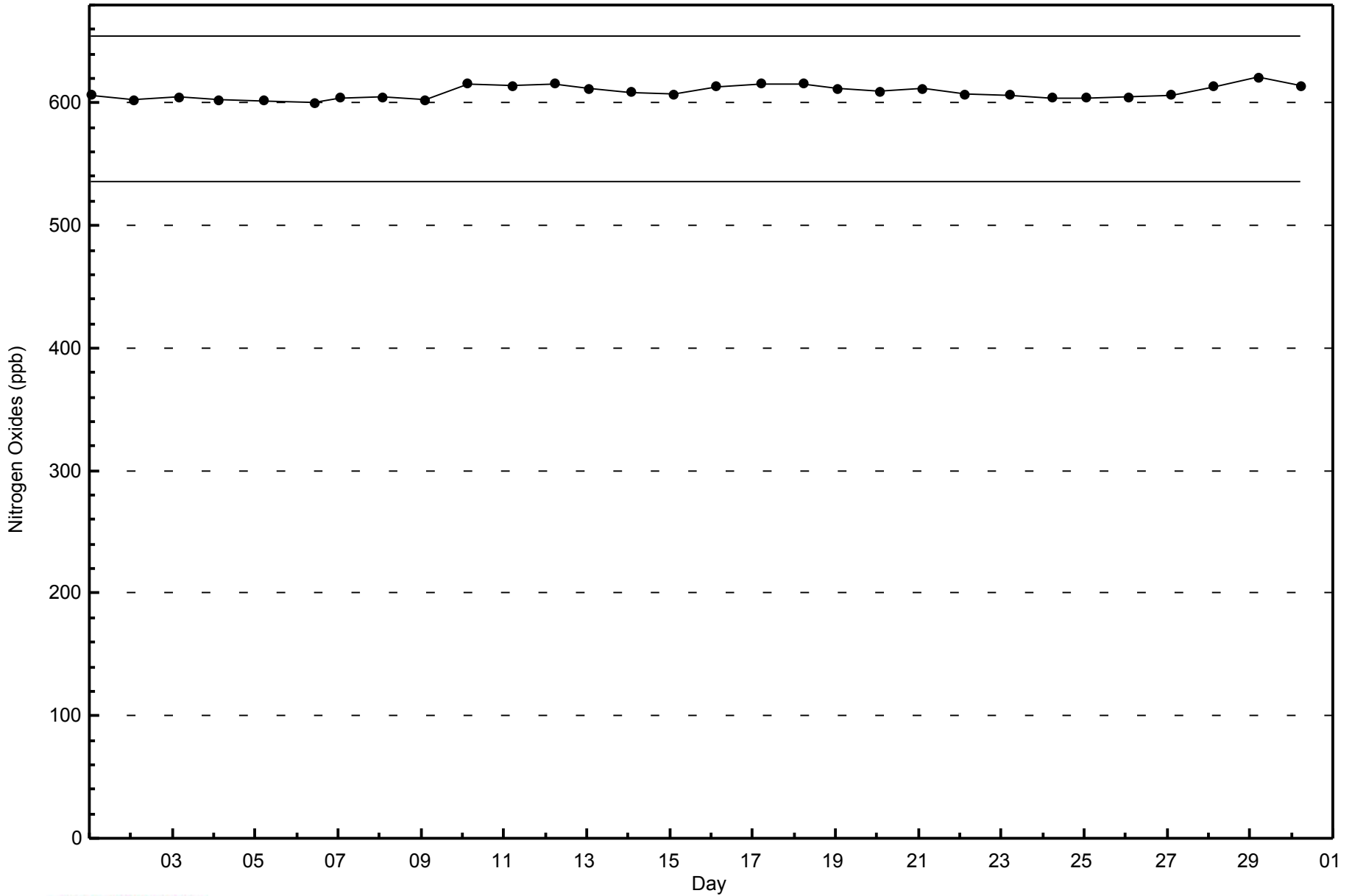






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - April 2015





Summary of Hour Averages

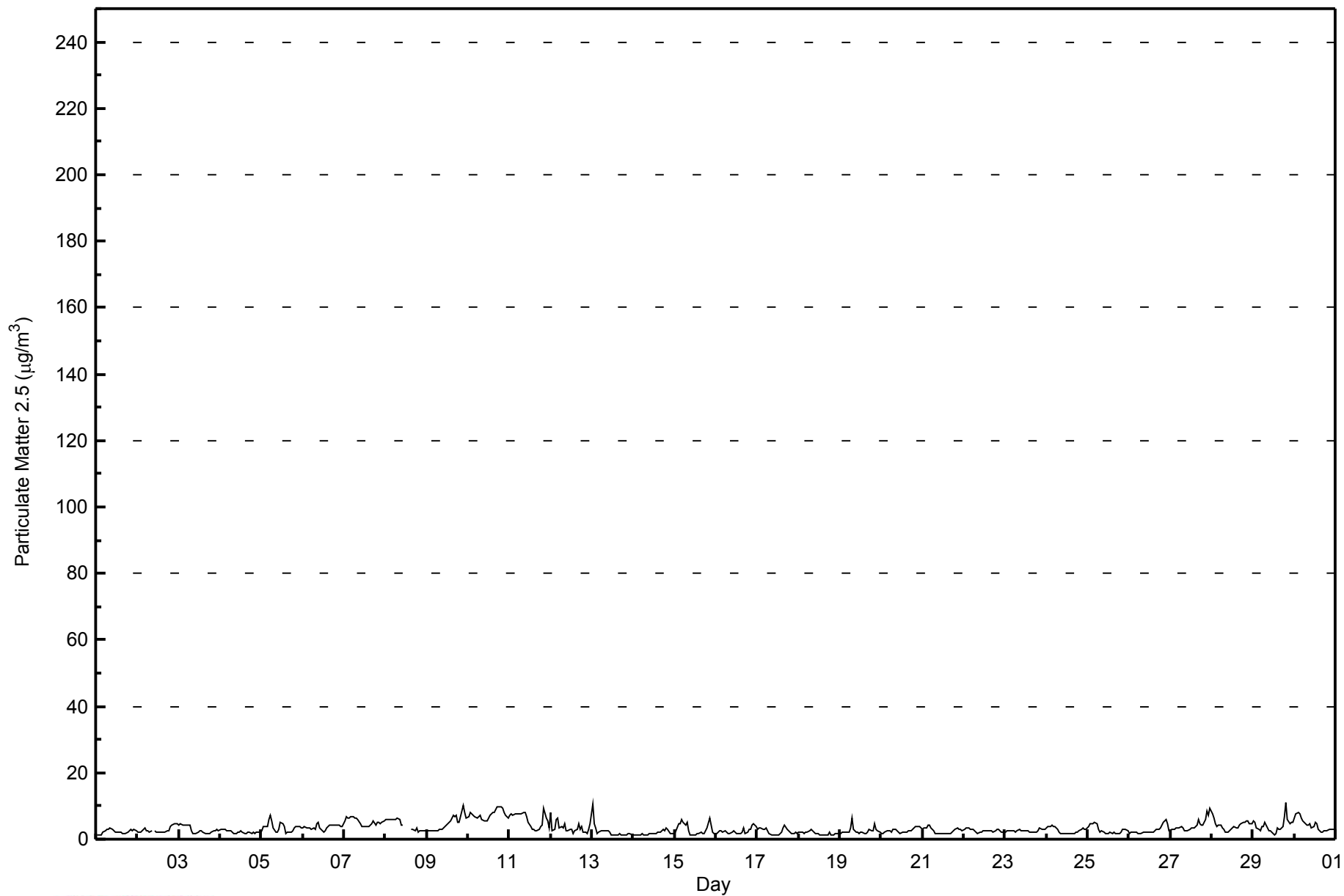
Wapasu - April 2015

Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 11.0 µg/m <sup>3</sup> on Apr 29 20:00 Maximum Daily Average: 7.4 µg/m <sup>3</sup> on Apr 10																	Hours in Service: 720 Hours of Data: 715 Hours of Missing Data: 5 Hours of Calibration: 0 Percent Operational Time: 99.3									
Minimum Value: 1.1 µg/m <sup>3</sup> on Apr 1 03:00 Maximum Diurnal Average: 4.1 µg/m <sup>3</sup> at hour 21 Monthly Average: 3.31 µg/m <sup>3</sup>																	Minimum Daily Average: 1.8 µg/m <sup>3</sup> on Apr 18 Minimum Diurnal Average: 2.6 µg/m <sup>3</sup> at hour 12 Percentiles: P <sub>1</sub> = 1.3 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.0 Median = 2.7 Q <sub>3</sub> = 4.1 P <sub>90</sub> = 6.0 P <sub>99</sub> = 9.2									
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-Apr	1.4	1.3	1.1	1.2	2.2	2.5	3.0	3.0	3.4	2.8	2.4	2.3	2.3	2.1	1.9	1.9	1.6	1.8	2.2	2.4	3.0	2.6	2.8	2.6	2.2	3.4
2-Apr	2.3	2.2	2.3	2.9	3.4	2.5	2.4	2.2	2.4	M	2.4	2.2	2.3	2.1	2.1	2.1	2.1	2.4	2.6	4.0	4.3	4.6	4.8	4.6	2.8	4.8
3-Apr	4.3	4.7	4.3	4.2	4.1	4.2	4.2	2.7	1.6	1.7	1.7	2.1	2.6	2.6	2.1	1.9	1.9	1.8	1.9	2.3	2.6	2.7	2.8	2.8	2.8	4.7
4-Apr	2.8	3.0	2.9	2.8	2.6	2.5	2.4	2.0	1.7	1.5	2.0	2.2	2.6	2.1	1.8	1.9	2.0	1.9	1.7	2.0	1.9	2.0	1.9	2.0	2.2	3.0
5-Apr	2.6	3.7	4.0	4.0	5.8	7.3	5.5	3.2	2.2	2.0	2.8	5.0	4.7	3.7	1.9	1.9	2.1	2.2	2.5	3.5	3.9	3.6	3.7	3.3	3.5	7.3
6-Apr	3.6	3.7	3.5	3.3	3.3	3.1	3.2	2.8	4.6	5.0	3.5	2.4	2.2	2.5	3.3	4.2	4.4	4.1	4.1	4.2	4.3	4.1	3.9	3.9	3.6	5.0
7-Apr	5.5	6.7	6.5	6.5	6.6	6.7	6.3	6.3	6.1	4.6	3.9	3.6	3.7	4.0	3.9	4.1	4.5	5.4	4.3	5.2	4.9	4.8	5.1	5.4	5.2	6.7
8-Apr	5.8	6.1	5.8	5.9	6.0	5.9	5.8	6.6	5.9	4.2	4.3	PF	PF	PF	PF	3.1	3.0	2.7	3.4	2.3	2.5	2.7	2.7	2.5	4.4	6.6
9-Apr	2.5	2.6	2.4	2.4	2.4	2.4	2.7	2.9	2.9	2.9	3.6	4.2	4.7	5.0	5.7	7.4	6.7	7.1	5.1	5.1	8.4	10.1	7.9	6.2	4.7	10.1
10-Apr	6.9	7.9	7.7	7.4	6.6	6.4	6.7	7.1	5.9	5.5	5.7	5.6	6.2	7.1	7.9	8.2	8.9	9.8	9.7	9.7	9.4	8.2	7.1	6.4	7.4	9.8
11-Apr	7.2	7.6	7.3	7.6	7.4	7.4	7.4	7.8	8.0	8.1	6.6	5.3	3.6	3.1	3.0	2.6	2.4	2.9	4.0	4.1	9.1	6.3	5.5	3.5	5.7	9.1
12-Apr	8.2	2.7	3.0	6.1	6.4	3.6	3.6	3.6	4.7	2.6	2.7	2.8	2.8	1.9	2.4	3.1	4.5	3.2	3.8	2.3	2.2	1.8	3.0	4.7	3.6	8.2
13-Apr	10.5	4.7	3.2	1.7	2.0	2.4	2.4	2.5	2.4	2.4	1.9	1.4	1.3	1.4	1.3	1.3	1.5	1.4	1.3	1.3	1.4	1.6	1.5	1.4	2.3	10.5
14-Apr	1.5	1.4	1.4	1.5	1.4	1.7	1.5	1.4	1.4	1.6	1.6	1.6	1.6	1.7	2.0	2.0	2.2	3.2	2.7	3.2	3.0	1.8	1.8	1.7	1.9	3.2
15-Apr	1.8	2.7	4.7	4.5	5.8	5.1	4.3	5.2	2.3	1.5	1.4	1.3	1.2	1.6	1.8	2.1	1.8	1.7	2.4	3.5	6.3	4.3	2.3	1.5	3.0	6.3
16-Apr	1.8	2.2	2.6	2.4	2.3	2.6	2.0	1.6	1.5	2.0	2.5	2.1	1.8	1.9	1.9	2.3	3.3	1.8	2.1	2.9	3.2	4.0	4.5	3.7	2.5	4.5
17-Apr	2.8	3.3	3.2	3.0	3.0	3.3	2.6	1.7	1.5	1.5	1.3	1.4	1.4	1.7	2.2	3.4	4.3	3.1	2.4	2.0	1.7	1.9	2.0	1.8	2.3	4.3
18-Apr	2.3	2.2	2.3	1.8	2.0	2.3	2.5	2.9	2.4	1.9	1.7	1.5	1.5	1.5	1.5	1.4	1.3	1.4	2.0	1.3	1.5	1.7	1.7	1.7	1.8	2.9
19-Apr	1.8	1.9	2.0	2.1	2.1	2.1	3.4	6.2	3.1	2.0	1.9	1.9	2.0	2.0	1.8	1.7	2.1	3.1	2.6	2.7	4.8	2.8	2.4	2.2	2.5	6.2
20-Apr	1.7	1.7	1.9	2.4	2.5	2.7	2.3	2.8	2.8	2.4	2.0	1.9	1.9	2.1	2.3	2.1	2.4	2.4	2.8	3.3	3.9	3.9	3.8	3.5	2.6	3.9
21-Apr	3.2	3.5	3.4	4.3	4.2	3.5	2.5	1.7	1.7	1.7	1.7	1.7	1.8	1.7	1.6	1.6	1.8	2.3	2.6	2.8	3.3	3.0	2.8	2.4	2.5	4.3
22-Apr	2.8	3.5	3.6	3.3	3.1	2.8	2.4	2.0	1.8	2.1	2.3	2.4	2.4	2.5	2.4	2.3	2.4	2.3	2.5	2.9	2.8	2.5	2.3	2.2	2.6	3.6
23-Apr	2.2	2.4	2.5	2.4	2.4	2.4	2.2	2.6	2.8	2.6	2.6	2.6	2.6	2.4	2.2	2.1	2.0	2.1	2.2	2.6	3.2	3.1	3.0	2.9	2.5	3.2
24-Apr	3.5	3.7	3.6	4.0	4.0	3.9	3.2	2.3	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7	1.8	1.9	2.0	2.5	2.8	3.3	3.1	2.9	2.6	4.0
25-Apr	4.0	4.8	4.8	4.5	5.0	4.6	3.0	2.1	2.4	2.2	1.8	1.8	1.8	2.0	1.9	2.1	1.8	1.7	1.6	2.0	2.9	3.1	2.9	2.5	2.8	5.0
26-Apr	1.8	1.9	2.0	2.1	2.2	1.8	1.7	1.9	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.6	2.8	2.8	3.2	4.4	4.9	6.0	4.8	2.7	2.6	6.0
27-Apr	2.6	2.9	2.9	3.2	3.4	3.6	3.8	3.4	2.7	2.4	2.7	2.9	3.6	3.3	3.6	4.4	6.0	4.6	4.1	4.2	5.8	8.5	7.3	9.2	4.2	9.2
28-Apr	7.8	6.2	4.6	4.0	4.1	4.2	3.4	3.0	2.3	2.1	2.6	2.8	3.3	3.7	3.6	3.5	4.2	4.5	4.9	5.0	5.7	5.4	4.8	4.8	4.2	7.8
29-Apr	5.4	5.2	3.2	3.0	2.6	3.6	3.8	5.2	3.2	2.5	2.4	2.2	1.4	1.6	3.3	2.8	3.0	3.9	6.7	11.0	6.1	4.7	4.9	5.2	4.0	11.0
30-Apr	6.2	7.6	8.2	7.5	6.4	5.7	4.8	4.2	4.1	4.5	3.6	3.9	4.9	4.7	2.9	2.3	2.3	2.3	2.4	2.6	2.9	2.9	2.9	2.9	4.3	8.2
																								Diurnal Average		
																								Diurnal Maximum		
																								3.9 3.8 3.7 3.7 3.8 3.7 3.5 3.4 3.1 2.8 2.6 2.6 2.6 2.6 2.6 2.8 3.0 3.1 3.2 3.6 4.1 3.9 3.7 3.4		
																								10.5 7.9 8.2 7.6 7.4 7.4 7.4 7.8 8.0 8.1 6.6 5.6 6.2 7.1 7.9 8.2 8.9 9.8 9.7 11.0 9.4 10.1 7.9 9.2		
M - Maintenance PF - Power Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 24-hr 30 µg/m <sup>3</sup>																										



WBEA  
Hourly Averages

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Wapasu - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Wapasu - April 2015**

<b>Concentration Ranges (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
1 - 5	625	87.41	87.41
6 - 15	90	12.59	100.00
16 - 25	0	0.00	100.00
26 - 80	0	0.00	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 715

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**

**Wapasu - April 2015**

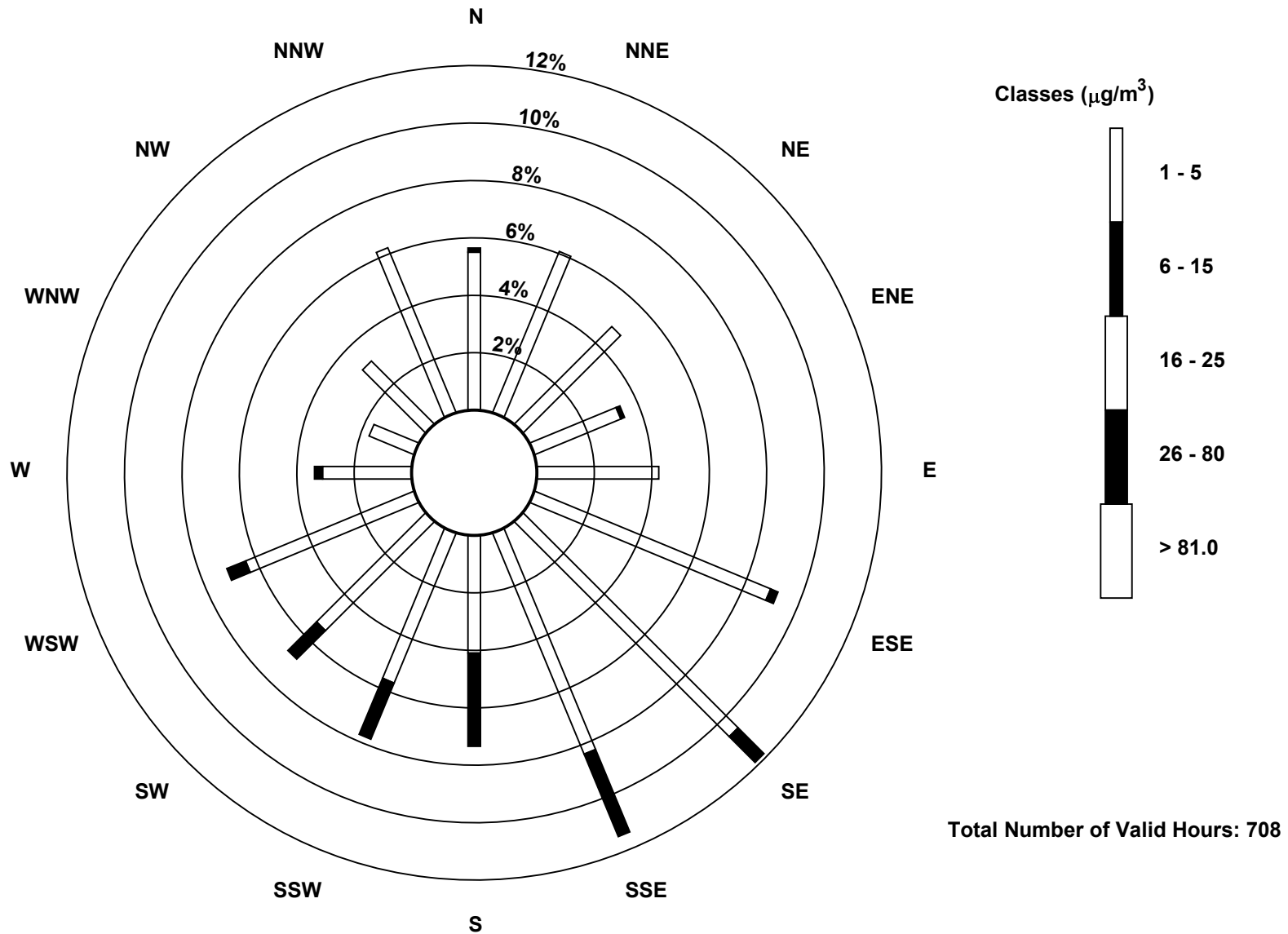
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	39	43	34	23	30	63	75	59	29	40	38	45	22	12	22	44	618
6 - 15	1	0	0	1	0	2	9	22	23	15	10	5	2	0	0	0	90
16 - 25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26 - 80	0	0	0	0	0	0	0	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
<b>Totals</b>	40	43	34	24	30	65	84	81	52	55	48	50	24	12	22	44	708

Total Number of Valid Hours: 708

Total Number of Hours: 720

Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Wapasu (AMS 17)



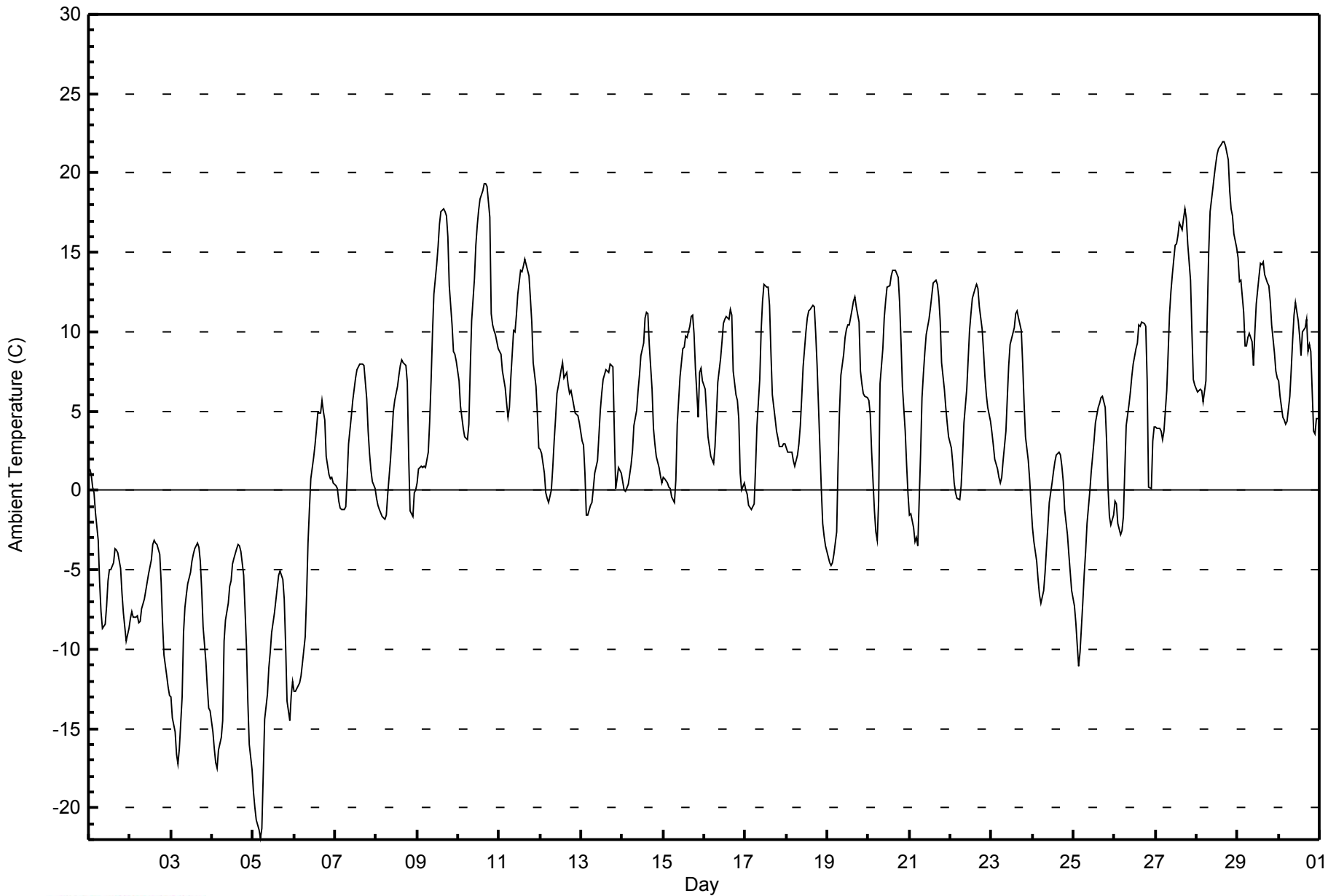


Maximum Value: 22.0 C on Apr 28 17:00																				Maximum Daily Average: 15.7 C on Apr 28					Hours in Service: 720				
Minimum Value: -21.9 C on Apr 5 05:00																				Minimum Daily Average: -12.7 C on Apr 5					Hours of Data: 720				
Maximum Diurnal Average: 8.9 C at hour 16																				Minimum Diurnal Average: -2.4 C at hour 5					Hours of Missing Data: 0				
Monthly Average: 3.28 C																				Percentiles: P <sub>1</sub> = -17.6 P <sub>10</sub> = -7.7 Q <sub>1</sub> = -1.3 Median = 3.9 Q <sub>3</sub> = 9.1 P <sub>90</sub> = 12.9 P <sub>99</sub> = 20.6					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-Apr	1.4	1.0	0.2	-0.1	-1.4	-3.1	-5.7	-7.6	-8.7	-8.4	-7.3	-5.7	-5.0	-5.0	-4.6	-3.7	-3.8	-3.9	-4.9	-6.5	-7.7	-8.6	-9.4	-8.7	-4.9	1.4			
2-Apr	-8.1	-7.6	-8.0	-7.9	-7.9	-8.4	-8.2	-7.5	-6.8	-6.3	-5.8	-5.2	-4.3	-3.4	-3.2	-3.3	-3.4	-4.0	-5.7	-8.3	-10.4	-11.7	-12.4	-12.9	-7.1	-3.2			
3-Apr	-13.0	-14.3	-15.2	-16.6	-17.2	-16.2	-13.0	-8.9	-7.4	-6.6	-5.9	-5.1	-4.5	-4.1	-3.7	-3.3	-3.6	-4.5	-6.3	-8.6	-10.8	-12.4	-13.7	-13.9	-9.5	-3.3			
4-Apr	-15.2	-16.3	-17.1	-17.5	-16.4	-15.6	-14.5	-9.5	-8.1	-7.1	-6.1	-5.7	-4.7	-4.3	-3.6	-3.4	-3.5	-3.9	-5.3	-7.6	-9.9	-13.4	-16.0	-17.6	-10.1	-3.4			
5-Apr	-19.0	-20.0	-20.7	-21.4	-21.9	-21.3	-17.9	-14.5	-12.9	-11.1	-10.2	-9.0	-7.7	-6.9	-6.1	-5.3	-5.1	-5.6	-6.8	-9.8	-13.3	-14.5	-12.9	-12.0	-12.7	-5.1			
6-Apr	-12.7	-12.6	-12.3	-12.1	-11.7	-10.9	-9.3	-6.5	-3.3	-1.2	0.7	2.0	2.9	3.8	4.9	4.9	5.6	4.9	4.4	2.2	1.0	0.7	0.8	0.5	-2.2	5.6			
7-Apr	0.3	0.1	-0.7	-1.1	-1.2	-1.2	-1.0	0.9	3.0	4.7	5.7	6.4	7.1	7.6	8.0	7.9	8.0	7.9	5.8	3.7	2.3	1.3	0.6	0.1	3.2	8.0			
8-Apr	-0.5	-0.9	-1.2	-1.6	-1.8	-1.8	-1.5	-0.2	2.0	3.5	5.0	5.7	6.5	7.2	7.9	8.2	8.0	7.9	6.8	2.1	-1.3	-1.7	-0.2	0.0	2.4	8.2			
9-Apr	0.5	1.3	1.5	1.4	1.5	1.5	2.4	4.4	6.9	9.9	12.4	14.2	15.4	16.8	17.6	17.8	17.6	17.3	16.0	12.9	10.5	8.8	8.5	8.1	9.4	17.8			
10-Apr	6.9	5.3	4.7	3.9	3.4	3.2	4.2	7.6	10.7	13.4	15.5	16.7	17.7	18.3	18.9	19.3	19.3	19.1	17.2	11.2	10.4	10.1	9.8	8.9	11.5	19.3			
11-Apr	8.8	8.6	7.5	6.5	5.5	4.6	5.2	7.1	10.1	10.0	11.0	12.4	13.8	13.8	14.2	14.6	14.2	13.5	12.1	10.6	8.1	6.6	4.8	2.7	9.4	14.6			
12-Apr	2.6	2.3	1.1	-0.1	-0.5	-0.8	0.0	1.5	3.1	4.5	6.1	7.1	7.6	8.0	7.1	7.5	6.6	6.1	6.3	5.9	4.9	4.8	4.7	4.2	4.2	8.0			
13-Apr	3.1	2.8	1.1	-1.5	-1.5	-1.0	-0.8	0.1	1.1	1.9	3.5	5.1	6.2	7.0	7.6	7.5	7.5	8.0	7.8	3.8	0.1	0.7	1.4	1.1	3.0	8.0			
14-Apr	0.5	0.0	-0.1	0.4	1.0	1.6	2.5	4.1	5.1	6.3	7.3	8.5	9.3	10.8	11.3	11.2	9.2	6.4	3.9	2.9	2.2	1.4	0.9	0.5	4.5	11.3			
15-Apr	0.8	0.7	0.5	0.2	0.2	-0.4	-0.7	0.6	4.2	5.7	7.2	8.9	9.0	9.7	9.7	10.3	11.0	11.0	9.9	7.7	4.6	7.5	7.7	6.9	5.5	11.0			
16-Apr	6.4	4.9	3.4	2.8	2.1	1.7	2.8	4.7	6.8	8.3	9.4	10.5	10.8	11.0	10.8	11.4	11.1	7.6	6.0	5.7	4.5	1.1	0.0	0.5	6.0	11.4			
17-Apr	0.0	-0.2	-1.0	-1.2	-1.0	-0.8	1.4	4.0	7.0	10.1	11.9	13.0	12.8	12.8	11.6	8.7	6.0	4.5	3.8	3.3	2.8	2.8	3.0	2.9	4.9	13.0			
18-Apr	2.7	2.5	2.4	2.4	1.9	1.5	2.2	2.9	4.1	5.9	7.8	10.0	10.9	11.3	11.4	11.6	11.6	9.9	7.9	5.4	0.1	-2.1	-2.9	-3.5	4.9	11.6			
19-Apr	-4.2	-4.6	-4.7	-4.6	-4.0	-2.6	1.7	5.0	7.3	8.6	9.7	10.2	10.4	10.5	11.4	11.9	12.2	11.6	10.6	7.5	6.7	6.1	5.9	5.8	5.4	12.2			
20-Apr	5.6	4.8	2.5	-1.3	-2.6	-3.1	-0.7	6.7	8.9	10.9	12.0	12.8	12.9	13.5	13.9	13.9	13.8	13.4	11.9	9.3	6.6	3.8	1.6	-0.3	7.1	13.9			
21-Apr	-1.5	-1.5	-2.3	-3.2	-3.0	-3.5	2.3	5.8	7.3	8.7	9.8	10.8	11.5	12.2	13.1	13.3	13.0	12.2	10.7	8.1	6.4	5.3	4.3	3.4	6.0	13.3			
22-Apr	2.7	1.7	0.5	-0.1	-0.5	-0.6	0.3	2.1	4.3	6.4	8.3	10.0	11.1	12.1	12.7	13.0	12.8	11.5	10.2	8.7	7.1	6.0	5.2	4.4	6.2	13.0			
23-Apr	3.7	2.8	2.0	1.4	0.9	0.4	0.8	1.8	3.7	5.8	7.9	9.2	9.9	10.3	11.1	11.3	10.9	10.1	8.0	5.5	3.3	1.9	0.6	-0.9	5.1	11.3			
24-Apr	-2.3	-3.3	-4.5	-5.6	-6.6	-7.1	-6.3	-5.2	-3.7	-2.2	-0.7	0.5	1.2	1.8	2.2	2.4	2.2	1.5	0.5	-1.2	-2.8	-4.0	-5.2	-6.3	-2.3	2.4			
25-Apr	-7.2	-8.4	-9.8	-11.1	-10.1	-7.0	-5.3	-3.8	-2.0	0.0	1.1	2.2	3.1	4.3	5.2	5.5	5.9	5.9	5.2	3.1	0.2	-1.7	-2.2	-1.6	-1.2	5.9			
26-Apr	-0.7	-0.8	-2.1	-2.8	-2.5	-1.6	1.3	4.1	5.4	6.2	7.1	8.0	8.9	9.3	10.4	10.3	10.6	10.5	10.3	6.9	0.2	0.1	3.1	4.0	4.4	10.6			
27-Apr	4.0	3.9	3.9	3.7	3.2	3.8	6.3	8.7	11.1	12.5	13.6	15.4	15.5	16.1	16.8	16.4	17.1	17.7	17.1	15.5	13.2	10.0	7.0	6.7	10.8	17.7			
28-Apr	6.2	6.3	6.4	6.3	5.5	6.9	11.1	15.0	17.6	19.1	19.9	20.6	21.2	21.5	21.8	22.0	22.0	21.7	20.8	18.9	17.7	17.3	16.2	15.3	15.7	22.0			
29-Apr	14.7	13.2	13.3	11.2	9.1	9.1	9.6	9.9	9.4	7.9	10.0	11.8	13.5	14.3	14.3	14.4	13.6	13.1	12.9	12.0	10.4	8.7	7.6	7.1	11.3	14.7			
30-Apr	6.9	5.9	4.7	4.4	4.2	4.4	5.9	7.6	9.5	11.0	11.9	10.7	9.7	8.5	10.0	10.3	10.8	8.7	9.2	8.7	3.7	3.5	4.5	4.5	7.5	11.9			
																								Diurnal Average					
																								Diurnal Maximum					



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Wapasu - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Wapasu - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	4	0.56	0.56
-20 - 0	214	29.72	30.28
0 - 10	348	48.33	78.61
10 - 20	146	20.28	98.89
> 20	8	1.11	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

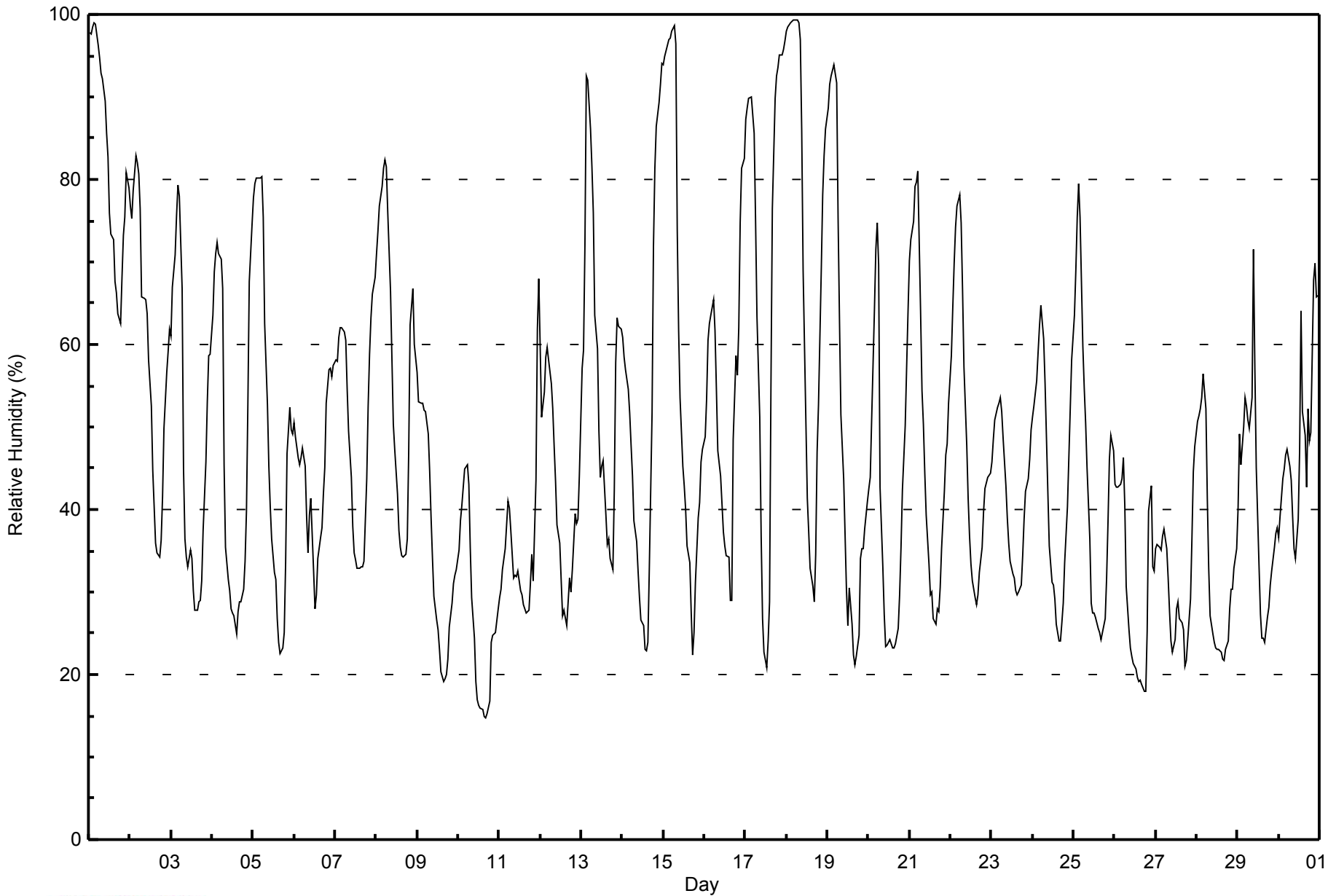


Maximum Value: 99 % on Apr 18 06:00																		Maximum Daily Average: 82.7 % on Apr 1																		Hours in Service: 720			
Minimum Value: 15 % on Apr 10 17:00																		Minimum Daily Average: 27.2 % on Apr 10																		Hours of Data: 720			
Maximum Diurnal Average: 67.9 % at hour 5																		Minimum Diurnal Average: 30.1 % at hour 16																		Hours of Missing Data: 0			
Monthly Average: 48.1 %																		Percentiles: P <sub>1</sub> = 17 P <sub>10</sub> = 25 Q <sub>1</sub> = 31 Median = 44 Q <sub>3</sub> = 62 P <sub>90</sub> = 80 P <sub>99</sub> = 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-Apr	98	98	98	99	99	96	95	93	92	89	86	83	76	73	73	68	66	64	63	68	73	75	81	79	82.7	99													
2-Apr	77	75	79	83	82	81	77	66	66	66	64	58	52	45	40	36	35	34	36	41	50	57	59	62	59.1	83													
3-Apr	61	67	71	76	79	78	67	45	36	34	33	35	34	30	28	28	29	29	31	38	46	53	59	59	47.7	79													
4-Apr	64	69	71	72	71	70	67	45	35	31	30	28	28	27	25	28	29	29	30	34	40	53	68	75	46.6	75													
5-Apr	78	80	80	80	80	80	75	62	53	45	40	36	32	32	27	24	23	23	25	34	47	52	50	49	50.3	80													
6-Apr	51	49	46	46	46	47	45	39	35	39	41	33	28	30	34	37	38	42	45	53	57	57	56	57	43.8	57													
7-Apr	58	58	61	62	62	61	60	55	49	44	38	35	34	33	33	33	33	34	44	53	59	63	66	68	49.8	68													
8-Apr	71	74	77	79	81	82	81	76	66	58	50	47	42	38	35	34	34	35	36	47	62	67	60	58	58.1	82													
9-Apr	57	53	53	53	52	52	49	45	39	34	30	27	25	23	20	19	20	20	22	26	29	31	32	33	35.1	57													
10-Apr	35	39	41	43	45	45	43	35	29	24	19	17	16	16	16	15	15	15	17	24	25	25	25	28	27.2	45													
11-Apr	29	30	33	35	38	41	40	37	32	32	32	33	30	30	29	28	27	28	31	35	31	43	62	68	35.6	68													
12-Apr	60	51	54	58	60	58	55	52	48	43	38	36	31	27	28	26	29	32	30	33	39	38	39	44	42.1	60													
13-Apr	57	59	72	93	92	86	81	76	64	59	49	44	45	46	39	36	36	34	33	42	58	63	62	62	57.9	93													
14-Apr	61	58	57	55	52	48	44	39	36	33	29	27	26	23	23	24	33	52	72	81	86	89	92	94	51.3	94													
15-Apr	94	95	96	97	97	98	99	96	74	62	53	45	43	40	36	33	27	22	25	31	39	41	46	47	59.9	99													
16-Apr	49	53	60	62	64	65	62	55	47	44	41	37	36	34	34	29	29	48	59	56	62	75	81	83	52.7	83													
17-Apr	87	89	90	90	88	86	75	63	51	37	27	23	21	24	29	55	76	90	93	94	95	95	96	97	69.5	97													
18-Apr	98	99	99	99	99	99	99	99	97	86	69	50	41	37	33	31	29	35	47	53	69	78	83	86	71.5	99													
19-Apr	89	91	93	93	94	92	75	63	51	44	37	30	26	31	26	22	21	22	25	34	35	35	38	41	50.3	94													
20-Apr	43	44	51	64	72	75	70	43	33	27	23	24	24	24	23	23	24	26	30	35	42	50	57	64	41.3	75													
21-Apr	70	73	75	79	80	81	64	54	50	44	39	33	30	30	27	26	28	28	31	35	42	47	48	53	48.6	81													
22-Apr	59	64	70	74	77	78	75	67	57	48	41	37	33	31	29	28	30	32	35	40	43	43	44	44	49.2	78													
23-Apr	46	49	51	52	53	54	52	49	43	39	36	34	32	32	30	30	30	31	34	39	42	44	46	50	41.5	54													
24-Apr	51	53	56	59	62	65	61	55	49	42	36	31	31	29	26	24	24	26	29	34	40	46	52	58	43.3	65													
25-Apr	64	69	75	80	75	60	55	51	45	36	29	27	28	27	26	25	24	25	27	32	38	46	49	47	44.1	80													
26-Apr	43	43	43	43	44	46	41	31	25	23	22	21	21	20	19	19	19	18	18	25	40	43	33	32	30.5	46													
27-Apr	35	36	35	35	37	38	35	32	28	24	23	24	28	29	27	26	25	21	22	24	29	36	45	48	30.9	48													
28-Apr	51	51	52	54	56	52	41	33	27	25	24	23	23	23	23	22	22	23	24	28	30	30	33	35	33.6	56													
29-Apr	40	49	45	50	54	52	51	50	54	72	57	45	33	27	24	24	24	27	28	31	33	35	37	38	40.9	72													
30-Apr	37	39	44	45	47	47	45	44	39	35	34	39	47	64	52	49	43	52	48	49	68	70	66	66	48.7	70													
																		60.3 61.9 64.2 67.0 67.9 67.2 62.6 55.0 48.4 44.0 39.0 35.4 33.2 32.5 30.5 30.1 30.7 33.2 36.3 41.6 48.3 52.8 55.4 57.5																		Diurnal Average			
																		98 99 99 99 99 99 99 99 99 97 89 86 83 76 73 73 68 76 90 93 94 95 95 96 97																		Diurnal Maximum			



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Wapasu - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Wapasu - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	17	2.36	2.36
20 - 40	300	41.67	44.03
40 - 60	213	29.58	73.61
60 - 80	116	16.11	89.72
80 - 100	74	10.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 24 km/h on Apr 23 00:00	Maximum Daily Speed Average: 18.4 km/h on Apr 22	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 26 20:00	Minimum Daily Speed Average: 1.1 km/h on Apr 8	Hours of Data: 713
Maximum Diurnal Speed Average: 5.4 km/h at hour 5	Minimum Diurnal Speed Average: 0.8 km/h at hour 19	Hours of Missing Data: 7
Monthly Average Velocity: 2.4 km/h 161.0 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 16 P <sub>99</sub> = 22	Percent Operational Time: 99.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NE11	NNE11	NNE11	N12	AF	AF	AF	AF	AF	AF	AF	N14	NNW16	N13	N15	N13	N14	N12	N11	N7	NNE6	NE5	NE5	NE6	---	NNW16
2-Apr	NE3	NW3	NNW3	NNW4	N2	ENE3	ENE1	NW2	NW7	NW9	NNW8	NW8	NNW9	NNW9	NNW11	N10	NNW9	N8	N7	NNE4	NE6	NE5	E5	E6	N4.8	NNW11
3-Apr	E6	ESE5	SE5	ESE4	SE4	ESE4	ESE4	E4	NE6	N8	N7	NW9	NNW11	NNW11	N10	N9	N9	NNE9	NNE8	NE6	NE5	NE5	E5	ESE6	NNE4.3	NNW11
4-Apr	E5	E5	ESE4	E4	ESE4	ESE3	E3	NE4	NE7	N7	NNW7	NNW9	NNW8	NW10	NNW9	NNW9	N8	N8	N8	N5	NNE4	N4	NE3	ESE2	N4.0	NW10
5-Apr	SE4	ESE4	ESE4	ESE4	ENE3	N4	NNE6	NNE8	NNE8	N7	NNW9	NNW7	NNW8	NNW9	NNW10	N9	NNE9	NE8	NNE6	NE4	ENE5	ENE5	ESE7	ESE7	NNE4.2	NNW10
6-Apr	SE9	SE10	SE10	SE11	SE11	SE11	SSE9	SSE10	S9	SSW10	SSW10	S11	S11	S10	SSW9	SSW9	S9	SSE9	SSE9	SE8	SE10	SSE11	SSE11	SSE11	SSE9.0	S11
7-Apr	S10	S11	S10	SSE9	S10	SSE10	SSE11	S11	S11	SSW13	S14	S14	S13	S13	S12	S13	S12	SSW10	SSE10	SSE10	SSE10	SSE9	SSE10	S10	S10.8	S14
8-Apr	S9	S10	S10	S9	SSE10	SSE10	SSE9	S8	SSW8	W8	NW11	NNW11	NNW11	NNW12	NNW10	NNW9	NNW9	N7	N4	ENE4	SE5	SE6	SE7	SE8	SSW1.1	NNW12
9-Apr	SE8	SE10	SSE12	SSE12	SSE13	SSE14	SSE14	SSE14	S12	S13	S14	SSW14	SSW15	SSW14	SW18	SW17	SW16	SW14	SW8	SSW6	S6	S6	S7	S6	S10.0	SW18
10-Apr	S6	SSE7	SSE7	SSE7	SSE9	SSE8	SSE8	S8	SSW9	SSW9	SW12	WSW12	SW11	SW11	SW10	SSW9	S6	S6	SSE7	ESE6	SE9	SE10	SE8	SE9	S6.9	SW12
11-Apr	SE10	SE12	SSE9	SSE8	SSE8	SSE8	SSE8	SSE9	SSW8	SW10	WSW9	WSW8	WSW12	WSW11	WNW10	WNW12	WNW9	W9	W9	WSW11	WSW16	WSW18	W10	SW5	SW6.2	WSW18
12-Apr	WSW9	WSW10	SW8	SSW7	SSW7	SSW7	SSW9	SW12	SW15	SW17	SW16	SW17	WSW18	WSW18	WSW16	WSW19	WSW16	WSW11	WSW13	W11	W10	WSW16	WSW17	W17	WSW12.6	WSW19
13-Apr	W20	W20	NNW10	NNW11	NNW8	NNW10	NNW11	W9	NNW15	NNW13	NNW20	NNW18	NW17	NW13	NW15	NW12	NNW9	NNW8	N4	NE4	E6	E9	ESE11	ESE12	WNW7.9	W20
14-Apr	SE12	SE11	SE11	SE13	SE14	SE17	SE18	SE19	SE18	SE15	SE16	SE14	SE16	SE16	SSE14	SSE13	SSE15	SSE16	SE14	SE14	SE15	SE14	SE15	SE13	SE14.4	SE19
15-Apr	SSE11	SSE11	S8	S8	S7	SSE7	SSE8	S8	SSW8	SW11	WSW9	WSW11	W10	W13	W13	W11	W12	WSW14	WSW9	SSW5	SSE6	WSW13	WSW12	WSW12	SW7.5	WSW14
16-Apr	WSW11	SW7	SW7	SW9	SW8	SSW7	SW10	SW11	SW11	SSW11	SSW12	SW14	SW17	SW16	WSW13	WSW16	WSW17	NW14	W5	W7	W6	SW4	SSW5	SSW6	SW9.3	SW17
17-Apr	SSW5	S6	SSE6	SSE6	SSE7	SSE8	SSE7	S8	S8	SSW8	S10	SSW11	SSW12	SSW12	S12	SSW14	SSW8	SSE8	SE11	SE13	SE10	ESE8	SE5	NW3	S7.4	SSW14
18-Apr	NW3	WNW5	NW7	NNW10	NNW11	N12	N12	NNW9	NW10	NW12	NNW13	NNW14	NNW16	NNW15	NNW15	NNW16	NNW14	N8	N12	NE2	ESE2	SE4	ESE4	SE4	NNW8.2	NNW16
19-Apr	SE4	SE6	SE5	SE7	SE7	SE7	SSE5	S7	SSW6	SW10	WSW8	WSW9	W9	SSW5	WSW6	WSW10	WSW10	W8	W4	SE4	SE6	SE6	SE7	ESE7	SSW3.8	WSW10
20-Apr	SE7	ESE6	SE5	SE5	SE4	E4	E4	NE4	N6	NE6	NNW5	NW6	NNW9	N8	NNW7	NNW7	N6	N8	NNE9	NNE7	NE7	NE4	NE6	ENE4	NNE3.8	NNW9
21-Apr	ENE5	ENE5	E5	E4	NE5	NE4	NNE5	NNE8	NNE8	NNE10	NNE10	NNE12	NE10	NE11	NNE10	NNE10	ENE11	ENE11	E12	E9	E13	ESE16	ESE16	ESE17	ENE7.8	ESE17
22-Apr	ESE18	ESE17	ESE16	ESE17	ESE18	ESE18	ESE18	ESE17	ESE14	ESE18	ESE18	ESE19	ESE22	ESE19	ESE20	ESE20	ESE18	ESE18	ESE15	ESE14	ESE20	ESE22	ESE22	ESE24	ESE18.4	ESE24
23-Apr	ESE22	ESE23	ESE23	ESE22	ESE22	ESE15	ESE11	ESE11	ESE14	ESE15	E14	E17	E18	E18	E16	E17	E15	ENE17	ENE14	ENE14	E18	E19	ENE14	E16.2	ESE23	
24-Apr	ENE13	ENE12	ENE10	NE10	ENE10	ENE10	NE12	NE13	NE12	NE12	NE12	NE11	NNE12	NNE12	NNE13	NNE13	NNE13	NNE13	NNE11	NNE9	NNE9	NNE8	NNE6	NE10.5	NNE13	
25-Apr	NNE5	NNE3	NNW3	NNW1	E3	ESE8	NNW2	NW7	NNW8	N7	ENE8	NNE7	NNW6	NNE8	NNW9	NNE6	N9	N8	NNE6	NNE5	NE6	ENE5	ESE8	ENE4.6	N9	
26-Apr	ESE10	ESE9	SE7	SE8	SE9	SE8	SE8	SSE8	S7	SW7	WSW5	S3	SSW7	SSE5	SW6	NNW7	W3	WSW5	WNW4	ESE1	E5	ESE7	ESE9	SE13	SSE4.1	SE13
27-Apr	SE14	SE15	SE15	SE12	SE11	SE11	SSE11	SSE12	S11	SSE16	SSE16	SSW15	SSW16	SSW14	SW16	SW15	SW15	WSW15	WSW13	SW8	SSW5	S5	SSE6	SSE6	S9.9	SSE16
28-Apr	SE7	SE8	SE7	SSE7	SE7	SE7	SSE7	SSE9	SSE12	SSE13	SSE12	SSE14	SSE14	SSE15	SSE14	SSE15	SSE15	SSE11	SSE10	SE10	SE13	SE14	SE11	SSE8	SSE10.6	SSE15
29-Apr	SW8	WSW6	WSW9	SW5	SW3	W4	WSW5	SW5	SSW6	SSW7	SW7	SW7	WSW12	WSW13	WSW13	WSW12	WSW10	SSW6	S5	S5	SSW6	S5	S6	SSW7	SW6.5	WSW13
30-Apr	SSW7	SSW8	SSW7	SSW8	SSW8	SSW9	SSW10	SW12	SW13	SW14	SW17	SW18	WSW16	WSW12	W13	SW11	W14	SW7	SSW6	SSW4	SE5	SSE7	SSE7	SSE8	SW8.7	SW18

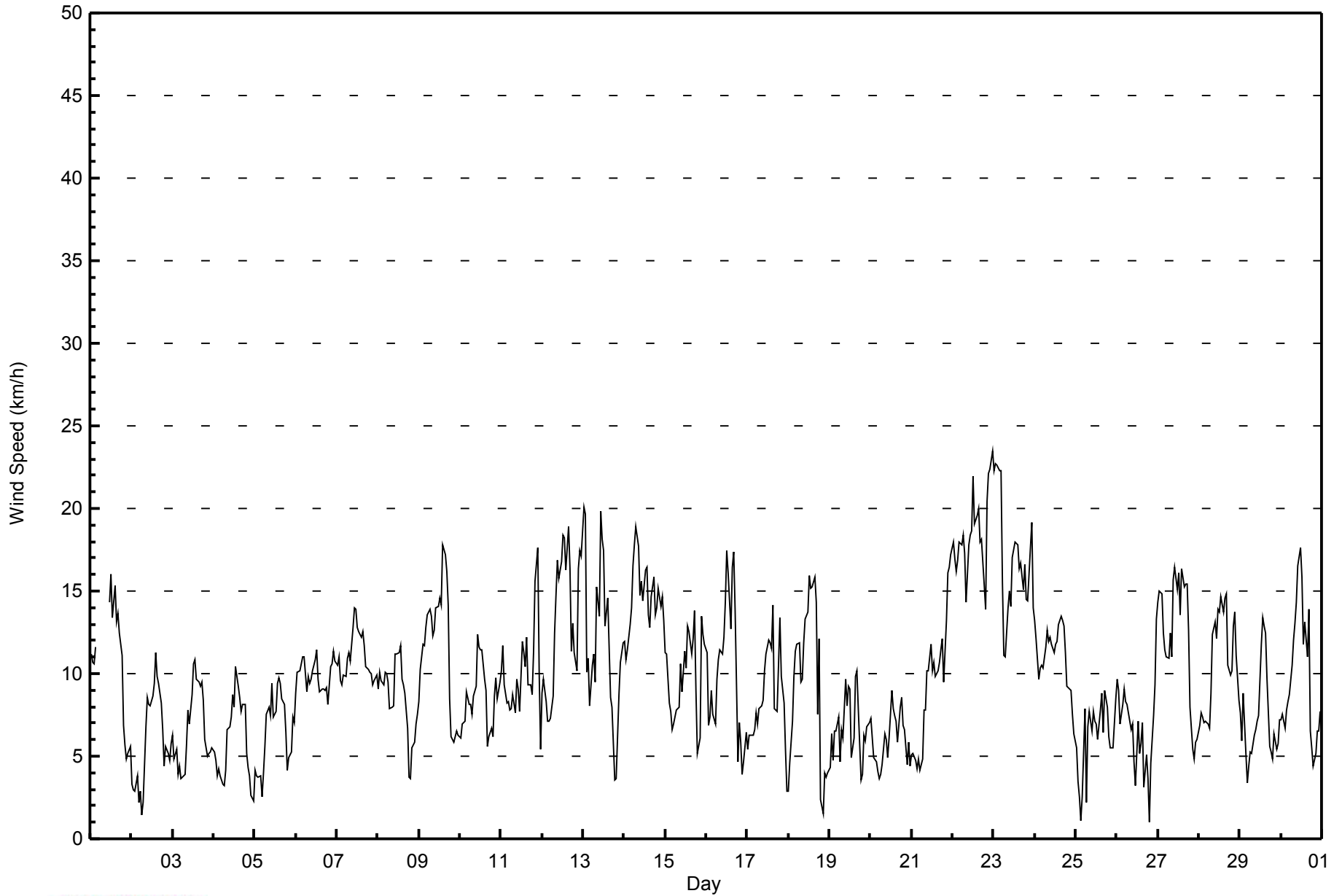
SE4.9	SE5.2	SE4.7	SE4.6	SE5.4	SE5.3	SSE4.7	SSE4.4	S3.5	SSW3.3	SW2.8	WSW2.8	WSW3.4	WSW2.7	W3.3	W3.2	W2.3	NNW1.1	ENE0.8	ESE2.1	ESE4.0	SE4.7	SE5.1	SE5.2	Diurnal Average
ESE22	ESE23	ESE23	ESE22	ESE22	ESE18	ESE18	SE19	SE18	ESE18	NW20	ESE19	ESE22	ESE19	ESE20	ESE20	ESE18	ESE18	ENE17	ENE14	ESE20	ESE22	ESE22	ESE24	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 - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Wapasu - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	115	16.13	16.13
6 - 11	375	52.59	68.72
12 - 19	208	29.17	97.90
20 - 28	15	2.10	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 713

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Wapasu - April 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	7	15	11	13	13	14	2	5	6	5	4	3	2	4	6	115
6 - 11	25	29	15	6	5	16	43	56	37	38	22	19	13	6	12	33	375
12 - 19	10	7	4	7	12	24	27	23	10	11	21	27	6	4	6	9	208
20 - 28	0	0	0	0	0	12	0	0	0	0	0	0	2	0	1	0	15
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
<b>Totals</b>	40	43	34	24	30	65	84	81	52	55	48	50	24	12	23	48	713

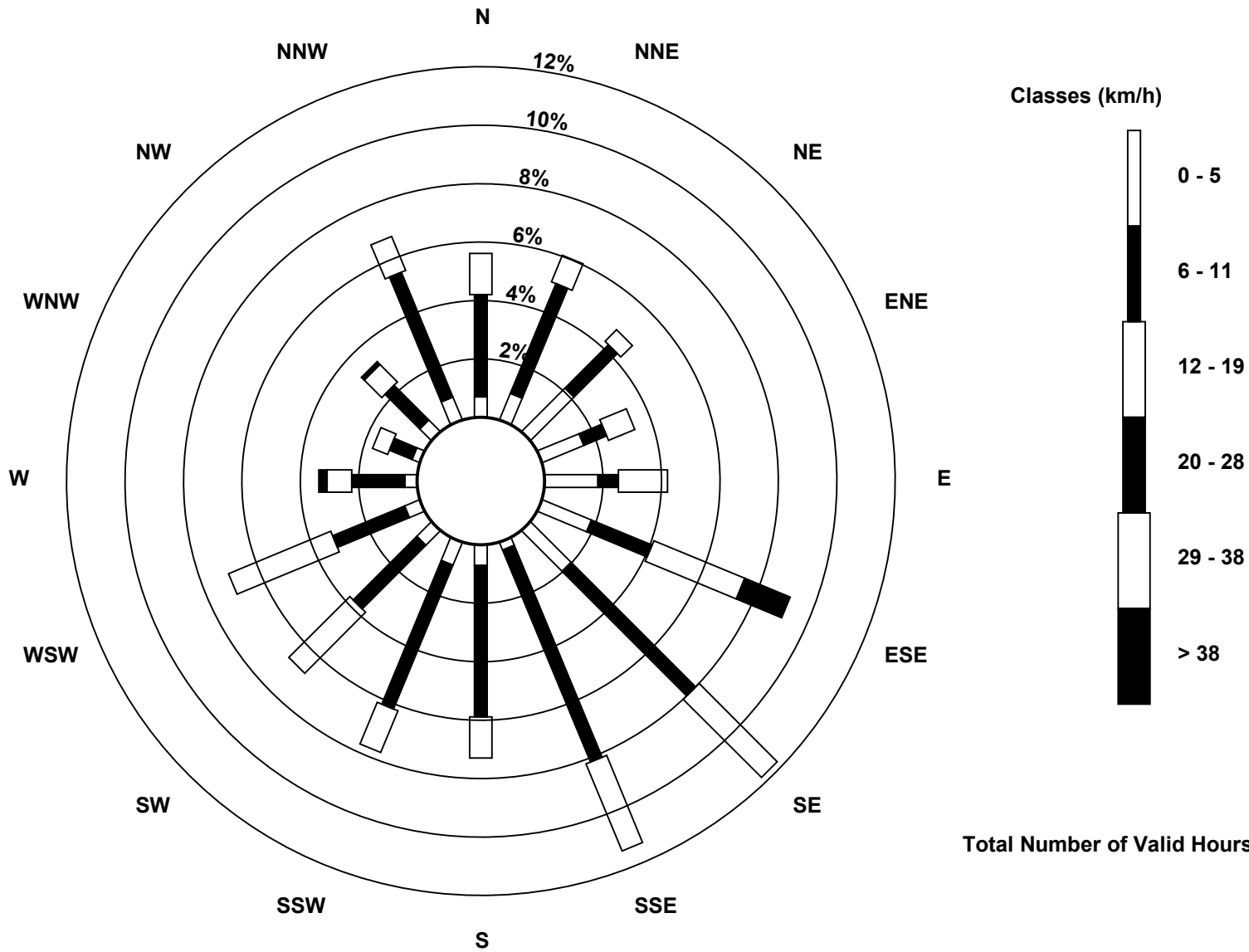
Total Number of Valid Hours: 713

Total Number of Hours: 720



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

**Wind Speed (WS) - km/h  
Wapasu (AMS 17)**





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Wapasu - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 7 km/h on Apr 15 22:00			Hours of Data:	713
Minimum Value: 0 km/h on Apr 19 06:00			Hours of Missing Data:	7
			Hours of Calibration:	0
			Percent Operational Time:	99.0
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 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-Apr	3	3	4	4	AF	AF	AF	AF	AF	AF	AF	5	6	5	6	4	5	5	4	3	2	1	1	1	6
2-Apr	1	1	1	1	1	1	1	1	2	3	3	3	3	4	4	4	3	3	2	1	1	1	1	1	4
3-Apr	1	1	1	1	1	1	1	1	2	3	3	4	4	4	4	3	3	3	3	2	2	1	1	1	4
4-Apr	1	1	1	1	1	1	1	2	3	3	3	4	4	4	4	4	3	3	3	2	1	1	1	1	4
5-Apr	1	1	1	1	0	1	2	3	3	3	3	3	3	4	4	4	3	3	2	1	1	1	2	2	4
6-Apr	2	2	2	2	2	3	3	3	3	3	4	4	4	3	4	4	4	3	3	2	2	3	4	4	4
7-Apr	4	4	3	3	3	3	3	4	4	5	5	5	5	5	5	4	4	4	4	3	3	3	3	3	5
8-Apr	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	3	1	1	1	1	1	1	4
9-Apr	2	2	3	3	4	4	4	4	4	5	5	5	5	6	6	6	5	4	3	2	2	1	2	2	6
10-Apr	1	1	1	1	2	2	2	2	3	3	4	4	4	4	4	3	3	3	2	1	1	2	2	2	4
11-Apr	2	3	2	2	2	2	2	2	3	3	3	3	4	4	4	4	3	4	4	7	5	6	6	1	7
12-Apr	3	2	3	2	2	2	3	4	5	5	5	6	6	6	5	7	6	4	5	4	4	6	6	6	7
13-Apr	7	7	6	3	3	6	3	5	6	5	6	6	6	4	5	4	3	3	2	1	1	2	3	3	7
14-Apr	3	2	2	3	3	5	5	5	5	4	4	5	5	6	4	5	5	6	5	4	4	4	4	3	6
15-Apr	4	4	3	2	2	2	3	3	3	3	3	4	4	4	5	4	4	4	3	2	1	7	5	4	7
16-Apr	4	2	3	3	2	2	3	3	3	4	4	5	6	5	4	6	6	6	3	3	3	1	1	2	6
17-Apr	1	2	2	1	1	2	2	2	3	3	4	4	4	4	5	5	3	3	3	4	4	2	2	1	5
18-Apr	1	2	2	3	4	4	4	3	3	4	4	5	6	6	6	6	4	4	6	1	1	1	1	1	6
19-Apr	1	1	1	1	1	0	1	2	2	3	3	3	4	3	3	4	4	3	3	1	1	1	1	1	4
20-Apr	1	1	1	1	1	1	1	2	2	2	3	4	4	4	4	4	3	3	3	2	2	1	1	1	4
21-Apr	1	1	1	0	1	1	2	3	3	3	4	4	4	4	4	4	4	4	4	2	4	5	4	5	5
22-Apr	5	4	4	4	4	5	5	5	4	6	6	6	6	6	6	6	6	5	5	5	5	6	6	6	6
23-Apr	6	6	6	6	6	5	5	3	4	4	5	5	6	5	6	5	5	5	5	5	4	5	6	5	6
24-Apr	5	4	3	3	4	3	4	4	4	4	4	4	5	5	5	5	5	4	4	3	3	3	3	2	5
25-Apr	2	1	1	1	2	2	1	2	2	3	4	4	3	4	4	4	3	3	3	2	1	1	1	2	4
26-Apr	2	2	1	1	2	1	2	3	2	3	3	3	3	3	4	4	3	3	2	1	1	1	2	3	4
27-Apr	3	4	4	3	3	3	3	4	4	5	6	6	6	5	6	6	7	6	4	3	1	1	1	1	7
28-Apr	1	1	1	1	1	1	2	3	4	4	4	5	5	5	5	5	5	3	3	2	3	3	3	3	5
29-Apr	3	2	4	1	2	1	2	3	2	2	3	3	4	4	4	4	3	2	2	2	2	1	1	2	4
30-Apr	2	3	2	2	2	3	4	4	4	5	6	5	5	5	5	4	6	4	2	1	1	1	2	2	6
	7	7	6	6	6	6	5	5	6	6	6	6	6	6	6	7	7	6	6	7	5	7	6	6	

Diurnal Maximum

AF - Analyzer Failure



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Wapasu - April 2015**

Direction of Maximum Speed: 118 deg on Apr 23 00:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 117.0 deg on Apr 22	Hours of Data: 713
Direction of Minimum Speed: 115 deg on Apr 26 20:00	Hours of Missing Data: 7
Direction of Minimum Daily Speed Average: 1.1 deg on Apr 8	Percent Operational Time: 99.0
Monthly Average Direction: 221.4 deg	

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	39	33	21	11	AF	AF	AF	AF	AF	AF	AF	1	348	358	355	2	2	359	351	4	19	38	48	52	--
2-Apr	35	322	328	346	355	57	59	310	318	326	341	323	328	337	331	349	346	4	9	30	39	55	79	85	353.3
3-Apr	94	116	128	117	128	105	106	88	47	11	6	325	339	342	355	349	356	22	28	36	38	56	91	105	30.8
4-Apr	96	96	105	84	118	103	83	47	37	9	341	330	344	314	328	335	353	351	354	351	23	11	36	78	7.9
5-Apr	132	122	121	121	71	8	24	21	18	4	329	336	330	329	344	9	12	41	29	35	61	78	113	118	23.9
6-Apr	129	133	132	131	133	136	152	153	181	201	209	178	186	187	200	207	176	161	158	140	140	147	166	164	161.9
7-Apr	172	172	170	168	169	167	161	174	185	198	186	181	184	174	177	174	177	209	167	164	159	161	166	175	175.1
8-Apr	172	174	175	176	168	168	165	184	211	272	316	338	327	333	338	340	332	353	8	71	126	125	130	130	210.9
9-Apr	140	144	151	152	154	153	155	162	169	174	182	194	199	213	231	234	233	229	225	198	185	170	188	188	186.9
10-Apr	174	161	160	162	154	153	157	174	199	197	228	239	228	226	220	207	169	182	159	122	129	136	141	139	179.6
11-Apr	139	142	149	159	160	154	153	158	204	224	242	248	258	253	290	288	296	280	272	251	251	251	279	231	231.5
12-Apr	241	238	226	209	207	209	209	218	228	230	226	230	239	241	257	248	254	250	252	275	271	250	253	279	241.9
13-Apr	265	263	298	316	301	297	303	272	284	289	306	301	308	325	320	315	340	340	2	35	88	99	113	118	303.7
14-Apr	124	130	131	135	135	139	139	144	140	135	132	132	126	144	153	148	165	167	144	140	136	137	140	143	140.2
15-Apr	154	158	180	188	179	167	167	183	199	227	239	248	263	264	281	275	264	251	243	206	150	237	245	242	225.7
16-Apr	243	223	223	222	222	204	214	223	222	208	210	218	231	236	239	248	256	306	279	274	272	230	212	210	234.5
17-Apr	194	176	164	158	151	149	159	172	184	193	188	196	207	192	189	210	194	157	133	135	136	121	127	314	172.2
18-Apr	319	303	306	326	344	350	350	334	311	315	329	338	335	345	341	337	328	6	5	42	120	128	122	125	338.8
19-Apr	126	133	132	137	138	137	150	189	209	229	256	252	266	196	253	237	252	269	260	134	137	136	132	123	194.7
20-Apr	125	122	134	141	130	94	96	41	4	37	339	326	340	357	348	348	356	353	29	29	37	42	41	62	29.0
21-Apr	71	73	81	87	52	38	30	33	13	16	27	12	35	41	21	21	70	76	87	89	100	108	107	108	63.2
22-Apr	112	115	118	118	115	117	119	122	117	116	119	118	120	119	117	112	120	123	115	113	112	115	116	118	117.0
23-Apr	116	116	113	112	112	116	120	118	112	103	83	85	94	88	85	90	83	85	60	65	74	79	83	68	95.1
24-Apr	63	62	60	55	62	61	56	53	50	54	47	44	27	24	19	26	18	12	18	15	14	20	24	21	38.3
25-Apr	21	15	348	331	91	105	334	319	333	3	58	27	29	347	13	329	26	357	9	14	33	56	72	104	20.3
26-Apr	108	119	127	130	134	135	146	159	190	229	238	181	213	165	221	335	259	254	302	115	99	107	123	137	151.6
27-Apr	139	137	141	138	144	142	151	160	173	159	160	197	207	202	215	227	225	241	244	231	203	173	151	148	180.5
28-Apr	144	139	146	147	138	145	154	153	154	155	158	155	162	164	160	154	152	158	161	134	137	143	145	166	151.9
29-Apr	234	244	252	232	227	262	258	231	211	208	216	229	252	249	254	254	252	212	185	185	194	177	177	194	230.4
30-Apr	210	203	194	202	206	203	211	222	232	225	233	234	238	237	275	218	262	234	200	201	143	148	160	161	220.0
	138.4	142.2	143.4	140.4	140.5	139.2	147.0	162.0	187.1	199.0	217.9	238.1	250.9	249.2	278.0	272.8	270.0	283.3	74.1	112.7	118.8	129.5	131.8	136.0	

Diurnal Average

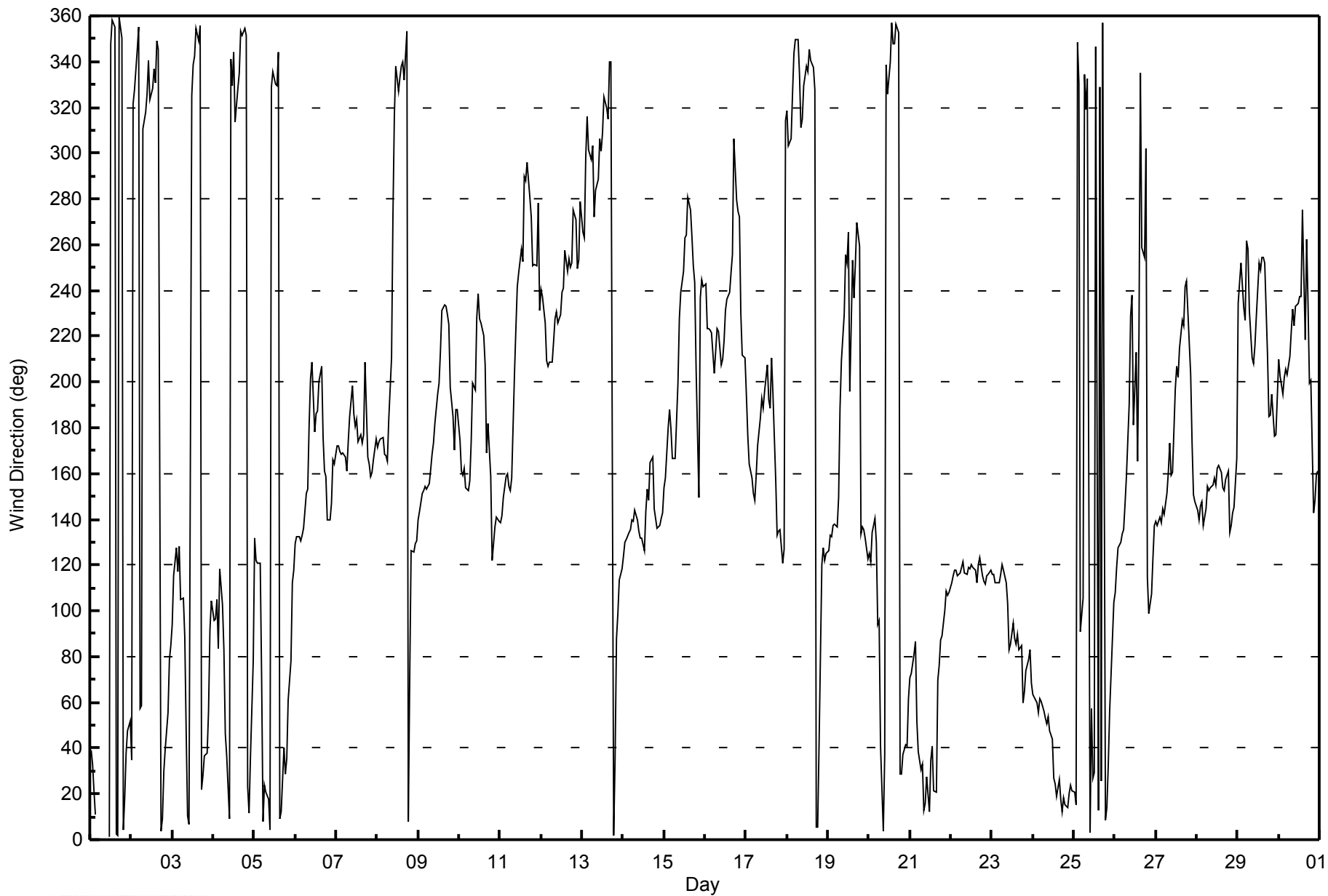
AF - Analyzer Failure

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Wapasu - April 2015**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 87 deg on Apr 26 17:00	Hours of Data: 713
Minimum Value: 4 deg on Apr 19 06:00	Hours of Missing Data: 7
	Hours of Calibration: 0
	Percent Operational Time: 99.0
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 15 Q <sub>1</sub> = 22 Median = 28 Q <sub>3</sub> = 36 P <sub>90</sub> = 43 P <sub>99</sub> = 74	

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-Apr	26	31	37	38	AF	AF	AF	AF	AF	AF	AF	37	34	40	37	36	38	35	35	33	27	27	17	21	40
2-Apr	34	25	35	35	44	28	42	57	29	33	40	42	41	41	35	40	37	38	33	23	13	16	21	18	57
3-Apr	16	22	14	22	10	21	20	37	46	49	59	41	37	41	44	45	39	34	28	23	22	23	16	22	59
4-Apr	16	20	12	13	13	12	15	41	48	53	48	43	47	40	44	47	45	42	37	34	27	14	40	48	53
5-Apr	10	11	10	13	45	26	26	36	41	39	35	51	47	40	39	44	45	34	25	20	22	12	15	16	51
6-Apr	14	15	15	15	17	18	26	25	37	36	36	40	40	42	45	42	46	31	27	16	16	21	30	30	46
7-Apr	33	30	29	28	30	29	27	33	37	36	38	37	42	37	40	35	36	36	31	27	25	28	28	29	42
8-Apr	30	30	34	33	27	29	28	41	40	37	28	37	34	33	40	40	34	39	33	29	21	8	9	10	41
9-Apr	16	19	23	26	25	25	25	28	33	35	35	37	36	36	26	26	24	24	27	25	24	19	28	24	37
10-Apr	20	16	17	17	14	14	18	35	36	37	28	31	32	35	39	41	52	47	21	10	11	15	18	17	52
11-Apr	17	20	23	23	23	19	22	26	42	27	26	30	33	28	34	28	25	27	27	30	24	25	31	23	42
12-Apr	25	21	25	28	29	35	35	29	27	26	28	30	30	25	26	26	27	24	24	26	28	25	24	28	35
13-Apr	28	26	51	29	27	27	23	28	26	26	25	25	29	34	32	33	41	40	56	33	10	17	18	17	56
14-Apr	16	17	15	17	18	20	21	23	22	20	21	23	22	25	29	31	31	30	23	20	19	18	20	20	31
15-Apr	27	27	32	32	38	28	25	33	39	28	38	36	35	29	30	36	30	28	26	29	12	41	23	23	41
16-Apr	25	28	30	29	28	31	33	25	27	36	34	36	27	29	27	26	29	32	38	33	31	28	21	24	38
17-Apr	25	25	23	15	19	15	24	30	37	36	41	38	35	38	37	32	35	27	19	19	24	19	23	73	73
18-Apr	29	17	19	26	34	36	35	30	23	23	29	34	35	38	36	34	31	46	38	37	80	14	9	13	80
19-Apr	14	4	17	4	7	4	14	33	42	27	45	35	42	66	81	34	36	33	49	7	6	11	14	14	81
20-Apr	14	19	13	7	17	17	14	45	40	50	71	69	47	56	58	58	67	45	31	24	23	31	18	15	71
21-Apr	12	12	15	13	13	13	25	35	39	38	46	43	40	43	44	43	31	27	24	17	20	20	21	21	46
22-Apr	20	19	19	19	19	20	20	22	26	24	24	25	24	27	24	24	23	22	21	21	20	19	20	19	27
23-Apr	19	20	20	20	21	22	40	26	25	25	28	26	28	25	28	28	26	28	24	22	23	24	23	25	40
24-Apr	26	29	26	22	24	24	27	27	30	31	38	39	44	42	39	36	37	38	36	33	34	34	32	35	44
25-Apr	34	39	36	84	80	19	74	24	36	63	54	65	64	76	52	50	65	42	37	27	21	15	17	14	84
26-Apr	15	16	11	11	15	15	21	33	48	53	76	80	50	69	70	59	87	68	58	73	12	11	14	18	87
27-Apr	18	19	19	20	21	20	25	28	36	31	31	39	34	35	35	29	31	27	26	26	26	24	10	10	39
28-Apr	11	9	11	14	10	14	23	26	28	30	33	29	32	33	34	31	27	29	28	16	18	18	20	33	34
29-Apr	33	31	25	26	36	33	31	32	34	33	39	29	28	28	28	29	25	34	31	26	31	23	24	33	39
30-Apr	30	31	33	31	31	34	35	29	27	28	30	29	31	31	30	36	31	57	34	26	18	16	24	25	57
	34	39	51	84	80	36	74	57	48	63	76	80	64	76	81	59	87	68	58	73	80	41	40	73	

Diurnal Maximum

AF - Analyzer Failure

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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 1, 2015	Last Calibration	March 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	14:05
Gas Cert Reference	SA130010A	Station temp.	23 Deg C
Cal Gas Concentration	47.8 ppm	Cal Gas Exp Date	12-Dec-16
Calibrator Make/Model	API T700	Serial Number	493
ZAG Make/Model	API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-702	-702
Analyzer IP address	192.168.1.43		Lamp voltage	899	889
Calculated slope	0.995136	0.995019	Chamber temp	44.9	45.1
Calculated intercept	-0.240967	0.525292	Pressure	694.0	690.7
Analyzer Background	8.4	42.8	Flow	0.454	0.452
Analyzer Coefficient	0.808	0.802	Intensity	83	82
Analyzer make	Thermo 43i		Analyzer serial #	1218153459	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.5	----
as found span	5000	60.4	577.4	579.4	0.997
calibrator zero	5000	0.0	0.0	-0.5	----
high point	5000	60.4	577.4	579.4	0.997
second point	5000	30.2	288.7	290.7	0.993
third point	5000	15.2	145.3	144.8	1.004
as left zero	5000	0.0	0.0	0.0	----
as left span	5000	60.4	577.4	582.9	0.991
Average Correction Factor					0.998

Corrected As found      579.9      Previous response      580.5      % change      0.1%

**Notes:**

Filter changed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



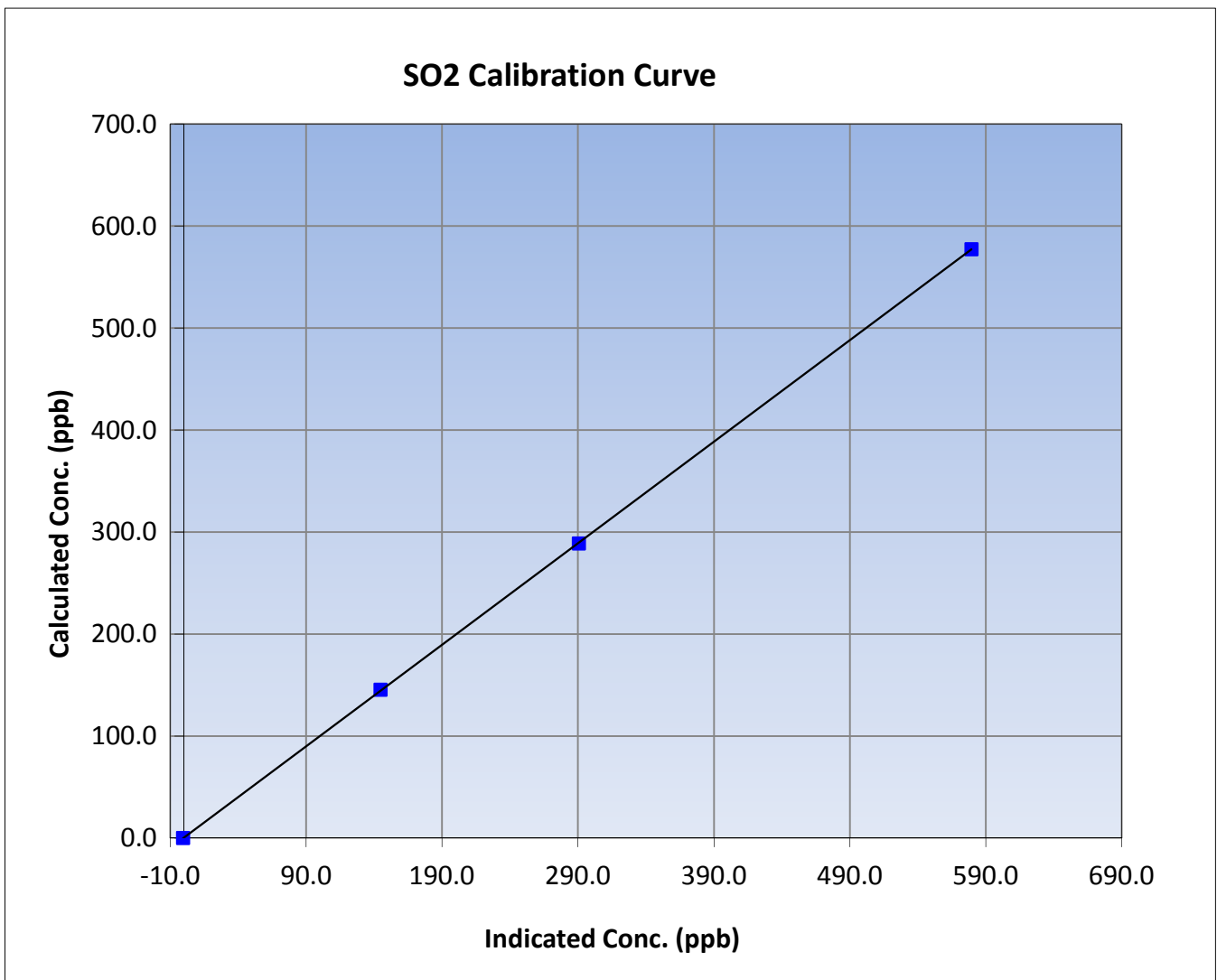
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:35	End Time (MST)	14:05
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

## Calibration Data

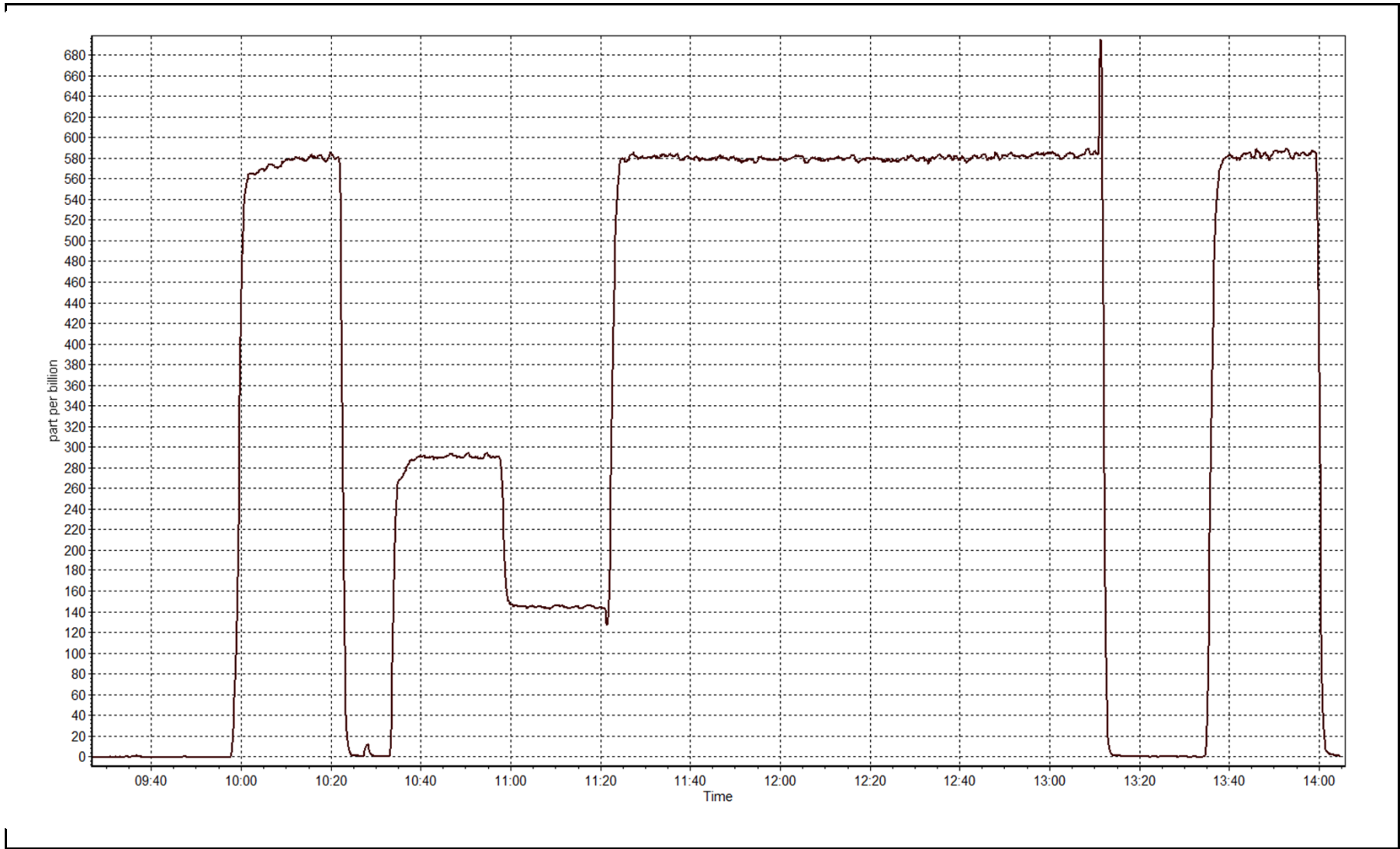
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999990
577.4	579.4	0.9965		
288.7	290.7	0.9931	Slope	0.995019
145.3	144.8	1.0039		
			Intercept	0.525292





SO2 Calibration Plot

Date: April 1, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

## Station Information

Calibration Date	April 2, 2015	Last Calibration	March 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	14:25
Gas Cert Reference	CC107167	Station temp.	23 Deg C
Cal Gas Concentration	5.1 ppm	Cal Gas Exp Date	9-Sep-17
Calibrator Make/Model	API T700	Serial Number	997
ZAG air Make/Model	API 701	Serial Number	4227
DACS make/model	Campbell Scientific CR3000	Serial Number	6894
SO2 gas concentration	47.8 ppm	SO2 gas cert/exp	SA130010A 12-Dec-2016

## Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-651	-651
Analyzer IP address	192.168.1.42		Lamp voltage	813	813
Calculated slope	1.001516	1.006686	Chamber temp	45	45
Calculated intercept	-0.326526	-0.154233	Pressure	563.0	554.3
Analyzer Background	11.7	11.6	Flow	0.978	0.973
Analyzer Coefficient	0.863	0.842	Intensity	91	91
			Converter temp.	342	341
Analyzer make/model	Thermo 450i		Analyzer serial #	1218153583	
Converter make/model			Converter serial #		

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	----
as found span	5000	78.5	80.1	79.7	1.004
SO2 scrubber check	5000	20.9	199.8	1.9	----
calibrator zero	5000	0.0	0.0	0.2	----
high point	5000	78.5	80.1	79.7	1.004
second point	5000	39.2	40.0	39.7	1.007
third point	5000	19.7	20.1	20.2	0.994
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	78.5	80.1	80.2	0.999
Average Correction Factor					1.002

Corrected As found	79.6	Previous response	80.3	% change	0.9%
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**Notes:**

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

Calibration Performed By: Devin Russell



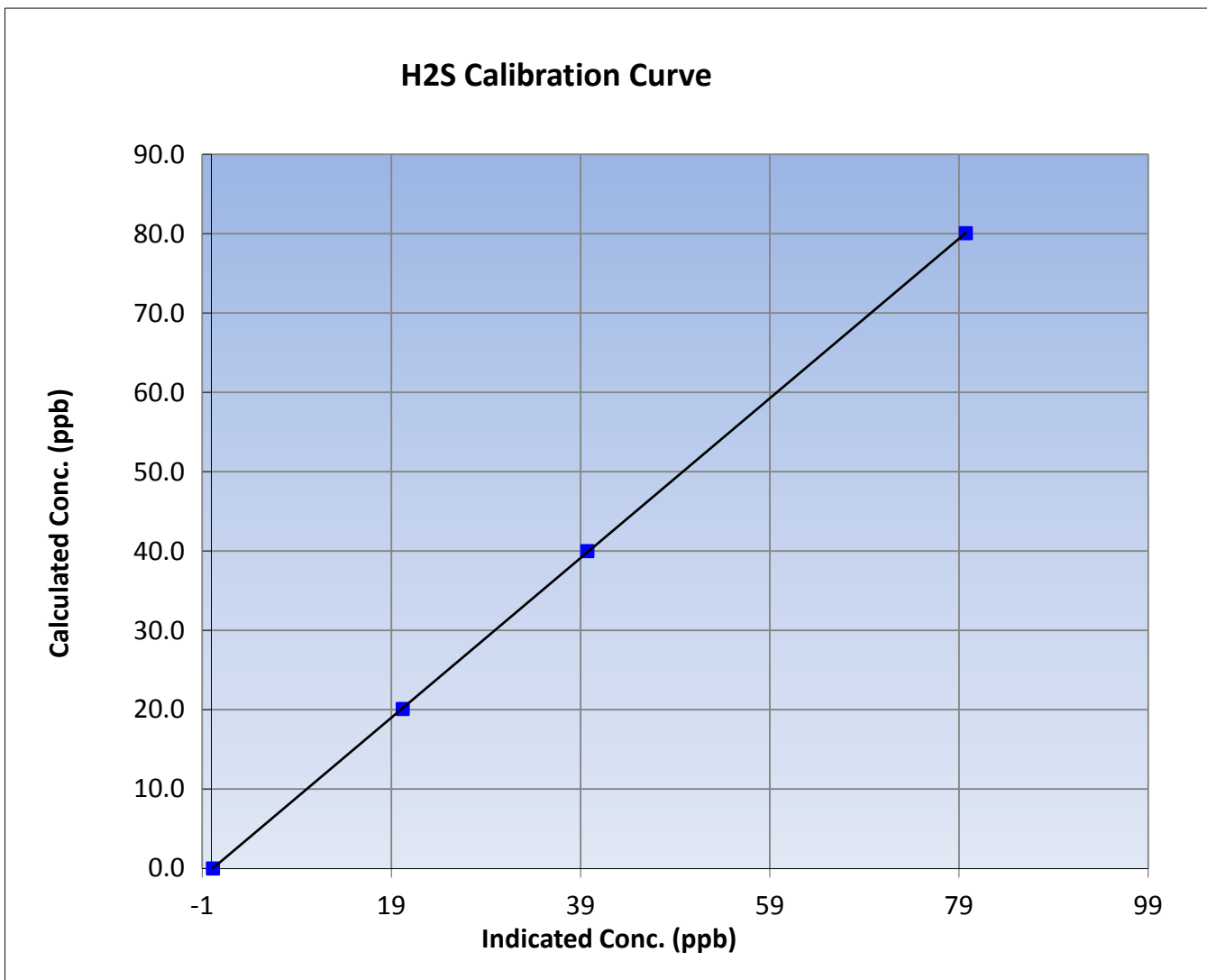
# Wood Buffalo Environmental Association H2S Calibration Report

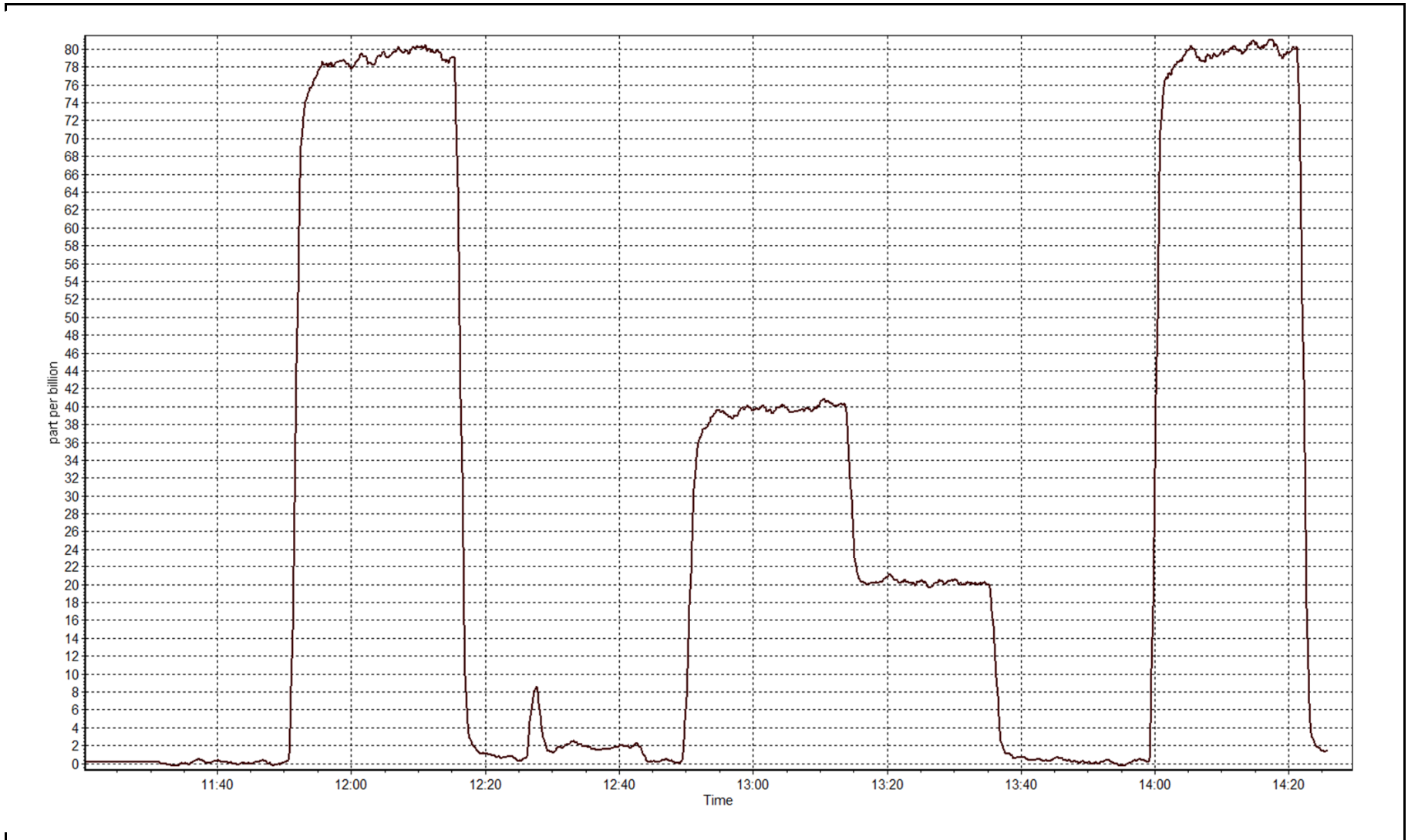
## Station Information

Calibration Date	April 2, 2015	Previous Calibration	March 10, 2015
Station Name	AMS 17	Station Number	AMS 17
Start Time (MST)	11:30	End Time (MST)	14:25
Analyzer make	Thermo 450i	Analyzer serial #	1218153583

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999989
80.1	79.7	1.0041		
40.0	39.7	1.0066	Slope	1.006686
20.1	20.2	0.9938		
			Intercept	-0.154233







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Wednesday, April 01, 2015	Last Calibration	Friday, March 06, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	14:05
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12/12/2015
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	39.9	40.1
Calculated slope	1.006750	1.005599	Fuel Pressure	24.8	24.8
Calculated intercept	-0.074158	-0.049441	Analyzer Coeff	5.0	5.0
			Analyzer BKG	2.700	2.700

Analyzer make Thermo 51i-LT Analyzer serial # 1218153352

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.03	----
as found span	5000	60.4	13.19	13.15	1.003
calibrator zero	5000	0.0	0.00	0.03	----
high point	5000	60.4	13.19	13.15	1.003
second point	5000	30.2	6.60	6.65	0.992
third point	5000	15.2	3.32	3.35	0.991
as left zero	5000	0.0	0.00	-0.02	----
as left span	5000	60.4	13.19	13.04	1.012
Average Correction Factor					0.996

Corrected As found 13.12 Previous response 13.18 % change 0.5%

**Notes:**

Filter changed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association THC Calibration Report

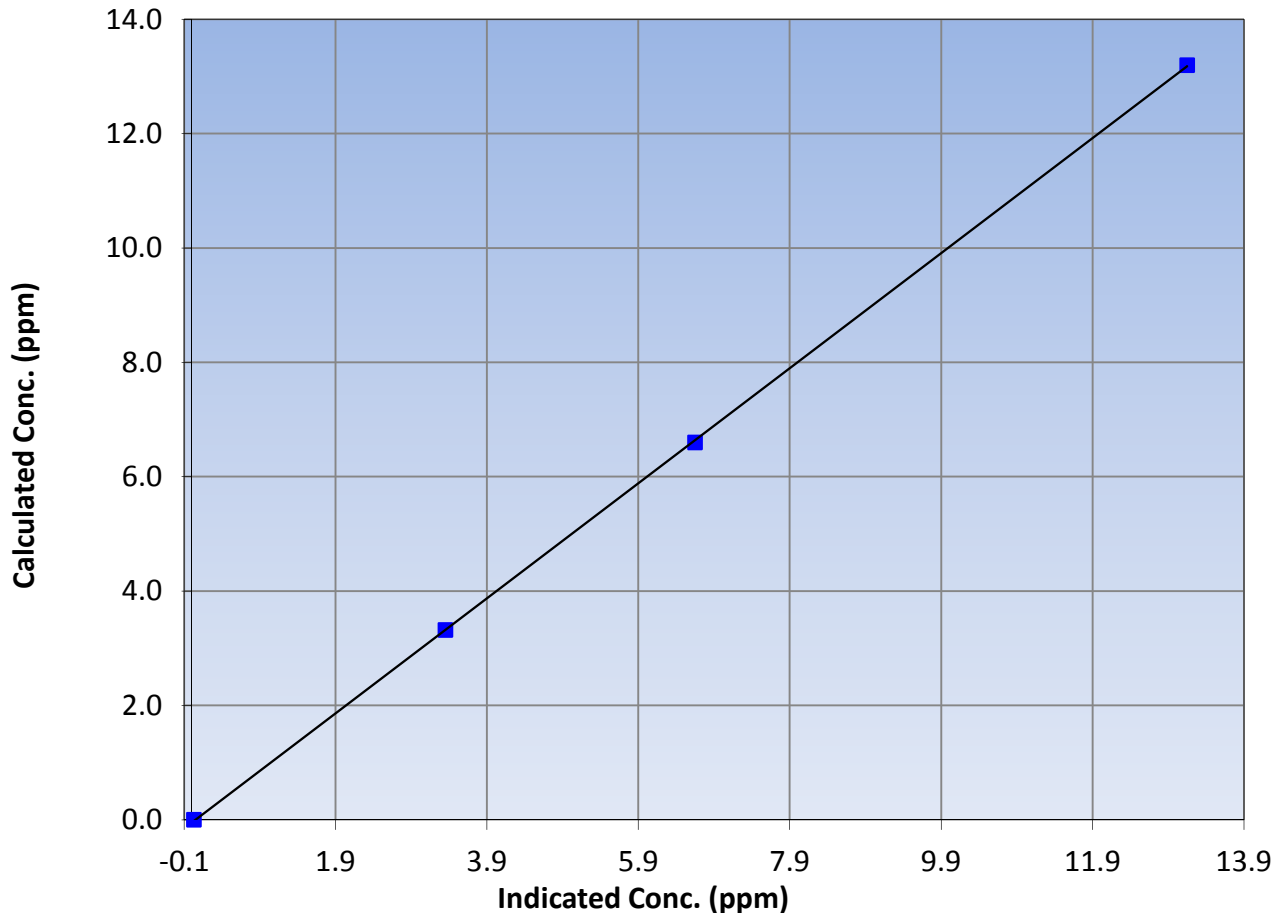
## Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:35	End Time (MST)	14:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

## Calibration Data

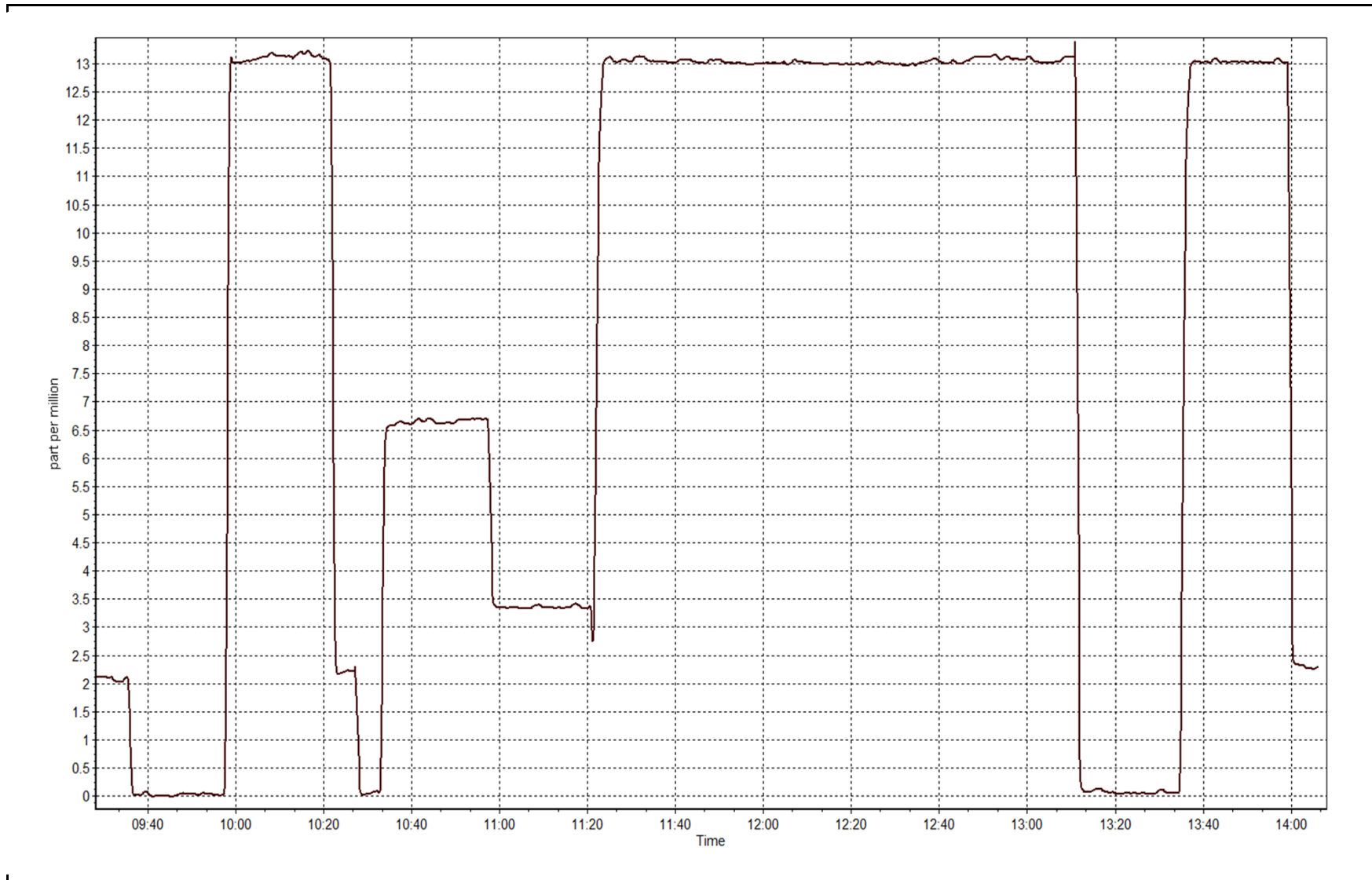
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.03	----	Correlation Coefficient	0.999974
13.19	13.15	1.0034		
6.60	6.65	0.9921	Slope	1.005599
3.32	3.35	0.9912		
			Intercept	-0.049441

**THC Calibration Curve**



THC Calibration Plot

Date: April 1, 2015





# Wood Buffalo Environmental Association

## O<sub>3</sub> Calibration Report

### Station Information

Calibration Date	April 2, 2015	Previous Calibration	March 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:10	End Time (MST)	11:35
NO2 GPT Ref date	Wednesday, April 01, 2015	Transfer Standard	23
		Station temp.	23 Deg C
Calibrator Make/Model	Teledyne API T700	Serial Number	997
ZAG make/model	Teledyne API 701	Serial Number	4427
DACS make/model	Campbell Scientific CR3000	Serial Number	6894

### Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 500 ppb		Bench temp.	26.5	27.0
Analyzer IP address	192.168.1.48		Lamp temp.	58.0	58.0
Calculated slope	0.997655	0.992793	Pressure	26.2	26.1
Calculated intercept	-0.010647	0.435543	Flow cell A	0.718	0.723
Analyzer Background	5.5	5.5	Flow cell B	0.732	0.741
Analyzer Coefficient	0.974	0.974	Cell A Intensity		
			Cell B Intensity		

Analyzer make	Teledyne API T400	Analyzer serial #	824
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	195.9/800	0.0	0.0	----
as found span	5000	713.6/1081.1	363.8	366.6	0.992
calibrator zero	5000	195.9/800	0.0	0.0	----
high point	5000	713.6/1081.1	363.8	366.6	0.992
second point	5000	494.3/973.8	245.7	246.3	0.998
third point	5000	261.8/846.8	126.8	127.0	0.998
as left zero	5000	195.9/800	0.0	0.6	----
as left span	5000	713.6/1081.1	363.8	367.4	0.990
Average Correction Factor					0.996

Corrected As found	366.6	Previous response	364.7	% change	-0.5%
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**Notes:**

Changed filter after as founds. No adjustments made.

Calibration Performed By:

Devin Russell





# Wood Buffalo Environmental Association O3 Calibration Report

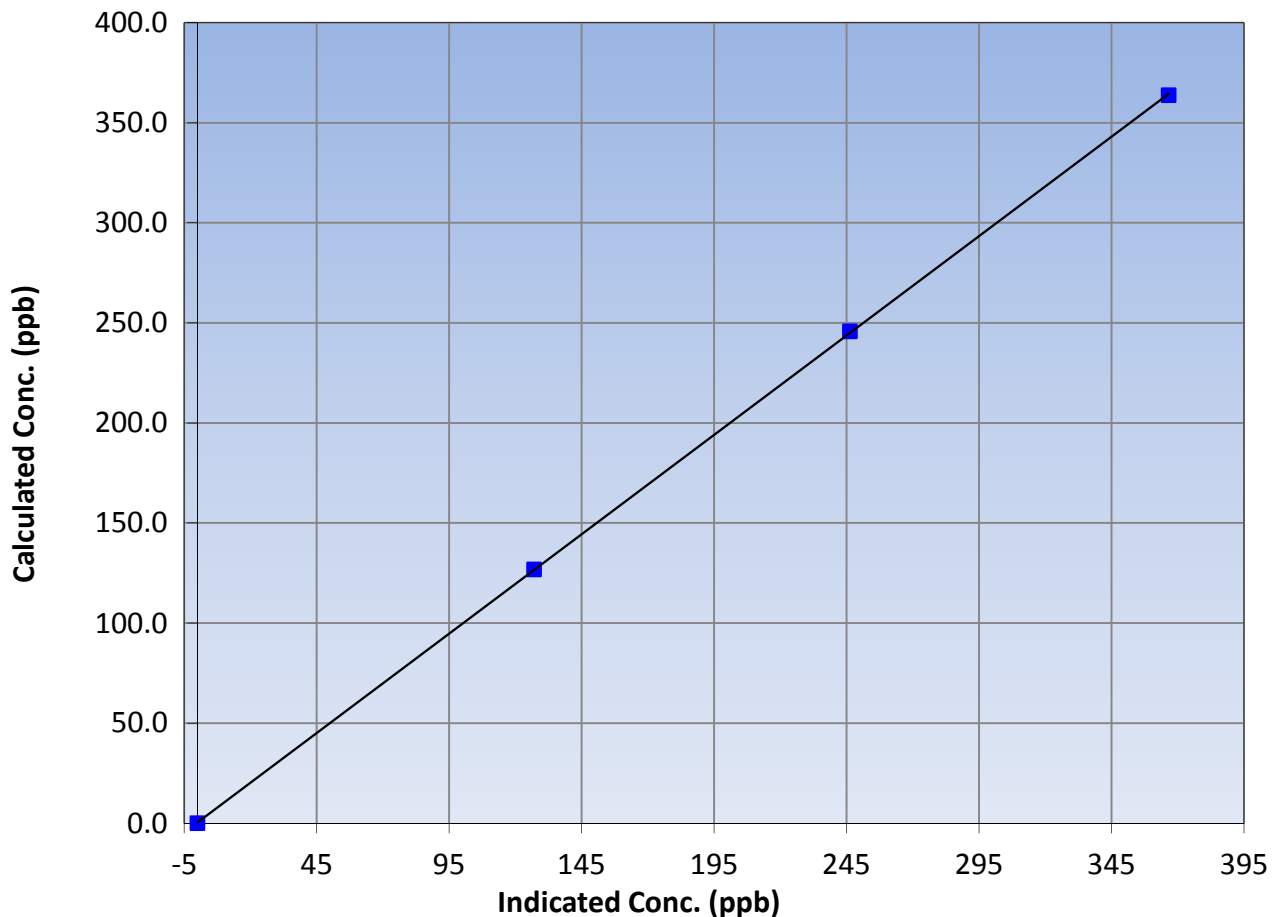
## Station Information

Calibration Date	Thursday, April 02, 2015	Previous Calibration	March 10, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:10	End Time (MST)	11:35
Analyzer make	Teledyne API T400	Analyzer serial #	824

## Calibration Data

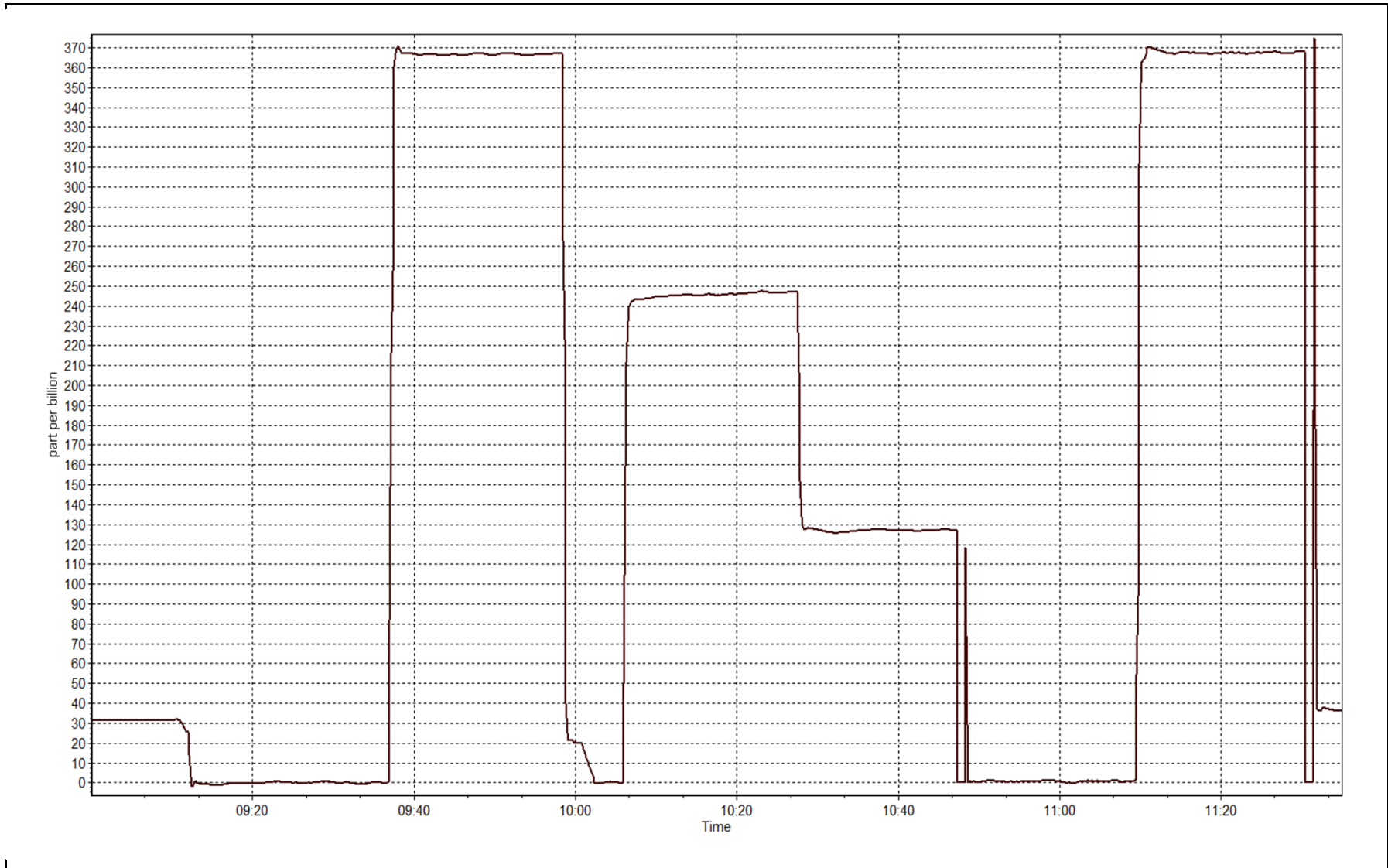
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	----	Correlation Coefficient	0.999983
363.8	366.6	0.9923		
245.7	246.3	0.9977	Slope	0.992793
126.8	127.0	0.9983		
			Intercept	0.435543

### O3 Calibration Curve



O3 Calibration Plot

Date: April 2, 2015





# Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

## Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	9:35	End Time (MST)	14:05
NO Cal Gas Conc	49.7 ppm	Gas Cert Reference	SA130010A
NOx Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
Calibrator	API T700	Serial Number	997
Zero air Generator	Teledyne API T701	Serial Number	4427

## DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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## Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.993328	0.995618	0.998843
	Data Offset	-0.224600	-0.387626	-0.402994
Current Calibration	Data Slope	0.994753	0.998592	0.999985
	Data Offset	0.658760	0.245942	-0.492318

## Analyzer Information

Analyzer make/model \_\_\_\_\_ Analyzer serial # \_\_\_\_\_

Test Point	before		after	
		ppb		ppb
Concentration range	0-1000		0-1000	
NO coefficient	0.993		0.993	
NOX coefficient	0.993		0.993	
NO2 coefficient	1.000		1.000	
NO bkgrnd	-0.4		-0.4	
NOX bkgrnd	0.7		0.7	
Chamber Temp	50	Deg C	50	Deg C
Moly Temp	314.5	Deg C	314.4	Deg C
PMT voltage		V		V
PMT Temp	7	Deg C	7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	5.9	mmHg	5.9	mmHg
R Cell Press Nox	5.9	mmHg	5.9	mmHg
NO sample flow	0.443	lpm	0.44	lpm
Nox sample Flow	0.443	lpm	0.440	lpm

**Notes:**

Filter changed after as founds. No adjustments made.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: April 1, 2015 Station Number: AMS 17

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.3	0.2	-0.5	----	----
as found span	5000	60.4	600.4	600.4	0.0	602.6	600.8	1.7	0.9963	0.9994
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.3	0.2	-0.5	----	----
high point	5000	60.4	600.4	600.4	0.0	602.6	600.8	1.7	0.9963	0.9994
second point	5000	30.2	300.2	300.2	0.0	302.3	301.4	0.2	0.9930	0.9959
third point	5000	15.2	151.1	151.1	0.0	150.0	149.8	0.2	1.0075	1.0085
as left zero	5000	0.0	0.0	0.0	0.0	-0.3	0.1	-0.4	----	----
as left span	5000	60.4	600.4	239.1	361.2	606.8	243.2	366.5	0.9894	0.9833
Average Correction Factor									0.9989	1.0013

Corrccted As found NO<sub>x</sub>= 602.9 NO= 600.6 Percent Change NO<sub>x</sub>= 0.3% NO= 0.5%  
 Previous Response NO<sub>x</sub>= 604.6 NO= 603.4

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.40 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			-0.5			N/A	
1st NO2 (300)	----	239.1	363.8	603.0	239.1	363.6	0.9838	1.0000	1.0007	99.9%
2nd NO2 (200)	----	357.2	245.7	603.6	357.2	246.6	0.9828	1.0000	0.9964	100.4%
3rd NO2 (100)	----	476.2	126.8	604.9	476.2	128.6	0.9807	1.0000	0.9858	101.4%
4th NO2 (0)	602.9	----	1.2	604.2	602.9	1.3	0.9819	1.0000	N/A	----
Average Correction Factor							0.9823	1.0000	0.9943	100.6%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

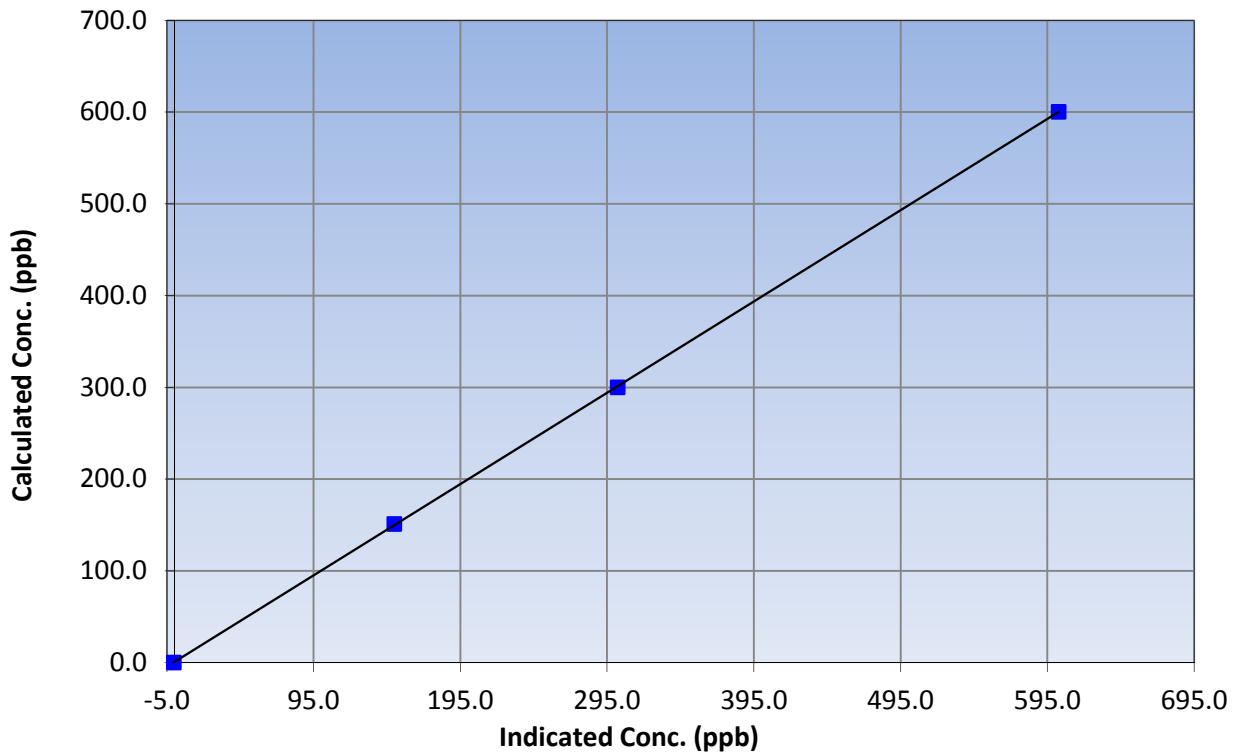
### Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:35	End Time (MST)	14:05
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	----	Correlation Coefficient	0.999984
600.4	602.6	0.9963		
300.2	302.3	0.9930	Slope	0.994753
151.1	150.0	1.0075		
			Intercept	0.658760

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

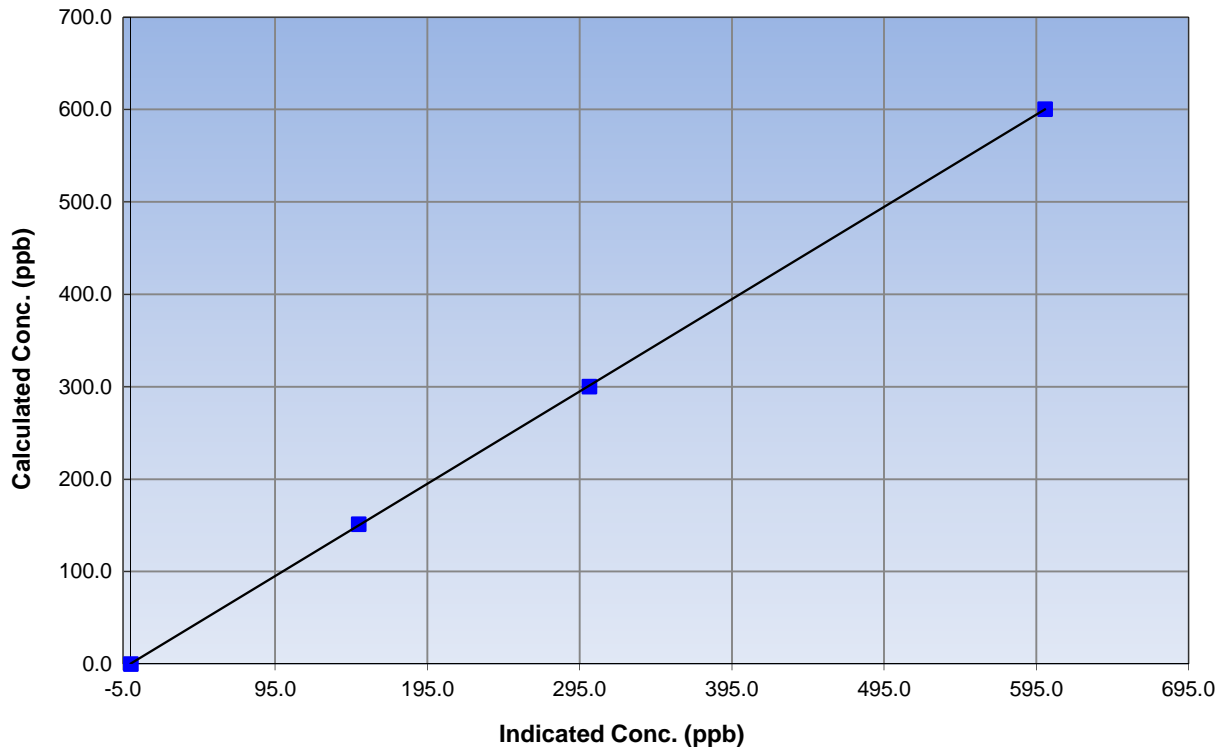
### Station Information

Calibration Date	April 1, 2015	Previous Calibration	March 6, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	9:35	End Time (MST)	14:05
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999986
600.4	600.8	0.9994		
300.2	301.4	0.9959	Slope	0.998592
151.1	149.8	1.0085	Intercept	0.245942

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

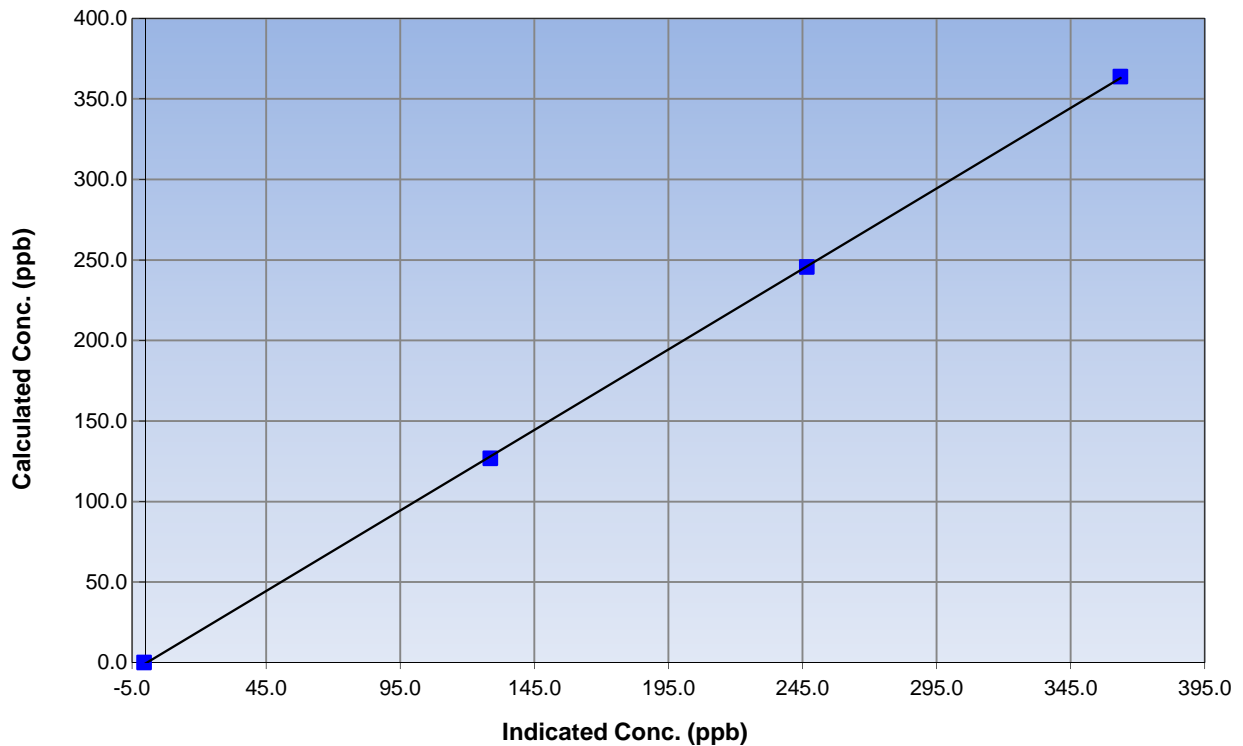
### Station Information

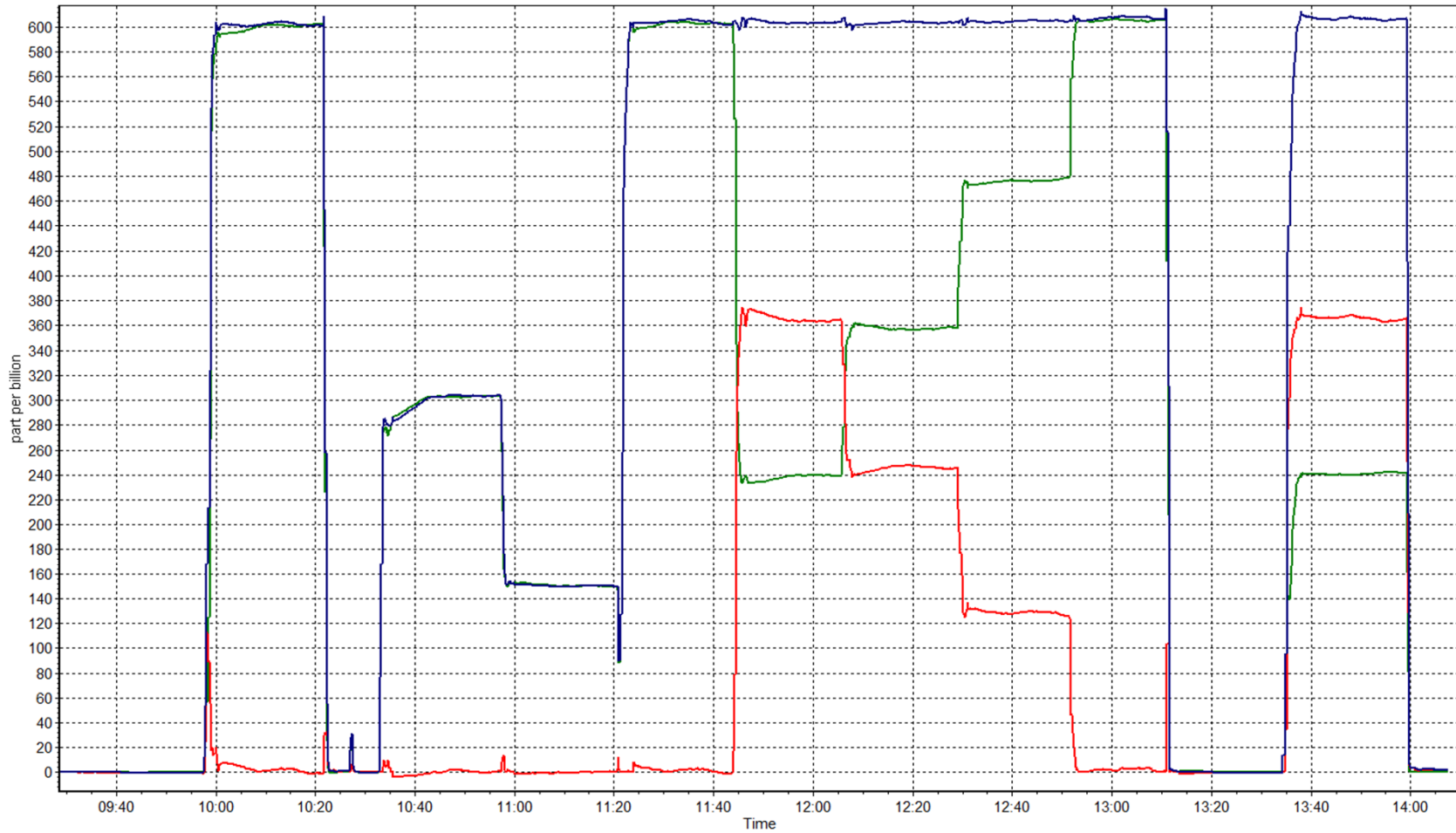
Calibration Date	April 1, 2015	Previous Calibration	March 6, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	9:35	End Time (MST)	14:05
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	----	Correlation Coefficient	0.999953
363.8	363.6	1.0007		
245.7	246.6	0.9964	Slope	0.999985
126.8	128.6	0.9858		
			Intercept	-0.492318

### NO<sub>2</sub> Calibration Curve







**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 19  
FIREBAG  
APRIL 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

May 29, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)

APRIL 2015  
 MONTHLY SUMMARY for  
 AMD SECTION III.B.1(c)

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	37	37	100.00	27	0	4	0
H2S (ppb) Average	686	34	34	100.00	4	0	1	0
THC (ppm) Average	685	35	35	100.00	2.6	-	2.2	-
NO2 (ppb) Average	684	36	36	100.00	39	0	8	-
NO (ppb) Average	684	36	36	100.00	41	-	5	-
NOX (ppb) Average	684	36	36	100.00	63	-	13	-
Temperature 2 m (C) Average	720	0	0	100.00	20.9	-	15.1	-
Relative Humidity (%) Average	720	0	0	100.00	99	-	88	-
Wind Speed 10 m (km/h) Average	717	0	3	99.58	37	-	26	-
Wind Direction 10 m (deg) Average	717	0	3	99.58	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
 APRIL 2015

MONTHLY SUMMARY FOR AIR QUALITY/ METEOROLOGICAL MONITORING MEASUREMENTS

Parameter	Number	Mean	StnDev	Total	Percentile						
					Min	P10	Q1	Median	Q3	P90	Max
SO2 (ppb) Average	683	0.8	2	-	0	0	0	0	1	2	27
H2S (ppb) Average	686	0.3	0	-	0	0	0	0	0	0	4
THC (ppm) Average	685	2.11	0.1	-	1.9	2	2	2.1	2.2	2.2	2.6
NO2 (ppb) Average	684	3.2	5	-	0	0	1	2	4	8	39
NO (ppb) Average	684	1	3	-	0	0	0	0	1	2	41
NOX (ppb) Average	684	4.3	8	-	0	0	1	2	4	10	63
Temperature 2 m (C) Average	720	2.75	7.5	-	-16.7	-8.4	-1.2	3.4	8.3	11.6	20.9
Relative Humidity (%) Average	720	49.5	20	-	16	27	34	45	61	81	99
Wind Speed 10 m (km/h) Average	717	15.6	7	-	1	7	11	15	20	25	37
Wind Direction 10 m (deg) Average	717	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	15 Apr 2015 06:00	15 Apr 2015 08:00	3	Flat line in sensor output signal - sensor frozen

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Summary of Hour Averages

Firebag - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 27 ppb on Apr 19 08:00	Maximum Daily Average: 4.2 ppb on Apr 10		Hours of Data:	683
Minimum Value: 0 ppb on Apr 18 08:00	Minimum Daily Average: 0.1 ppb on Apr 1		Hours of Missing Data:	37
Maximum Diurnal Average: 2.7 ppb at hour 8	Minimum Diurnal Average: 0.4 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
2-Apr	0	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-Apr	0	0	0	Z	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
4-Apr	3	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Apr	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1
7-Apr	0	Z	0	0	0	0	0	0	0	0	1	3	2	1	2	2	1	2	2	3	1	0	0	1.0	3	
8-Apr	0	0	Z	0	0	0	0	1	6	5	1	1	0	0	0	0	0	0	0	0	0	0	0	0.8	6	
9-Apr	0	0	0	Z	0	0	1	1	1	1	0	0	0	1	2	3	4	5	5	1	2	2	4	1.6	5	
10-Apr	5	8	6	4	Z	6	7	11	10	13	11	6	3	1	0	0	0	1	1	1	1	0	0	4.2	13	
11-Apr	1	1	1	1	1	Z	4	7	8	7	7	1	0	0	0	0	0	0	0	0	0	0	0	1.8	8	
12-Apr	Z	0	0	0	0	1	1	1	1	1	3	2	1	0	0	0	0	0	0	0	1	0	0	0.6	3	
13-Apr	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	
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	
15-Apr	0	0	0	Z	1	1	2	7	6	3	1	1	1	0	0	0	0	0	0	0	1	1	0	1.1	7	
16-Apr	0	0	1	1	Z	0	1	1	1	6	3	2	2	2	1	0	0	0	0	0	0	0	0	1.0	6	
17-Apr	0	0	1	1	3	Z	10	10	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	10	
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.2	1	
19-Apr	0	Z	0	0	0	0	3	27	6	2	2	1	1	1	2	1	0	0	0	0	0	0	1	2.1	27	
20-Apr	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
21-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	3	0	0.4	3	
22-Apr	0	0	0	0	Z	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	1	1	--	1	
23-Apr	1	0	0	0	0	Z	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1	
24-Apr	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	
25-Apr	0	Z	1	1	0	0	5	6	0	0	0	0	0	1	1	1	1	0	0	0	0	0	3	1.0	6	
26-Apr	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	2	0	0.5	2	
27-Apr	0	0	0	Z	0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	2	2	1	0.8	2	
28-Apr	1	1	1	0	Z	0	0	0	0	1	0	0	0	1	0	1	1	1	1	1	1	1	0	0.6	1	
29-Apr	1	1	1	0	0	Z	0	1	1	1	0	1	1	0	0	0	0	0	2	2	1	1	1	0.7	2	
30-Apr	Z	1	2	2	2	2	2	2	2	1	3	3	2	1	0	1	0	0	1	0	1	1	1	1.3	3	

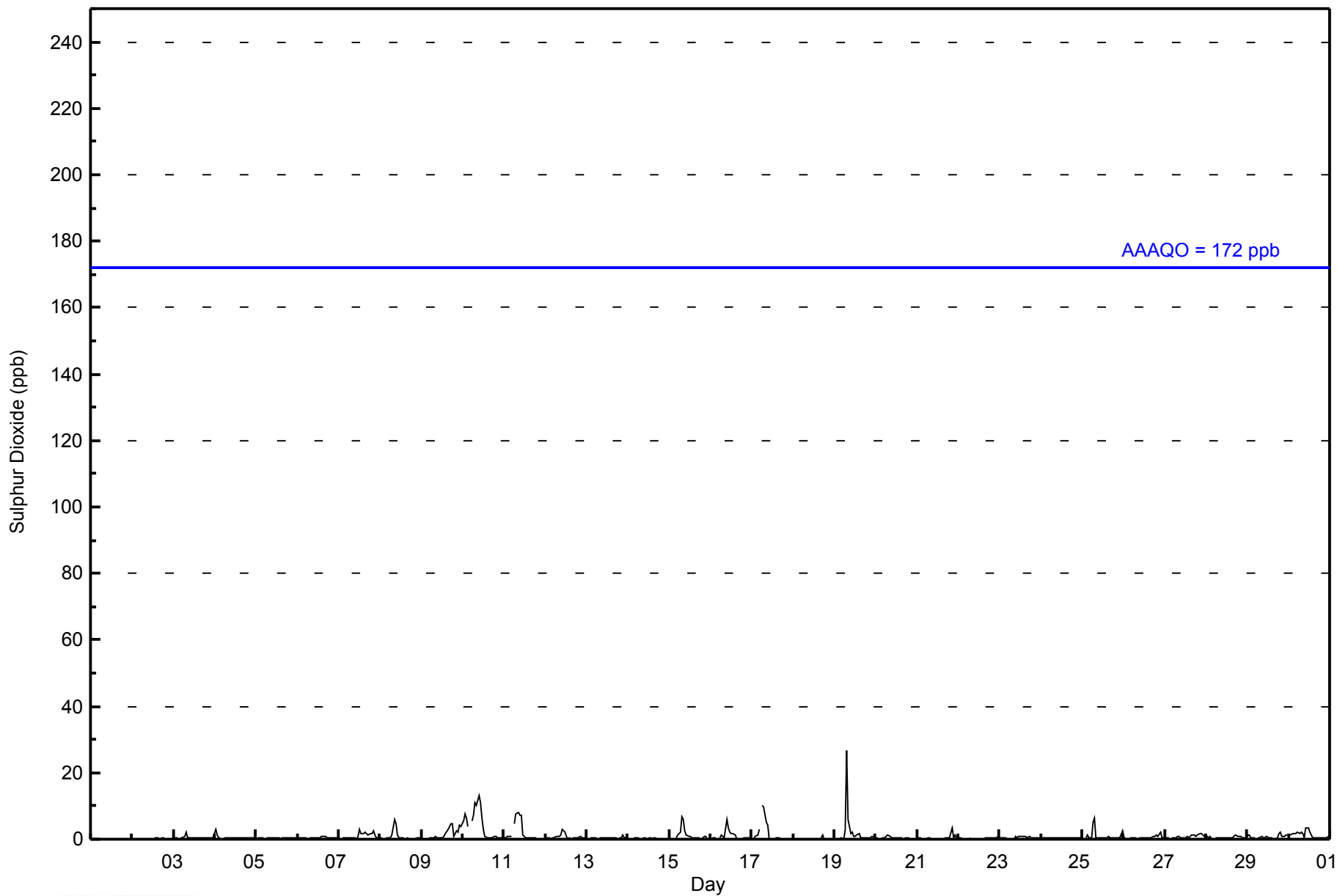
0.6	0.7	0.6	0.6	0.4	0.6	1.4	2.7	1.8	1.7	1.3	0.9	0.7	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.7	0.6	0.5	0.6	Diurnal Average
5	8	6	4	3	6	10	27	10	13	11	6	3	2	2	3	4	5	5	2	3	2	4	4	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	679	99.41	99.41
11 - 20	3	0.44	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: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - April 2015**

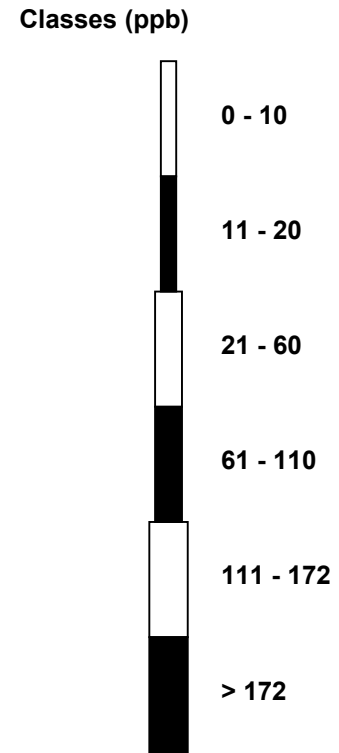
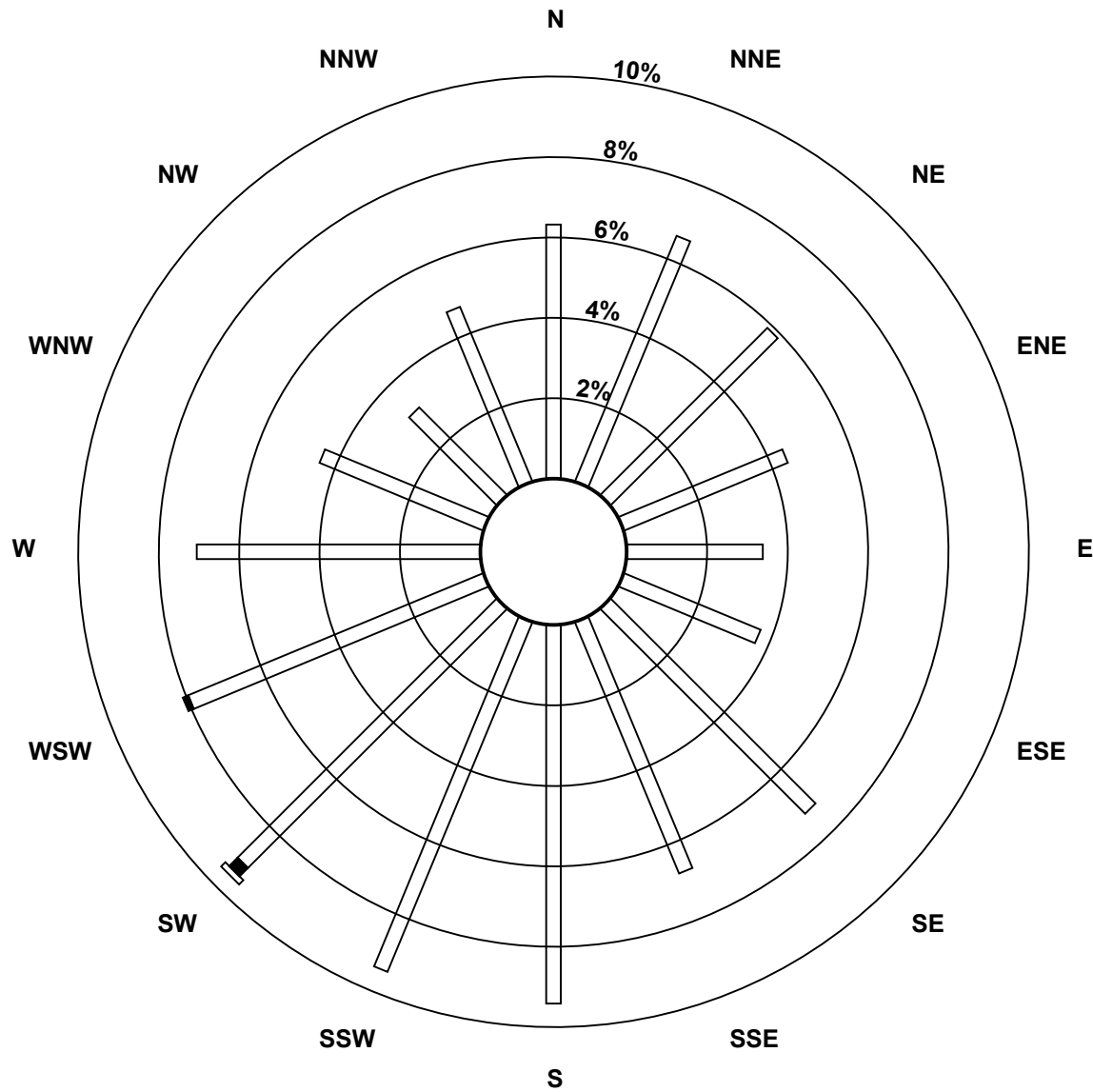
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	43	45	40	30	23	25	49	46	64	64	62	54	48	30	21	32	676
11 - 20	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	43	45	40	30	23	25	49	46	64	64	65	55	48	30	21	32	680

Total Number of Valid Hours: 680

Total Number of Hours: 720

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag (AMS 19)**

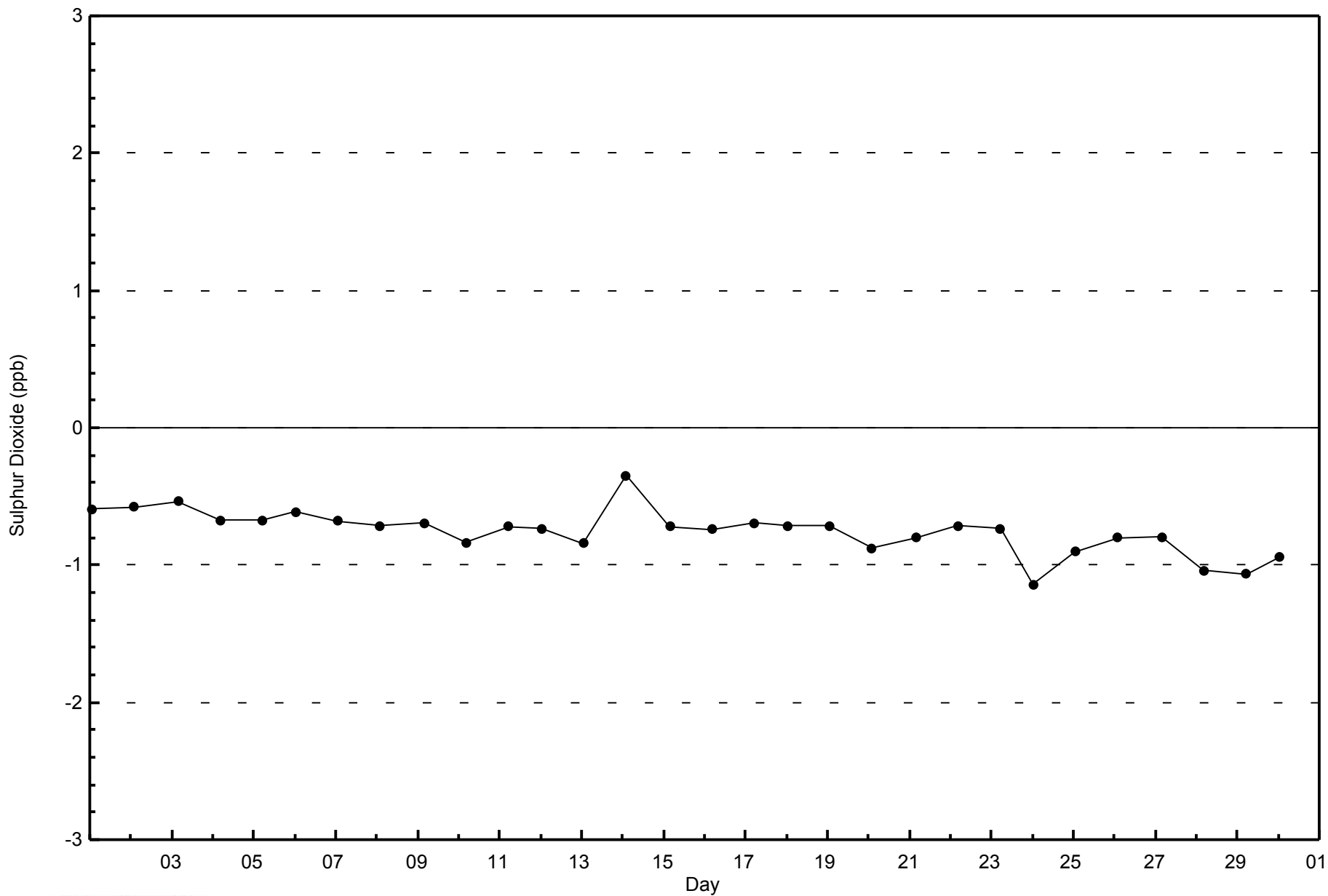


Total Number of Valid Hours: 680



WBEA  
Zero Responses

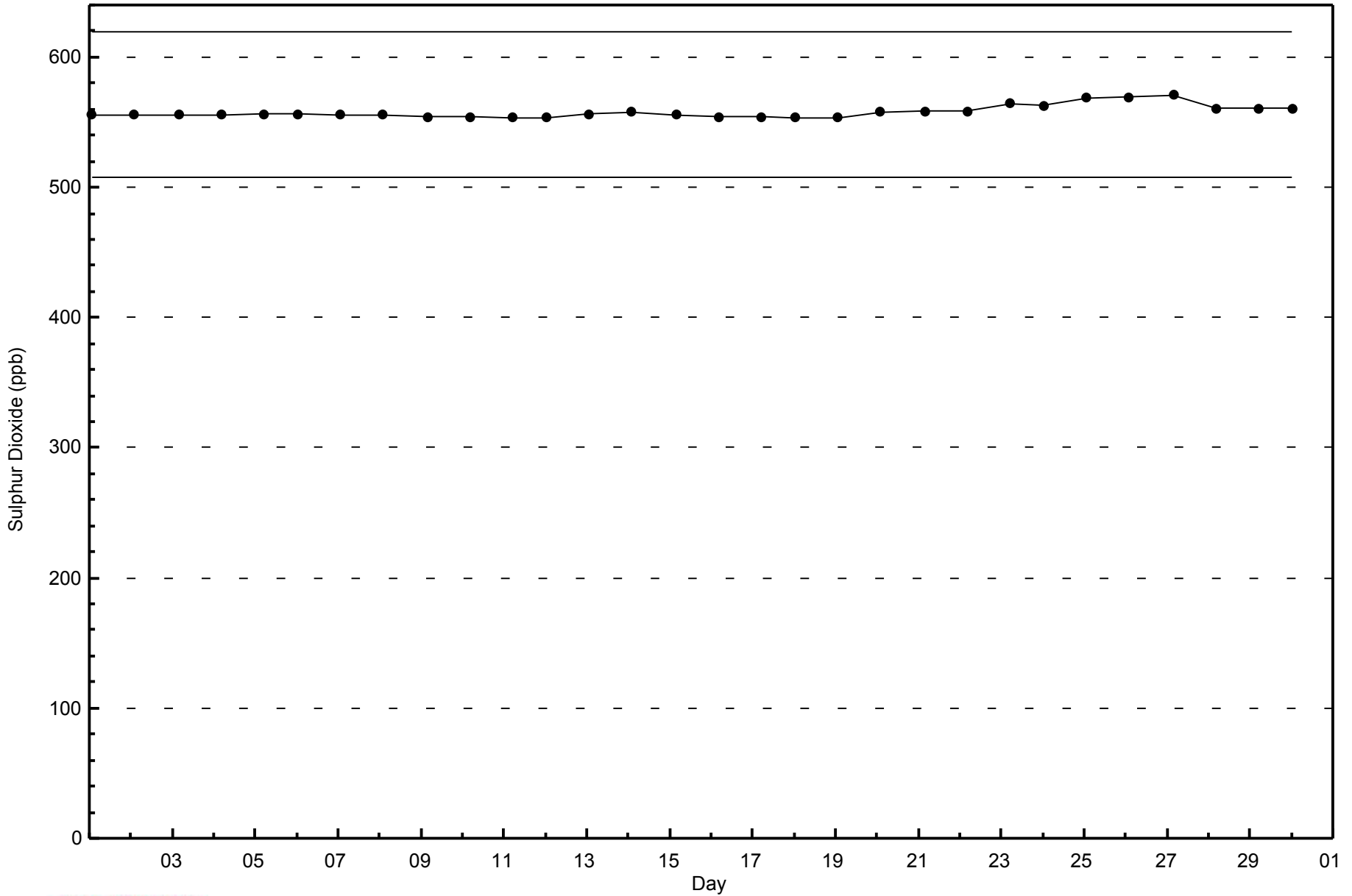
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - April 2015





Summary of Hour Averages

Firebag - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Apr 21 04:00	Maximum Daily Average: 0.8 ppb on Apr 21		Hours of Data:	686
Minimum Value: 0 ppb on Apr 1 10:00	Minimum Daily Average: 0.1 ppb on Apr 18		Hours of Missing Data:	34
Maximum Diurnal Average: 0.5 ppb at hour 4	Minimum Diurnal Average: 0.2 ppb at hour 15		Hours of Calibration:	34
Monthly Average: 0.3 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Apr	0	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
3-Apr	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
4-Apr	2	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
5-Apr	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
6-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Apr	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
9-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
10-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
11-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
12-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
13-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
14-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
16-Apr	0	0	0	0	0	Z	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Apr	0	0	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
18-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
19-Apr	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Apr	1	0	0	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
21-Apr	1	1	3	4	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0.8	4
22-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Apr	0	0	Z	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
26-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.3	1
27-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
29-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
30-Apr	0	Z	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

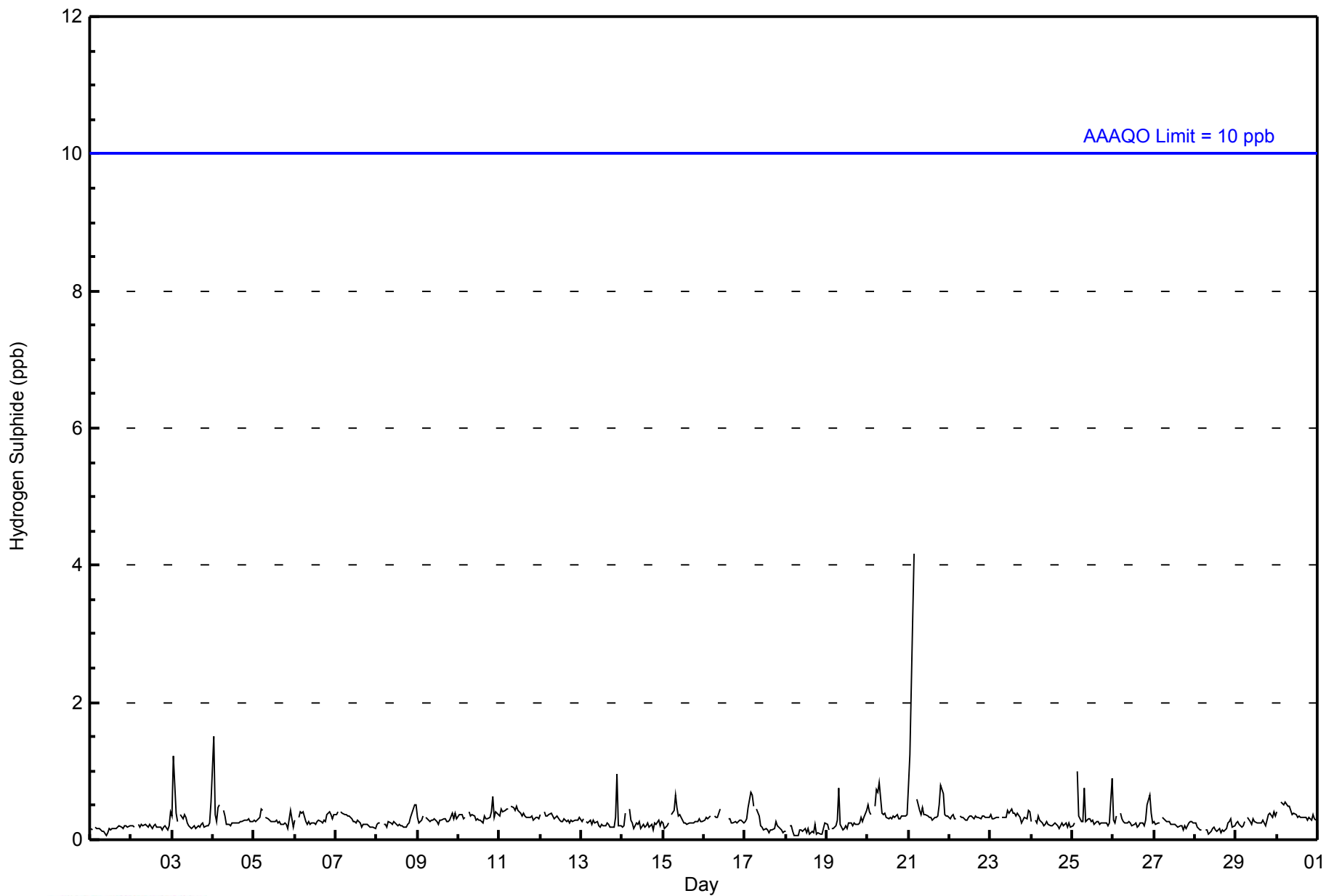
0.3	0.4	0.4	0.5	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	Diurnal Average
2	1	3	4	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	Diurnal Maximum

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



WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	684	99.71	99.71
3 - 4	2	0.29	100.00
5 - 7	0	0.00	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 686

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - April 2015**

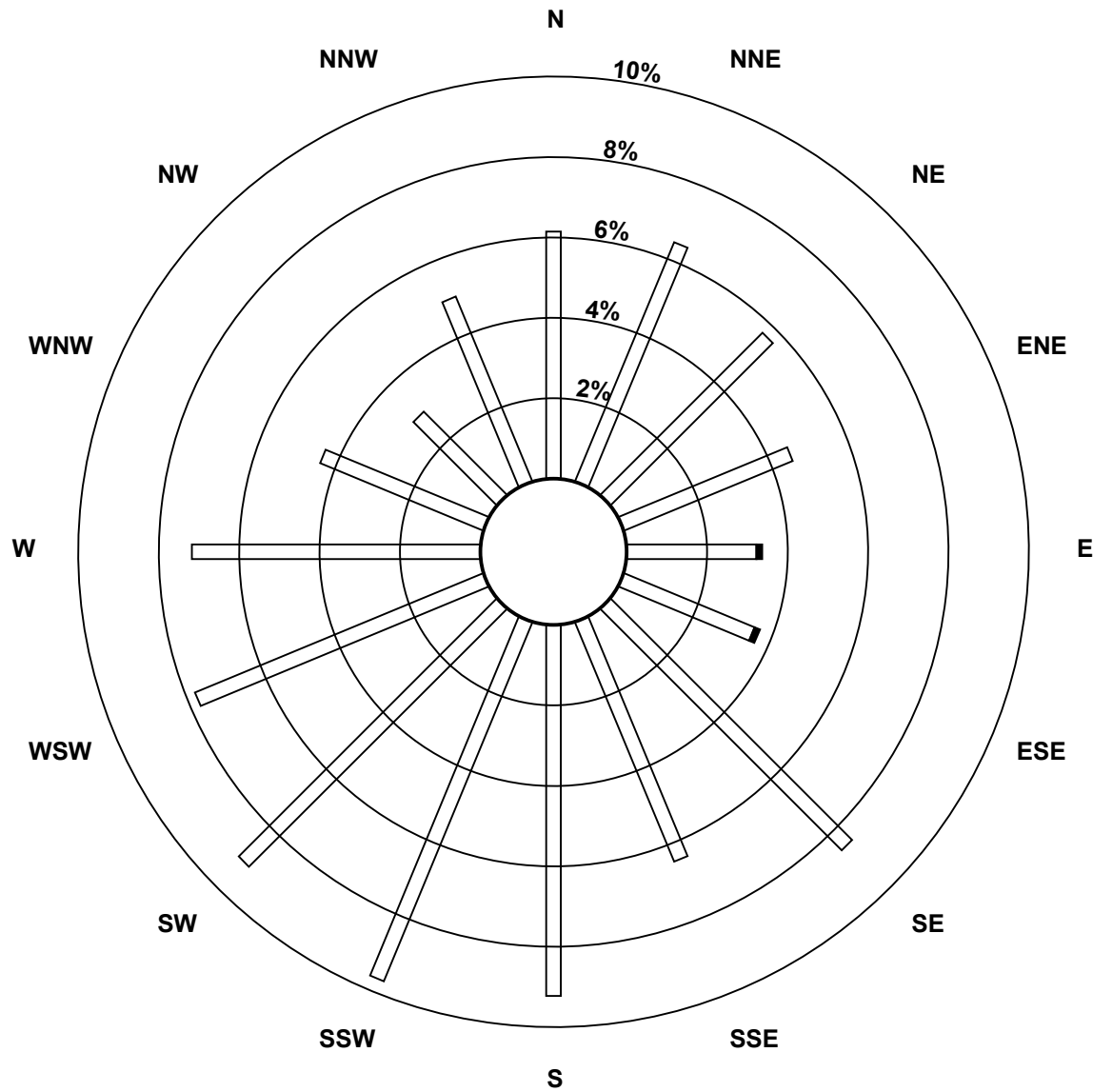
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	42	44	39	31	22	24	58	44	63	66	62	53	49	30	20	34	681
3 - 4	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	44	39	31	23	25	58	44	63	66	62	53	49	30	20	34	683

Total Number of Valid Hours: 683

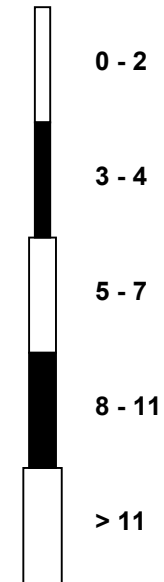
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag (AMS 19)



Classes (ppb)

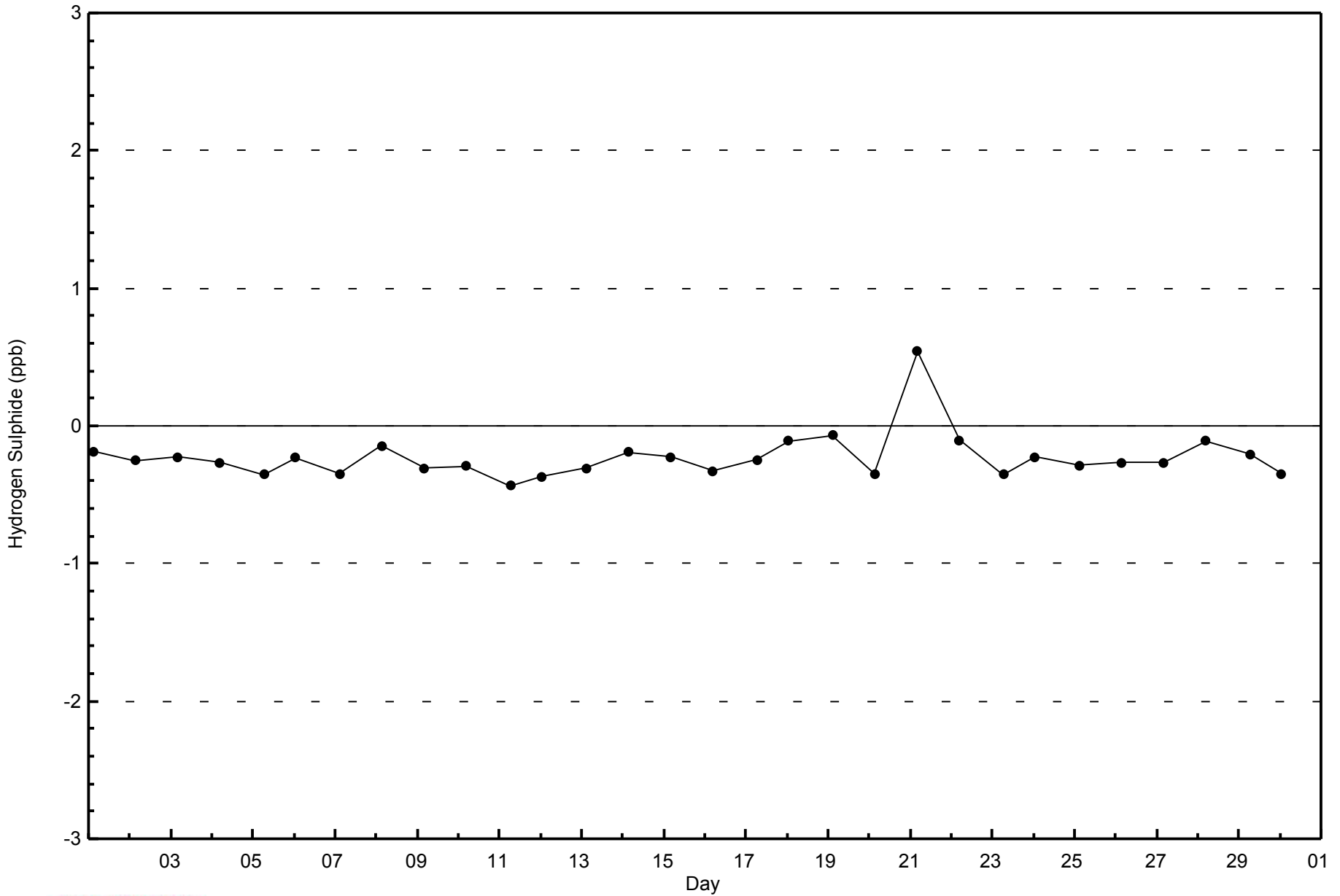


Total Number of Valid Hours: 683



WBEA  
Zero Responses

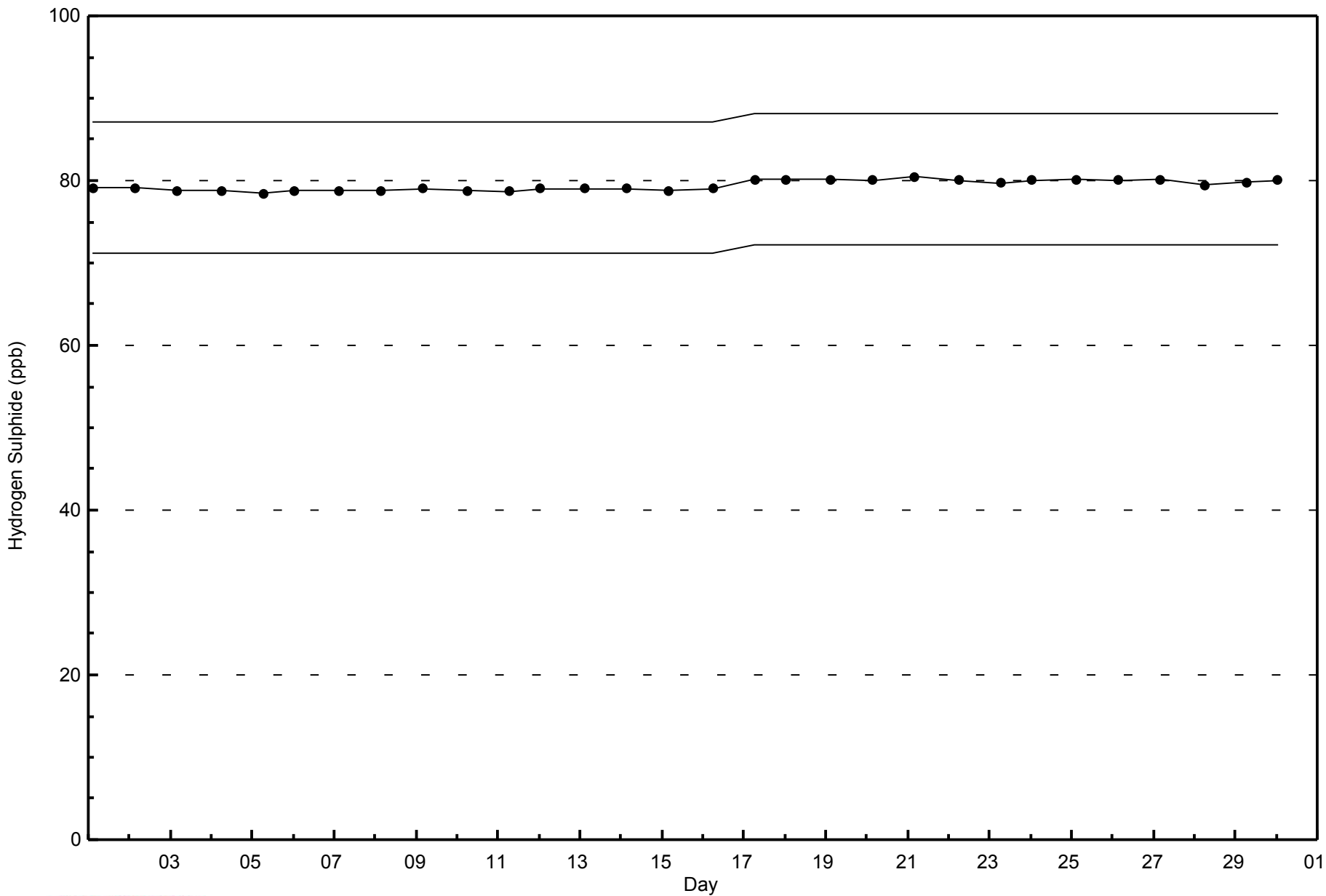
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - April 2015

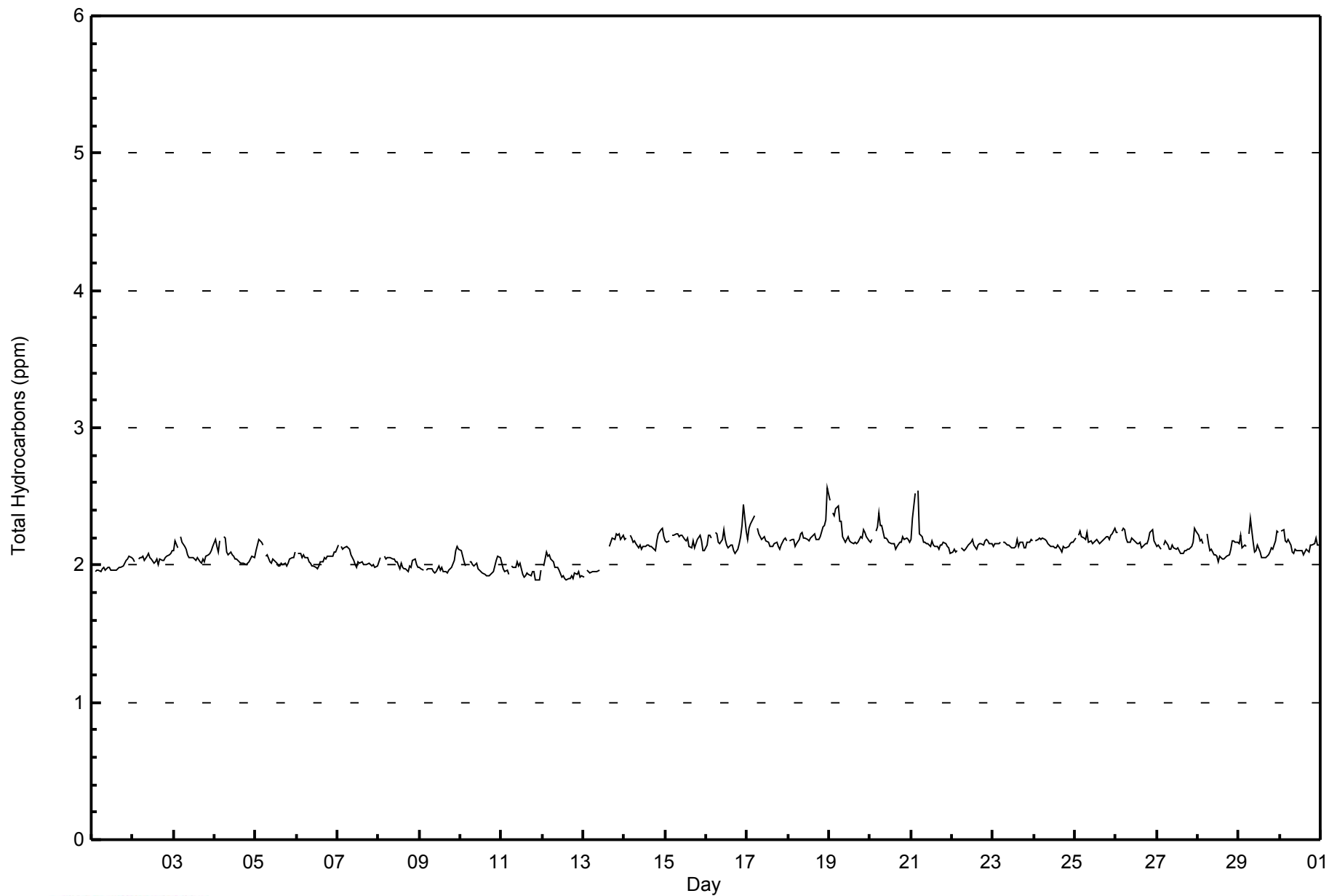






**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - April 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	202	29.49	29.49
2.1 - 3.0	483	70.51	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 685

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - April 2015**

<b>Concentration</b> <b>Ranges (ppm)</b>	<b>Wind Direction</b>																<b>Totals</b>
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	26	27	6	1	0	0	1	6	19	30	19	16	14	15	7	15	202
2.1 - 3.0	17	18	34	29	23	25	55	40	45	34	46	39	34	15	11	15	480
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
<b>Totals</b>	43	45	40	30	23	25	56	46	64	64	65	55	48	30	18	30	682

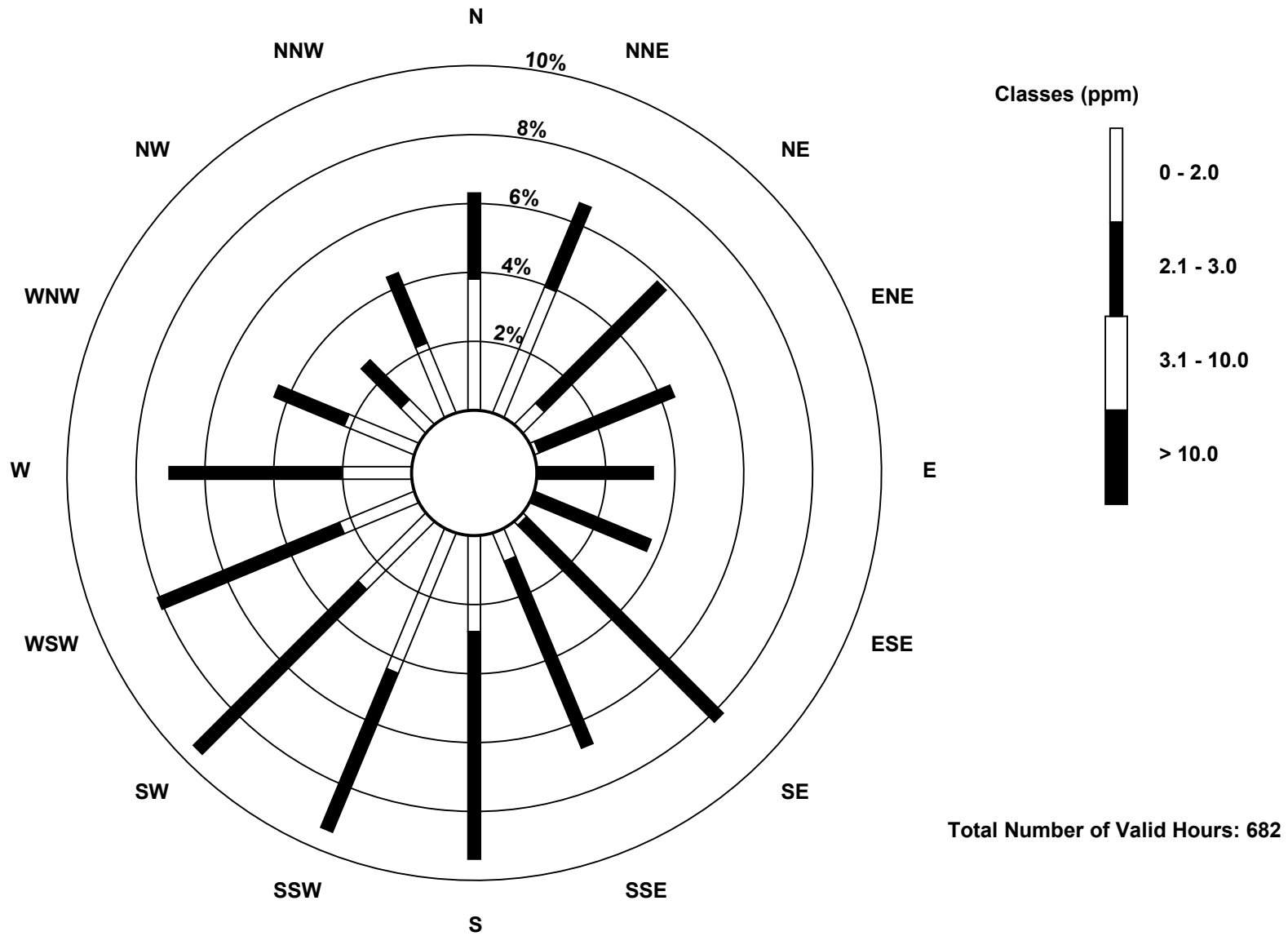
Total Number of Valid Hours: 682

Total Number of Hours: 720



Wood Buffalo Environmental Association  
 Wind Rose Apr 2015

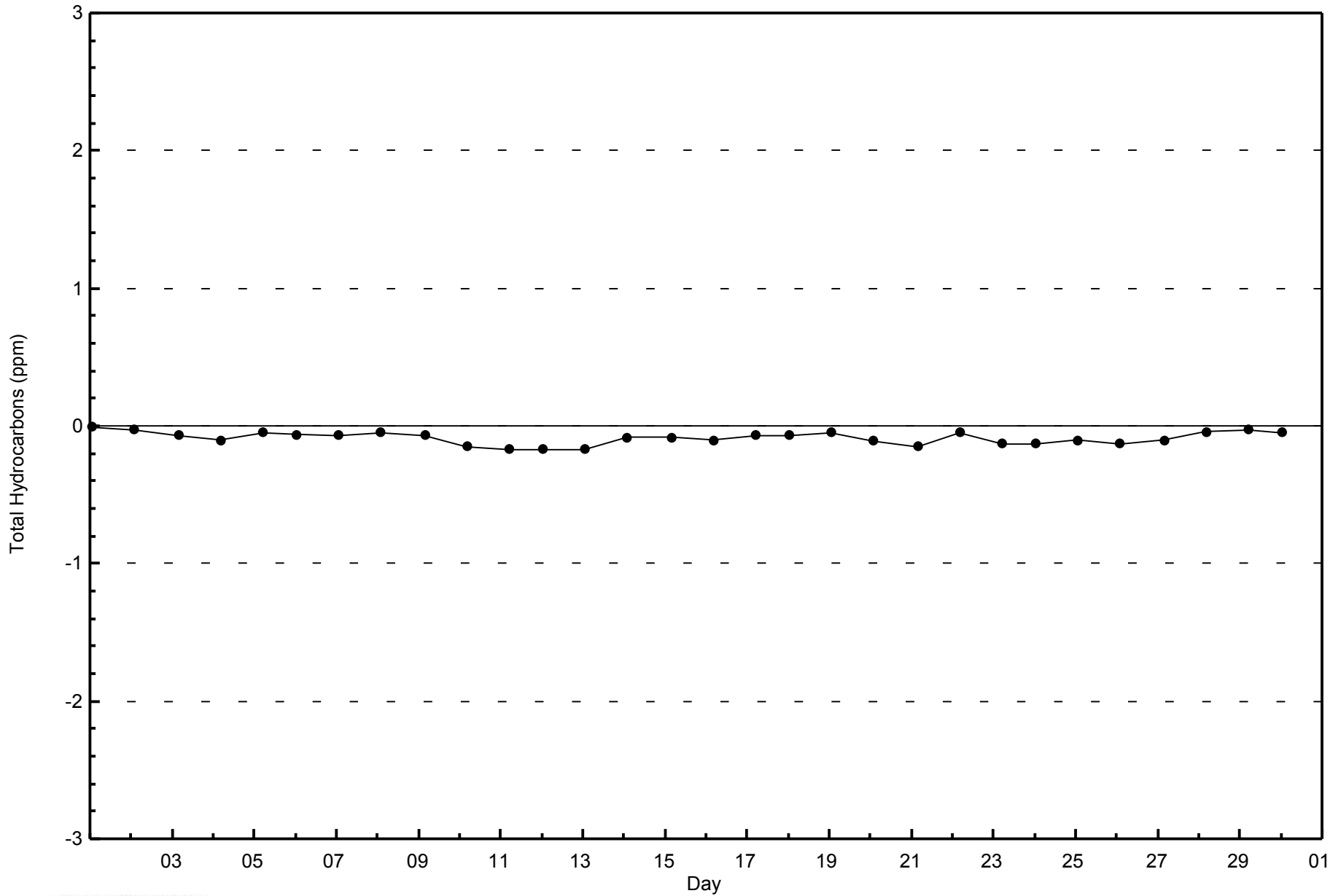
Total Hydrocarbons (THC) - ppm  
 Firebag (AMS 19)





WBEA  
Zero Responses

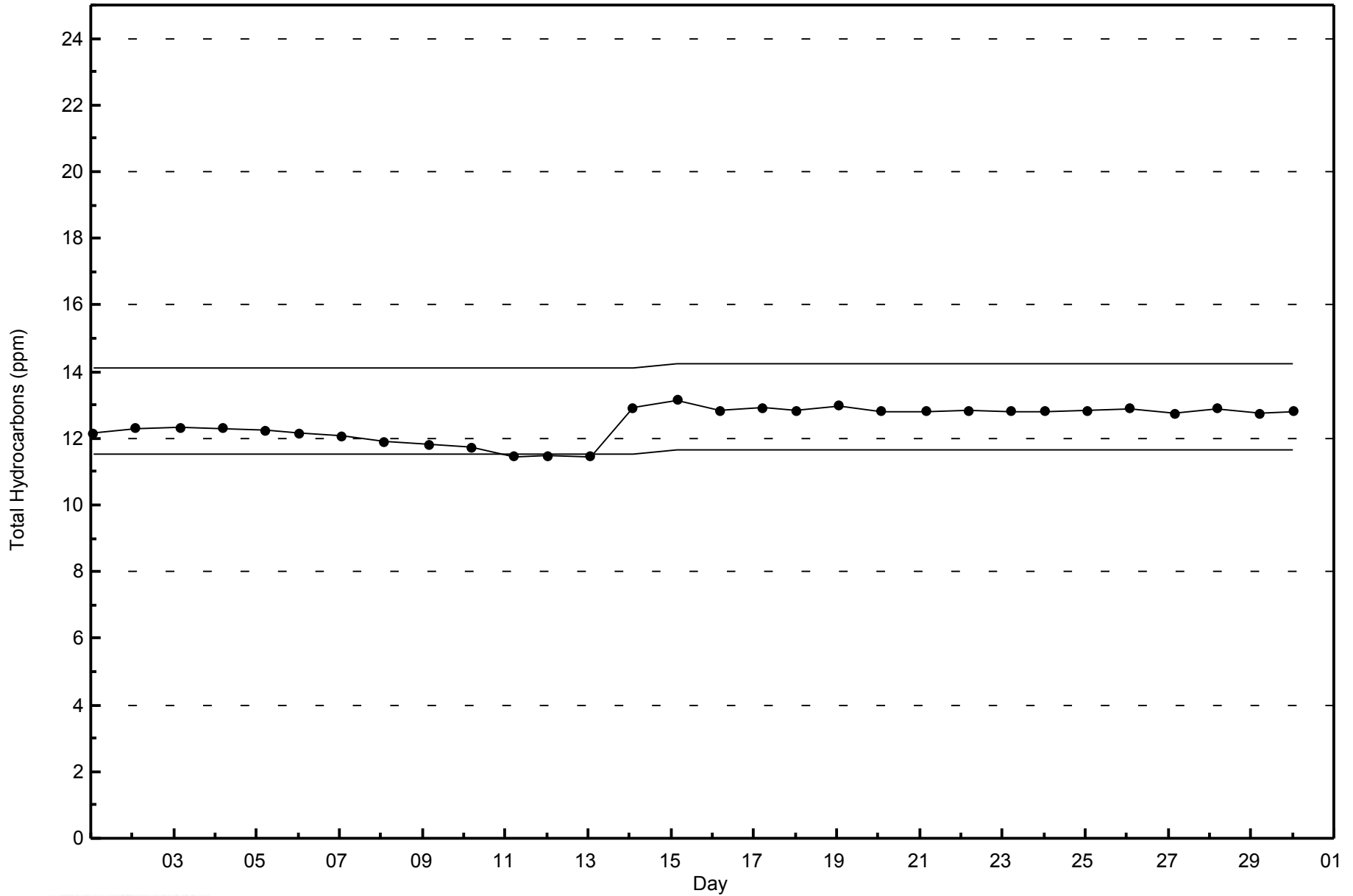
Total Hydrocarbons (THC) - ppm  
Firebag - April 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Firebag - April 2015





Summary of Hour Averages

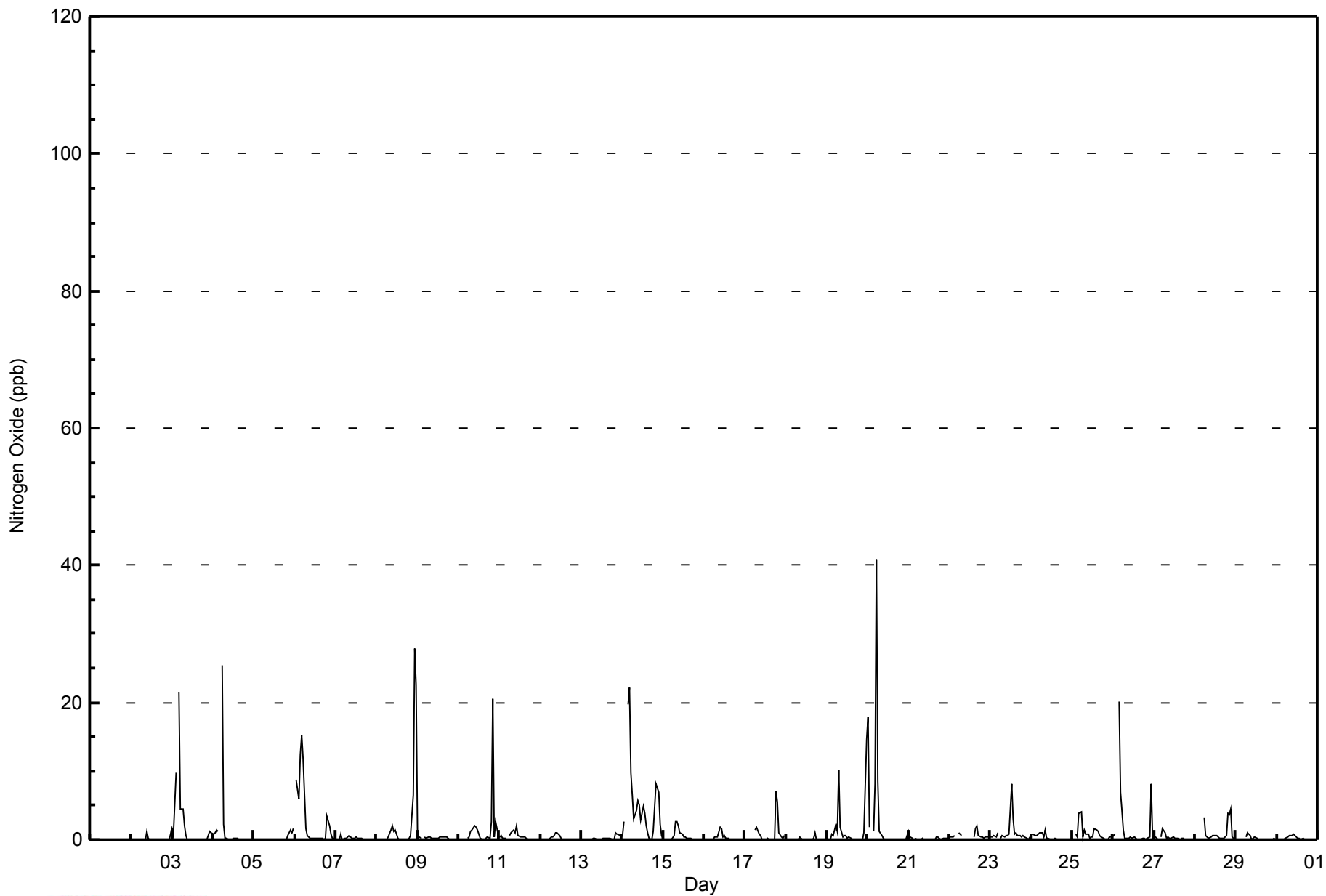
Firebag - April 2015

Maximum Value: 41 ppb on Apr 20 06:00														Maximum Daily Average: 5.1 ppb on Apr 14														Hours in Service: 720	
Minimum Value: 0 ppb on Apr 1 05:00														Minimum Daily Average: 0.0 ppb on Apr 1														Hours of Data: 684	
Maximum Diurnal Average: 4.4 ppb at hour 6														Minimum Diurnal Average: 0.2 ppb at hour 18														Hours of Missing Data: 36	
Monthly Average: 1.0 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 20														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-Apr	0	Z	0	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-Apr	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1			
3-Apr	2	1	10	Z	22	4	4	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2.1	22			
4-Apr	1	1	1	1	Z	25	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4	25			
5-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0.2	2			
6-Apr	Z	9	6	12	15	12	2	1	0	0	0	0	0	0	0	0	0	0	0	3	2	1	0	0	2.8	15			
7-Apr	0	Z	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
8-Apr	0	0	Z	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	1	7	28	23	2.8	28			
9-Apr	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
10-Apr	0	0	0	0	Z	0	1	1	1	2	2	1	1	0	0	0	0	0	0	3	21	0	3	1	1.6	21			
11-Apr	0	1	0	0	0	Z	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2			
12-Apr	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
13-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0.2	1			
14-Apr	1	3	Z	20	22	10	6	3	4	6	5	3	5	4	2	1	0	0	1	5	8	7	2	1	5.1	22			
15-Apr	0	0	0	Z	0	0	1	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3			
16-Apr	0	0	0	0	Z	0	0	0	0	2	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	2			
17-Apr	0	0	0	0	0	Z	1	2	1	1	0	0	0	0	0	0	0	0	7	6	1	0	0	1	0.9	7			
18-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.1	1			
19-Apr	1	Z	0	1	1	2	1	10	2	0	1	1	0	0	0	0	0	0	0	0	0	0	1	15	1.6	15			
20-Apr	18	2	Z	1	8	41	9	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3.6	41			
21-Apr	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
22-Apr	0	0	0	1	Z	1	1	1	1	C	C	C	C	C	C	0	2	2	1	0	0	0	0	0	--	2			
23-Apr	0	0	1	0	1	Z	0	1	0	1	1	1	8	3	1	1	1	1	0	1	0	0	0	0	1.0	8			
24-Apr	Z	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
25-Apr	0	Z	1	0	4	4	0	1	1	1	0	0	2	1	1	1	0	0	0	0	0	0	1	0	0.9	4			
26-Apr	1	1	Z	20	7	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	2.0	20			
27-Apr	0	0	0	Z	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2			
28-Apr	0	0	0	0	Z	3	1	0	0	0	1	1	1	1	0	0	0	0	1	4	4	4	0	0	0.9	4			
29-Apr	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
30-Apr	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1			
																												Diurnal Average	
																												Diurnal Maximum	
Z - zerospan														C - Calibration															



**WBEA**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	677	98.98	98.98
21 - 40	6	0.88	99.85
41 - 80	1	0.15	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - April 2015**

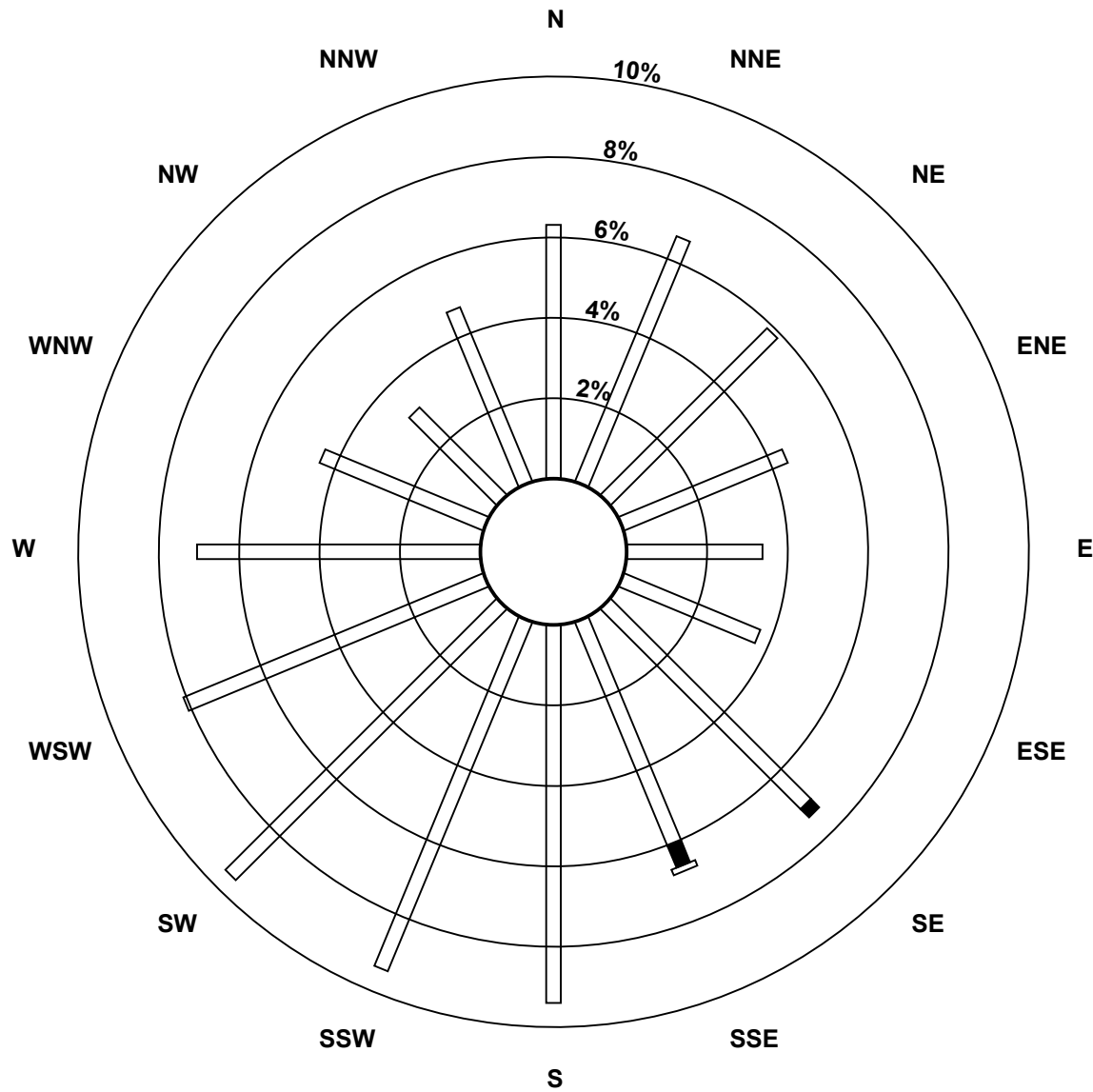
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	45	40	30	23	25	48	41	64	64	65	55	48	30	21	32	674
21 - 40	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	0	6
41 - 80	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	45	40	30	23	25	50	46	64	64	65	55	48	30	21	32	681

Total Number of Valid Hours: 681

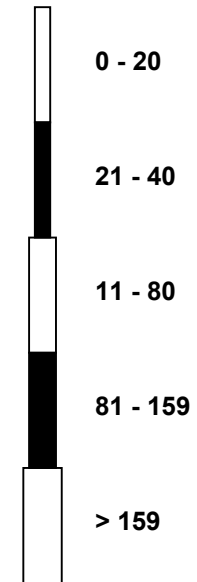
Total Number of Hours: 720

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

**Nitrogen Oxide (NO) - ppb  
Firebag (AMS 19)**



Classes (ppb)



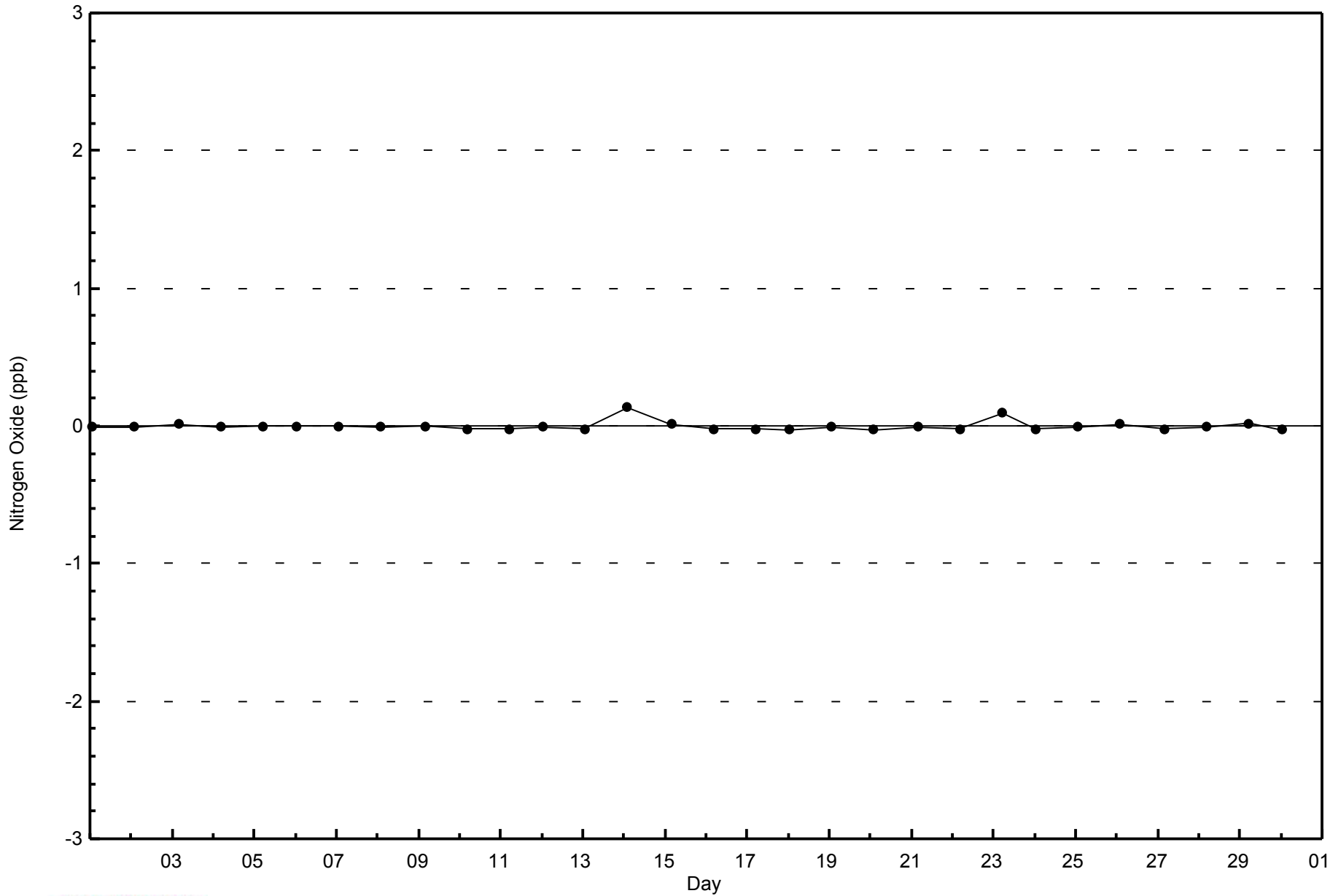
Total Number of Valid Hours: 681





WBEA  
Zero Responses

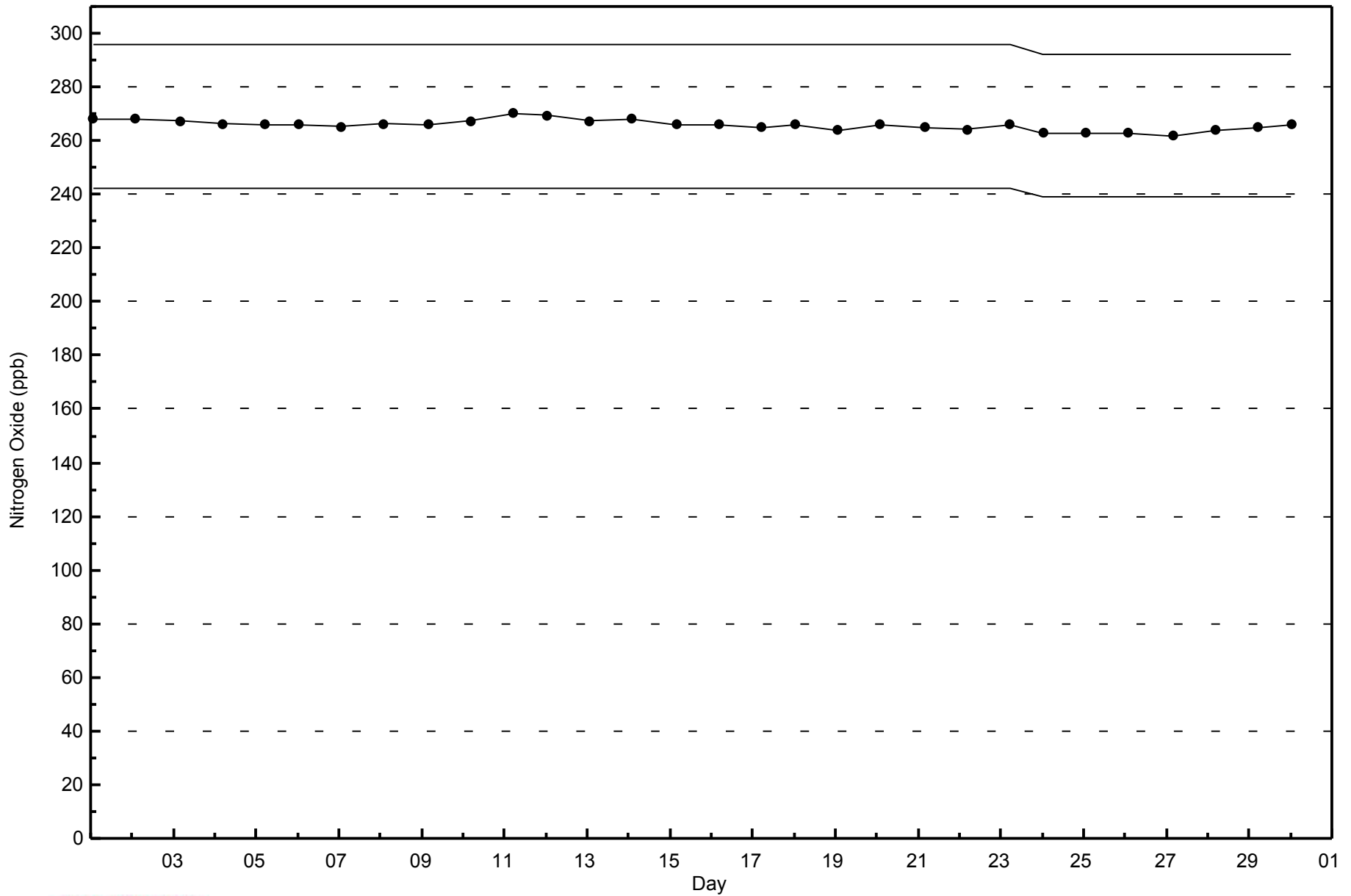
Nitrogen Oxide (NO) - ppb  
Firebag - April 2015





WBEA  
Span Responses

Nitrogen Oxide (NO) - ppb  
Firebag - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 39 ppb on Apr 10 21:00	Maximum Daily Average: 8.1 ppb on Apr 14		Hours of Data:	684
Minimum Value: 0 ppb on Apr 1 03:00	Minimum Daily Average: 0.2 ppb on Apr 1		Hours of Missing Data:	36
Maximum Diurnal Average: 7.5 ppb at hour 6	Minimum Diurnal Average: 1.0 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 3.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 8 P <sub>99</sub> = 25		Percent Operational Time:	100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Apr	0	0	Z	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	1	6	0.7	6
3-Apr	8	7	18	Z	31	22	14	6	1	1	0	0	0	0	0	0	0	0	0	0	0	2	4	5	5.3	31
4-Apr	6	7	7	7	Z	28	12	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	3.1	28
5-Apr	0	0	1	2	8	Z	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	7	7	1.8	9
6-Apr	Z	16	12	22	24	19	6	2	1	1	1	1	1	1	1	1	1	1	2	12	8	5	2	2	6.1	24
7-Apr	1	Z	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1.4	2
8-Apr	1	1	Z	1	1	1	1	2	4	4	3	3	1	1	1	0	0	0	0	2	11	22	30	30	5.3	30
9-Apr	4	2	1	Z	2	1	2	2	1	1	1	1	1	2	2	2	2	3	3	1	4	9	11	10	2.9	11
10-Apr	11	9	9	5	Z	6	6	6	5	6	5	4	3	1	1	1	1	2	5	23	39	6	11	5	7.3	39
11-Apr	5	4	3	3	2	Z	6	5	5	5	7	3	2	2	2	2	2	2	2	2	1	1	1	2	2.9	7
12-Apr	Z	3	5	4	4	3	3	2	2	2	3	2	1	1	1	0	1	1	1	2	2	2	0	1	1.8	5
13-Apr	1	Z	2	1	1	1	0	1	1	0	0	0	0	1	1	1	1	1	1	1	5	5	5	5	1.5	5
14-Apr	4	9	Z	24	26	14	9	5	6	9	8	5	7	6	4	3	1	1	3	10	15	12	4	2	8.1	26
15-Apr	1	1	1	Z	2	3	4	7	5	4	3	2	1	2	1	1	1	1	1	1	3	3	1	1	2.0	7
16-Apr	1	3	2	2	Z	3	3	2	1	4	5	2	2	1	1	1	1	1	1	2	4	8	13	3	2.8	13
17-Apr	1	3	4	7	10	Z	9	6	3	2	1	1	1	1	1	1	1	1	15	11	5	4	4	5	4.1	15
18-Apr	Z	1	4	3	0	0	0	0	1	1	0	0	0	0	0	0	1	4	0	2	2	1	2	1	1.1	4
19-Apr	10	Z	6	13	16	13	5	18	5	1	2	2	1	2	1	1	1	1	2	2	5	2	4	25	6.0	25
20-Apr	25	7	Z	12	16	22	17	5	3	1	1	0	1	1	1	1	1	0	0	0	0	1	1	4	5.1	25
21-Apr	6	6	5	Z	5	0	0	0	1	0	0	0	0	0	0	0	1	2	1	1	2	1	2	2	1.6	6
22-Apr	2	2	2	2	Z	3	2	1	C	C	C	C	C	C	1	3	4	2	2	2	1	1	2	1	--	4
23-Apr	1	2	2	1	3	Z	1	1	1	2	1	2	6	4	2	2	2	2	1	2	3	2	1	3	1.9	6
24-Apr	Z	6	3	3	4	5	2	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.3	6
25-Apr	1	Z	3	3	9	9	2	4	1	2	1	1	1	3	3	3	2	1	1	0	0	0	3	5	2.5	9
26-Apr	4	6	Z	21	14	8	4	1	1	1	1	1	1	0	0	1	2	2	3	7	8	15	1	4.4	21	
27-Apr	1	1	0	Z	4	5	4	1	2	1	1	1	1	1	1	1	2	1	1	1	2	2	11	12	2.5	12
28-Apr	9	4	2	1	Z	13	3	2	1	1	2	2	2	2	1	2	2	2	4	21	22	22	2	1	5.4	22
29-Apr	3	7	5	3	2	Z	8	11	5	1	1	3	1	1	1	1	1	1	2	4	3	5	11	10	3.7	11
30-Apr	Z	6	6	4	3	4	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	2.1	6

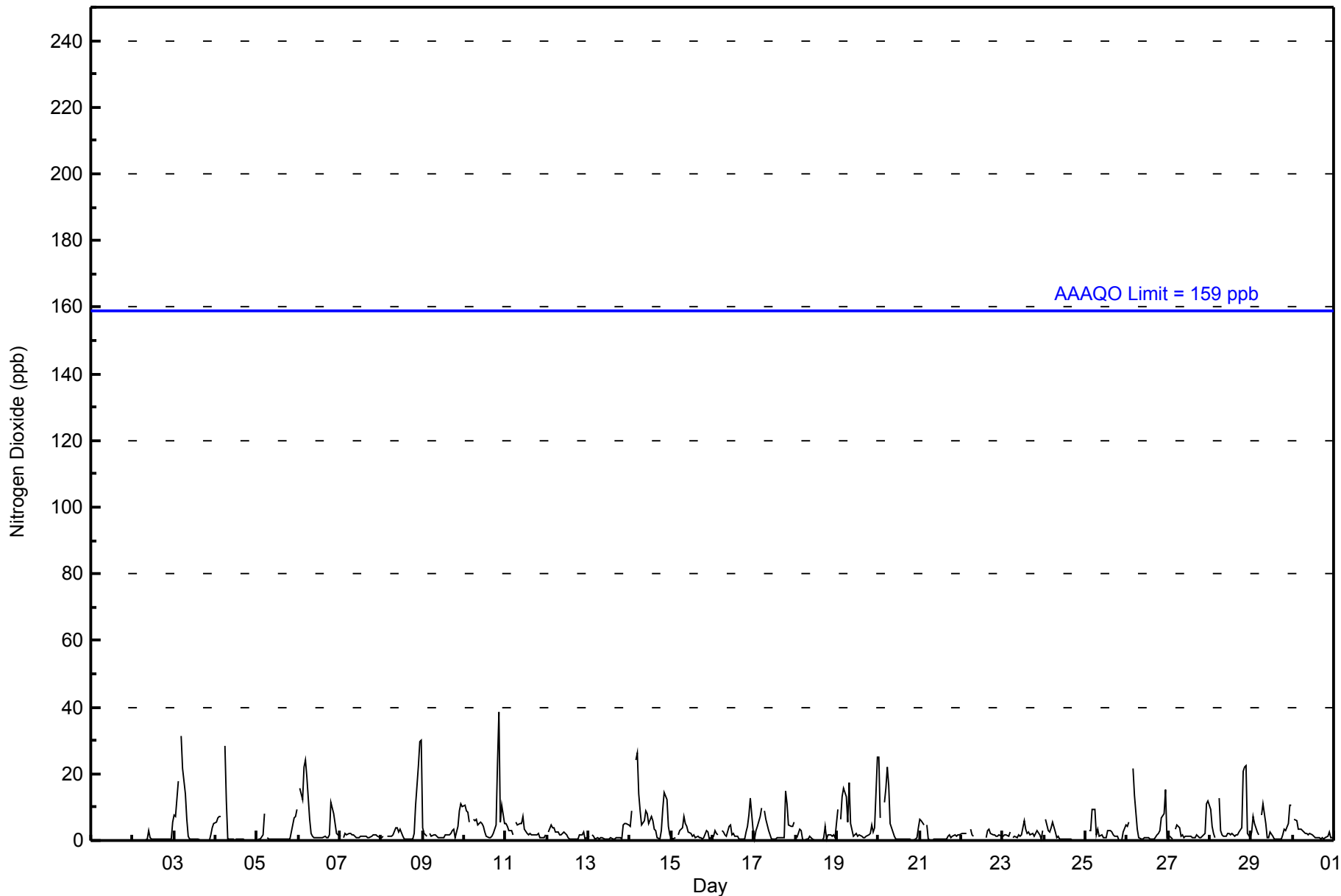
4.2	4.5	4.1	5.9	7.4	7.5	4.2	3.2	2.1	1.9	1.7	1.4	1.3	1.2	1.0	1.0	1.0	1.1	1.7	3.5	4.9	4.5	4.9	5.0	Diurnal Average		
25	16	18	24	31	28	17	18	6	9	8	5	7	6	4	3	4	4	4	15	23	39	22	30	30	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	665	97.22	97.22
21 - 40	19	2.78	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - April 2015**

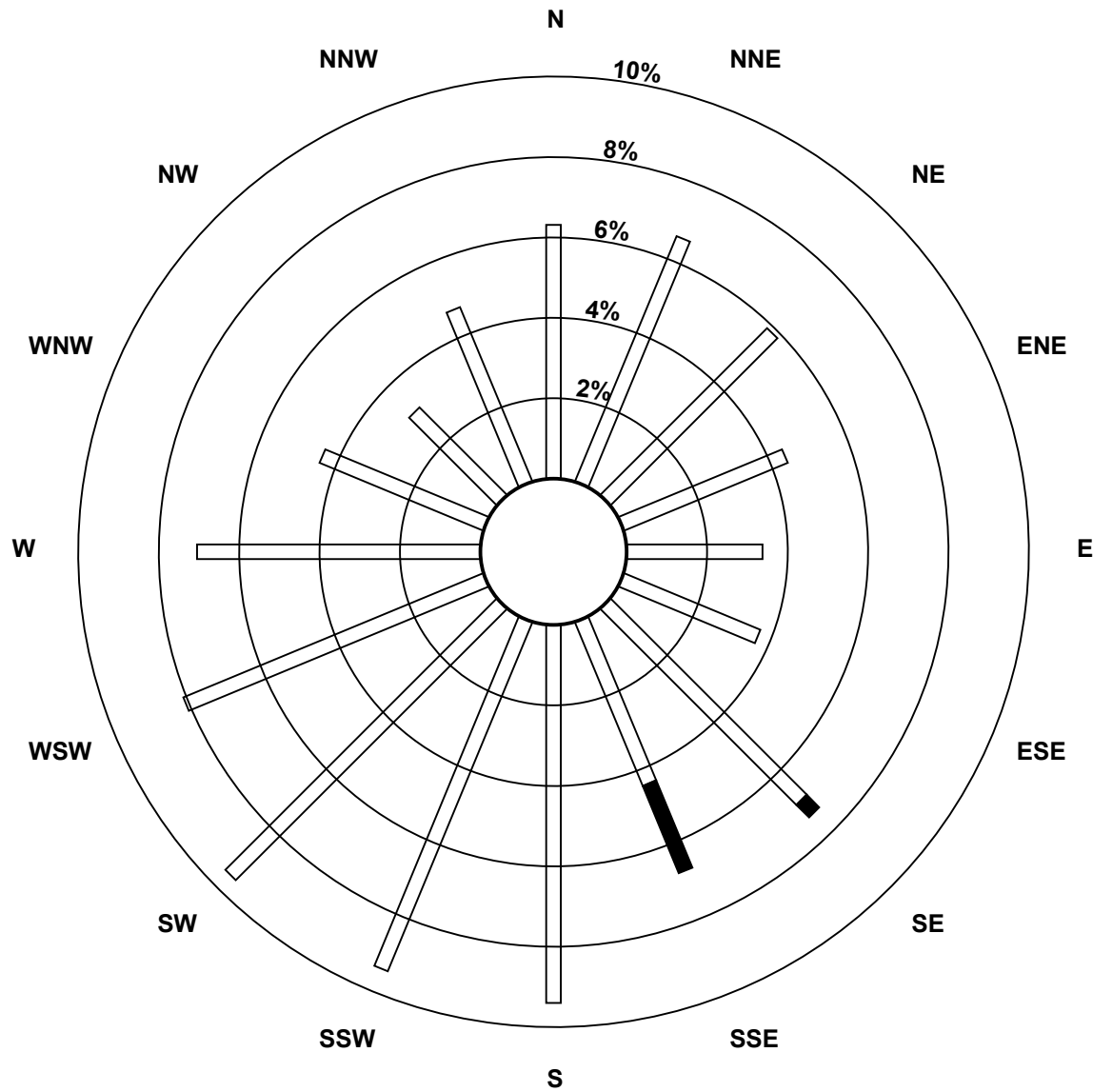
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	45	40	30	23	25	47	30	64	64	65	55	48	30	21	32	662
21 - 40	0	0	0	0	0	0	3	16	0	0	0	0	0	0	0	0	19
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	45	40	30	23	25	50	46	64	64	65	55	48	30	21	32	681

Total Number of Valid Hours: 681

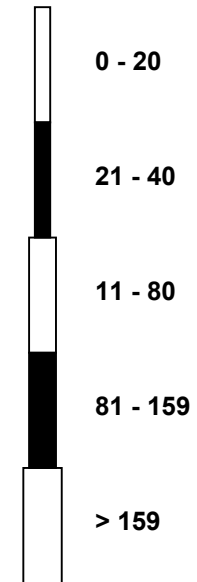
Total Number of Hours: 720

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag (AMS 19)**



Classes (ppb)

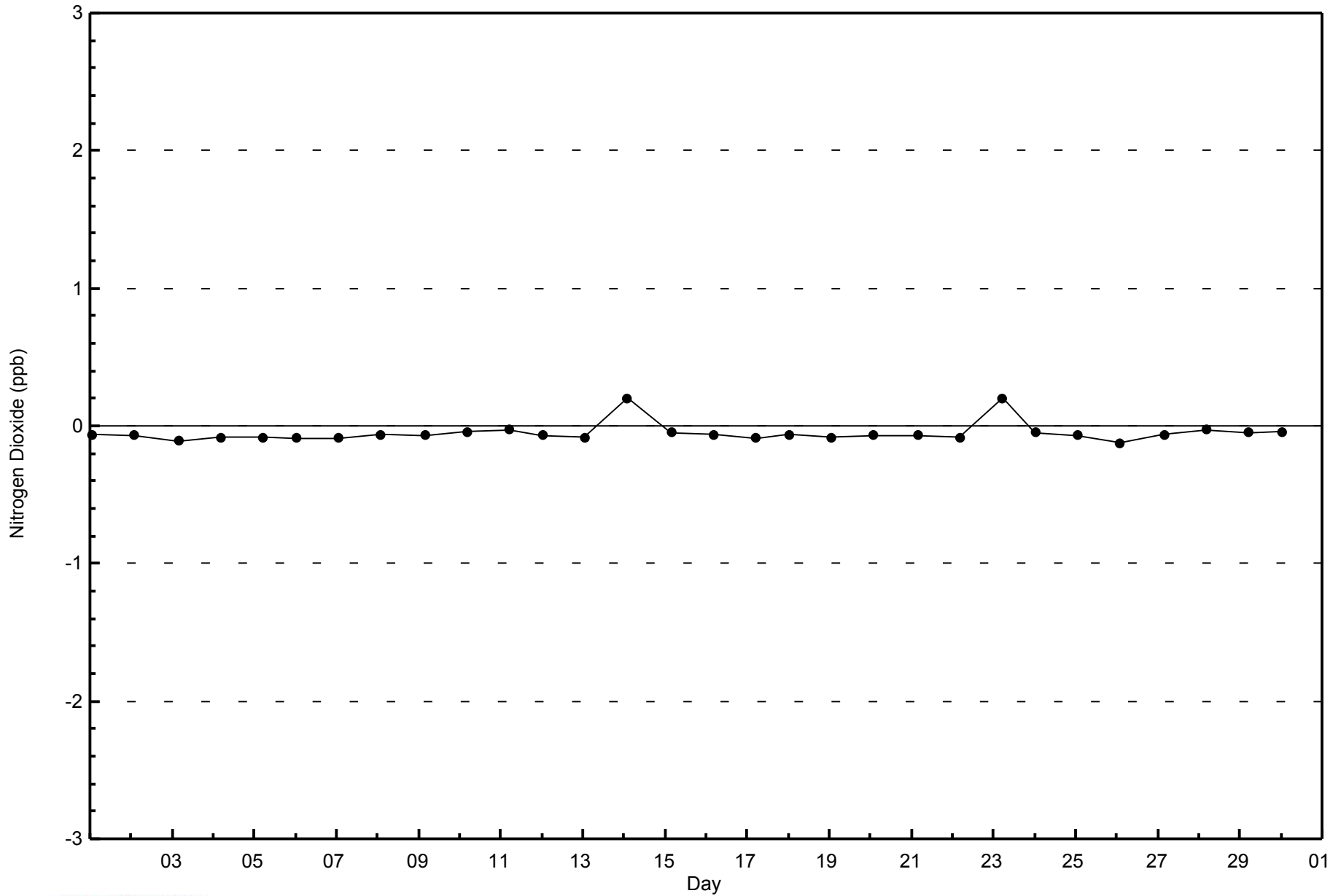


Total Number of Valid Hours: 681



WBEA  
Zero Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - April 2015

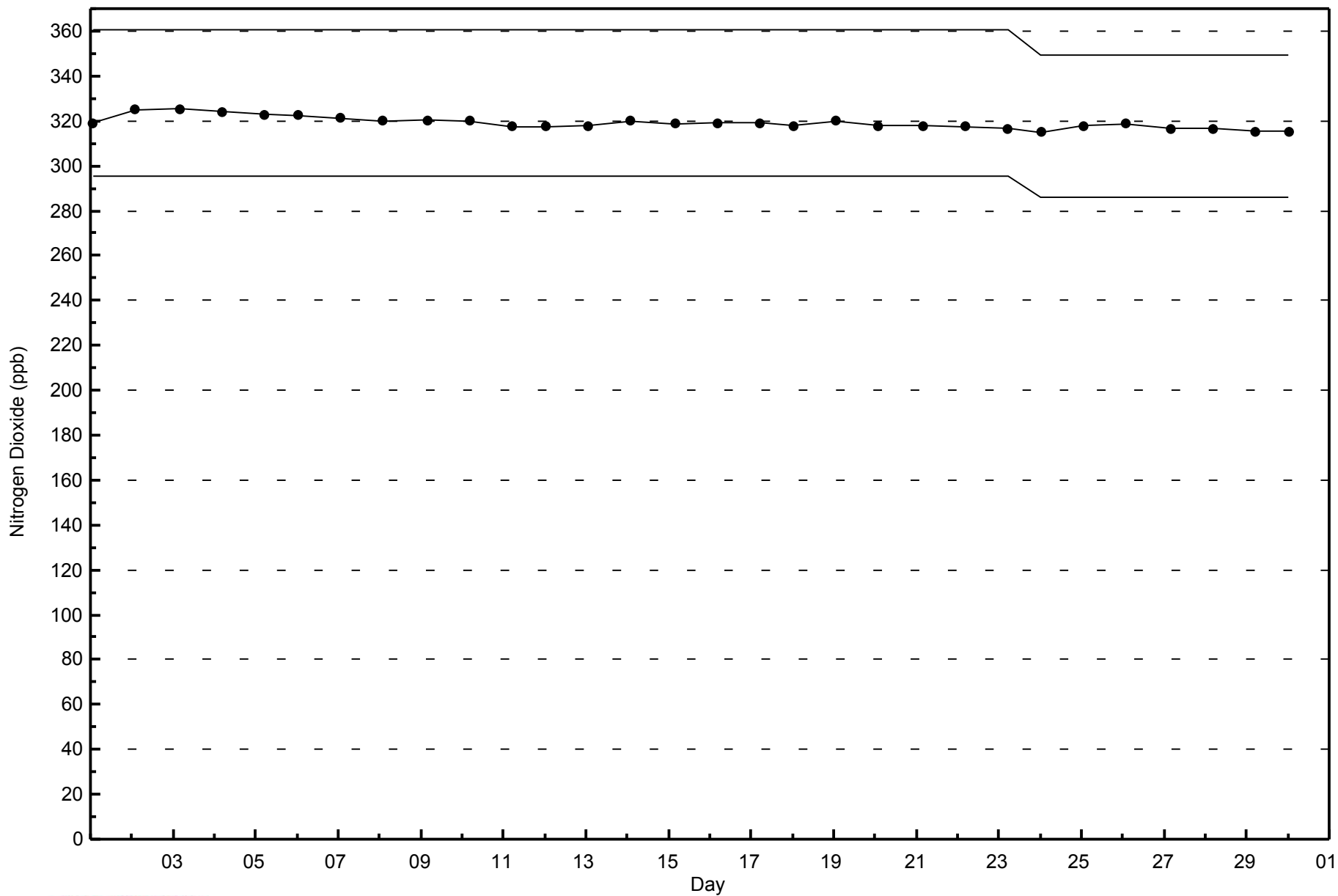






WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - April 2015



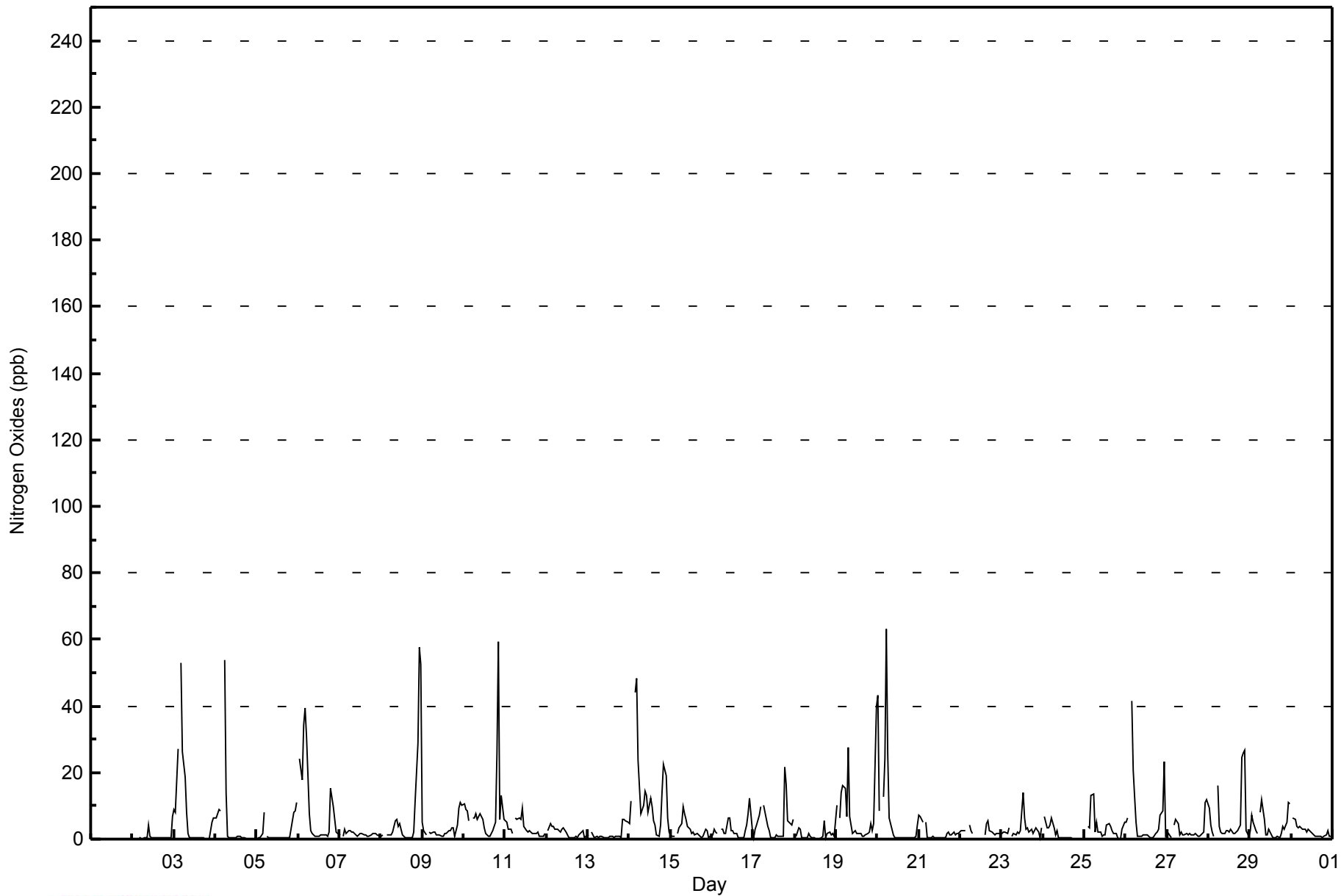


Maximum Value: 63 ppb on Apr 20 06:00																		Maximum Daily Average: 13.2 ppb on Apr 14						Hours in Service: 720		
Minimum Value: 0 ppb on Apr 25 00:00																		Minimum Daily Average: 0.2 ppb on Apr 1						Hours of Data: 684		
Maximum Diurnal Average: 12.0 ppb at hour 6																		Minimum Diurnal Average: 1.2 ppb at hour 17						Hours of Missing Data: 36		
Monthly Average: 4.3 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 10 P <sub>99</sub> = 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-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
2-Apr	0	0	Z	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	1	7	0.8	7
3-Apr	9	8	27	Z	53	26	18	8	2	1	0	0	0	0	0	0	0	0	0	0	0	2	5	6	7.4	53
4-Apr	6	8	9	8	Z	54	14	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	4.6	54
5-Apr	0	0	0	2	8	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	8	9	2.0	11
6-Apr	Z	24	18	34	39	31	8	3	2	1	1	1	1	1	1	1	1	1	2	15	10	6	2	2	8.9	39
7-Apr	1	Z	1	3	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	2	2	2	1	1	1.5	3
8-Apr	1	1	Z	1	1	1	1	2	5	6	4	5	1	1	0	0	0	0	0	2	12	29	58	53	8.1	58
9-Apr	5	3	1	Z	2	2	2	2	1	1	1	1	2	2	2	2	3	3	3	1	4	9	11	10	3.2	11
10-Apr	11	9	8	5	Z	7	6	7	6	8	7	6	3	1	1	1	2	3	5	26	59	6	13	6	9.0	59
11-Apr	5	5	3	3	2	Z	6	6	6	6	9	4	2	2	2	2	2	2	1	2	1	1	1	2	3.3	9
12-Apr	Z	3	5	4	4	3	3	2	2	3	4	2	1	0	1	0	1	1	1	1	2	2	0	1	2.0	5
13-Apr	1	Z	2	1	0	1	0	1	1	1	0	0	1	1	1	1	1	1	1	1	6	6	6	5	1.7	6
14-Apr	5	11	Z	44	48	24	16	8	10	15	13	8	12	10	6	4	1	1	4	14	23	19	7	2	13.2	48
15-Apr	1	1	1	Z	2	3	5	10	8	6	4	3	2	2	1	1	1	1	1	1	3	3	1	1	2.6	10
16-Apr	1	3	2	2	Z	3	3	2	2	6	6	2	3	2	2	1	1	1	1	2	4	8	12	3	3.1	12
17-Apr	1	3	4	7	10	Z	10	8	4	3	1	1	1	1	1	1	1	1	22	17	6	5	4	6	5.0	22
18-Apr	Z	1	4	3	0	0	0	0	2	1	1	0	0	0	0	0	1	5	0	2	2	1	1	1	1.2	5
19-Apr	10	Z	6	14	16	15	7	28	7	2	2	3	2	2	2	1	1	1	2	2	5	2	5	40	7.5	40
20-Apr	43	9	Z	13	24	63	25	6	3	1	1	0	0	0	1	1	0	0	0	0	0	1	1	4	8.6	63
21-Apr	7	7	5	Z	5	0	0	0	1	0	0	0	0	0	0	0	2	2	1	1	2	1	2	2	1.8	7
22-Apr	2	3	2	3	Z	4	3	2	C	C	C	C	C	C	1	5	6	3	2	2	1	2	2	2	--	6
23-Apr	2	2	2	2	4	Z	1	2	1	2	2	3	14	6	3	4	2	3	2	3	4	2	1	3	2.9	14
24-Apr	Z	7	4	3	4	7	3	1	3	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1.6	7
25-Apr	1	Z	4	3	13	13	2	5	2	2	1	1	1	4	4	4	2	2	2	0	0	0	3	5	3.3	13
26-Apr	5	6	Z	42	21	13	5	1	1	1	1	1	1	0	0	1	2	2	3	7	8	23	1	6.4	42	
27-Apr	1	2	0	Z	4	6	5	1	2	1	1	2	1	2	1	1	2	1	1	1	2	2	11	12	2.7	12
28-Apr	9	4	2	1	Z	16	4	2	2	2	3	3	2	3	2	2	2	3	4	25	26	27	3	1	6.3	27
29-Apr	3	7	5	3	2	Z	8	12	6	1	1	3	1	0	1	1	1	0	2	4	3	5	11	10	3.9	12
30-Apr	Z	6	6	4	3	4	3	3	3	2	3	2	2	1	1	1	1	1	1	1	1	3	1	1	2.3	6
																		Diurnal Average								
																		Diurnal Maximum								
Z - zerospan																		C - Calibration								



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	654	95.61	95.61
21 - 40	20	2.92	98.54
41 - 80	10	1.46	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 684

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - April 2015**

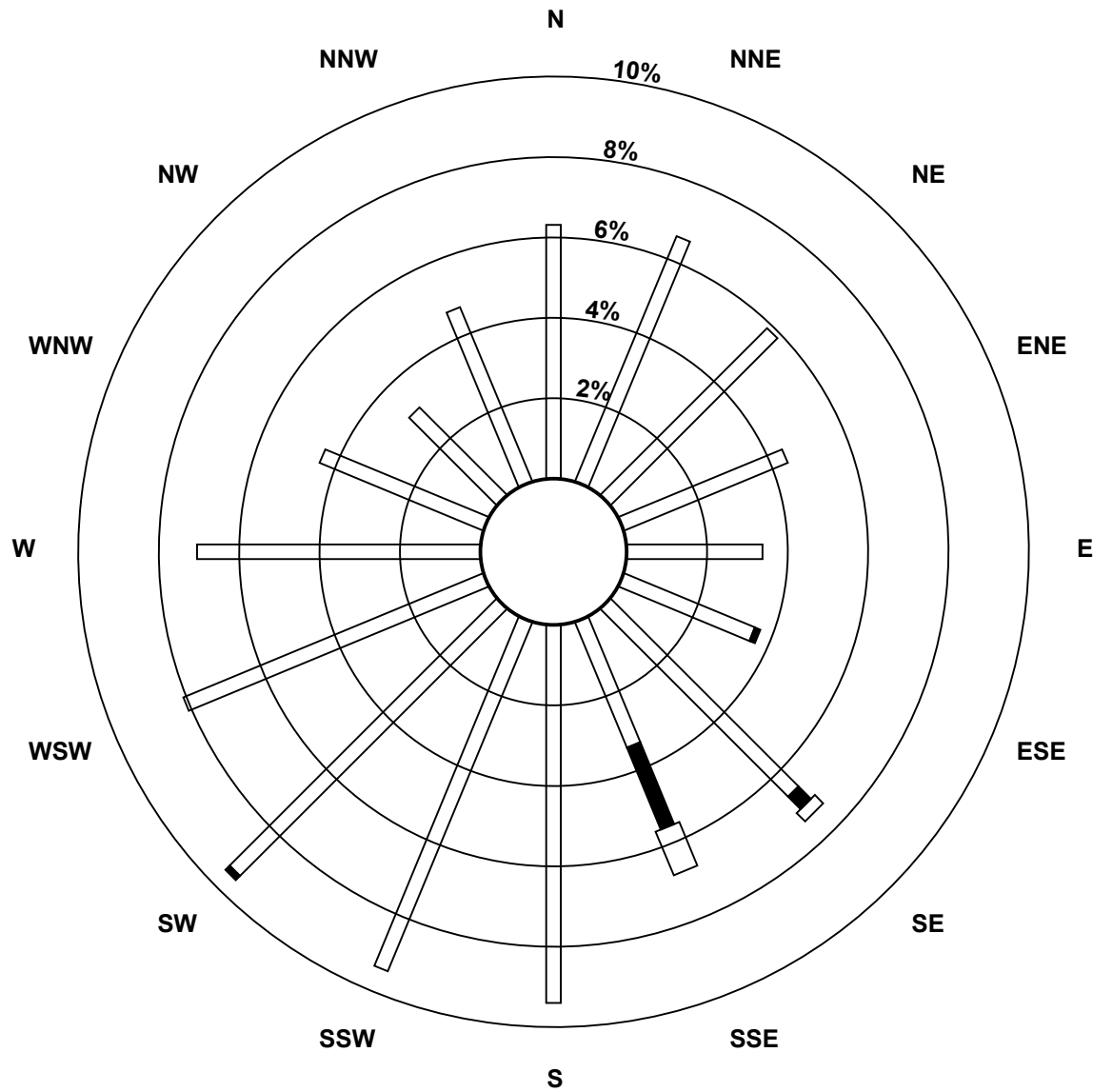
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	45	40	30	23	24	45	23	64	64	64	55	48	30	21	32	651
21 - 40	0	0	0	0	0	1	3	15	0	0	1	0	0	0	0	0	20
41 - 80	0	0	0	0	0	0	2	8	0	0	0	0	0	0	0	0	10
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	45	40	30	23	25	50	46	64	64	65	55	48	30	21	32	681

Total Number of Valid Hours: 681

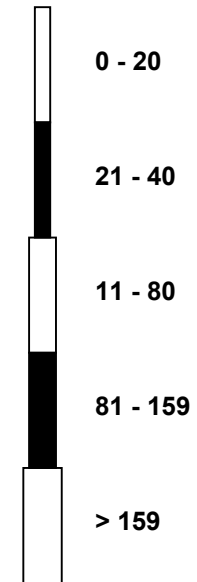
Total Number of Hours: 720

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

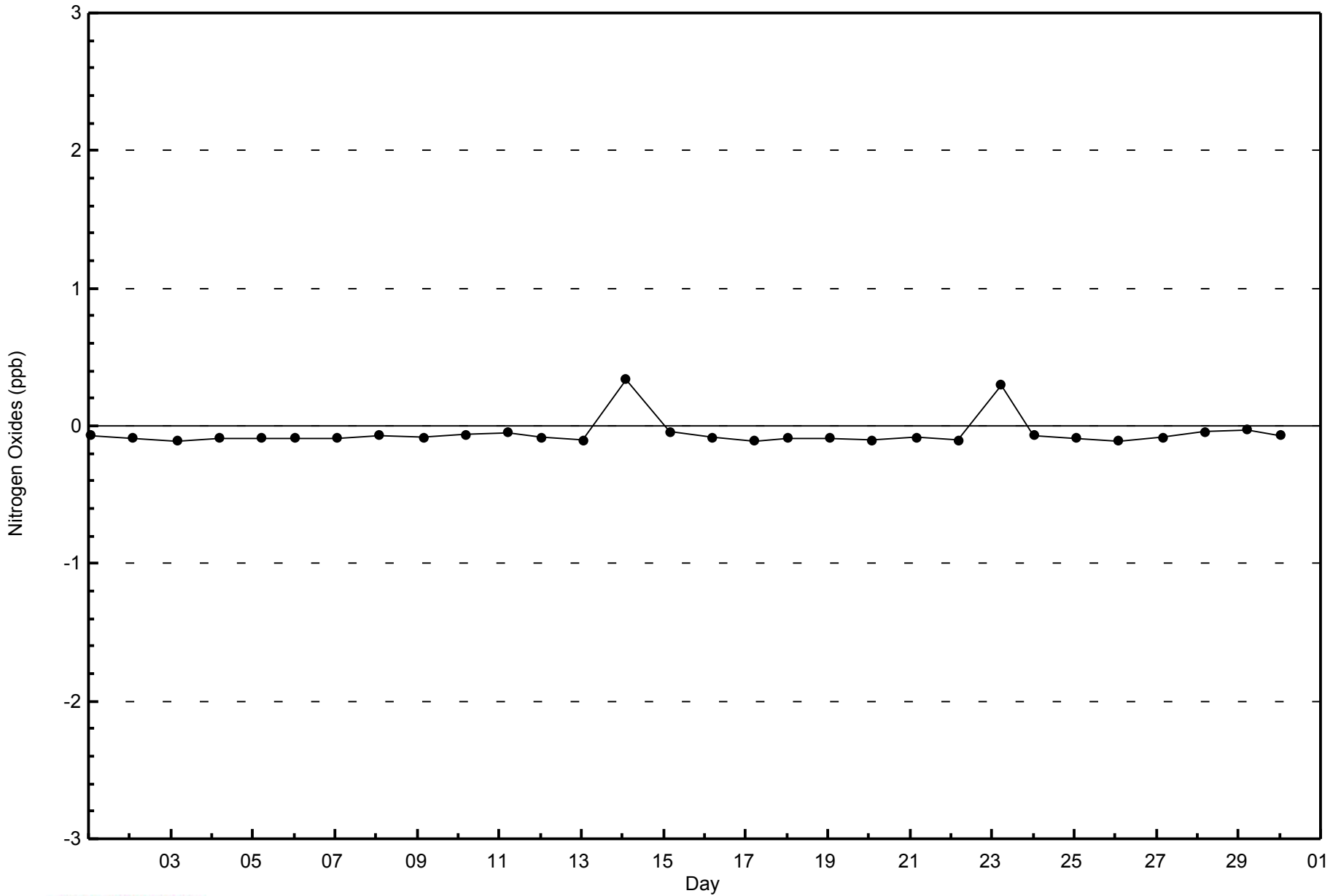
**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag (AMS 19)**



Classes (ppb)



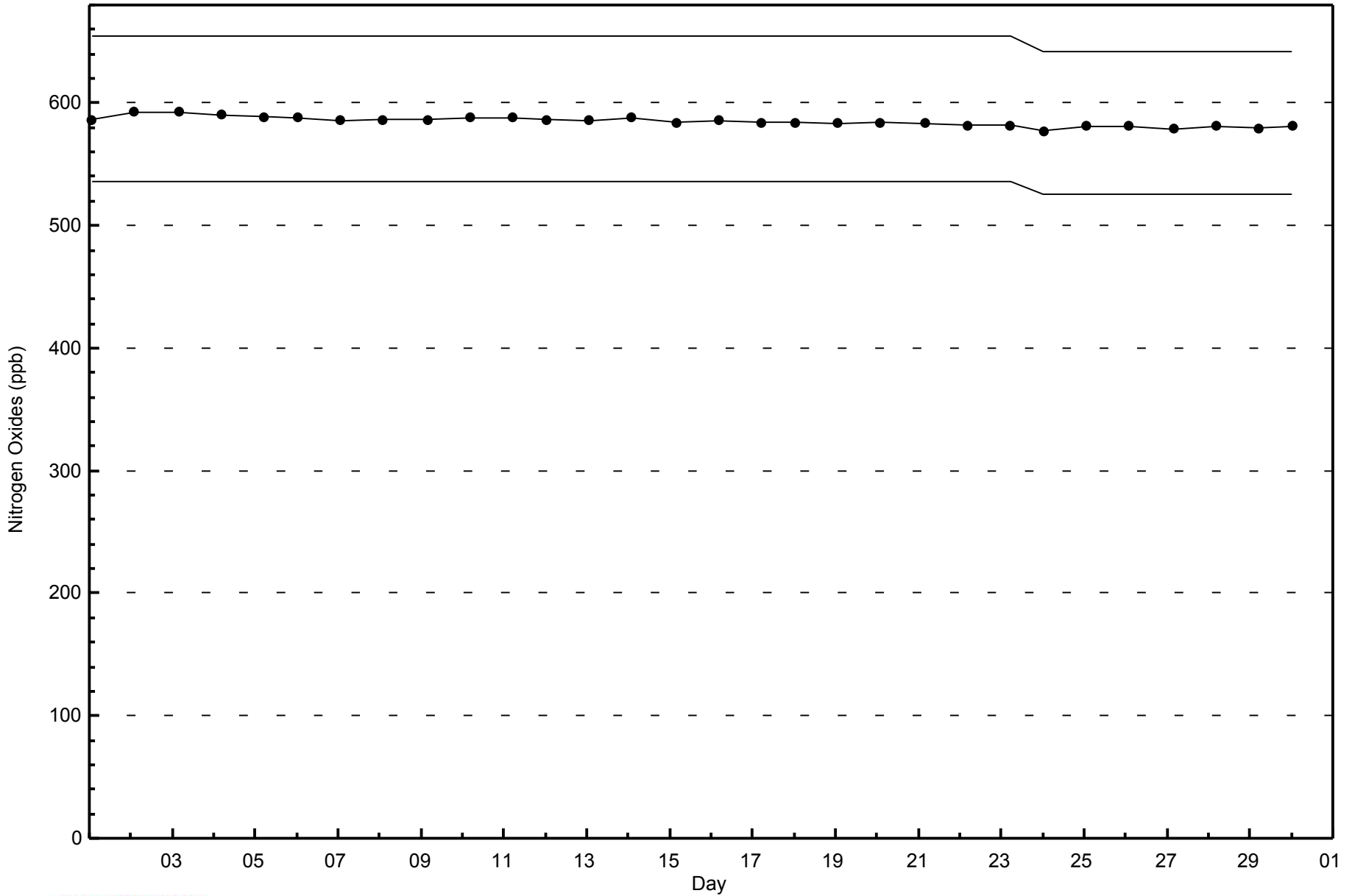
Total Number of Valid Hours: 681





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - April 2015





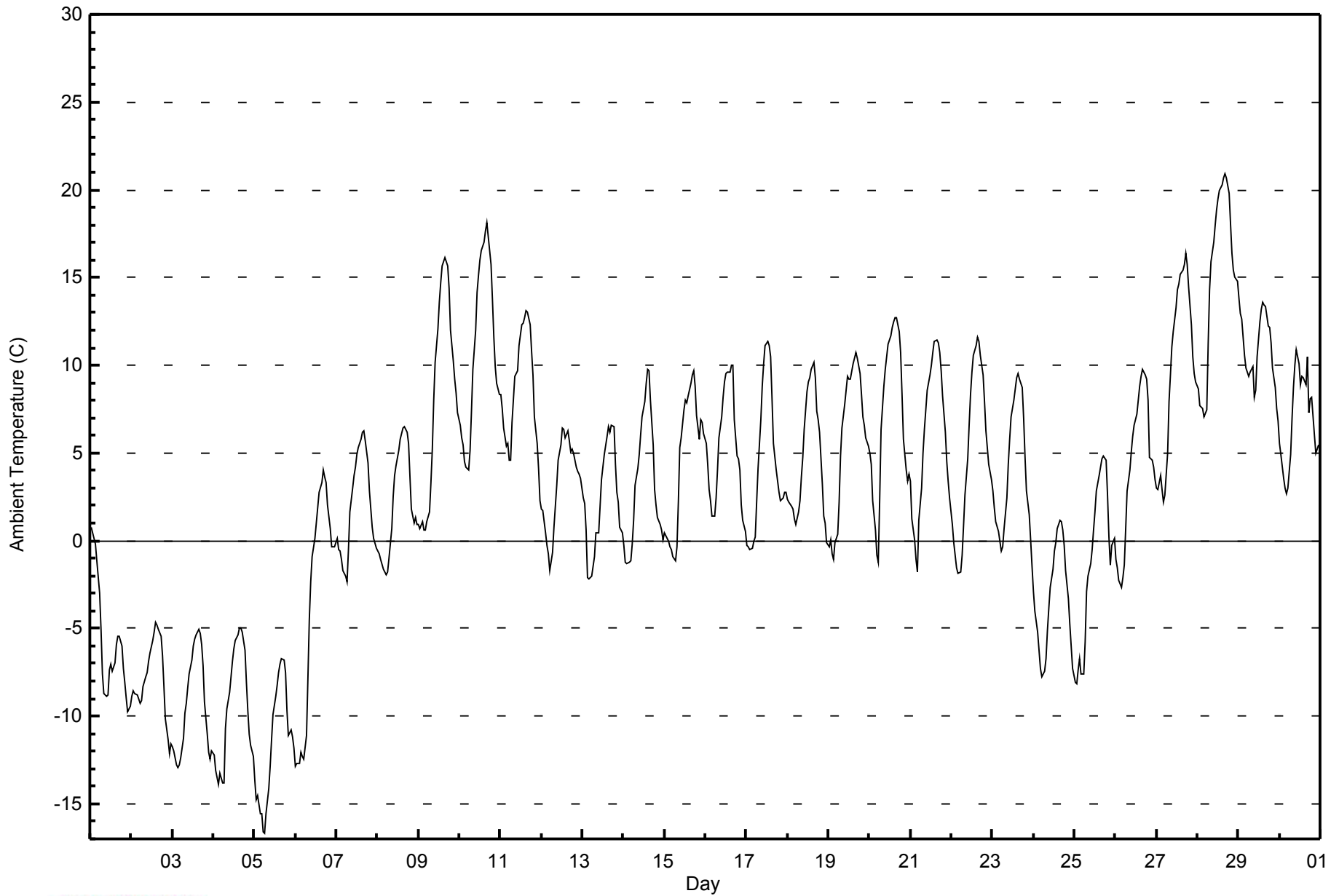


Maximum Value: 20.9 C on Apr 28 17:00																				Maximum Daily Average: 15.1 C on Apr 28					Hours in Service: 720																								
Minimum Value: -16.7 C on Apr 5 07:00																				Minimum Daily Average: -11.6 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 7.4 C at hour 16																				Minimum Diurnal Average: -2.0 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 2.75 C																				Percentiles: P <sub>1</sub> = -14.2 P <sub>10</sub> = -8.4 Q <sub>1</sub> = -1.2 Median = 3.4 Q <sub>3</sub> = 8.3 P <sub>90</sub> = 11.6 P <sub>99</sub> = 19.3					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-Apr	0.7	0.4	0.1	-0.2	-1.2	-2.9	-5.1	-7.6	-8.7	-8.9	-8.8	-7.4	-7.1	-7.4	-7.0	-5.9	-5.5	-5.5	-6.0	-7.3	-8.1	-9.0	-9.8	-9.5	-5.7	0.7																							
2-Apr	-8.9	-8.5	-8.7	-8.8	-9.0	-9.2	-9.1	-8.4	-7.8	-7.5	-6.9	-6.4	-5.7	-5.2	-4.7	-4.8	-5.0	-5.5	-6.5	-8.4	-10.2	-11.3	-12.1	-11.6	-7.9	-4.7																							
3-Apr	-11.7	-12.0	-12.8	-12.9	-12.7	-12.4	-11.3	-9.9	-9.2	-8.4	-7.6	-6.8	-6.0	-5.6	-5.4	-5.0	-5.3	-5.9	-7.1	-9.2	-11.0	-12.1	-12.5	-12.0	-9.4	-5.0																							
4-Apr	-12.2	-13.1	-13.5	-13.9	-13.3	-13.9	-13.8	-10.7	-9.6	-8.6	-7.8	-6.9	-6.2	-5.7	-5.4	-5.0	-4.9	-5.2	-6.2	-8.1	-9.7	-11.0	-11.6	-12.3	-9.5	-4.9																							
5-Apr	-13.6	-14.8	-14.6	-15.5	-15.6	-16.6	-16.7	-15.6	-14.1	-12.8	-11.3	-9.9	-8.9	-8.3	-7.5	-7.0	-6.7	-6.8	-7.5	-9.7	-11.1	-10.8	-11.2	-11.8	-11.6	-6.7																							
6-Apr	-12.9	-12.7	-12.7	-12.1	-12.3	-12.5	-11.1	-7.8	-4.5	-2.3	-0.9	0.1	1.0	1.9	2.8	3.3	4.0	3.6	3.3	2.0	0.7	-0.3	-0.4	-0.3	-3.3	4.0																							
7-Apr	0.1	-0.5	-0.6	-1.1	-1.7	-2.0	-2.3	-0.5	1.6	3.0	3.7	4.2	4.9	5.3	5.7	6.2	6.2	5.7	4.4	2.8	1.8	0.8	0.1	-0.4	2.0	6.2																							
8-Apr	-0.6	-0.7	-1.1	-1.6	-1.8	-2.0	-1.8	-1.0	0.7	2.5	3.8	4.3	5.2	5.8	6.1	6.5	6.5	6.2	5.5	3.6	1.8	1.0	1.3	0.9	2.1	6.5																							
9-Apr	0.9	0.6	1.1	0.6	0.6	1.1	1.6	3.3	5.2	8.1	10.2	12.1	13.6	14.7	15.7	16.1	15.9	15.6	14.4	12.0	10.2	9.2	8.4	7.3	8.3	16.1																							
10-Apr	6.6	5.8	5.4	4.5	4.2	4.0	5.2	7.4	9.8	12.0	14.1	15.1	16.0	16.5	17.0	17.6	18.1	17.4	15.7	13.7	11.6	9.9	9.0	8.3	11.0	18.1																							
11-Apr	8.3	7.5	6.4	5.4	5.5	4.6	4.6	6.7	9.3	9.6	9.7	11.1	12.3	12.4	12.7	13.1	13.0	12.3	10.8	9.4	7.1	5.6	4.1	2.3	8.5	13.1																							
12-Apr	1.8	1.8	0.5	-0.2	-0.8	-1.7	-0.7	0.7	1.9	3.2	4.6	5.5	6.4	6.3	5.9	6.3	5.7	5.0	5.2	5.0	4.2	3.9	3.8	3.5	3.2	6.4																							
13-Apr	2.4	2.1	0.6	-2.1	-2.2	-2.0	-1.5	-0.9	0.4	0.5	2.0	3.4	4.2	4.9	6.0	6.5	6.2	6.6	6.5	4.4	2.8	2.2	0.8	0.5	2.3	6.6																							
14-Apr	-0.2	-1.2	-1.3	-1.2	-1.2	-0.2	1.1	3.2	4.1	4.9	6.0	7.0	7.9	9.0	9.8	9.7	8.0	5.5	2.9	2.0	1.3	0.9	0.6	0.1	3.3	9.8																							
15-Apr	0.5	0.3	0.0	-0.3	-0.5	-0.9	-1.1	-0.4	2.2	5.3	5.9	7.5	8.0	7.9	8.3	9.0	9.4	9.7	8.8	7.1	5.8	6.9	6.8	6.1	4.7	9.7																							
16-Apr	5.6	4.3	2.9	2.3	1.4	1.4	2.5	4.0	5.9	7.0	8.1	9.1	9.6	9.6	9.6	10.0	10.0	6.9	4.9	4.6	4.0	2.0	1.2	0.5	5.3	10.0																							
17-Apr	-0.2	-0.3	-0.5	-0.5	-0.1	0.2	2.2	4.1	6.9	8.8	10.1	11.1	11.4	11.2	10.5	8.1	5.6	4.0	3.4	2.8	2.3	2.4	2.7	2.8	4.5	11.4																							
18-Apr	2.4	2.2	2.0	1.8	1.3	0.9	1.6	2.3	3.6	4.7	6.3	8.5	9.1	9.3	9.8	10.1	9.3	7.3	6.9	6.2	3.2	1.4	1.0	-0.1	4.6	10.1																							
19-Apr	-0.4	0.1	-0.8	-1.1	-0.1	0.4	2.2	4.8	6.4	7.8	8.5	9.4	9.2	9.2	10.1	10.4	10.7	10.4	9.5	8.4	7.1	6.6	5.9	5.4	5.8	10.7																							
20-Apr	5.0	4.4	2.3	0.6	-0.8	-1.2	2.3	6.3	8.8	9.8	10.5	11.2	11.7	12.1	12.5	12.7	12.7	11.9	10.7	8.3	5.8	4.1	3.4	3.8	7.0	12.7																							
21-Apr	3.4	1.3	0.0	-1.1	-1.8	1.2	3.0	5.0	6.4	7.4	8.5	9.5	10.0	10.7	11.4	11.4	11.3	10.7	9.7	8.2	6.2	4.5	3.4	2.4	5.9	11.4																							
22-Apr	0.9	-0.1	-0.9	-1.5	-1.9	-1.8	-0.8	0.8	2.6	4.7	6.6	8.3	9.6	10.6	11.2	11.6	11.4	10.6	9.4	7.9	6.3	5.3	4.4	3.5	4.9	11.6																							
23-Apr	2.8	1.9	1.1	0.5	-0.1	-0.6	-0.3	0.6	2.4	4.3	5.8	7.0	8.0	8.6	9.3	9.5	9.2	8.7	6.9	4.8	2.9	1.5	0.0	-1.4	3.9	9.5																							
24-Apr	-2.9	-4.0	-5.2	-6.2	-7.3	-7.8	-7.5	-6.7	-5.1	-3.9	-2.7	-1.6	-0.6	-0.1	0.7	1.2	1.1	0.6	-0.3	-1.7	-3.3	-4.7	-6.0	-7.3	-3.4	1.2																							
25-Apr	-8.1	-8.1	-7.4	-6.7	-7.6	-7.6	-5.8	-2.9	-2.0	-1.3	-0.5	0.6	1.6	2.8	3.7	4.2	4.7	4.8	4.6	2.6	0.2	-1.3	-0.3	0.1	-1.2	4.8																							
26-Apr	-1.1	-1.5	-2.2	-2.6	-2.1	-1.4	0.6	2.9	4.1	5.1	5.9	6.5	7.2	8.0	8.8	9.4	9.8	9.5	9.2	8.0	4.7	4.6	4.2	3.5	4.2	9.8																							
27-Apr	3.0	2.9	3.7	2.9	2.2	2.6	5.0	8.0	9.5	11.0	11.9	13.3	14.3	14.6	15.2	15.4	15.7	16.3	15.7	14.5	12.3	10.5	9.5	9.0	10.0	16.3																							
28-Apr	8.6	7.7	7.6	7.5	7.0	7.5	11.2	14.3	15.9	17.0	18.0	18.9	19.5	20.0	20.3	20.7	20.9	20.7	19.8	18.1	16.4	15.4	15.1	14.8	15.1	20.9																							
29-Apr	13.8	12.9	12.6	10.6	9.9	9.6	9.3	9.6	9.9	8.2	8.6	10.5	12.5	13.2	13.6	13.4	13.4	12.2	12.2	11.3	9.9	8.8	7.5	6.8	10.8	13.8																							
30-Apr	5.6	4.9	3.5	3.0	2.7	3.0	4.9	7.0	8.7	10.0	10.9	10.1	8.9	9.3	9.3	8.9	10.5	7.3	8.1	8.1	6.1	5.0	5.2	5.4	6.9	10.9																							
																								0.0	-0.5	-1.1	-1.7	-2.0	-2.0	-1.1	0.6	2.2	3.4	4.4	5.5	6.3	6.7	7.2	7.4	7.4	6.7	5.8	4.4	2.7	1.7	1.2	0.7	Diurnal Average	
																								13.8	12.9	12.6	10.6	9.9	9.6	11.2	14.3	15.9	17.0	18.0	18.9	19.5	20.0	20.3	20.7	20.9	20.7	19.8	18.1	16.4	15.4	15.1	14.8	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Firebag - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**Firebag - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	231	32.08	32.08
0 - 10	379	52.64	84.72
10 - 20	106	14.72	99.44
> 20	4	0.56	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

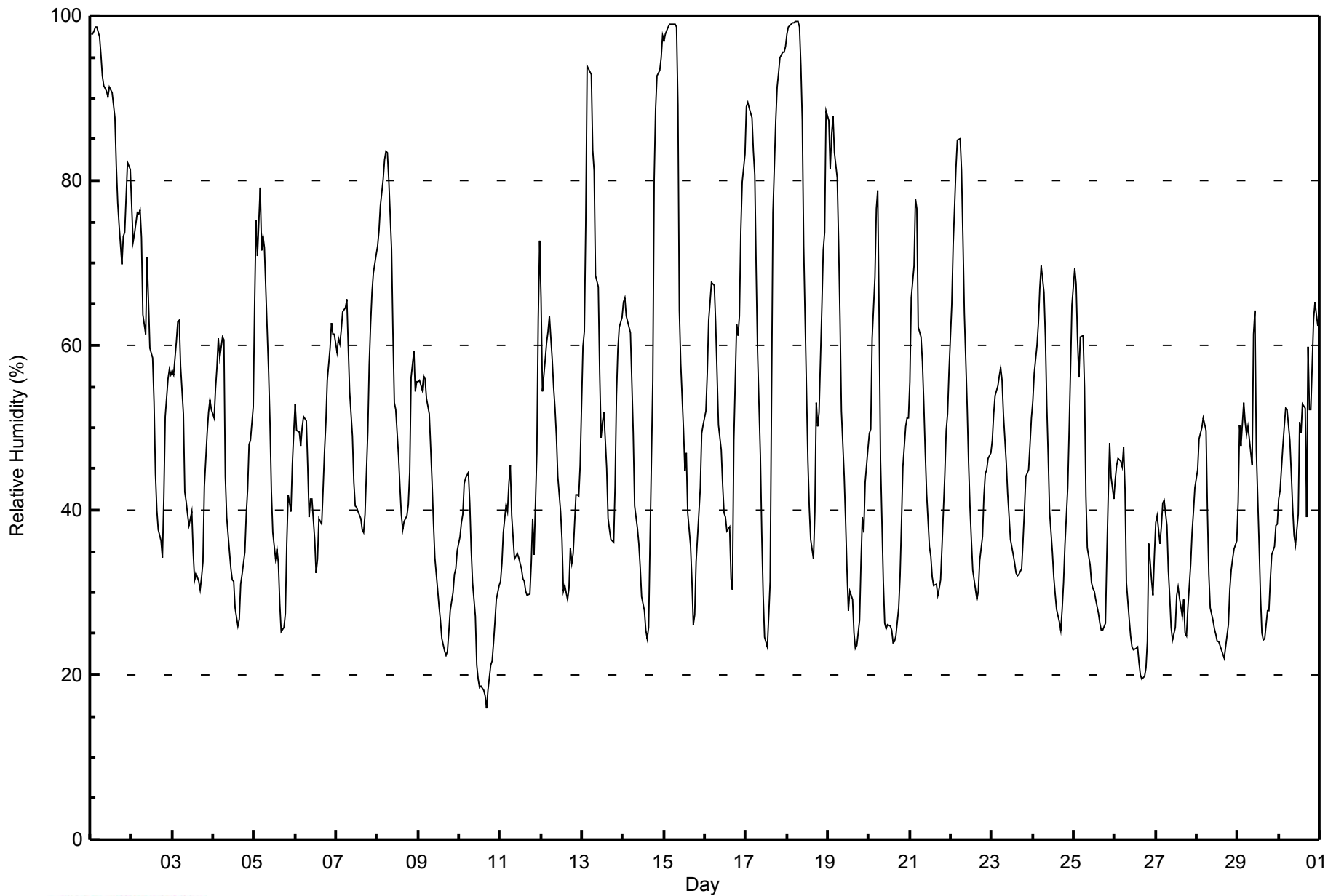


Maximum Value: 99 % on Apr 18 07:00														Maximum Daily Average: 87.6 % on Apr 1														Hours in Service: 720	
Minimum Value: 16 % on Apr 10 17:00														Minimum Daily Average: 28.4 % on Apr 10														Hours of Data: 720	
Maximum Diurnal Average: 67.2 % at hour 5														Minimum Diurnal Average: 32.7 % at hour 16														Hours of Missing Data: 0	
Monthly Average: 49.5 %														Percentiles: P <sub>1</sub> = 19 P <sub>10</sub> = 27 Q <sub>1</sub> = 34 Median = 45 Q <sub>3</sub> = 61 P <sub>90</sub> = 81 P <sub>99</sub> = 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-Apr	98	98	98	99	99	97	95	93	91	91	90	91	91	88	82	77	75	70	73	74	78	82	81	87.6	99				
2-Apr	77	72	74	76	76	76	73	64	61	71	65	60	58	53	44	40	38	36	34	42	51	56	57	57	58.8	77			
3-Apr	57	56	61	63	63	58	52	42	41	40	38	40	35	31	32	31	30	32	34	43	49	52	53	52	45.2	63			
4-Apr	51	55	57	61	58	61	61	44	39	35	33	32	31	28	26	27	31	32	35	39	43	48	49	53	42.8	61			
5-Apr	65	75	71	79	72	73	72	67	57	51	42	37	34	35	33	29	25	26	27	36	42	40	46	50	49.3	79			
6-Apr	53	50	49	48	50	51	51	46	39	41	41	37	32	34	39	38	43	47	51	56	60	63	61	61	47.5	63			
7-Apr	59	61	60	62	64	65	66	60	54	49	43	41	40	40	39	38	37	40	49	58	63	66	69	71	53.9	71			
8-Apr	72	74	77	80	82	84	83	80	72	62	53	52	47	43	40	38	39	39	41	45	56	59	54	56	59.4	84			
9-Apr	56	56	55	56	56	53	52	48	43	39	34	30	28	27	24	23	22	23	25	28	30	32	33	35	37.9	56			
10-Apr	37	39	39	43	44	45	41	35	31	27	21	19	18	19	18	17	16	18	21	22	24	26	29	31	28.4	45			
11-Apr	31	34	37	41	40	43	45	39	34	34	35	34	33	32	31	30	30	30	34	39	35	47	63	73	38.5	73			
12-Apr	66	54	58	60	62	64	58	55	52	49	44	40	36	30	31	29	30	35	34	35	42	42	42	45	45.6	66			
13-Apr	60	62	75	94	94	93	84	81	68	67	57	49	51	52	45	39	38	36	36	43	54	59	62	63	60.9	94			
14-Apr	65	66	64	62	62	56	49	41	38	36	33	30	28	25	24	26	36	56	80	89	93	93	95	98	55.9	98			
15-Apr	97	98	99	99	99	99	99	99	89	64	58	50	45	47	40	36	32	26	27	34	40	43	49	50	63.2	99			
16-Apr	52	57	63	65	68	67	63	57	50	47	43	40	39	38	38	32	30	48	63	61	64	74	80	83	55.0	83			
17-Apr	89	89	89	88	84	81	69	59	47	37	30	25	23	27	31	54	76	87	91	93	95	96	96	96	68.8	96			
18-Apr	98	99	99	99	99	99	99	99	94	87	72	55	46	40	36	34	40	53	50	52	64	71	74	89	72.8	99			
19-Apr	87	81	86	88	83	80	72	63	52	44	39	33	28	30	29	25	23	24	27	34	39	37	43	48	49.8	88			
20-Apr	49	50	61	68	77	79	63	46	31	26	26	26	26	25	24	24	25	28	32	38	45	50	51	51	42.6	79			
21-Apr	56	66	70	78	77	62	61	58	53	47	42	36	34	32	31	31	30	30	32	36	44	50	52	57	48.4	78			
22-Apr	65	72	77	82	85	85	81	73	64	53	46	41	36	33	30	29	30	34	37	42	44	45	46	47	53.2	85			
23-Apr	48	52	54	55	56	57	56	51	46	42	39	36	35	33	32	32	32	33	36	40	44	45	48	51	44.0	57			
24-Apr	53	57	60	63	67	70	66	61	53	47	40	35	32	30	28	27	25	28	31	36	43	50	57	65	46.7	70			
25-Apr	69	67	61	56	61	61	55	42	35	33	31	30	30	29	27	26	25	25	26	35	42	48	44	41	41.8	69			
26-Apr	44	45	46	46	45	48	43	31	27	25	23	23	23	23	22	20	19	20	21	24	36	32	30	34	31.2	48			
27-Apr	38	39	36	38	41	41	38	33	30	26	24	26	30	31	29	27	29	25	25	28	33	37	40	43	32.8	43			
28-Apr	45	49	49	50	51	50	40	32	28	27	26	25	24	24	23	23	22	23	26	30	33	34	35	36	33.6	51			
29-Apr	41	50	48	53	51	49	50	49	45	61	64	47	36	29	25	24	24	28	28	31	35	36	38	38	40.9	64			
30-Apr	41	42	48	50	52	52	49	45	40	37	36	40	51	49	53	52	39	60	52	52	63	65	64	62	49.8	65			
	60.7	62.1	64.0	66.7	67.2	66.6	62.9	56.3	50.2	46.5	42.3	38.6	36.7	35.4	33.8	32.7	33.2	36.6	39.2	43.7	49.3	52.5	54.7	57.3	Diurnal Average				
	98	99	99	99	99	99	99	99	94	91	90	91	91	91	88	82	77	87	91	93	95	96	96	98	Diurnal Maximum				



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Firebag - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**Firebag - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	10	1.39	1.39
20 - 40	280	38.89	40.28
40 - 60	233	32.36	72.64
60 - 80	119	16.53	89.17
80 - 100	78	10.83	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 37 km/h on Apr 13 01:00	Maximum Daily Speed Average: 24.8 km/h on Apr 23	Hours in Service: 720
Minimum Speed Value: 1 km/h on Apr 26 20:00	Minimum Daily Speed Average: 5.0 km/h on Apr 8	Hours of Data: 717
Maximum Diurnal Speed Average: 6.8 km/h at hour 24	Minimum Diurnal Speed Average: 0.3 km/h at hour 19	Hours of Missing Data: 3
Monthly Average Velocity: 3.6 km/h 205.1 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 7 Q <sub>1</sub> = 11 Median = 15 Q <sub>3</sub> = 20 P <sub>90</sub> = 25 P <sub>99</sub> = 29	Percent Operational Time: 99.6

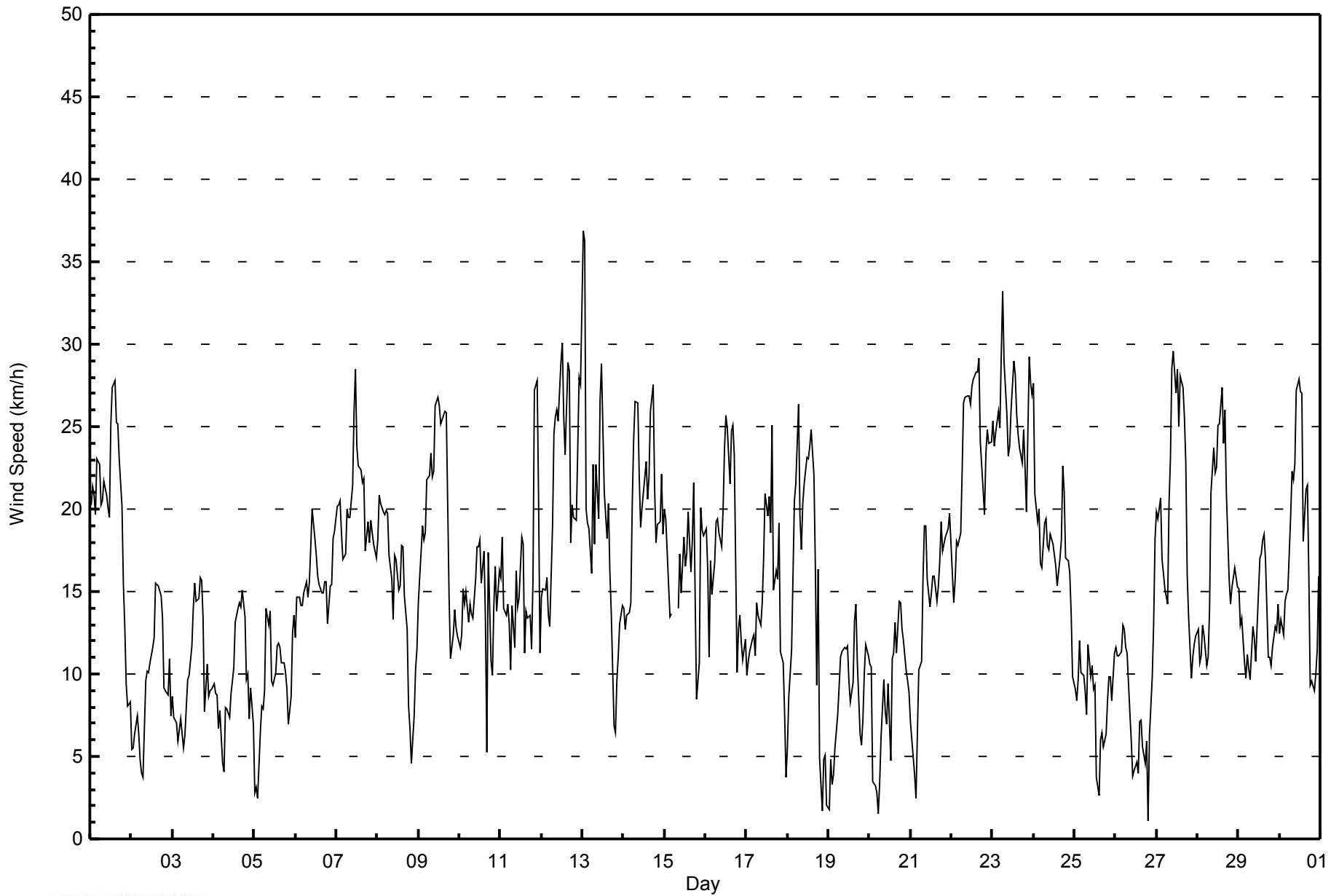
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	NE20	NE21	NE21	NNE20	NNE23	NNE23	NNE20	NNE20	NNE22	NNE21	NNE20	NNE19	N25	N27	N28	N25	NNE25	N23	N20	N15	N13	NNE9	NE8	NE8	NNE19.4	N28
2-Apr	NE5	N6	NNW6	N7	NNE6	NNE5	N4	NW4	NNW10	NNW10	N10	N11	NNW12	NNW12	NNW15	NNE15	N15	NNE15	NNE13	NNE9	NNE9	NE9	ENE11	E7	N8.5	NNW15
3-Apr	E9	SE7	SE7	SE6	SE7	SE7	SE6	ESE6	ENE8	NE10	NNE10	N12	N14	N16	N14	N15	NNE16	NNE16	NNE13	NE8	NE11	ENE9	E9	E9	NE6.9	NNE16
4-Apr	ESE9	SE9	SE9	ESE7	SE8	SE5	ENE4	ENE8	NE8	NNE7	N9	NNW10	N10	NNW13	NNW14	N14	NNW14	N15	NNE13	NNE10	NNE10	NNE7	N9	N7	NNE6.3	N15
5-Apr	NW3	NW3	WNW2	WNW7	NW8	NNW8	NNE9	NNE4	NNE13	N14	N10	N9	NNW10	NNW12	N12	N12	NNE11	NNE11	NNE10	NE9	ENE7	E9	SE12	SE14	NNE6.5	NNE14
6-Apr	SSE12	SSE15	SSE15	SSE14	SSE14	SSE15	S16	S15	SSW15	SW18	SW20	SSW18	SSW17	SSW16	SSW15	SSW15	SW15	SSW16	S16	SSE13	SSE15	S15	S18	S19	S14.6	SW20
7-Apr	SSW20	SSW20	SSW20	SSW19	SSW17	SSW17	S20	SSW20	SSW19	SW21	SSW26	SSW28	SSW24	SSW23	SSW22	SSW22	SSW22	SSW17	SSW19	S18	S19	S19	SSW18	SSW17	SSW20.2	SSW28
8-Apr	SSW18	SSW21	SSW20	SW20	SW20	SW20	SW20	SW17	WSW16	WNW13	NNW17	NNW17	NNW15	NNW15	N18	NNW18	N15	N13	NNE8	NE7	SE5	SSE7	SSE10	SSE12	WSW5.0	SSW21
9-Apr	S14	S16	S19	S18	S19	S22	S22	S23	SSW22	SSW22	SSW26	SSW27	SW26	SW25	SW25	WSW26	WSW26	WSW20	WSW15	SW11	SW12	SW14	SW13	SW12	SSW18.2	SSW27
10-Apr	SW12	SW12	SW15	SSW14	SSW15	SSW13	SW14	SW14	SW13	SW16	WSW18	WSW18	WSW18	SW15	SW17	SW13	SSW5	S17	S11	SSE10	SSE14	S17	S14	SSE16	SSW12.6	WSW18
11-Apr	SSE16	S18	S14	SSW14	SSW14	SSW13	SSW10	SW14	SW12	WSW16	W14	WNW15	WNW18	WNW18	WNW11	NW14	NW13	WNW14	WNW12	W16	W27	W28	WNW21	W11	WSW11.4	W28
12-Apr	W15	W15	WSW15	WSW16	WSW14	SW13	WSW19	WSW25	WSW26	WSW26	WSW25	WSW29	WSW30	W26	W23	W29	W28	W18	W20	WNW19	WNW19	W24	W28	WNW28	W21.3	WSW30
13-Apr	WNW37	W36	NW20	NNW19	NW19	WNW16	NW23	WNW18	WNW23	NW19	NW27	NW29	NNW25	NNW21	NW18	NNW20	NNW16	NNW14	NNW7	NE6	E10	ESE11	SE13	SE14	NW14.2	WNW37
14-Apr	SE14	SE13	SSE14	SSE14	SSE14	SSE20	SSE24	SSE27	SSE26	SSE22	SSE19	SE20	SSE22	SSE23	S21	S22	S26	SSW28	S21	SSE18	SSE19	SSE19	SSE22	S19	SSE19.8	SSW28
15-Apr	S20	SSW19	SSW15	SW13	SW14	AF	AF	AF	WSW14	WSW17	W15	W18	W17	W17	W20	WNW16	W18	WSW22	WSW15	SW8	SSW11	WSW20	W19	W18	WSW14.5	WSW22
16-Apr	W19	W16	W11	WSW17	WSW15	WSW17	WSW19	WSW19	WSW19	SW18	SW20	SW24	WSW26	WSW25	WSW21	W25	W25	NW23	WNW10	WNW13	WNW14	W12	W11	W12	WSW16.6	WSW26
17-Apr	WSW10	SW11	SW11	SW12	SW12	SSW11	SW14	SW14	SW13	SW14	SW17	SW21	SW20	SSW21	SSW19	SW25	SW15	S16	SSE16	SSE19	SE11	SE11	SE8	SSE4	SSW12.4	SW25
18-Apr	NW6	NW9	NW11	NNW16	N20	N22	N26	N20	NNW18	NNW20	NNW22	N23	N23	N24	N25	N22	NE16	ESE9	NNW16	NE5	NW2	WNW5	NNW5	WNW2	N13.8	N26
19-Apr	SSW2	SW5	SSW3	S4	SSW5	SSW8	SSW9	SW11	WSW11	WSW12	WNW12	W10	WSW8	WSW9	W13	W14	W11	W6	SW6	S7	S10	S12	SSE11	WSW6.6	W14	
20-Apr	SSE11	SE10	SE3	SSE3	SE3	SSE1	ESE3	NE6	NNE10	NE8	NNE7	N9	N5	NNW11	NW11	NW13	NNW11	N14	NNE14	NE13	NE12	NE10	ENE10	ENE9	NNE5.1	N14
21-Apr	E7	E6	ESE4	E2	NE6	NE10	NE11	NE16	NE19	ENE19	NE16	NE14	NNE15	NNE16	NE16	ENE14	ENE15	E17	ESE19	E17	ESE18	ESE19	ESE19	ESE20	ENE11.6	ESE20
22-Apr	SE16	SE14	SE16	SE18	SE18	SE19	SE22	SE26	SE27	SE27	SE27	SE26	SE27	SE28	SE28	SE28	SE29	SE24	SE21	SE20	SE23	SE25	SE24	SE24	SE23.2	SE29
23-Apr	SE25	SE24	SE25	SE26	SE25	ESE29	ESE33	SE29	SE26	ESE23	E24	ESE26	ESE29	E28	ESE26	ESE25	E24	E23	ENE25	ENE23	E20	E29	E28	E27	ESE24.8	ESE33
24-Apr	E28	E21	ENE19	ENE20	E17	E16	ENE19	ENE19	ENE18	ENE18	NE18	NE17	NE17	NE15	NE17	NE18	NE23	NE21	NNE17	NNE17	NNE16	NNE14	NE10	ENE16.8	E28	
25-Apr	NE9	ENE8	E10	ESE12	ESE10	ESE10	ESE9	E8	ENE12	ENE10	ENE10	ENE9	ENE9	SE4	ENE3	ESE6	SSE6	ENE6	ENE6	NE8	NNE10	NE10	E8	ESE11	E7.3	ESE12
26-Apr	SE12	SE11	SE11	SSE11	SSE13	SSE13	SSE12	S11	S8	S6	S4	SSE4	SE5	NE4	SSW7	W7	W6	WNW5	NW6	NW1	ESE6	SE10	SSE13	S18	SSE6.0	S18
27-Apr	S20	S19	S21	S17	S16	S15	S14	S20	S23	S29	S30	SSW27	SW29	SW25	SW28	WSW27	SW26	WSW23	WSW16	WSW13	SW10	SSW11	SW12	SSW12	SSW17.8	S30
28-Apr	SSW13	SSW11	SSW11	SSW13	SSW12	S10	SSW11	S14	S21	S24	S22	S23	S25	S25	S27	S24	S26	S21	S16	SSE14	SSE15	SSE16	S16	S15	S17.3	S27
29-Apr	WSW15	WNW13	W13	W11	W10	WNW11	WNW10	W10	W13	WSW12	WSW11	W13	W17	W17	W18	WNW18	WNW17	WSW11	SW11	SSW11	SW12	SW13	SW13	SW14	W11.8	WNW18
30-Apr	SW12	SW13	SW12	SW14	SW15	SW15	WSW20	WSW22	WSW22	WSW23	WSW27	WSW28	WSW27	WSW27	W18	WSW21	W21	WSW16	SW9	SW10	SSW9	S10	SSW11	SSW16	WSW16.4	WSW28
S6.0 S6.2 S5.9 S5.5 S5.2 S5.4 S5.2 SSW5.5 SSW4.8 SW5.1 WSW4.5 WSW4.8 WSW5.2 W5.0 W4.9 W5.5 W4.3 W2.0 WNW0.3 SE1.9 SE3.2 SSE4.8 SSE5.6 S6.8																								Diurnal Average		
WNW37 W36 SE25 SE26 SE25 ESE29 ESE33 SE29 SE27 S29 S30 WSW29 WSW30 E28 SE28 W29 SE29 SSW28 ENE25 ENE23 W27 E29 W28 WNW28																								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 - April 2015**







**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Firebag - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	38	5.30	5.30
6 - 11	175	24.41	29.71
12 - 19	304	42.40	72.11
20 - 28	186	25.94	98.05
29 - 38	14	1.95	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 717

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Firebag - April 2015**

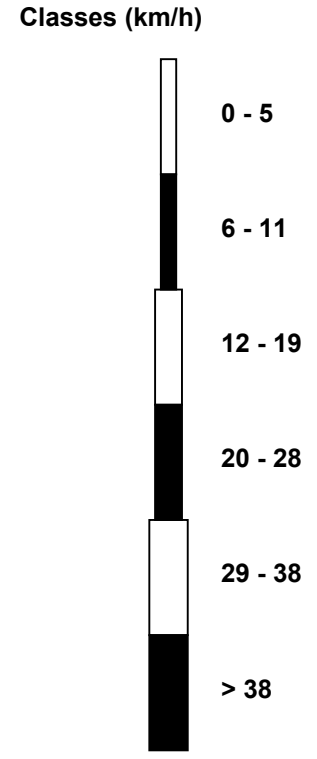
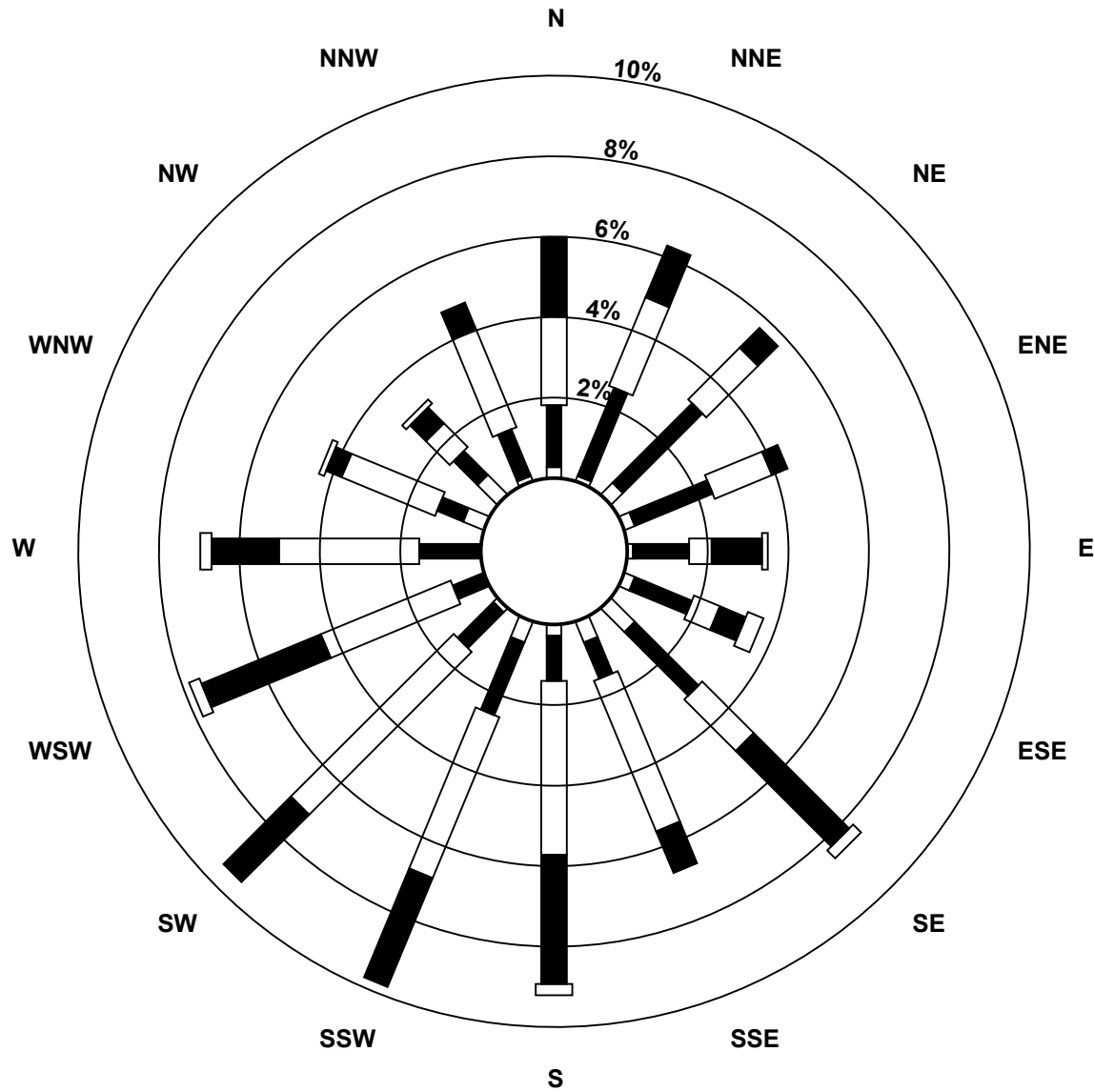
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	2	1	3	2	1	2	6	4	2	4	1	0	0	4	5	1	38
6 - 11	11	17	20	15	10	11	16	7	8	14	9	6	11	5	6	9	175
12 - 19	16	17	13	11	4	5	13	29	31	31	41	25	25	18	6	19	304
20 - 28	14	10	5	3	9	5	24	8	23	21	17	23	12	3	4	5	186
29 - 38	0	0	0	0	1	3	2	0	2	0	0	2	2	1	1	0	14
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	43	45	41	31	25	26	61	48	66	70	68	56	50	31	22	34	717

Total Number of Valid Hours: 717

Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
Firebag (AMS 19)**



**Total Number of Valid Hours: 717**



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Speed (WS) - km/h

Firebag - April 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 10 km/h on Apr 11 23:00			Hours of Data:	717
Minimum Value: 0 km/h on Apr 5 03:00			Hours of Missing Data:	3
			Hours of Calibration:	0
			Percent Operational Time:	99.6
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 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-Apr	3	3	3	5	5	6	7	7	5	5	5	4	4	5	4	5	4	4	4	3	2	2	1	1	7	
2-Apr	1	1	1	1	1	1	1	1	2	2	3	3	4	4	5	4	3	3	2	1	1	1	2	1	5	
3-Apr	1	1	2	1	1	1	1	2	3	3	4	4	4	4	5	4	4	3	2	2	2	2	2	2	5	
4-Apr	2	2	1	1	1	3	2	2	2	3	3	4	4	4	4	4	4	3	3	2	2	1	2	2	4	
5-Apr	1	1	0	2	1	2	3	2	3	3	3	3	4	4	4	3	3	2	2	1	1	2	2	2	4	
6-Apr	2	2	2	2	2	2	2	2	3	3	3	4	4	4	4	4	3	3	2	2	2	2	2	3	4	
7-Apr	4	2	2	3	2	3	2	3	3	4	5	5	5	4	5	4	4	3	4	2	2	2	2	2	5	
8-Apr	3	3	3	3	3	2	2	2	2	3	4	4	4	4	4	4	4	3	2	1	1	1	1	1	4	
9-Apr	3	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	4	4	3	1	1	1	1	1	5	
10-Apr	1	2	1	2	1	1	1	2	2	3	4	3	4	4	4	4	5	3	2	1	2	1	2	1	5	
11-Apr	2	2	2	1	1	1	1	3	3	3	3	3	4	4	4	5	4	5	4	6	6	6	10	2	10	
12-Apr	3	3	2	2	3	2	3	4	4	4	5	6	6	6	6	7	7	5	6	5	5	6	6	7	7	
13-Apr	9	8	7	4	5	5	5	5	5	6	7	7	6	5	5	5	3	3	3	2	2	2	2	2	9	
14-Apr	2	2	2	2	2	3	5	5	5	4	4	4	4	4	4	4	5	4	4	3	3	4	4	3	5	
15-Apr	3	3	3	2	2	AF	AF	AF	3	3	3	5	5	5	5	5	6	5	4	1	1	8	3	4	8	
16-Apr	5	4	3	3	2	2	3	4	3	3	4	5	5	5	4	6	6	7	2	4	4	1	1	2	7	
17-Apr	2	1	1	1	2	2	2	2	2	2	5	4	5	4	5	5	3	3	3	4	2	3	2	2	5	
18-Apr	2	2	2	3	4	4	5	6	4	5	4	5	5	6	5	5	5	4	8	1	2	1	1	1	8	
19-Apr	1	1	1	1	0	1	1	2	2	3	3	5	4	6	5	4	6	3	1	1	0	3	2	2	6	
20-Apr	1	3	1	1	1	2	1	2	2	2	4	4	4	5	5	4	3	3	2	1	2	2	1	2	5	
21-Apr	1	1	3	1	2	1	1	4	3	4	4	5	5	5	5	5	4	3	3	3	3	3	4	3	5	
22-Apr	3	2	3	3	3	4	4	5	5	5	5	6	6	5	6	6	6	6	5	4	4	5	4	4	6	
23-Apr	5	4	4	5	4	5	5	6	5	5	4	5	6	6	5	5	5	4	5	4	5	5	5	5	6	
24-Apr	5	5	3	4	3	3	3	4	3	4	4	5	5	5	5	4	6	5	4	3	3	2	2	1	6	
25-Apr	2	1	1	2	1	1	1	3	4	4	4	4	4	5	4	3	3	3	3	3	1	1	2	2	5	
26-Apr	2	2	2	1	2	2	1	1	2	3	4	3	4	3	4	4	3	3	2	2	1	3	3	2	4	
27-Apr	2	2	3	2	2	2	2	4	3	5	4	5	6	5	5	6	7	6	6	3	1	1	1	1	7	
28-Apr	1	1	1	1	1	1	1	3	3	4	4	5	4	4	5	4	4	4	2	2	2	2	2	3	5	
29-Apr	2	2	4	2	2	2	3	3	4	3	4	4	4	4	4	4	4	3	2	1	2	1	1	1	4	
30-Apr	2	2	2	2	2	2	4	4	4	4	6	6	7	6	6	8	7	6	2	1	2	1	2	2	8	
	9	8	7	5	5	6	7	7	5	6	7	7	7	6	6	8	7	7	8	6	6	8	10	7		
Diurnal Maximum																										

AF - Analyzer Failure



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Firebag - April 2015**

Direction of Maximum Speed: 284 deg on Apr 13 01:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 109.0 deg on Apr 23	Hours of Data: 717
Direction of Minimum Speed: 306 deg on Apr 26 20:00	Direction of Minimum Daily Speed Average: 5.0 deg on Apr 8
Direction of Minimum Speed: 306 deg on Apr 26 20:00	Hours of Missing Data: 3
Monthly Average Direction: 237.3 deg	Percent Operational Time: 99.6

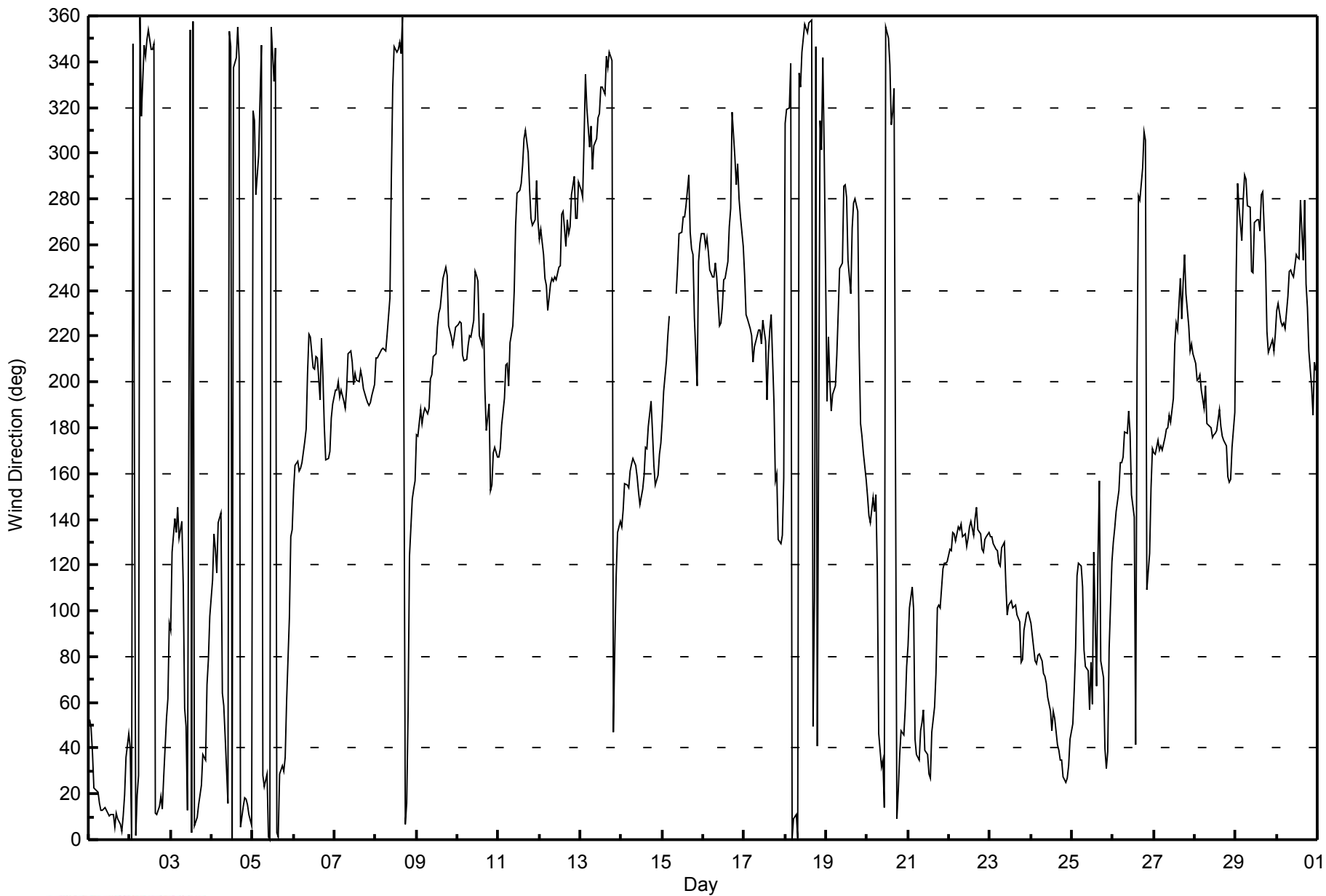
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Apr	53	49	38	22	22	21	16	13	13	14	13	12	11	11	11	5	12	9	7	3	10	19	36	46	17.9
2-Apr	40	0	348	2	19	28	360	316	347	342	350	354	345	345	348	12	11	15	19	14	27	53	61	94	8.8
3-Apr	91	126	140	134	145	132	139	111	57	49	13	354	3	358	6	10	15	20	24	37	35	68	79	98	43.1
4-Apr	114	134	127	116	139	143	64	59	45	16	353	347	0	338	342	355	342	6	15	18	17	15	11	6	19.7
5-Apr	318	314	282	299	325	347	28	23	29	1	0	355	331	346	3	1	29	32	30	36	60	97	132	135	16.7
6-Apr	153	164	165	161	162	164	174	179	204	221	219	207	206	211	211	192	219	203	181	166	166	170	184	190	187.8
7-Apr	197	196	200	193	197	192	189	197	213	214	209	199	204	201	200	205	202	197	193	191	190	191	194	199	198.7
8-Apr	210	211	212	214	215	214	214	221	237	289	329	347	344	345	349	344	359	7	16	56	124	149	153	157	256.1
9-Apr	177	176	188	182	186	188	186	189	201	203	211	213	224	230	232	245	248	250	246	225	220	216	220	224	212.5
10-Apr	225	227	226	211	209	210	216	220	220	227	248	246	244	220	216	230	197	179	191	152	155	169	171	167	209.6
11-Apr	167	171	181	193	208	208	198	217	225	240	268	283	284	287	295	306	310	300	284	272	269	271	288	271	254.7
12-Apr	262	266	256	245	242	231	243	246	244	246	245	250	251	273	275	260	271	265	268	282	290	272	272	288	260.7
13-Apr	284	281	306	334	320	303	312	293	303	306	315	318	329	329	326	342	337	344	341	47	84	115	134	139	315.7
14-Apr	137	144	156	155	154	161	164	166	163	159	152	146	153	159	171	171	181	192	178	164	155	159	168	174	163.4
15-Apr	183	196	209	220	229	AF	AF	AF	238	251	265	265	272	272	277	290	265	258	255	228	198	252	261	265	248.0
16-Apr	265	259	263	257	249	246	246	252	246	225	226	232	245	245	252	268	276	318	298	286	295	280	272	259	258.5
17-Apr	246	230	228	223	220	209	215	218	222	223	217	227	218	192	213	223	229	191	157	160	131	129	133	158	205.8
18-Apr	313	319	319	339	1	9	11	1	335	329	344	357	355	353	357	358	49	106	347	41	314	302	341	299	354.1
19-Apr	192	220	201	187	195	198	212	230	249	252	286	286	281	254	239	267	278	280	275	215	182	176	169	157	236.9
20-Apr	150	142	138	149	143	151	117	46	32	35	14	355	350	338	312	318	328	9	21	37	47	46	57	75	27.1
21-Apr	85	101	111	101	44	37	35	47	51	57	39	37	29	27	47	58	73	101	103	101	118	121	121	121	73.9
22-Apr	127	126	134	133	131	137	136	138	132	133	128	132	137	139	133	140	145	135	134	127	126	131	133	134	133.9
23-Apr	132	133	129	127	126	121	120	127	130	113	98	103	104	101	102	103	98	95	77	78	92	99	99	97	109.0
24-Apr	94	89	78	77	80	81	78	73	71	68	62	56	48	56	53	41	39	35	35	28	25	27	32	44	58.7
25-Apr	51	65	84	115	121	120	111	83	75	74	57	77	59	126	67	123	157	78	71	40	31	38	83	122	83.0
26-Apr	130	136	143	152	165	165	167	178	177	187	178	151	141	41	208	281	279	293	309	306	109	125	154	171	162.8
27-Apr	169	169	174	170	172	170	176	180	180	185	183	193	217	226	223	245	228	244	256	239	224	213	216	212	202.4
28-Apr	208	201	201	203	197	189	199	182	181	180	176	177	178	179	188	181	176	175	172	158	156	157	171	187	180.5
29-Apr	248	287	276	262	279	290	289	277	276	249	248	270	271	271	266	282	283	252	222	213	215	219	214	221	259.1
30-Apr	232	234	227	224	226	223	237	249	249	247	246	256	254	254	279	253	280	243	232	214	197	186	209	205	241.5
177.1 185.7 186.8 185.3 186.3 177.6 182.8 192.0 208.4 220.2 240.3 248.6 256.4 263.2 265.7 275.4 273.4 262.6 293.5 136.4 142.4 159.9 165.0 170.0																									
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 - April 2015**





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Firebag - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 720
Maximum Value: 106 deg on Apr 25 15:00	Hours of Data: 717
Minimum Value: 4 deg on Apr 21 06:00	Hours of Missing Data: 3
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 7 Q <sub>1</sub> = 9 Median = 12 Q <sub>3</sub> = 17 P <sub>90</sub> = 26 P <sub>99</sub> = 79	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-Apr	9	9	11	9	11	12	11	12	11	11	12	12	13	13	13	15	14	14	13	11	10	10	14	10	15
2-Apr	23	12	10	13	13	16	23	25	15	16	23	21	26	25	25	21	14	16	12	9	12	9	8	13	26
3-Apr	10	13	15	14	9	9	18	27	24	26	27	29	23	17	23	19	20	16	14	13	11	11	14	14	29
4-Apr	12	13	8	16	13	30	26	9	23	37	30	33	28	25	18	21	21	15	14	8	8	9	8	11	37
5-Apr	37	22	23	8	6	14	14	10	16	18	28	26	31	26	26	25	25	19	9	6	16	20	11	9	37
6-Apr	14	9	8	8	8	8	7	8	14	13	14	17	19	16	19	21	21	10	9	8	7	7	8	9	21
7-Apr	8	6	7	9	8	10	6	8	11	11	11	11	15	15	15	16	13	10	8	6	6	6	6	7	16
8-Apr	8	8	8	7	7	7	7	10	13	20	16	16	18	17	16	20	24	14	15	13	32	8	7	7	32
9-Apr	7	7	6	7	7	6	7	8	7	8	9	11	9	11	12	14	10	9	7	8	6	6	9	6	14
10-Apr	6	6	6	5	5	5	6	8	8	11	15	18	19	20	16	22	59	10	14	13	8	5	8	5	59
11-Apr	5	7	7	9	6	5	8	9	17	11	14	14	15	15	19	21	19	13	14	17	10	11	17	10	21
12-Apr	11	11	9	7	8	8	8	9	11	13	12	12	15	16	16	16	12	12	11	17	12	12	11	18	18
13-Apr	14	11	30	19	12	13	12	13	13	13	14	15	18	16	18	22	13	15	19	31	12	15	10	10	31
14-Apr	11	10	9	9	9	10	10	9	10	10	13	13	14	16	14	10	9	13	11	9	11	10	8	16	16
15-Apr	10	9	10	9	9	AF	AF	AF	12	14	17	18	22	13	17	19	20	15	10	13	7	29	10	10	29
16-Apr	12	9	9	8	8	7	8	9	11	14	14	14	17	15	17	13	18	25	21	14	11	7	7	8	25
17-Apr	9	7	10	7	7	6	6	8	10	14	16	21	17	15	20	23	21	11	10	10	14	11	15	68	68
18-Apr	7	10	9	12	15	12	12	15	13	12	13	19	16	17	16	17	42	38	19	39	74	28	9	14	74
19-Apr	46	21	16	13	5	8	8	11	15	23	29	34	33	56	42	21	28	23	12	21	5	7	7	8	56
20-Apr	8	12	20	26	33	82	20	14	17	28	60	49	85	45	35	27	28	14	10	7	6	10	9	10	85
21-Apr	11	13	34	37	9	4	7	12	12	14	23	27	30	26	26	26	25	16	12	10	11	10	10	10	37
22-Apr	11	11	12	11	11	11	12	11	13	15	14	16	16	18	15	17	14	13	12	12	11	11	11	11	18
23-Apr	11	11	10	11	11	10	10	11	13	17	13	15	15	13	15	15	13	19	12	11	13	10	10	10	19
24-Apr	11	12	11	11	11	11	11	13	15	20	22	21	25	21	24	28	23	15	12	10	9	8	8	7	28
25-Apr	8	10	14	9	10	10	9	27	28	32	39	50	46	81	106	62	50	56	38	14	6	5	18	12	106
26-Apr	11	11	9	10	7	7	7	11	29	61	76	80	78	82	73	60	56	65	37	90	10	11	12	7	90
27-Apr	7	8	8	7	8	8	10	8	9	10	11	20	18	14	13	14	13	18	11	13	8	7	7	7	20
28-Apr	6	4	6	4	5	8	8	10	10	13	14	15	12	12	11	12	10	11	10	8	8	8	8	14	15
29-Apr	24	14	13	9	10	11	16	13	14	10	20	13	14	15	20	15	18	13	9	6	7	6	7	8	24
30-Apr	8	8	6	7	7	7	9	9	12	14	15	15	16	23	24	22	15	37	17	9	8	6	13	7	37
	46	22	34	37	33	82	26	27	29	61	76	80	85	82	106	62	59	65	38	90	74	29	18	68	

Diurnal Maximum

AF - Analyzer Failure

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# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Last Calibration	March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:35
Gas Cert Reference	SA130123A	Station temp.	Deg C
Cal Gas Concentration	49.3 ppm	Cal Gas Exp Date	December 12, 2016
Calibrator Make/Model	API T700	Serial Number	996
ZAG Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	-606	-606
Analyzer IP address	192.168.1.43		Lamp voltage	818	800
Calculated slope	0.997541	0.998591	Chamber temp	45.1	45.0
Calculated intercept	0.051348	-0.186280	Pressure	692.9	784.7
Analyzer Background	8.2	8.4	Flow	0.453	0.448
Analyzer Coefficient	0.928	0.941	Intensity	88	90
Analyzer make	Thermo 43i		Analyzer serial #	1410661308	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.9	----
as found span	5000	58.3	574.8	564.0	1.019
calibrator zero	5000	0.0	0.0	-0.4	----
high point	5000	58.3	574.8	575.1	0.999
second point	5000	29.2	287.9	290.0	0.993
third point	5000	14.7	144.9	145.2	0.998
as left zero	5000	0.0	0.0	-0.3	----
as left span	5000	58.3	574.8	573.8	1.002
Average Correction Factor					0.997

Corrected As found      564.9      Previous response      576.2      % change      2.0%

**Notes:**

Filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



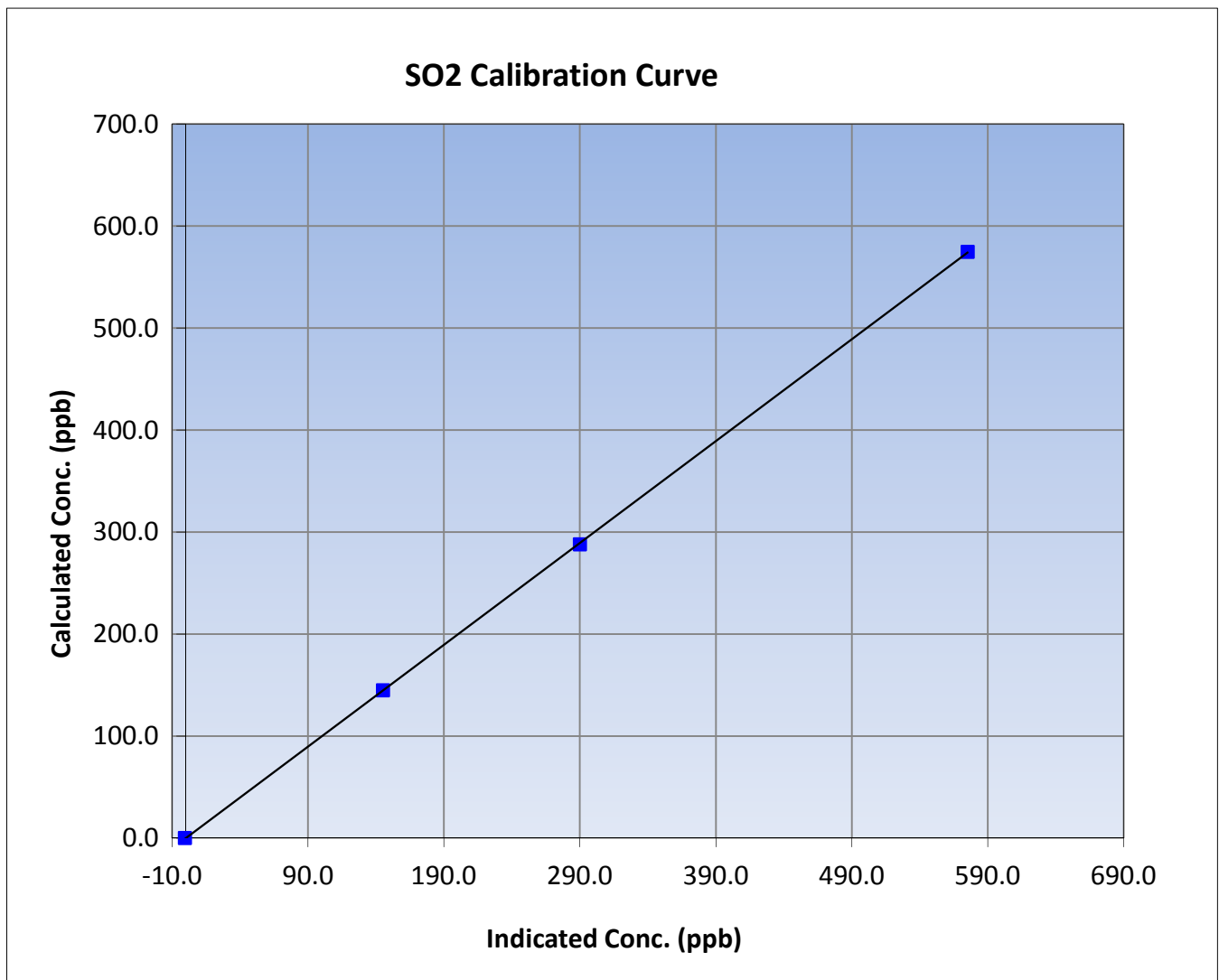
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:45	End Time (MST)	13:35
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

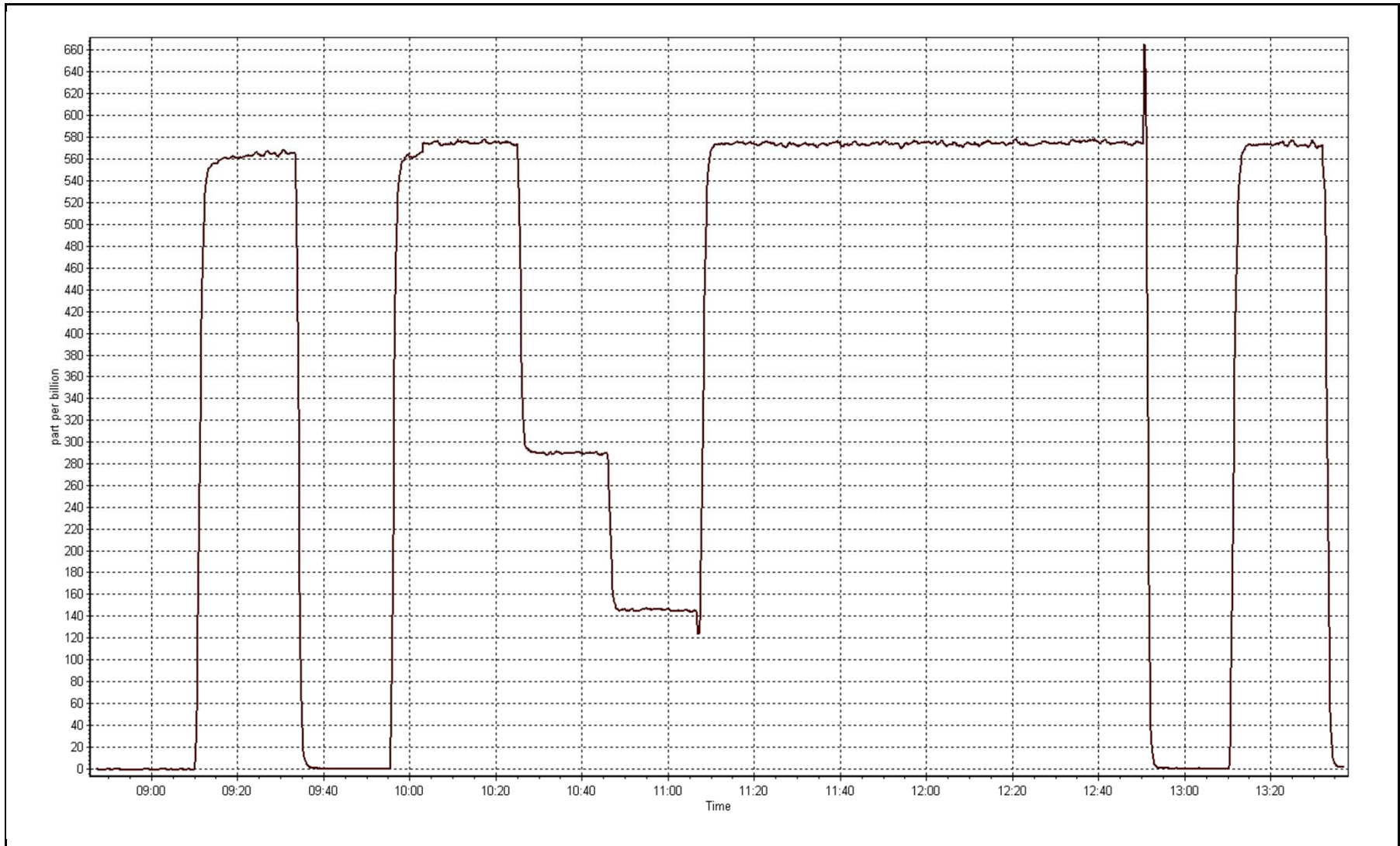
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	----	Correlation Coefficient	0.999983
574.8	575.1	0.9995		
287.9	290.0	0.9929	Slope	0.998591
144.9	145.2	0.9982		
			Intercept	-0.186280



SO2 Calibration Plot

Date: April 22, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	April 16, 2015	Last Calibration	March 19, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	13:45
Gas Cert Reference	ALM066720	Station temp.	22 Deg C
Cal Gas Concentration	4.85 ppm	Cal Gas Exp Date	6/10/2014
Calibrator Make/Model	API T700	Serial Number	996
ZAG air Make/Model	API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037
SO2 gas concentration	49.3 ppm	SO2 gas cert/exp	SA130123A 12/Dec/16

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	-574	-574
Analyzer IP address	192.168.1.42		Lamp voltage	924	923
Calculated slope	0.993460	0.995931	Chamber temp	45	45
Calculated intercept	0.107382	0.121670	Pressure	543.4	539.5
Analyzer Background	12	12.2	Flow	0.960	0.954
Analyzer Coefficient	1.070	1.083	Intensity	84	86
			Converter temp.	332	336
Analyzer make/model	Thermo 450i		Analyzer serial #	815129098	
Converter make/model	NA		Converter serial #	NA	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	----
as found span	5000	83.3	80.8	79.7	1.014
SO2 scrubber check	5000	14.6	144.0	0.9	----
calibrator zero	5000	0.0	0.0	-0.2	----
high point	5000	83.3	80.8	81.0	0.998
second point	5000	41.7	40.4	40.6	0.996
third point	5000	21.0	20.4	20.3	1.004
as left zero	5000	0.0	0.0	-0.1	----
as left span	5000	83.3	80.8	81.5	0.992
Average Correction Factor					0.999

Corrected As found	80.1	Previous response	81.2	% change	1.4%
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**Notes:**

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

Calibration Performed By:

Devin Russell



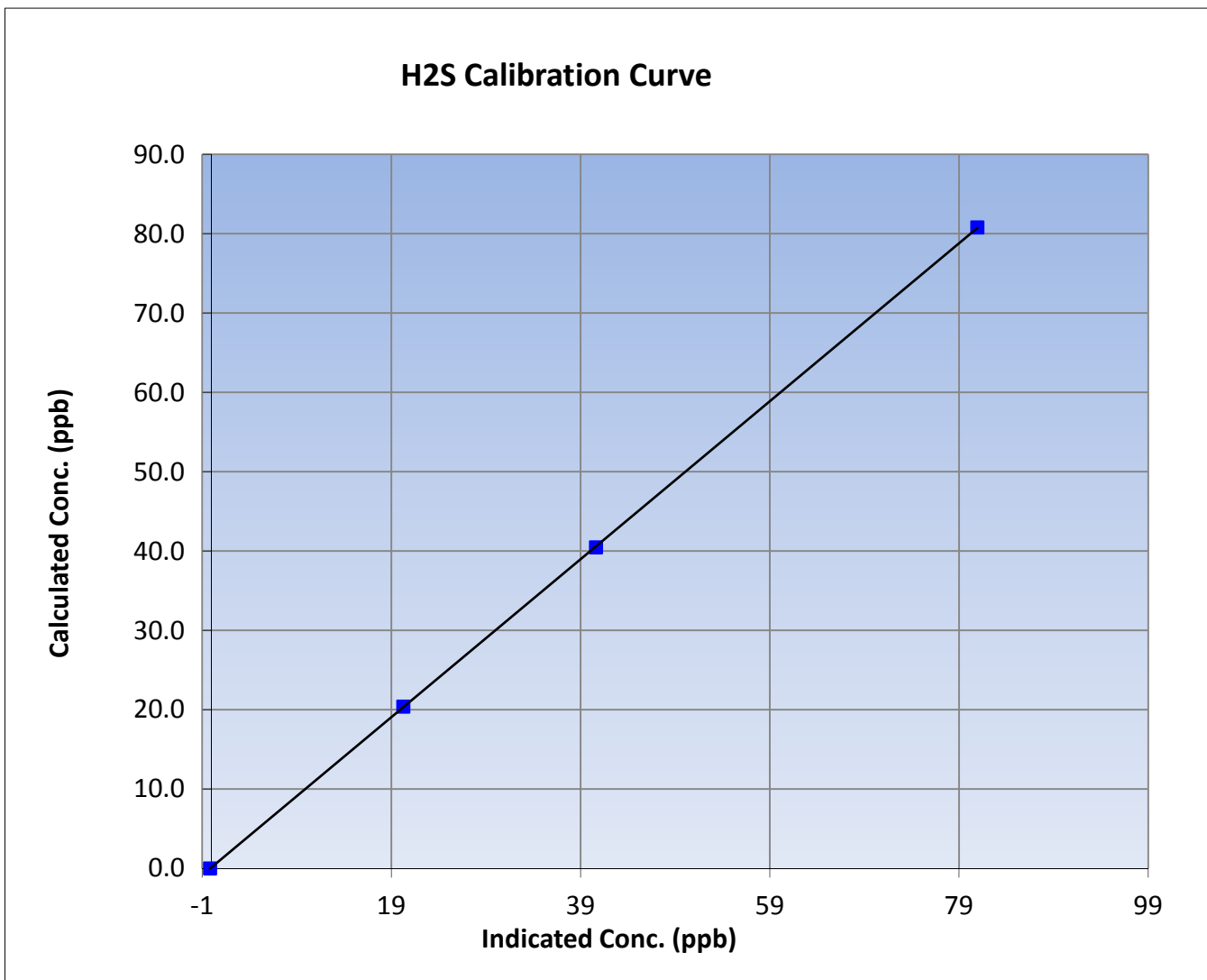
# Wood Buffalo Environmental Association H2S Calibration Report

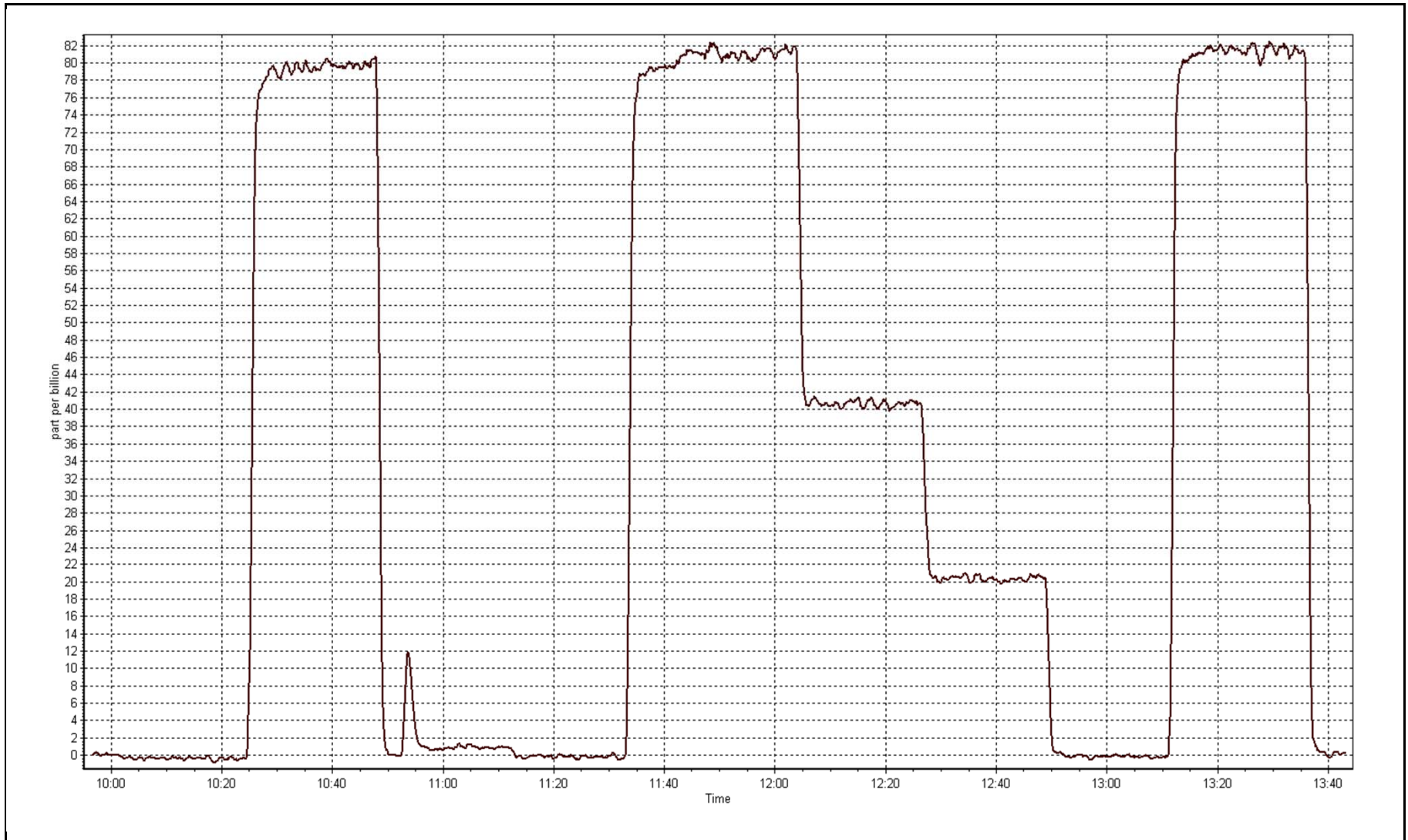
## Station Information

Calibration Date	April 16, 2015	Previous Calibration	March 19, 2015
Station Name	AMS 19	Station Number	AMS 19
Start Time (MST)	9:55	End Time (MST)	13:45
Analyzer make	Thermo 450i	Analyzer serial #	815129098

## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	----	Correlation Coefficient	0.999993
80.8	81.0	0.9982		
40.4	40.6	0.9955	Slope	0.995931
20.4	20.3	1.0039		
			Intercept	0.121670







# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	Monday, April 13, 2015	Last Calibration	Friday, March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:45
Gas Cert Reference		Cal Gas Expiry Date	12/12/2016
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
ZAG make/model	Teledyne API 701	Serial Number	4891
DACS make/model	Campbell Scientific CR3000	Serial Number	9037

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 50 ppm		Sample Pressure	8.5	8.5
Analyzer IP address	192.168.1.51		Air or Bypass Press	34.9	34.9
Calculated slope	0.994506	0.990484	Fuel Pressure	23.0	23.0
Calculated intercept	0.027083	0.066877	Analyzer Coeff	4.6	4.6
			Analyzer BKG	3.482	3.541

Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089
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## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.19	----
as found span	5000	58.3	12.74	11.49	1.108
calibrator zero	5000	0.0	0.00	-0.07	----
high point	5000	58.3	12.74	12.77	0.997
second point	5000	29.2	6.38	6.43	0.992
third point	5000	14.7	3.21	3.14	1.023
as left zero	5000	0.0	0.00	-0.08	----
as left span	5000	58.3	12.74	12.80	0.995
Average Correction Factor					1.004

Corrected As found	11.68	Previous response	12.78	% change	9.4%
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**Notes:**

As found span 10.8% out due to failing pump. Filter and pump changed after as founds. H2 cylinder changed after as founds. Span jumped back up to within 3%. Adjusted span. High point was unstable due to Air pressure fluctuating. Increased the

Calibration Performed By:

\_\_\_\_\_  
Devin Russell



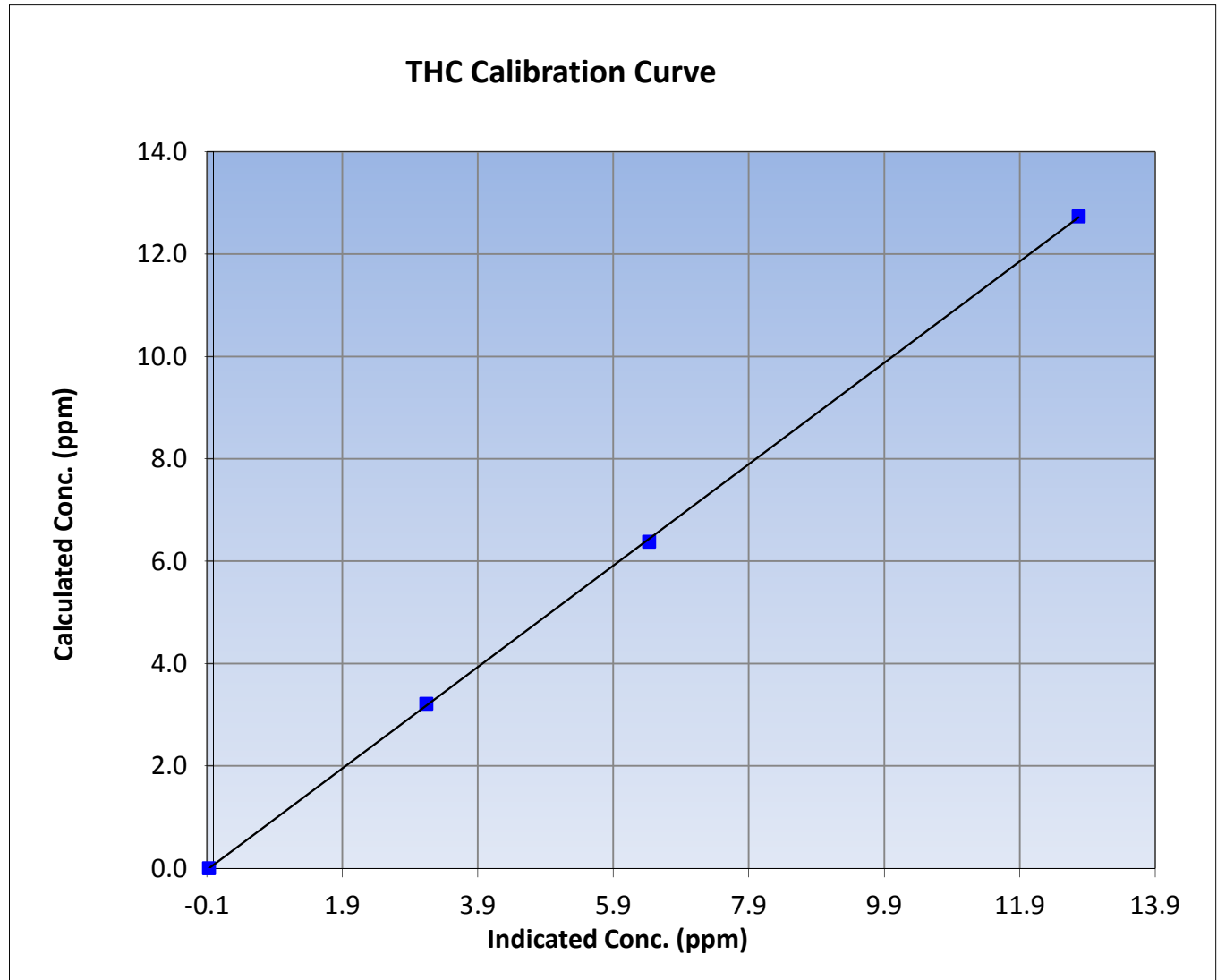
# Wood Buffalo Environmental Association THC Calibration Report

## Station Information

Calibration Date	April 13, 2015	Previous Calibration	March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	10:10	End Time (MST)	14:45
Analyzer make	Thermo 51i-LT	Analyzer serial #	1336160089

## Calibration Data

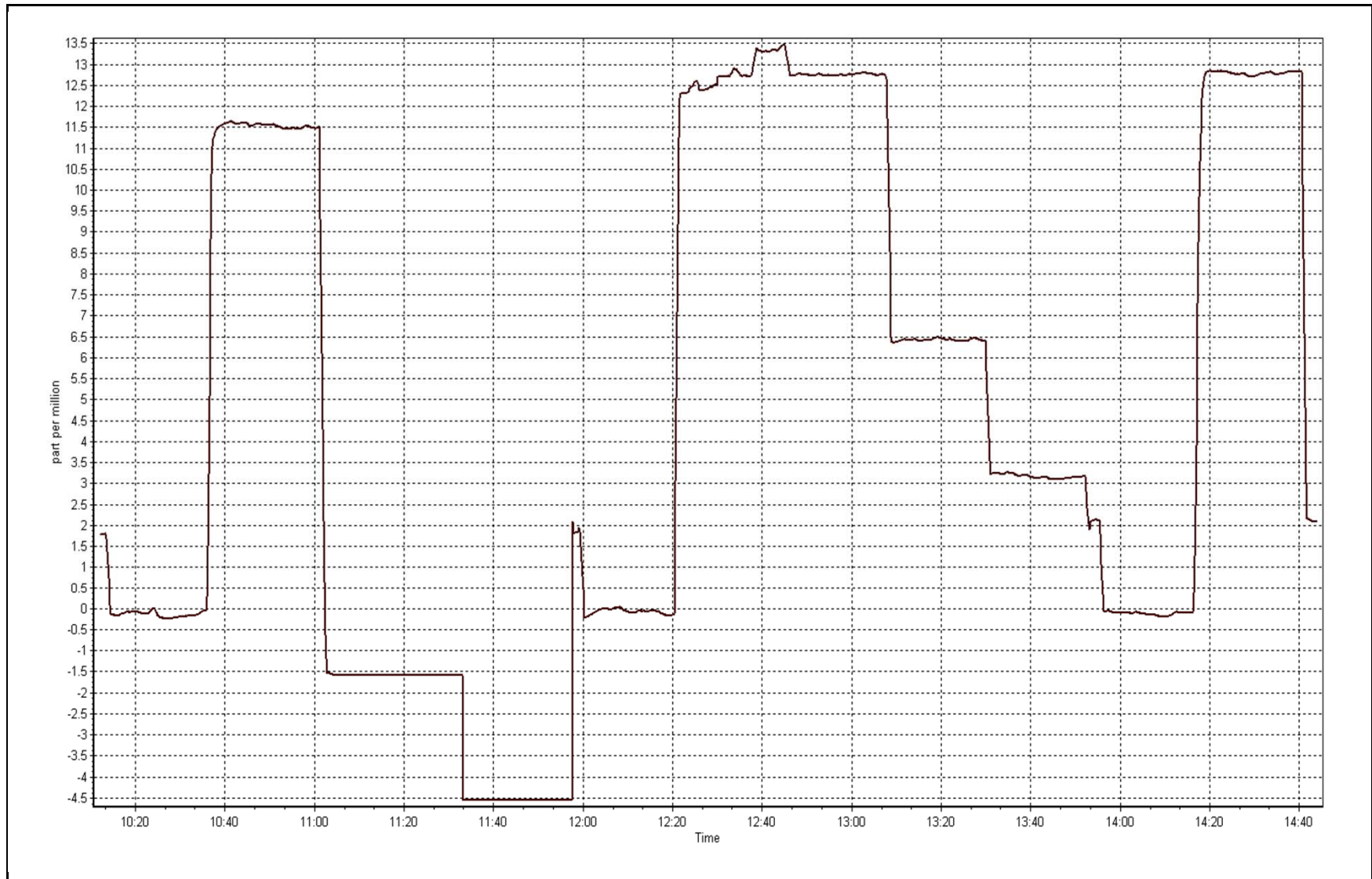
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.07	----	Correlation Coefficient	0.999945
12.74	12.77	0.9973		
6.38	6.43	0.9920	Slope	0.990484
3.21	3.14	1.0227		
			Intercept	0.066877





THC Calibration Plot

Date: April 13, 2015





## Wood Buffalo Environmental Association NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:45	End Time (MST)	13:35
NO Cal Gas Conc	51.5 ppm	Gas Cert Reference	SA130123A
NOx Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	12/12/2016
Calibrator	API T700	Serial Number	996
Zero air Generator	Teledyne API T701	Serial Number	4891

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	9037
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	0.998504	0.999925	0.994862
	Data Offset	-0.465870	-0.386161	-0.598550
Current Calibration	Data Slope	0.998802	1.000080	0.992229
	Data Offset	-0.945586	-0.628588	-1.094413

### Analyzer Information

Analyzer make/model \_\_\_\_\_ Analyzer serial # \_\_\_\_\_

Test Point	before		after	
Concentration range	1000	ppb	0-1000	ppb
NO coefficient	0.929		0.924	
NOx coefficient	1.001		1.001	
NO2 coefficient	1.000		1.000	
NO bkgnd	3.9		3.9	
NOx bkgnd	4.0		4.0	
Chamber Temp	50.6	Deg C	50.8	Deg C
Moly Temp	327.4	Deg C	326	Deg C
PMT voltage		V	-780	V
PMT Temp	-2.7	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	172.2	mmHg	169.2	mmHg
R Cell Press Nox	172.2	mmHg	169.2	mmHg
NO sample flow	0.598	lpm	0.605	lpm
Nox sample Flow	0.598	lpm	0.603	lpm

**Notes:**

Filter changed after as founds. Span adjusted.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date: April 22, 2015      Station Number: AMS 19

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	----	----
as found span	5000	58.3	600.5	600.5	0.0	597.8	596.4	1.3	1.0045	1.0068
calibrator zero	5000	0.0	0.0	0.0	0.0	0.2	0.1	0.0	----	----
high point	5000	58.3	600.5	600.5	0.0	601.5	600.5	1.0	0.9983	1.0000
second point	5000	29.2	300.8	300.8	0.0	303.2	302.6	0.6	0.9920	0.9940
third point	5000	14.7	151.4	151.4	0.0	152.9	151.9	0.9	0.9905	0.9966
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.1	0.0	----	----
as left span	5000	58.3	600.5	278.8	321.7	601.6	277.2	324.4	0.9981	1.0057
<b>Average Correction Factor</b>									<b>0.9936</b>	<b>0.9969</b>

Corrcctd As found      NO<sub>x</sub>= 597.9      NO= 596.5      Percent Change      NO<sub>x</sub>= 0.7%      NO= 0.7%  
 Previous Response      NO<sub>x</sub>= 601.9      NO= 600.9

### GPT Calibration Data

Dilution Flow 5000 ccm      Source Gas Flow 58.30 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	----	278.8	319.7	601.3	278.8	322.5	0.9872	1.0000	0.9915	100.9%
2nd NO2 (200)	----	383.9	214.6	601.9	383.9	218.0	0.9862	1.0000	0.9845	101.6%
3rd NO2 (100)	----	489.6	108.9	602.3	489.6	112.2	0.9855	1.0000	0.9707	103.0%
4th NO2 (0)	598.5	----	2.1	600.6	598.5	2.1	0.9882	1.0000	N/A	----
<b>Average Correction Factor</b>							<b>0.9868</b>	<b>1.0000</b>	<b>0.9822</b>	<b>101.8%</b>

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

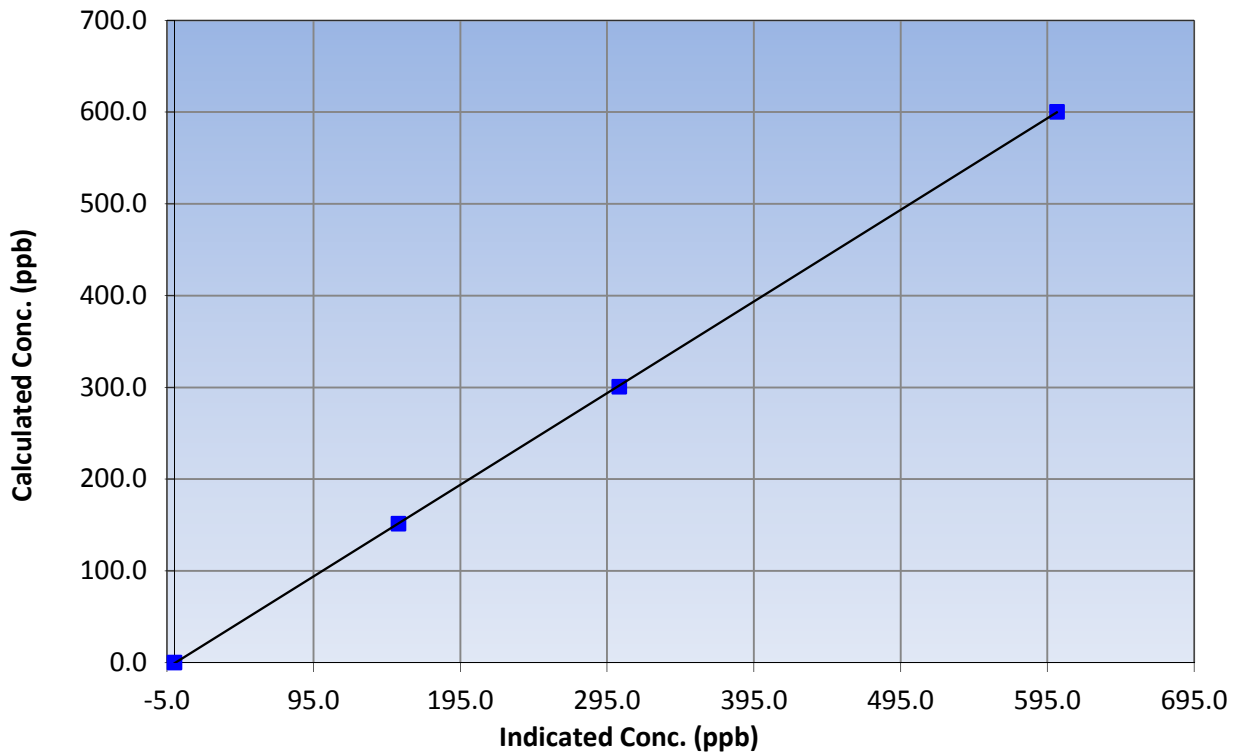
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:45	End Time (MST)	13:35
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	----	Correlation Coefficient	0.999988
600.5	601.5	0.9983		
300.8	303.2	0.9920	Slope	0.998802
151.4	152.9	0.9905		
			Intercept	-0.945586

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

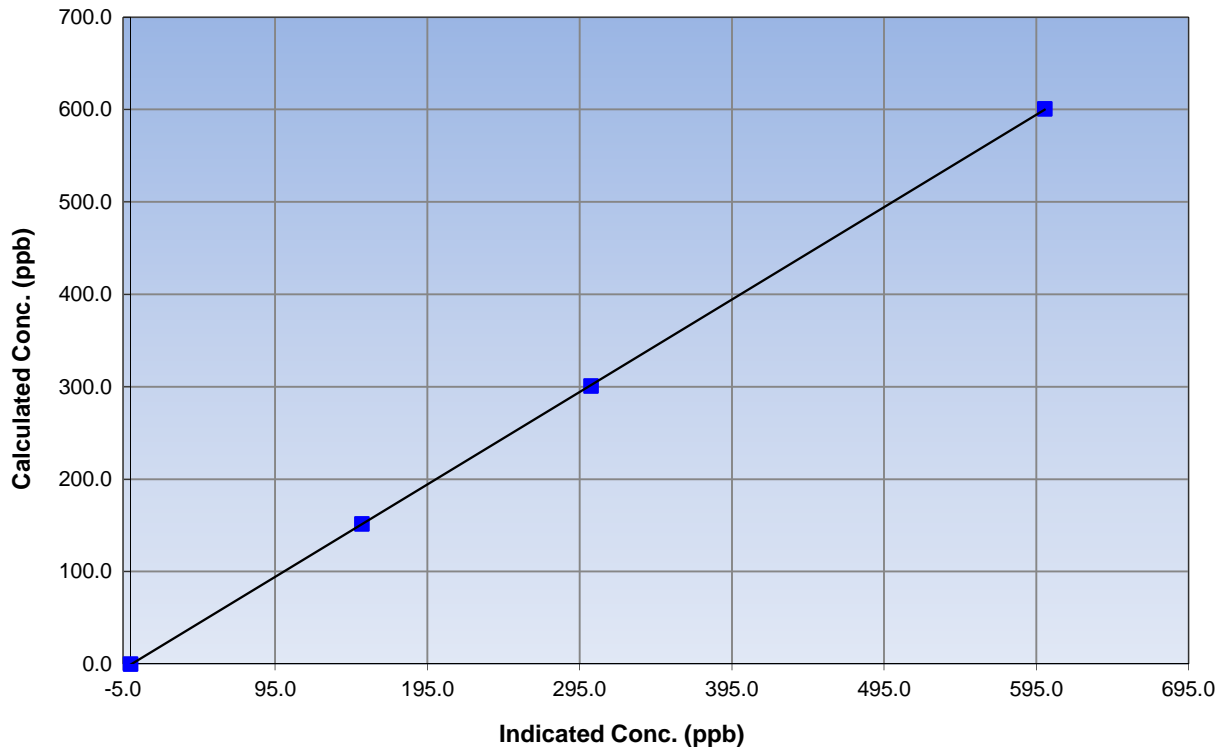
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 20, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:45	End Time (MST)	13:35
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999989
600.5	600.5	1.0000		
300.8	302.6	0.9940	Slope	1.000080
151.4	151.9	0.9966		
			Intercept	-0.628588

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

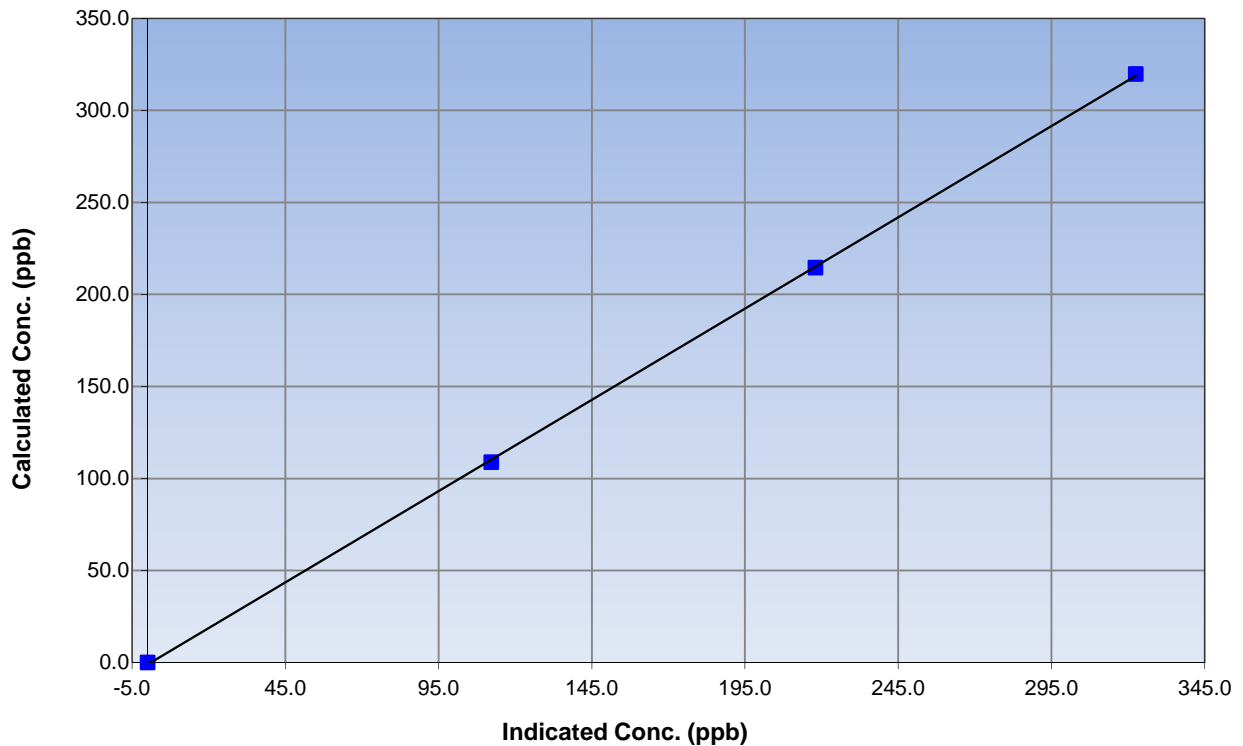
### Station Information

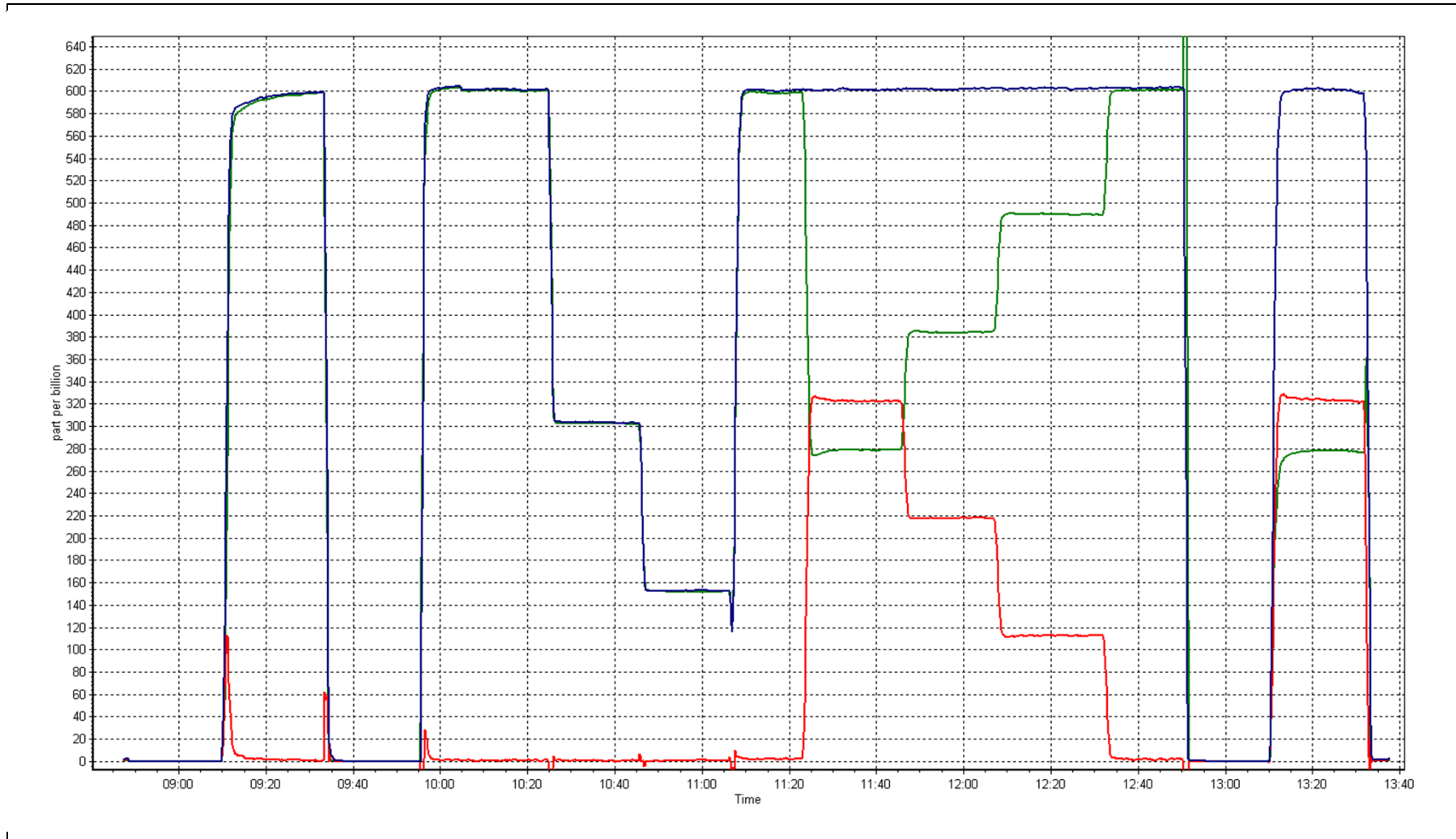
Calibration Date	April 22, 2015	Previous Calibration	March 20, 2015
Station Number	Firebag	Station Number	AMS 19
Start Time (MST)	8:45	End Time (MST)	13:35
Analyzer make		Analyzer serial #	

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999930
319.7	322.5	0.9915		
214.6	218.0	0.9845	Slope	0.992229
108.9	112.2	0.9707		
			Intercept	-1.094413

### NO<sub>2</sub> Calibration Curve





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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 502**  
**CONOCOPHILLIPS SURMONT**  
**APRIL 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

May 28, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 APRIL 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	667	37	53	97.78	8	0	3	0
H2S (ppb) Average	682	35	38	99.58	4	0	1	0
NO2 (ppb) Average	683	36	37	99.86	29	0	6	-
NO (ppb) Average	683	36	37	99.86	189	-	30	-
NOX (ppb) Average	683	36	37	99.86	215	-	34	-
Temperature 2 m (C) Average	720	0	0	100.00	21.6	-	16.2	-
Relative Humidity (%) Average	720	0	0	100.00	100	-	-	-
Wind Speed 10 m (km/h) Average	720	0	0	100.00	39	-	-	-
Wind Direction 10 m (deg) Average	720	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 APRIL 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	667	0.7	1	-	0	0	0	0	1	1	8
H2S (ppb) Average	682	0.2	0	-	0	0	0	0	0	0	4
NO2 (ppb) Average	683	2.9	3	-	0	0	1	2	4	6	29
NO (ppb) Average	683	1.9	12	-	0	0	0	1	1	2	189
NOX (ppb) Average	683	4.8	14	-	0	1	1	3	5	8	215
Temperature 2 m (C) Average	720	4.16	6.7	-	-11.7	-5.5	0	4.3	8.9	12.3	21.6
Relative Humidity (%) Average	720	46.5	19	-	15	26	33	42	57	75	100
Wind Speed 10 m (km/h) Average	720	14.9	7	-	2	7	10	13	19	25	39
Wind Direction 10 m (deg) Average	720	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
APRIL 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	21 Apr 2015 14:00	21 Apr 2015 14:00	1	Maintenance - sample manifold cleaned/repared
SO2	23 Apr 2015 06:00	23 Apr 2015 17:00	1	Intermittent unstable operation - excessive baseline drift
SO2	29 Apr 2015 15:00	29 Apr 2015 17:00	10	Intermittent unstable operation - excessive baseline drift
H2S	22 Apr 2015 11:00	22 Apr 2015 13:00	1	Maintenance - sample manifold cleaned/repared
NO2, NO, NOX	21 Apr 2015 14:00	21 Apr 2015 14:00	1	Maintenance - sample manifold cleaned/repared

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Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 8 ppb on Apr 29 08:00	Maximum Daily Average: 2.8 ppb on Apr 29		Hours of Data:	667
Minimum Value: 0 ppb on Apr 2 12:00	Minimum Daily Average: 0.1 ppb on Apr 24		Hours of Missing Data:	53
Maximum Diurnal Average: 1.1 ppb at hour 14	Minimum Diurnal Average: 0.3 ppb at hour 5		Hours of Calibration:	37
Monthly Average: 0.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 1 P <sub>90</sub> = 1 P <sub>99</sub> = 5		Percent Operational Time:	97.8

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0.3	1
2-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	3	2	1	1	1	1	1	0.7	3
3-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0.4	1
4-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	3	2	2	1	1	1	0.7	3
5-Apr	1	1	1	1	Z	1	1	0	0	2	1	1	0	0	0	0	1	2	1	1	0	0	0	0	0.6	2
6-Apr	0	0	0	0	0	Z	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.4	1
7-Apr	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
8-Apr	0	Z	0	0	0	0	0	0	0	0	0	1	2	3	2	1	2	1	2	1	1	0	0	0	0.8	3
9-Apr	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
10-Apr	0	0	0	Z	0	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	0	1	1.1	2
11-Apr	1	0	0	0	Z	0	1	0	0	2	4	4	1	1	1	1	1	1	1	0	0	0	0	0	0.9	4
12-Apr	0	0	0	0	0	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	4	5	3	3	2	1.1	5
13-Apr	Z	1	0	0	0	0	0	0	0	1	1	3	1	5	3	2	1	1	1	0	0	0	0	0	1.1	5
14-Apr	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
15-Apr	0	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-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0.4	1
17-Apr	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
18-Apr	0	0	1	1	1	Z	3	3	1	1	3	5	6	5	4	2	1	1	1	1	0	0	0	0	1.7	6
19-Apr	Z	0	0	0	0	0	0	0	1	2	2	1	1	1	2	1	1	0	0	0	0	0	0	0	0.7	2
20-Apr	0	Z	0	0	0	1	1	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1.1	3
21-Apr	0	0	Z	0	0	1	1	1	1	1	2	3	2	M	2	1	1	0	0	0	0	0	0	0	0.8	3
22-Apr	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	1	--	1
23-Apr	1	0	0	0	Z	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	0	0	0	0	0	0	0	0	--	1
24-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Apr	Z	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.2	1
26-Apr	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
27-Apr	0	1	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
28-Apr	0	0	0	Z	0	0	0	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	0.8	2
29-Apr	1	4	6	6	Z	4	2	8	5	7	2	3	4	0	UO	UO	UO	0	0	0	0	1	0	0	2.8	8
30-Apr	1	1	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

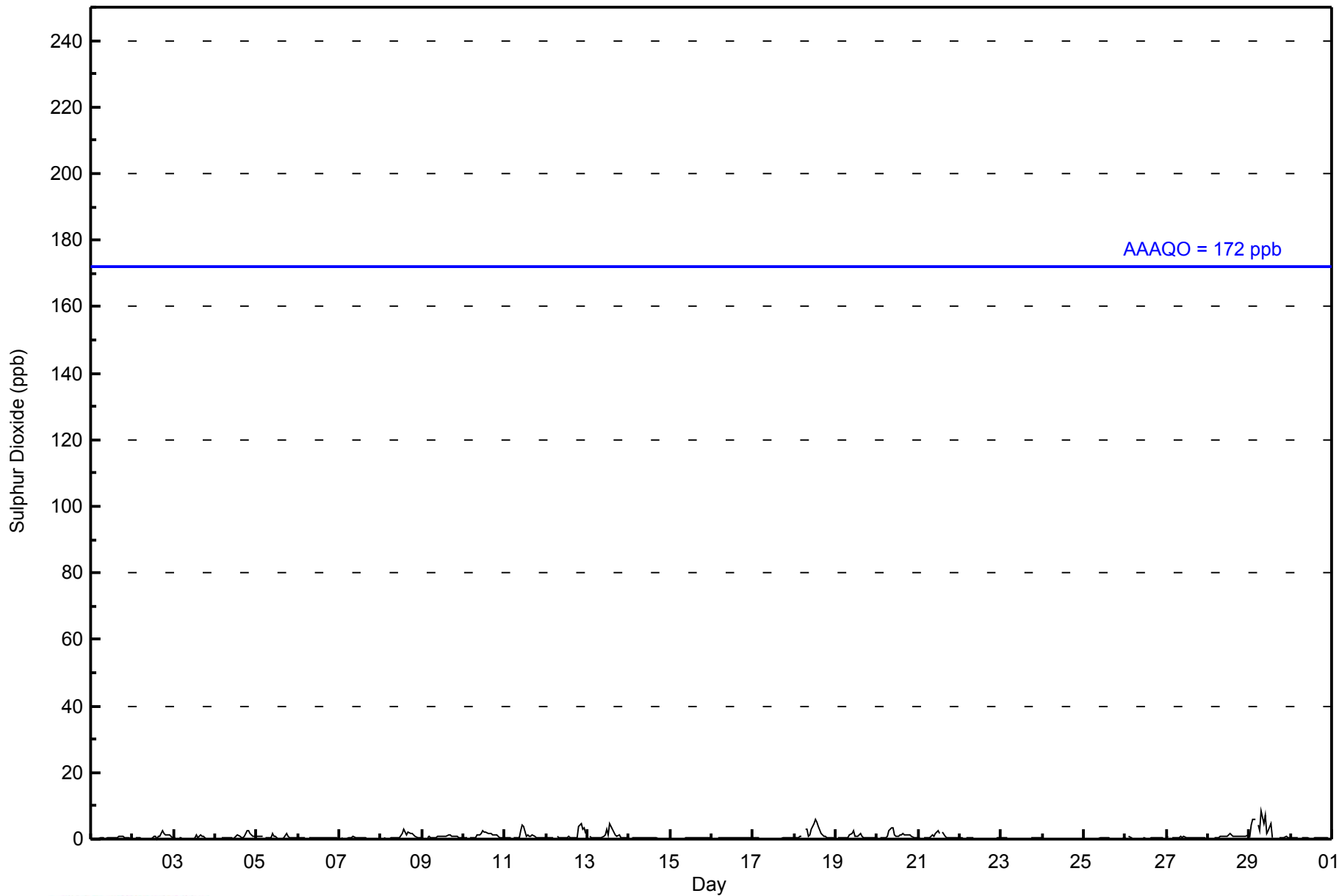
0.3	0.5	0.6	0.6	0.3	0.5	0.5	0.8	0.7	0.9	0.9	1.0	1.0	1.1	0.9	0.8	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.4	Diurnal Average	
1	4	6	6	1	4	3	8	5	7	4	5	6	5	4	2	2	3	3	4	5	3	3	2	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - April 2015







**WBEA**  
**Cumulative Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	667	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: 667

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - April 2015**

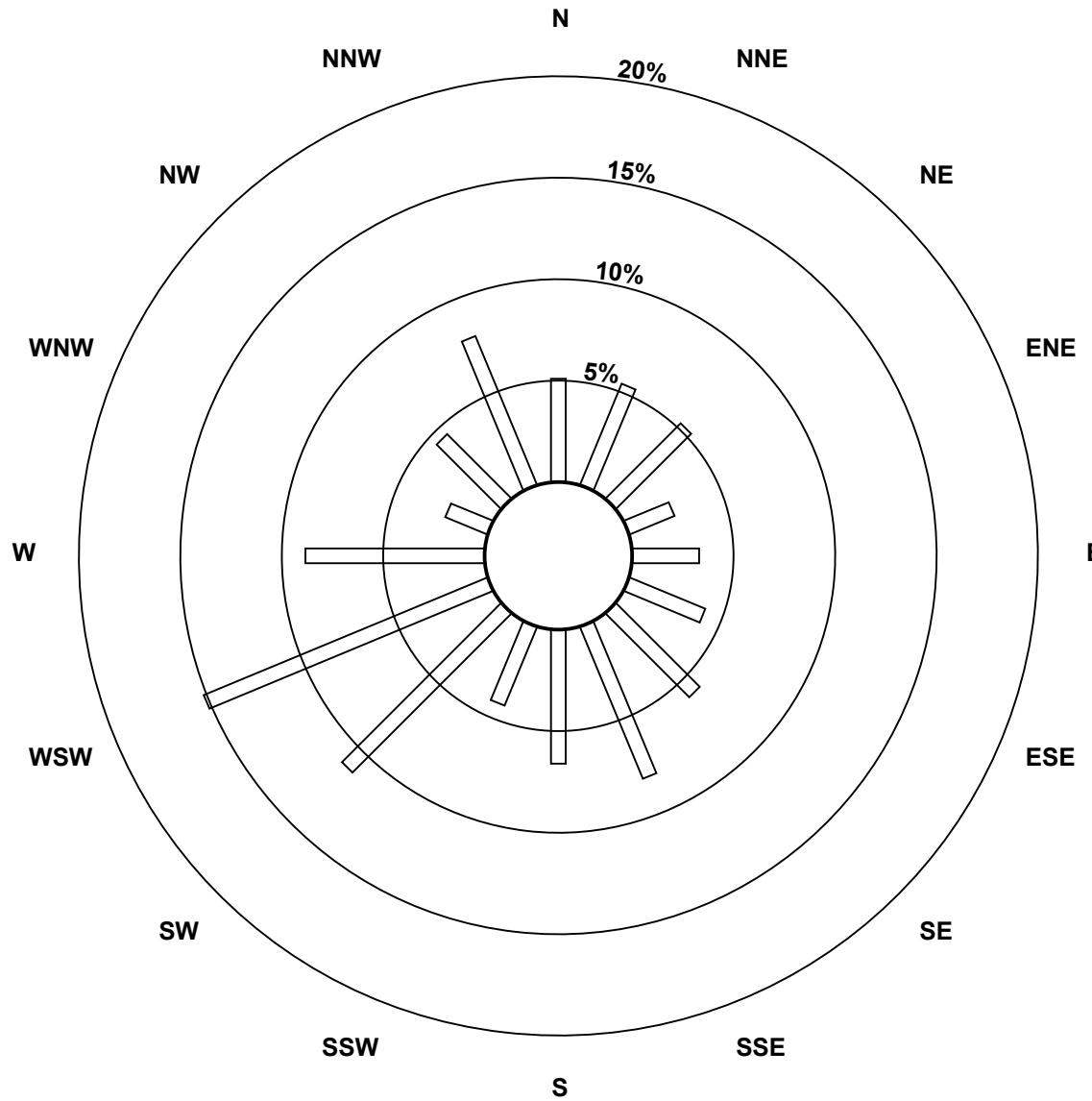
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	34	36	35	16	22	27	39	54	44	28	74	101	59	15	30	53	667
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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
<b>Totals</b>	34	36	35	16	22	27	39	54	44	28	74	101	59	15	30	53	667

Total Number of Valid Hours: 667

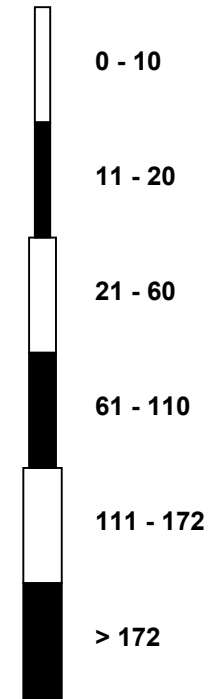
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

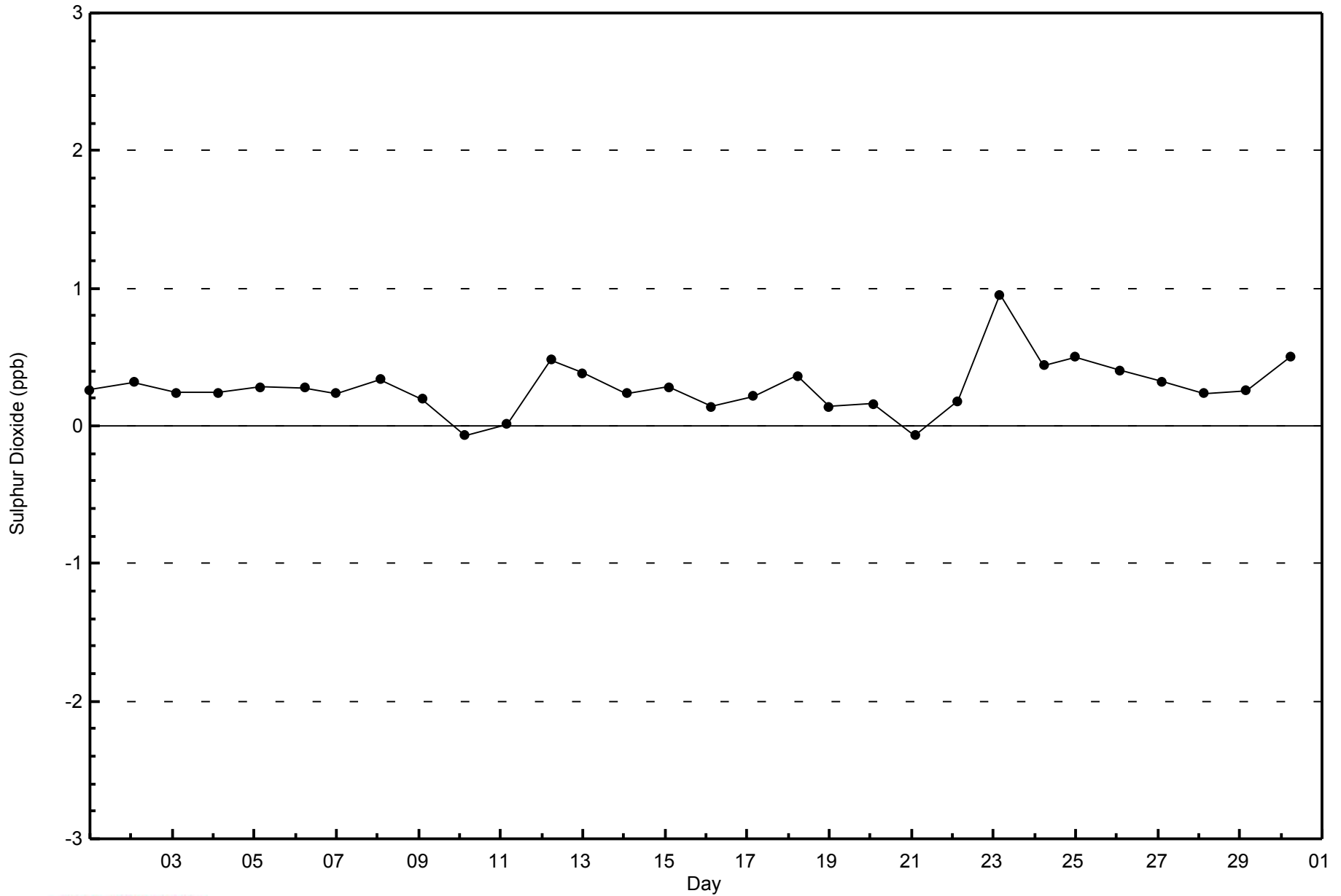


Total Number of Valid Hours: 667



WBEA  
Zero Responses

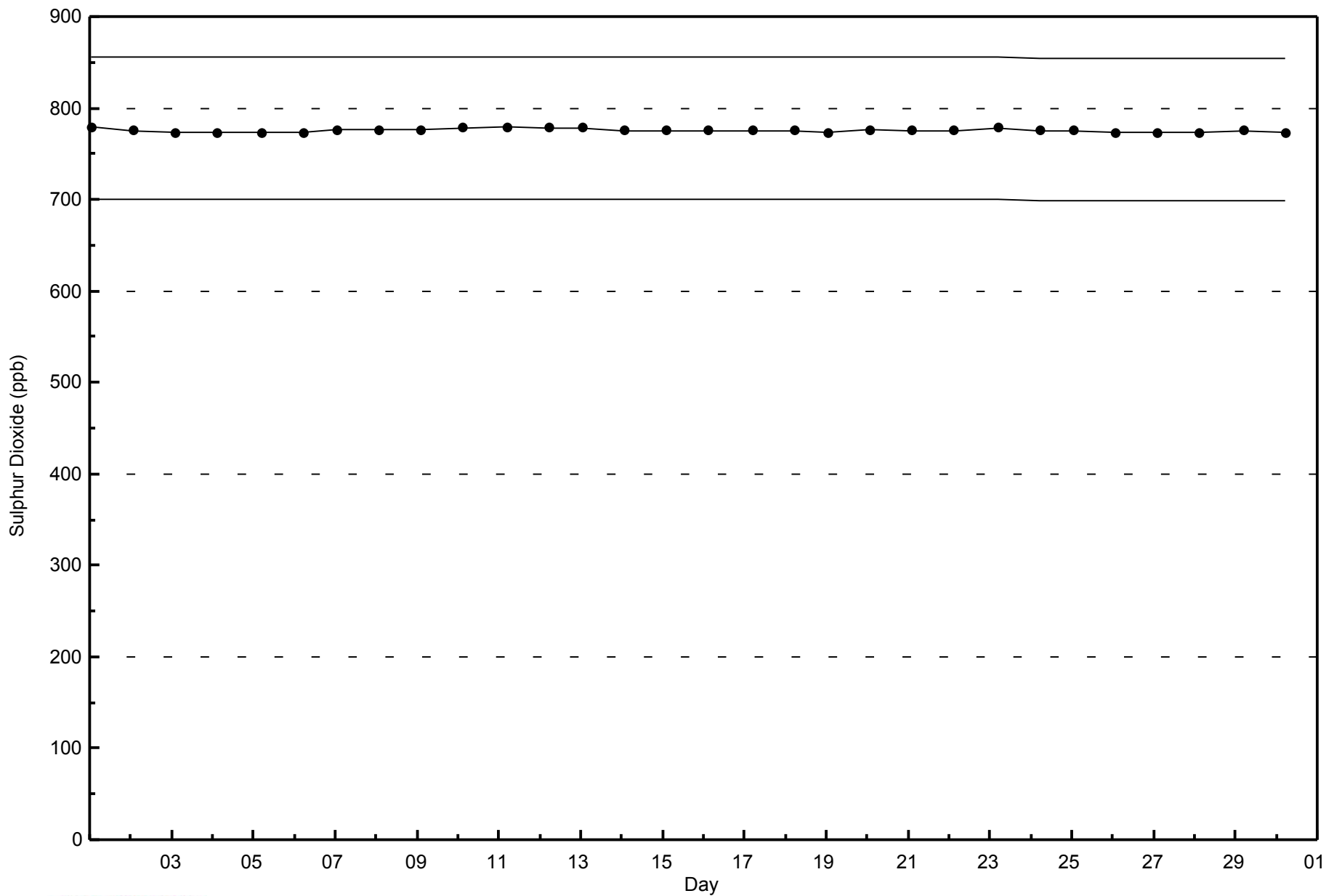
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surrmont - April 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - April 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 4 ppb on Apr 12 21:00	Maximum Daily Average: 0.7 ppb on Apr 12		Hours of Data:	682
Minimum Value: 0 ppb on Apr 9 21:00	Minimum Daily Average: 0.0 ppb on Apr 26		Hours of Missing Data:	38
Maximum Diurnal Average: 0.3 ppb at hour 23	Minimum Diurnal Average: 0.2 ppb at hour 7		Hours of Calibration:	35
Monthly Average: 0.2 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 0 P <sub>90</sub> = 0 P <sub>99</sub> = 1		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-Apr	0	Z	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	1	1	1	1	1	0.4	1
2-Apr	1	1	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.5	1
3-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1
4-Apr	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
5-Apr	1	1	2	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
6-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
9-Apr	0	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-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
11-Apr	0	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-Apr	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	3	2	0.7	4
13-Apr	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
14-Apr	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
15-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Apr	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
17-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
18-Apr	0	0	0	0	0	0	Z	1	0	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0.3	1
19-Apr	0	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-Apr	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
21-Apr	0	0	0	Z	0	0	0	0	1	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0	0.4	1
22-Apr	0	0	0	0	Z	0	0	0	0	0	M	M	M	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Apr	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-Apr	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
26-Apr	0	0	Z	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-Apr	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Apr	0	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-Apr	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
30-Apr	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

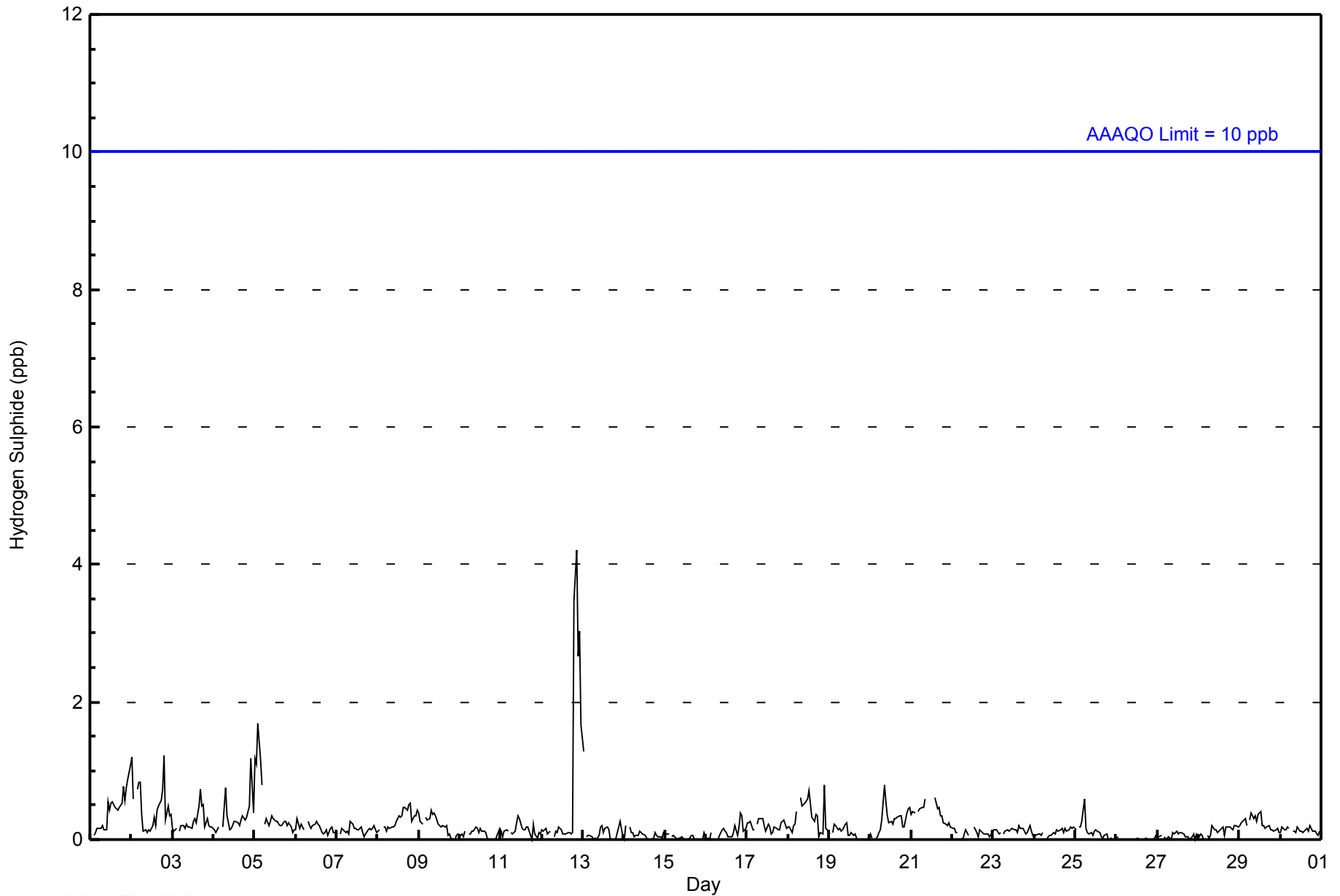
0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.2	Diurnal Average
1	1	2	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	3	4	3	3	2	Diurnal Maximum

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 (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	678	99.41	99.41
3 - 4	4	0.59	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: 682

Total Number of Hours: 720





**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - April 2015**

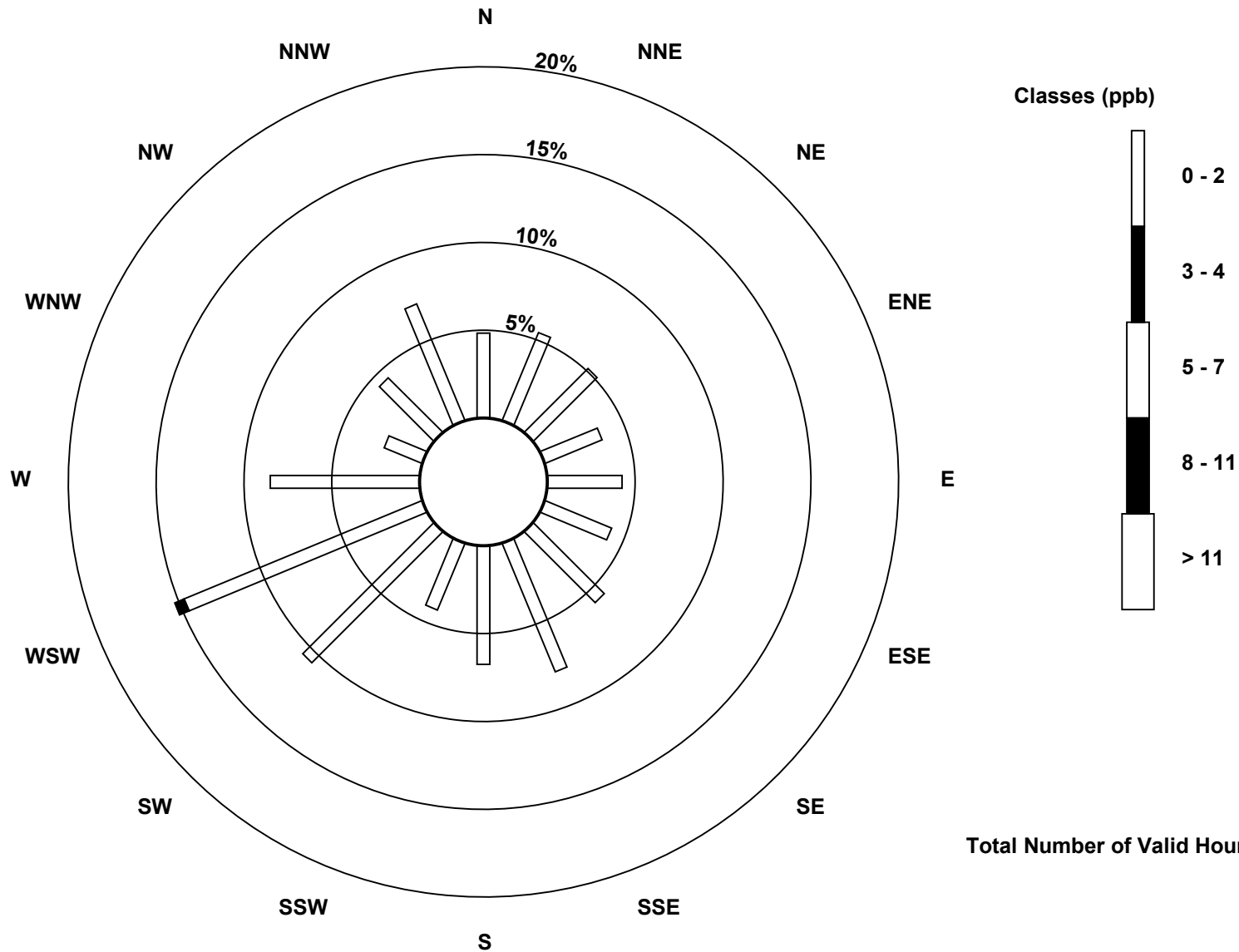
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	33	37	35	24	29	28	39	54	46	28	72	100	58	16	30	49	678
3 - 4	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>33</b>	<b>37</b>	<b>35</b>	<b>24</b>	<b>29</b>	<b>28</b>	<b>39</b>	<b>54</b>	<b>46</b>	<b>28</b>	<b>72</b>	<b>104</b>	<b>58</b>	<b>16</b>	<b>30</b>	<b>49</b>	<b>682</b>

Total Number of Valid Hours: 682

Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

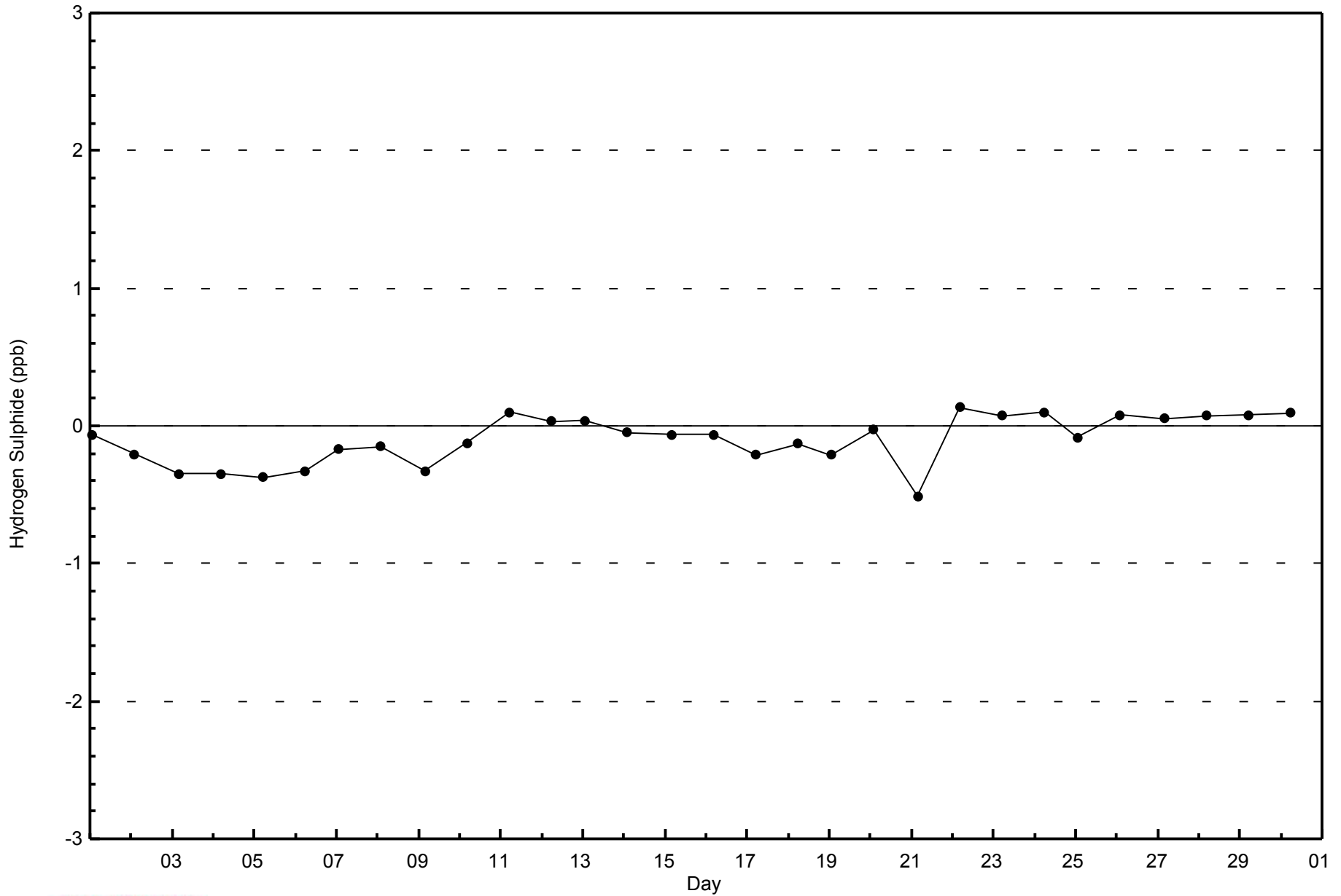
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont (AMS502)





WBEA  
Zero Responses

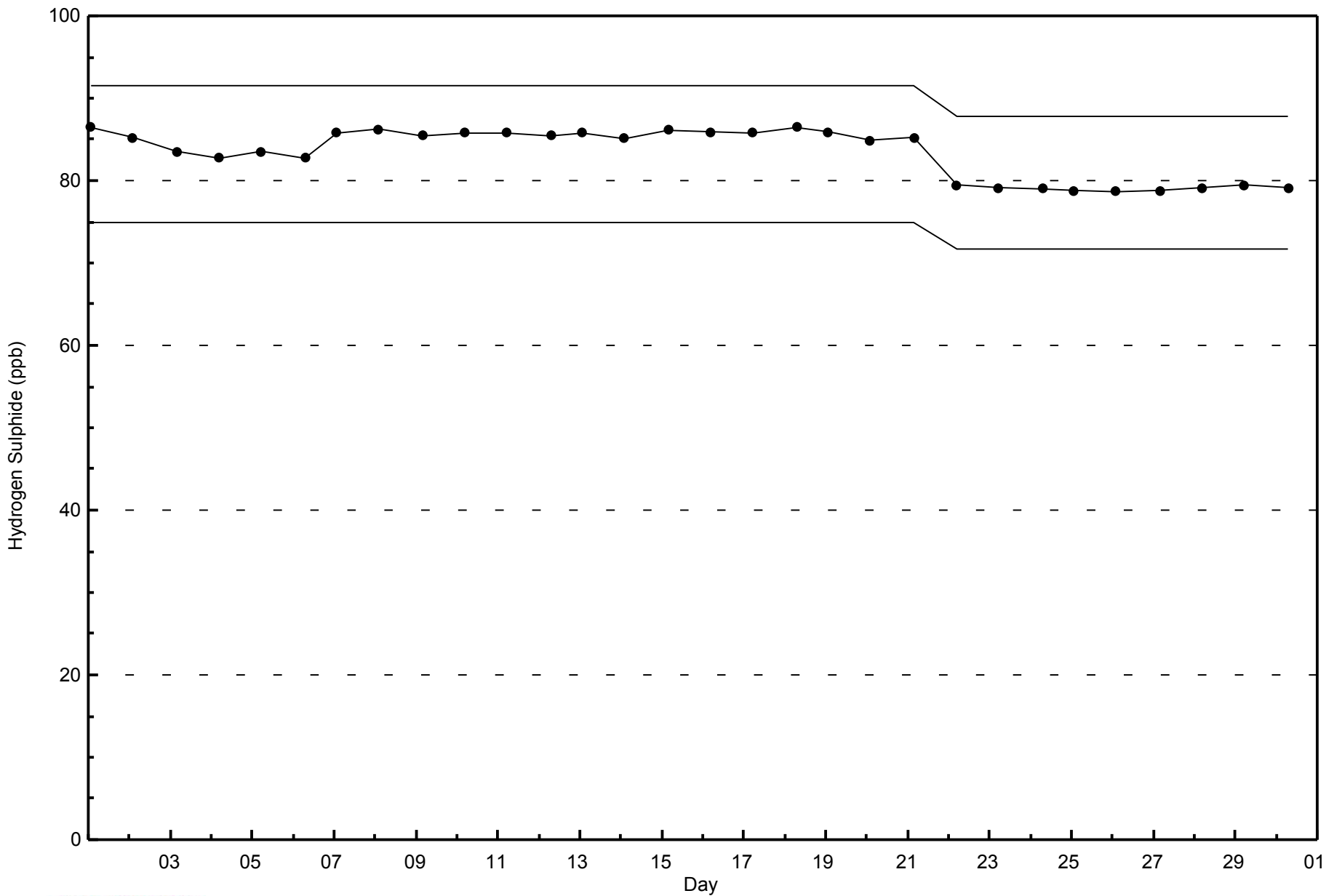
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - April 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - April 2015



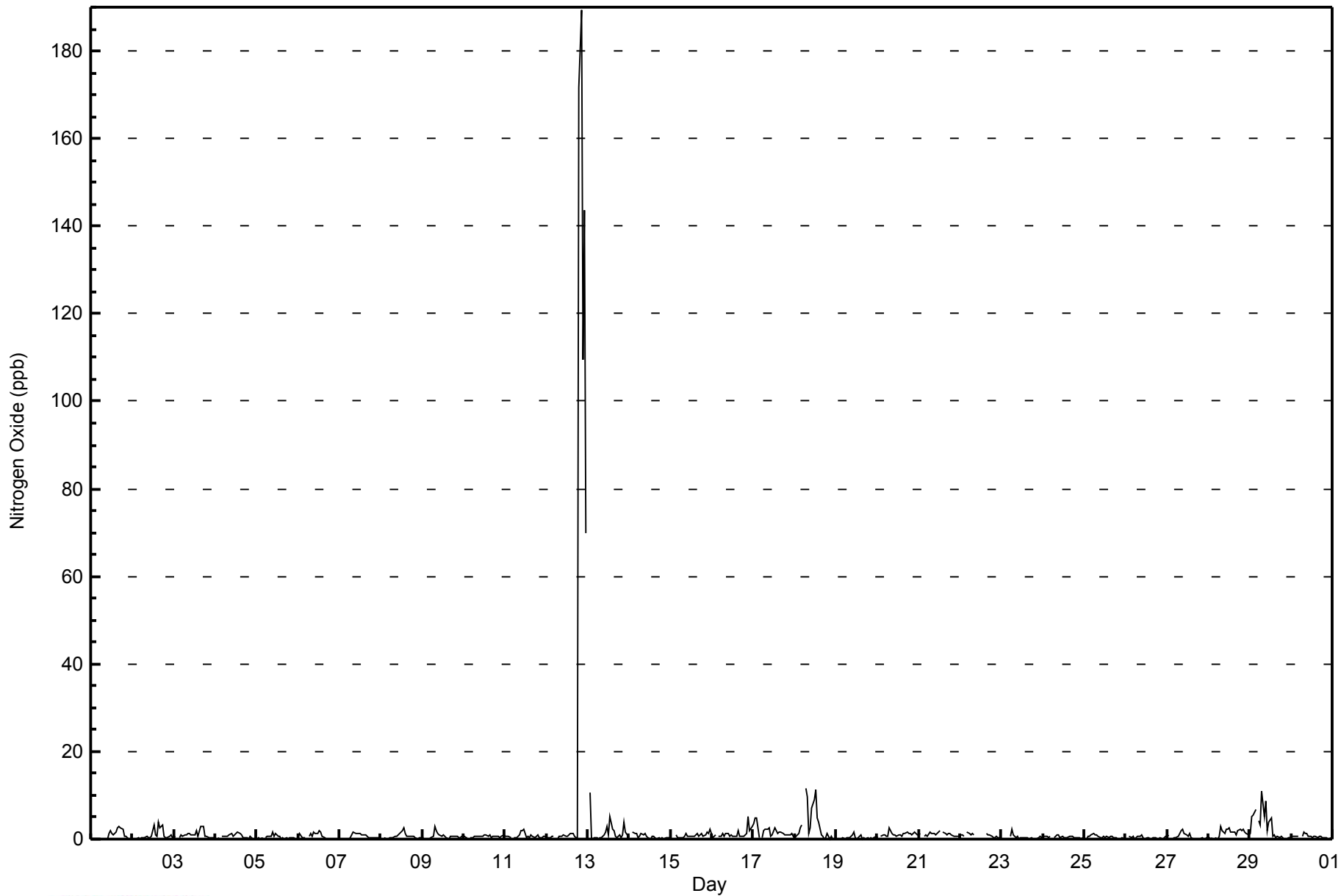


Maximum Value: 189 ppb on Apr 12 21:00																		Maximum Daily Average: 30.2 ppb on Apr 12						Hours in Service: 720		
Minimum Value: 0 ppb on Apr 1 02:00																		Minimum Daily Average: 0.3 ppb on Apr 19						Hours of Data: 683		
Maximum Diurnal Average: 6.8 ppb at hour 21																		Minimum Diurnal Average: 0.6 ppb at hour 1						Hours of Missing Data: 37		
Monthly Average: 1.9 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 2 P <sub>99</sub> = 11						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-Apr	Z	0	0	0	0	0	0	0	0	0	1	2	1	1	1	3	3	3	2	1	1	0	0	0	0.8	3
2-Apr	0	Z	0	0	0	0	0	0	1	0	0	1	3	1	1	4	3	3	1	0	0	1	1	0	0.9	4
3-Apr	0	1	Z	0	1	1	1	1	1	1	1	1	1	2	1	3	3	3	1	1	0	0	0	0	1.0	3
4-Apr	0	0	0	Z	1	1	1	1	1	1	1	1	1	2	1	1	0	0	0	1	0	0	0	0	0.6	2
5-Apr	0	0	0	0	Z	0	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	2
6-Apr	0	1	0	0	0	Z	1	1	1	1	1	1	2	2	1	0	0	0	0	0	0	0	0	0	0.6	2
7-Apr	Z	0	0	0	0	0	0	1	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.6	2
8-Apr	0	Z	0	0	0	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	0	0	0	0	0.7	2
9-Apr	0	0	Z	0	0	0	1	3	2	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	0.7	3
10-Apr	1	0	0	Z	0	0	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0.6	1
11-Apr	1	1	1	0	Z	0	0	0	1	2	2	2	0	1	0	1	1	0	1	1	0	0	1	0	0.7	2
12-Apr	0	0	0	1	1	Z	0	1	1	1	1	1	0	1	1	1	1	0	0	172	189	109	144	70	30.2	189
13-Apr	Z	11	0	0	0	0	0	0	0	1	2	3	1	5	2	2	1	0	1	0	1	4	2	1	1.7	11
14-Apr	1	Z	2	1	1	0	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.6	2
15-Apr	0	0	Z	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.9	2
16-Apr	0	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	5	2	3	1.2	5
17-Apr	3	5	5	0	Z	0	2	2	2	3	1	1	3	2	1	2	1	1	1	1	1	1	1	1	1.8	5
18-Apr	0	1	1	3	3	Z	12	10	1	3	7	9	11	5	4	1	1	0	0	1	0	1	0	0	3.2	12
19-Apr	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0.3	1
20-Apr	0	Z	1	1	1	1	1	3	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1.1	3
21-Apr	1	1	Z	1	1	1	1	1	1	1	1	2	2	M	1	1	1	1	1	1	1	1	1	1	1.1	2
22-Apr	1	1	1	Z	2	1	1	1	1	C	C	C	C	C	C	1	1	1	0	0	0	1	0	0	--	2
23-Apr	0	0	0	0	Z	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2
24-Apr	1	1	1	0	1	Z	0	1	1	1	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0.5	1
25-Apr	Z	0	1	1	1	1	1	1	1	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0.5	1
26-Apr	0	Z	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
27-Apr	0	1	Z	0	0	0	0	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.6	2
28-Apr	0	0	0	Z	0	0	1	3	2	1	2	2	3	1	2	2	1	2	2	2	2	2	1	1	1.4	3
29-Apr	1	5	6	7	Z	4	3	11	5	9	2	4	5	1	1	0	1	0	1	0	0	0	0	0	2.9	11
30-Apr	1	1	1	1	1	Z	1	1	1	1	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0.6	1
																		Diurnal Average						Diurnal Maximum		
																		3						70		
Z - zerspan																		C - Calibration						M - Maintenance		



WBEA  
Hourly Averages

Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	678	99.27	99.27
21 - 40	0	0.00	99.27
11 - 80	1	0.15	99.41
81 - 159	2	0.29	99.71
> 159	2	0.29	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - April 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	36	35	24	27	27	39	54	44	28	74	98	60	15	30	53	678
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	1	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
<b>Totals</b>	34	36	35	24	27	27	39	54	44	28	74	103	60	15	30	53	683

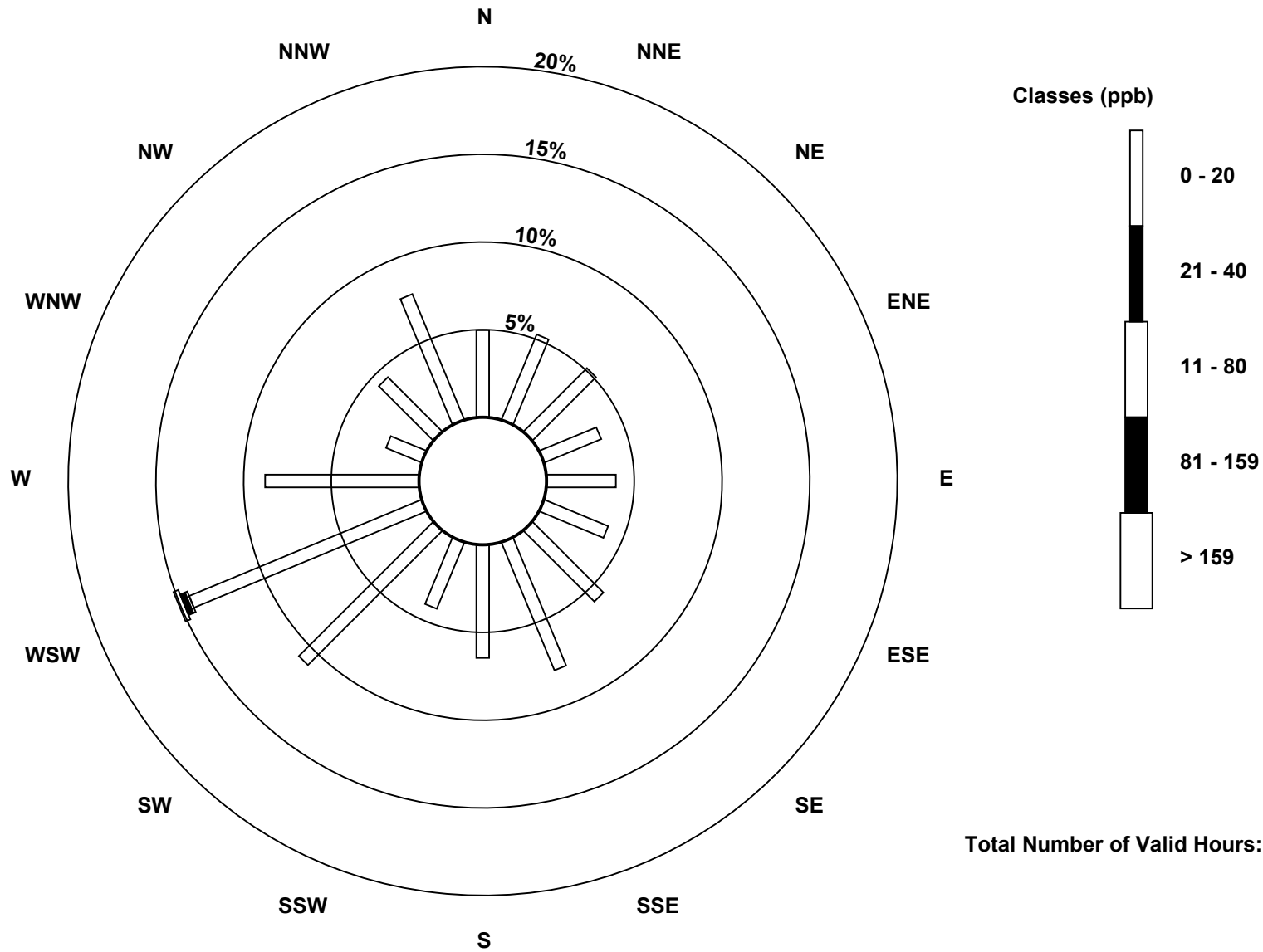
Total Number of Valid Hours: 683

Total Number of Hours: 720



Wood Buffalo Environmental Association  
Wind Rose Apr 2015

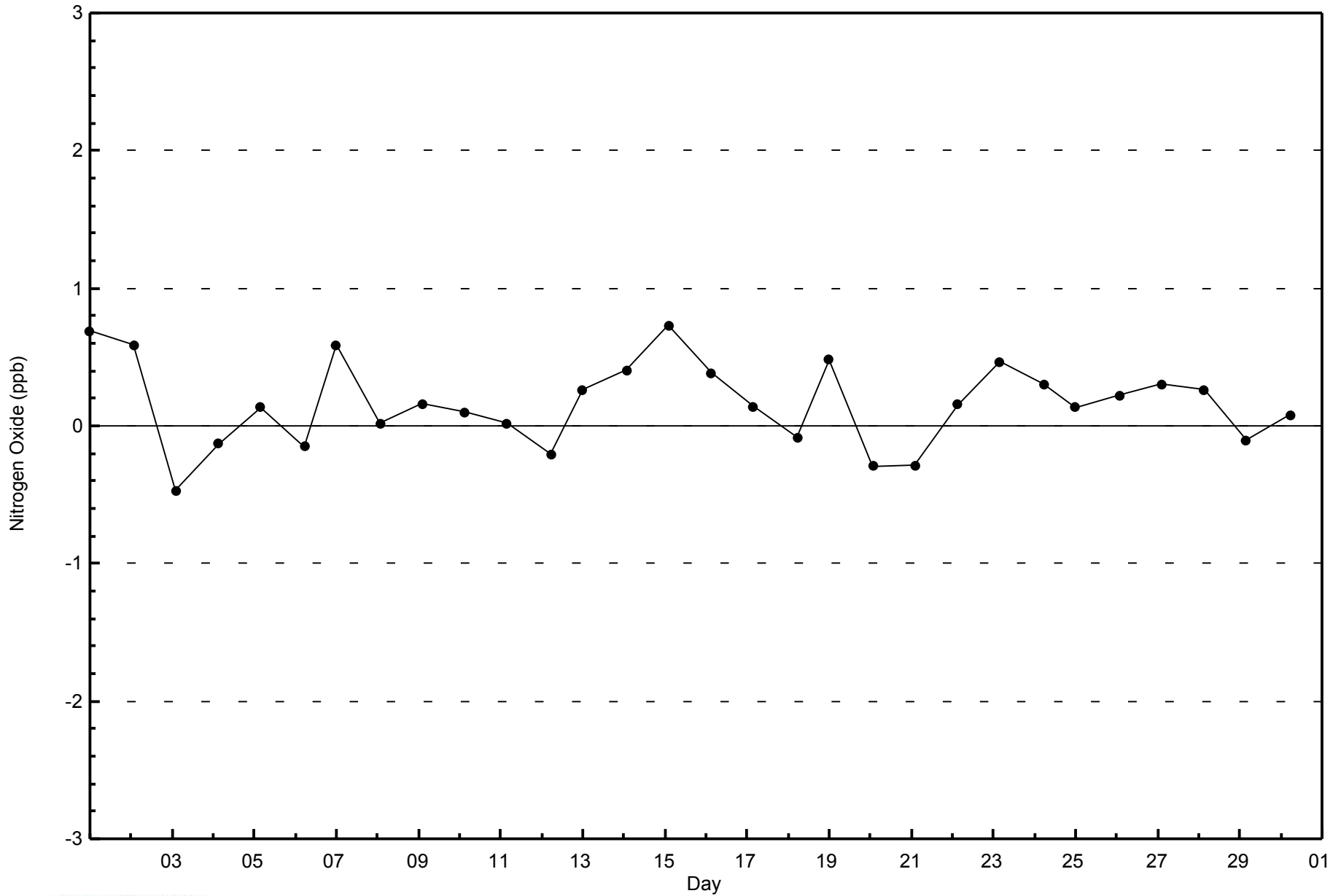
Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont (AMS502)





WBEA  
Zero Responses

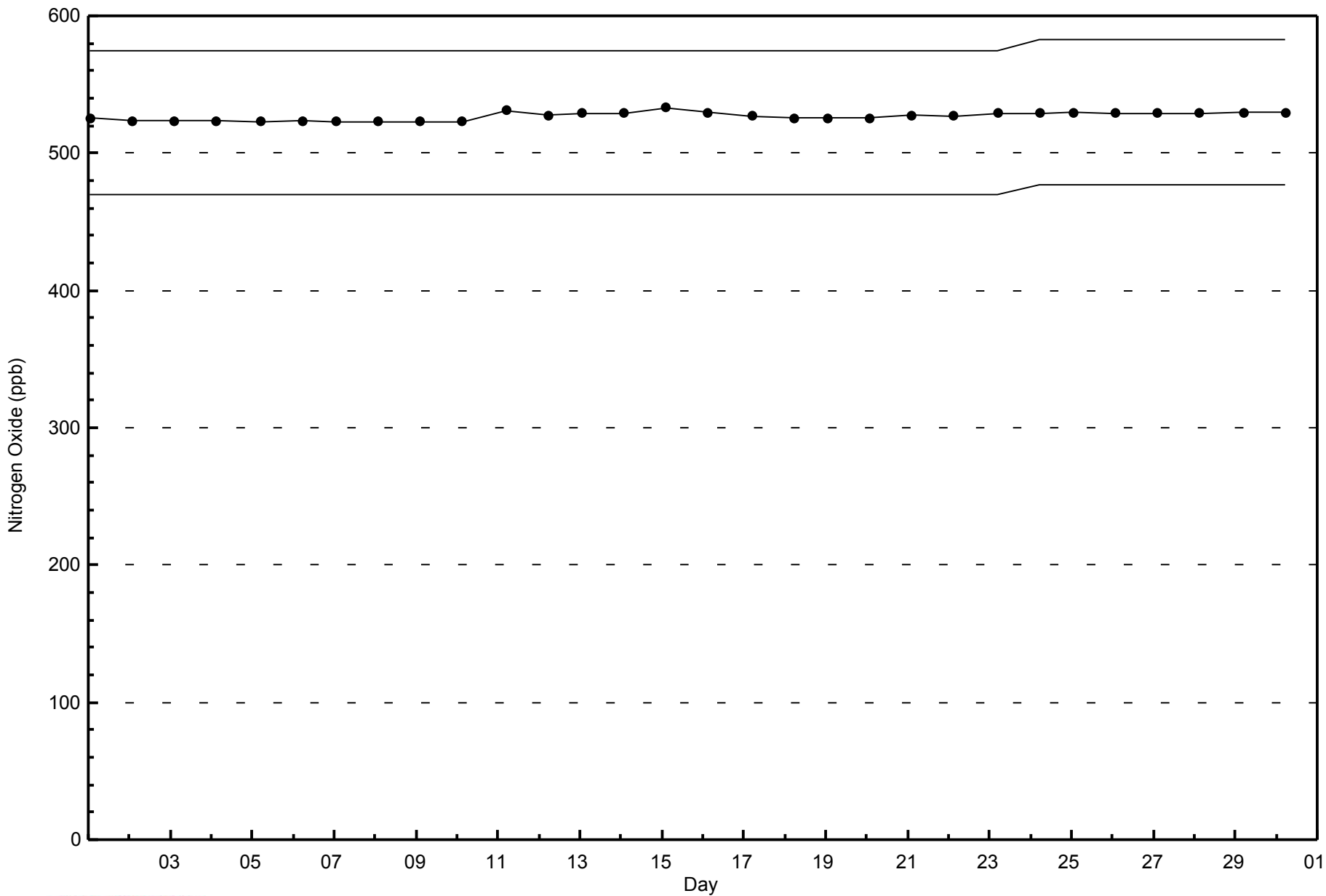
Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surrmont - April 2015





**WBEA**  
**Span Responses**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - April 2015**





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	720
Maximum Value: 29 ppb on Apr 12 22:00	Maximum Daily Average: 5.7 ppb on Apr 18		Hours of Data:	683
Minimum Value: 0 ppb on Apr 22 18:00	Minimum Daily Average: 0.3 ppb on Apr 30		Hours of Missing Data:	37
Maximum Diurnal Average: 4.5 ppb at hour 22	Minimum Diurnal Average: 1.9 ppb at hour 17		Hours of Calibration:	36
Monthly Average: 2.9 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 4 P <sub>90</sub> = 6 P <sub>99</sub> = 13		Percent Operational Time:	99.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Apr	Z	1	0	0	2	3	2	1	1	1	3	3	3	2	3	3	3	4	4	3	3	3	2	1	2.2	4
2-Apr	1	Z	2	2	1	2	3	2	2	1	1	1	4	3	1	7	6	9	5	5	3	5	7	6	3.4	9
3-Apr	3	1	Z	1	6	4	2	3	3	2	1	1	1	3	1	4	5	6	3	3	3	6	6	6	3.3	6
4-Apr	1	1	4	Z	8	6	4	3	2	2	1	1	2	3	2	1	2	2	4	5	13	8	3	4	3.6	13
5-Apr	4	4	1	1	Z	2	5	2	1	4	3	3	2	2	2	2	2	3	4	6	8	5	2	1	3.0	8
6-Apr	2	11	6	4	5	Z	4	9	4	5	5	5	5	6	5	4	2	2	2	3	5	4	4	3	4.5	11
7-Apr	Z	2	5	7	4	5	7	8	8	6	5	4	3	5	5	6	3	2	3	3	5	4	3	1	4.5	8
8-Apr	2	Z	2	2	1	1	1	2	1	1	1	2	5	8	6	4	4	4	4	8	9	10	10	14	4.4	14
9-Apr	9	5	Z	5	5	4	6	13	10	7	6	3	4	3	2	1	1	1	0	4	1	1	0	1	3.9	13
10-Apr	0	1	1	Z	1	1	3	2	2	3	4	4	5	5	5	5	3	3	3	4	3	6	6	8	3.3	8
11-Apr	4	3	4	2	Z	1	2	1	2	7	9	9	1	2	1	3	3	0	0	1	0	0	0	0	2.5	9
12-Apr	0	0	0	0	0	Z	1	2	2	1	2	0	0	2	2	2	1	0	0	10	26	29	6	8	4.1	29
13-Apr	Z	3	0	0	0	0	0	0	1	3	5	8	2	9	6	6	2	2	4	4	9	11	15	4	4.0	15
14-Apr	5	Z	11	6	5	5	3	4	5	4	2	2	1	2	3	3	2	5	5	2	2	1	3	4	3.7	11
15-Apr	3	2	Z	3	1	0	1	1	1	2	1	1	1	1	1	4	1	2	3	2	2	4	3	5	1.9	5
16-Apr	1	1	2	Z	0	1	2	1	2	2	2	3	1	2	2	3	1	1	1	2	4	9	3	4	2.1	9
17-Apr	5	8	8	1	Z	1	4	7	7	9	3	4	7	6	2	3	6	5	5	3	5	3	3	1	4.5	9
18-Apr	0	1	2	4	3	Z	14	14	5	5	12	15	19	12	9	3	3	1	0	4	1	3	1	0	5.7	19
19-Apr	Z	3	0	3	5	5	5	5	2	4	7	1	1	2	4	1	1	0	2	1	2	1	1	3	2.6	7
20-Apr	3	Z	0	0	1	1	1	6	6	6	4	1	1	1	1	1	2	2	1	2	2	9	6	4	2.6	9
21-Apr	2	1	Z	2	1	1	3	3	3	3	3	4	4	Z	2	1	1	1	0	0	1	1	1	1	1.6	4
22-Apr	1	2	3	Z	3	2	2	1	0	C	C	C	C	C	C	1	0	0	0	0	0	0	0	0	--	3
23-Apr	0	0	0	0	Z	1	0	2	1	1	0	0	0	0	1	1	0	0	0	0	0	1	1	1	0.4	2
24-Apr	0	0	0	0	2	Z	0	0	1	1	0	0	0	1	0	1	1	1	1	0	0	0	0	2	0.6	2
25-Apr	Z	2	4	3	5	5	2	1	1	1	0	0	0	0	0	1	0	0	0	1	1	1	2	6	1.6	6
26-Apr	3	Z	8	4	1	1	1	3	1	1	1	1	1	0	1	1	0	0	0	1	2	1	2	7	1.7	8
27-Apr	6	6	Z	1	1	1	2	4	3	5	4	3	2	2	2	1	0	1	1	1	3	2	1	1	2.3	6
28-Apr	1	1	2	Z	3	3	3	8	4	3	6	4	3	4	4	4	4	5	3	7	7	8	5	2	4.0	8
29-Apr	1	5	5	4	Z	3	3	8	5	7	2	3	5	1	1	0	1	0	0	0	0	0	0	0	2.4	8
30-Apr	1	1	0	0	1	Z	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1

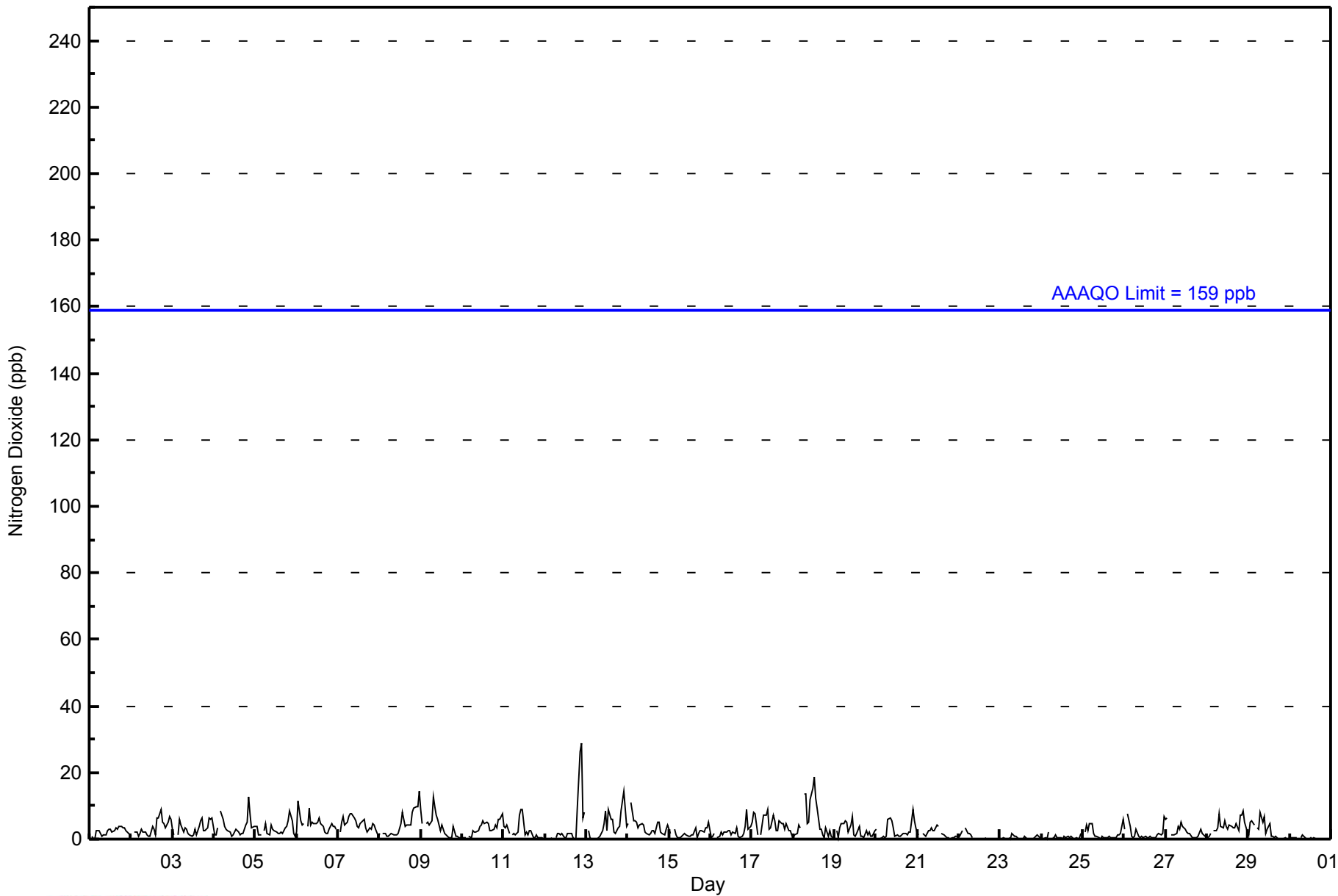
2.3	2.6	2.8	2.2	2.7	2.3	2.8	3.9	2.9	3.3	3.2	3.0	3.0	3.1	2.5	2.4	1.9	2.0	1.9	2.8	4.1	4.5	3.2	3.2	Diurnal Average	
9	11	11	7	8	6	14	14	10	9	12	15	19	12	9	7	6	9	5	10	26	29	15	14	Diurnal Maximum	

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



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	681	99.71	99.71
21 - 40	2	0.29	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - April 2015**

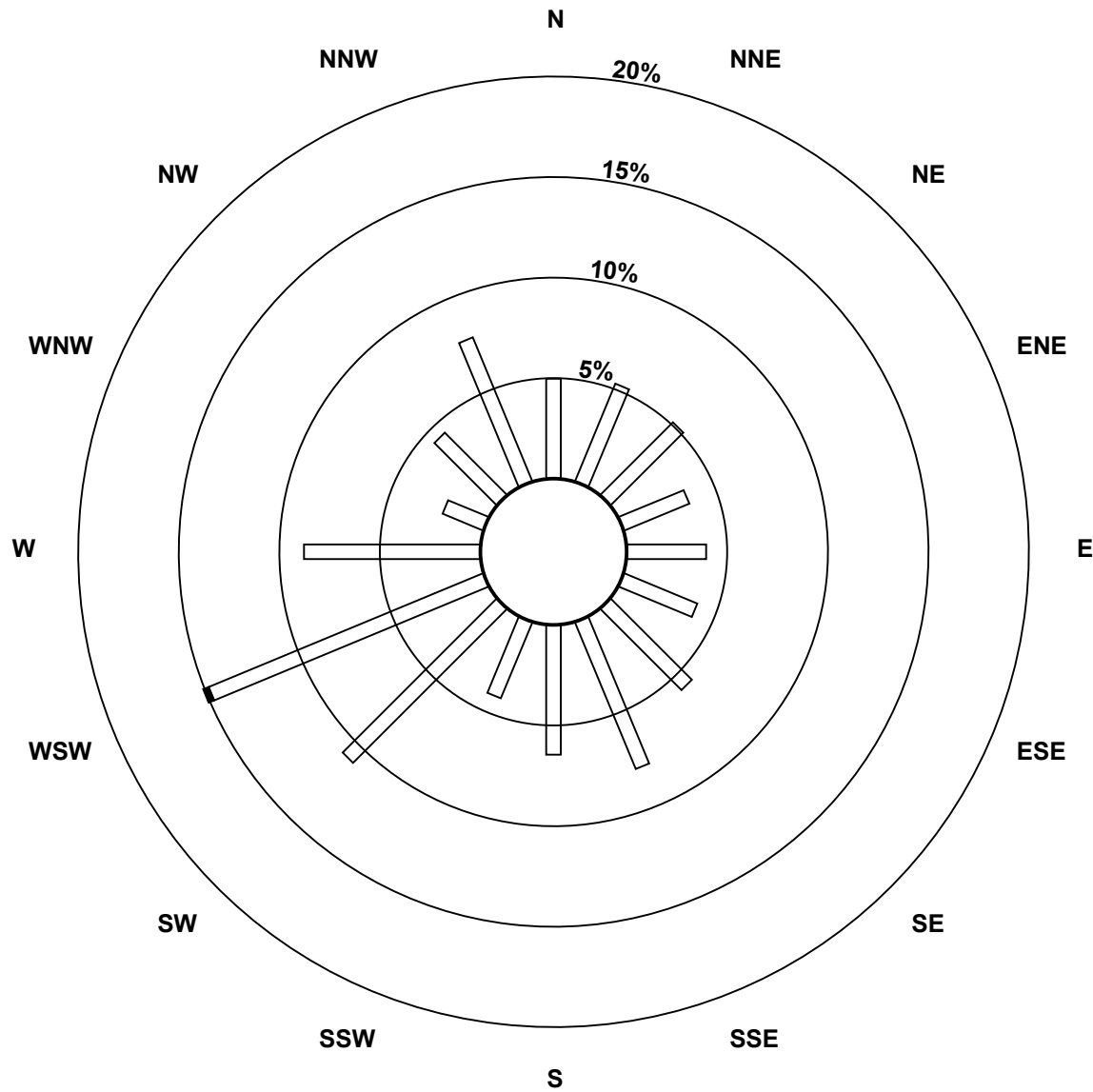
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	34	36	35	24	27	27	39	54	44	28	74	101	60	15	30	53	681
21 - 40	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	34	36	35	24	27	27	39	54	44	28	74	103	60	15	30	53	683

Total Number of Valid Hours: 683

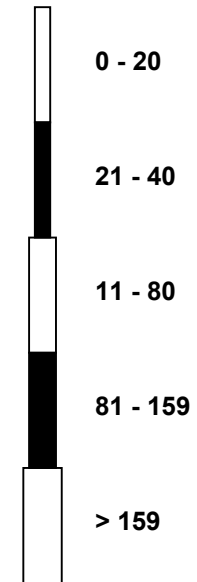
Total Number of Hours: 720

Wood Buffalo Environmental Association  
Wind Rose Apr 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



Classes (ppb)



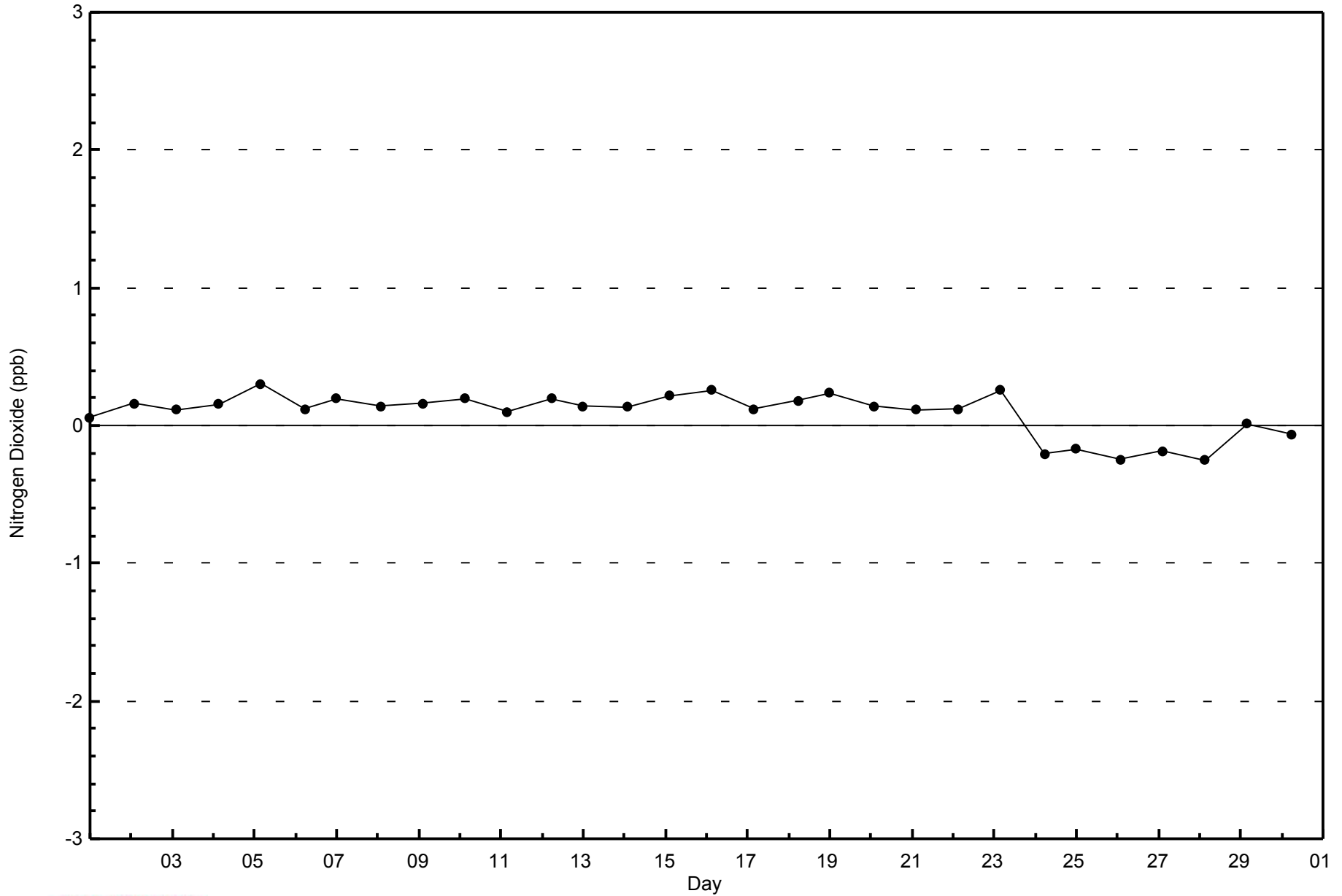
Total Number of Valid Hours: 683





WBEA  
Zero Responses

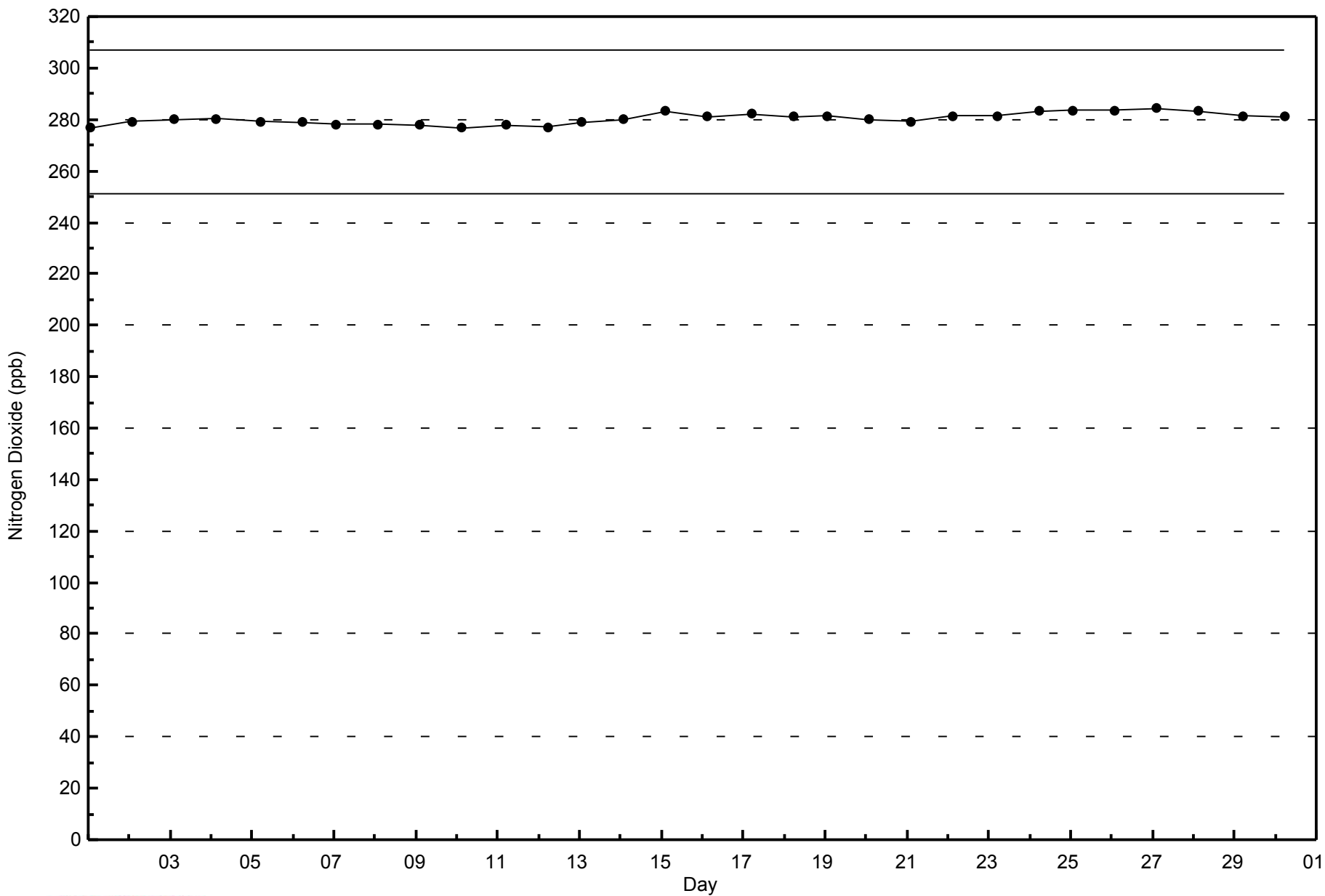
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surrmont - April 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - April 2015



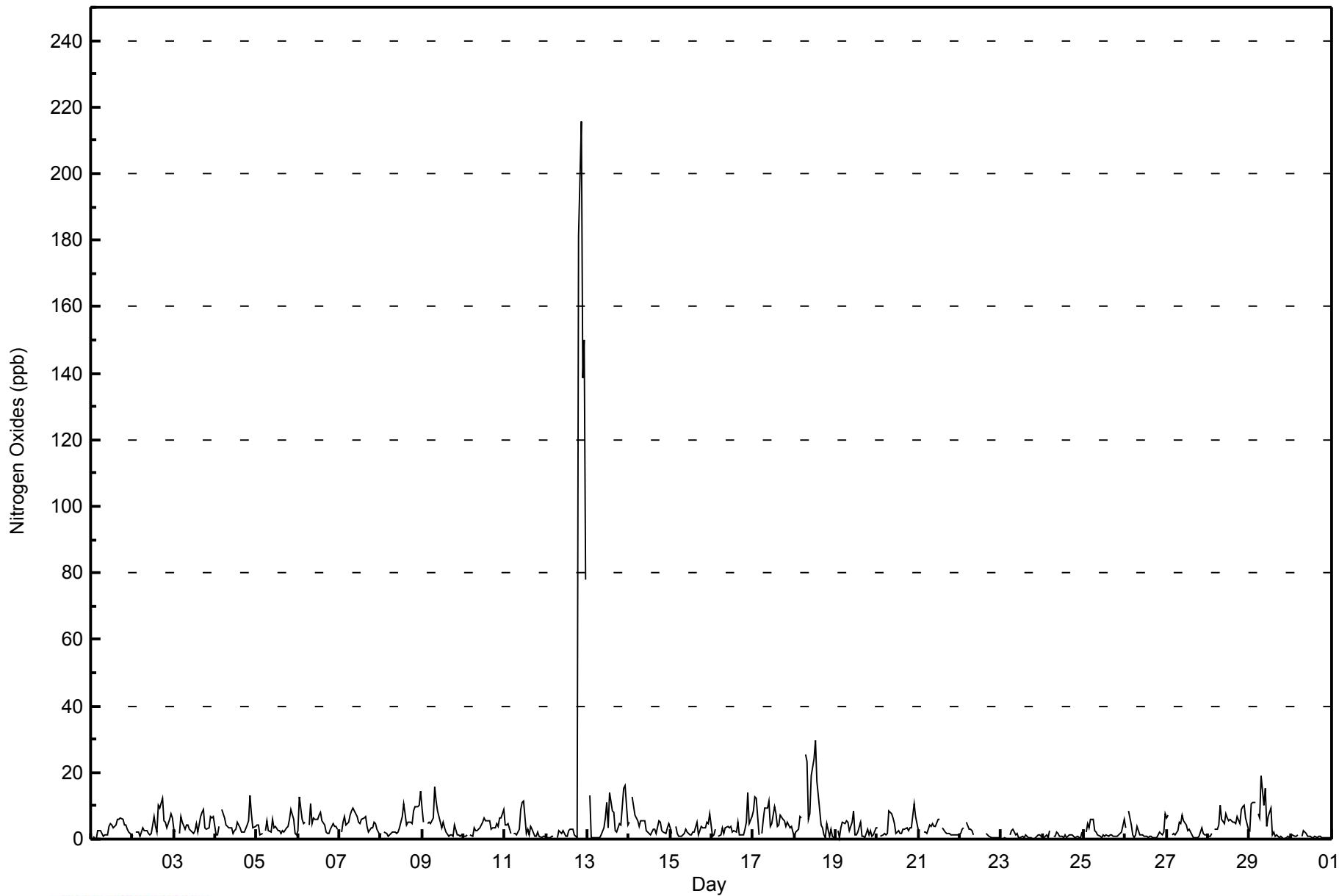


Maximum Value: 215 ppb on Apr 12 21:00																	Maximum Daily Average: 34.3 ppb on Apr 12																	Hours in Service: 720	
Minimum Value: 0 ppb on Apr 23 02:00																	Minimum Daily Average: 0.8 ppb on Apr 23																	Hours of Data: 683	
Maximum Diurnal Average: 10.8 ppb at hour 21																	Minimum Diurnal Average: 2.5 ppb at hour 19																	Hours of Missing Data: 37	
Monthly Average: 4.8 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 5 P <sub>90</sub> = 8 P <sub>99</sub> = 24																	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-Apr	Z	1	0	0	2	3	2	1	1	1	4	5	4	3	4	6	6	6	6	4	4	3	2	1	3.0	6									
2-Apr	1	Z	2	2	1	2	3	2	3	2	1	2	7	4	2	10	9	12	6	5	4	6	7	6	4.3	12									
3-Apr	3	2	Z	2	7	5	3	4	4	3	2	2	2	5	2	7	8	9	3	3	3	7	6	7	4.3	9									
4-Apr	1	1	4	Z	9	7	4	4	3	3	2	2	3	5	3	2	2	2	4	5	13	8	3	4	4.2	13									
5-Apr	4	4	1	2	Z	3	6	3	2	6	3	4	3	2	2	3	2	4	4	6	9	6	2	1	3.4	9									
6-Apr	2	13	6	5	5	Z	4	10	5	6	6	6	7	8	5	4	2	2	2	3	5	4	4	3	5.1	13									
7-Apr	Z	2	5	7	4	5	7	9	9	8	7	5	5	6	6	7	4	2	3	3	5	5	3	1	5.1	9									
8-Apr	2	Z	2	2	1	1	2	2	2	2	2	3	7	11	7	4	5	5	5	9	10	10	10	15	5.1	15									
9-Apr	9	5	Z	5	5	5	6	16	11	8	7	3	5	4	2	1	1	1	1	4	1	1	1	1	4.6	16									
10-Apr	1	1	1	Z	1	1	3	3	3	3	4	5	6	6	6	5	3	3	3	5	4	6	6	9	3.9	9									
11-Apr	4	4	5	2	Z	2	2	1	3	9	11	11	1	3	1	4	3	1	1	2	1	1	1	1	3.2	11									
12-Apr	1	1	1	1	1	Z	1	2	2	2	3	1	1	2	3	3	1	1	0	181	215	138	150	78	34.3	215									
13-Apr	Z	13	1	0	0	0	0	1	1	3	6	11	3	14	8	8	3	2	5	4	10	15	16	4	5.7	16									
14-Apr	5	Z	13	7	7	5	4	6	6	5	3	2	1	2	3	3	2	6	5	3	2	2	3	5	4.3	13									
15-Apr	3	2	Z	4	2	1	1	1	2	3	2	1	1	2	2	5	1	3	4	3	3	5	5	7	2.8	7									
16-Apr	1	1	3	Z	1	1	3	2	3	4	3	4	2	3	2	5	1	1	1	3	5	14	5	7	3.3	14									
17-Apr	9	13	12	1	Z	2	6	9	9	11	4	5	10	8	4	4	7	6	6	4	5	3	4	2	6.3	13									
18-Apr	1	2	3	7	7	Z	25	23	6	8	19	24	30	17	13	4	4	1	1	5	1	3	1	0	8.9	30									
19-Apr	Z	3	0	3	5	5	6	5	2	5	8	1	1	2	5	1	1	1	3	1	2	1	1	3	2.9	8									
20-Apr	3	Z	1	1	2	1	2	9	8	7	5	2	3	2	2	3	3	4	3	3	3	11	7	5	3.7	11									
21-Apr	3	3	Z	2	2	2	4	4	5	4	4	6	6	M	3	2	2	2	2	1	1	1	1	1	2.8	6									
22-Apr	2	3	3	Z	5	3	3	3	1	C	C	C	C	C	C	2	1	1	0	0	0	1	1	1	--	5									
23-Apr	0	0	1	0	Z	1	2	3	1	2	0	0	1	1	1	1	0	0	0	0	0	1	1	1	0.8	3									
24-Apr	1	1	1	0	3	Z	1	1	2	1	1	1	1	1	1	1	1	1	1	0	1	0	0	2	1.1	3									
25-Apr	Z	2	5	3	6	6	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	6	2.1	6									
26-Apr	3	Z	8	4	1	1	1	4	1	1	1	1	1	1	1	1	1	0	1	1	2	1	2	7	2.0	8									
27-Apr	6	7	Z	1	2	1	2	5	5	7	5	4	3	3	2	1	0	1	1	1	3	2	1	1	2.8	7									
28-Apr	1	1	2	Z	3	3	4	10	6	5	8	6	6	6	5	5	5	7	5	9	10	10	6	3	5.4	10									
29-Apr	3	10	11	11	Z	8	6	19	10	15	4	7	9	1	2	1	1	0	1	0	0	1	1	1	5.3	19									
30-Apr	1	1	1	1	1	Z	1	3	2	2	1	1	1	1	1	0	1	1	0	1	1	0	0	0	0.9	3									
																	Diurnal Average		Diurnal Maximum																
																	9		78																
Z - zerospan																	C - Calibration		M - Maintenance																



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont - April 2015





**WBEA**  
**Cumulative Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	674	98.68	98.68
21 - 40	4	0.59	99.27
11 - 80	1	0.15	99.41
81 - 159	2	0.29	99.71
> 159	2	0.29	100.00

Total Number of Valid Hours: 683

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - April 2015**

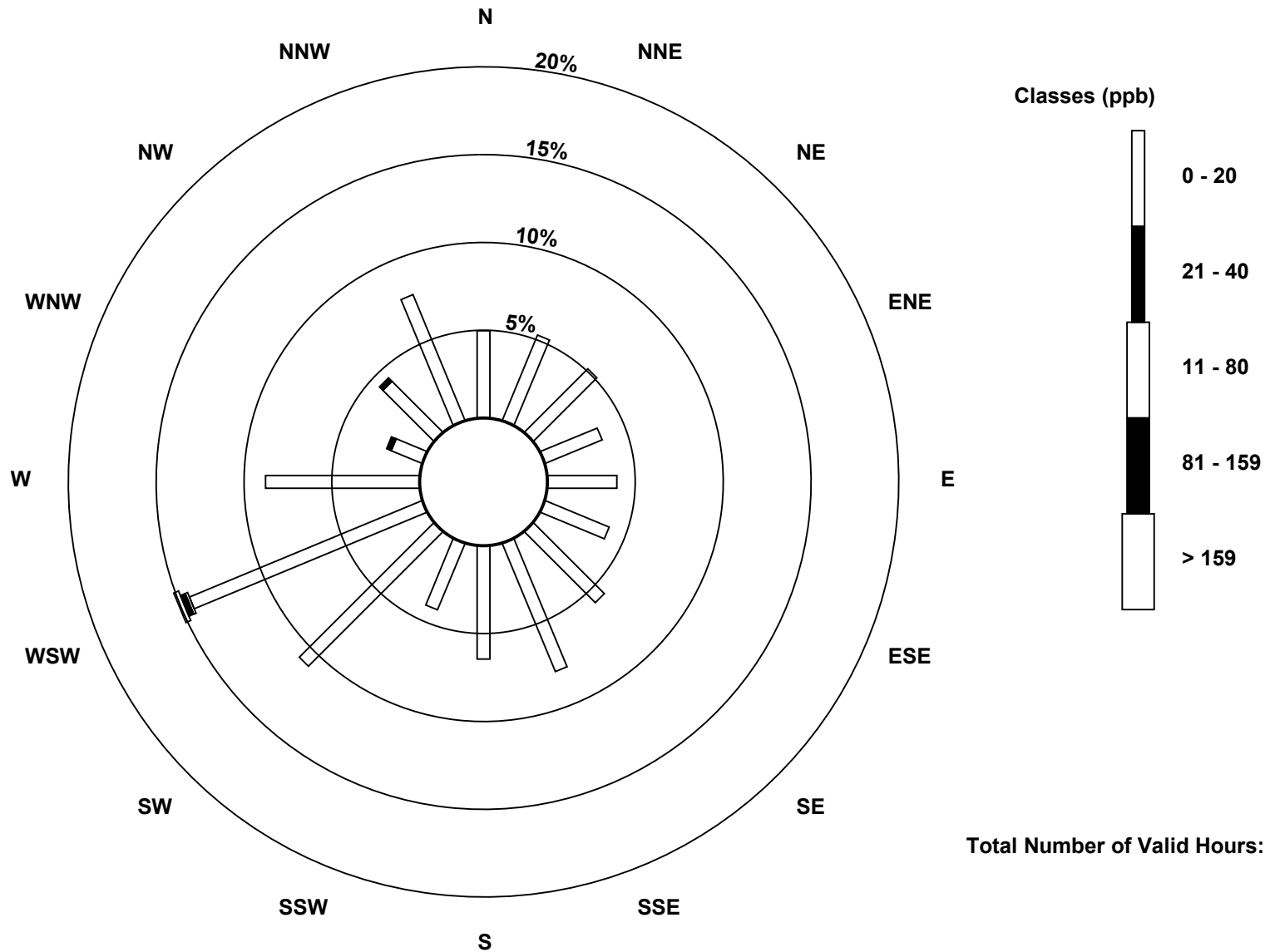
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	34	36	35	24	27	27	39	54	44	28	74	98	60	13	28	53	674
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	4
11 - 80	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
<b>Totals</b>	34	36	35	24	27	27	39	54	44	28	74	103	60	15	30	53	683

Total Number of Valid Hours: 683

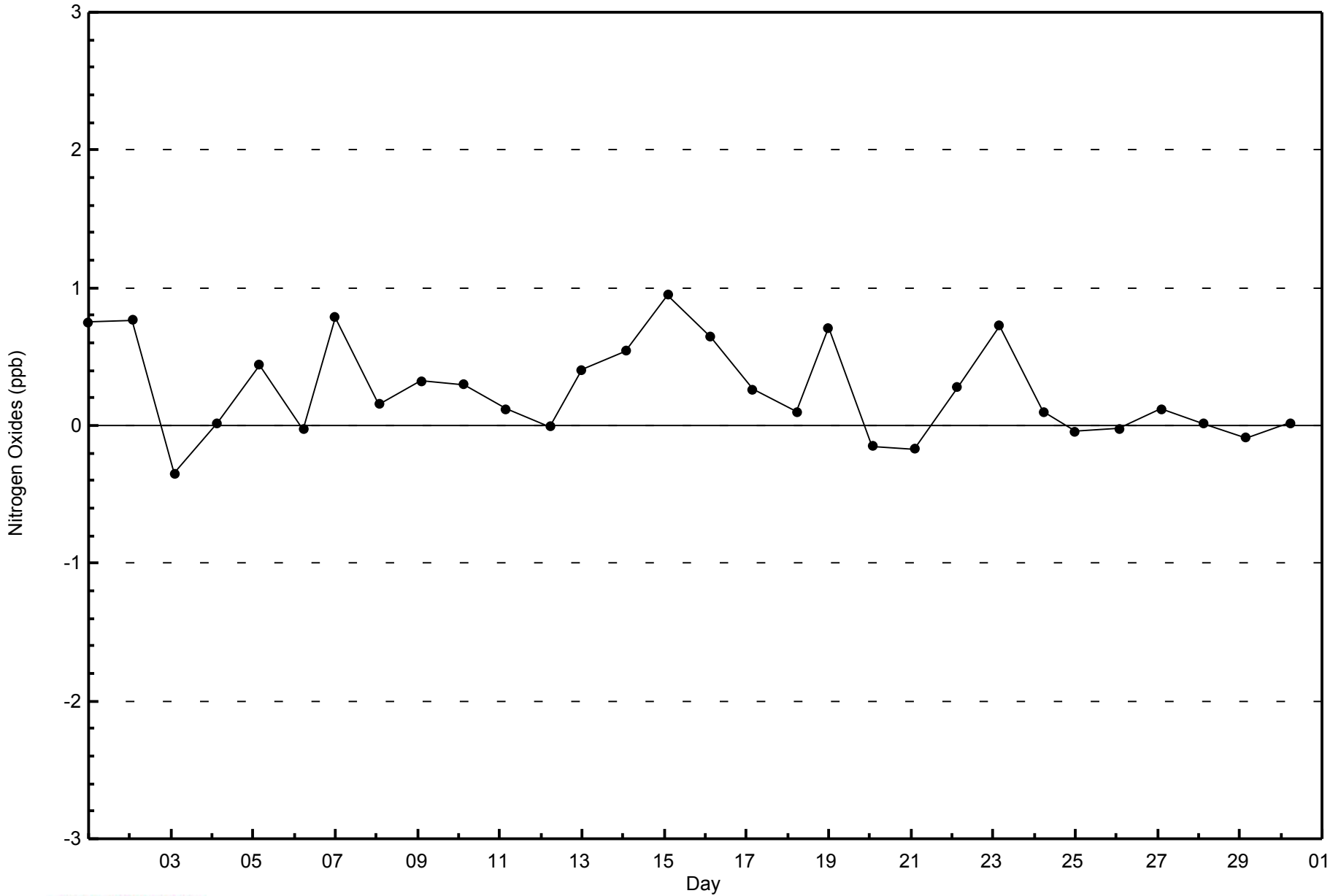
Total Number of Hours: 720

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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)**



**Total Number of Valid Hours: 683**

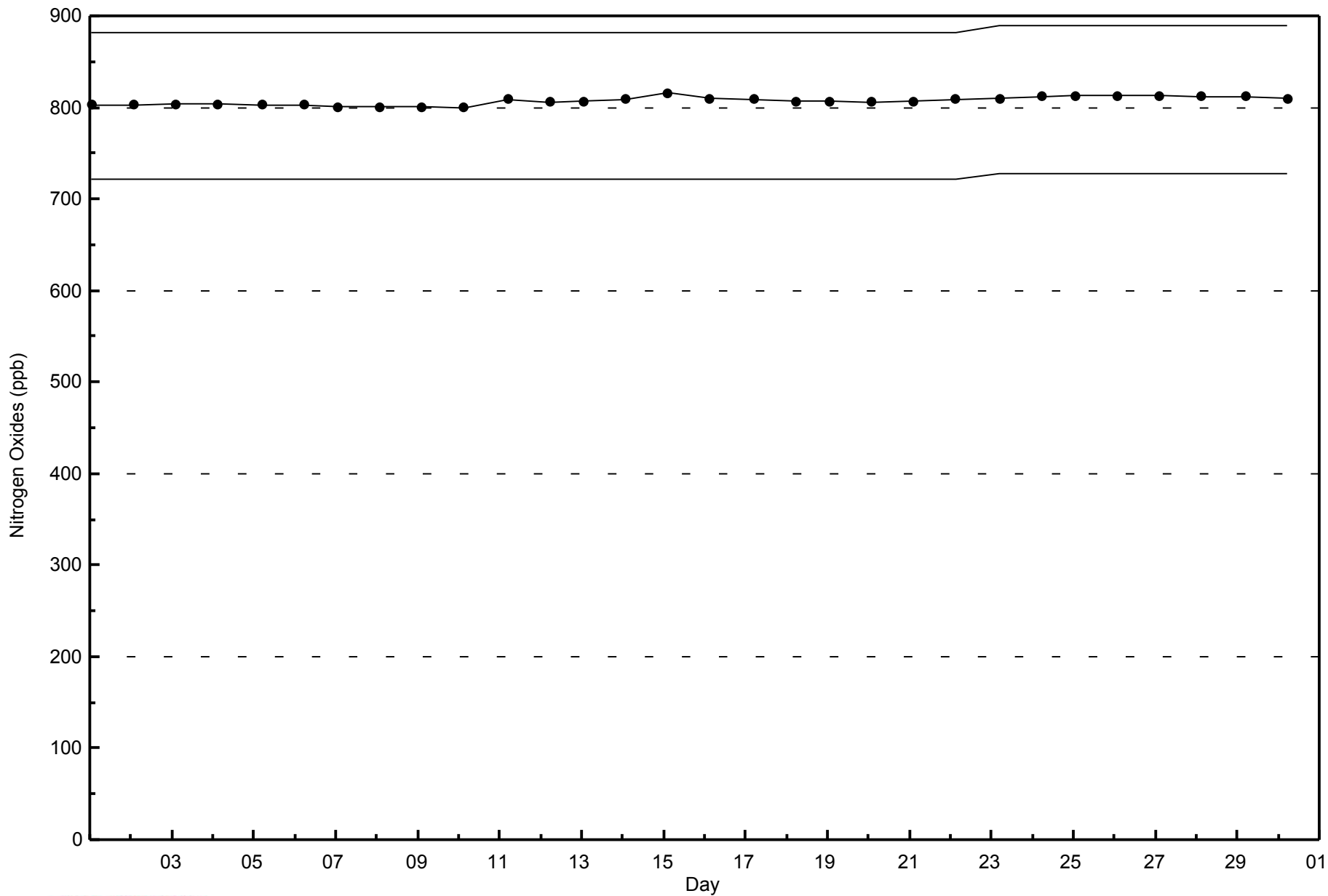






**WBEA**  
**Span Responses**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surrmont - April 2015**



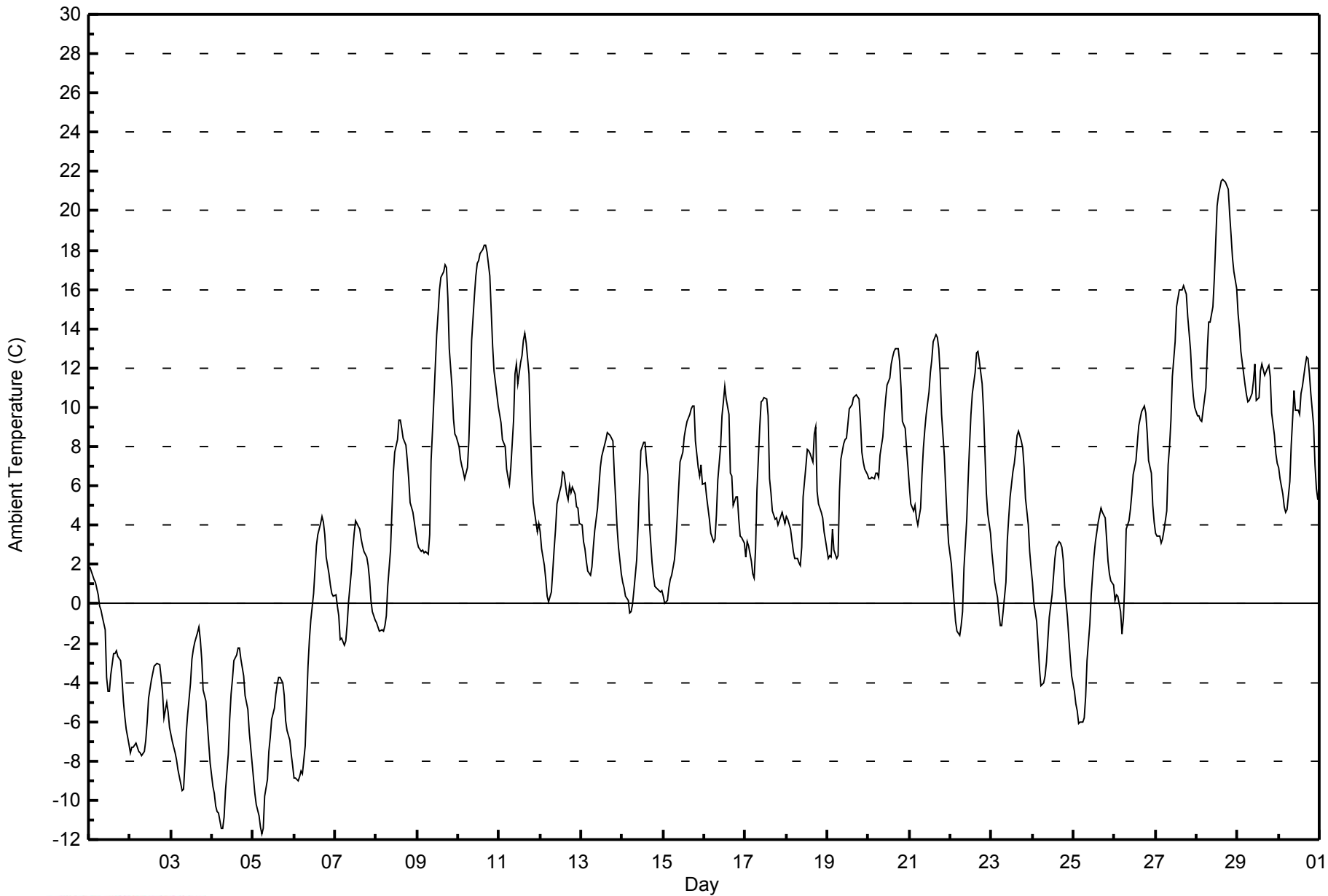


Maximum Value: 21.6 C on Apr 28 16:00																				Maximum Daily Average: 16.2 C on Apr 28					Hours in Service: 720																								
Minimum Value: -11.7 C on Apr 5 06:00																				Minimum Daily Average: -7.4 C on Apr 5					Hours of Data: 720																								
Maximum Diurnal Average: 8.0 C at hour 16																				Minimum Diurnal Average: 0.1 C at hour 6					Hours of Missing Data: 0																								
Monthly Average: 4.16 C																				Percentiles: P <sub>1</sub> = -10.7 P <sub>10</sub> = -5.5 Q <sub>1</sub> = 0.0 Median = 4.3 Q <sub>3</sub> = 8.9 P <sub>90</sub> = 12.3 P <sub>99</sub> = 19.9					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-Apr	1.9	1.7	1.4	1.3	1.1	0.4	-0.1	-0.3	-0.7	-1.4	-3.8	-4.5	-4.4	-3.6	-2.5	-2.5	-2.4	-2.7	-2.9	-3.8	-5.0	-5.7	-6.4	-7.2	-2.2	1.9																							
2-Apr	-7.6	-7.3	-7.3	-7.1	-7.3	-7.5	-7.6	-7.7	-7.5	-6.9	-6.0	-4.8	-3.9	-3.5	-3.1	-3.1	-3.0	-3.1	-3.7	-4.5	-5.8	-5.0	-5.5	-6.3	-5.6	-3.0																							
3-Apr	-6.7	-7.0	-7.6	-8.0	-8.4	-8.8	-9.5	-9.4	-8.1	-6.5	-5.6	-4.0	-2.8	-2.3	-2.0	-1.5	-1.2	-1.8	-2.8	-4.4	-4.9	-6.1	-7.1	-8.1	-5.6	-1.2																							
4-Apr	-9.3	-9.7	-10.3	-10.6	-10.7	-11.4	-11.4	-10.9	-9.5	-7.7	-5.9	-4.6	-3.8	-2.9	-2.6	-2.3	-2.3	-2.8	-3.6	-4.7	-5.1	-5.4	-6.5	-8.1	-6.7	-2.3																							
5-Apr	-8.8	-9.6	-10.2	-10.8	-11.3	-11.7	-11.4	-9.8	-8.9	-7.5	-6.8	-5.9	-5.3	-4.6	-4.1	-3.7	-3.7	-4.0	-4.7	-5.9	-6.4	-6.9	-7.6	-8.2	-7.4	-3.7																							
6-Apr	-8.9	-8.8	-9.0	-8.8	-8.5	-8.7	-7.2	-5.2	-3.2	-1.8	-0.8	0.5	1.7	3.0	3.5	4.1	4.5	4.1	3.5	2.4	1.6	0.9	0.5	0.4	-1.7	4.5																							
7-Apr	0.4	-0.1	-0.6	-1.8	-1.7	-2.1	-1.9	-1.0	0.1	1.7	2.8	3.6	4.2	4.1	3.8	3.3	3.0	2.6	2.4	2.0	1.2	0.2	-0.4	-0.8	1.0	4.2																							
8-Apr	-1.0	-1.2	-1.4	-1.3	-1.4	-1.1	-0.6	0.9	2.7	4.8	6.6	7.7	8.4	9.4	9.4	9.0	8.5	8.1	7.3	6.3	5.2	4.7	4.2	3.7	4.1	9.4																							
9-Apr	3.2	2.9	2.6	2.7	2.6	2.7	2.5	3.5	7.3	8.8	10.4	13.7	14.8	15.9	16.6	16.9	17.3	17.1	15.6	13.0	11.0	9.4	8.7	8.5	9.5	17.3																							
10-Apr	8.0	7.3	7.0	6.7	6.4	6.9	8.3	10.6	13.4	15.7	16.7	17.3	17.5	17.8	18.0	18.2	18.3	17.9	16.7	14.9	13.2	11.8	11.3	10.0	12.9	18.3																							
11-Apr	9.6	9.2	8.4	8.0	6.9	6.4	6.1	6.9	9.4	11.7	12.2	11.2	12.3	12.6	13.4	13.7	13.3	11.7	9.0	6.6	5.2	4.2	3.7	4.1	9.0	13.7																							
12-Apr	3.6	2.8	2.0	1.2	0.4	0.1	0.6	1.7	2.8	3.8	5.1	5.7	6.0	6.7	6.7	5.6	5.3	6.0	5.7	6.0	5.6	4.9	4.8	4.1	4.1	6.7																							
13-Apr	4.0	3.2	2.8	2.1	1.6	1.5	1.9	2.9	3.7	4.8	5.9	6.9	7.5	7.8	8.4	8.7	8.6	8.6	8.3	6.6	5.3	3.9	2.8	1.5	5.0	8.7																							
14-Apr	1.1	0.8	0.4	0.1	-0.4	-0.4	-0.1	0.7	2.2	3.9	6.1	7.8	8.2	8.2	7.2	6.6	4.2	2.1	1.4	0.9	0.8	0.7	0.6	0.7	2.7	8.2																							
15-Apr	0.4	0.0	0.2	0.8	1.2	1.4	2.2	3.1	4.4	5.8	7.2	7.7	8.5	8.9	9.3	9.7	10.0	10.0	10.0	8.3	6.9	6.5	7.1	6.1	5.7	10.0																							
16-Apr	6.1	5.5	4.8	4.3	3.6	3.2	3.3	4.5	6.3	8.0	9.5	10.3	11.1	10.4	9.7	6.6	6.5	5.0	5.4	5.4	4.3	3.4	3.4	3.1	6.0	11.1																							
17-Apr	2.4	3.2	3.0	2.2	1.6	1.3	2.8	5.8	9.0	10.3	10.4	10.5	10.4	9.6	6.3	5.6	4.7	4.3	4.4	4.0	4.3	4.6	4.4	4.1	5.4	10.5																							
18-Apr	4.5	4.3	3.8	3.2	2.7	2.3	2.3	2.1	2.0	2.8	5.4	7.0	7.9	7.8	7.7	7.2	8.7	9.0	5.8	5.1	4.6	4.4	3.7	3.3	4.9	9.0																							
19-Apr	2.3	2.5	2.4	3.8	2.7	2.3	2.4	5.7	7.3	8.1	8.4	8.4	9.1	10.0	10.1	10.5	10.5	10.7	10.4	9.3	7.7	7.2	6.9	6.6	6.9	10.7																							
20-Apr	6.4	6.4	6.4	6.3	6.7	6.6	6.4	7.6	8.5	9.5	10.4	11.1	11.5	12.2	12.6	12.8	13.0	13.0	12.3	11.0	9.3	8.9	7.8	6.9	9.3	13.0																							
21-Apr	5.9	5.1	4.7	5.0	4.4	4.0	4.9	6.6	8.0	8.9	9.6	10.8	11.8	12.4	13.3	13.7	13.5	13.0	11.7	9.7	7.5	5.8	4.3	3.1	8.2	13.7																							
22-Apr	2.0	0.9	0.0	-0.9	-1.4	-1.6	-1.1	-0.4	1.8	4.3	6.3	8.1	9.6	10.7	11.8	12.7	12.8	12.3	11.2	9.8	7.7	5.7	4.6	3.6	5.4	12.8																							
23-Apr	2.6	1.9	1.1	0.3	-0.4	-1.1	-1.1	-0.4	1.1	3.2	4.4	5.5	6.8	7.2	7.8	8.6	8.8	8.3	8.0	6.9	5.4	4.0	2.6	1.8	3.9	8.8																							
24-Apr	1.1	0.0	-0.9	-2.0	-3.3	-4.1	-4.0	-3.7	-3.0	-1.8	-0.7	0.4	1.4	2.3	2.9	3.2	3.1	2.9	2.3	0.9	-0.7	-1.7	-2.7	-3.6	-0.5	3.2																							
25-Apr	-4.5	-5.1	-5.5	-6.1	-6.0	-6.0	-5.8	-4.7	-2.9	-1.0	0.4	1.5	2.5	3.2	4.2	4.5	4.9	4.7	4.4	3.3	2.2	1.5	1.2	1.0	-0.3	4.9																							
26-Apr	0.2	0.4	0.4	-0.4	-1.5	-0.8	1.1	3.8	4.2	4.8	5.6	6.5	7.3	8.2	9.1	9.5	9.8	10.1	9.7	8.7	7.3	6.6	5.0	4.1	5.0	10.1																							
27-Apr	3.6	3.5	3.4	3.1	3.3	3.7	4.7	7.1	8.0	9.3	11.6	13.3	15.1	15.6	15.9	16.0	16.2	16.0	15.8	14.6	12.9	11.5	10.6	10.0	10.2	16.2																							
28-Apr	9.6	9.6	9.3	9.3	9.8	11.0	12.9	14.3	14.3	15.1	16.6	18.4	20.3	20.8	21.6	21.6	21.5	21.5	21.1	19.8	18.8	17.6	16.9	16.0	16.2	21.6																							
29-Apr	14.7	14.0	12.8	11.7	11.1	10.6	10.3	10.4	10.7	11.3	12.2	10.4	10.5	11.9	12.2	11.9	11.6	12.0	12.1	11.6	9.7	8.6	7.7	7.2	11.1	14.7																							
30-Apr	6.9	6.3	5.6	4.9	4.7	4.8	6.2	8.1	9.4	10.8	9.9	9.9	9.7	10.7	11.1	12.1	12.5	12.5	11.7	10.7	9.1	7.1	5.8	5.3	8.6	12.5																							
																								1.8	1.4	1.0	0.6	0.3	0.1	0.6	1.8	3.1	4.4	5.5	6.4	7.1	7.7	7.9	8.0	7.9	7.6	6.9	5.8	4.6	3.8	3.1	2.4	Diurnal Average	
																								14.7	14.0	12.8	11.7	11.1	11.0	12.9	14.3	14.3	15.7	16.7	18.4	20.3	20.8	21.6	21.6	21.5	21.5	21.1	19.8	18.8	17.6	16.9	16.0	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	0	0.00	0.00
-20 - 0	179	24.86	24.86
0 - 10	404	56.11	80.97
10 - 20	130	18.06	99.03
> 20	7	0.97	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720

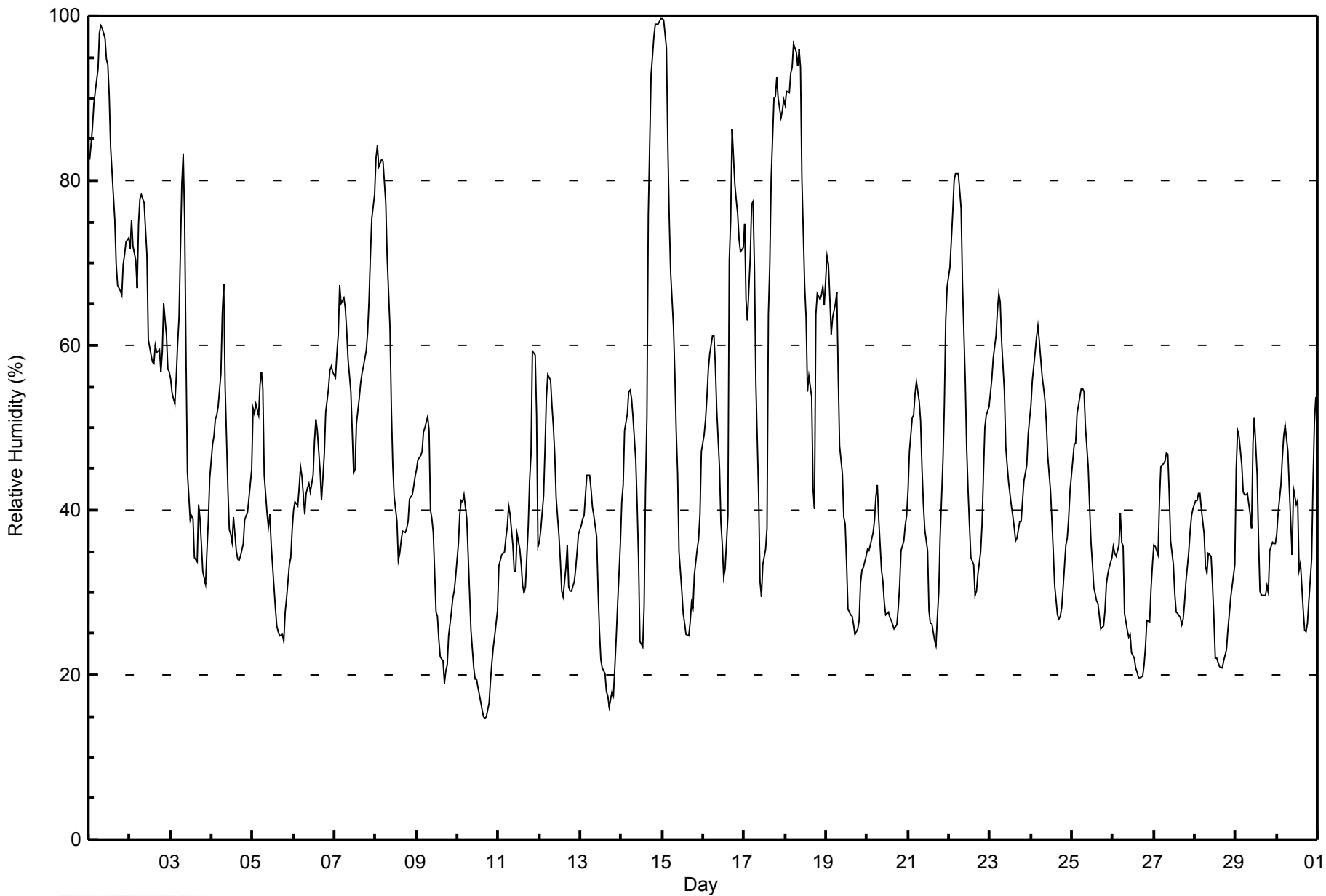


Maximum Value: 100 % on Apr 15 00:00																			Maximum Daily Average: 83.0 % on Apr 1						Hours in Service: 720	
Minimum Value: 15 % on Apr 10 17:00																			Minimum Daily Average: 25.8 % on Apr 10						Hours of Data: 720	
Maximum Diurnal Average: 58.6 % at hour 6																			Minimum Diurnal Average: 35.0 % at hour 14						Hours of Missing Data: 0	
Monthly Average: 46.5 %																			Percentiles: P <sub>1</sub> = 17 P <sub>10</sub> = 26 Q <sub>1</sub> = 33 Median = 42 Q <sub>3</sub> = 57 P <sub>90</sub> = 75 P <sub>99</sub> = 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-Apr	83	84	86	89	91	94	98	99	98	97	95	94	90	84	78	75	70	67	67	66	70	71	72	73	83.0	99
2-Apr	72	75	72	70	67	75	78	78	77	74	71	61	59	58	58	60	59	59	57	59	65	61	57	57	65.8	78
3-Apr	56	54	53	56	60	63	80	83	75	59	45	39	39	39	34	34	41	39	36	32	31	35	39	44	48.6	83
4-Apr	48	49	51	52	53	57	64	67	55	43	38	37	36	39	35	34	34	34	36	39	39	40	41	45	44.4	67
5-Apr	52	52	53	52	55	57	55	44	40	38	39	36	31	28	26	25	25	25	24	28	29	33	34	38	38.3	57
6-Apr	40	41	41	43	45	44	39	42	43	43	42	44	48	51	50	45	41	44	47	52	55	57	58	57	46.3	58
7-Apr	56	59	61	67	65	66	65	62	58	54	50	45	45	50	54	55	57	57	59	62	65	71	75	78	59.9	78
8-Apr	83	84	82	83	82	80	77	71	62	52	46	42	39	34	35	36	37	37	38	39	41	42	43	44	54.5	84
9-Apr	45	46	47	47	50	50	51	50	40	39	37	28	27	24	22	22	19	20	21	25	28	29	30	32	34.5	51
10-Apr	36	40	41	41	42	39	35	30	26	21	20	19	18	18	16	15	15	15	17	19	22	23	25	28	25.8	42
11-Apr	33	34	35	35	37	38	41	40	36	33	33	37	35	33	31	30	31	38	44	47	59	59	52	36	38.5	59
12-Apr	36	38	42	47	54	56	56	53	50	47	42	37	34	30	29	33	36	31	30	30	31	33	35	37	39.4	56
13-Apr	38	39	39	42	44	44	42	40	39	37	31	25	22	21	20	18	18	16	18	17	21	24	29	36	30.0	44
14-Apr	41	43	50	52	54	55	54	51	46	41	34	24	23	28	42	51	76	93	95	97	99	99	100	100	60.3	100
15-Apr	100	99	96	84	75	69	62	57	50	44	35	30	27	26	25	25	26	29	28	32	35	36	39	47	49.1	100
16-Apr	49	51	54	57	59	61	61	58	52	45	38	36	32	33	39	70	75	86	80	78	76	73	71	72	58.6	86
17-Apr	75	66	63	71	77	77	69	56	42	31	30	33	35	38	64	70	80	90	90	93	90	88	89	90	66.9	93
18-Apr	89	91	91	93	94	97	96	94	96	94	80	67	63	54	56	54	43	40	64	66	66	66	67	65	74.4	97
19-Apr	71	70	66	61	63	65	66	56	48	44	39	38	34	28	27	27	26	25	26	27	31	33	33	34	43.3	71
20-Apr	35	35	36	37	39	42	43	39	33	31	29	27	28	27	27	26	26	26	28	31	35	36	38	39	33.0	43
21-Apr	42	47	51	52	54	56	53	51	45	41	38	35	28	26	26	24	24	27	30	37	46	53	63	67	42.3	67
22-Apr	69	73	76	80	81	81	79	77	68	56	47	42	38	34	33	30	30	32	35	38	44	50	52	52	54.1	81
23-Apr	54	56	58	61	64	66	65	60	54	48	45	43	41	39	38	36	37	39	39	41	44	45	49	51	49.0	66
24-Apr	53	56	59	61	62	60	56	55	53	51	47	42	39	35	31	27	27	27	28	31	36	37	39	42	43.9	62
25-Apr	46	48	48	52	53	55	55	54	50	45	40	36	33	31	29	29	27	26	26	28	31	32	33	34	39.2	55
26-Apr	36	35	34	36	40	36	36	27	25	25	25	23	22	21	20	20	20	20	21	23	27	26	30	33	27.5	40
27-Apr	36	36	35	41	45	45	46	47	47	42	36	33	30	28	27	27	26	27	29	31	35	37	39	40	36.1	47
28-Apr	41	41	42	42	40	37	33	32	35	34	31	27	22	22	21	21	21	22	23	25	27	29	31	33	30.6	42
29-Apr	45	50	49	45	42	42	42	42	40	38	48	51	44	36	30	30	30	30	31	30	35	36	36	36	39.1	51
30-Apr	37	40	43	46	49	50	47	43	39	35	43	41	41	33	34	28	25	25	26	29	34	43	51	54	39.0	54
																			53.2 54.3 55.1 56.5 57.9 58.6 58.1 55.3 50.7 46.0 42.4 39.1 36.8 35.0 35.3 35.9 36.6 38.2 39.7 41.7 44.9 46.7 48.3 49.8						Diurnal Average	
																			100 99 96 93 94 97 98 99 98 97 95 94 90 84 78 75 80 93 95 97 99 99 99 100						Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - April 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	19	2.64	2.64
20 - 40	314	43.61	46.25
40 - 60	234	32.50	78.75
60 - 80	100	13.89	92.64
80 - 100	53	7.36	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



Maximum Speed: 39 km/h on Apr 13 09:00	Maximum Daily Speed Average: 27.8 km/h on Apr 12	Hours in Service: 720
Minimum Speed Value: 2 km/h on Apr 13 21:00	Minimum Daily Speed Average: 2.0 km/h on Apr 21	Hours of Data: 720
Maximum Diurnal Speed Average: 9.2 km/h at hour 5	Minimum Diurnal Speed Average: 1.8 km/h at hour 20	Hours of Missing Data: 0
Monthly Average Velocity: 5.3 km/h 244.7 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 7 Q <sub>1</sub> = 10 Median = 13 Q <sub>3</sub> = 19 P <sub>90</sub> = 25 P <sub>99</sub> = 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-Apr	NNE12	NNE14	NNE15	N17	NNE20	NNE18	N17	N22	NNW24	NNW25	NW27	NW29	NW28	NW28	NW28	NW27	NW25	NW24	NW21	NW20	NW23	NW21	NW19	NW15	NNW20.1	NW29
2-Apr	NNW15	NW11	NW11	NW11	NNW13	NNW10	NNW10	N9	N9	N7	N5	NE4	NNW5	NNW8	NNW10	NW11	NW12	WNW13	NNW13	NNW8	W5	NNW6	NNW7	N2	NNW8.4	NNW15
3-Apr	NE4	E5	ENE6	ENE5	NE5	NE7	NE7	NNE5	NNE6	NE6	N9	NNE7	NNW8	NNW10	N11	NW11	NW14	NW17	NNW14	N9	NNW7	NNE6	NNE7	NNE6	N6.6	NW17
4-Apr	ENE5	NE3	NE4	N4	N4	NNW7	NW7	NNW7	N8	NNE8	NNE7	N9	N10	NNW10	N12	NNW13	NNW13	NNW14	N13	N9	N6	NNW7	NNW9	NNW11	N7.8	NNW14
5-Apr	NNW9	NNW11	NW12	NW12	NW10	NW8	W7	NNW5	NNE7	N7	NNW11	NNW14	NNW13	NNW13	N12	NNW13	NNW13	NNW14	NNW11	NNW9	NNW7	NE4	E7	ESE10	NNW8.3	NNW14
6-Apr	SE10	SE10	SSE11	S13	S12	S12	SSW11	S11	SSE12	SSE12	SE16	SE17	SE15	SSE13	SSE13	SSE13	S13	S14	S13	SSE11	SSE11	SSE11	SSE13	S15	SSE11.9	SE17
7-Apr	S18	S14	SSE11	SSE9	SSE12	SSE11	S11	SSE12	SSE13	SSE14	SSE17	SE18	SE18	SE16	SSE13	SSE14	SSE12	S11	S8	SSE10	SSE8	S9	S11	SSW13	SSE12.0	SE18
8-Apr	SSW15	SSW15	SW17	SW20	SW24	SW23	SW23	SW21	SW19	WSW19	WSW19	W21	W19	W21	NNW16	NNW18	NNW17	NNW14	NNW10	N7	NNE3	ESE4	SE6	SSE8	WSW10.4	SW24
9-Apr	S11	S12	S13	S13	S14	S14	S14	S12	S9	SE11	SE14	SSW15	SW18	SW19	SW21	SW22	WSW20	SW18	WSW13	SW10	SW15	SW16	SW18	SW21	SSW13.0	SW22
10-Apr	SW20	SW18	SW17	SW15	SW17	SW17	SW14	SW13	SW14	SW12	SW13	S11	SSE13	SSE14	SSE16	SSE14	S17	S13	S10	SSE10	SSE10	S9	SSE10	SSE14	SSW12.2	SW20
11-Apr	S11	SSW13	SSW12	SW21	SW21	SW18	SW20	WSW21	WSW21	W20	W24	W19	W23	W18	WSW19	W20	W19	WSW26	WSW33	WSW34	W27	W22	WSW23	W26	WSW19.8	WSW34
12-Apr	WSW25	WSW26	WSW26	WSW28	WSW29	WSW30	WSW30	WSW34	WSW28	W26	WSW27	WSW30	WSW33	WSW34	WSW30	WSW28	WSW28	WSW26	WSW25	WSW20	WSW21	WSW25	WSW29	WSW30	WSW27.8	WSW34
13-Apr	WSW33	WSW35	WSW36	WSW33	WSW33	WSW34	W36	W39	W39	W34	W37	W36	W36	W30	W27	W24	W22	W19	W12	N5	S2	S4	SE3	ESE10	W24.0	W39
14-Apr	SE11	SSE12	SSE11	SE13	SE11	SE14	SE17	SE17	SE14	SE13	ESE13	ESE19	ESE14	ESE16	ESE17	E13	SSE16	SE13	SE11	SE10	ESE8	ESE9	SE11	SSE8	SE12.4	ESE19
15-Apr	S10	SSW7	WSW13	WSW24	WSW24	W22	W25	W27	W25	W20	WSW23	WSW27	WSW25	WSW24	WSW26	WSW26	WSW23	WSW20	WSW17	SSW9	SSW10	SW13	WSW21	WSW20	WSW19.2	W27
16-Apr	WSW25	WSW24	WSW25	WSW26	WSW26	WSW27	WSW27	WSW25	WSW25	SW18	SW22	WSW23	WSW30	WSW26	WSW18	WSW21	W12	W15	WSW16	W13	W10	WSW15	WSW22	WSW22	WSW21.1	WSW30
17-Apr	WSW20	WSW18	WSW17	WSW19	SW19	SW17	SW15	SW10	S9	S13	S16	S16	S16	SSW17	S19	SSE15	SSE17	SE12	SE9	SE8	S8	SSW14	SW18	SW19	SSW12.4	WSW20
18-Apr	W17	W14	W17	W18	W21	WNW23	WNW22	NW24	NW28	NW26	NW25	NW26	WNW27	WNW25	WNW21	NW15	NNW18	N14	NE8	WSW7	W10	WNW8	W9	WSW11	WNW16.3	NW28
19-Apr	WSW9	W8	W6	W6	WSW5	SW3	SW9	SSW4	WSW5	WNW9	WNW7	NNE8	NNE8	W10	W13	WSW14	WSW12	WSW13	WSW10	SW7	SSW8	SSW8	SSW9	SSW10	WSW6.3	WSW14
20-Apr	SW13	SW20	SW22	SW23	WSW22	WSW20	W16	WNW14	NNW14	N14	N16	N12	N10	NNE8	NNE10	NNE9	NNE9	NE5	E5	ESE4	SE9	SE12	SSE11	S12	W3.4	SW23
21-Apr	S12	SSW14	SSW16	SW19	SW23	SW21	SSW4	W11	WNW9	NNW10	NNW11	NNW11	NNW13	NW13	N12	NNE12	N12	NE13	NE13	NE13	ENE14	ENE13	E11	E8	NW2.0	SW23
22-Apr	E10	ESE9	ESE10	ESE9	ESE9	ESE11	ESE14	ESE17	ESE17	ESE18	E21	E23	E23	E22	E22	E22	E24	E23	E21	ESE18	E14	E14	E13	E12	E16.5	E24
23-Apr	E11	E12	E11	E11	E11	E11	E12	E14	E15	ENE17	ENE17	ENE19	ENE18	ENE19	ENE17	ENE20	ENE18	ENE16	ENE15	ENE12	ENE13	ENE12	NE13	NE12	ENE13.9	ENE20
24-Apr	NE13	NE12	NE10	NE12	NE14	NE15	NE14	NNE13	NNE14	NNE16	NNE16	NNE16	NNE16	NNE14	NNE14	NNE14	NNE14	NNE14	NNE14	NE12	NE8	NE9	NE7	NE7	NNE12.5	NNE18
25-Apr	NNE7	N6	NNE6	N7	NNW7	NNW6	NNE7	N7	NNE8	NNE12	NE10	ENE6	ENE7	NE7	NE6	NE9	N10	NE7	NE9	ENE8	E5	E6	ESE8	SE6	NE5.9	NNE12
26-Apr	S5	SSE5	SSE5	SSE3	SW3	SW3	WSW4	NE2	ENE4	ENE4	ENE4	SSW2	E9	ENE8	ESE9	E7	ESE5	ESE6	ESE9	ESE8	ESE8	SE10	ESE9	SE12	ESE4.5	SE12
27-Apr	SSE10	S12	S10	SSW11	SSW10	SSW11	SSW10	SSE14	SSE16	SE15	SSE17	S18	SSW19	SSW18	SW17	WSW18	SW18	SW17	SW9	SSW8	SSW9	SW10	SW11	SW12	SSW11.6	SSW19
28-Apr	SW14	SW13	SW11	SSW11	SSW10	S11	S10	SSE9	SE12	SE14	SE14	SE17	SSE20	SSE19	SSE22	SSE18	SSE18	SSE16	SSE11	SSE9	SE11	SE11	SSE8	SW14	SSE11.8	SSE22
29-Apr	W25	WNW22	WNW22	WNW24	WNW26	W28	W30	WNW24	W22	WNW23	W21	W22	W12	W19	W20	W16	WSW13	SW12	SW14	SW9	SW10	SW15	SW15	SW21	W17.9	W30
30-Apr	WSW23	WSW23	WSW21	WSW21	WSW21	WSW19	WSW17	WSW13	SW12	SW22	SW26	SW25	SW20	WSW26	WSW26	WSW29	WSW27	WSW22	WSW21	SW13	WSW13	WSW15	SW18	SW22	WSW20.5	WSW29

SW6.8	SW7.5	SW7.8	WSW8.7	WSW9.2	WSW8.6	WSW7.9	WSW6.6	W5.1	W3.7	W4.2	W4.2	W4.8	W6.2	W5.0	W5.2	W5.3	W4.4	WSW3.0	SW1.8	SSW2.5	SSW3.5	SW4.9	SW6.8	Diurnal Average	
WSW33	WSW35	WSW36	WSW33	WSW33	WSW34	W36	W39	W39	W34	W37	W36	W36	WSW34	WSW30	WSW29	WSW28	WSW26	WSW33	WSW34	W27	WSW25	WSW29	WSW30	Diurnal Maximum	

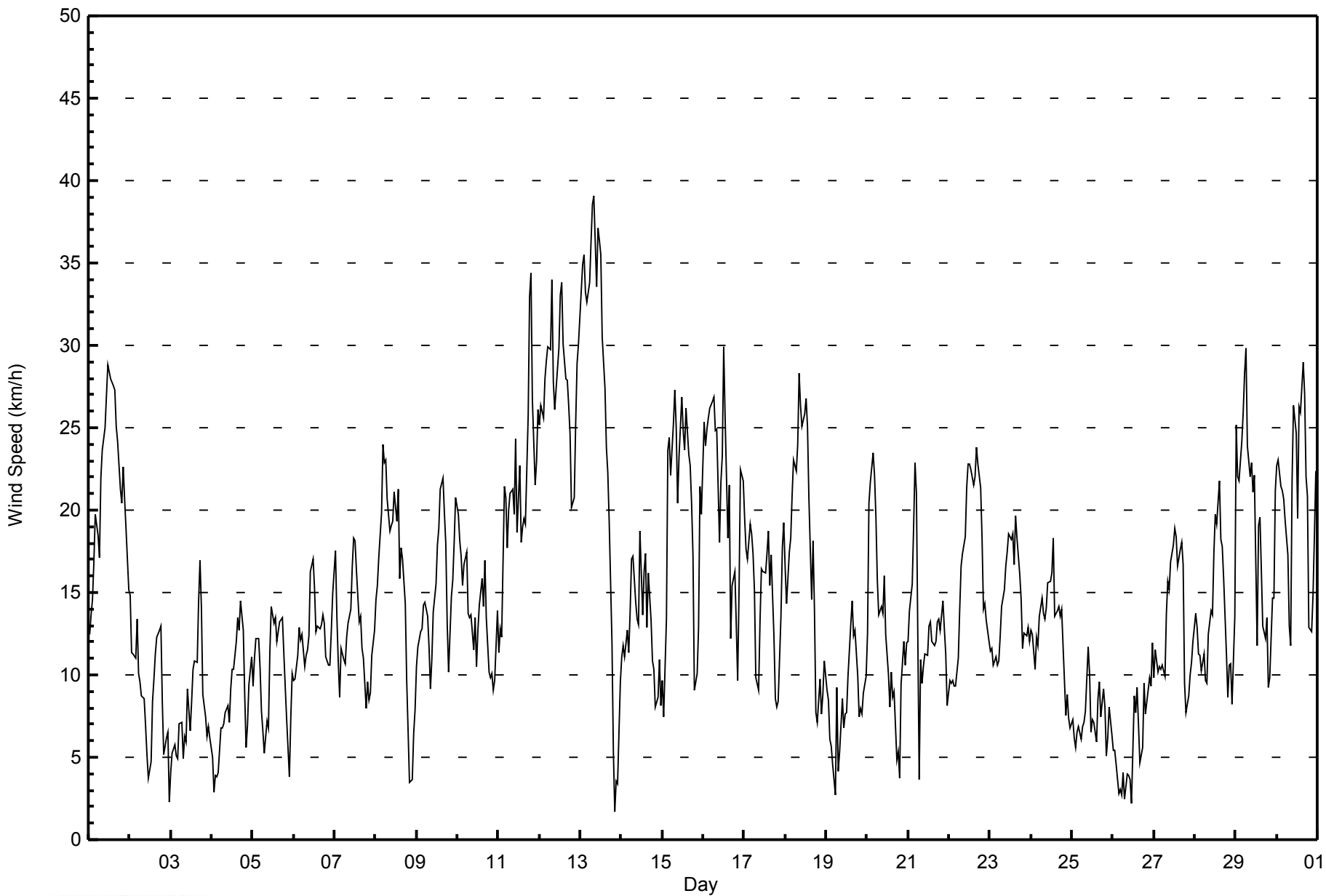
All monthly, daily, and diurnal averages have been calculated using vector methods





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - April 2015**





**WBEA**  
**Cumulative Frequency Distribution**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - April 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	45	6.25	6.25
6 - 11	218	30.28	36.53
12 - 19	279	38.75	75.28
20 - 28	148	20.56	95.83
29 - 38	28	3.89	99.72
> 38	2	0.28	100.00

Total Number of Valid Hours: 720

Total Number of Hours: 720



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - April 2015**

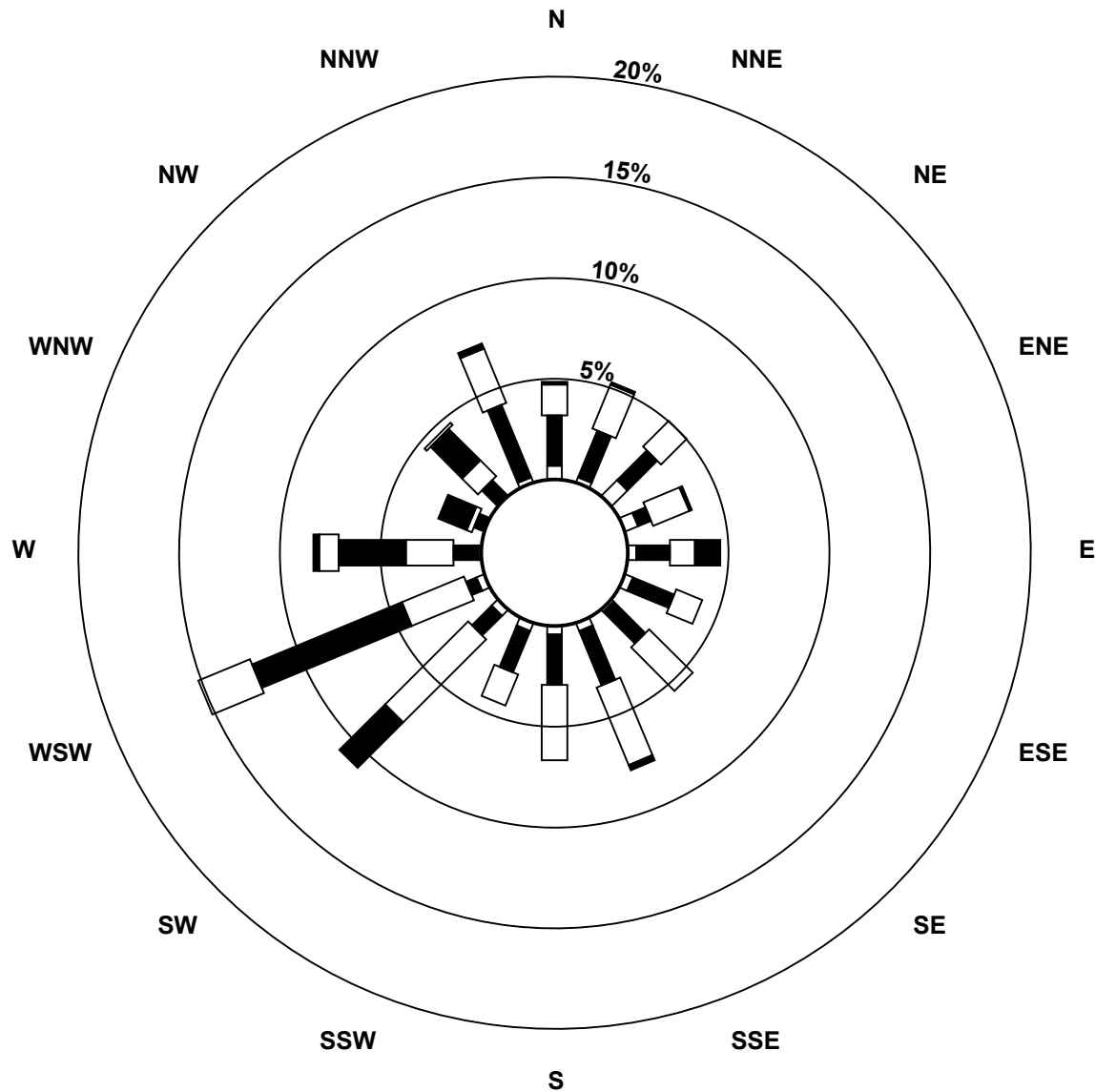
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	2	8	5	3	3	1	3	3	3	3	3	1	0	0	2	45
6 - 11	18	18	15	5	12	16	16	21	18	16	10	4	9	4	8	28	218
12 - 19	11	17	13	14	9	10	22	30	27	12	42	24	17	2	8	21	279
20 - 28	1	1	0	1	9	0	0	2	0	0	23	58	24	11	16	2	148
29 - 38	0	0	0	0	0	0	0	0	0	0	0	20	7	0	1	0	28
> 38	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
<b>Totals</b>	35	38	36	25	33	29	39	56	48	31	78	109	60	17	33	53	720

Total Number of Valid Hours: 720

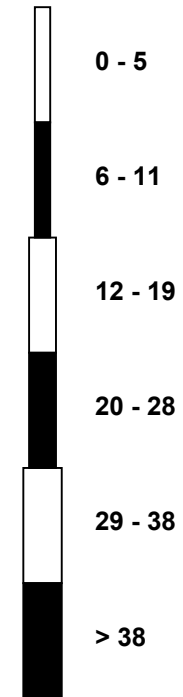
Total Number of Hours: 720

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

**Wind Speed (WS) - km/h  
ConocoPhillips - Surmont (AMS502)**



**Classes (km/h)**



**Total Number of Valid Hours: 720**



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



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**ConocoPhillips - Surmont - April 2015**

Direction of Maximum Speed: 269 deg on Apr 13 09:00	Hours in Service: 720
Direction of Maximum Daily Speed Average: 248.6 deg on Apr 12	Hours of Data: 720
Direction of Minimum Speed: 170 deg on Apr 13 21:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 2.0 deg on Apr 21	Percent Operational Time: 100.0
Monthly Average Direction: 256.3 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-Apr	17	12	12	10	15	13	9	353	344	340	321	320	322	322	320	319	317	319	320	322	321	322	323	326	334.9
2-Apr	328	312	322	317	329	329	343	356	353	356	3	37	337	334	337	321	316	303	329	328	259	337	342	359	330.0
3-Apr	49	88	73	57	43	40	42	33	22	40	11	24	347	340	350	319	323	321	338	350	344	23	26	31	3.6
4-Apr	77	49	35	354	351	348	318	332	356	20	13	11	1	330	350	344	339	334	352	349	349	339	342	336	350.2
5-Apr	327	327	321	321	314	305	273	342	16	3	337	336	341	341	354	346	344	342	340	347	348	50	96	118	340.9
6-Apr	124	144	167	173	176	184	193	178	167	149	131	136	139	149	161	172	172	174	167	166	163	166	175	160.9	
7-Apr	181	176	160	148	162	168	172	160	156	154	147	139	131	145	162	153	158	174	179	166	161	178	186	197	161.3
8-Apr	202	212	219	222	226	227	228	226	231	239	251	271	274	277	329	332	335	334	340	349	20	109	141	165	252.0
9-Apr	174	171	176	180	178	177	171	181	170	128	125	207	218	221	224	231	238	228	237	217	223	222	225	226	204.5
10-Apr	226	224	222	221	222	223	220	223	224	221	214	187	165	164	159	164	174	175	174	167	164	175	166	159	196.1
11-Apr	176	209	209	225	227	223	229	238	246	277	273	281	268	271	258	266	265	254	253	257	263	262	252	261	251.5
12-Apr	256	250	253	248	242	242	243	248	253	259	250	248	250	250	252	246	252	250	251	244	241	242	246	248	248.6
13-Apr	247	248	249	252	252	256	259	265	269	271	273	276	267	276	271	268	269	268	281	356	170	173	139	107	262.5
14-Apr	132	157	155	133	128	131	130	130	128	124	118	118	104	106	109	86	154	142	132	127	116	123	129	167	127.3
15-Apr	177	203	239	244	258	263	264	260	259	266	252	254	256	257	246	250	250	251	247	204	204	224	246	245	249.0
16-Apr	247	249	248	248	247	248	244	240	243	229	226	242	247	241	242	250	261	268	244	276	276	254	255	253	247.3
17-Apr	247	250	246	237	228	223	221	215	188	180	174	172	173	194	182	165	157	132	143	125	170	212	228	234	201.8
18-Apr	261	274	277	281	281	286	291	306	319	318	310	308	295	301	296	306	328	349	49	246	262	288	261	248	297.0
19-Apr	241	271	262	274	249	223	222	211	252	296	292	17	33	263	267	246	249	251	255	229	194	192	199	202	247.9
20-Apr	218	224	228	231	237	254	269	290	332	350	2	10	2	33	29	26	18	43	101	115	126	143	162	174	265.1
21-Apr	188	201	211	217	222	225	209	268	297	347	332	337	333	320	358	17	355	39	42	55	72	77	84	80	324.8
22-Apr	86	102	105	108	111	103	107	106	104	104	97	98	97	100	96	92	97	93	96	102	94	93	92	94	98.6
23-Apr	99	95	93	90	82	81	86	86	80	65	60	64	64	67	70	67	73	76	78	59	58	59	47	45	71.7
24-Apr	42	50	45	44	40	41	45	34	31	30	24	33	20	15	22	21	13	28	28	41	54	50	44	34	32.9
25-Apr	18	9	17	1	347	348	13	4	14	15	36	67	74	51	56	46	9	51	47	78	88	97	114	146	38.9
26-Apr	181	165	153	154	229	221	255	55	61	60	66	212	80	75	103	83	104	112	116	118	115	125	122	140	117.4
27-Apr	157	171	185	195	199	196	193	168	152	143	152	173	192	212	229	242	230	224	223	213	207	215	217	223	196.5
28-Apr	221	221	216	210	196	182	179	159	143	128	140	132	151	151	149	164	164	155	158	156	141	145	164	226	165.5
29-Apr	276	284	283	282	282	280	279	289	281	285	274	279	278	270	266	259	241	224	223	223	218	225	226	232	267.3
30-Apr	240	241	241	239	245	245	242	239	233	229	227	222	228	241	245	247	240	243	240	236	248	237	232	233	238.1

227.8 231.2 235.6 238.7 241.3 242.4 243.6 250.5 260.9 275.5 263.0 259.3 259.8 262.2 259.7 266.7 264.1 261.2 257.2 232.8 208.4 206.5 215.2 219.4

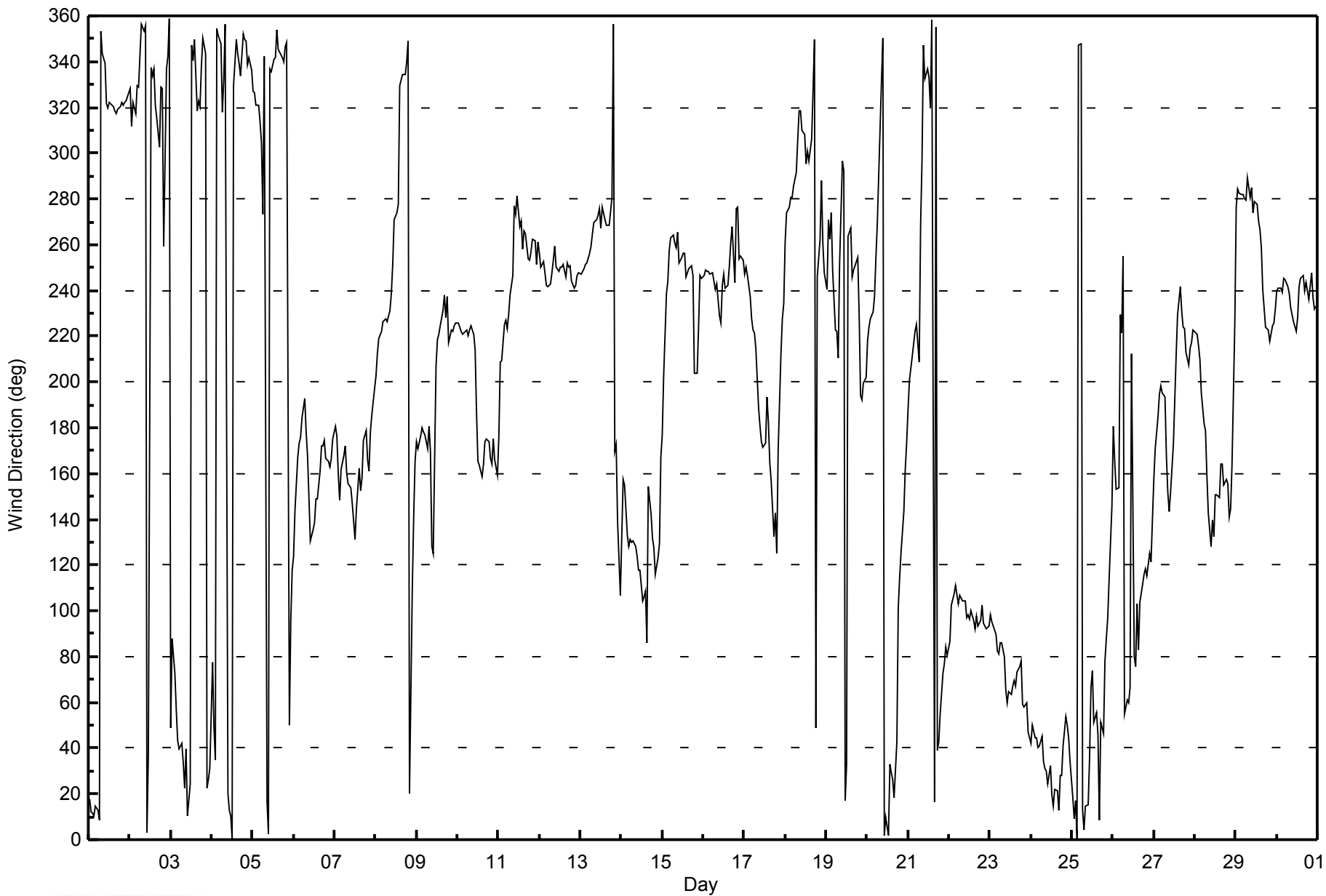
Diurnal Average

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**ConocoPhillips - Surmont - April 2015**





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

ConocoPhillips - Surmont - April 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Apr 26 12:00 Minimum Value: 4 deg on Apr 19 22:00 Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 14 Q <sub>3</sub> = 20 P <sub>90</sub> = 30 P <sub>99</sub> = 71																	Hours in Service: 720 Hours of Data: 720 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																	
1-Apr	12	14	13	14	13	13	15	16	15	16	10	11	10	10	10	11	12	12	10	10	9	9	9	9	16																
2-Apr	8	20	17	17	9	12	15	16	16	21	37	74	72	31	34	27	24	20	15	26	30	27	11	53	74																
3-Apr	15	22	15	14	15	16	17	24	22	44	26	52	48	36	32	34	19	16	19	10	15	11	14	14	52																
4-Apr	15	25	19	19	21	11	29	24	24	25	37	32	29	36	29	23	22	16	14	10	9	11	15	12	37																
5-Apr	12	12	9	8	15	27	22	34	28	42	27	24	22	23	28	24	18	17	14	11	12	31	16	9	42																
6-Apr	9	16	12	12	11	10	10	12	16	22	17	17	19	28	20	25	21	17	16	12	13	13	13	14	28																
7-Apr	15	16	19	19	12	13	13	14	16	21	20	22	19	23	24	20	26	18	17	14	12	12	12	11	26																
8-Apr	13	13	11	10	8	9	8	9	10	10	16	12	16	17	31	16	17	17	13	13	33	13	19	15	33																
9-Apr	10	11	12	10	12	12	12	14	16	15	12	28	18	17	17	16	14	14	11	8	8	8	7	7	28																
10-Apr	7	8	8	8	8	7	9	9	10	18	30	42	26	35	26	23	20	23	15	13	11	13	18	16	42																
11-Apr	17	12	11	9	7	8	8	9	10	17	14	16	11	16	22	14	18	13	10	10	10	10	11	10	22																
12-Apr	10	8	8	9	8	8	10	10	14	13	16	15	16	17	14	14	12	12	10	9	10	9	10	10	17																
13-Apr	10	9	10	9	9	9	10	11	12	13	14	14	14	15	16	20	14	14	21	44	64	25	33	13	64																
14-Apr	13	16	14	10	10	9	9	10	13	13	16	13	19	21	18	21	30	13	13	10	15	11	14	21	30																
15-Apr	17	20	20	11	8	9	9	10	11	15	15	17	16	18	17	16	17	14	16	13	15	17	9	10	20																
16-Apr	10	9	9	9	9	8	9	10	10	17	20	18	14	13	16	12	15	12	10	25	28	9	8	8	28																
17-Apr	8	8	7	7	8	8	8	12	24	22	23	21	21	23	21	16	17	15	20	15	19	14	9	13	24																
18-Apr	9	10	10	10	10	10	13	15	12	12	15	16	16	21	29	35	20	48	20	52	15	36	9	9	52																
19-Apr	10	7	9	21	18	46	6	34	47	40	63	40	59	35	25	22	28	21	11	10	6	4	7	9	63																
20-Apr	11	8	8	8	8	11	9	19	16	22	27	33	51	59	42	43	29	68	22	50	21	10	13	12	68																
21-Apr	12	12	13	13	11	11	69	16	35	23	19	35	29	30	29	30	29	18	15	14	13	13	12	10	69																
22-Apr	12	10	10	10	10	10	12	14	14	15	17	15	17	17	17	16	15	14	12	11	14	12	11	12	17																
23-Apr	10	11	11	12	13	12	13	14	17	18	17	18	18	18	16	19	17	15	13	13	13	14	14	18	19																
24-Apr	15	13	13	14	16	14	16	21	20	21	25	21	29	27	32	22	30	19	17	13	13	12	15	13	32																
25-Apr	16	15	13	14	13	15	19	23	30	24	37	69	63	57	86	46	37	38	26	11	9	6	15	15	86																
26-Apr	17	11	14	33	43	17	12	76	64	81	85	94	43	61	42	66	69	51	24	10	9	12	11	11	94																
27-Apr	11	11	12	10	10	12	13	14	20	16	18	26	26	21	27	22	22	17	23	10	7	8	8	7	27																
28-Apr	8	8	7	5	8	12	17	13	17	11	14	15	19	20	17	19	18	15	15	17	10	11	14	32	32																
29-Apr	9	10	11	9	9	9	9	12	11	11	14	13	22	12	14	11	13	16	16	13	9	7	6	8	22																
30-Apr	8	8	8	8	9	8	11	15	18	14	14	18	27	18	15	16	16	14	11	10	20	10	7	7	27																
																	17	25	20	33	43	46	69	76	64	81	85	94	72	61	86	66	69	68	26	52	64	36	33	53	
Diurnal Maximum																																									





# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Last Calibration	March 23, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	14:30
Gas Cert Reference	LL110503	Station temp.	22 Deg C
Cal Gas Concentration	51.1 ppm	Cal Gas Exp Date	April-1-2016
Calibrator Make/Model	API T700	Serial Number	522
ZAG Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882

## Analyzer Information

	Before	After		Before	After
Analyzer Range	0 - 1000 ppb		PMT voltage	776	
Analyzer IP address	192.168.1.43		Lamp voltage	2658	2600
Calculated slope	0.998235	0.997201	Chamber temp	50.0	50.0
Calculated intercept	0.074732	0.017038	Pressure	22.3	22.2
Analyzer Background	16.9	16.9	Flow	0.561	0.556
Analyzer Coefficient	1.011	1.011	Intensity	66	64
Analyzer make	API T100		Analyzer serial #	598	

## Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	----
as found span	5000	76.6	782.9	785.1	0.997
calibrator zero	5000	0.0	0.0	0.3	----
high point	5000	76.6	782.9	785.1	0.997
second point	5000	38.3	391.4	392.6	0.997
third point	5000	19.2	196.2	196.3	1.000
as left zero	5000	0.0	0.0	0.7	----
as left span	6000	92.0	783.5	775.8	1.010
Average Correction Factor					0.998

Corrected As found      784.8      Previous response      784.2      % change      -0.1%

**Notes:**

Changed inlet filter after as founds. No adjustments made.

Calibration Performed By:

Asad Hidayat



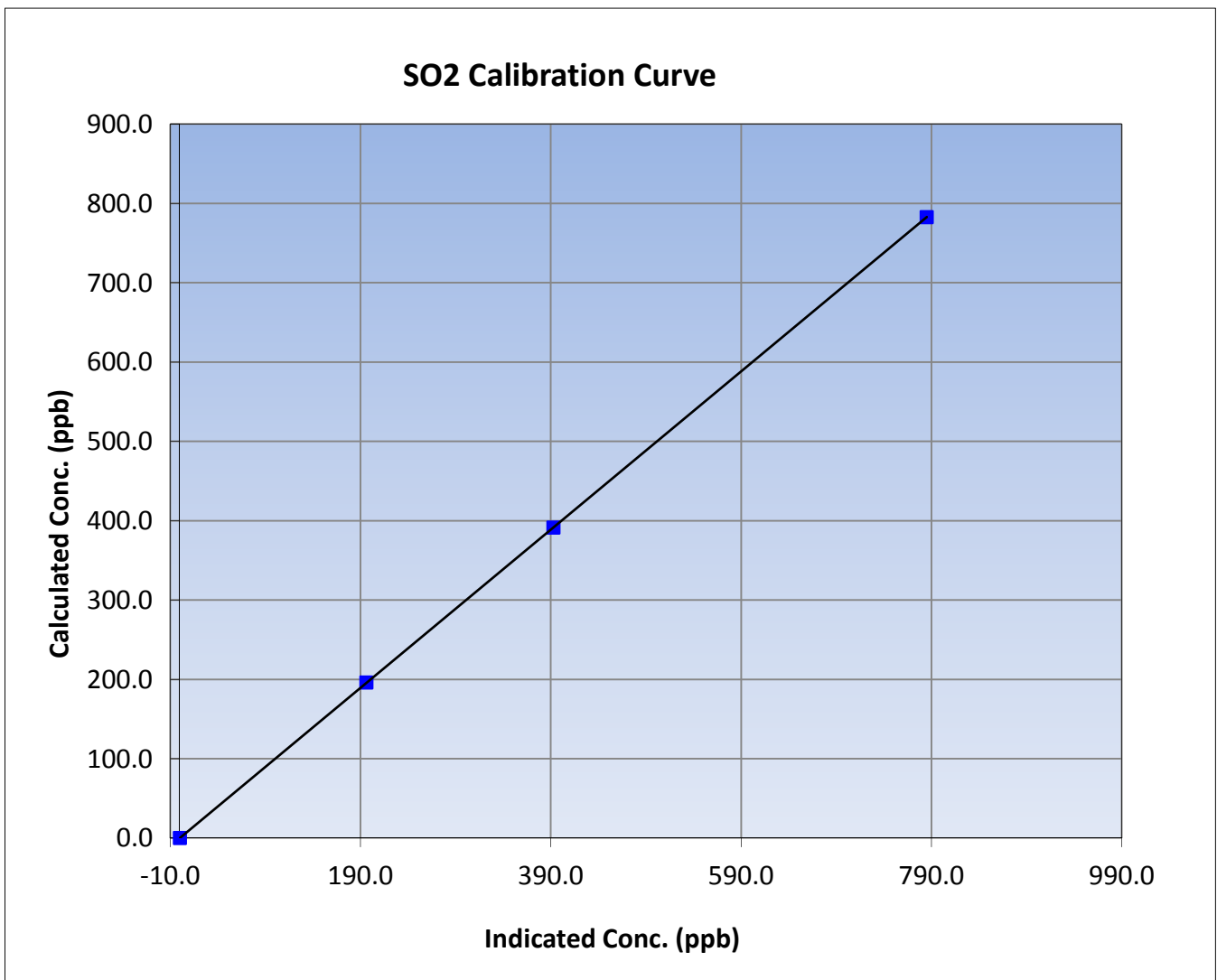
# Wood Buffalo Environmental Association SO2 Calibration Report

## Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 23, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:45	End Time (MST)	14:30
Analyzer make	API T100	Analyzer serial #	598

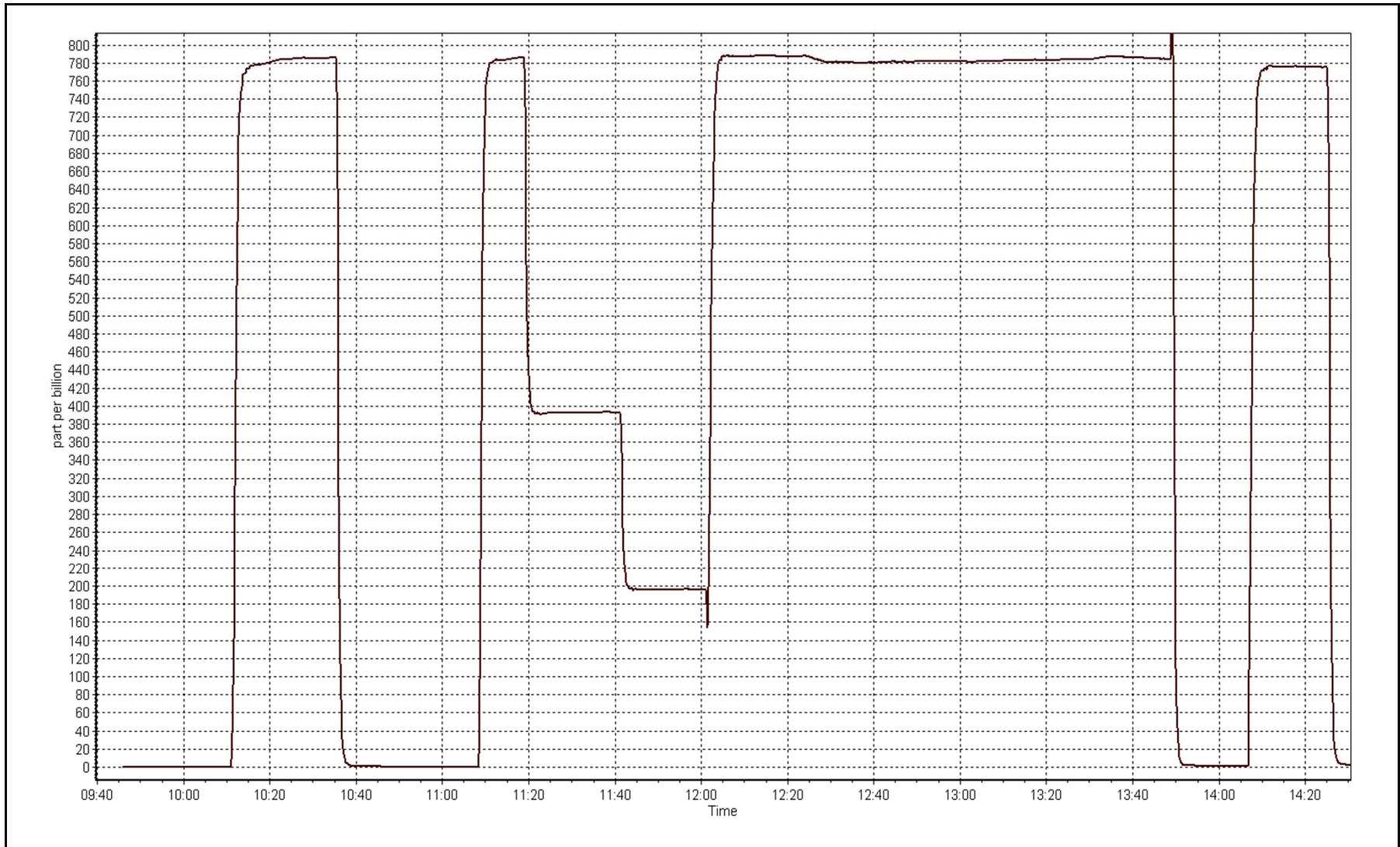
## Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	----	Correlation Coefficient	0.999999
782.9	785.1	0.9971		
391.4	392.6	0.9970	Slope	0.997201
196.2	196.3	0.9998		
			Intercept	0.017038



SO2 Calibration Plot

Date: April 22, 2015





# Wood Buffalo Environmental Association H2S Calibration Report

### Station Information

Calibration Date	April 21, 2015	Last Calibration	March 20, 2015
Station Name	ConocoPhillips-Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	9:20	End Time (MST)	13:55
Gas Cert Reference	LL34303	Station temp.	22 Deg C
Cal Gas Concentration	10.4 ppm	Cal Gas Exp Date	30 May, 2016
Calibrator Make/Model	API T700	Serial Number	622
ZAG air Make/Model	API 701	Serial Number	4865
DACS make/model	Campbell Scientific CR3000	Serial Number	7882
SO2 gas concentration	51.1 ppm	SO2 gas cert/exp	LL110503 April-1-2016

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	0 - 100 ppb		PMT voltage	9	9
Analyzer IP address	192.168.1.75		Lamp voltage	2721	2566
Calculated slope	0.983326	0.999683	Chamber temp	50	50
Calculated intercept	0.028480	-0.079965	Pressure	23.2	22.7
Analyzer Background	19.3	19.3	Flow	0.573	0.558
Analyzer Coefficient	1.072	0.937	Intensity	60	57
			Converter temp.	316	317

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	N/A	Converter serial #	N/A

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	----
as found span	5000	38.5	80.1	83.6	0.958
SO2 scrubber check	5000	19.6	200.3	3.1	----
calibrator zero	5000	0.0	0.0	0.1	----
high point	5000	38.5	80.1	80.2	0.999
second point	5000	19.3	40.1	40.2	0.999
third point	5000	12.0	25.0	25.1	0.996
as left zero	5000	0.0	0.0	0.2	----
as left span	5000	38.5	80.1	80.0	1.001
Average Correction Factor					0.998

Corrected As found	83.5	Previous response	81.4	% change	-2.6%
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**Notes:**

Performed scrubber check before as founds. Performed scrubber check again after replacing the SOX scrubber beads after as founds. Changed inlet filter after as founds. Adjusted span.

Calibration Performed By:

Asad Hidayat



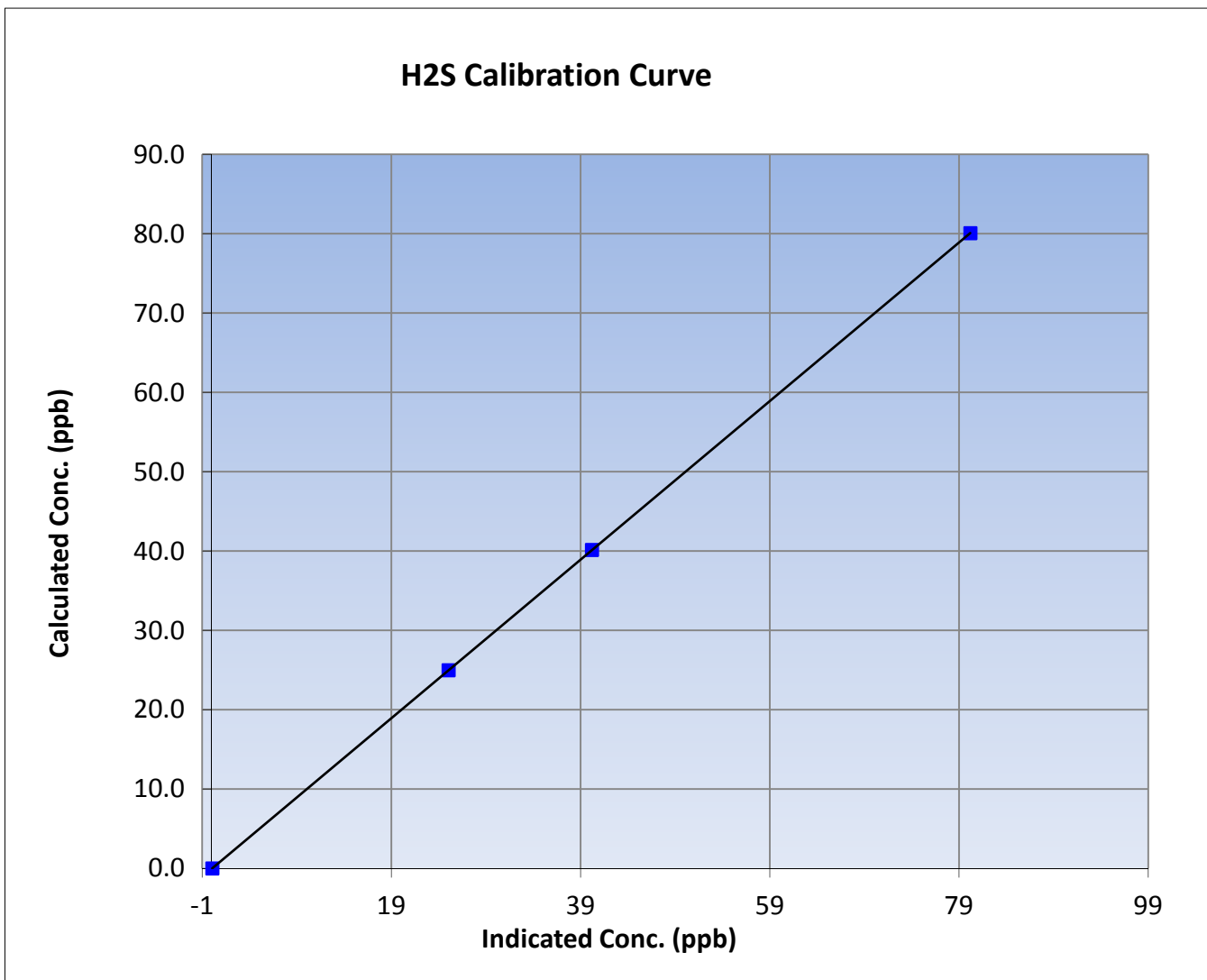
# Wood Buffalo Environmental Association H2S Calibration Report

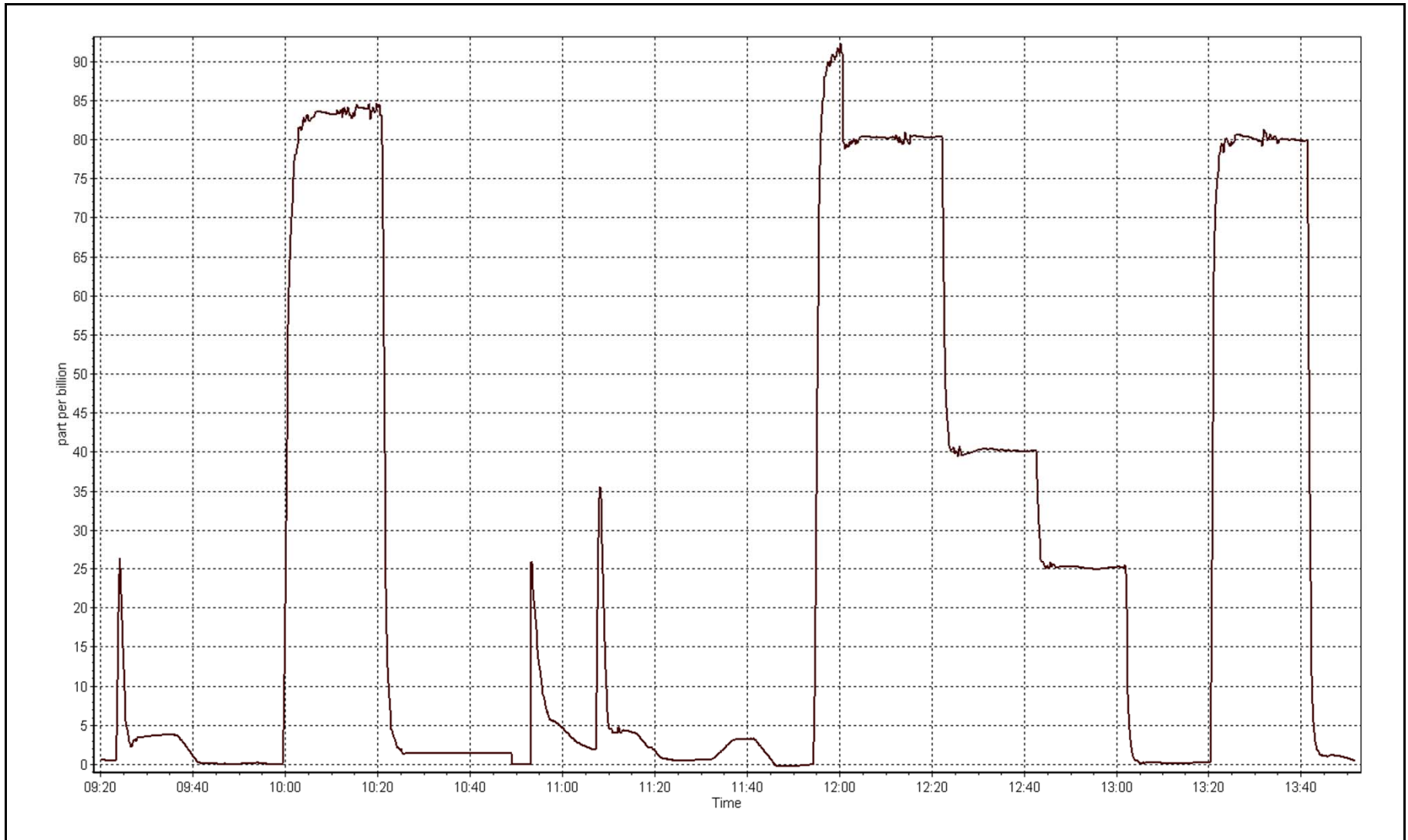
## Station Information

Calibration Date	April 21, 2015	Previous Calibration	March 20, 2015
Station Name	AMS 502	Station Number	AMS 502
Start Time (MST)	9:20	End Time (MST)	13:55
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	0.1	----	Correlation Coefficient	0.999999
80.1	80.2	0.9985		
40.1	40.2	0.9986	Slope	0.999683
25.0	25.1	0.9960		
			Intercept	-0.079965







# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 23, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	14:30
NO Cal Gas Conc	52.2 ppm	Gas Cert Reference	LL110503
NOx Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	1-Apr-16
Calibrator	API T700	Serial Number	622
Zero air Generator	Teledyne API T701	Serial Number	4865

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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### Calibration Statistics

Parameter		NOx	NO	NO2
As Found (last calibration results)	Data Slope	1.012761	1.011245	1.004743
	Data Offset	0.113828	0.263070	0.285947
Current Calibration	Data Slope	1.002643	1.001435	0.994135
	Data Offset	-0.112004	-0.195768	0.652608

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.721		0.721	
NOX coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgnd	4.8		4.9	
NOX bkgnd	4.8		5.1	
Chamber Temp	50.5	Deg C	50.6	Deg C
Moly Temp	322.4	Deg C	327.4	Deg C
PMT voltage	-941	V	-941	V
PMT Temp	-2.9	Deg C	-2.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO		mmHg	206.7	mmHg
R Cell Press Nox		mmHg	206.7	mmHg
NO sample flow		lpm	0.489	lpm
Nox sample Flow		lpm	0.489	lpm

**Notes:**

Changed inlet filter after as founds. Slightly adjusted zero.



# Wood Buffalo Environmental Association

## NOX-NO-NO2 Calibration Report

### Station Information

Calibration Date:

April 22, 2015

Station Number:

AMS 102

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated NOx conc (ppb)	Calculated NO conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	0.6	0.4	0.2	----	----
as found span	5000	76.6	799.7	799.7	0.0	797.8	798.8	-1.0	1.0024	1.0011
calibrator zero	5000	0.0	0.0	0.0	0.0	0.4	0.4	0.0	----	----
high point	5000	76.6	799.7	799.7	0.0	797.8	798.8	-1.0	1.0024	1.0011
second point	5000	38.3	399.9	399.9	0.0	398.9	399.6	-0.8	1.0023	1.0007
third point	5000	19.2	200.4	200.4	0.0	199.6	200.0	-0.3	1.0040	1.0023
as left zero	5000	0.0	0.0	0.0	0.0	0.4	0.5	-0.1	----	----
as left span	6000	92.0	800.4	515.2	285.2	808.6	528.2	280.4	0.9898	0.9754
Average Correction Factor									1.0029	1.0014

Corrected As found

NO<sub>x</sub>= 797.2

NO= 798.5

Percent Change

NO<sub>x</sub>= -1.0%

NO= -1.0%

Previous Response

NO<sub>x</sub>= 789.5

NO= 790.5

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

76.70

ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO2 conc (ppb)	Indicated NOx conc (ppb)	Indicated NO conc (ppb)	Indicated NO2 conc (ppb)	NOx Correction factor	NO Correction factor	NO2 Correction factor	Converter Efficiency
Cal zero			0.0			0.0			N/A	
1st NO2 (300)	N/A	515.2	277.1	799.5	520.5	278.9	0.9865	0.9897	0.9934	100.7%
2nd NO2 (200)	N/A	599.5	192.8	798.5	606.2	192.3	0.9876	0.9889	1.0024	99.8%
3rd NO2 (100)	N/A	690.0	102.3	798.8	697.0	101.7	0.9873	0.9899	1.0058	99.4%
4th NO2 (0)	792.3	N/A	9.0	801.3	801.7	-0.4	0.9843	0.9883	N/A	----
Average Correction Factor							0.9864	0.9892	1.0006	99.9%

Calibration Performed By:

Asad Hidayat





# Wood Buffalo Environmental Association

## NO<sub>x</sub> Calibration Summary

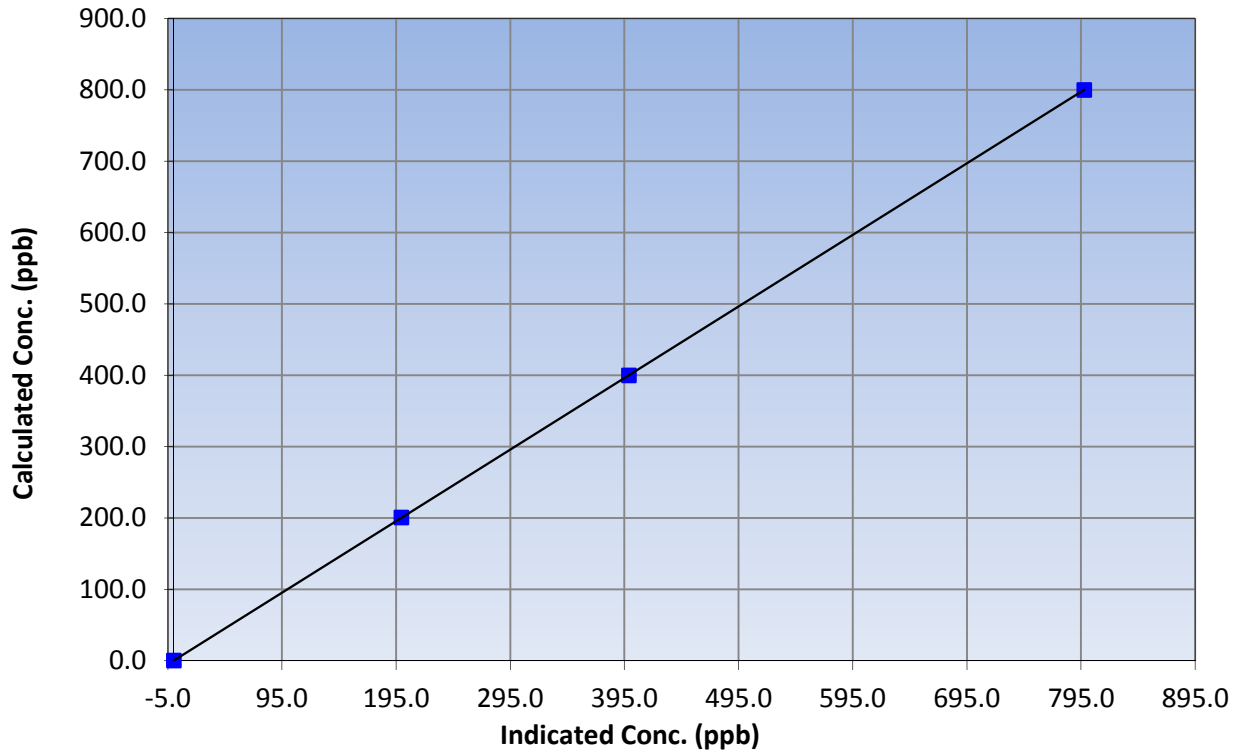
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 23, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:45	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	----	Correlation Coefficient	0.999999
799.7	797.8	1.0024		
399.9	398.9	1.0023	Slope	1.002643
200.4	199.6	1.0040		
			Intercept	-0.112004

### NO<sub>x</sub> Calibration Curve





# Wood Buffalo Environmental Association

## NO Calibration Summary

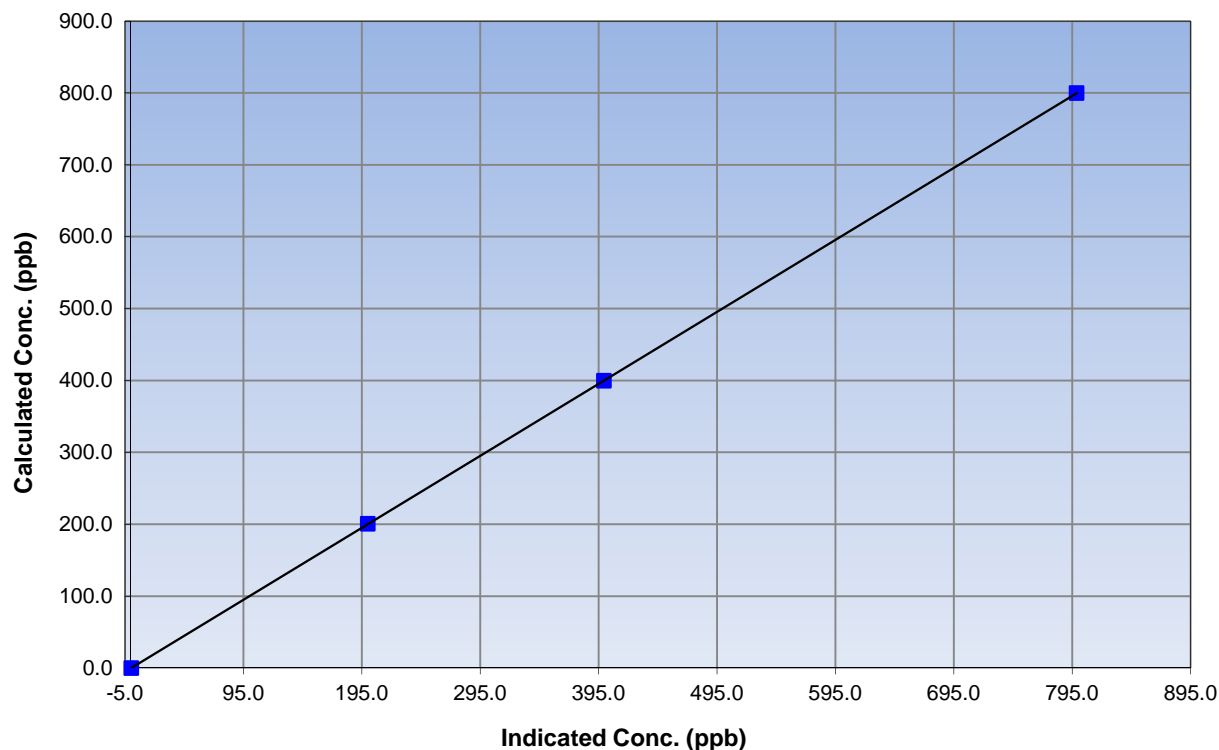
### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 23, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:45	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.4	N/A	Correlation Coefficient	0.999999
799.7	798.8	1.0011		
399.9	399.6	1.0007	Slope	1.001435
200.4	200.0	1.0023		
			Intercept	-0.195768

### NO Calibration Curve





# Wood Buffalo Environmental Association

## NO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	April 22, 2015	Previous Calibration	March 23, 2015
Station Number	ConocoPhillips - Surmont	Station Number	AMS 102
Start Time (MST)	9:45	End Time (MST)	14:30
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999946
277.1	278.9	0.9934		
192.8	192.3	1.0024	Slope	0.994135
102.3	101.7	1.0058		
			Intercept	0.652608

### NO<sub>2</sub> Calibration Curve

