



*WOOD BUFFALO  
ENVIRONMENTAL  
ASSOCIATION*

**FEBRUARY 2015  
MONTHLY REPORT**



CONTINUOUS MONITORING  
March 30, 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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March 30, 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 February 2015  
Wood Buffalo Environmental Association**

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Enclosed is the February 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
<b>Aboriginal Communities</b>	
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	
<b>Government and Non-Industrial Organizations</b>	
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.

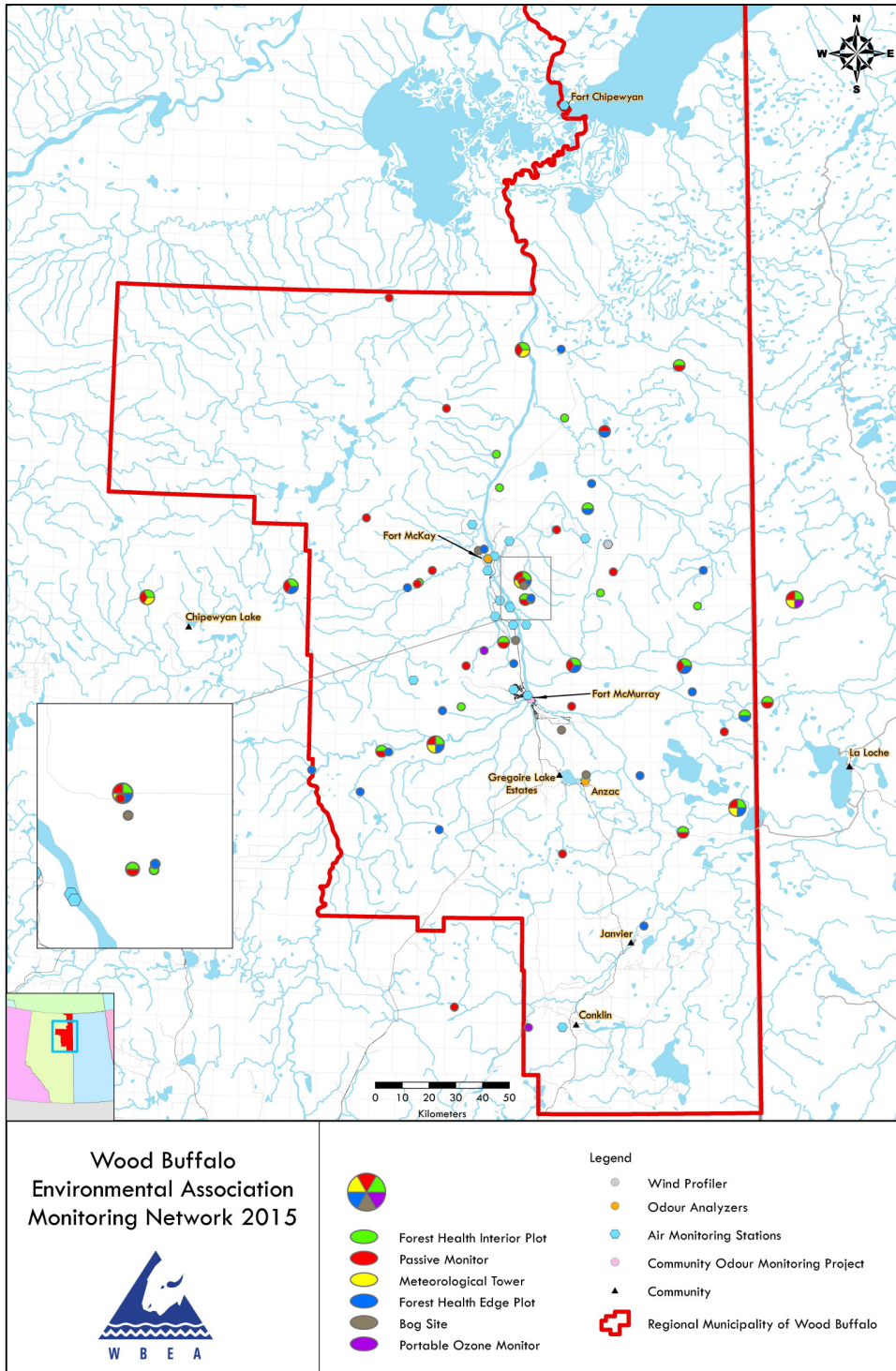


Figure 1 Map of WBEA Air Monitoring Network.

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, H<sub>2</sub>S, NO<sub>2</sub>, NH<sub>3</sub>, O<sub>3</sub> and PM<sub>2.5</sub>.

### **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**

Enclosed is a revision to the Wood Buffalo Environmental Association regional air quality monitoring network monthly report for September, 2014. There is 1 update in Revision 1.

The ammonia (NH<sub>3</sub>) analyzer at AMS 6, Patricia McInnes, operated less than 90% of the time in September 2014. During the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) audit of the station on September 20, the NH<sub>3</sub> analyzer failed to meet the operational performance specifications as identified in the Air Monitoring Directive (AMD). Data from the AEMERA audit conducted on September 22, 2013 to and including analyzer repairs and recalibration on November 4, 2014 were reviewed and re-processed as per the findings of the audit, records of the analyzer operations and a data assessment. Conservatively, the NH<sub>3</sub> data from Thermo Model 17C, following the AEMERA Audit on September 20, 2014 and extending to the daily span check on September 24 at 08:00h MST, was invalidated and removed from the final data set.

For the September 2014 monthly reporting period, data from the NH<sub>3</sub> analyzer was available for only 84% of the time. An operational time of less than 90% was reported to Environmental Response Centre on March 5, 2015 (ESRD reference number 295573). Revised summary tables and data are being resubmitted to Alberta Environment and Sustainable Resource Development and Clean Air Strategic Alliance Data Warehouse with this monthly report.

## **2.0 Operational Status**

### **2.1 Continuous Monitoring**

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

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

### **2.2 Intermittent Monitoring**

The February 2015 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***

Station operator activities in relation to station upgrades and installation of a new modem on February 12 interrupted the normal data collection of all parameters 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 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 hour following the daily spans and 1 hour following the routine monthly calibration period have been reported as invalid for a total of 29 hours this month.

The TRS analyzer experienced three episodes of intermittent unstable operations during this reporting period, resulting in 8 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on February 9 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 2 hours.

The THC, NH<sub>3</sub> and PM<sub>2.5</sub> analyzers experienced single episodes of unstable operations on February 18, 19 and 23 resulting in 1 hour of invalid data, respectively.

A power spike at the station on January 24 affected the normal operations of the NH<sub>3</sub> and PM<sub>2.5</sub> analyzers for 1 hour. The PM<sub>2.5</sub> analyzer failed to respond following the power spike resulting in an additional 12 hours of downtime. A backup PM<sub>2.5</sub> analyzer was installed on January 24, 2015.

A flat-line in the output signals of the wind sensor resulted in 1 hour of invalid data this reporting period.

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

### ***Station 2, Mildred Lake***

No operational issues to report.

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

No operational issues to report.

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

No operational issues to report.

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

The THC analyzer response to the automated daily span check on February 5 exceeded the allowable 10% variance from the expected span target. A follow-up maintenance and calibration period on February 5 resulted in 10 hours of invalid data.

Flat-lines in the output signals of the 45, 75 and 90 m elevation wind speed sensors resulted in 2, 52 and 34 hours of invalid data, respectively.

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

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 one hour following the daily spans and 4 hours following the monthly calibrations have been reported as invalid for a total of 6 hours this month.

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



The THC analyzer experienced a single episode of unstable operations on February 1 resulting in 1 hour of invalid data.

The TRS analyzer response to the automated daily span check on February 8 exceeded the allowable 10% variance from the expected span target. A follow-up maintenance and calibration period on February 9 resulted in 25 hours of invalid data.

Maintenance on the daily zero and span systems and confirmation of O<sub>3</sub> and TRS analyzer responses on February 9 interrupted the normal operations of these analyzers for 2 and 3 hours, respectively.

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

There were three issues associated with operation of the PM<sub>2.5</sub> analyzer, resulting in 27 hours of data being flagged as invalid. Power spikes at the station on February 5 and 18 affected the normal operations of the PM<sub>2.5</sub> analyzer for 2 hours. The PM<sub>2.5</sub> analyzer experienced two episodes of excessive baseline drifts resulting in 23 hours of invalid data. Maintenance to the sample inlet, flow audits and zero reference checks on February 20 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 2 hour.

The THC analyzer exhibited elevated baseline data on February 12 and 13 due to a contaminated span gas cylinder regulator connection. The analyzer was switched to maintenance mode overnight to condition to ambient levels and re-calibrated the following day. This resulted in 19 hours of invalid data.

A power spike at the station on February 18 affected the normal operation of the THC analyzer for 1 hour.

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

Maintenance to the sample inlet, flow audits and zero reference checks on February 14 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 6 hours.

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

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

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

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

Depletion and replacement of the hydrogen gas cylinder at the station on February 14 affected the normal operations of the THC analyzer for 39 hours.

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

The THC analyzer experienced a single episode of excessive baseline drift on February 13 resulting in 2 hours of invalid data.

Maintenance and cleaning of the sample manifold on February 18 affected the normal operations of the SO<sub>2</sub> analyzer for 1 hour.

Maintenance to the sample inlet, flow audits and zero reference checks on February 19 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.

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

The NO<sub>x</sub> analyzer response to the automated daily span check on February 23 exceeded the allowable 10% variance from the expected span target. A follow-up maintenance and calibration period on February 24 resulted in 34 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on February 19 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 2 hours.

A flat-line in the output signals of the wind sensor resulted in 58 hours of invalid data this reporting period.

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

The SO<sub>2</sub> analyzer experienced extended stabilization periods after the daily span checks this reporting month, resulting in 26 hours of invalid data.

Maintenance to the sample inlet, flow audits and zero reference checks on February 5 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.

The THC analyzer experienced a single episode of excessive baseline drift on February 17 resulting in 1 hour of invalid data.

Depletion and replacement of the hydrogen and nitrogen gas cylinders at the station on February 9 and 26 affected the normal operations of the THC analyzer for 3 hours.

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

The THC analyzer experienced a single episode of excessive baseline drift on February 10 resulting in 1 hour of invalid data.

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

Maintenance and cleaning of the sample manifold on February 18 affected the normal operations of the SO<sub>2</sub> analyzer for 1 hour.

Maintenance and replacement of the sample pump and a follow-up calibration on February 18 interrupted the normal operations of the THC analyzer for 41 hours.

Maintenance to the sample inlet, flow audits and zero reference checks on February 18 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 1 hour.

A flat-line in the output signals of the wind sensor resulted in 1 hour of invalid data this reporting period.

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

A power outage at the station on February 14 interrupted the normal operations of all parameters for 8 to 10 hours. A tripped circuit breaker following the power outage resulted in an additional 24 hours of downtime for the SO<sub>2</sub> analyzer.

Maintenance to the sample inlet, flow audits and zero reference checks on February 10 interrupted the normal operations of the PM<sub>2.5</sub> analyzer for 3 hours.

### ***Station 19, Firebag***

Maintenance and cleaning of the sample manifold on February 18 affected the normal operations of the H<sub>2</sub>S analyzer for 4 hours.

A flat-line in the output signals of the wind sensor resulted in 1 hour of invalid data this reporting period.

### ***Station 502, ConocoPhillips Surrmont***

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 extended stabilization periods after the daily span checks this reporting month, resulting in 20 hours of invalid data.

The H<sub>2</sub>S analyzer experienced three episodes of excessive baseline drifts resulting in 3 hours of invalid data this reporting period.

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

Yours sincerely,

**Aurora Atmospheric Inc.**

Sanjay Prasad  
Air Quality Scientist

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

FEBRUARY 2015

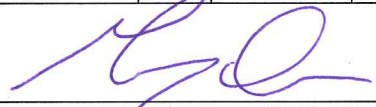
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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	2	2015					
254465-00-00							
149968-00-01							
48522-01-00	CONTINUOUS AMBIENT MONITORING						
240008-00-03			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
48263-00-00	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
224816-00-03	SO2(ppm)	1	100.00	0.033	0	0.005	0
189942-00-02	SO2(ppm)	2	100.00	0.048	0	0.010	0
206355-00-00	SO2(ppm)	4	100.00	0.025	0	0.006	0
46586-00-00	SO2(ppm)	5	100.00	0.091	0	0.011	0
216466-00-04	SO2(ppm)	6	100.00	0.017	0	0.004	0
137467-00-00	SO2(ppm)	7	100.00	0.019	0	0.004	0
20809-01-00	SO2(ppm)	8	100.00	0.011	0	0.001	0
241311-00-00	SO2(ppm)	11	100.00	0.054	0	0.014	0
094-02-00	SO2(ppm)	12	100.00	0.067	0	0.014	0
305529-00-00	SO2(ppm)	13	100.00	0.013	0	0.002	0
026-02-00	SO2(ppm)	14	96.13	0.012	0	0.002	0
228044-00-00	SO2(ppm)	15	100.00	0.023	0	0.008	0
73203-01-00	SO2(ppm)	16	99.85	0.029	0	0.009	0
	SO2(ppm)	17	95.24	0.010	0	0.002	0
	SO2(ppm)	19	100.00	0.012	0	0.003	0
	SO2(ppm)	502	97.02	0.018	0	0.006	0
	H2S(ppm)	2	100.00	0.006	0	0.002	0
	H2S(ppm)	4	100.00	0.003	0	0.001	0
	H2S(ppm)	5	100.00	0.003	0	0.002	0
	H2S(ppm)	11	100.00	0.008	0	0.003	0
	H2S(ppm)	17	98.51	0.001	0	0.000	0
	H2S(ppm)	19	99.40	0.003	0	0.001	0
	H2S(ppm)	502	99.55	0.002	0	0.001	0
	TRS(ppm)	1	98.36	0.002	0	0.001	0
	TRS(ppm)	6	95.98	0.001	0	0.001	0
	TRS(ppm)	7	100.00	0.001	0	0.001	0
	TRS(ppm)	9	100.00	0.005	0	0.001	0
	TRS(ppm)	12	99.85	0.003	0	0.001	0
	TRS(ppm)	13	100.00	0.002	0	0.001	0
	TRS(ppm)	14	100.00	0.002	0	0.000	0
	TRS(ppm)	15	100.00	0.002	0	0.001	0
	THC(ppm)	1	99.70	2.6	-	2.1	-
	THC(ppm)	2	100.00	3.6	-	2.7	-
	THC(ppm)	4	100.00	4.3	-	2.6	-
	THC(ppm)	5	98.51	3.8	-	2.9	-
	THC(ppm)	6	99.85	2.4	-	2.2	-
	THC(ppm)	7	97.02	2.6	-	2.3	-
	THC(ppm)	9	100.00	3.8	-	2.6	-
	THC(ppm)	11	94.20	3.3	-	2.7	-
	THC(ppm)	12	99.70	6.7	-	3.0	-
	THC(ppm)	13	100.00	3.6	-	2.6	-
	THC(ppm)	14	99.40	2.5	-	2.1	-
	THC(ppm)	15	99.85	5.2	-	2.7	-
	THC(ppm)	16	93.90	4.8	-	3.1	-
	THC(ppm)	17	98.66	2.5	-	2.2	-
	THC(ppm)	19	100.00	2.6	-	2.3	-
	O3(ppm)	1	100.00	0.042	0	0.037	-
	O3(ppm)	6	99.55	0.042	0	0.037	-

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

FEBRUARY 2015  
page 2 of 2  
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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	2	2015					
254465-00-00							
149968-00-01							
48522-01-00							
240008-00-03	CONTINUOUS AMBIENT MONITORING						
48263-00-00			ONE-HOUR AVERAGE		24-HOUR AVERAGE		
224816-00-03	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
189942-00-02	O3(ppm)	7	100.00	0.038	0	0.033	-
206355-00-00	O3(ppm)	8	100.00	0.036	0	0.033	-
46586-00-00	O3(ppm)	13	100.00	0.037	0	0.032	-
216466-00-04	O3(ppm)	14	100.00	0.045	0	0.040	-
137467-00-00	O3(ppm)	17	98.66	0.042	0	0.038	-
20809-01-00	NO2(ppm)	1	100.00	0.039	0	0.023	-
241311-00-02	NO2(ppm)	6	100.00	0.036	0	0.024	-
094-02-00	NO2(ppm)	7	100.00	0.044	0	0.025	-
305529-00-00	NO2(ppm)	8	100.00	0.024	0	0.008	-
026-02-00	NO2(ppm)	12	100.00	0.060	0	0.034	-
228044-00-00	NO2(ppm)	13	94.94	0.034	0	0.018	-
73203-01-00	NO2(ppm)	14	100.00	0.027	0	0.009	-
	NO2(ppm)	15	100.00	0.044	0	0.025	-
	NO2(ppm)	16	100.00	0.047	0	0.031	-
	NO2(ppm)	17	98.66	0.031	0	0.013	-
	NO2(ppm)	19	100.00	0.051	0	0.014	-
	NO2(ppm)	502	100.00	0.029	0	0.012	-
	CO(ppm)	7	100.00	0.6	-	0.2	0
	NH3(ppm)	1	94.64	0	-	0	0
	NH3(ppm)	6	99.11	0	-	0	0
	PM2.5(ug/m <sup>3</sup> )	1	99.55	37.7	-	10.9	0
	PM2.5(ug/m <sup>3</sup> )	6	99.55	39	-	10.6	0
	PM2.5(ug/m <sup>3</sup> )	7	95.98	21.9	-	9.9	0
	PM2.5(ug/m <sup>3</sup> )	8	99.11	30.1	-	11	0
	PM2.5(ug/m <sup>3</sup> )	12	99.85	39.7	-	18.2	0
	PM2.5(ug/m <sup>3</sup> )	13	99.70	19.6	-	8.5	0
	PM2.5(ug/m <sup>3</sup> )	14	99.85	19.4	-	7.8	0
	PM2.5(ug/m <sup>3</sup> )	15	100.00	33.4	-	14.6	0
	PM2.5(ug/m <sup>3</sup> )	16	99.85	55	-	11.1	0
	PM2.5(ug/m <sup>3</sup> )	17	98.36	23	-	8.5	0
	WIND	1	99.85	-	-	-	-
	WIND	2	100.00	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	100.00	-	-	-	-
	WIND	6	100.00	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	99.70	-	-	-	-
	WIND	9	99.70	-	-	-	-
	WIND	11	100.00	-	-	-	-
	WIND	12	100.00	-	-	-	-
	WIND	13	91.37	-	-	-	-
	WIND	14	100.00	-	-	-	-
	WIND	15	100.00	-	-	-	-
	WIND	16	99.85	-	-	-	-
	WIND	17	100.00	-	-	-	-
	WIND	19	99.85	-	-	-	-
	WIND	502	100.00	-	-	-	-
							
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**  
**FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT McKAY - BERTHA GANTER (AMS 1)  
FEBRUARY 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	638	34	34	100.00	33	0	5	0
TRS(ppb) Average	628	33	44	98.36	2	0	1	0
THC(ppm) Average	636	34	36	99.70	2.6	-	2.1	-
NMHC(ppm) Average	636	34	36	99.70	0.182	-	0.015	-
CH4(ppm) Average	636	34	36	99.70	2.6	-	2.1	-
O3 (ppb) Average	641	31	31	100.00	42	0	37	-
NO2 (ppb) Average	637	35	35	100.00	39	0	23	-
NO (ppb) Average	637	35	35	100.00	69	-	27	-
NOX (ppb) Average	637	35	35	100.00	106	-	46	-
NH3 (ppb) Average	600	42	72	95.54	0	0	0	-
PM2.5 (ug/m3) Average	669	0	3	99.55	37.7	0	10.9	0
Wind Speed 10 m (km/h) Average	671	0	1	99.85	19	-	13	-
Wind Direction 10 m (deg) Average	671	0	1	99.85	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100.00	1.2	-	-2.8	-
Temperature 10 m (C) Average	672	0	0	100.00	1.1	-	-2.4	-
Relative Humidity (%) Average	672	0	0	100.00	90	-	-	-
Precipitation (mm) Total	671	0	1	99.85	0.8	-	-	-
Surface Wetness (% of range) Average	672	0	0	100.00	0	-	-	-
Global Solar Radiation (W/m2) Average	672	0	0	100.00	497	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BERTHA GANTER FORT MCKAY (AMS 1)  
 FEBRUARY 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	638	1.6	3	-	0	0	0	1	1	3	33
TRS (ppb) Average	628	0.7	0	-	0	0	0	1	1	1	2
THC (ppm) Average	636	1.96	0.1	-	1.8	1.9	1.9	1.9	2	2.1	2.6
NMHC(ppm) Average	636	0.002	0.015	-	0	0	0	0	0	0	0.182
CH4(ppm) Average	636	1.96	0.1	-	1.8	1.9	1.9	1.9	2	2.1	2.6
O3 (ppb) Average	641	21.8	10	-	2	5	16	24	29	34	42
NO2 (ppb) Average	637	11.3	9	-	0	3	5	9	15	25	39
NO (ppb) Average	637	3.8	9	-	0	0	0	0	3	10	69
NOX (ppb) Average	637	15.1	16	-	0	3	6	10	18	32	106
NH3 (ppb) Average	600	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	669	5.19	3.9	-	0.1	1.9	3.1	4.2	6.2	9.2	37.7
Wind Speed 10 m (km/h) Average	671	6	3	-	0	2	4	5	8	10	19
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-17.56	7.9	-	-38.5	-27.2	-23.8	-18	-11.9	-7.4	1.2
Temperature 10 m (C) Average	672	-17.04	7.4	-	-36.9	-25.9	-22.7	-17.5	-12	-7.3	1.1
Relative Humidity (%) Average	672	70.3	8	-	39	59	67	72	76	78	90
Precipitation (mm) Total	671	-	-	4.32	0	0	0	0	0	0	0.8
Surface Wetness (% of range) Average	672	0	0	-	0	0	0	0	0	0	0
Global Solar Radiation (W/m2) Average	672	55	97	-	0	0	0	0	78	196	497

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
ALL PARAMETERS	12 Feb 2015 13:00	12 Feb 2015 13:00	1	Maintenance - New modem installed
TRS	26 Feb 2015 03:00	26 Feb 2015 03:00	1	Intermittent unstable operation
TRS	26 Feb 2015 06:00	26 Feb 2015 08:00	3	Intermittent unstable operation
TRS	26 Feb 2015 09:00	26 Feb 2015 10:00	2	Maintenance - Analyzer response verified
TRS	27 Feb 2015 08:00	27 Feb 2015 11:00	4	Intermittent unstable operation
THC	18 Feb 2015 12:00	18 Feb 2015 12:00	1	Unstable Operation
NH3	01 Feb 2015 07:00	28 Feb 2015 10:00	28	Stabilization after daily span
NH3	06 Feb 2015 18:00	06 Feb 2015 18:00	1	Stabilization after monthly calibrations
NH3	19 Feb 2015 16:00	19 Feb 2015 16:00	1	Intermittent unstable operation
PM2.5	09 Feb 2015 15:00	09 Feb 2015 16:00	2	Maintenance - Flow and zero check, sample head cleaning
PM2.5	23 Feb 2015 11:00	23 Feb 2015 11:00	1	Intermittent unstable operation
Wind Speed, Wind Direction	17 Feb 2015 18:00	17 Feb 2015 18:00	1	Flat line in sensor output signal - Sensor frozen

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Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 33 ppb on Feb 21 18:00	Maximum Daily Average: 5.0 ppb on Feb 21
Minimum Value: 0 ppb on Feb 10 22:00	Hours of Data: 638
Maximum Diurnal Average: 2.8 ppb at hour 18	Hours of Missing Data: 34
Monthly Average: 1.6 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Feb 13	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.8 ppb at hour 4	
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> =14	

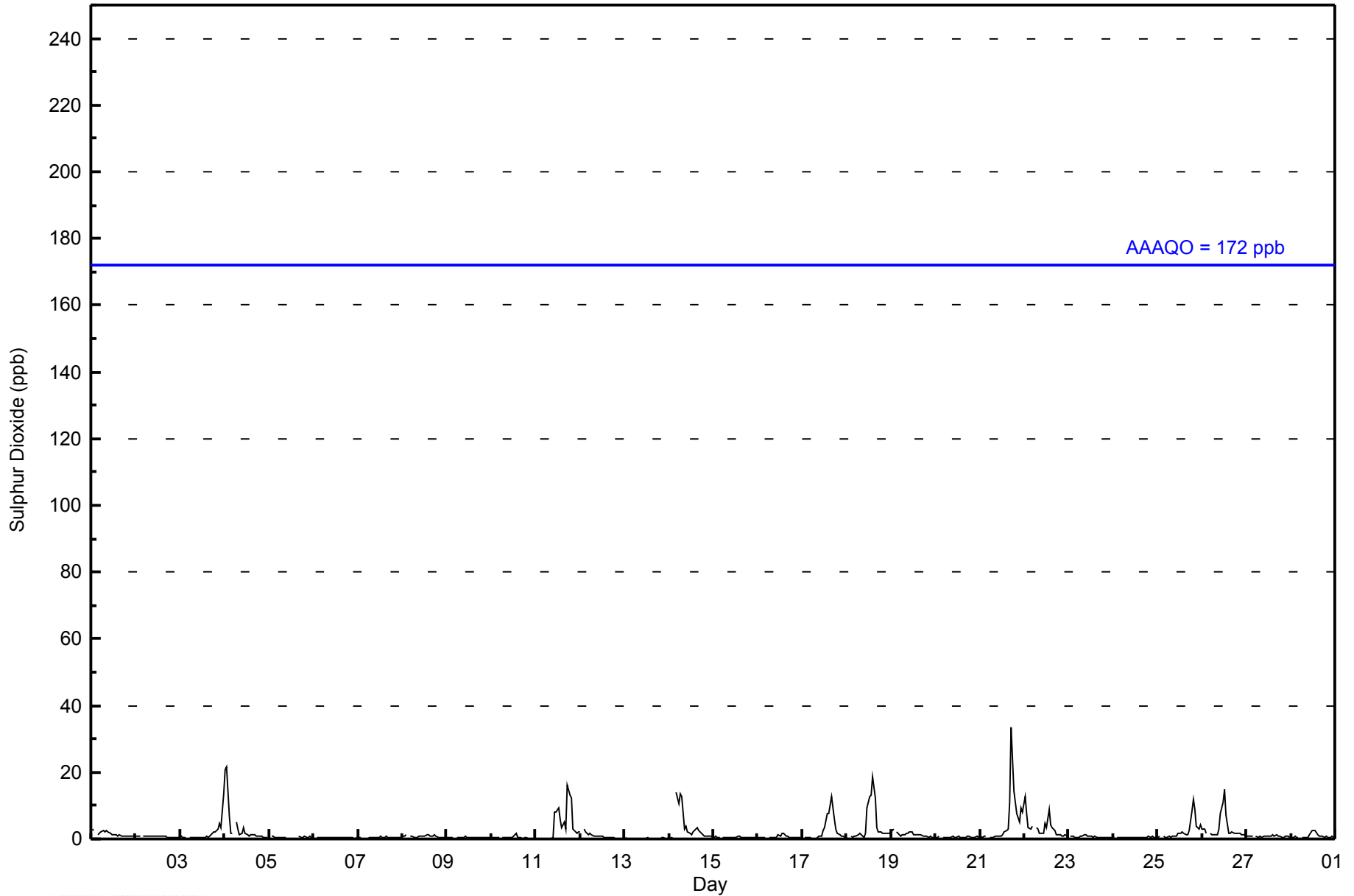
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	3	3	Z	1	2	2	3	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.5	3
2-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	0.7	1
3-Feb	1	1	0	0	Z	0	0	0	0	1	0	0	1	1	1	1	1	2	2	2	3	5	3	14	1.7	14
4-Feb	21	21	7	2	2	Z	5	3	1	2	3	2	1	1	1	1	1	1	1	1	1	1	0	1	3.4	21
5-Feb	Z	1	1	0	0	0	0	1	0	1	C	C	C	C	C	C	1	1	0	1	1	1	1	--	1	
6-Feb	1	Z	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.4	1
7-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0.5	1
8-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0.8	1
9-Feb	1	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1	0	0.5	1
10-Feb	1	1	1	1	0	Z	1	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0.5	2
11-Feb	Z	0	0	0	0	0	0	0	0	0	8	8	9	6	3	5	3	16	13	12	3	2	2	2	4.1	16
12-Feb	2	Z	3	2	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.9	3
13-Feb	0	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-Feb	0	0	0	Z	14	11	13	13	3	4	2	2	1	2	3	3	2	2	1	1	1	1	1	1	3.5	14
15-Feb	1	1	1	0	Z	0	1	0	0	1	1	0	1	1	1	1	1	1	0	1	0	0	0	0	0.5	1
16-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	2	1	1	1	0	0	0	0	0	0	0.6	2
17-Feb	Z	0	0	0	0	0	0	0	1	1	1	2	3	8	7	10	13	6	3	2	1	1	1	1	2.7	13
18-Feb	1	Z	1	1	1	1	1	2	1	1	2	9	13	13	18	12	3	2	2	2	1	2	2	2	4.0	18
19-Feb	2	3	Z	2	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1.4	3
20-Feb	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0.6	1
21-Feb	1	1	1	1	Z	1	0	1	1	1	1	1	1	2	2	3	11	33	14	11	7	5	9	8	5.0	33
22-Feb	13	7	3	3	4	Z	4	3	2	2	2	5	3	9	4	4	2	1	1	1	1	1	1	1	3.4	13
23-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0.6	1	
24-Feb	1	Z	1	1	1	1	0	0	0	1	0	0	0	1	1	1	1	1	1	1	0	1	1	1	0.5	1
25-Feb	1	1	Z	1	0	0	1	1	1	1	1	2	2	2	2	1	1	2	8	12	9	4	3	4	2.6	12
26-Feb	3	3	2	Z	2	1	1	1	1	3	8	11	15	7	2	2	2	2	2	2	2	1	1	1	3.2	15
27-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.7	1
28-Feb	1	1	1	0	1	Z	0	0	1	1	1	3	2	2	1	1	1	1	0	1	1	1	1	0	0.9	3
	2.2	2.0	1.1	0.8	1.4	1.1	1.4	1.2	0.8	1.0	1.5	2.1	2.4	2.5	2.2	2.0	1.8	2.8	2.0	1.9	1.3	1.1	1.1	1.5	Diurnal Average	
	21	21	7	3	14	11	13	13	3	4	8	11	15	13	18	12	13	33	14	12	9	5	9	14	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 McKay - Bertha Ganter - February 2015





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	615	96.39	96.40
11 - 20	20	3.13	99.53
21 - 60	3	0.47	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: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay - Bertha Ganter - February 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	104	91	44	13	18	3	4	57	84	51	18	19	17	29	32	30	614
11 - 20	0	0	0	0	0	0	0	1	14	5	0	0	0	0	0	0	20
21 - 60	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	104	91	44	13	18	3	4	58	101	56	18	19	17	29	32	30	637

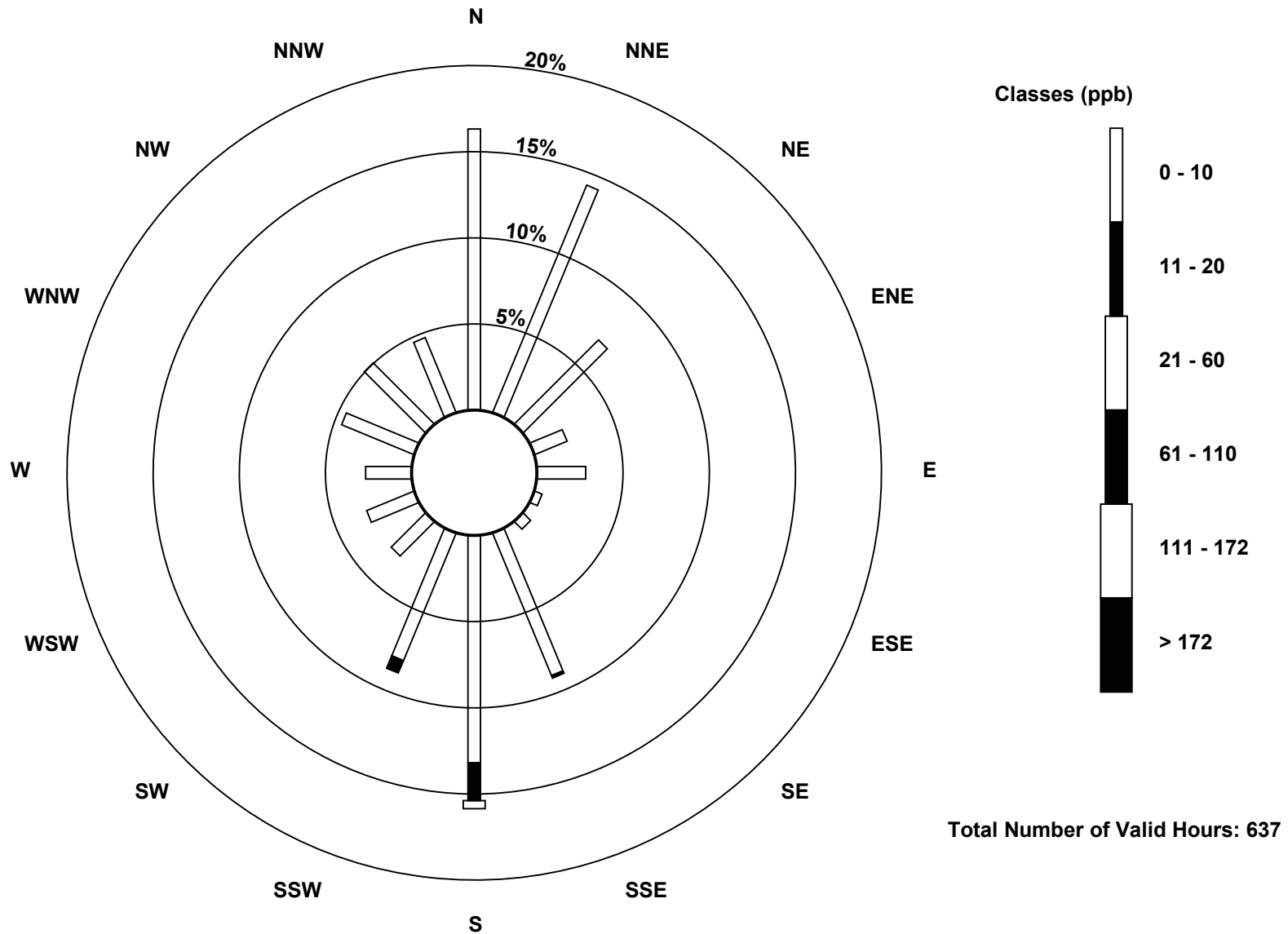
Total Number of Valid Hours: 637

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

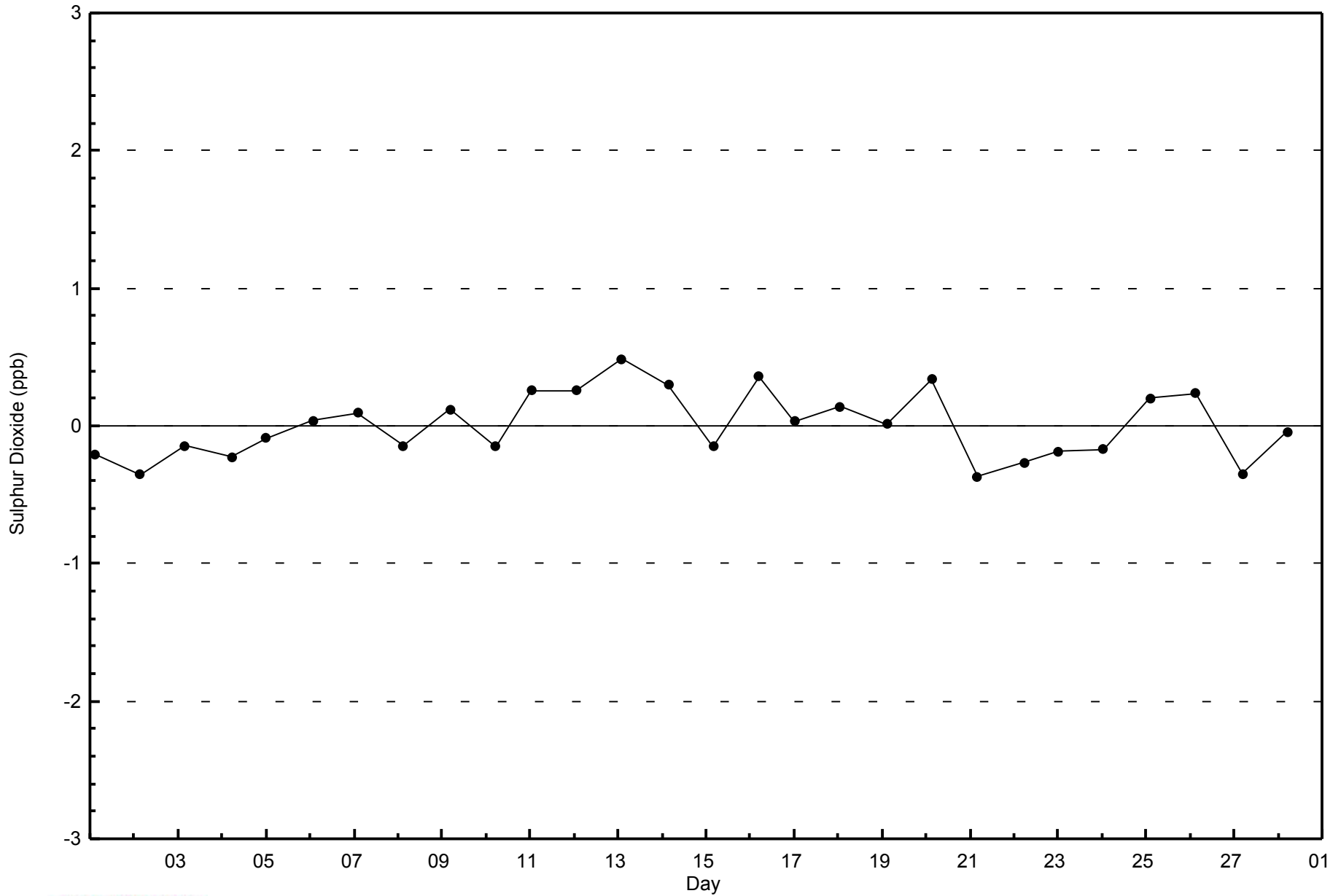
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

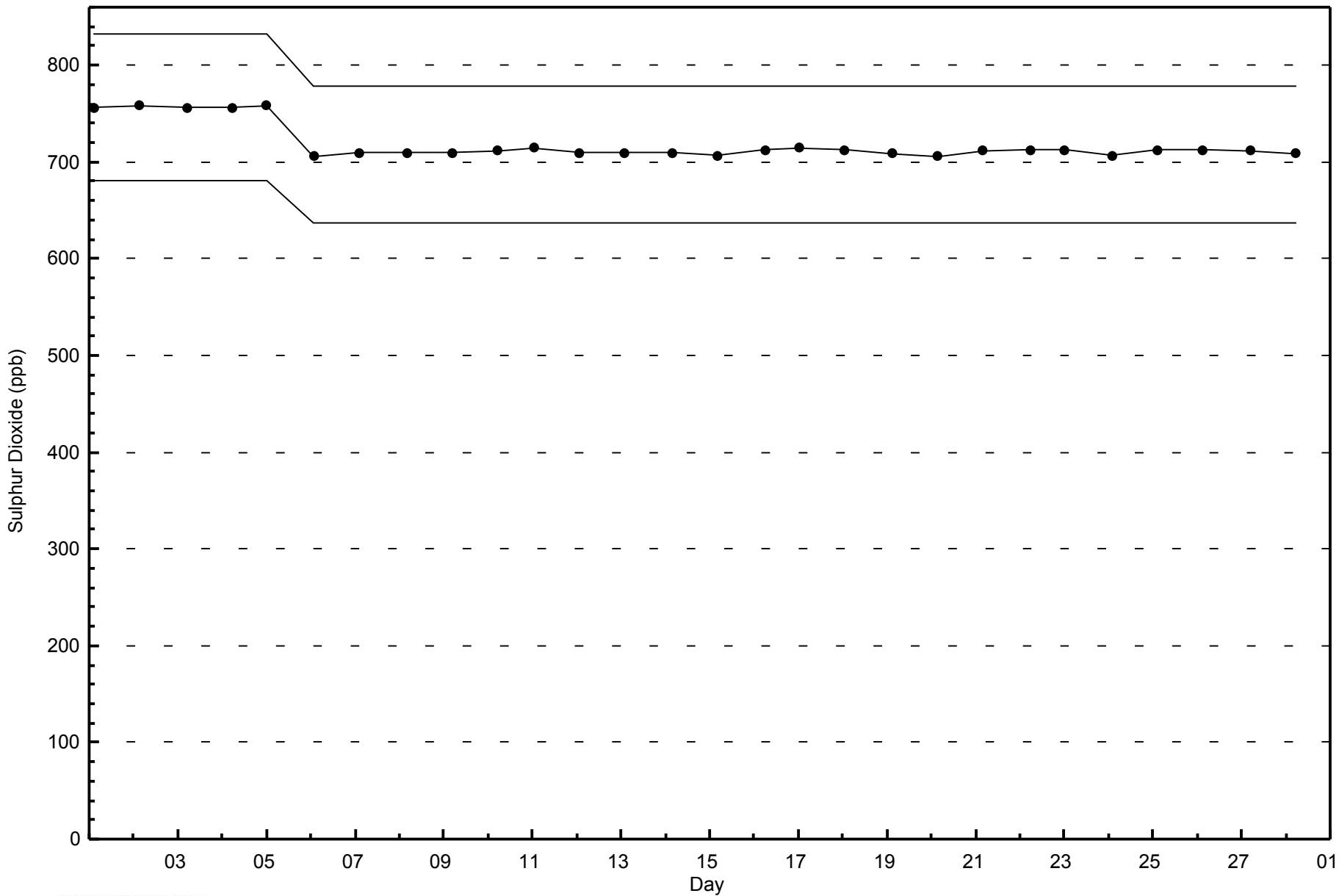
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - February 2015





WBEA  
Span Responses

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



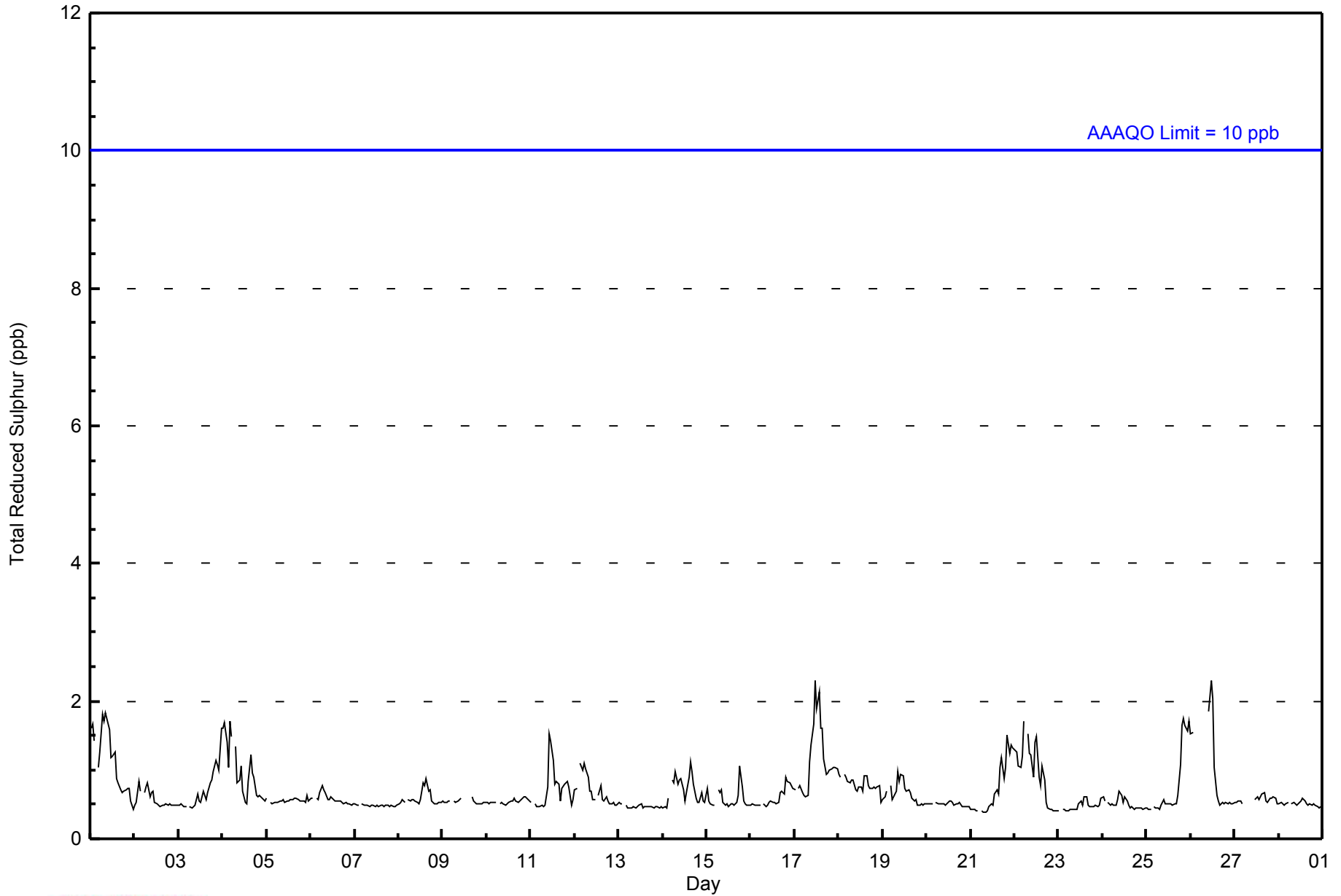


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 2 ppb on Feb 17 12:00										Maximum Daily Average: 1.2 ppb on Feb 17										Hours of Data: 628						
Minimum Value: 0 ppb on Feb 21 09:00										Minimum Daily Average: 0.5 ppb on Feb 13										Hours of Missing Data: 44						
Maximum Diurnal Average: 0.8 ppb at hour 12										Minimum Diurnal Average: 0.6 ppb at hour 19										Hours of Calibration: 33						
Monthly Average: 0.7 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> =2										Percent Operational Time: 98.4						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2	2	1	Z	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1.1	2
2-Feb	0	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0.6	1
3-Feb	0	1	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	0.7	2
4-Feb	2	2	1	1	2	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
5-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
6-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0.6	1
7-Feb	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
8-Feb	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
9-Feb	1	1	1	1	1	Z	1	1	1	1	1	C	C	C	C	C	1	1	1	1	1	1	1	1	0.5	1
10-Feb	1	1	1	1	1	1	Z	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
11-Feb	1	Z	1	0	0	0	0	0	0	1	2	1	1	1	1	1	1	1	1	1	1	1	0	1	0.7	2
12-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	M	1	1	1	1	1	1	1	1	1	0	0	0.7	1
13-Feb	1	1	1	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Feb	0	0	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
15-Feb	1	1	1	0	0	Z	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0.6	1
16-Feb	0	0	0	0	0	0	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
17-Feb	1	Z	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1.2	2
18-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
19-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0.7	1
20-Feb	1	1	1	1	Z	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	0	0	0	0	0.5	1
21-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	1	2	1	1	1	0.7	2
22-Feb	1	1	1	1	1	2	Z	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1.0	2
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	1	0.5	1
24-Feb	1	1	Z	1	0	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
25-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	2	2	2	2	2	0.8	2
26-Feb	2	2	UO	1	Z	UO	UO	UO	UO	M	M	2	2	2	1	1	1	0	1	1	1	1	1	1	--	2
27-Feb	1	1	1	1	1	Z	0	UO	UO	UO	UO	UO	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
28-Feb	1	1	1	0	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0.5	1
0.7 0.7 0.6 0.6 0.7 0.7 0.6 0.7 0.7 0.7 0.7 0.8 0.8 0.7 0.7 0.7 0.7 0.6 0.6 0.6 0.7 0.7 0.7 0.6 0.6																								Diurnal Average		
2 2 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1 1 1 2 2 2 2 2																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance UO - Unstable Operation																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



WBEA  
Hourly Averages

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





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	628	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: 628

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

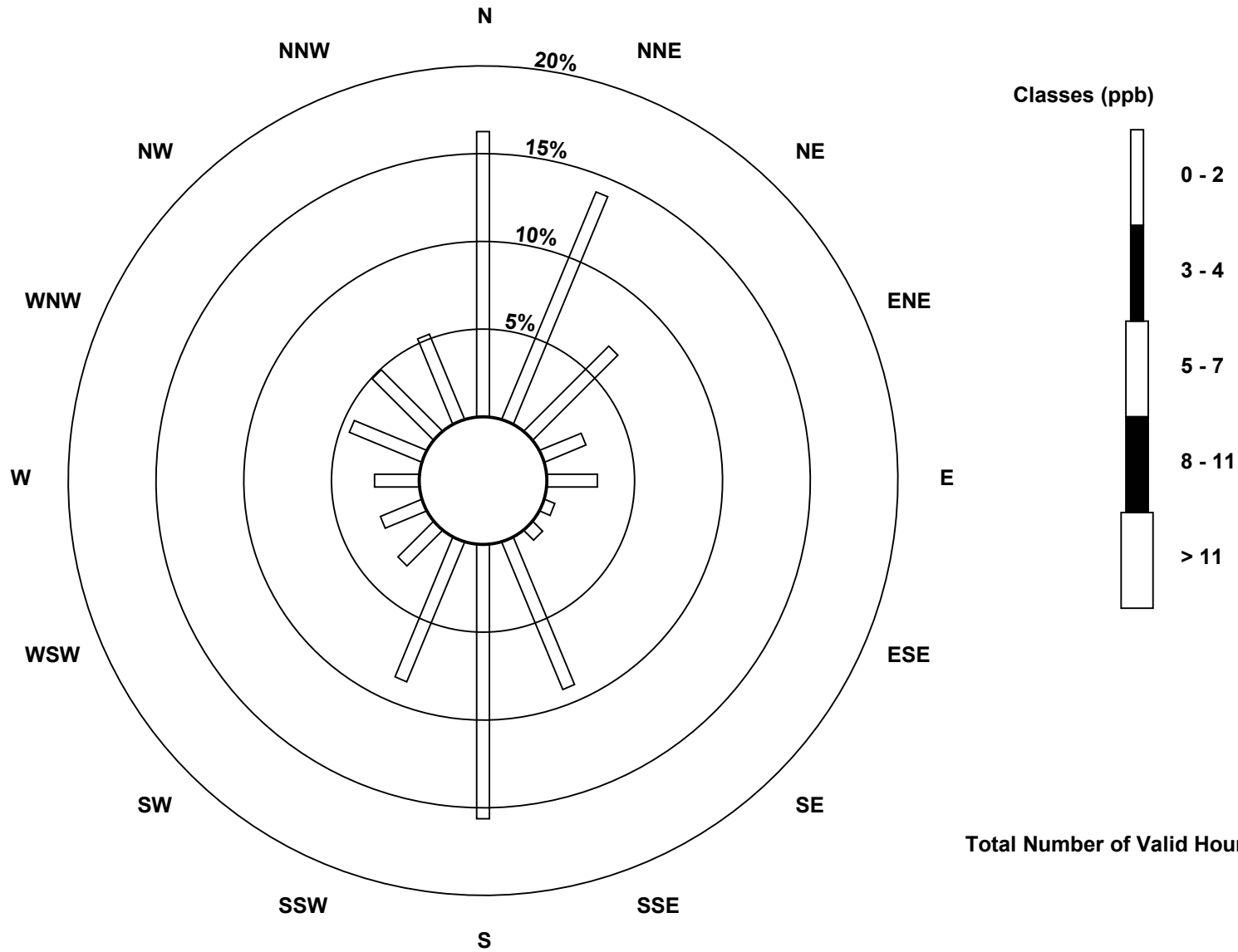
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	102	88	43	16	18	4	5	57	98	54	18	16	16	28	31	33	627
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	102	88	43	16	18	4	5	57	98	54	18	16	16	28	31	33	627

Total Number of Valid Hours: 627

Total Number of Hours: 672

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

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

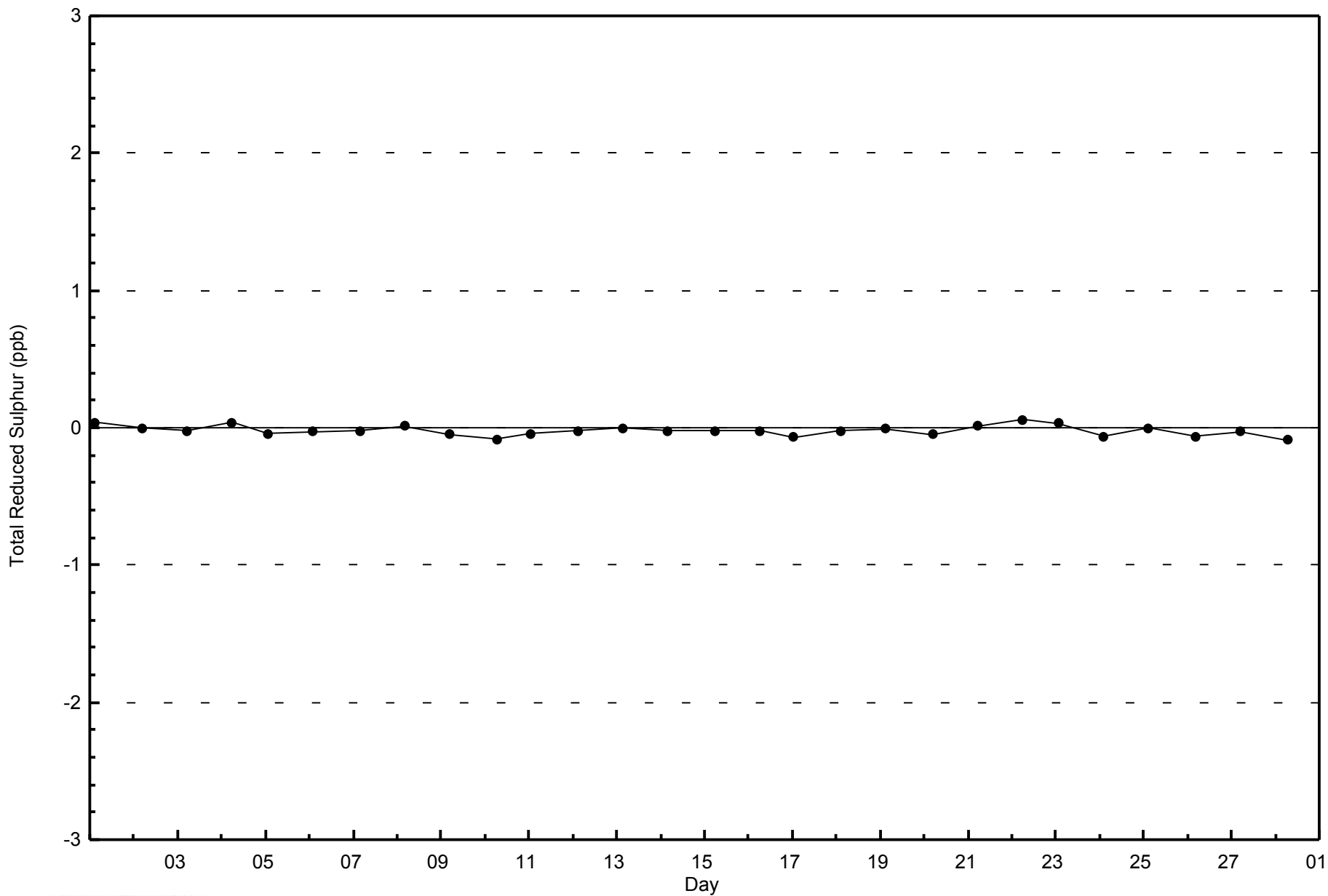






WBEA  
Zero Responses

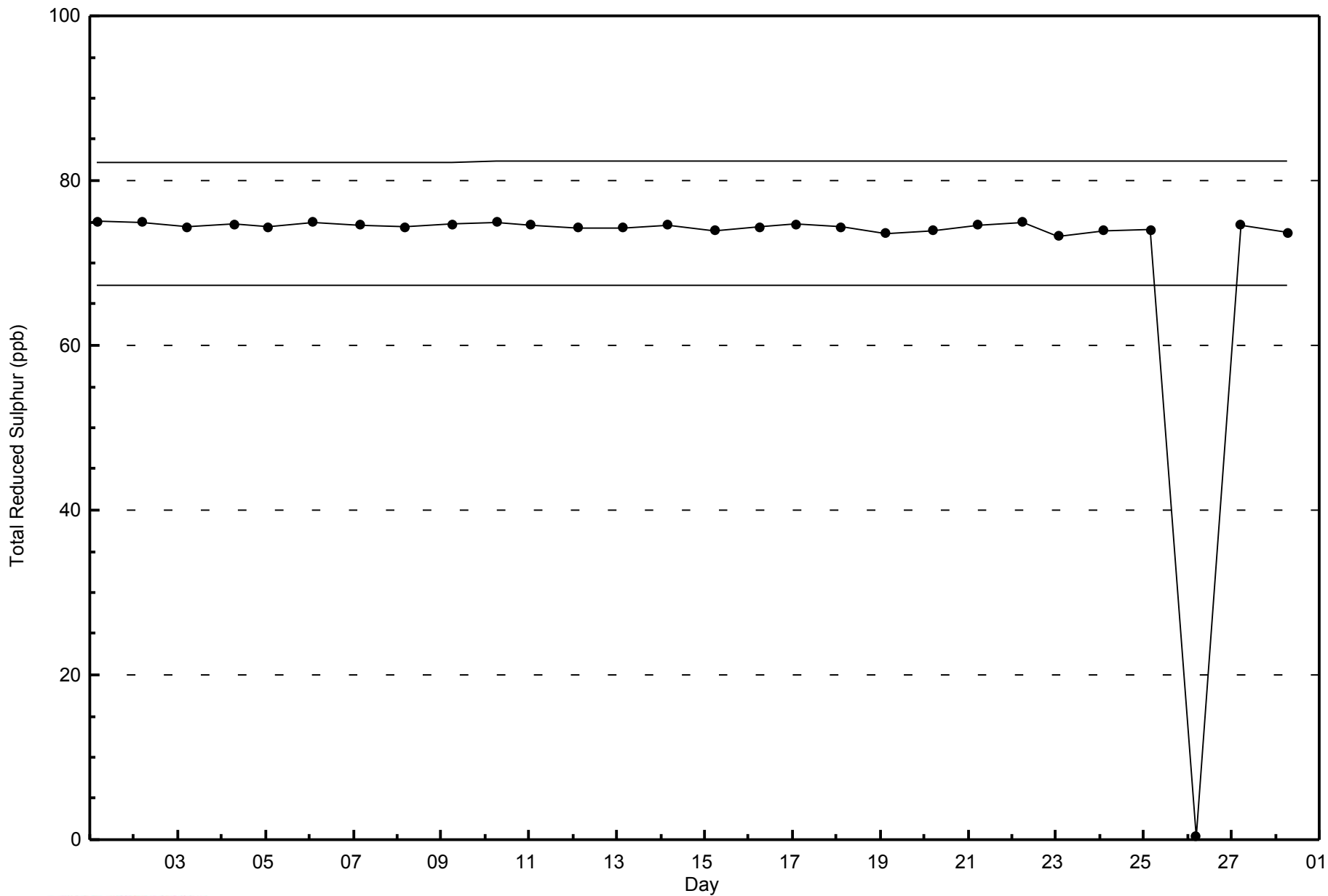
Total Reduced Sulphur (TRS) - ppb  
Fort McKay - Bertha Ganter - February 2015





WBEA  
Span Responses

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





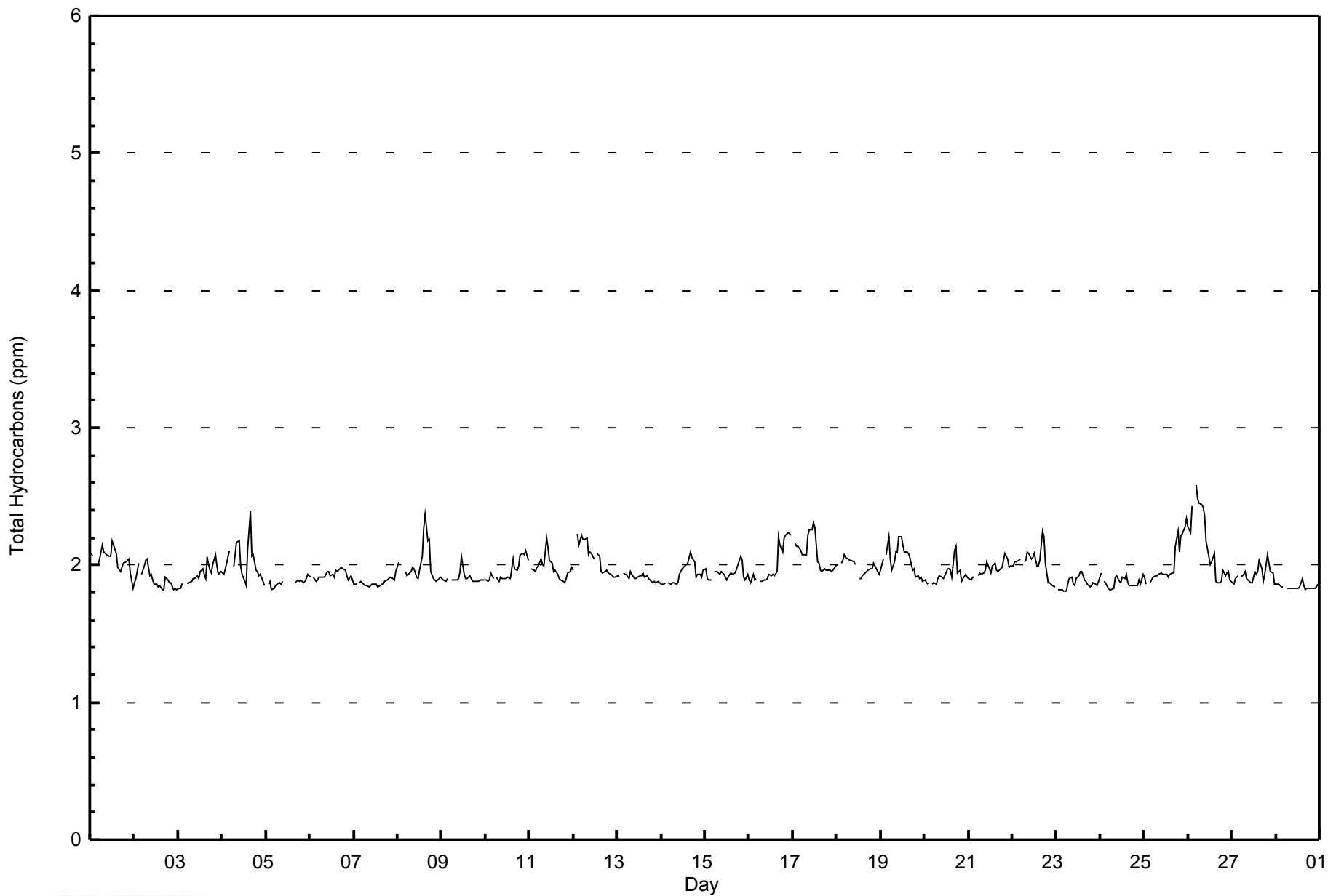
Maximum Value: 2.6 ppm on Feb 26 05:00																				Maximum Daily Average: 2.1 ppm on Feb 26					Hours in Service: 672			
Minimum Value: 1.8 ppm on Feb 23 06:00																				Minimum Daily Average: 1.8 ppm on Feb 28					Hours of Data: 636			
Maximum Diurnal Average: 2.0 ppm at hour 10																				Minimum Diurnal Average: 1.9 ppm at hour 2					Hours of Missing Data: 36			
Monthly Average: 1.96 ppm																				Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.4					Hours of Calibration: 34			
																				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-Feb	2.1	2.1	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.8	2.0	2.2		
2-Feb	1.9	1.9	2.0	Z	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.0		
3-Feb	1.8	1.8	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	2.1		
4-Feb	1.9	1.9	2.0	2.1	2.1	Z	2.0	2.1	2.2	2.2	2.0	1.9	1.9	2.1	2.4	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.8	2.0	2.4			
5-Feb	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--			
6-Feb	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	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0		
7-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
8-Feb	2.0	2.0	2.0	Z	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.3	2.4	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.4		
9-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1		
10-Feb	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.1	2.1		
11-Feb	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2		
12-Feb	2.0	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	M	2.1	2.1	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.2			
13-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
14-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.1		
15-Feb	2.0	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	1.9	1.9	1.9	1.9	2.1		
16-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2		
17-Feb	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.3		
18-Feb	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	UO	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1		
19-Feb	2.0	2.0	Z	2.1	2.2	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.2		
20-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.1	2.1	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.1		
21-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1		
22-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.2	2.2	2.0	1.9	1.9	1.9	1.8	1.8	2.0	2.2		
23-Feb	Z	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	2.0		
24-Feb	1.9	Z	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9		
25-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.0		
26-Feb	2.3	2.2	2.4	Z	2.6	2.5	2.4	2.4	2.4	2.4	2.2	2.1	2.0	2.0	2.1	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.6		
27-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.1	2.0	2.0	1.9	1.9	1.9	2.1		
28-Feb	1.9	1.9	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9		
																								Diurnal Average				
																								Diurnal Maximum				
																								1.9				
																								2.3				

Z - zerospan                      C - Calibration                      M - Maintenance                      UO - Unstable Operation



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	526	82.70	82.70
2.1 - 3.0	110	17.30	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 636

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

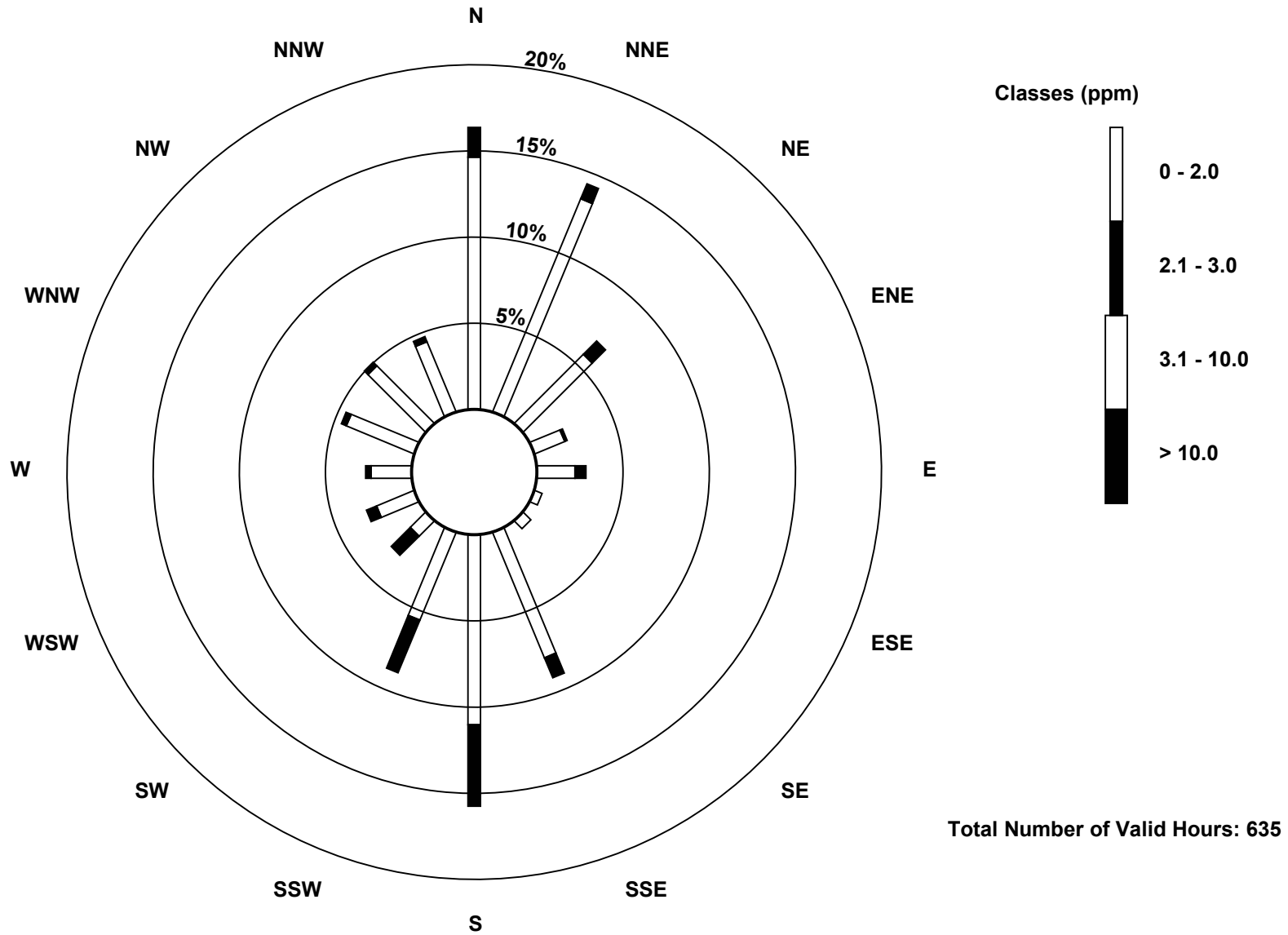
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	93	85	36	12	14	3	4	50	70	35	8	15	15	27	30	28	525
2.1 - 3.0	11	6	7	1	4	0	0	8	30	21	10	4	2	2	2	2	110
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	104	91	43	13	18	3	4	58	100	56	18	19	17	29	32	30	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

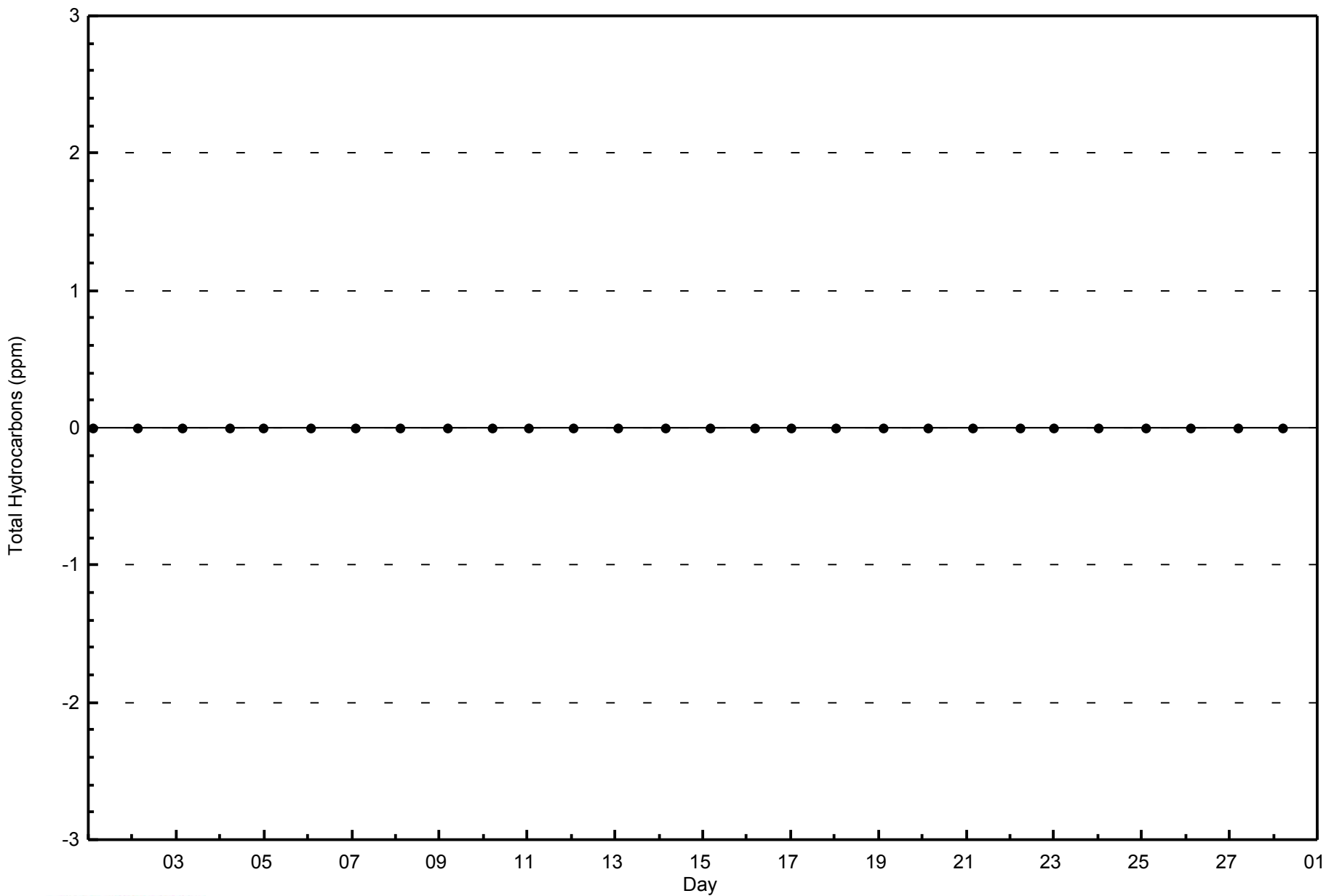
Total Hydrocarbons (THC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





**WBEA**  
**Zero Responses**

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

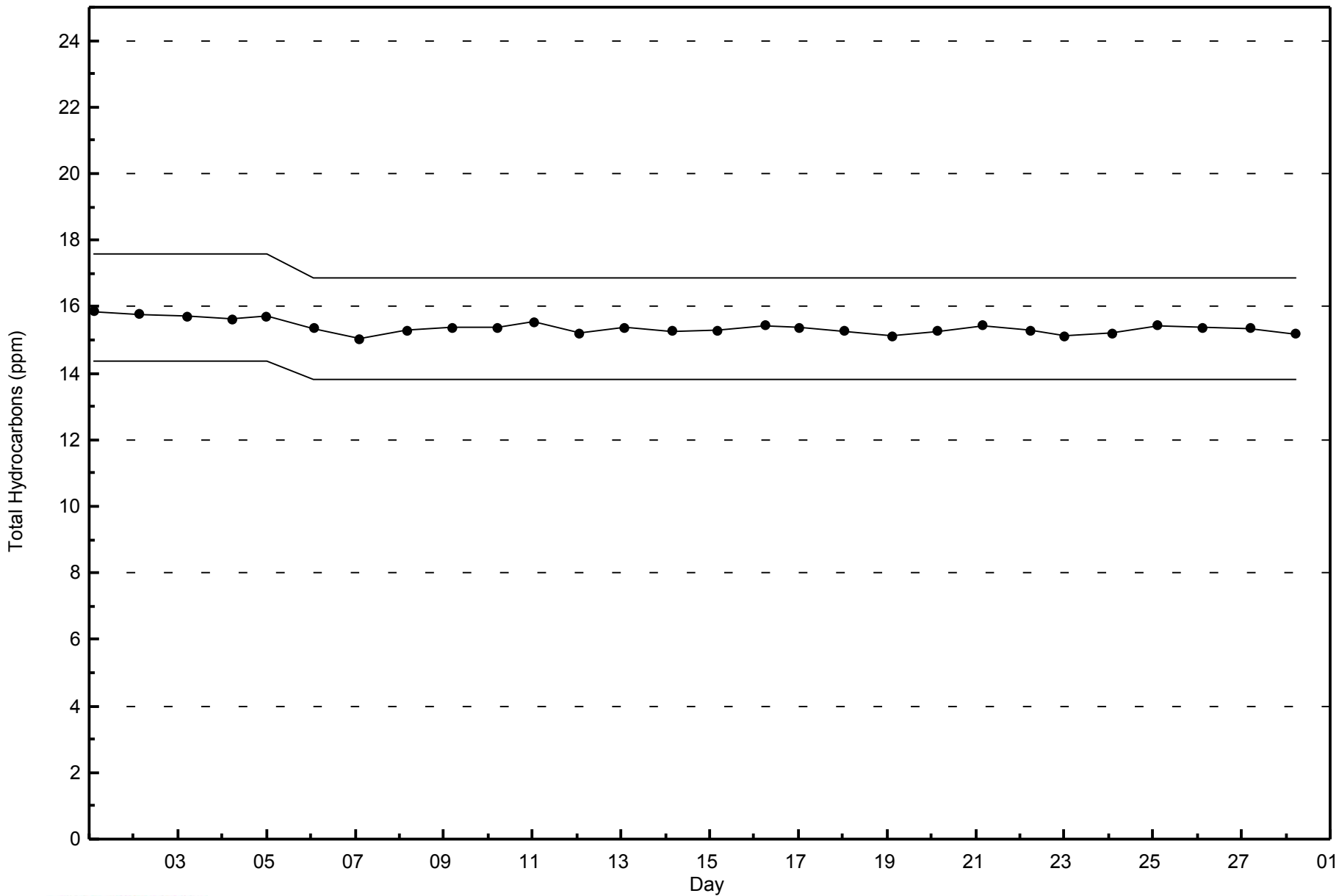






WBEA  
Span Responses

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



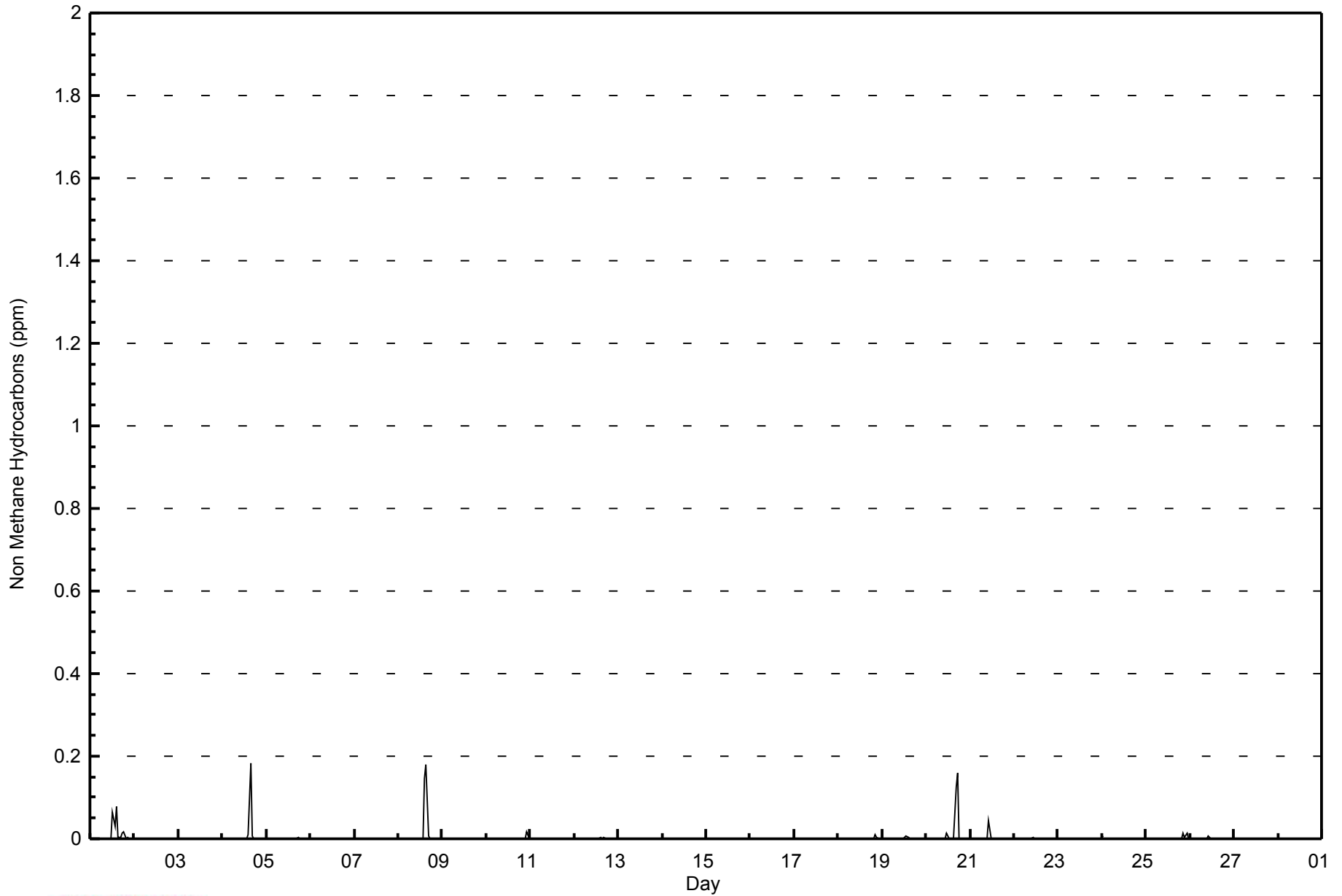


Maximum Value: 0.182 ppm on Feb 4 16:00																				Maximum Daily Average: 0.015 ppm on Feb 8					Hours in Service: 672	
Minimum Value: 0.000 ppm on Feb 1 01:00																				Minimum Daily Average: 0.000 ppm on Feb 2					Hours of Data: 636	
Maximum Diurnal Average: 0.014 ppm at hour 16																				Minimum Diurnal Average: 0.000 ppm at hour 5					Hours of Missing Data: 36	
Monthly Average: 0.002 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: 34	
																									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-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.063	0.029	0.078	0.004	0.002	0.014	0.016	0.000	0.003	0.001	0.000	0.000	0.009	0.078
2-Feb	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
3-Feb	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
4-Feb	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	0.012	0.182	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.182
5-Feb	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	0.000	0.003	0.000	0.000	0.000	0.000	0.000	--	0.003	
6-Feb	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	
7-Feb	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	
8-Feb	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	0.147	0.181	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.181
9-Feb	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	
10-Feb	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	0.017	0.017	
11-Feb	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	
12-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	0.000	0.003	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
13-Feb	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	
14-Feb	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	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
15-Feb	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	
16-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	
17-Feb	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	
18-Feb	0.000	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	UO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.003	0.000	0.000	0.001	
19-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.006	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	
20-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.124	0.159	0.000	0.000	0.000	0.000	0.000	0.013	0.159	
21-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.045	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.045	
22-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	
23-Feb	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	
24-Feb	0.006	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	0.006	
25-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.005	0.014	0.000	0.014	
26-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	
27-Feb	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	
28-Feb	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	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan			C - Calibration					M - Maintenance					UO - Unstable Operation													



WBEA  
Hourly Averages

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





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

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	614	96.54	96.54
0.006 - 0.05	15	2.36	98.90
0.06 - 0.1	4	0.63	99.53
> 0.1	3	0.47	100.00

Total Number of Valid Hours: 636

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

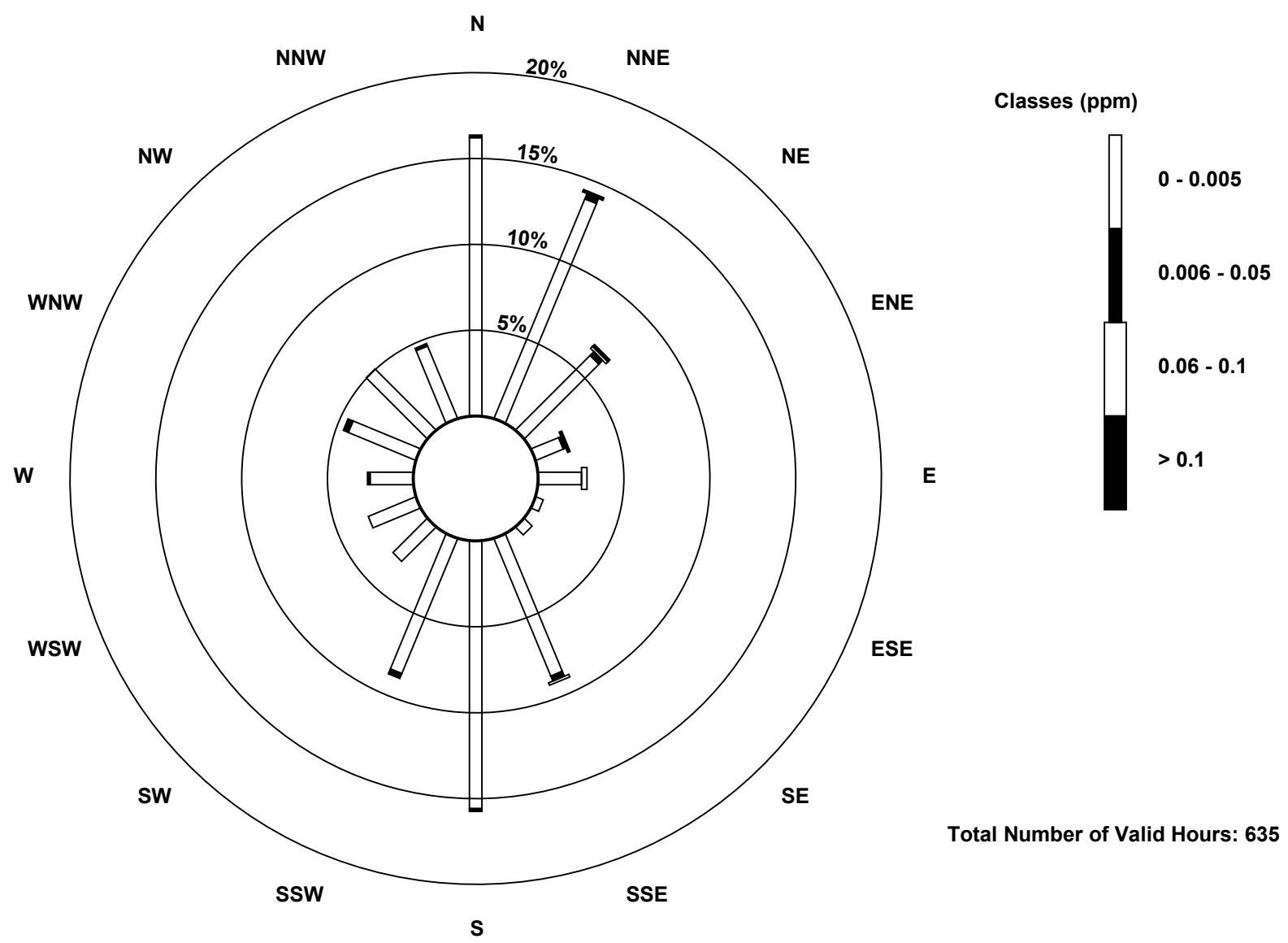
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	103	88	39	11	16	3	4	55	99	54	18	19	16	27	32	29	613
0.006 - 0.05	1	2	2	1	0	0	0	2	1	2	0	0	1	2	0	1	15
0.06 - 0.1	0	0	1	0	2	0	0	1	0	0	0	0	0	0	0	0	4
> 0.1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
<b>Totals</b>	104	91	43	13	18	3	4	58	100	56	18	19	17	29	32	30	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

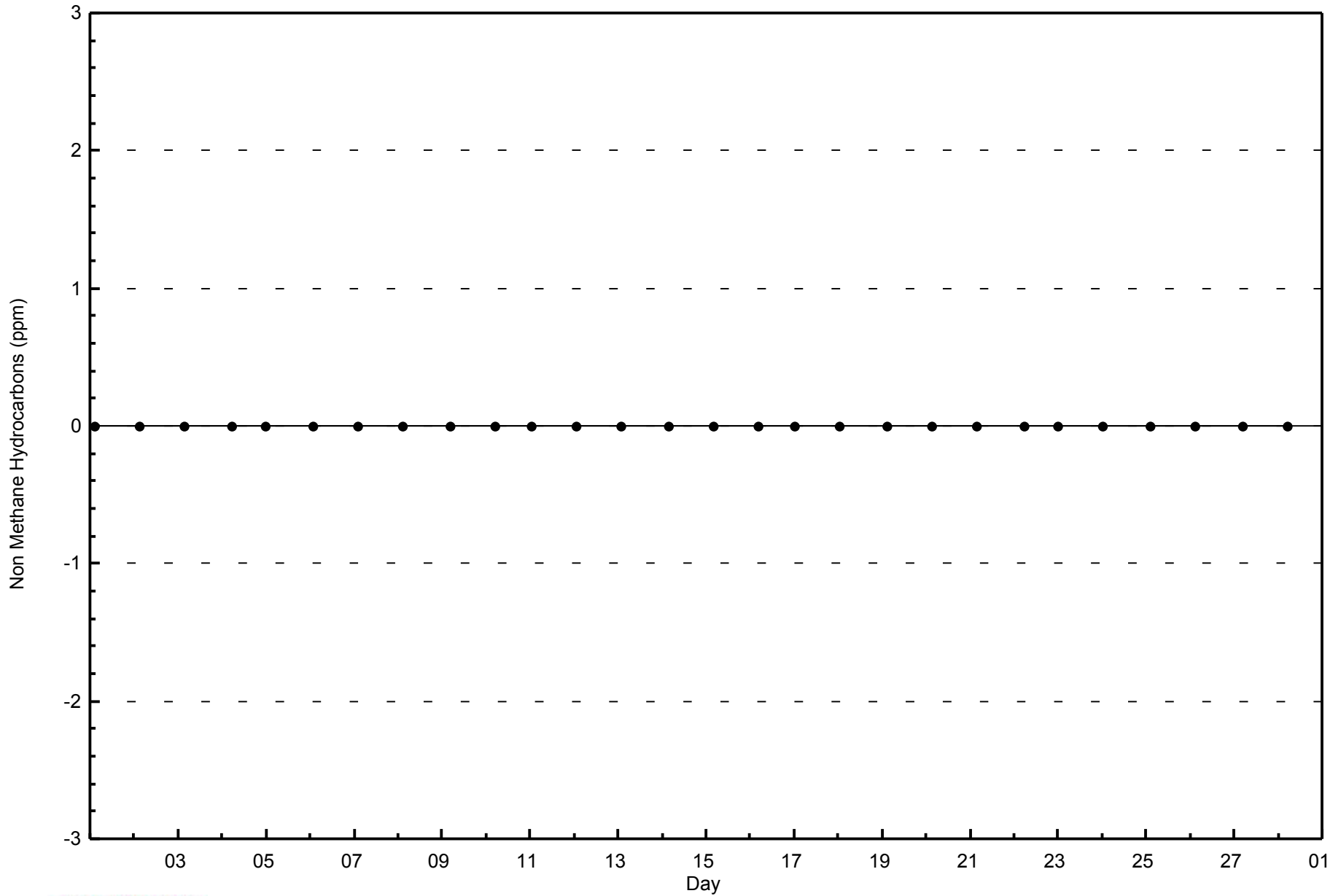
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

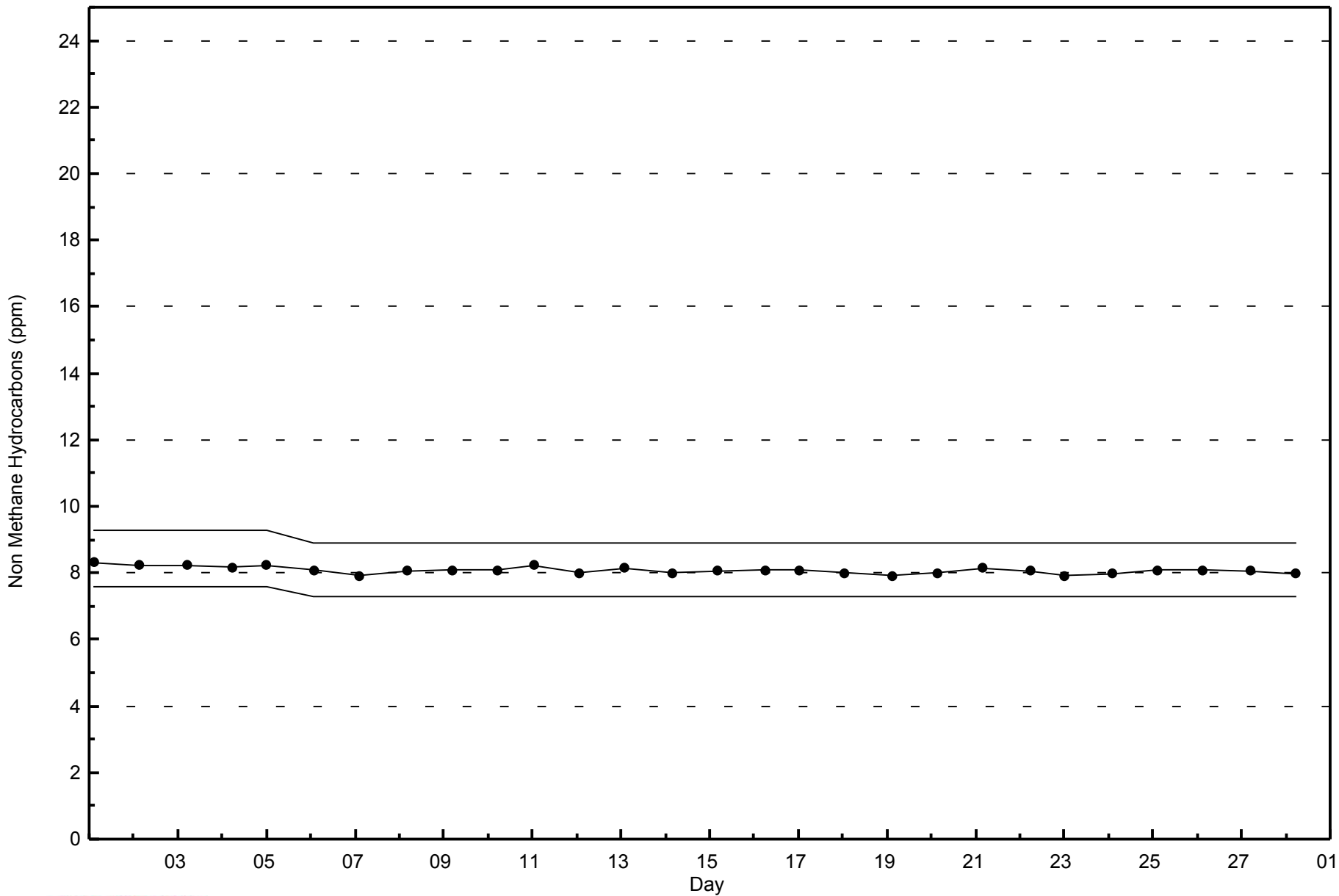
Non Methane Hydrocarbons (NMHC) - ppm  
Fort McKay - Bertha Ganter - February 2015





WBEA  
Span Responses

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







Summary of Hour Averages

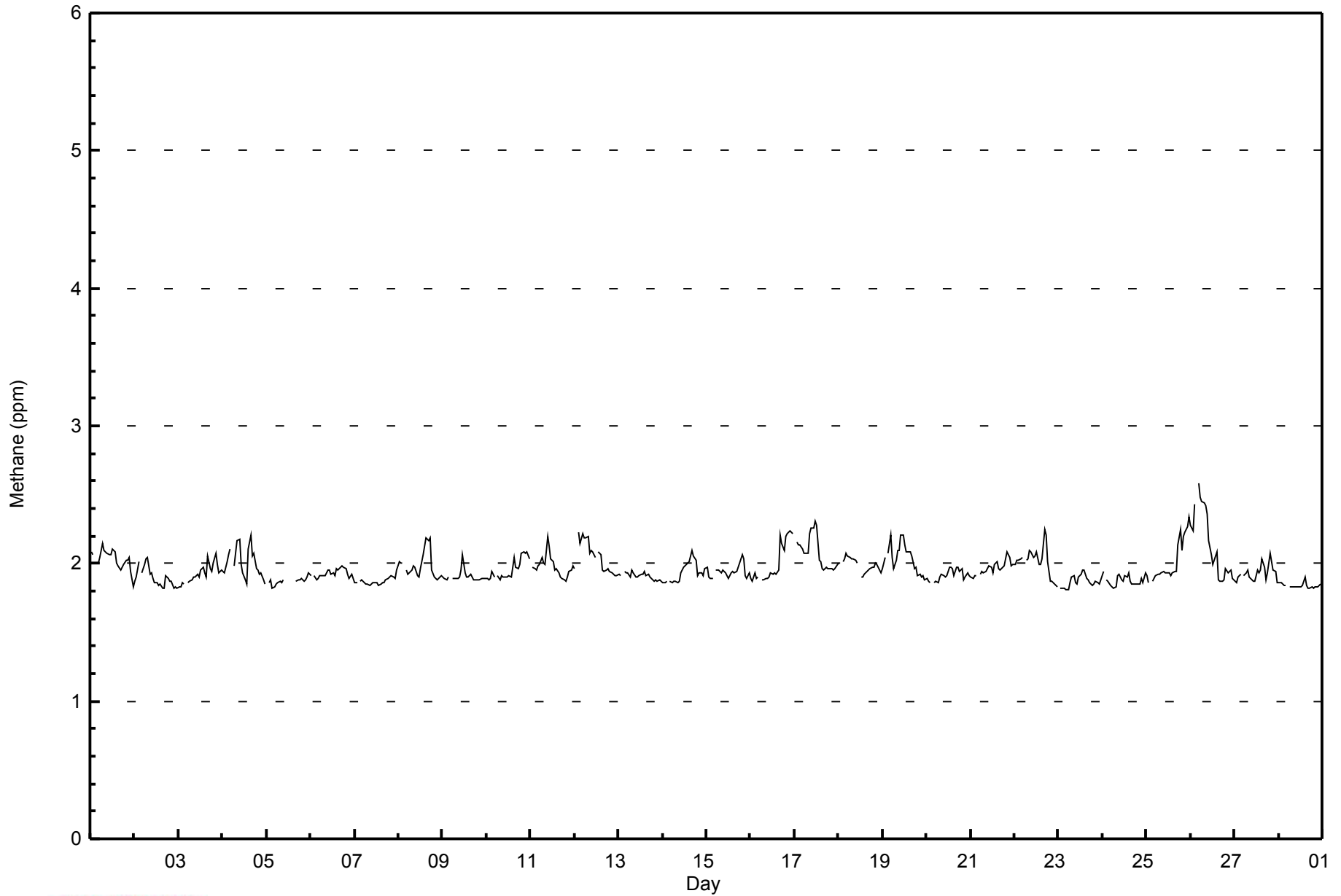
Fort McKay - Bertha Ganter - February 2015

Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service:		672																				
Maximum Value: 2.6 ppm on Feb 26 05:00		Maximum Daily Average: 2.1 ppm on Feb 26		Minimum Value: 1.8 ppm on Feb 23 06:00		Minimum Daily Average: 1.8 ppm on Feb 28		Hours of Data: 636																				
Maximum Diurnal Average: 2.0 ppm at hour 10		Minimum Diurnal Average: 1.9 ppm at hour 2		Monthly Average: 1.96 ppm		Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.4		Hours of Missing Data: 36																				
								Hours of Calibration: 34																				
								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-Feb	2.1	2.1	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.8	2.0	2.1		
2-Feb	1.9	1.9	2.0	Z	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.8	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.0	
3-Feb	1.8	1.8	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	2.1	
4-Feb	1.9	1.9	2.0	2.1	2.1	Z	2.0	2.1	2.2	2.2	2.0	1.9	1.9	2.1	2.2	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.8	2.0	2.2		
5-Feb	Z	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	C	C	C	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	--	1.9		
6-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
7-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
8-Feb	2.0	2.0	2.0	Z	2.0	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.1	2.1	2.2	2.2	2.2	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	
9-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.1	
10-Feb	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	
11-Feb	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.2	2.2	
12-Feb	2.0	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.0	M	2.1	2.1	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.2	
13-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
14-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.1	
15-Feb	2.0	1.9	1.9	1.9	Z	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	2.1	
16-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
17-Feb	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.3
18-Feb	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.0	2.0	2.0	2.0	UO	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	2.1	
19-Feb	2.0	2.0	Z	2.1	2.2	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.2	
20-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
21-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	
22-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	2.2	2.2	2.0	1.9	1.9	1.9	1.8	1.8	2.0	2.2	2.2	
23-Feb	Z	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
24-Feb	1.9	Z	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	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	
25-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.0	2.3	
26-Feb	2.3	2.2	2.4	Z	2.6	2.5	2.4	2.4	2.4	2.4	2.2	2.1	2.0	2.0	2.1	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.1	2.6	2.6	
27-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.1	2.0	2.0	1.9	1.9	1.9	2.1	2.1	
28-Feb	1.9	1.9	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	
		1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	Diurnal Average	
		2.3	2.2	2.4	2.2	2.6	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation																



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	529	83.18	83.18
2.1 - 3.0	107	16.82	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 636

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

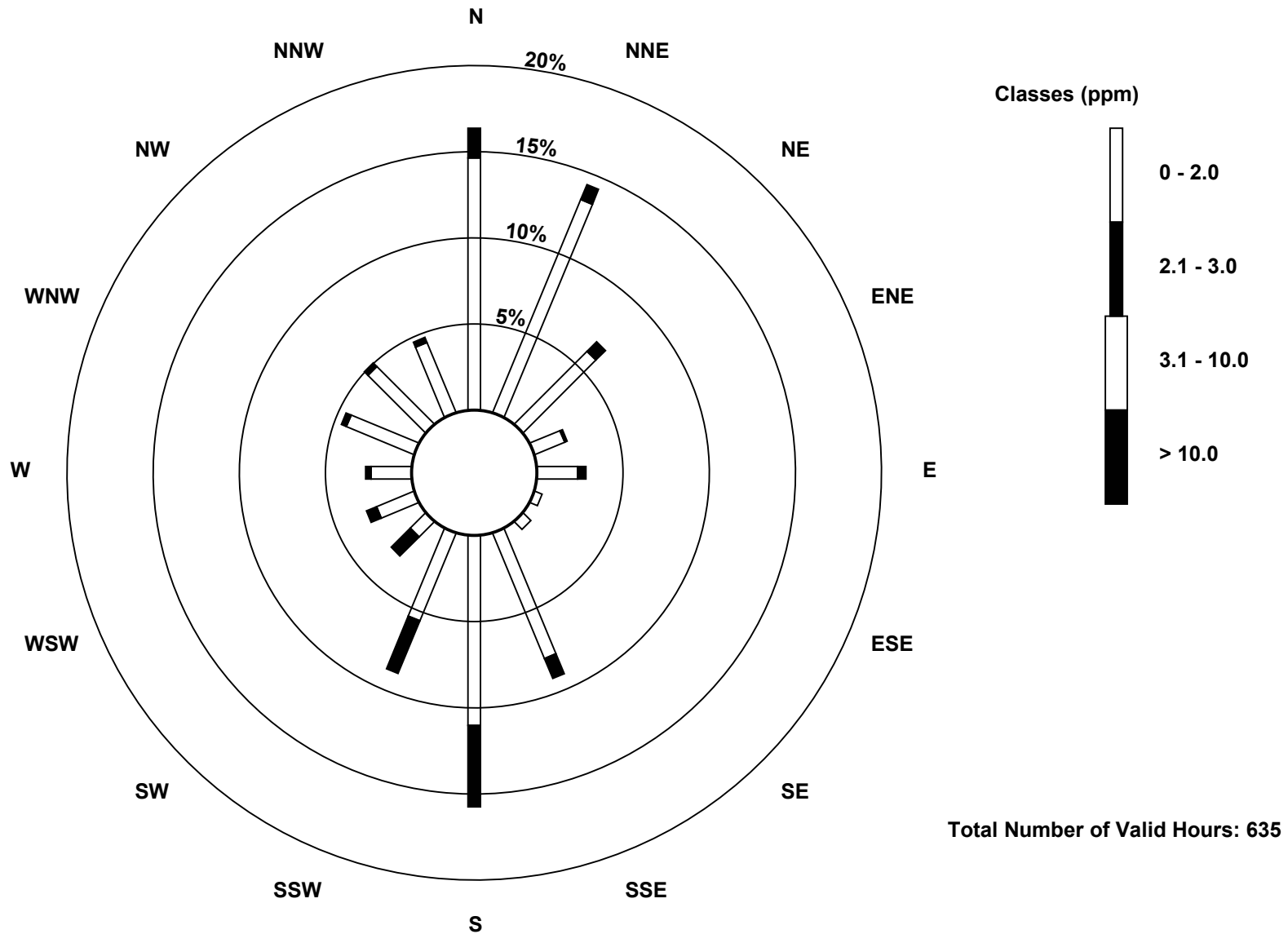
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	93	85	38	12	15	3	4	50	70	35	8	15	15	27	30	28	528
2.1 - 3.0	11	6	5	1	3	0	0	8	30	21	10	4	2	2	2	2	107
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	104	91	43	13	18	3	4	58	100	56	18	19	17	29	32	30	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

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

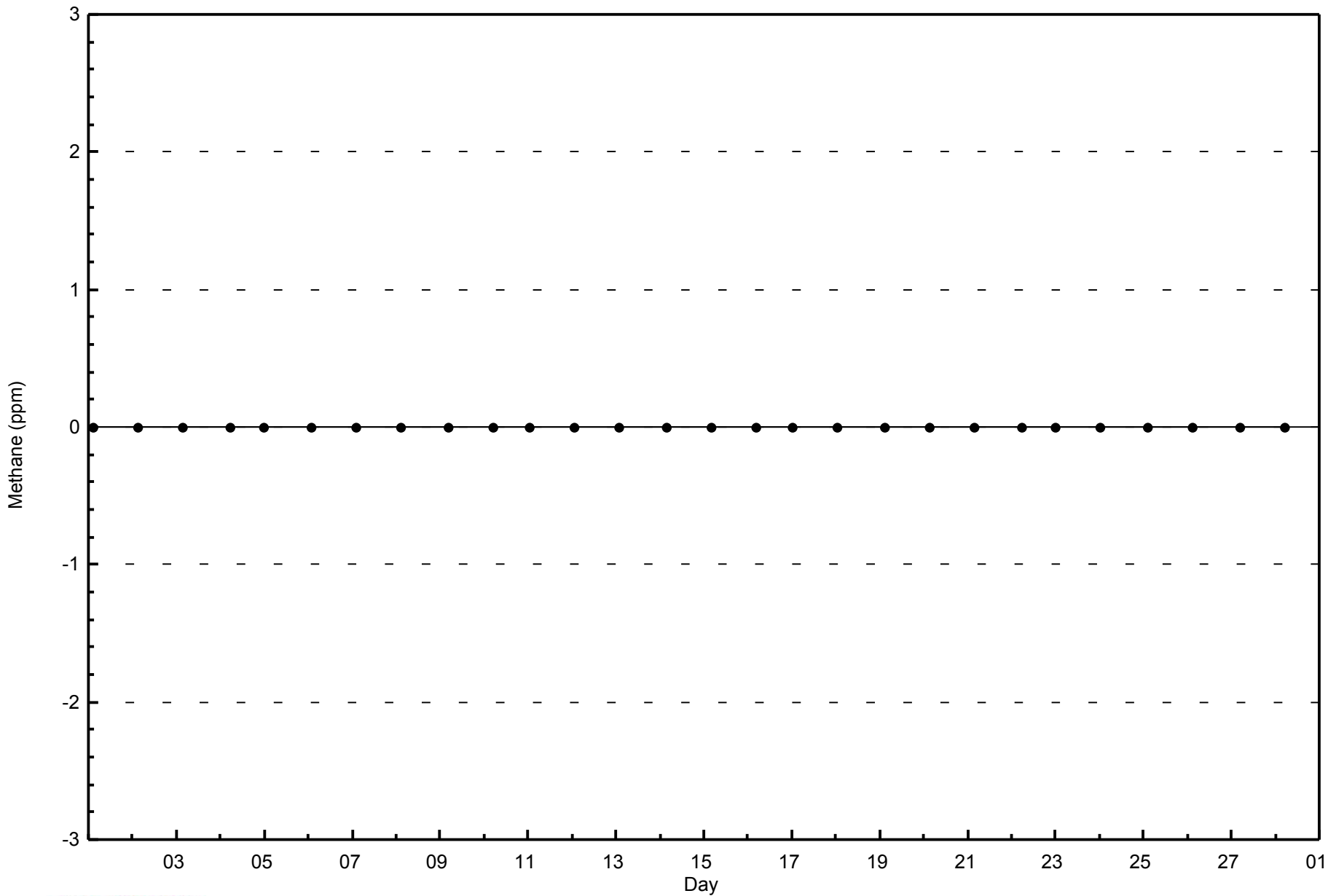
**Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter (AMS 1)**





WBEA  
Zero Responses

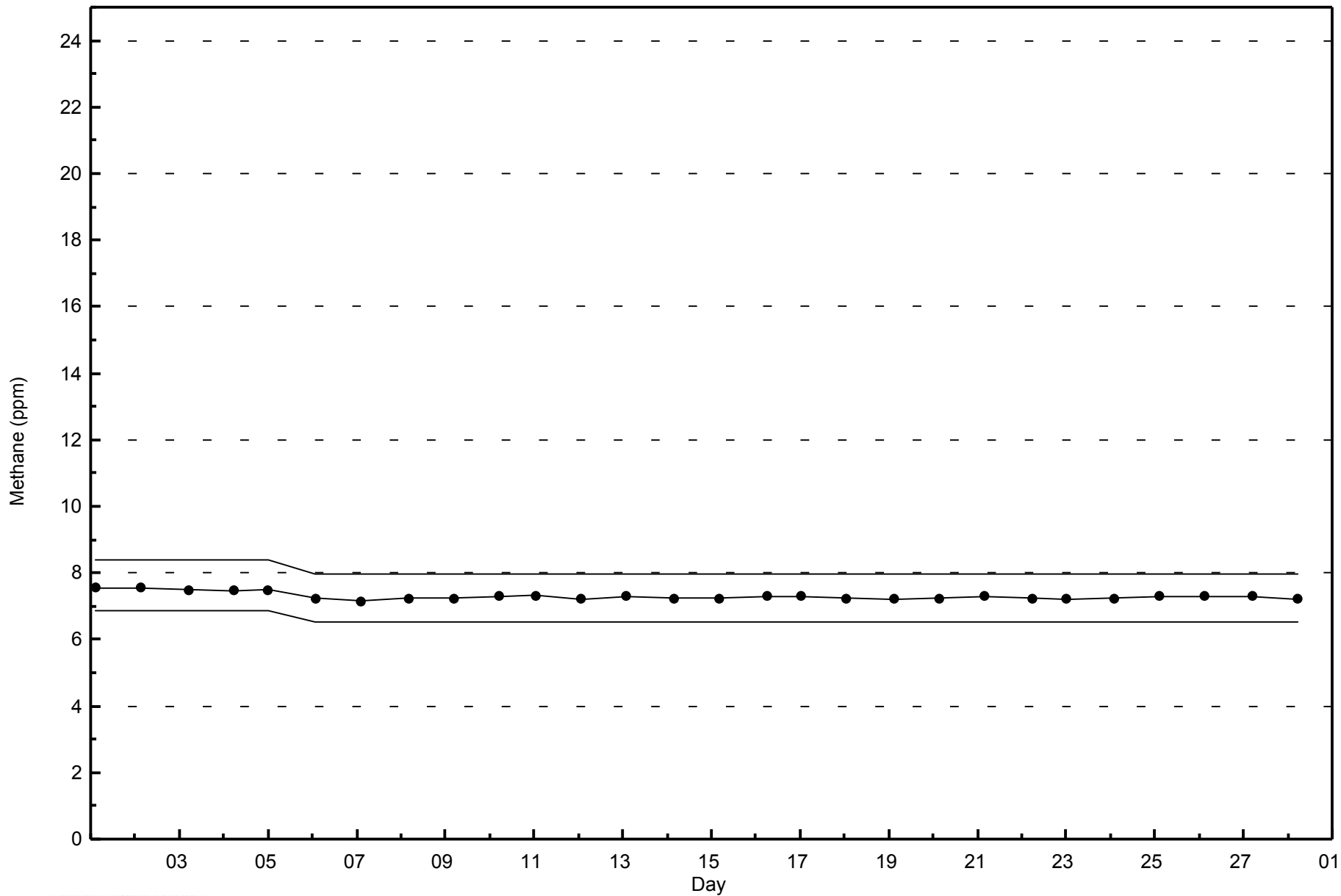
Methane (CH<sub>4</sub>) - ppm  
Fort McKay - Bertha Ganter - February 2015





WBEA  
Span Responses

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





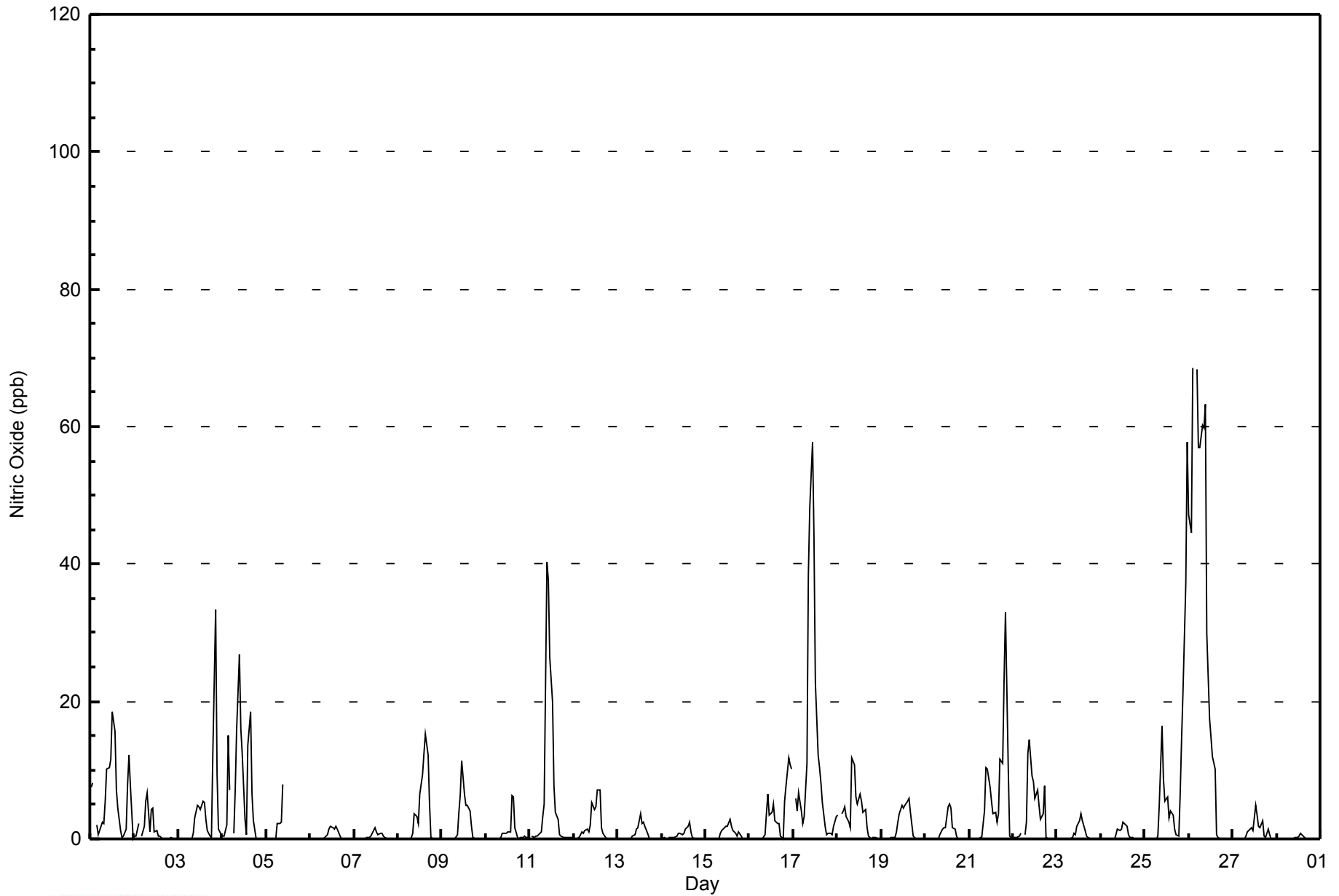
Maximum Value: 69 ppb on Feb 26 03:00																		Maximum Daily Average: 26.6 ppb on Feb 26						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 2 22:00																		Minimum Daily Average: 0.1 ppb on Feb 28						Hours of Data: 637		
Maximum Diurnal Average: 10.0 ppb at hour 10																		Minimum Diurnal Average: 0.5 ppb at hour 19						Hours of Missing Data: 35		
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> = 3 P <sub>90</sub> = 10 P <sub>99</sub> = 56						Hours of Calibration: 35		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	8	8	Z	2	1	1	2	2	6	10	10	12	19	16	7	5	1	0	0	2	8	12	8	0	6.0	19
2-Feb	0	0	2	Z	0	2	5	7	1	4	5	1	1	0	0	0	0	0	0	0	0	0	0	0	1.3	7
3-Feb	0	0	0	0	Z	0	0	0	1	3	5	5	4	5	5	3	1	0	0	13	33	10	1	1	3.9	33
4-Feb	0	0	2	15	7	Z	1	7	16	27	16	12	3	1	14	18	6	3	0	0	0	0	0	0	6.5	27
5-Feb	Z	0	0	0	0	0	2	2	3	8	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	8
6-Feb	0	Z	0	0	0	0	0	0	0	1	1	2	2	1	2	1	0	0	0	0	0	0	0	0	0.5	2
7-Feb	0	0	Z	0	0	0	0	0	0	1	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0.3	2
8-Feb	0	0	0	Z	0	0	0	0	1	4	3	2	6	9	12	15	12	5	0	0	0	0	0	0	3.1	15
9-Feb	0	0	0	0	Z	0	0	0	1	4	6	11	6	5	5	4	2	0	0	0	0	0	0	0	2.0	11
10-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	6	6	2	0	0	0	0	1	0	0	0.9	6
11-Feb	Z	0	0	0	0	1	1	3	5	40	38	26	20	8	4	3	1	0	0	0	0	0	0	0	6.6	40
12-Feb	0	Z	0	0	1	1	1	1	1	2	5	4	5	7	7	2	1	0	0	0	0	0	0	0	1.7	7
13-Feb	0	0	Z	0	0	0	0	0	0	1	1	2	4	2	2	2	1	0	0	0	0	0	0	0	0.7	4
14-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	2	2	1	0	0	0	0	0	0	0	0.5	2
15-Feb	0	0	0	0	Z	0	0	0	1	1	2	2	3	2	2	1	1	0	1	0	0	0	0	0	0.7	3
16-Feb	0	0	0	0	0	Z	0	0	1	4	7	4	4	5	3	2	2	0	0	6	8	12	11	10	3.3	12
17-Feb	Z	6	4	7	4	2	3	11	39	48	58	44	23	12	10	8	5	2	1	1	1	1	2	3	12.8	58
18-Feb	3	Z	4	4	5	3	2	2	12	11	6	5	6	6	4	4	2	0	0	0	0	0	0	0	3.5	12
19-Feb	0	0	Z	0	0	0	0	0	1	2	4	5	4	5	5	6	4	0	0	0	0	0	0	0	1.6	6
20-Feb	0	0	0	Z	0	0	0	0	1	1	2	2	5	5	4	2	1	0	0	0	0	0	0	0	1.0	5
21-Feb	0	0	0	0	Z	0	0	0	4	10	10	7	5	4	4	2	4	12	11	23	33	10	0	0	6.2	33
22-Feb	0	0	0	0	1	Z	1	2	12	14	9	8	6	7	5	3	4	8	0	0	0	0	0	0	3.5	14
23-Feb	Z	0	0	0	0	0	0	0	0	1	1	2	3	4	3	1	0	0	0	0	0	0	0	0	0.6	4
24-Feb	0	Z	0	0	0	0	0	0	1	1	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0.5	2
25-Feb	0	0	Z	0	0	0	0	0	5	17	9	5	6	3	4	3	1	1	0	7	15	22	37	58	8.4	58
26-Feb	47	45	69	Z	68	57	57	60	60	63	30	18	15	12	10	1	0	0	0	0	0	0	0	0	26.6	69
27-Feb	0	0	0	0	Z	0	0	0	1	2	2	1	5	4	2	2	3	0	0	1	1	0	0	0	1.0	5
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
																								Diurnal Average		
																								Diurnal Maximum		
2.5 2.5 3.5 1.3 3.8 2.9 2.8 3.6 6.1 10.0 8.6 6.9 5.9 4.8 4.7 3.6 2.1 1.2 0.5 1.9 3.5 2.4 2.2 2.6																										
47 45 69 15 68 57 57 60 60 63 58 44 23 16 14 18 12 12 11 23 33 22 37 58																										
Z - zerospan C - Calibration																										





**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	612	96.08	96.08
21 - 40	12	1.88	97.96
41 - 80	13	2.04	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

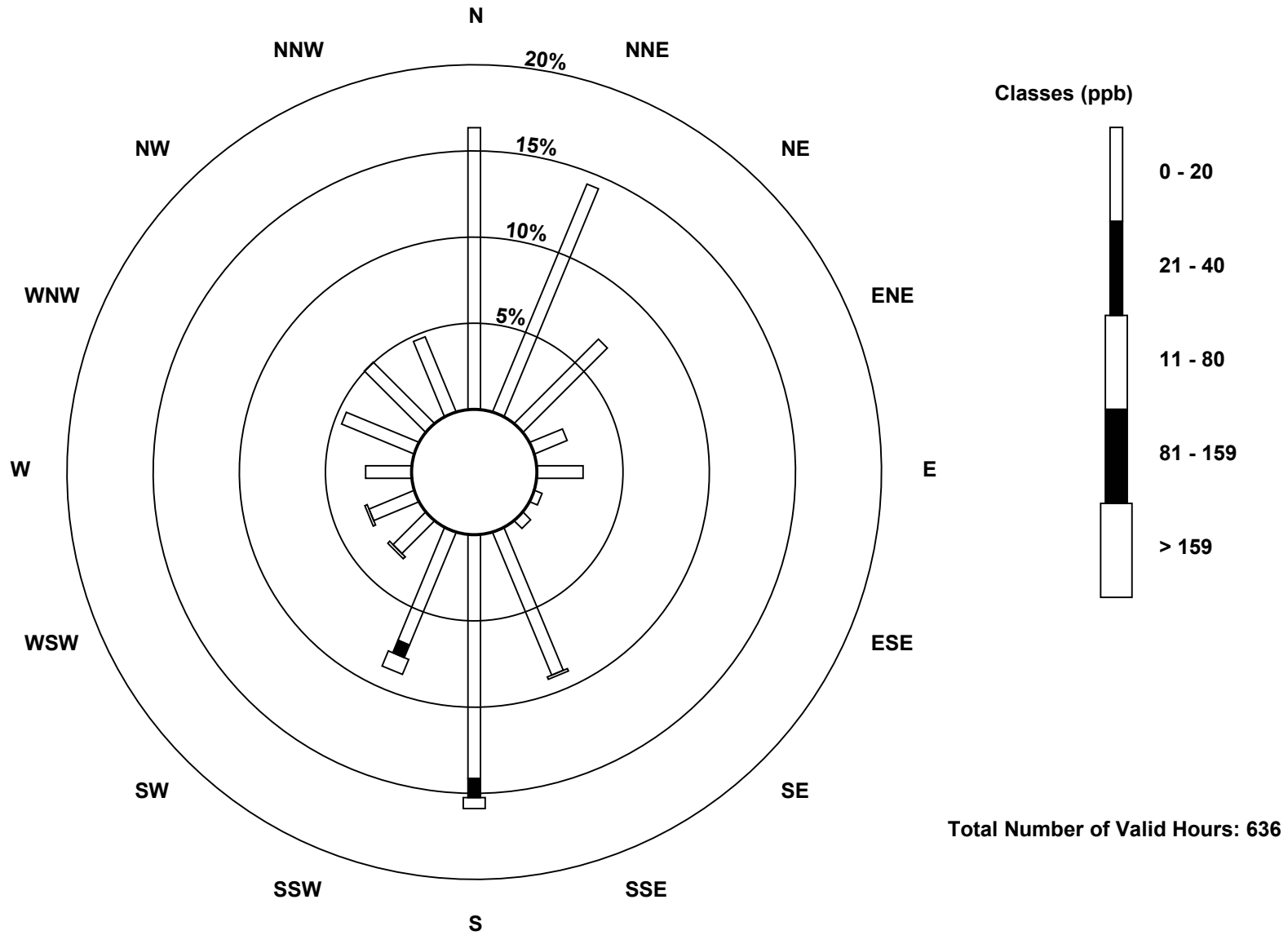
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	104	91	44	13	17	3	4	57	90	45	17	18	17	29	32	30	611
21 - 40	0	0	0	0	0	0	0	0	7	5	0	0	0	0	0	0	12
11 - 80	0	0	0	0	0	0	0	1	4	6	1	1	0	0	0	0	13
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	104	91	44	13	17	3	4	58	101	56	18	19	17	29	32	30	636

Total Number of Valid Hours: 636

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

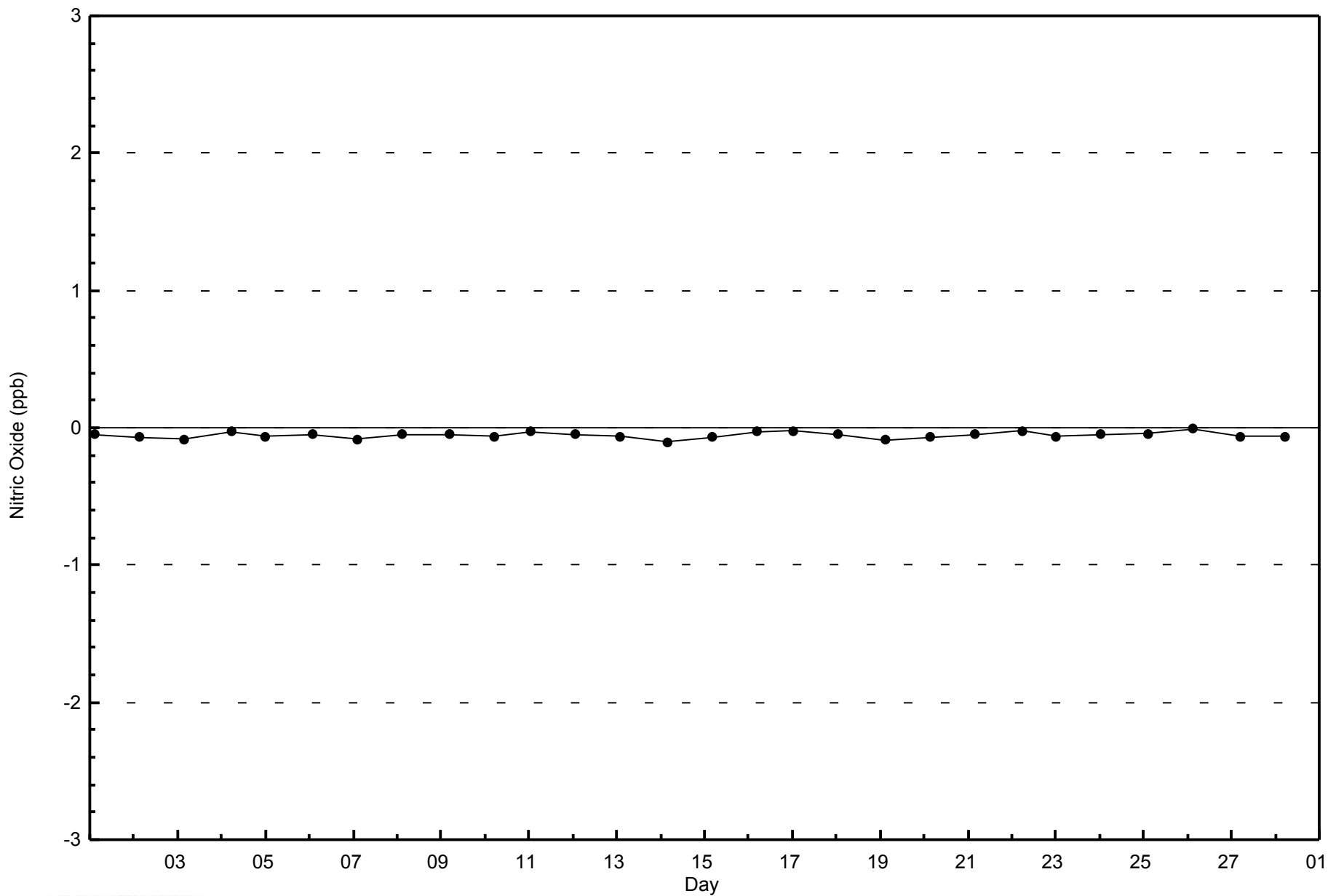
Nitric Oxide (NO) - ppb  
 Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

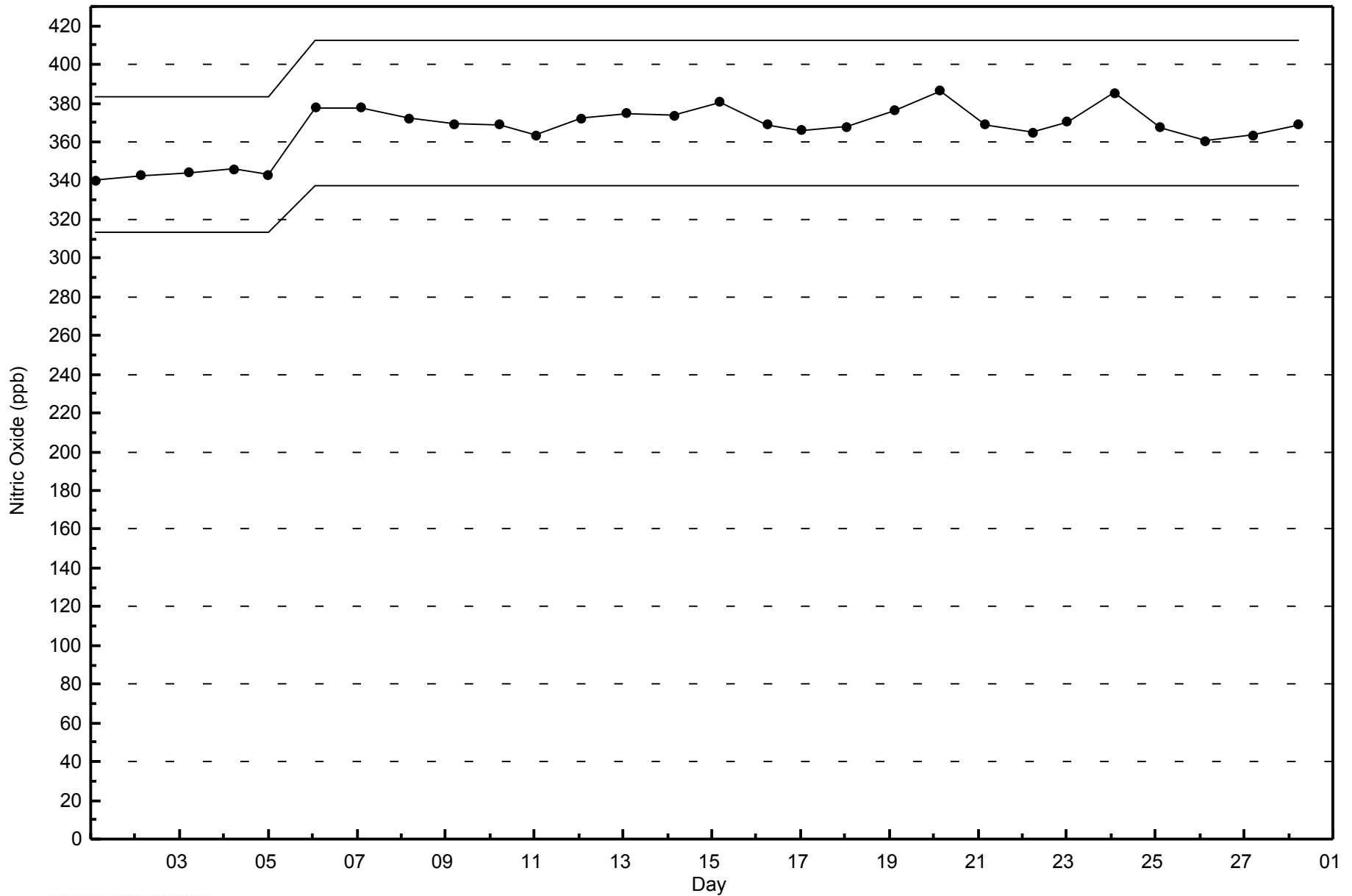
Nitric Oxide (NO) - ppb  
Fort McKay - Bertha Ganter - February 2015





WBEA  
Span Responses

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 39 ppb on Feb 21 21:00	Maximum Daily Average: 23.1 ppb on Feb 17
Minimum Value: 0 ppb on Feb 23 06:00	Hours of Data: 637
Maximum Diurnal Average: 14.3 ppb at hour 20	Hours of Missing Data: 35
Monthly Average: 11.3 ppb	Hours of Calibration: 35
Minimum Daily Average: 1.5 ppb on Feb 28	Percent Operational Time: 100.0
Minimum Diurnal Average: 7.8 ppb at hour 14	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 9 Q <sub>3</sub> = 15 P <sub>90</sub> = 25 P <sub>99</sub> = 37	

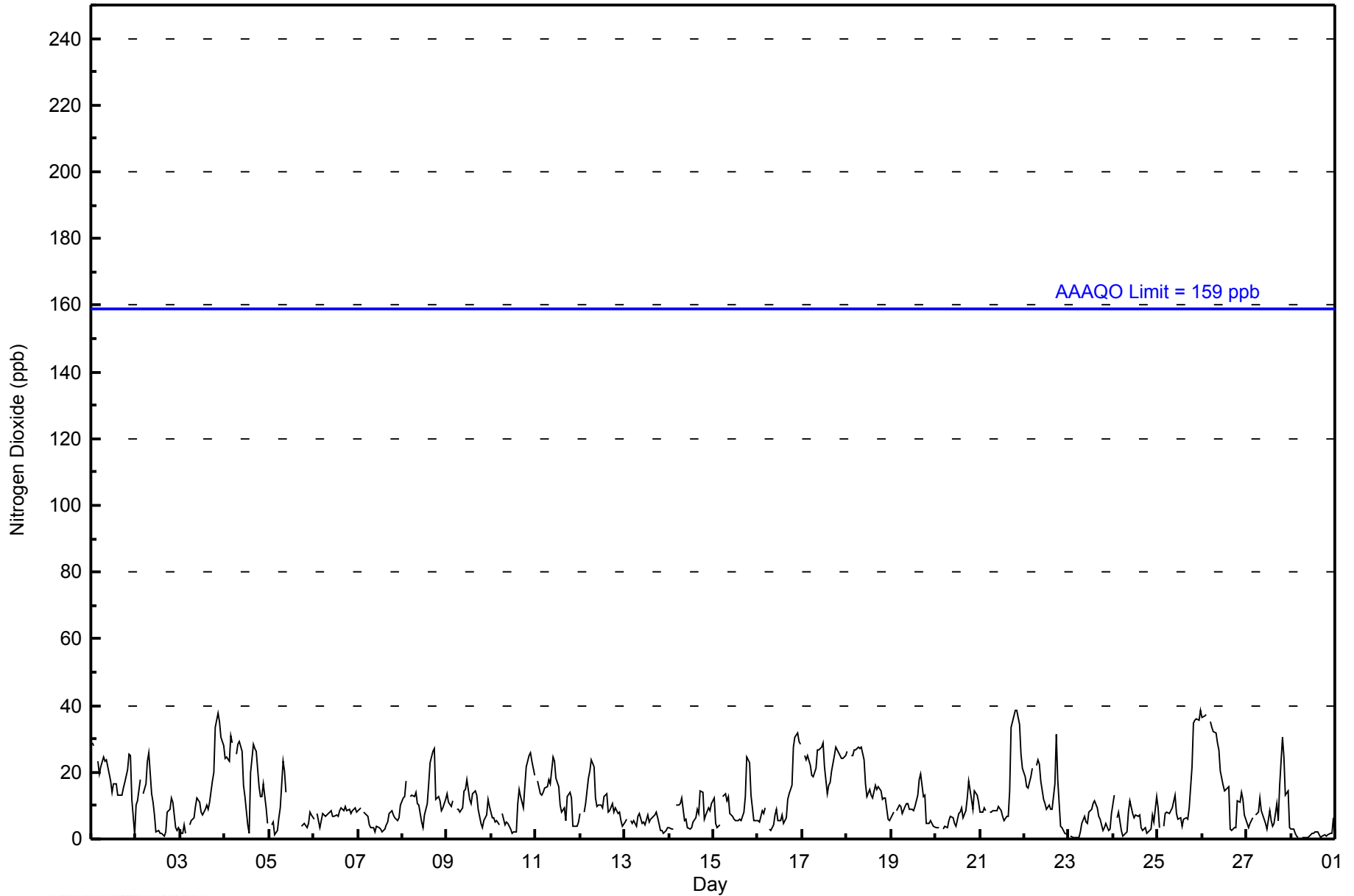
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	29	28	Z	24	20	22	24	23	24	22	17	14	17	16	13	13	13	15	17	21	25	25	12	1	18.9	29																							
2-Feb	10	11	18	Z	14	17	24	26	13	11	7	2	3	2	2	1	2	8	9	12	11	3	3	4	9.2	26																							
3-Feb	2	2	4	2	Z	4	6	6	10	12	11	8	7	9	10	9	11	18	20	34	38	35	31	28	13.7	38																							
4-Feb	24	25	23	31	29	Z	26	29	29	26	16	13	4	2	20	29	27	26	16	13	13	17	9	5	19.5	31																							
5-Feb	Z	4	5	1	3	6	10	23	20	14	C	C	C	C	C	C	C	4	4	5	3	5	8	7	--	23																							
6-Feb	6	Z	8	4	6	8	7	7	8	8	7	7	7	7	9	10	8	10	8	9	8	9	10	8	7.6	10																							
7-Feb	9	9	Z	8	8	7	4	3	3	2	4	4	3	2	3	4	5	8	9	7	6	6	6	10	5.7	10																							
8-Feb	12	13	17	Z	13	13	13	14	11	10	5	3	7	11	17	23	26	27	12	13	11	9	9	12	13.1	27																							
9-Feb	14	11	10	12	Z	9	9	8	9	14	15	18	12	11	13	14	13	9	5	3	6	7	12	10	10.5	18																							
10-Feb	6	6	5	6	4	Z	8	4	5	5	3	2	2	2	10	15	13	9	16	22	25	26	24	19	10.3	26																							
11-Feb	Z	18	14	13	14	15	16	18	17	24	23	18	16	10	8	9	6	13	14	12	4	4	4	5	12.8	24																							
12-Feb	8	Z	8	11	18	20	24	22	12	10	10	10	9	13	14	8	8	11	8	9	8	8	5	4	11.2	24																							
13-Feb	5	6	Z	6	5	6	4	7	8	5	5	4	7	5	6	7	7	8	6	3	2	2	2	3	5.2	8																							
14-Feb	4	3	3	Z	10	10	11	12	5	6	3	3	5	6	6	9	8	14	14	6	7	9	8	11	7.4	14																							
15-Feb	12	5	3	4	Z	13	13	11	13	8	7	6	6	6	6	5	8	13	24	23	13	9	6	5	9.5	24																							
16-Feb	5	5	8	8	9	Z	3	3	4	7	9	5	6	7	5	6	12	13	16	28	30	32	29	28	12.1	32																							
17-Feb	Z	25	24	25	22	19	19	21	27	27	28	29	22	14	16	17	20	25	28	27	25	24	24	25	23.1	29																							
18-Feb	26	Z	25	25	27	27	28	27	28	24	16	13	15	13	12	16	15	16	14	12	12	12	6	5	18.0	28																							
19-Feb	7	8	Z	9	10	10	8	10	10	10	9	9	8	10	13	18	19	13	13	5	5	6	5	4	9.4	19																							
20-Feb	4	3	4	Z	3	4	3	6	7	6	5	4	8	8	9	7	9	12	17	12	9	15	13	11	7.7	17																							
21-Feb	8	8	9	9	Z	8	8	8	8	8	10	9	7	6	7	7	14	33	37	38	39	34	26	21	15.7	39																							
22-Feb	19	16	15	19	21	Z	22	24	23	17	12	11	9	10	9	9	17	31	18	4	3	2	2	1	13.6	31																							
23-Feb	Z	1	1	1	0	0	2	5	7	5	5	8	9	11	11	9	7	6	3	3	5	3	3	8	4.8	11																							
24-Feb	13	Z	6	8	2	1	1	2	8	12	8	6	7	7	4	3	4	2	2	2	3	7	5	13	5.7	13																							
25-Feb	9	3	Z	4	8	8	8	9	9	13	8	6	6	4	6	7	6	9	22	35	36	36	35	39	14.1	39																							
26-Feb	36	37	37	Z	35	33	32	32	29	27	20	16	15	15	16	3	2	4	3	12	11	14	12	7	19.5	37																							
27-Feb	5	3	5	6	Z	7	8	12	8	6	5	3	8	5	4	5	11	5	16	31	24	13	14	4	9.1	31																							
28-Feb	3	3	2	1	1	Z	0	0	1	1	1	2	2	2	2	1	0	1	1	1	1	2	2	6	1.5	6																							
																								11.4	10.5	11.0	10.1	12.2	11.6	12.1	13.3	12.7	12.1	9.9	8.6	8.3	7.8	9.4	9.7	10.8	13.0	13.3	14.3	13.7	13.3	11.5	10.8	Diurnal Average	
																								36	37	37	31	35	33	32	32	29	27	28	29	22	16	20	29	27	33	37	38	39	36	35	39	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**  
**Fort McKay - Bertha Ganter - February 2015**







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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	533	83.67	83.67
21 - 40	104	16.33	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: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

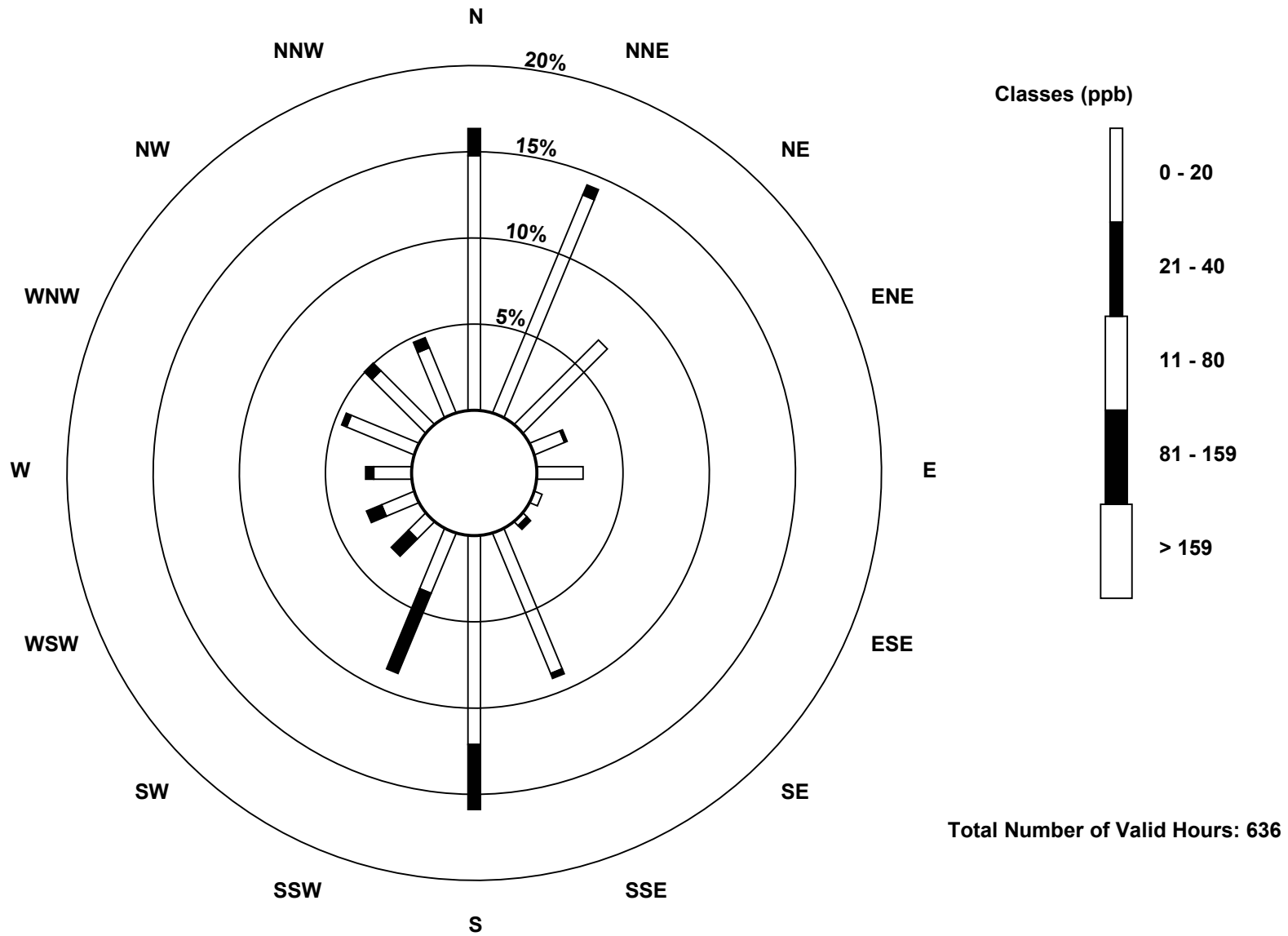
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	94	87	44	12	17	3	2	56	77	24	9	13	14	27	28	26	533
21 - 40	10	4	0	1	0	0	2	2	24	32	9	6	3	2	4	4	103
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	104	91	44	13	17	3	4	58	101	56	18	19	17	29	32	30	636

Total Number of Valid Hours: 636

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

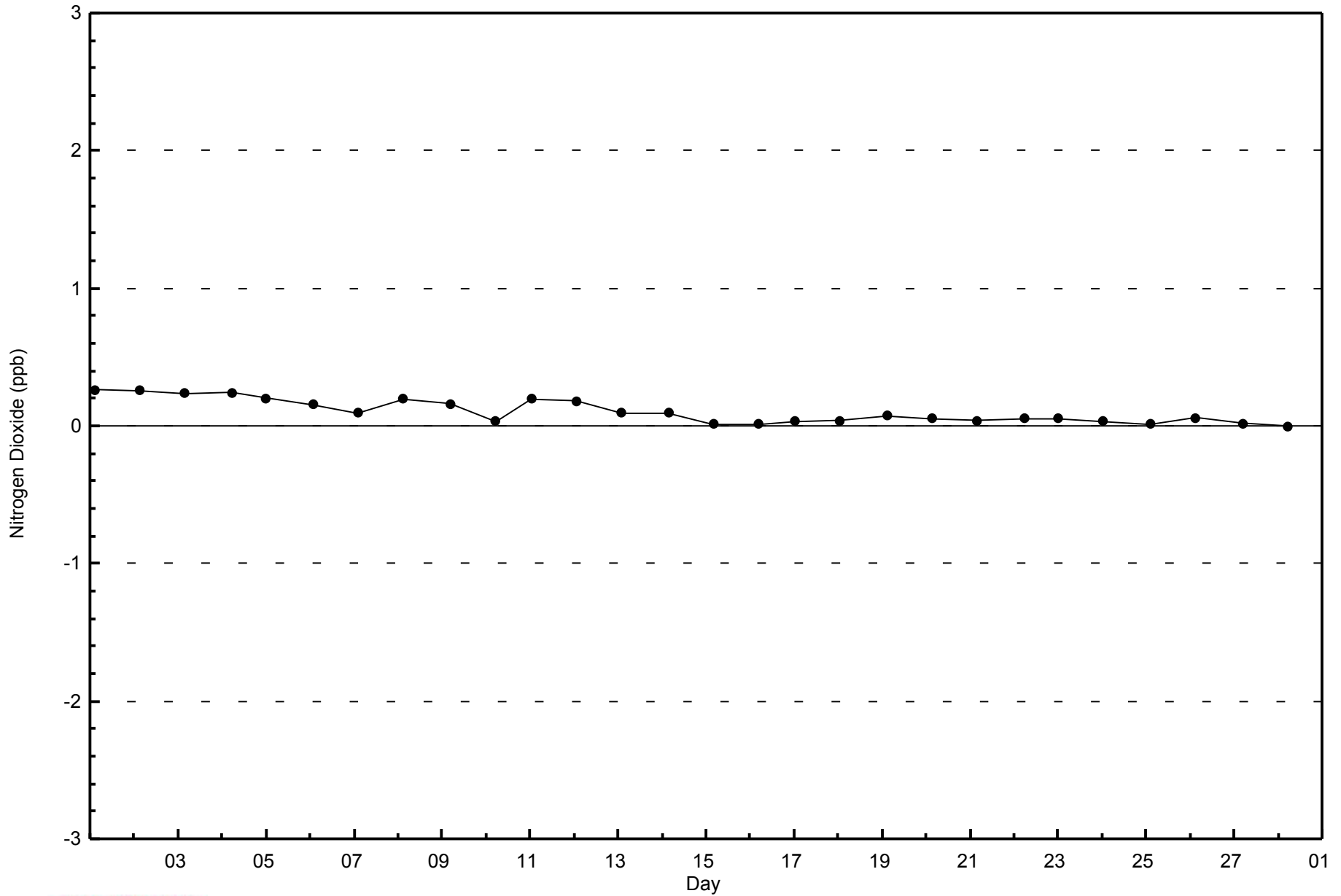
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter (AMS 1)





WBEA  
Zero Responses

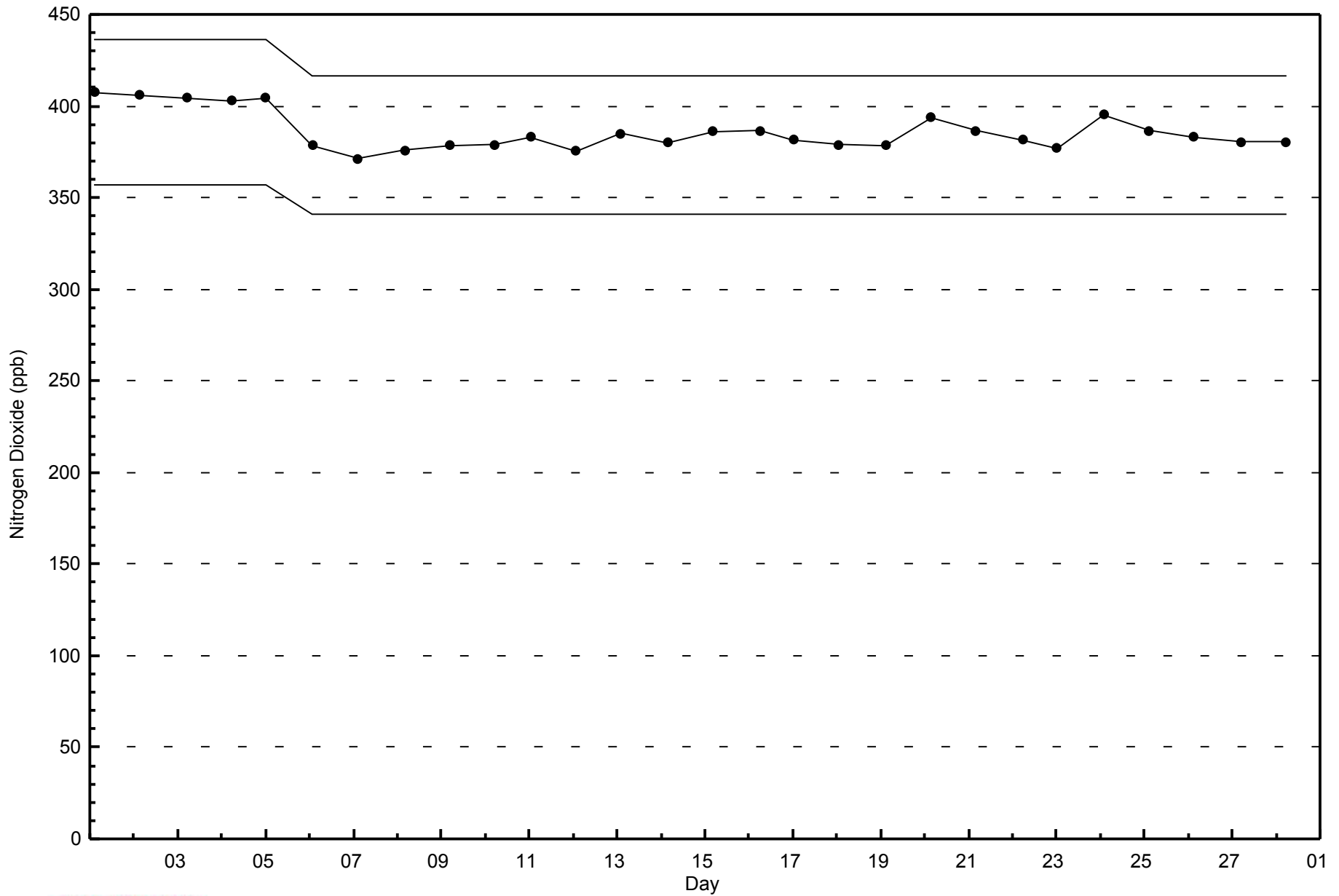
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay - Bertha Ganter - February 2015





**WBEA**  
**Span Responses**

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



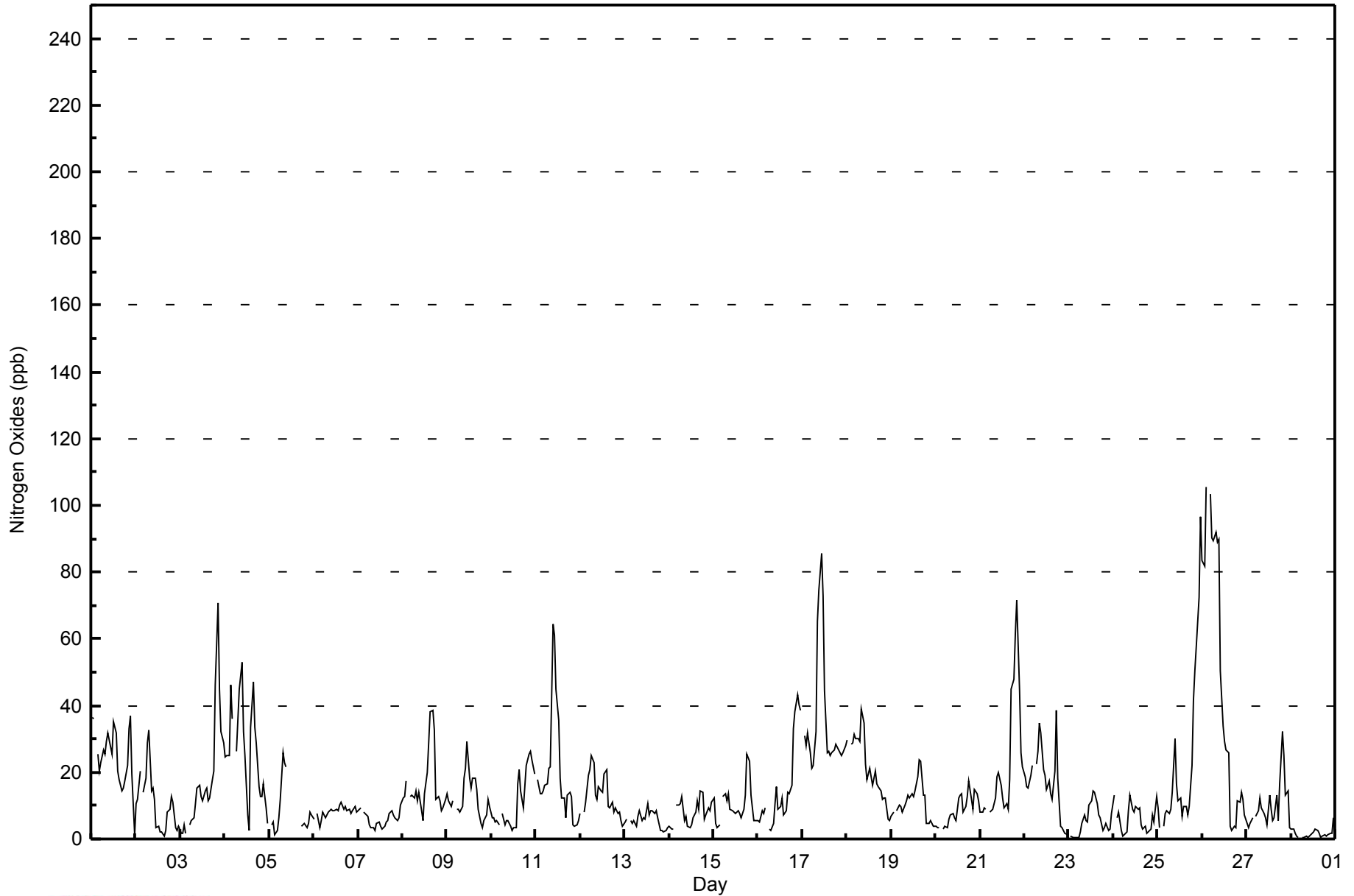


Maximum Value: 106 ppb on Feb 26 03:00		Maximum Daily Average: 46.0 ppb on Feb 26		Hours in Service: 672																							
Minimum Value: 0 ppb on Feb 23 06:00		Minimum Daily Average: 1.6 ppb on Feb 28		Hours of Data: 637																							
Maximum Diurnal Average: 22.2 ppb at hour 10		Minimum Diurnal Average: 11.4 ppb at hour 4		Hours of Missing Data: 35																							
Monthly Average: 15.1 ppb		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 18 P <sub>90</sub> = 32 P <sub>99</sub> = 90		Hours of Calibration: 35																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	36	36	Z	26	20	23	27	25	29	32	28	25	35	32	20	18	15	15	18	22	33	37	19	1	24.9	37	
2-Feb	11	12	20	Z	14	18	29	33	14	15	12	3	4	2	2	1	2	8	9	13	11	3	3	4	10.5	33	
3-Feb	2	2	4	2	Z	4	6	6	11	15	16	13	12	15	15	11	12	18	20	46	71	45	32	29	17.7	71	
4-Feb	24	25	25	46	36	Z	26	36	45	53	32	25	7	2	34	47	34	29	16	13	13	17	9	5	26.0	53	
5-Feb	Z	4	5	1	3	6	12	26	23	22	C	C	C	C	C	C	C	4	4	5	3	5	8	7	--	26	
6-Feb	6	Z	8	4	6	8	7	7	8	9	8	9	9	8	10	11	9	10	8	9	8	9	10	8	8.1	11	
7-Feb	9	9	Z	8	8	7	4	4	4	3	5	5	4	3	4	5	5	8	8	7	6	6	6	10	6.0	10	
8-Feb	12	13	17	Z	13	13	12	14	11	14	8	5	14	20	29	38	39	33	12	13	11	9	9	12	16.2	39	
9-Feb	14	11	10	12	Z	9	9	8	10	18	21	29	18	15	18	18	15	9	5	3	6	7	12	10	12.5	29	
10-Feb	6	6	5	6	4	Z	8	4	5	5	4	3	3	3	17	21	14	9	16	22	25	26	24	19	11.2	26	
11-Feb	Z	18	14	14	15	16	17	21	22	65	61	45	36	18	12	12	6	13	14	13	4	4	4	5	19.4	65	
12-Feb	8	Z	8	11	19	21	25	23	13	12	15	14	14	20	21	10	9	11	8	9	8	8	5	4	12.9	25	
13-Feb	5	6	Z	6	5	6	4	7	8	5	6	6	11	7	9	8	8	8	6	3	3	2	2	3	5.9	11	
14-Feb	4	3	3	Z	10	10	11	13	6	7	4	4	4	6	8	11	9	15	14	6	7	10	8	11	7.9	15	
15-Feb	12	5	3	4	Z	13	13	11	14	9	9	8	7	8	8	7	9	13	25	23	13	9	6	5	10.2	25	
16-Feb	5	5	8	8	9	Z	3	2	5	11	16	9	10	12	7	8	14	14	16	33	38	43	40	38	15.5	43	
17-Feb	Z	31	28	32	26	21	22	32	65	75	85	73	44	26	26	25	26	27	28	27	26	25	26	28	35.9	85	
18-Feb	30	Z	29	29	31	30	30	29	39	35	23	18	21	19	16	20	17	16	14	12	12	12	6	6	21.4	39	
19-Feb	7	8	Z	9	10	10	8	10	11	13	12	14	13	15	19	24	23	13	13	5	5	6	5	4	11.1	24	
20-Feb	4	3	4	Z	3	4	3	6	7	8	6	6	12	13	14	8	10	13	18	12	9	15	13	11	8.7	18	
21-Feb	8	8	9	9	Z	8	8	9	12	19	20	16	12	9	11	9	18	45	48	62	72	44	26	21	21.9	72	
22-Feb	19	16	15	19	22	Z	23	26	35	32	21	19	15	17	14	12	20	39	18	4	3	2	2	1	17.1	39	
23-Feb	Z	1	1	1	0	0	2	5	7	6	5	10	11	14	14	10	7	6	2	3	5	3	3	8	5.4	14	
24-Feb	13	Z	6	8	2	1	1	2	9	13	9	8	10	9	9	4	3	4	2	2	3	7	5	13	6.2	13	
25-Feb	9	3	Z	4	8	8	8	9	14	30	16	11	12	7	10	10	7	10	22	42	50	58	73	96	22.5	96	
26-Feb	83	82	106	Z	104	90	89	92	89	90	50	34	29	27	26	4	3	4	3	11	11	14	12	7	46.0	106	
27-Feb	5	3	5	6	Z	7	8	12	9	8	6	4	13	9	6	6	13	6	17	32	25	13	14	4	10.1	32	
28-Feb	3	3	2	1	1	Z	0	0	1	1	1	2	2	3	3	2	0	1	1	1	1	2	2	6	1.6	6	
		13.9	13.0	14.5	11.4	16.0	14.5	14.8	16.9	18.8	22.2	18.5	15.4	14.2	12.6	14.1	13.4	12.9	14.2	13.8	16.2	17.2	15.7	13.7	13.4	Diurnal Average	
		83	82	106	46	104	90	89	92	89	90	85	73	44	32	34	47	39	45	48	62	72	58	73	96	Diurnal Maximum	
Z - zerospan		C - Calibration																									



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	496	77.86	77.87
21 - 40	105	16.48	94.35
41 - 80	25	3.92	98.27
81 - 159	11	1.73	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

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

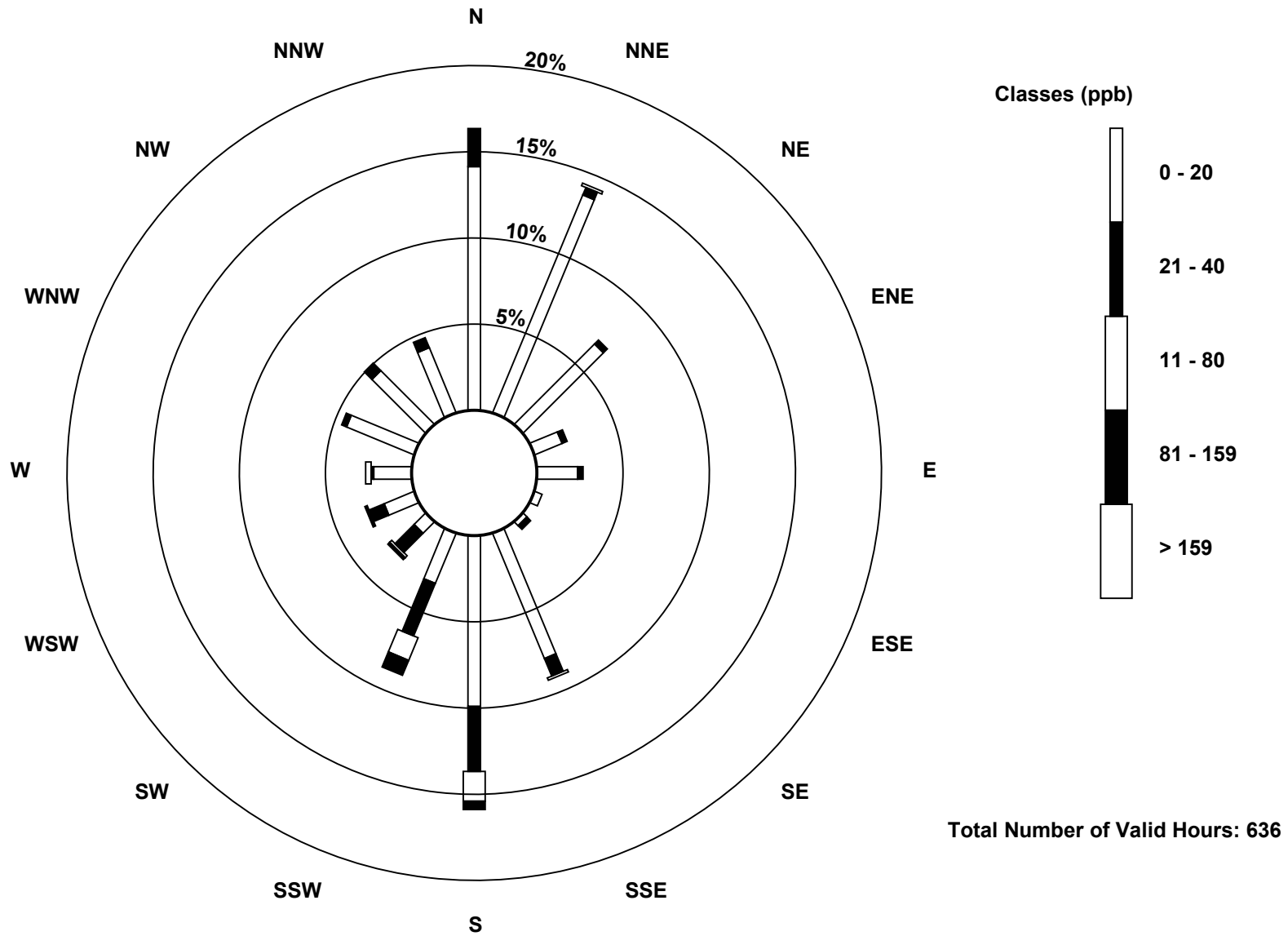
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	90	87	42	11	15	3	2	50	63	20	6	12	14	27	28	26	496
21 - 40	14	3	2	2	2	0	2	7	24	21	10	6	1	2	4	4	104
11 - 80	0	1	0	0	0	0	0	1	11	9	1	0	2	0	0	0	25
81 - 159	0	0	0	0	0	0	0	0	3	6	1	1	0	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>	104	91	44	13	17	3	4	58	101	56	18	19	17	29	32	30	636

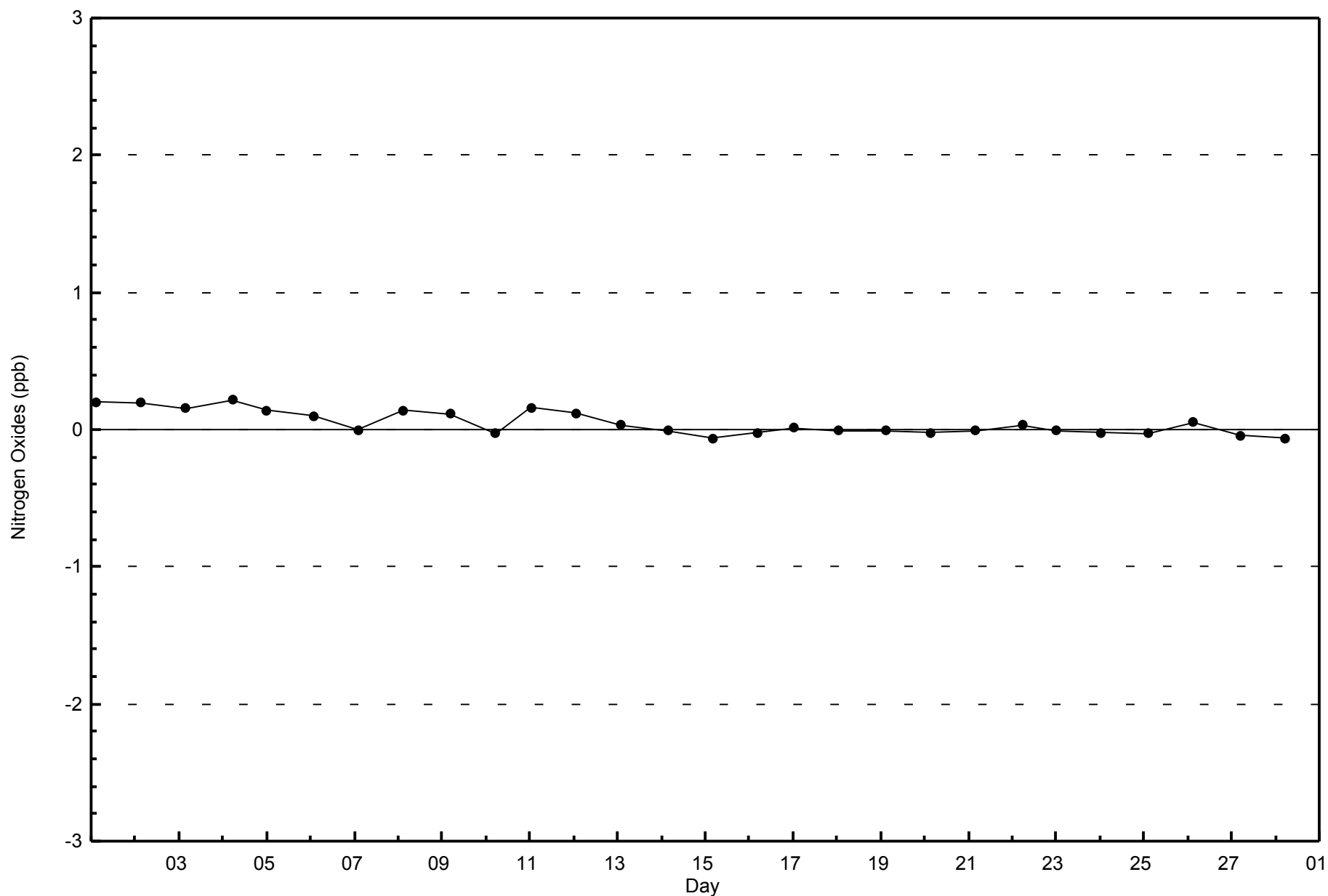
Total Number of Valid Hours: 636

Total Number of Hours: 672

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

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

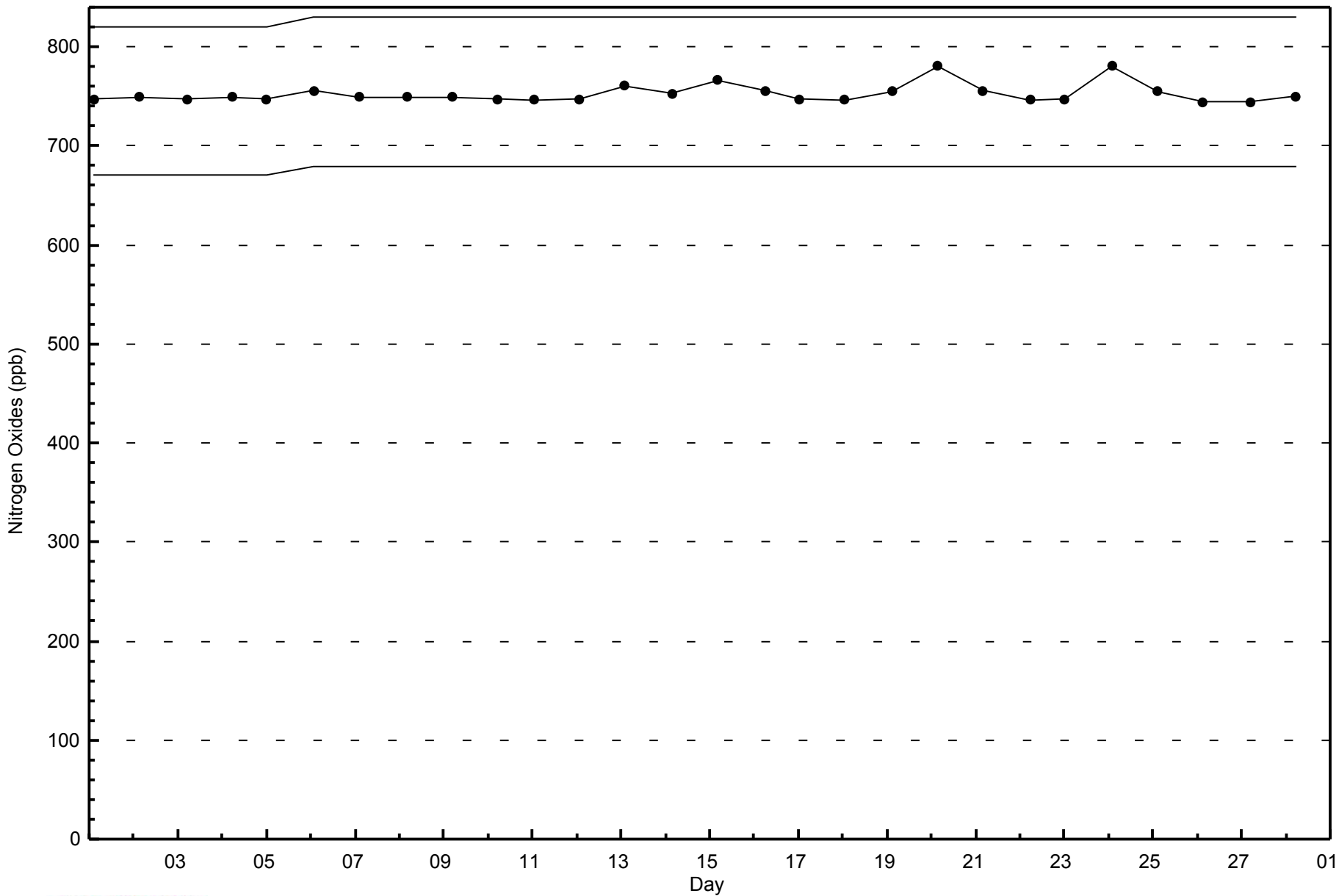






WBEA  
Span Responses

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





Summary of Hour Averages

Fort McKay - Bertha Ganter - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 42 ppb on Feb 28 17:00	Maximum Daily Average: 37.5 ppb on Feb 28		Hours of Data:	641
Minimum Value: 2 ppb on Feb 26 05:00	Minimum Daily Average: 7.8 ppb on Feb 17		Hours of Missing Data:	31
Maximum Diurnal Average: 27.6 ppb at hour 14	Minimum Diurnal Average: 16.2 ppb at hour 8		Hours of Calibration:	31
Monthly Average: 21.8 ppb	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 16 Median = 24 Q <sub>3</sub> = 29 P <sub>90</sub> = 34 P <sub>99</sub> = 39		Percent Operational Time:	100.0

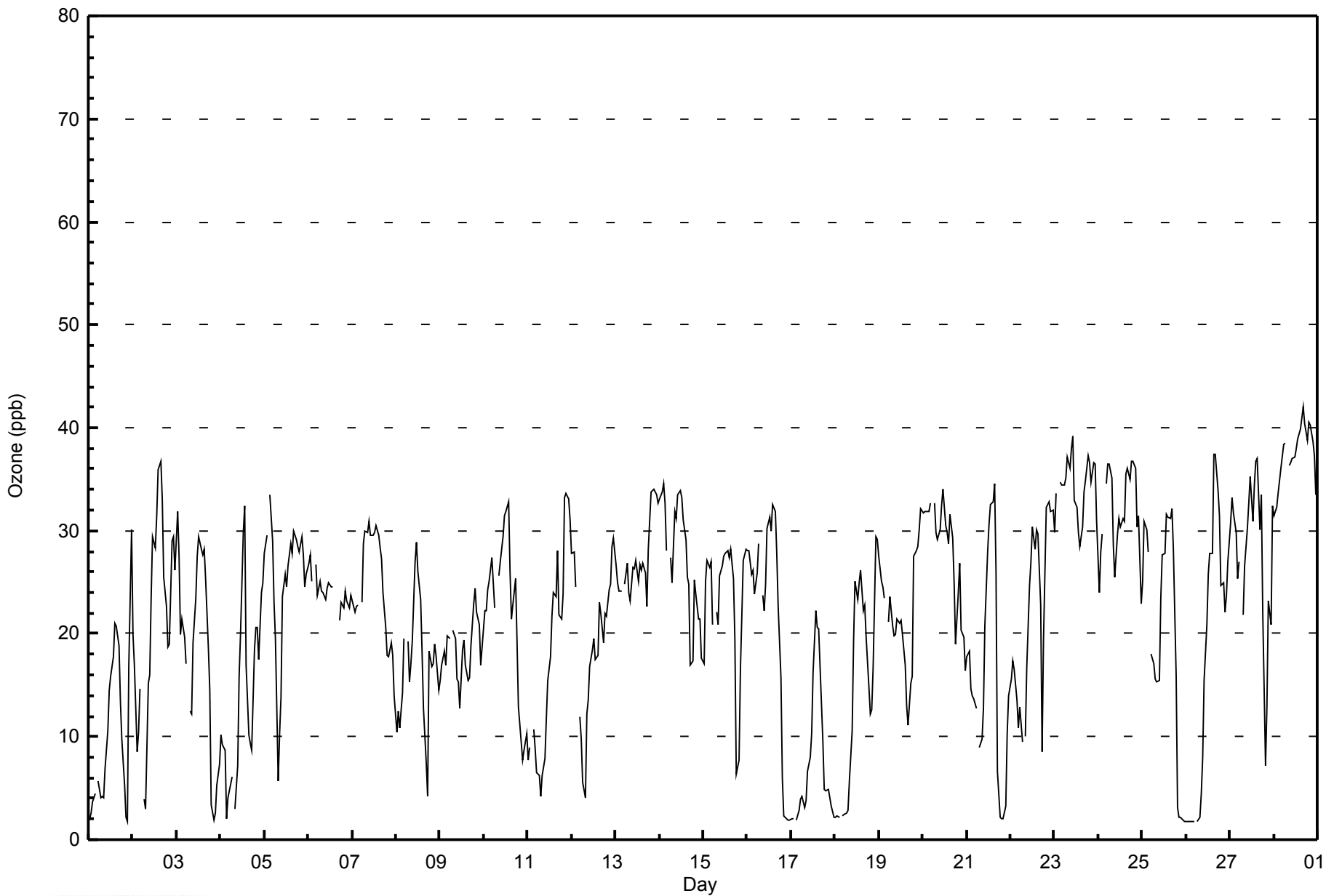
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2	3	4	5	Z	6	4	4	4	7	11	15	16	18	21	21	19	13	10	5	2	2	17	30	10.3	30
2-Feb	20	17	9	10	15	Z	4	3	15	16	23	29	28	31	36	37	33	25	23	19	19	29	29	26	21.6	37
3-Feb	32	28	20	21	20	17	Z	13	12	19	24	28	29	28	28	25	19	15	3	2	3	5	7	18.5	32	
4-Feb	10	9	9	2	4	5	6	Z	3	7	16	20	30	32	17	10	9	9	18	21	21	17	24	25	14.1	32
5-Feb	28	30	Z	34	29	23	19	6	10	14	24	26	25	27	29	28	30	29	29	28	29	28	25	26	24.9	34
6-Feb	27	28	25	Z	27	24	25	24	24	23	24	25	25	25	C	C	C	21	23	23	24	23	23	24	24.3	28
7-Feb	23	22	23	23	Z	23	29	30	30	31	30	30	30	31	30	28	27	24	21	18	18	19	18	14	24.7	31
8-Feb	10	12	11	14	19	Z	19	15	17	19	27	29	26	23	18	13	7	4	18	17	17	19	18	14	17.0	29
9-Feb	15	17	18	17	20	19	Z	20	20	16	15	13	18	19	17	15	16	19	23	24	22	21	17	19	18.3	24
10-Feb	22	22	24	25	27	25	23	Z	26	27	29	31	32	33	26	21	23	25	19	13	10	8	9	10	22.2	33
11-Feb	8	9	Z	11	9	7	6	4	6	8	12	15	18	22	24	24	28	22	21	24	33	34	33	31	17.7	34
12-Feb	28	28	24	Z	12	10	6	4	12	14	17	18	20	17	18	23	22	19	22	22	24	25	28	29	19.2	29
13-Feb	27	25	24	24	Z	25	27	24	23	26	26	27	25	27	26	27	26	23	28	34	34	34	33	33	27.3	34
14-Feb	33	34	35	33	28	Z	27	25	32	31	34	34	33	31	29	26	25	17	17	25	24	21	21	18	27.5	35
15-Feb	17	25	27	26	27	21	Z	22	21	26	27	28	28	28	27	28	25	19	6	8	17	22	27	28	23.1	28
16-Feb	28	28	26	26	24	26	29	Z	24	22	25	30	31	30	33	32	28	23	16	6	2	2	2	2	21.5	33
17-Feb	2	2	Z	2	3	4	4	3	4	7	8	10	16	22	21	20	17	10	5	5	5	4	3	2	7.8	22
18-Feb	2	2	2	Z	2	2	3	3	6	11	19	25	23	25	26	22	23	20	15	12	13	17	29	29	14.4	29
19-Feb	27	25	25	23	Z	21	24	21	20	20	21	21	21	20	17	13	11	15	16	27	28	29	30	32	22.1	32
20-Feb	32	32	32	32	33	Z	33	30	29	30	32	34	30	30	29	32	29	25	19	24	27	20	20	16	28.2	34
21-Feb	18	18	15	14	14	13	Z	9	10	13	21	28	31	33	33	35	26	7	2	2	2	3	10	14	16.0	35
22-Feb	16	17	16	14	11	13	10	Z	10	17	25	27	30	28	30	30	23	9	19	32	33	33	32	32	22.0	33
23-Feb	30	34	Z	35	34	34	35	37	36	38	39	33	32	30	29	30	34	35	37	37	35	37	37	31	34.3	39
24-Feb	24	28	30	Z	35	36	36	35	29	26	30	31	30	31	31	35	36	35	37	37	36	30	31	23	31.9	37
25-Feb	25	31	30	28	Z	18	17	16	15	16	23	28	28	32	31	31	32	28	16	3	2	2	2	2	19.8	32
26-Feb	2	2	2	2	2	Z	2	2	4	8	16	21	26	28	28	37	37	34	31	25	25	22	24	27	17.6	37
27-Feb	31	33	32	30	25	27	Z	22	27	30	33	35	31	34	37	37	30	34	22	7	13	23	21	32	28.1	37
28-Feb	31	32	34	35	36	38	39	Z	36	37	37	37	38	39	40	41	42	40	39	41	40	39	37	33	37.5	42
20.4 21.2 20.6 20.2 19.8 19.0 18.5 16.2 18.0 19.9 23.8 26.0 26.8 27.6 27.0 26.8 25.3 21.5 20.3 19.3 19.9 20.2 21.6 21.8																								Diurnal Average		
33 34 35 35 36 38 39 37 36 38 39 37 38 39 40 41 42 40 39 41 40 39 37 33																								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 McKay - Bertha Ganter - February 2015**





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	250	39.00	39.00
21 - 50	391	61.00	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - February 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	45	19	7	1	2	1	2	9	40	46	16	11	11	7	12	20	249
21 - 50	59	70	36	14	15	3	3	50	61	13	2	6	4	19	24	12	391
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>	104	89	43	15	17	4	5	59	101	59	18	17	15	26	36	32	640

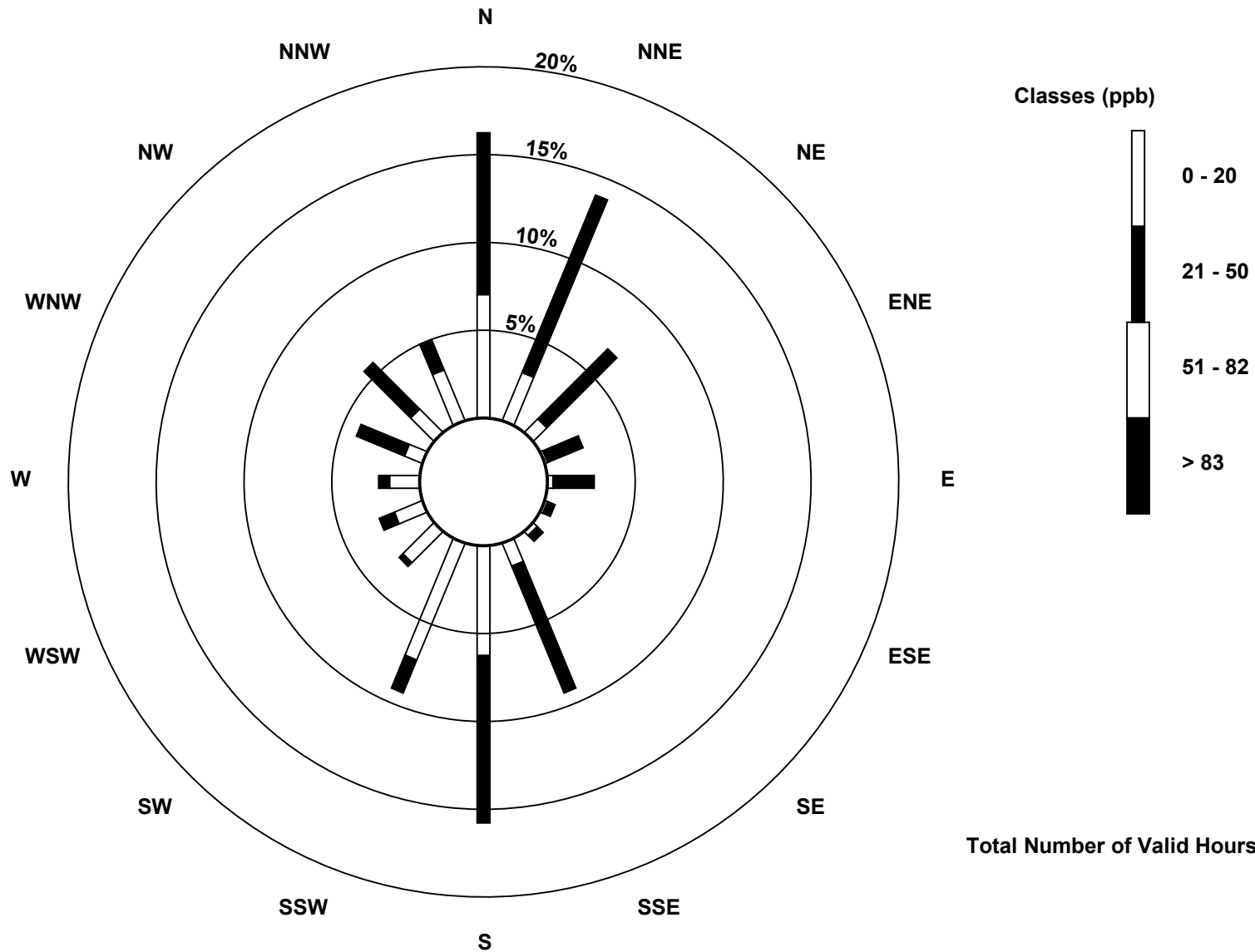
Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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

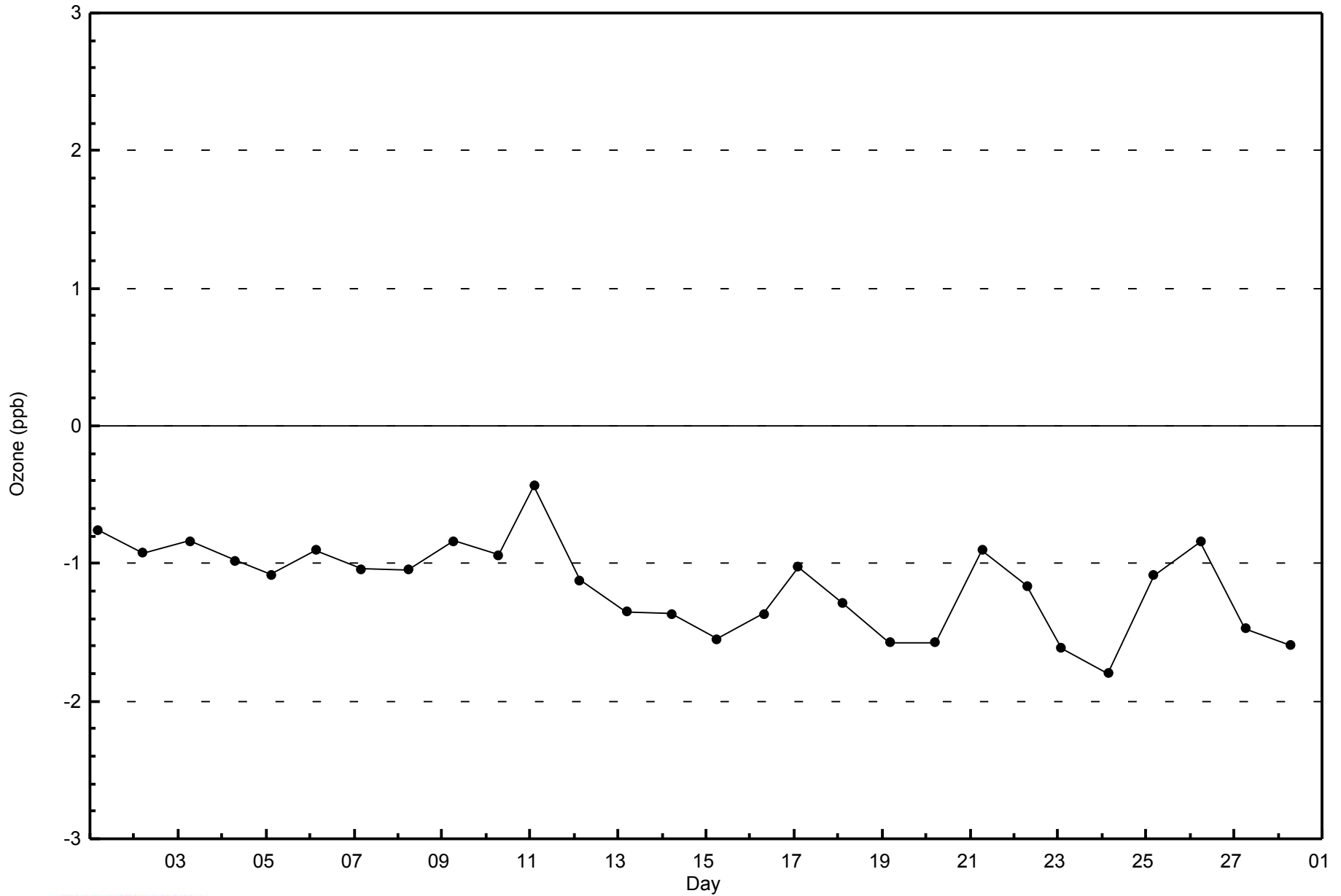


Total Number of Valid Hours: 640



WBEA  
Zero Responses

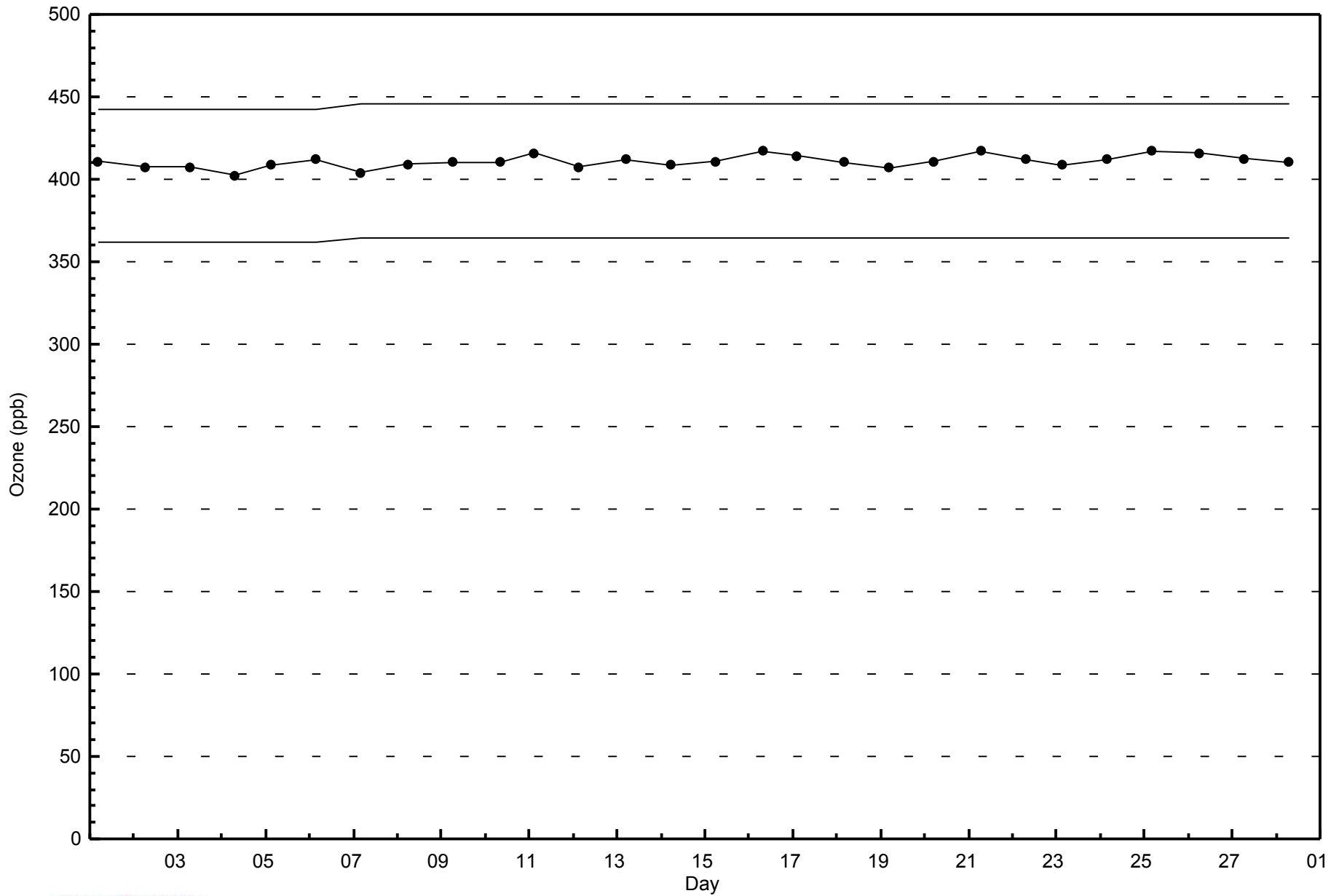
Ozone (O<sub>3</sub>) - ppb  
Fort McKay - Bertha Ganter - February 2015





WBEA  
Span Responses

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



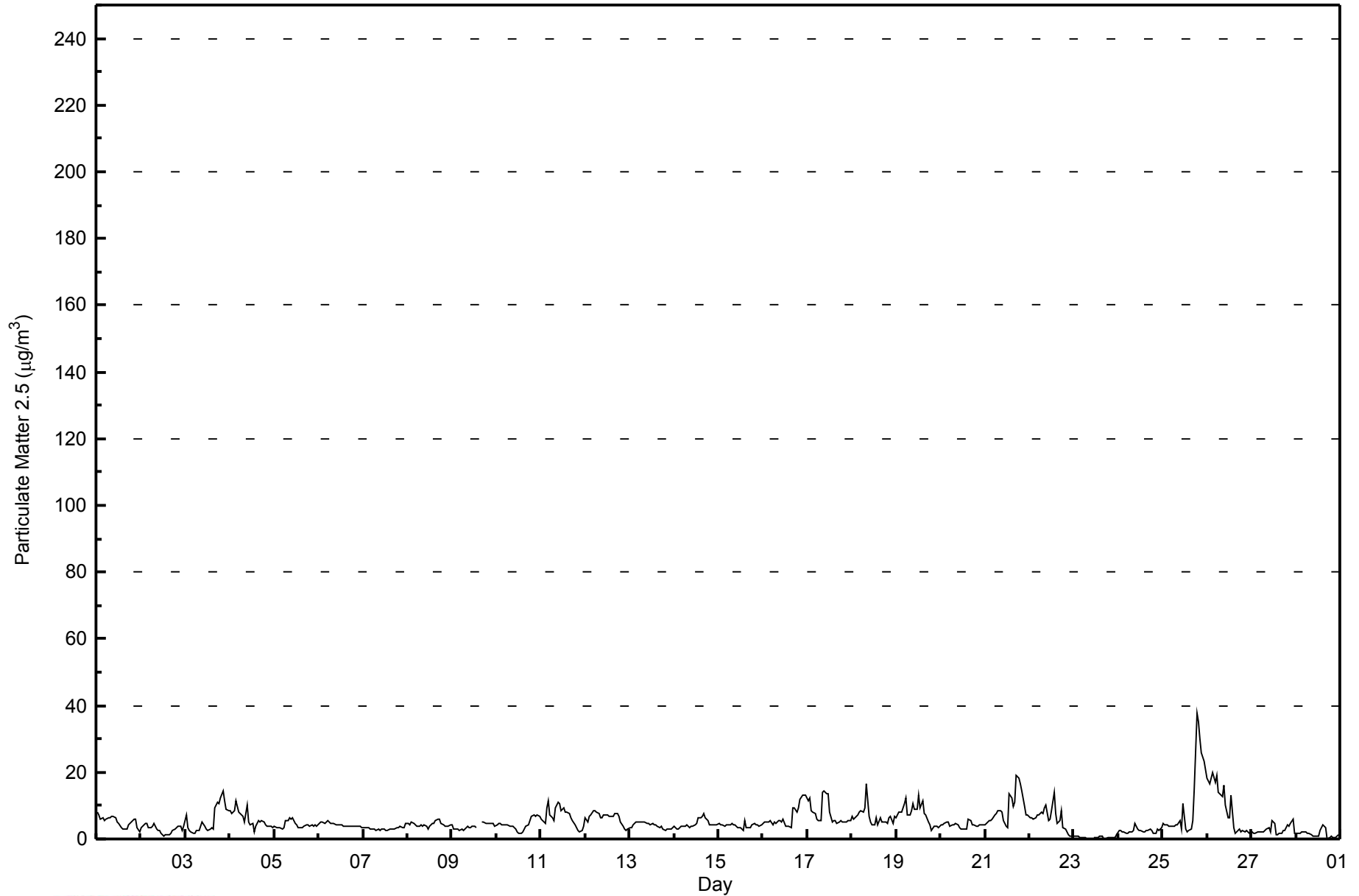


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																								
Maximum Value: 37.7 µg/m <sup>3</sup> on Feb 25 19:00		Maximum Daily Average: 10.9 µg/m <sup>3</sup> on Feb 25																								
Minimum Value: 0.1 µg/m <sup>3</sup> on Feb 28 18:00		Hours of Data: 669																								
Maximum Diurnal Average: 6.1 µg/m <sup>3</sup> at hour 10		Hours of Missing Data: 3																								
Monthly Average: 5.19 µg/m <sup>3</sup>		Hours of Calibration: 0																								
Minimum Daily Average: 0.5 µg/m <sup>3</sup> on Feb 23		Percent Operational Time: 99.6																								
Minimum Diurnal Average: 4.3 µg/m <sup>3</sup> at hour 16		Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 3.1 Median = 4.2 Q <sub>3</sub> = 6.2 P <sub>90</sub> = 9.2 P <sub>99</sub> = 19.6																								
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-Feb	7.8	7.3	6.1	6.2	5.5	6.1	6.3	6.5	6.9	6.9	6.3	5.1	4.5	3.5	3.1	2.9	3.1	4.1	4.7	5.4	5.9	6.0	3.3	2.3	5.3	7.8
2-Feb	3.5	3.8	4.6	4.6	3.3	3.4	4.0	4.5	2.8	2.7	2.7	1.8	1.0	1.1	1.4	1.4	1.7	2.4	2.8	3.3	3.9	3.8	2.6	3.8	3.0	4.6
3-Feb	7.3	3.6	2.4	2.2	1.8	1.9	2.4	2.6	3.7	4.9	3.9	2.9	2.5	3.0	3.4	3.0	9.5	11.2	10.7	12.3	14.3	11.5	8.8	8.3	5.8	14.3
4-Feb	8.3	7.8	8.4	11.4	9.7	7.9	7.3	6.8	5.3	10.1	5.0	4.1	4.5	2.2	3.9	5.6	5.0	5.5	4.9	4.3	4.0	3.7	3.9	3.5	6.0	11.4
5-Feb	3.7	3.6	3.3	3.2	3.0	3.2	5.6	5.5	6.3	6.0	6.4	4.7	4.3	3.3	3.3	3.5	3.8	4.2	4.2	4.0	4.1	4.0	4.1	3.7	4.2	6.4
6-Feb	4.5	5.2	5.2	4.8	5.0	5.3	4.6	4.8	4.7	4.3	4.4	4.2	4.2	3.8	3.8	3.8	3.8	3.9	4.0	3.7	3.8	3.8	3.8	3.3	4.3	5.3
7-Feb	3.4	3.3	3.3	3.2	3.2	3.1	2.8	2.5	2.8	2.7	2.8	2.8	2.5	2.6	2.8	2.9	2.9	3.1	3.4	3.4	3.6	3.4	3.3	4.7	3.1	4.7
8-Feb	4.7	4.3	5.0	4.7	4.1	3.9	4.0	4.1	3.7	4.3	3.7	2.9	3.9	4.5	4.7	5.4	5.9	6.0	4.8	4.4	3.9	3.8	3.9	4.1	4.4	6.0
9-Feb	4.2	3.1	2.9	3.0	2.7	2.8	2.7	2.8	4.0	3.5	3.5	3.7	3.6	3.3	M	M	5.1	5.0	4.7	4.5	4.6	4.8	4.5	3.9	3.8	5.1
10-Feb	4.4	4.8	4.7	4.4	4.3	4.1	4.3	3.7	3.9	3.7	3.2	2.2	1.6	1.6	2.3	3.1	3.9	4.2	5.7	6.8	7.1	7.0	7.3	7.0	4.4	7.3
11-Feb	5.8	5.3	4.6	9.3	11.4	7.2	6.4	5.5	9.3	11.2	10.6	8.5	9.4	8.0	8.0	7.4	6.3	5.6	4.4	3.6	2.5	2.1	2.3	4.0	6.6	11.4
12-Feb	6.4	5.2	6.6	7.3	8.6	8.6	8.0	7.6	6.6	6.5	7.1	7.2	7.4	7.0	6.8	6.9	7.4	7.7	6.9	5.0	3.8	3.1	2.6	2.9	6.4	8.6
13-Feb	3.5	3.5	4.2	5.2	5.0	5.1	5.1	5.1	5.0	4.7	4.8	4.3	4.5	4.2	4.2	3.9	3.6	3.8	3.1	2.6	2.8	2.8	3.1	3.6	4.1	5.2
14-Feb	3.8	3.1	2.8	3.3	3.7	3.7	3.8	4.1	3.6	3.8	4.0	4.1	4.8	6.2	6.4	6.9	7.7	6.5	5.5	4.1	4.3	4.1	4.1	4.1	4.5	7.7
15-Feb	4.6	4.4	4.3	4.0	4.2	4.0	4.4	4.8	4.4	4.2	3.6	3.3	3.6	2.5	5.6	3.5	3.3	3.6	4.4	4.6	4.1	4.4	4.0	4.2	4.1	5.6
16-Feb	4.7	4.9	5.1	5.2	5.3	4.4	4.9	4.8	5.4	5.5	5.0	5.9	3.7	3.6	3.8	3.5	9.2	9.3	7.9	9.1	11.8	13.0	13.0	13.0	6.8	13.0
17-Feb	11.6	12.4	8.5	8.1	7.5	5.8	5.4	5.4	14.1	14.6	13.4	13.6	8.2	4.9	5.5	5.7	4.6	5.0	5.4	5.2	5.1	5.1	5.4	5.4	7.7	14.6
18-Feb	6.7	6.1	7.0	7.1	8.1	8.3	8.2	9.2	16.7	6.8	5.3	4.3	4.1	6.2	4.1	6.3	5.1	5.3	5.2	4.7	6.3	6.9	4.9	6.6	6.6	16.7
19-Feb	6.3	8.2	8.0	8.2	10.4	12.1	7.0	7.2	8.3	10.6	9.1	9.0	13.1	9.5	11.2	7.7	7.0	5.2	4.1	2.4	3.8	4.0	3.8	3.2	7.5	13.1
20-Feb	4.4	4.4	4.6	4.9	4.9	4.0	4.1	4.3	4.5	4.2	3.5	3.1	2.8	2.8	2.8	5.8	5.3	4.4	4.3	3.7	3.7	4.2	4.2	4.3	4.1	5.8
21-Feb	4.2	5.1	5.3	5.3	5.9	7.0	7.6	8.6	8.3	7.9	5.4	3.9	3.5	13.7	12.2	9.9	11.2	19.0	18.4	16.7	14.6	9.9	7.4	7.2	9.1	19.0
22-Feb	6.3	6.3	6.1	6.5	7.2	7.4	7.9	7.7	9.4	10.3	5.6	5.8	8.5	14.0	7.4	4.8	5.4	8.6	3.3	3.0	2.3	1.5	0.9	0.8	6.1	14.0
23-Feb	0.9	0.7	0.7	0.6	0.6	0.5	0.5	0.2	0.1	0.1	UO	0.2	0.3	0.5	0.7	0.7	0.2	0.2	0.3	0.4	0.6	0.5	0.5	1.5	0.5	1.5
24-Feb	2.4	2.5	2.2	2.2	1.6	1.6	1.9	1.9	2.5	4.6	3.1	2.7	2.4	2.3	2.2	2.3	2.6	2.8	2.5	1.7	1.7	2.9	2.7	3.4	2.5	4.6
25-Feb	4.8	4.3	4.3	4.0	3.7	3.6	4.0	4.4	4.4	5.5	3.1	10.7	2.8	2.3	2.7	3.0	5.3	14.9	37.7	35.3	30.3	25.8	23.4	20.8	10.9	37.7
26-Feb	18.1	16.6	18.1	19.8	17.0	18.9	14.0	13.1	12.5	16.0	10.0	6.3	6.5	12.9	3.2	1.8	2.3	2.9	2.1	2.4	2.1	2.3	2.2	1.9	9.3	19.8
27-Feb	2.1	1.6	1.8	2.0	2.1	2.2	2.1	2.3	2.9	3.5	2.2	5.5	4.8	1.5	1.1	1.7	1.8	2.7	2.4	4.2	3.8	4.6	5.9	1.6	2.8	5.9
28-Feb	1.9	1.6	1.6	1.9	2.1	2.0	1.7	1.5	1.4	0.9	0.9	0.7	0.9	2.6	4.2	3.7	3.4	0.1	0.3	0.7	0.4	0.3	0.7	1.3	1.5	4.2
																								Diurnal Average		
																								Diurnal Maximum		
																								5.4 5.1 5.1 5.5 5.4 5.3 5.0 5.1 5.8 6.1 5.1 4.8 4.4 4.8 4.5 4.3 4.9 5.6 6.0 5.8 5.7 5.3 4.9 4.8		
																								18.1 16.6 18.1 19.8 17.0 18.9 14.0 13.1 16.7 16.0 13.4 13.6 13.1 14.0 12.2 9.9 11.2 19.0 37.7 35.3 30.3 25.8 23.4 20.8		
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 - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay - Bertha Ganter - February 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	442	66.07	66.07
6 - 15	176	26.31	92.38
16 - 25	13	1.94	94.32
26 - 80	4	0.60	94.92
> 81.0	0	0.00	94.92

Total Number of Valid Hours: 669

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort McKay - Bertha Ganter - February 2015**

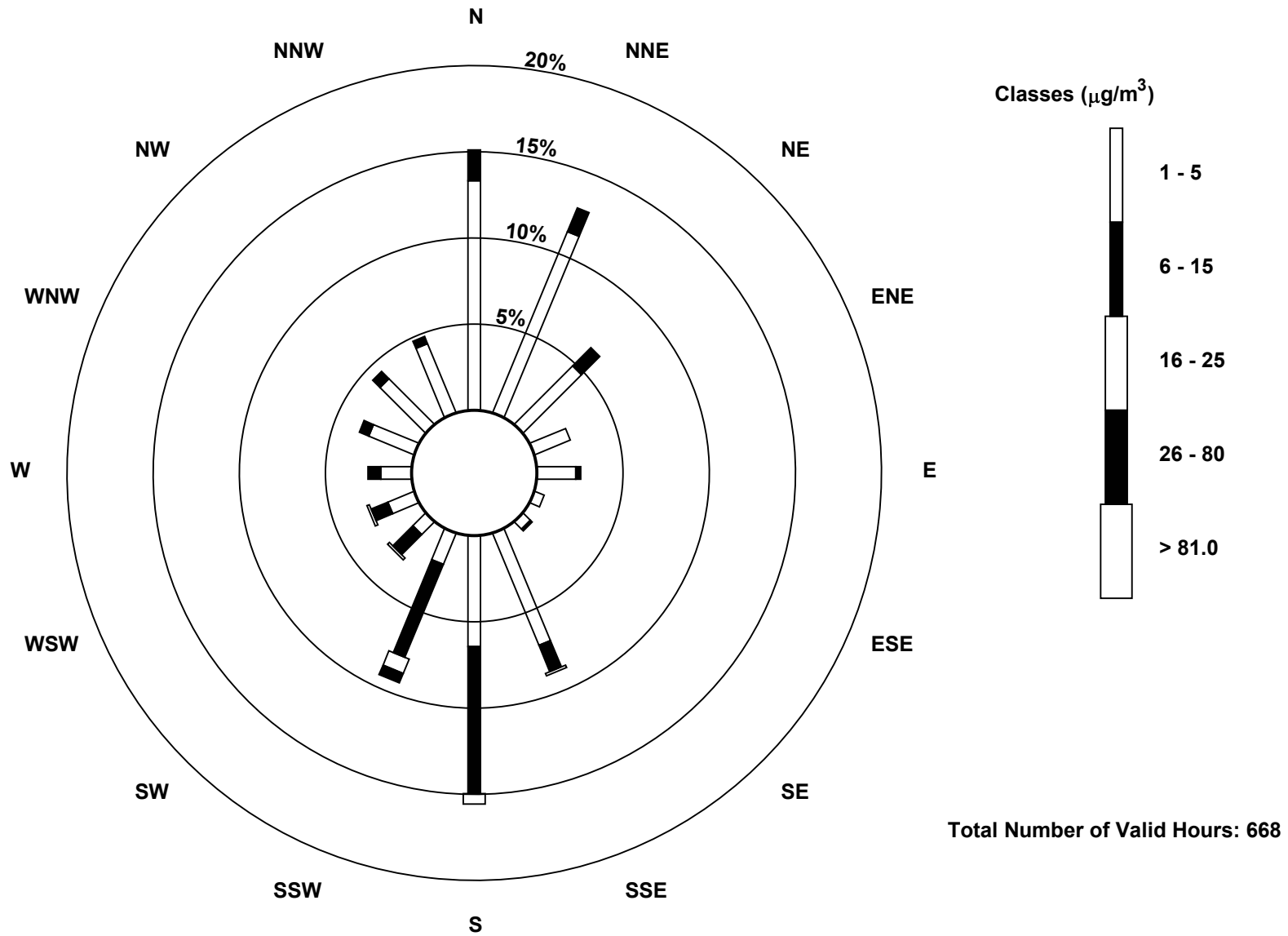
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	89	76	32	15	15	4	4	47	43	13	7	11	12	19	25	29	441
6 - 15	12	10	10	0	2	0	1	11	57	39	11	7	5	4	4	3	176
16 - 25	0	0	0	0	0	0	0	1	4	6	1	1	0	0	0	0	13
26 - 80	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	101	86	42	15	17	4	5	59	104	62	19	19	17	23	29	32	634

Total Number of Valid Hours: 668

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

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







Summary of Hour Averages

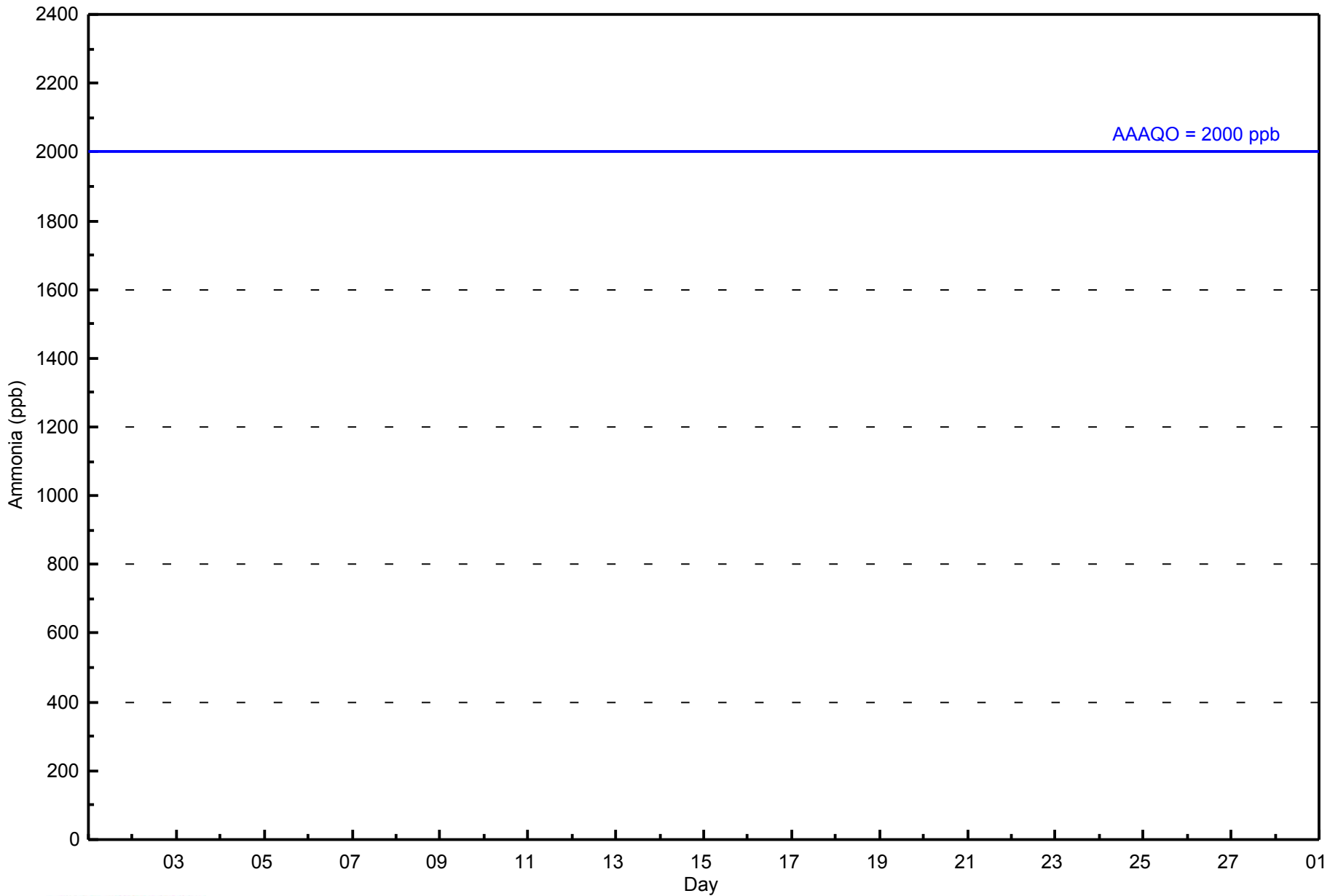
Fort McKay - Bertha Ganter - February 2015

Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 672																					
Maximum Value: 0 ppb on Feb 1 01:00										Maximum Daily Average: 0.0 ppb on Feb 1										Hours of Data: 600											
Minimum Value: 0 ppb on Feb 1 01:00										Minimum Daily Average: 0.0 ppb on Feb 1										Hours of Missing Data: 72											
Maximum Diurnal Average: 0.0 ppb at hour 1										Minimum Diurnal Average: 0.0 ppb at hour 1										Hours of Calibration: 36											
Monthly Average: 0.0 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> = 0 P <sub>99</sub> = 0										Percent Operational Time: 94.6											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Feb	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0				
2-Feb	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0				
3-Feb	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0				
4-Feb	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0				
5-Feb	0	0	0	Z	RE	0	0	0	0	0	M	M	M	M	M	M	0	0	0	0	0	0	0	0	--	0					
6-Feb	0	0	0	0	Z	RE	0	0	0	C	C	C	C	C	C	C	C	RE	0	0	0	0	0	0	--	0					
7-Feb	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					
8-Feb	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					
9-Feb	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					
10-Feb	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					
11-Feb	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					
12-Feb	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					
13-Feb	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					
14-Feb	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					
15-Feb	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					
16-Feb	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					
17-Feb	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					
18-Feb	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					
19-Feb	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	UO	0	0	0	0	0	0	0	0	0.0	0					
20-Feb	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					
21-Feb	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					
22-Feb	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					
23-Feb	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					
24-Feb	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					
25-Feb	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					
26-Feb	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					
27-Feb	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					
28-Feb	0	0	0	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0					
0.0																								Diurnal Average							
0																								Diurnal Maximum							
Z - zerospan																								C - Calibration		M - Maintenance		UO - Unstable Operation		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 - February 2015**





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	600	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: 600

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

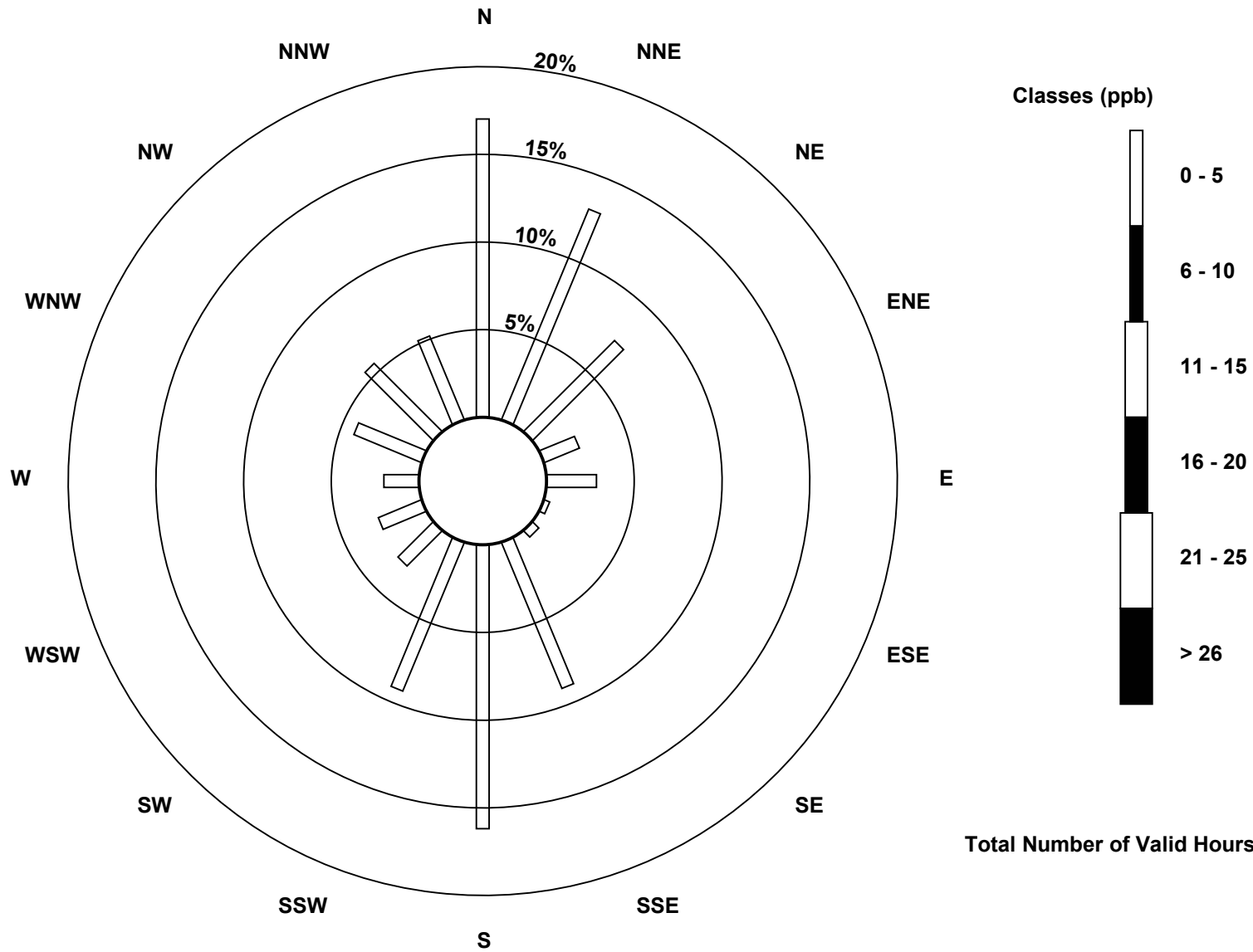
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	102	78	44	13	17	2	3	54	97	55	17	16	12	25	33	31	599
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 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>	102	78	44	13	17	2	3	54	97	55	17	16	12	25	33	31	599

Total Number of Valid Hours: 599

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

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

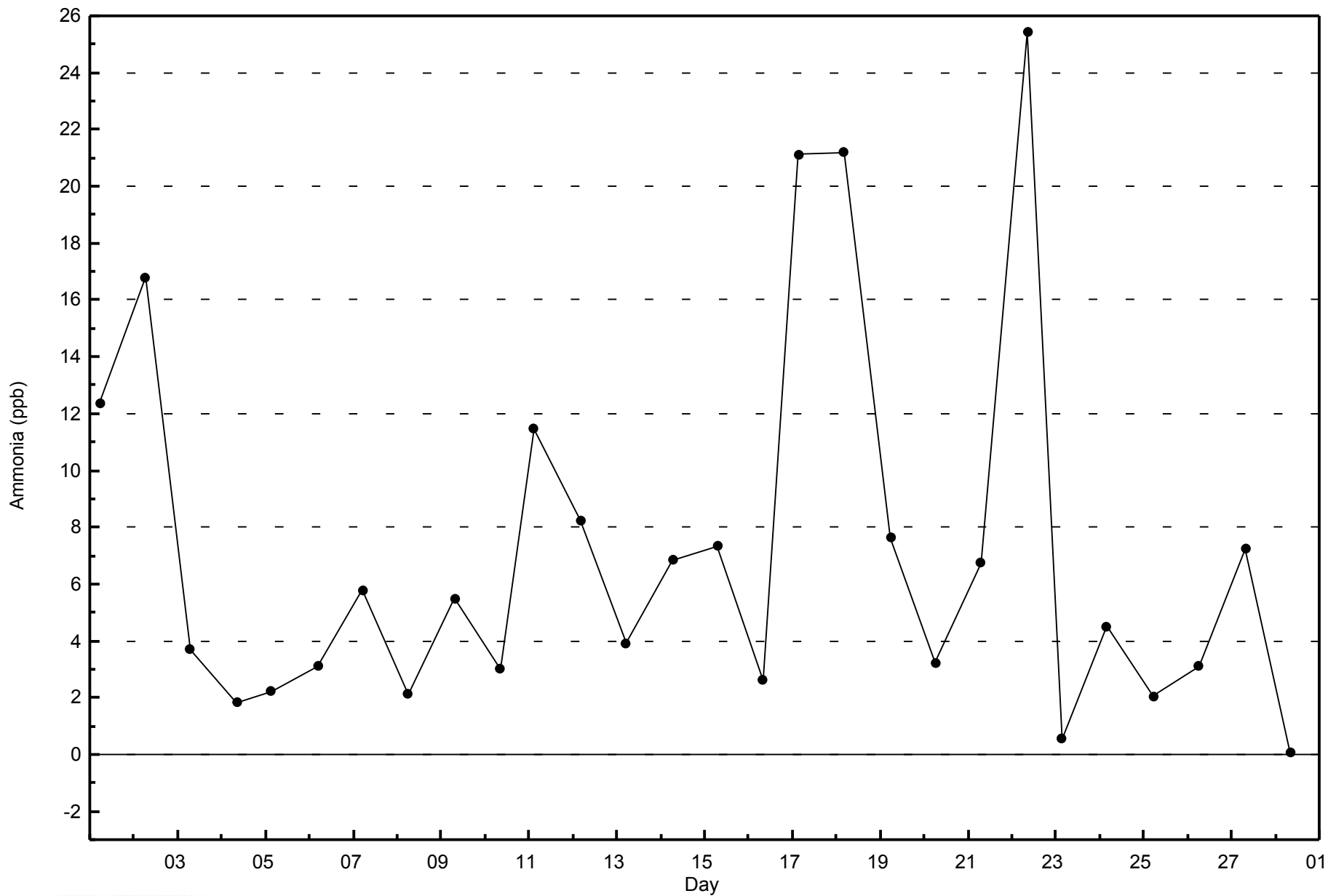


Total Number of Valid Hours: 599



**WBEA**  
**Zero Responses**

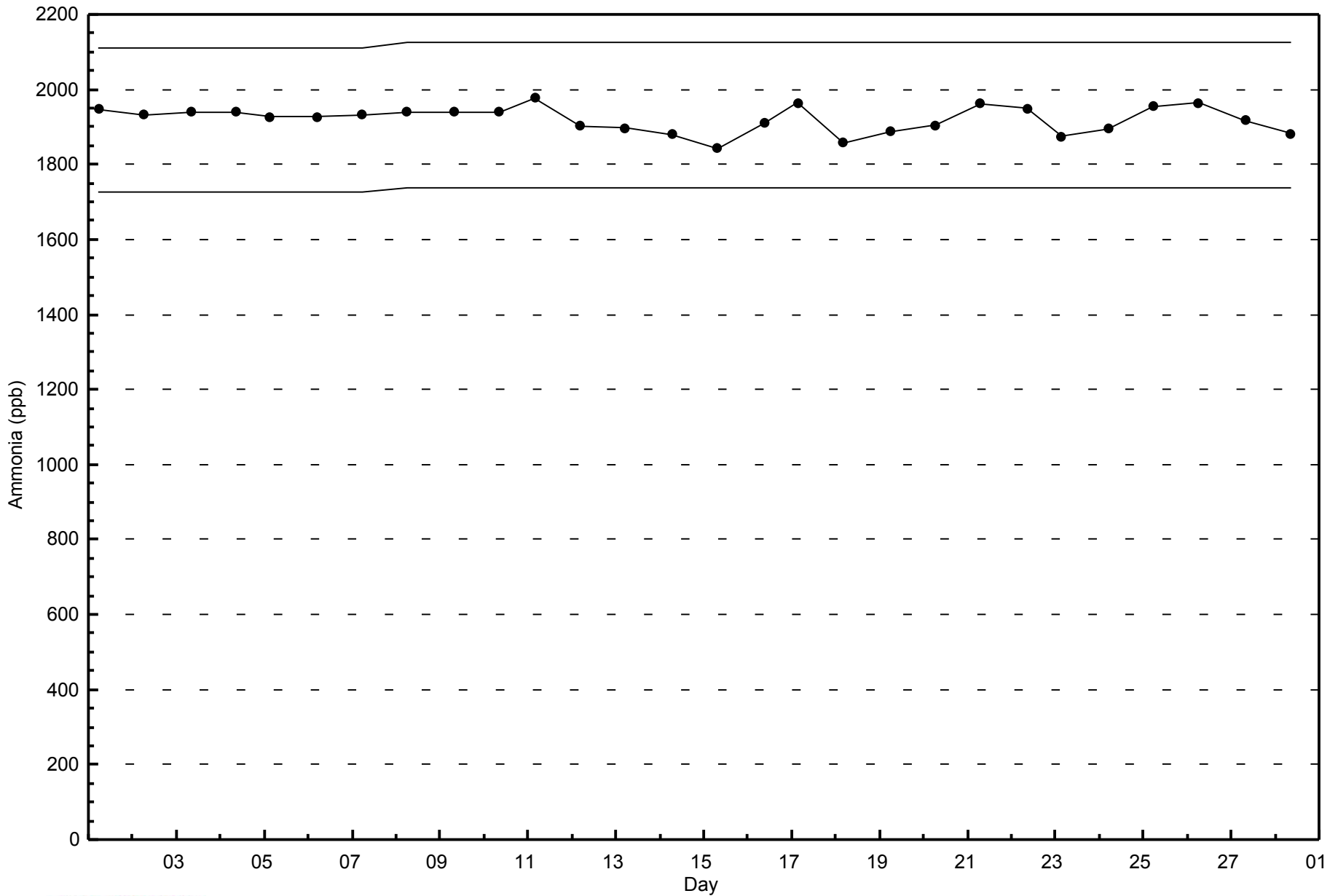
**Ammonia (NH<sub>3</sub>) - ppb**  
**Fort McKay - Bertha Ganter - February 2015**





WBEA  
Span Responses

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





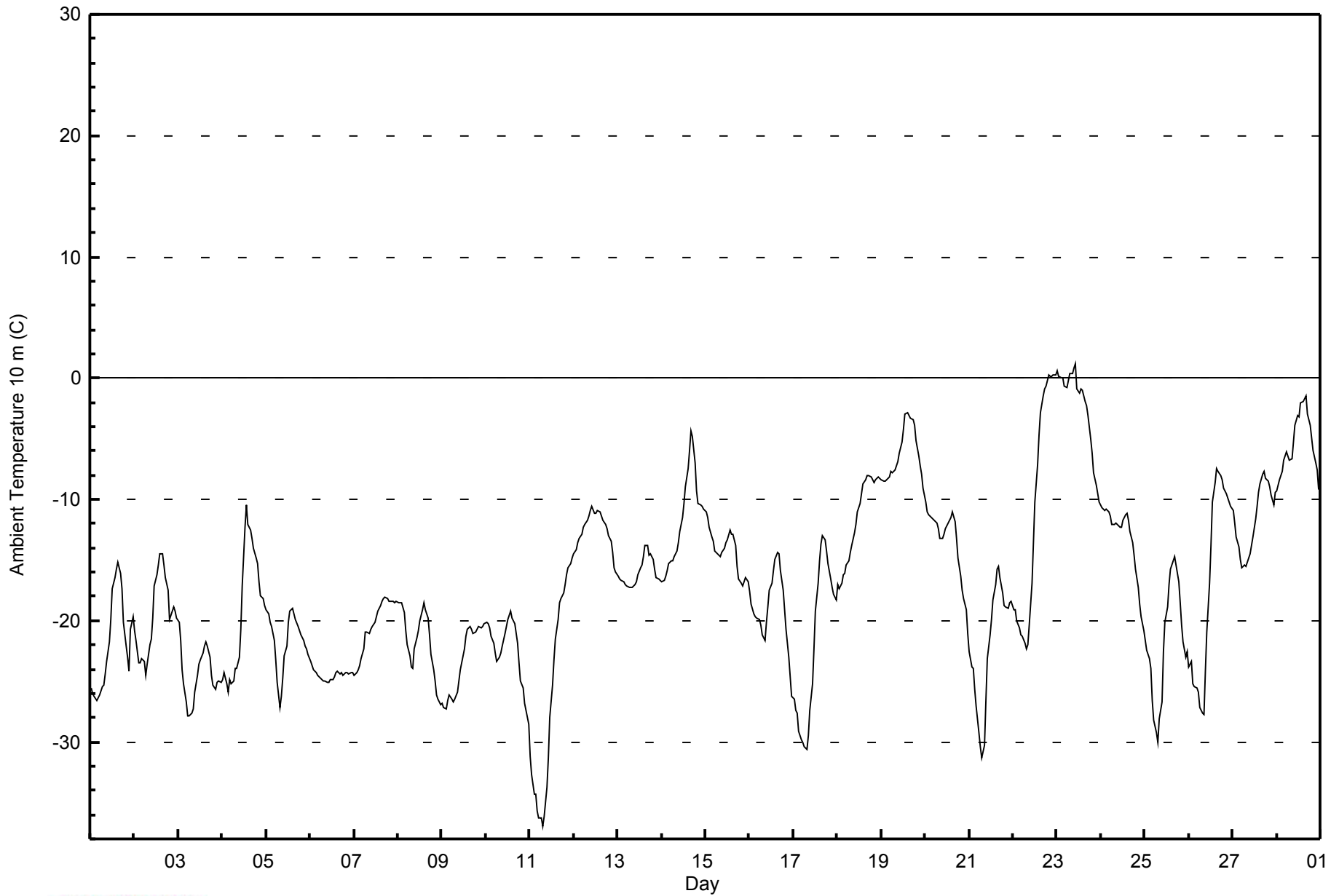
Maximum Value: 1.1 C on Feb 23 11:00		Maximum Daily Average: -2.4 C on Feb 23		Hours in Service: 672																						
Minimum Value: -36.9 C on Feb 11 08:00		Minimum Daily Average: -26.3 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.0 C at hour 16		Minimum Diurnal Average: -20.5 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -17.04 C		Percentiles: P <sub>1</sub> = -34.6 P <sub>10</sub> = -25.9 Q <sub>1</sub> = -22.7 Median = -17.5 Q <sub>3</sub> = -12.0 P <sub>90</sub> = -7.3 P <sub>99</sub> = 0.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-25.6	-26.0	-26.3	-26.6	-26.4	-26.1	-25.4	-25.3	-24.4	-23.3	-21.7	-19.9	-17.4	-16.5	-15.7	-15.1	-16.1	-17.3	-20.1	-22.0	-23.1	-24.2	-20.8	-19.7	-21.9	-15.1
2-Feb	-20.9	-21.7	-23.5	-23.5	-23.2	-23.4	-24.5	-23.6	-22.0	-21.6	-19.8	-17.1	-16.2	-15.4	-14.5	-14.5	-15.4	-16.5	-17.5	-20.0	-19.6	-18.8	-19.2	-19.8	-19.7	-14.5
3-Feb	-20.1	-21.7	-24.0	-25.2	-26.7	-27.9	-27.9	-27.6	-27.3	-25.8	-24.5	-23.6	-23.3	-22.7	-22.1	-21.8	-22.0	-23.1	-24.6	-25.3	-25.7	-25.1	-24.9	-25.1	-24.5	-20.1
4-Feb	-24.8	-24.3	-25.2	-25.9	-24.9	-25.2	-25.0	-24.0	-24.0	-23.0	-20.7	-17.1	-12.3	-10.5	-12.1	-12.5	-13.2	-14.1	-14.8	-15.3	-16.8	-17.9	-18.2	-18.7	-19.2	-10.5
5-Feb	-19.1	-19.5	-20.1	-20.4	-21.6	-23.3	-25.0	-27.2	-26.2	-24.8	-22.9	-22.1	-20.1	-19.2	-19.0	-19.4	-19.9	-20.5	-20.8	-21.1	-21.6	-22.0	-22.3	-22.7	-21.7	-19.0
6-Feb	-23.3	-23.7	-24.1	-24.3	-24.5	-24.6	-24.8	-24.9	-25.0	-25.1	-25.1	-24.8	-24.8	-24.6	-24.3	-24.2	-24.4	-24.3	-24.6	-24.3	-24.3	-24.4	-24.3	-24.3	-24.5	-23.3
7-Feb	-24.5	-24.3	-24.0	-23.7	-23.1	-22.3	-21.0	-20.9	-21.1	-20.7	-20.5	-20.1	-19.6	-19.2	-18.8	-18.4	-18.2	-18.1	-18.2	-18.4	-18.4	-18.4	-18.5	-18.5	-20.4	-18.1
8-Feb	-18.5	-18.5	-18.5	-19.3	-20.9	-22.0	-22.9	-23.8	-23.9	-22.3	-21.4	-20.9	-20.0	-19.1	-18.5	-19.1	-19.8	-21.2	-22.8	-24.0	-24.9	-26.1	-26.5	-27.0	-21.7	-18.5
9-Feb	-26.8	-27.2	-27.3	-26.6	-26.2	-26.5	-26.7	-26.5	-25.9	-25.0	-24.1	-23.5	-22.3	-21.3	-20.7	-20.5	-20.7	-21.1	-21.0	-20.7	-20.5	-20.5	-20.4	-20.2	-23.4	-20.2
10-Feb	-20.1	-20.2	-20.6	-21.3	-21.8	-22.7	-23.3	-23.0	-22.6	-22.0	-21.1	-20.5	-19.9	-19.3	-19.8	-20.0	-20.3	-21.8	-23.5	-24.9	-25.6	-26.9	-27.4	-28.5	-22.4	-19.3
11-Feb	-31.2	-32.7	-34.3	-34.4	-35.7	-36.3	-36.3	-36.9	-36.1	-33.8	-31.4	-27.9	-25.3	-23.3	-21.5	-19.9	-18.6	-18.2	-17.7	-17.0	-16.2	-15.7	-15.3	-14.9	-26.3	-14.9
12-Feb	-14.4	-14.1	-13.6	-13.2	-12.9	-12.4	-12.1	-11.7	-11.4	-10.9	-10.5	-11.2	-11.1	-10.9	-11.0	-11.3	-11.8	-12.1	-12.4	-13.0	-13.4	-14.4	-15.6	-16.0	-12.6	-10.5
13-Feb	-16.3	-16.5	-16.7	-16.8	-17.0	-17.2	-17.3	-17.3	-17.2	-17.0	-16.7	-16.3	-15.6	-15.4	-14.7	-13.8	-13.8	-14.6	-14.5	-15.0	-15.7	-16.4	-16.6	-16.6	-16.1	-13.8
14-Feb	-16.7	-16.7	-16.4	-15.8	-15.3	-15.1	-15.1	-14.7	-14.3	-13.6	-12.6	-11.5	-10.4	-8.9	-7.5	-5.9	-4.3	-4.8	-6.9	-9.3	-10.3	-10.5	-10.6	-10.8	-11.6	-4.3
15-Feb	-11.0	-11.5	-12.3	-13.1	-13.5	-14.2	-14.5	-14.7	-14.7	-14.3	-14.0	-13.5	-13.3	-12.5	-12.9	-12.9	-13.8	-15.5	-16.6	-16.9	-17.2	-16.8	-16.5	-16.8	-14.3	-11.0
16-Feb	-17.7	-18.7	-19.4	-19.7	-19.8	-19.9	-20.4	-21.1	-21.6	-20.1	-18.8	-17.5	-16.9	-15.9	-15.0	-14.4	-14.5	-15.9	-17.5	-19.1	-20.8	-23.1	-24.6	-26.3	-19.1	-14.4
17-Feb	-26.5	-27.4	-27.6	-29.2	-29.9	-30.0	-30.4	-30.7	-29.5	-27.4	-25.2	-22.3	-19.2	-16.9	-15.1	-13.7	-13.0	-13.3	-14.3	-15.3	-16.6	-17.3	-17.8	-18.3	-21.9	-13.0
18-Feb	-17.0	-17.4	-17.0	-16.2	-16.1	-15.4	-15.0	-14.4	-13.8	-12.8	-12.1	-11.0	-10.3	-9.5	-8.7	-8.3	-8.0	-8.0	-8.2	-8.3	-8.6	-8.4	-8.1	-8.2	-11.7	-8.0
19-Feb	-8.4	-8.4	-8.5	-8.4	-8.2	-7.7	-7.8	-7.6	-7.2	-6.9	-6.2	-5.3	-4.3	-3.0	-2.8	-3.1	-3.3	-3.5	-3.9	-5.2	-6.4	-7.3	-7.9	-9.0	-6.3	-2.8
20-Feb	-10.2	-11.1	-11.3	-11.5	-11.6	-11.8	-11.9	-12.4	-13.2	-13.2	-12.9	-12.5	-12.0	-11.7	-11.4	-11.1	-11.8	-13.2	-14.8	-16.4	-17.4	-18.2	-19.2	-21.1	-13.4	-10.2
21-Feb	-22.5	-23.8	-24.0	-25.6	-27.1	-29.3	-30.4	-31.4	-30.3	-26.6	-23.1	-21.2	-19.9	-18.3	-17.0	-15.7	-15.5	-16.4	-17.7	-18.8	-18.9	-19.0	-18.5	-18.4	-22.1	-15.5
22-Feb	-19.1	-19.1	-20.0	-20.6	-21.2	-21.3	-21.9	-22.3	-22.0	-20.4	-16.9	-13.6	-10.2	-7.1	-4.7	-2.8	-1.4	-0.9	-0.7	0.2	0.2	0.1	0.3	0.3	-11.0	0.3
23-Feb	0.6	0.1	0.0	0.0	-0.7	-0.8	-0.2	0.3	0.4	0.9	1.1	-0.9	-1.3	-0.9	-1.0	-1.9	-2.3	-3.1	-5.0	-6.2	-7.8	-8.8	-9.6	-10.2	-2.4	1.1
24-Feb	-10.7	-10.8	-10.9	-10.7	-11.0	-11.4	-12.0	-12.1	-12.0	-12.0	-12.3	-12.3	-11.8	-11.2	-11.2	-11.7	-12.7	-13.6	-14.6	-15.8	-17.2	-18.6	-19.7	-20.8	-13.2	-10.7
25-Feb	-21.6	-22.4	-23.1	-23.9	-26.6	-28.2	-29.2	-30.0	-28.1	-26.7	-22.5	-20.2	-18.9	-17.0	-15.8	-15.0	-14.7	-15.4	-16.7	-18.5	-20.4	-21.8	-23.0	-22.6	-21.8	-14.7
26-Feb	-23.8	-23.3	-25.2	-25.5	-25.5	-25.9	-27.2	-27.6	-27.7	-24.1	-20.9	-16.9	-13.8	-10.2	-8.6	-7.5	-7.7	-8.0	-8.4	-9.1	-9.5	-9.9	-10.2	-10.5	-17.0	-7.5
27-Feb	-10.9	-11.9	-13.1	-13.9	-15.0	-15.6	-15.5	-15.5	-15.1	-14.5	-13.8	-13.1	-11.6	-10.6	-9.5	-8.7	-7.9	-7.7	-8.3	-8.5	-9.0	-9.6	-10.5	-9.4	-11.6	-7.7
28-Feb	-9.3	-8.4	-8.1	-7.7	-6.8	-6.1	-6.5	-6.7	-6.7	-5.3	-3.8	-3.0	-3.2	-2.0	-1.9	-1.7	-1.5	-2.9	-3.9	-4.9	-6.0	-7.0	-7.6	-9.1	-5.4	-1.5
																								Diurnal Average		
																								Diurnal Maximum		





**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	259	38.54	38.54
-20 - 0	400	59.52	98.07
0 - 10	13	1.93	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

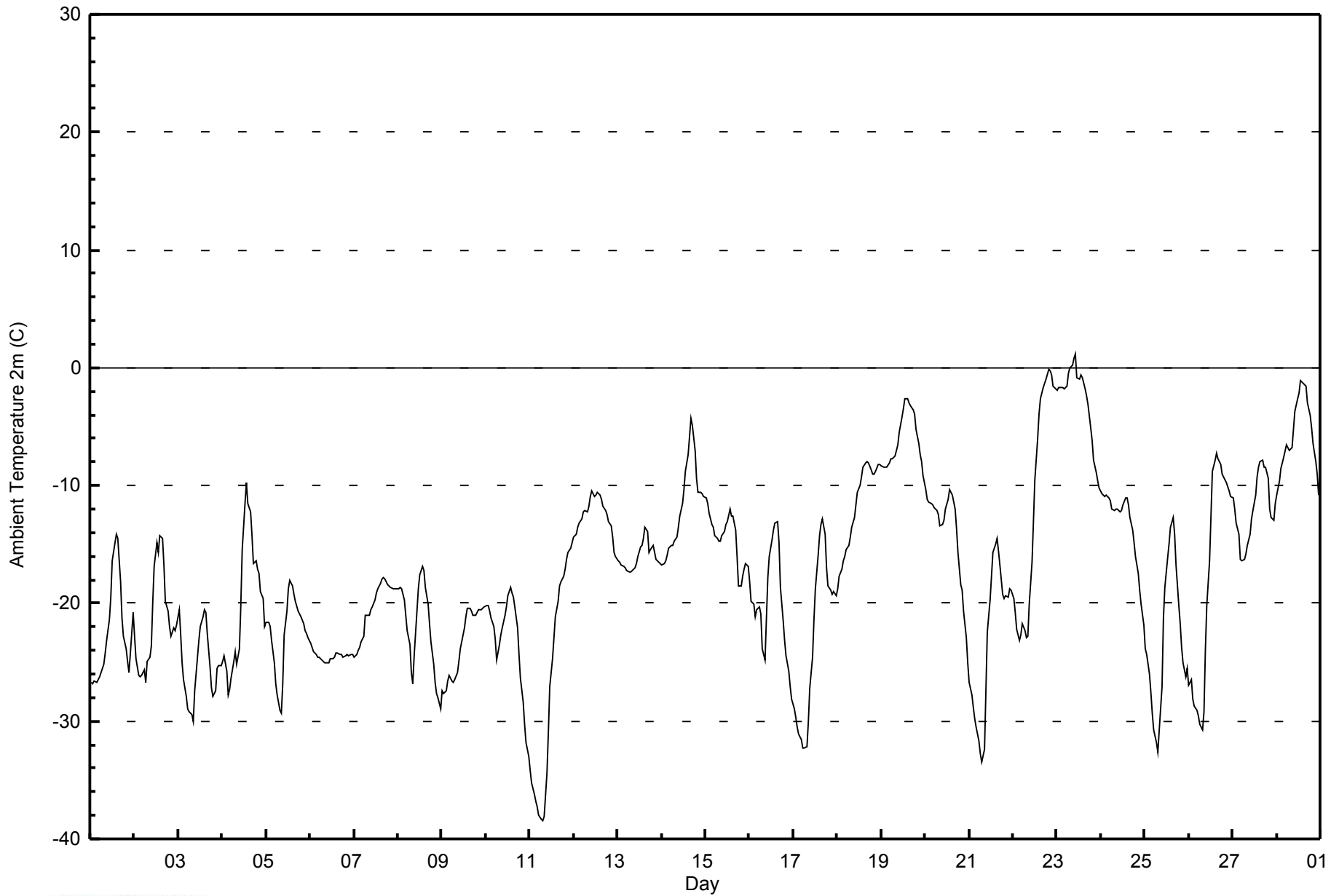


Maximum Value: 1.2 C on Feb 23 11:00		Maximum Daily Average: -2.8 C on Feb 23		Hours in Service: 672																						
Minimum Value: -38.5 C on Feb 11 08:00		Minimum Daily Average: -27.0 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.6 C at hour 16		Minimum Diurnal Average: -21.3 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -17.56 C		Percentiles: P <sub>1</sub> = -36.0 P <sub>10</sub> = -27.2 Q <sub>1</sub> = -23.8 Median = -18.0 Q <sub>3</sub> = -11.9 P <sub>90</sub> = -7.4 P <sub>99</sub> = -0.6		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-Feb	-26.7	-26.8	-26.6	-26.8	-26.4	-26.2	-25.6	-25.1	-24.2	-23.1	-21.4	-19.5	-16.4	-14.8	-14.2	-14.5	-18.2	-21.2	-22.8	-23.9	-24.9	-25.9	-24.2	-20.7	-22.5	-14.2
2-Feb	-22.8	-24.7	-26.1	-26.3	-26.2	-25.6	-26.7	-24.9	-24.5	-23.6	-20.0	-16.9	-14.8	-15.7	-14.3	-14.5	-16.7	-19.8	-20.6	-22.0	-22.8	-22.0	-22.4	-21.9	-21.5	-14.3
3-Feb	-20.5	-22.6	-25.0	-26.5	-28.0	-29.0	-29.1	-29.4	-30.1	-27.5	-24.6	-23.1	-21.9	-21.2	-20.5	-20.8	-22.5	-25.4	-27.2	-27.9	-27.4	-25.5	-25.2	-25.3	-25.3	-20.5
4-Feb	-25.0	-24.5	-25.8	-27.7	-27.3	-26.4	-24.9	-24.1	-25.1	-23.8	-20.2	-15.5	-11.5	-9.8	-11.6	-12.2	-14.3	-16.6	-16.4	-17.1	-17.5	-19.0	-19.6	-22.0	-19.9	-9.8
5-Feb	-21.6	-21.6	-22.0	-23.2	-25.1	-26.8	-27.7	-29.1	-29.3	-26.8	-22.7	-20.7	-18.8	-18.1	-18.5	-19.2	-19.8	-20.6	-20.9	-21.2	-21.7	-22.4	-22.5	-22.9	-22.6	-18.1
6-Feb	-23.4	-23.7	-24.1	-24.3	-24.5	-24.6	-24.9	-25.0	-25.0	-25.1	-25.1	-24.8	-24.7	-24.6	-24.2	-24.2	-24.4	-24.4	-24.6	-24.4	-24.4	-24.5	-24.3	-24.3	-24.5	-23.4
7-Feb	-24.5	-24.4	-24.0	-23.7	-23.2	-22.8	-21.1	-21.0	-21.0	-20.5	-20.3	-19.7	-19.2	-18.8	-18.3	-18.0	-17.9	-17.9	-18.4	-18.6	-18.7	-18.7	-18.7	-18.8	-20.3	-17.9
8-Feb	-18.7	-18.7	-18.8	-19.7	-21.0	-22.3	-23.5	-25.8	-26.8	-24.4	-20.7	-18.7	-17.6	-16.9	-17.2	-18.6	-20.0	-21.8	-23.3	-25.2	-26.7	-27.7	-28.0	-29.0	-22.1	-16.9
9-Feb	-27.5	-27.7	-27.4	-26.7	-26.2	-26.5	-26.8	-26.5	-25.9	-24.9	-23.9	-23.3	-22.1	-21.1	-20.4	-20.4	-20.7	-21.1	-21.0	-20.8	-20.6	-20.6	-20.5	-20.3	-23.4	-20.3
10-Feb	-20.2	-20.2	-20.7	-21.3	-22.0	-23.0	-24.9	-23.5	-22.7	-22.1	-21.0	-20.2	-19.3	-18.6	-19.1	-19.4	-20.3	-22.1	-24.3	-26.3	-28.4	-30.3	-31.8	-33.0	-23.1	-18.6
11-Feb	-34.2	-35.3	-36.2	-36.9	-37.3	-37.9	-38.3	-38.5	-38.1	-34.4	-31.0	-27.0	-24.7	-22.9	-21.2	-19.8	-18.5	-18.2	-17.7	-17.1	-16.2	-15.7	-15.4	-14.9	-27.0	-14.9
12-Feb	-14.4	-14.1	-13.5	-13.2	-12.8	-12.3	-12.2	-12.2	-11.8	-10.9	-10.4	-11.0	-10.8	-10.5	-10.8	-11.2	-11.7	-12.2	-12.5	-13.0	-13.5	-14.3	-15.6	-16.0	-12.5	-10.4
13-Feb	-16.4	-16.6	-16.8	-16.9	-17.0	-17.2	-17.3	-17.4	-17.3	-17.0	-16.6	-16.1	-15.3	-15.1	-14.5	-13.6	-13.9	-15.7	-15.4	-15.1	-15.7	-16.3	-16.5	-16.6	-16.1	-13.6
14-Feb	-16.7	-16.7	-16.4	-15.9	-15.3	-15.1	-15.1	-14.8	-14.3	-13.6	-12.6	-11.5	-10.3	-8.8	-7.4	-5.8	-4.3	-4.9	-7.0	-9.4	-10.5	-10.6	-10.7	-10.9	-11.6	-4.3
15-Feb	-11.1	-11.6	-12.4	-13.3	-13.6	-14.2	-14.5	-14.7	-14.7	-14.3	-13.8	-13.3	-13.1	-11.9	-12.5	-12.6	-13.7	-16.0	-18.5	-18.6	-17.8	-17.1	-16.7	-16.9	-14.5	-11.1
16-Feb	-18.1	-19.8	-20.1	-21.1	-20.6	-20.4	-20.9	-23.8	-24.8	-21.2	-17.8	-16.0	-14.6	-13.7	-13.2	-13.0	-14.9	-18.6	-21.5	-23.1	-24.5	-25.7	-27.1	-28.1	-20.1	-13.0
17-Feb	-28.9	-29.7	-30.5	-31.1	-31.6	-32.3	-32.3	-32.2	-30.0	-27.2	-24.6	-21.4	-18.8	-16.0	-14.3	-13.4	-12.9	-14.1	-17.0	-18.6	-18.9	-19.3	-19.0	-19.4	-23.0	-12.9
18-Feb	-18.7	-17.7	-17.1	-16.4	-16.1	-15.4	-15.0	-14.4	-13.6	-12.7	-11.6	-10.6	-10.0	-9.3	-8.5	-8.1	-7.9	-8.1	-8.7	-9.0	-9.0	-8.8	-8.2	-8.2	-11.8	-7.9
19-Feb	-8.3	-8.4	-8.4	-8.4	-8.1	-7.7	-7.8	-7.5	-7.0	-6.5	-5.5	-4.2	-3.5	-2.7	-2.6	-3.0	-3.2	-3.5	-4.0	-5.2	-6.4	-7.3	-8.0	-9.1	-6.1	-2.6
20-Feb	-10.3	-11.2	-11.4	-11.6	-11.7	-11.9	-12.1	-12.5	-13.4	-13.3	-12.9	-12.0	-11.2	-10.4	-10.6	-10.8	-12.0	-13.6	-15.7	-18.4	-18.9	-20.7	-22.9	-25.1	-13.9	-10.3
21-Feb	-26.8	-27.7	-28.8	-29.8	-30.5	-31.6	-32.7	-33.5	-32.4	-27.4	-22.4	-19.8	-17.7	-15.6	-15.0	-14.5	-15.6	-16.8	-19.3	-19.6	-19.4	-19.5	-18.8	-18.9	-23.1	-14.5
22-Feb	-19.6	-20.8	-22.2	-23.1	-22.7	-21.8	-22.3	-22.9	-22.7	-20.1	-16.5	-13.1	-9.5	-6.1	-3.9	-2.6	-1.7	-1.3	-1.0	-0.1	-0.2	-0.7	-1.6	-1.8	-11.6	-0.1
23-Feb	-1.9	-1.6	-1.7	-1.6	-1.8	-1.6	-0.5	0.0	0.2	0.8	1.2	-0.8	-1.0	-0.6	-0.8	-1.9	-2.3	-3.1	-5.1	-6.2	-7.8	-8.9	-9.6	-10.2	-2.8	1.2
24-Feb	-10.7	-10.9	-11.0	-10.8	-11.0	-11.3	-11.9	-12.1	-12.0	-12.3	-12.2	-11.6	-11.1	-11.0	-11.6	-12.7	-13.8	-14.9	-16.0	-17.4	-18.9	-20.1	-21.8	-21.8	-13.3	-10.7
25-Feb	-23.9	-24.4	-26.0	-27.5	-29.3	-30.7	-31.8	-32.6	-30.8	-27.1	-21.3	-18.6	-16.2	-14.9	-13.5	-12.7	-14.1	-16.7	-20.2	-21.7	-23.7	-25.0	-26.2	-25.5	-23.1	-12.7
26-Feb	-26.9	-26.4	-28.2	-28.7	-29.1	-29.6	-30.3	-30.7	-29.2	-24.0	-20.2	-16.4	-12.6	-8.7	-7.9	-7.3	-7.7	-8.2	-9.1	-9.3	-9.8	-10.1	-10.5	-10.9	-18.0	-7.3
27-Feb	-11.0	-12.0	-13.2	-14.2	-16.3	-16.4	-16.2	-15.9	-15.1	-14.1	-12.9	-12.1	-10.8	-9.3	-8.4	-8.0	-7.8	-8.4	-8.5	-9.4	-12.0	-12.7	-13.0	-11.5	-12.0	-7.8
28-Feb	-10.8	-9.6	-8.6	-8.1	-7.6	-6.5	-6.8	-7.0	-6.8	-5.2	-3.7	-2.6	-2.2	-1.0	-1.3	-1.5	-1.5	-2.9	-4.0	-5.2	-6.4	-8.0	-9.1	-10.8	-5.7	-1.0
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	277	41.22	41.22
-20 - 0	392	58.33	99.55
0 - 10	3	0.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

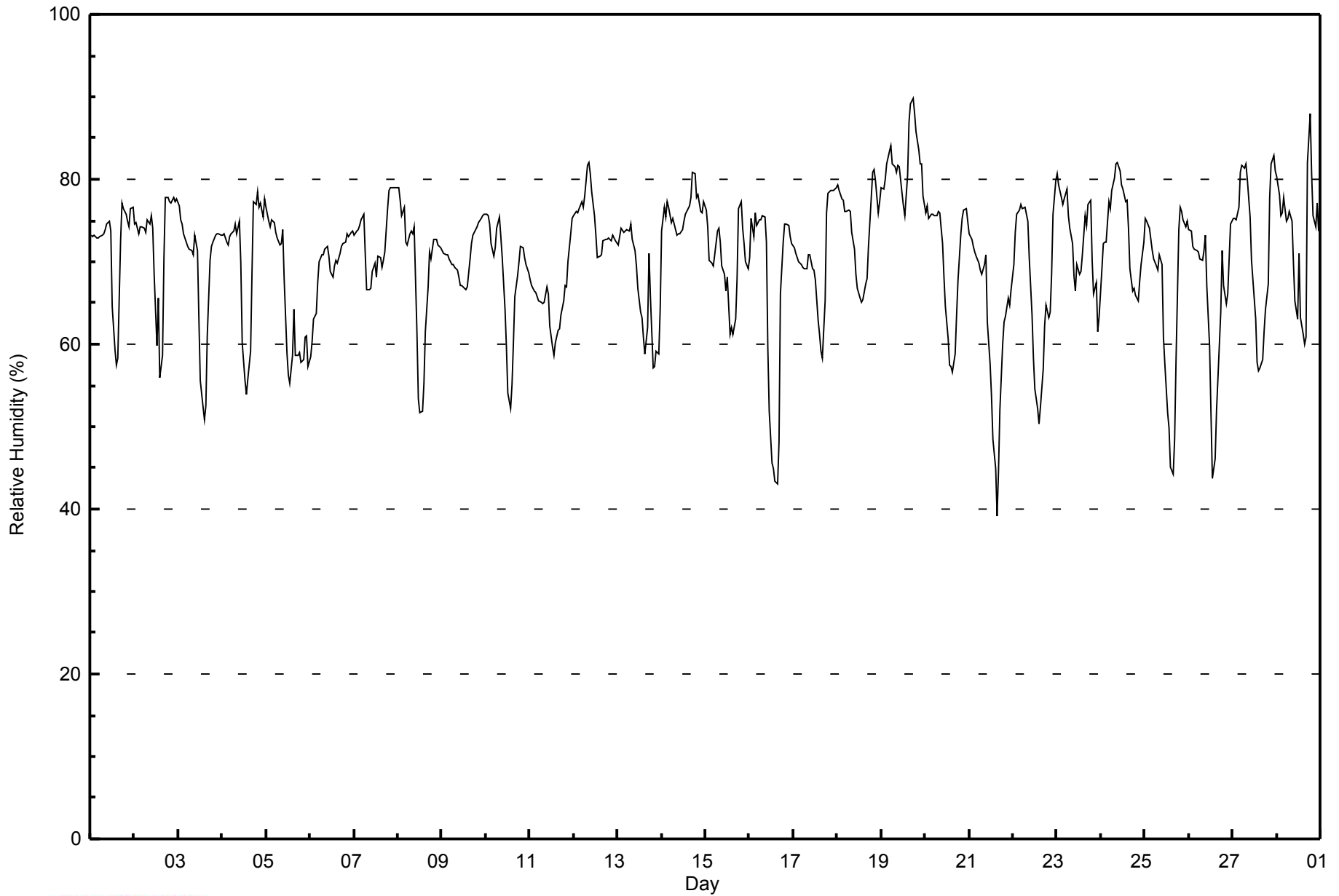


Maximum Value: 90 % on Feb 19 18:00														Maximum Daily Average: 82.1 % on Feb 19														Hours in Service: 672																					
Minimum Value: 39 % on Feb 21 16:00														Minimum Daily Average: 62.2 % on Feb 21														Hours of Data: 672																					
Maximum Diurnal Average: 74.2 % at hour 2														Minimum Diurnal Average: 60.3 % at hour 15														Hours of Missing Data: 0																					
Monthly Average: 70.3 %														Percentiles: P <sub>1</sub> = 45 P <sub>10</sub> = 59 Q <sub>1</sub> = 67 Median = 72 Q <sub>3</sub> = 76 P <sub>90</sub> = 78 P <sub>99</sub> = 84														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-Feb	73	73	73	73	73	73	73	73	74	75	75	74	65	59	57	58	73	77	76	76	75	74	76	77	71.9	77																							
2-Feb	75	75	73	74	74	74	74	75	75	76	74	68	60	66	56	59	70	78	78	77	77	78	77	78	72.5	78																							
3-Feb	77	75	75	73	72	72	72	71	71	73	71	63	56	52	51	53	61	70	72	72	73	73	73	73	68.5	77																							
4-Feb	73	73	72	72	73	73	74	75	73	75	70	60	56	54	56	59	69	77	77	78	77	77	75	78	70.7	78																							
5-Feb	77	75	74	75	75	74	73	72	72	74	68	59	56	55	59	64	59	59	59	58	58	61	61	57	65.5	77																							
6-Feb	58	60	63	64	67	70	71	71	72	72	71	69	68	69	70	70	71	72	72	72	73	73	74	74	69.4	74																							
7-Feb	73	74	74	74	75	76	71	67	67	67	69	70	68	71	70	69	70	71	76	79	79	79	79	79	72.8	79																							
8-Feb	79	77	76	77	72	72	73	74	73	74	61	53	52	52	55	61	67	71	70	73	73	73	72	72	68.9	79																							
9-Feb	71	71	71	71	70	70	70	69	69	68	67	67	67	67	67	70	72	73	74	74	75	75	76	76	70.8	76																							
10-Feb	76	76	74	72	71	72	74	75	73	71	64	60	54	52	55	60	66	68	70	72	72	71	70	69	68.1	76																							
11-Feb	68	67	67	66	66	65	65	65	65	67	66	62	60	59	60	62	62	64	65	67	67	70	73	75	65.5	75																							
12-Feb	76	76	76	76	77	77	78	82	82	81	79	76	73	70	71	71	73	73	73	73	73	73	73	73	75.1	82																							
13-Feb	72	73	74	74	74	74	74	75	73	71	69	67	64	63	61	59	62	71	66	57	57	59	59	64	67.1	75																							
14-Feb	74	77	75	77	77	75	75	75	73	73	73	74	75	76	76	77	78	81	81	78	78	76	76	77	76.1	81																							
15-Feb	76	74	70	70	69	71	74	74	72	69	69	66	68	61	62	61	63	68	76	77	74	72	70	69	69.9	77																							
16-Feb	71	75	73	76	74	75	75	76	75	72	59	52	46	45	43	43	48	66	72	75	75	74	73	72	66.1	76																							
17-Feb	72	71	70	70	70	69	69	69	71	71	69	69	68	63	61	59	58	65	76	78	79	79	79	79	70.2	79																							
18-Feb	79	79	78	78	76	76	76	76	73	71	69	67	66	65	65	67	68	72	78	81	81	80	76	77	73.9	81																							
19-Feb	79	79	80	82	83	84	82	81	81	82	82	78	77	76	81	87	89	90	88	86	83	82	82	78	82.1	90																							
20-Feb	76	77	75	76	76	76	76	76	76	72	68	65	61	57	57	57	59	63	68	73	75	76	76	75	70.2	77																							
21-Feb	73	73	72	71	71	70	69	68	70	71	63	58	54	48	45	39	45	52	60	63	63	66	65	67	62.2	73																							
22-Feb	70	74	76	76	77	76	77	76	75	71	64	58	55	52	50	52	57	62	65	63	64	69	76	80	67.2	80																							
23-Feb	81	79	78	77	78	79	76	74	72	68	66	70	68	69	71	76	74	77	77	70	66	67	62	63	72.4	81																							
24-Feb	69	72	72	72	77	76	79	80	82	82	81	79	79	77	77	74	69	66	67	66	65	68	70	72	73.9	82																							
25-Feb	75	75	74	73	71	70	70	69	71	70	61	58	52	50	45	44	48	58	74	77	76	75	74	75	66.0	77																							
26-Feb	74	74	72	72	71	71	70	70	71	73	67	60	52	44	46	52	56	64	71	67	65	66	70	75	65.6	75																							
27-Feb	75	75	75	77	81	82	81	82	80	75	70	68	63	58	57	57	58	62	64	67	78	82	83	81	72.1	83																							
28-Feb	80	78	76	76	78	75	75	76	75	70	65	63	71	63	61	60	61	82	88	81	76	74	77	74	73.1	88																							
																								74.0	74.2	73.5	73.7	73.9	73.8	73.7	73.8	73.4	72.7	68.9	65.4	62.5	60.5	60.3	61.5	64.5	69.7	72.6	72.5	72.4	72.9	73.1	73.5	Diurnal Average	
																								81	79	80	82	83	84	82	82	82	82	82	79	79	77	81	87	89	90	88	86	83	82	83	81	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





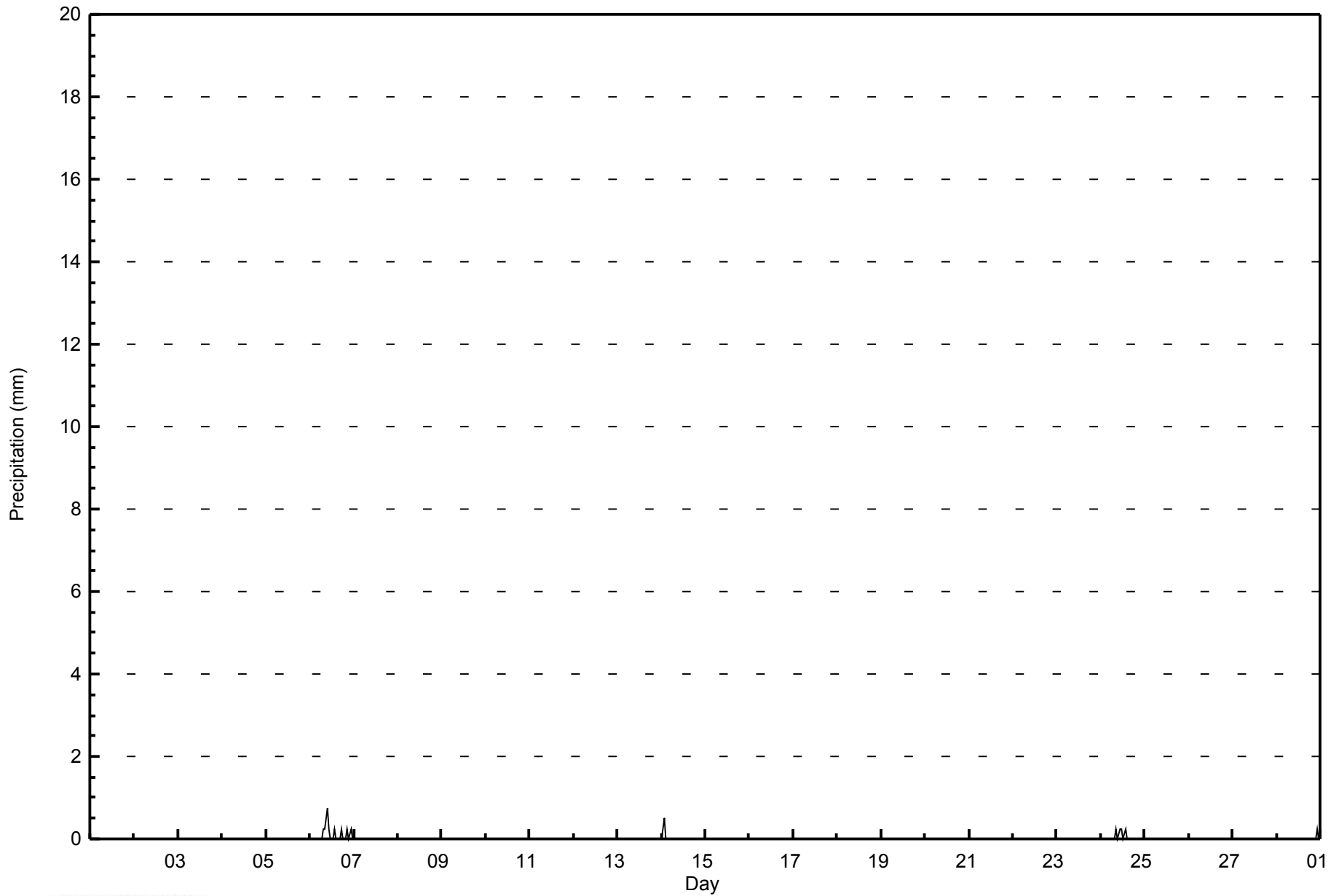
Maximum Value: 0.8 mm on Feb 6 10:00		Maximum Daily Total: 2.5 mm on Feb 6		Hours in Service: 672																								
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 671																								
Maximum Diurnal Total: 0.8 mm at hour 10		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 1																								
Monthly Total: 4.32 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> = 0.3		Hours of Calibration: 0																								
				Percent Operational Time: 99.9																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.8	0.3	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	2.5	0.8
7-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	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	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
15-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.3
25-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
		0.0	0.5	0.0	0.0	0.0	0.0	0.3	0.5	0.8	0.5	0.3	0.0	0.5	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.5	0.0	Diurnal Average			
		0.0	0.5	0.0	0.0	0.0	0.0	0.3	0.3	0.8	0.3	0.3	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.3	0.0	Diurnal Maximum			
M - Maintenance																												





Wood Buffalo Environmental Association  
Hourly Averages

Precipitation (PC) - mm  
Fort McKay - Bertha Ganter - February 20





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

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

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	669	99.70	99.70
0.4 - 0.5	1	0.15	99.85
0.6 - 0.7	0	0.00	99.85
0.8 - 1.4	1	0.15	100.00
1.5 - 10	0	0.00	100.00
> 10	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672

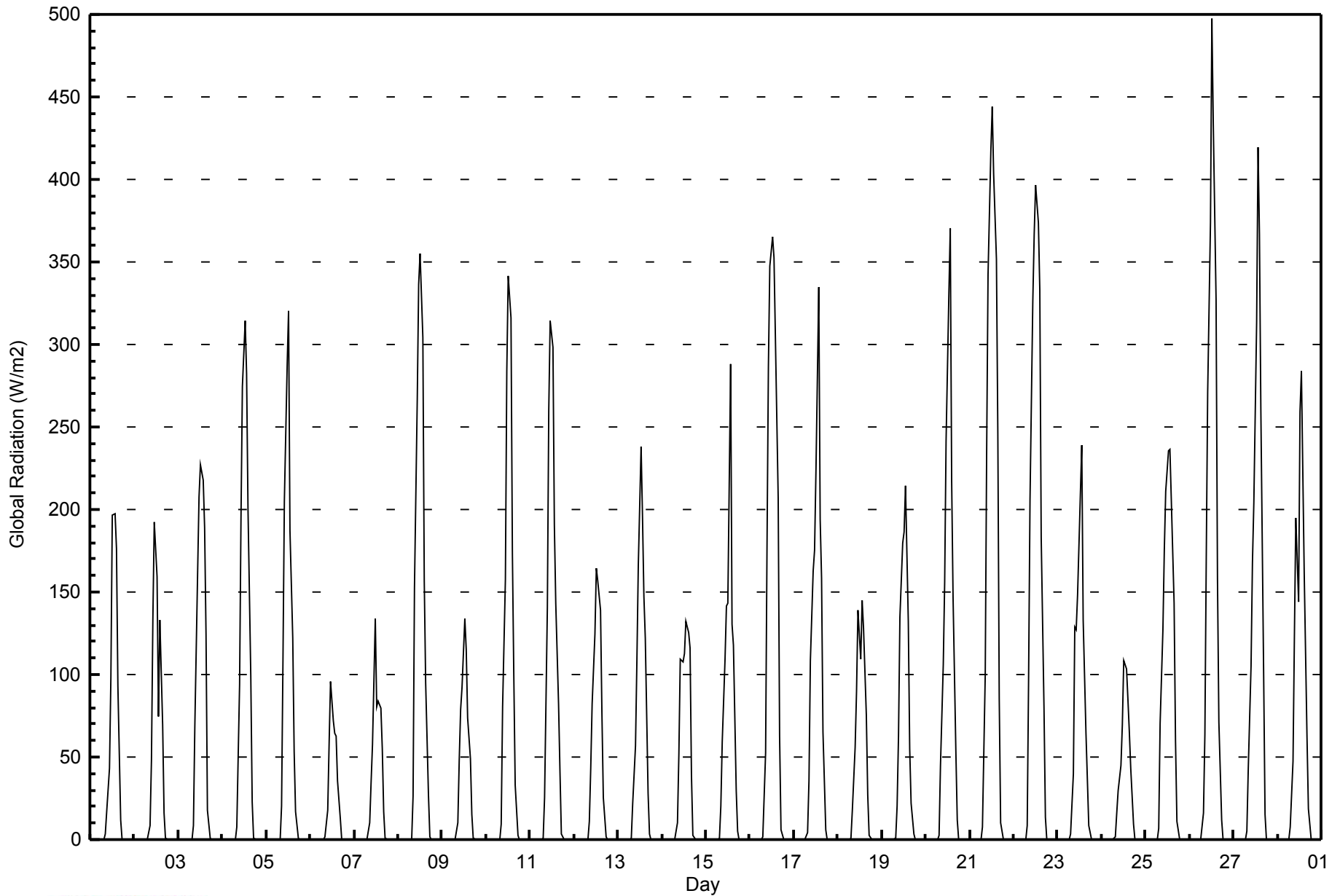


Maximum Value: 497 W/m2 on Feb 26 13:00		Maximum Daily Average: 110.0 W/m2 on Feb 21		Hours in Service: 672																						
Minimum Value: 0 W/m2 on Feb 1 01:00		Minimum Daily Average: 17.6 W/m2 on Feb 6		Hours of Data: 672																						
Maximum Diurnal Average: 244.2 W/m2 at hour 13		Minimum Diurnal Average: 0.0 W/m2 at hour 5		Hours of Missing Data: 0																						
Monthly Average: 55.0 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 78 P <sub>90</sub> = 196 P <sub>99</sub> = 395		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-Feb	0	0	0	0	0	0	0	0	4	17	43	98	197	198	176	93	12	0	0	0	0	0	0	0	35.0	198
2-Feb	0	0	0	0	0	0	0	0	9	48	133	192	159	74	133	69	16	1	0	0	0	0	0	0	34.8	192
3-Feb	0	0	0	0	0	0	0	0	8	69	162	208	227	218	189	124	18	1	0	0	0	0	0	0	51.0	227
4-Feb	0	0	0	0	0	0	0	0	8	94	195	275	315	282	201	99	23	1	0	0	0	0	0	0	62.2	315
5-Feb	0	0	0	0	0	0	0	0	21	109	205	287	321	187	122	53	17	0	0	0	0	0	0	0	55.1	321
6-Feb	0	0	0	0	0	0	0	0	2	18	58	96	72	64	62	36	12	0	0	0	0	0	0	0	17.6	96
7-Feb	0	0	0	0	0	0	0	0	10	34	57	134	81	84	80	55	17	1	0	0	0	0	0	0	23.1	134
8-Feb	0	0	0	0	0	0	0	0	26	153	267	336	355	304	156	95	27	2	0	0	0	0	0	0	71.8	355
9-Feb	0	0	0	0	0	0	0	0	10	48	79	92	134	115	73	49	15	1	0	0	0	0	0	0	25.7	134
10-Feb	0	0	0	0	0	0	0	0	10	80	158	284	342	316	174	100	33	3	0	0	0	0	0	0	62.5	342
11-Feb	0	0	0	0	0	0	0	1	26	141	260	315	298	191	144	82	41	3	0	0	0	0	0	0	62.6	315
12-Feb	0	0	0	0	0	0	0	0	11	43	82	125	164	157	139	76	25	2	0	0	0	0	0	0	34.4	164
13-Feb	0	0	0	0	0	0	0	1	22	56	108	167	238	195	148	122	28	3	0	0	0	0	0	0	45.4	238
14-Feb	0	0	0	0	0	0	0	0	10	52	109	108	113	132	126	116	39	3	0	0	0	0	0	0	33.6	132
15-Feb	0	0	0	0	0	0	0	1	20	59	109	142	143	288	131	118	30	5	0	0	0	0	0	0	43.6	288
16-Feb	0	0	0	0	0	0	0	2	52	177	287	348	365	353	304	207	63	6	0	0	0	0	0	0	90.1	365
17-Feb	0	0	0	0	0	0	0	4	36	109	163	176	224	335	194	158	66	6	0	0	0	0	0	0	61.3	335
18-Feb	0	0	0	0	0	0	0	1	18	56	90	139	110	145	128	75	27	2	0	0	0	0	0	0	33.0	145
19-Feb	0	0	0	0	0	0	0	1	20	63	135	179	187	214	133	55	22	3	0	0	0	0	0	0	42.2	214
20-Feb	0	0	0	0	0	0	0	3	45	106	156	242	331	370	217	147	54	12	0	0	0	0	0	0	70.0	370
21-Feb	0	0	0	0	0	0	0	7	100	234	342	417	444	404	352	245	85	10	0	0	0	0	0	0	110.0	444
22-Feb	0	0	0	0	0	0	0	8	99	206	326	367	397	374	333	183	80	13	0	0	0	0	0	0	99.4	397
23-Feb	0	0	0	0	0	0	0	3	40	129	127	149	209	239	133	64	36	9	0	0	0	0	0	0	47.5	239
24-Feb	0	0	0	0	0	0	0	2	16	30	45	70	108	103	85	65	43	9	0	0	0	0	0	0	24.0	108
25-Feb	0	0	0	0	0	0	0	6	70	127	175	211	236	236	206	144	60	11	0	0	0	0	0	0	61.8	236
26-Feb	0	0	0	0	0	0	0	16	63	172	271	373	497	434	327	159	72	12	0	0	0	0	0	0	99.9	497
27-Feb	0	0	0	0	0	0	0	5	42	105	168	204	313	419	367	261	101	16	0	0	0	0	0	0	83.4	419
28-Feb	0	0	0	0	0	0	0	8	48	124	195	144	259	284	162	112	62	19	0	0	0	0	0	0	59.1	284
		0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	30.3	95.0	161.0	209.9	244.2	239.9	178.3	113.0	40.2	5.5	0.1	0.0	0.0	0.0	0.0	0.0	Diurnal Average
		0	0	0	0	0	0	0	16	100	234	342	417	497	434	367	261	101	19	0	0	0	0	0	0	Diurnal Maximum



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	443	65.92	65.92
21 - 100	82	12.20	78.13
101 - 300	115	17.11	95.24
301 - 600	32	4.76	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

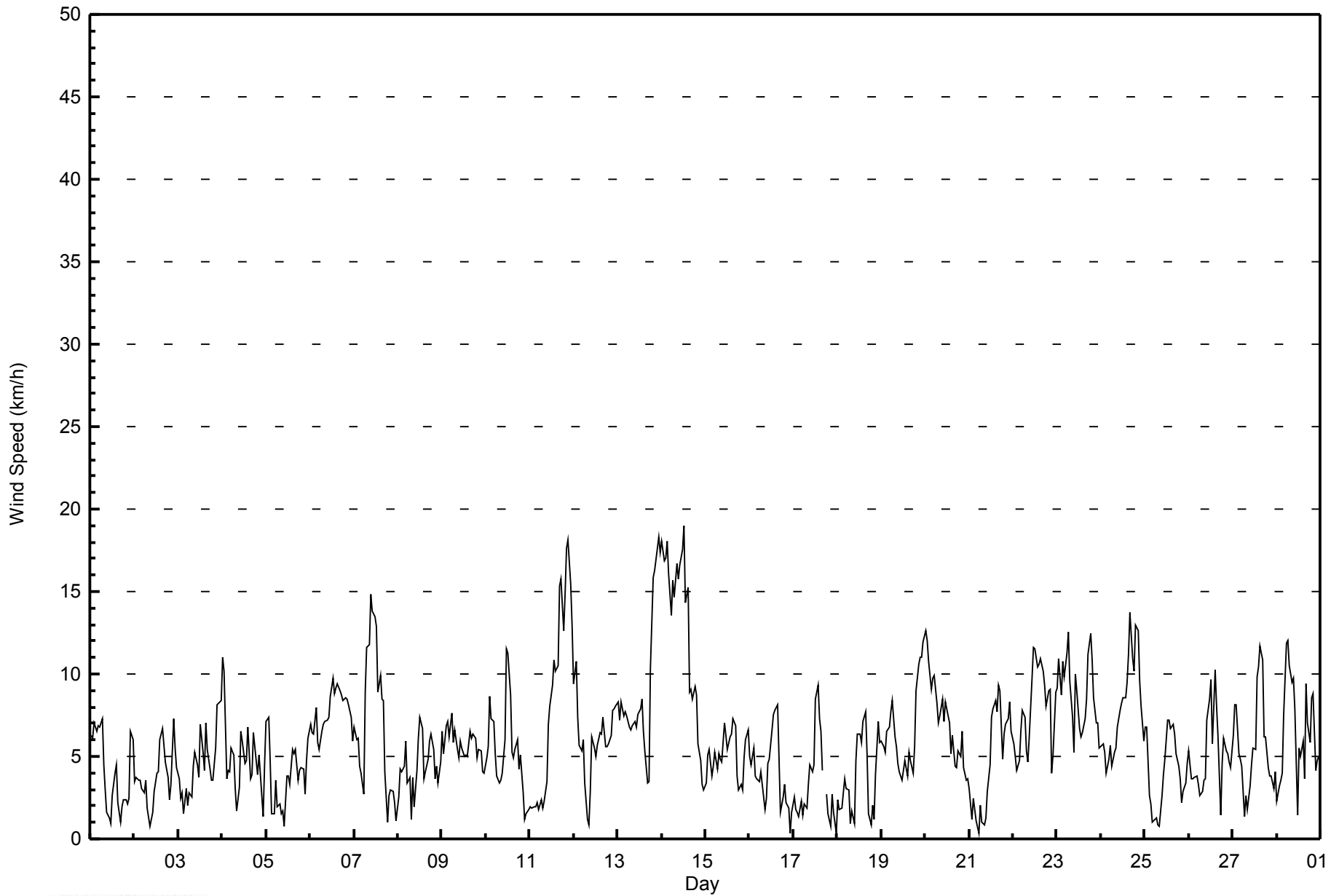


Maximum Speed: 19 km/h on Feb 14 13:00		Maximum Daily Speed Average: 9.2 km/h on Feb 14		Hours in Service: 672																							
Minimum Speed Value: 0 km/h on Feb 18 00:00		Minimum Daily Speed Average: 0.5 km/h on Feb 16		Hours of Data: 671																							
Maximum Diurnal Speed Average: 3.1 km/h at hour 13		Minimum Diurnal Speed Average: 0.4 km/h at hour 9		Hours of Missing Data: 1																							
Monthly Average Velocity: 0.4 km/h 69.0 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 5 Q <sub>3</sub> = 8 P <sub>90</sub> = 10 P <sub>99</sub> = 17		Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	SSW6	SSW6	SSW7	S7	SSW7	SSW7	SSW7	S5	S3	SSW2	E1	S1	SSE3	SSE4	E4	SE2	ESE1	WNW2	W2	WSW2	SW2	SSW2	WNW7	WNW6	SSW2.9	SSW7	
2-Feb	S4	SSW4	S4	SSW4	SSW3	SSW3	S4	SE2	NNW1	W1	SSW2	N3	E4	NW4	NW6	NNW7	NW6	NW5	WNW4	SW2	W3	WNW7	WNW6	N4	W1.7	WNW7	
3-Feb	NW4	NNW2	NNW3	NW2	NNW3	NW2	N3	NW3	NNW4	N5	NNE4	NE4	E7	ESE5	SE4	S7	S5	S4	S4	SSW4	SSW5	SSW8	SSW8	SSW8	S1.0	SSW8	
4-Feb	S11	S10	WSW4	SW4	SW4	SSW5	SSW5	WNW3	W2	SSW3	S7	SSE6	WNW5	NNW5	NE7	NNE4	N4	NW6	NNW5	N4	NNE5	N4	N1	NNW5	WSW1.0	S11	
5-Feb	NW7	NW7	NNW5	WNW1	WNW2	W4	WSW2	SSW2	SSW2	SSW2	SSW1	SSE4	SE4	ESE3	ENE5	ENE5	E5	NE4	ENE4	NE4	ENE4	ENE3	NNE5	NNE6	NE1.4	NW7	
6-Feb	NE7	NE6	NNE6	NE8	NNE6	NE5	NNE7	NNE7	NNE7	NNE7	NNE7	NNE9	NNE10	NNE9	NNE9	NNE9	NNE9	NNE9	NNE8	N9	N8	N8	N7	N6	NNE7.5	NNE10	
7-Feb	N7	N6	N6	N4	N4	ENE3	SSE9	SSE12	SSE12	SSE15	SSE14	SSE13	SSE13	SSE9	SSE10	SSE8	SSE8	SSE4	NW1	NNW3	N3	NNW3	NNW2	WSW1	SE3.9	SSE15	
8-Feb	N3	N4	NNE4	NNE4	NNE6	NE3	NNE4	W1	W4	WSW2	SSE4	SSE6	SSE7	SSE7	E4	ENE4	NNE5	N6	N6	N5	N4	N4	N3	N5	NNE2.0	SSE7	
9-Feb	N7	N5	N7	N7	N6	N8	N6	N7	N5	N5	N6	N5	NNE5	NNE5	NNE5	N7	N6	N6	N6	N5	N5	N5	N4	NNW4	N5.7	N8	
10-Feb	N5	N6	N9	NNE7	NNE7	N5	NW4	WNW3	NW4	N4	N6	NNW12	NW11	NNW9	ENE5	ENE5	NNE5	NNE6	NNE4	N5	NNE3	SW1	NNW2	NNW2	N4.6	NNW12	
11-Feb	WNW2	W2	WSW2	WSW2	SW2	SSW2	SW2	SW2	SW2	S3	S7	S8	S9	S11	S10	S11	S15	S16	S13	S15	S18	S18	S15	S13	S7.9	S18	
12-Feb	S9	S11	S7	S6	S5	S6	SSW3	SSW1	NE1	NNE3	N6	NE6	NE5	NE6	NE6	NE6	NE7	NNE6	NE6	NE6	NE6	NE8	NNE8	NNE8	ENE2.3	S11	
13-Feb	NNE8	NNE7	NNE8	NNE7	NNE8	NNE7	NNE7	NNE7	NNE7	NE7	NE7	NE8	NE8	N8	N6	NNW5	NNE3	E4	SSE10	SSE16	SSE16	SSE17	SSE18	SSE17	ENE3.7	SSE18	
14-Feb	SSE18	SSE17	SSE17	S18	S16	S14	S16	S15	S17	S16	S17	S18	S19	S14	S15	S9	S9	N8	N9	N9	NNE6	NNE5	NNE3	NNE3	S9.2	S19	
15-Feb	NE3	E5	E5	E4	ENE4	NE5	NE4	NNE5	NE5	NNE5	NNE7	NNE6	NNE5	ENE6	NNE5	NNE7	NE7	NNE4	N3	NNW3	N3	NNW3	N5	NNE6	NNE7	NE4.6	NNE7
16-Feb	N5	N4	NNE5	NNE4	N4	NW3	WNW4	WNW3	W2	SSE2	SSE5	SSE5	SSE7	SSE8	SSE8	SSE8	S5	NE2	NNW3	NW3	WNW2	W2	WSW0	SW2	S0.5	SSE8	
17-Feb	SW3	SW2	SW2	WSW1	SW2	WSW1	SW2	SW2	SSW3	S5	S4	SSE4	S8	S9	S7	S7	SSW4	MS	N3	NNW2	NW1	NNW3	NNW2	WSW0	SSW2.3	S9	
18-Feb	W2	N2	NW2	NNE3	N4	N3	N3	N1	SSE2	SE1	S5	S6	S6	SSW6	SSW7	S8	SSW5	SW2	NNW1	WNW2	WNW1	SSW4	SSW7	SSW6	SSW1.9	S8	
19-Feb	S6	S6	S5	SSW7	S7	SSW8	S8	S6	SSE6	S5	SSE4	SSE4	E4	NNE5	NNE4	N5	N5	N4	NNE6	NNE9	NNE11	NNE11	NNE11	NNE12	ENE1.1	NNE12	
20-Feb	NNE13	N12	N11	NNE9	N10	N10	NNE8	NNE7	NNE7	NNE8	NNE7	ENE8	ENE7	E7	ENE5	NNE6	NE4	NE4	NNE5	N5	N6	N4	NNW4	NW4	NNE6.6	NNE13	
21-Feb	NW3	N1	WNW2	NW2	NW1	WSW0	W2	W1	W1	SSE1	SSE3	SSE4	SSE7	SSE8	SSE8	S8	S9	S9	S5	S6	S7	S7	S8	S6	S3.7	S9	
22-Feb	S6	SSW5	SSW4	SSW5	SSW7	SSW8	SSW7	SSW5	S5	SSE6	S10	S12	S12	S10	S11	S11	S10	S9	S8	SSW9	SW9	W4	WNW5	NW9	SSW6.7	S12	
23-Feb	NW9	NNW11	WNW9	NNW11	WNW10	NNW11	NW13	NNW10	NW7	NW5	NNW10	NNE9	NNE7	NNE6	NE6	NE7	NNE8	NNE11	NNE12	NNE11	NE9	ENE7	NE7	NE5	N6.4	NW13	
24-Feb	NE6	NE6	NE5	ENE4	E5	ESE6	E4	NE5	NE6	NE7	NE8	NE8	NNE9	NNE9	NNE10	N11	N14	N11	N10	N13	N13	N10	N8	N6	NNE7.2	N14	
25-Feb	NNW7	NNW7	NNW3	NW2	W1	NNW1	NW1	NNW1	NW1	SSE3	SSE4	SSE5	SSE7	SSE7	SSE7	SSE7	S6	S5	SSW4	SSW4	SSW2	SSW3	SSW3	SSW5	S2.0	SSE7	
26-Feb	SSW5	SW4	SSW4	SSW4	SSW4	WSW3	SSW3	SSW3	S4	S4	S7	S8	SSE10	SSW6	S10	WSW8	SW6	NW1	N5	N6	N5	N5	N5	N4	SSW2.4	S10	
27-Feb	N6	NNE8	NNE8	NNE5	NNW5	N4	E1	WSW3	SSE2	S3	SSE4	SSE6	S5	S10	S10	S12	S11	S6	S6	S4	S4	SSW4	SSW3	W4	S2.2	S12	
28-Feb	WSW2	WSW3	WSW4	WSW4	WNW8	WNW12	WNW12	WNW10	WNW9	WNW10	NW8	WNW1	E6	E5	E6	NW4	NW9	N7	N6	N9	N9	N4	N5	N5	NW4.3	WNW12	
NNW0.9NNW0.8 N1.1NNW0.5 NW0.8WNW0.7WSW0.8 W0.7 W0.4 SE0.5 SE1.3 SE2.4 SE3.1 SE2.5 SE2.8 SE1.5 ESE0.6NNE1.5NNE1.8 N1.7NNE1.3 N0.8NNW0.8NNW1.2																								Diurnal Average			
SSE18 SSE17 SSE17 S18 S16 S14 S16 S15 S17 S16 S17 S18 S19 S14 S15 S12 S15 S16 S13 SSE16 S18 S18 SSE18 SSE17																								Diurnal Maximum			
MS - Missing																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	344	51.27	51.27
6 - 11	279	41.58	92.85
12 - 19	48	7.15	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: 671

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

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

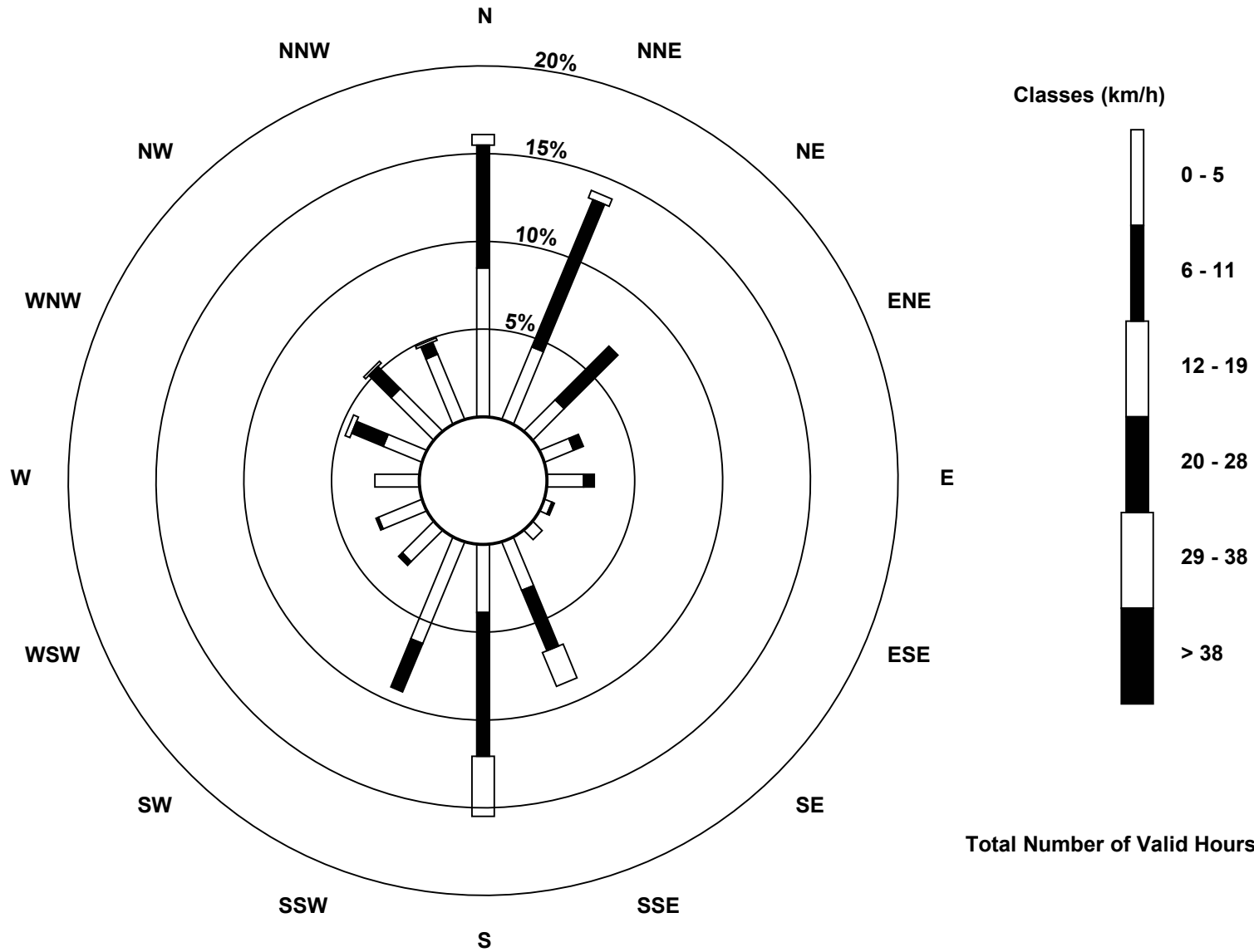
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	57	30	17	12	14	3	5	20	26	42	17	18	17	16	23	27	344
6 - 11	47	61	29	4	4	1	0	25	55	20	2	1	0	13	12	5	279
12 - 19	4	3	0	0	0	0	0	14	23	0	0	0	0	2	1	1	48
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	108	94	46	16	18	4	5	59	104	62	19	19	17	31	36	33	671

Total Number of Valid Hours: 671

Total Number of Hours: 672

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

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 km/h on Feb 13 19:00 Minimum Value: 0 km/h on Feb 7 20:00 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> = 3 P <sub>99</sub> = 5																	Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9										
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	3	3	3		
2-Feb	1	1	1	1	2	2	1	1	2	1	1	2	2	2	2	2	1	1	1	1	1	1	3	1	3		
3-Feb	2	1	1	1	1	1	1	1	2	1	2	2	2	2	1	2	1	1	1	1	1	2	2	2	2		
4-Feb	3	3	2	1	1	2	2	2	1	1	1	1	2	2	2	2	1	2	2	1	2	1	2	1	3		
5-Feb	2	1	3	2	1	1	1	1	1	1	2	1	1	1	2	2	2	2	2	2	2	1	2	3	3		
6-Feb	3	3	3	4	2	2	2	3	3	3	3	3	4	3	3	4	3	3	3	3	3	3	2	2	4		
7-Feb	2	2	2	1	1	1	3	3	3	3	3	3	3	2	2	2	2	2	1	0	1	1	1	1	3		
8-Feb	1	1	2	2	3	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	2	3		
9-Feb	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	2		
10-Feb	2	2	3	3	3	2	1	1	1	1	3	3	3	3	2	2	2	3	1	1	1	1	1	1	3		
11-Feb	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2	3	4	4	3	4	5	4	3	3	5		
12-Feb	2	2	2	1	1	1	1	1	1	2	3	2	2	2	3	3	3	2	3	2	3	4	3	4	4		
13-Feb	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2	2	1	1	5	4	4	4	4	5	5		
14-Feb	5	4	4	5	4	3	3	4	5	4	4	5	5	4	3	2	2	4	3	4	3	2	2	1	5		
15-Feb	1	2	2	2	2	2	2	2	2	2	3	3	2	2	3	3	3	2	1	1	1	2	3	2	3		
16-Feb	2	1	2	1	1	1	2	1	1	1	1	2	2	2	1	1	2	1	1	1	2	1	1	2	2		
17-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	MS	1	1	1	1	1	1	2		
18-Feb	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	1	1	1	1	2	2	1	2		
19-Feb	2	1	1	1	2	2	2	1	1	1	1	1	1	2	2	2	1	1	3	3	4	4	4	5	5		
20-Feb	5	4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	2	1	1	2	5		
21-Feb	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	2	2	2	2	2		
22-Feb	1	1	2	1	2	1	1	2	1	1	2	3	3	2	2	3	2	2	2	2	3	2	3	2	3		
23-Feb	2	3	2	3	2	3	3	2	2	3	3	4	3	3	3	3	3	5	5	5	4	3	3	2	5		
24-Feb	3	2	2	1	2	2	2	2	2	3	3	3	3	3	4	4	5	4	4	5	4	3	3	1	5		
25-Feb	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2		
26-Feb	1	2	1	1	1	1	1	1	1	1	2	3	2	2	2	3	2	1	1	2	2	1	1	1	3		
27-Feb	2	3	3	2	1	1	1	1	1	1	1	2	3	2	2	2	3	1	1	1	1	1	1	1	3		
28-Feb	1	1	1	1	3	4	3	3	3	3	2	2	2	2	2	4	3	4	4	3	3	2	2	1	4		
																	Diurnal Maximum										
MS - Missing																											

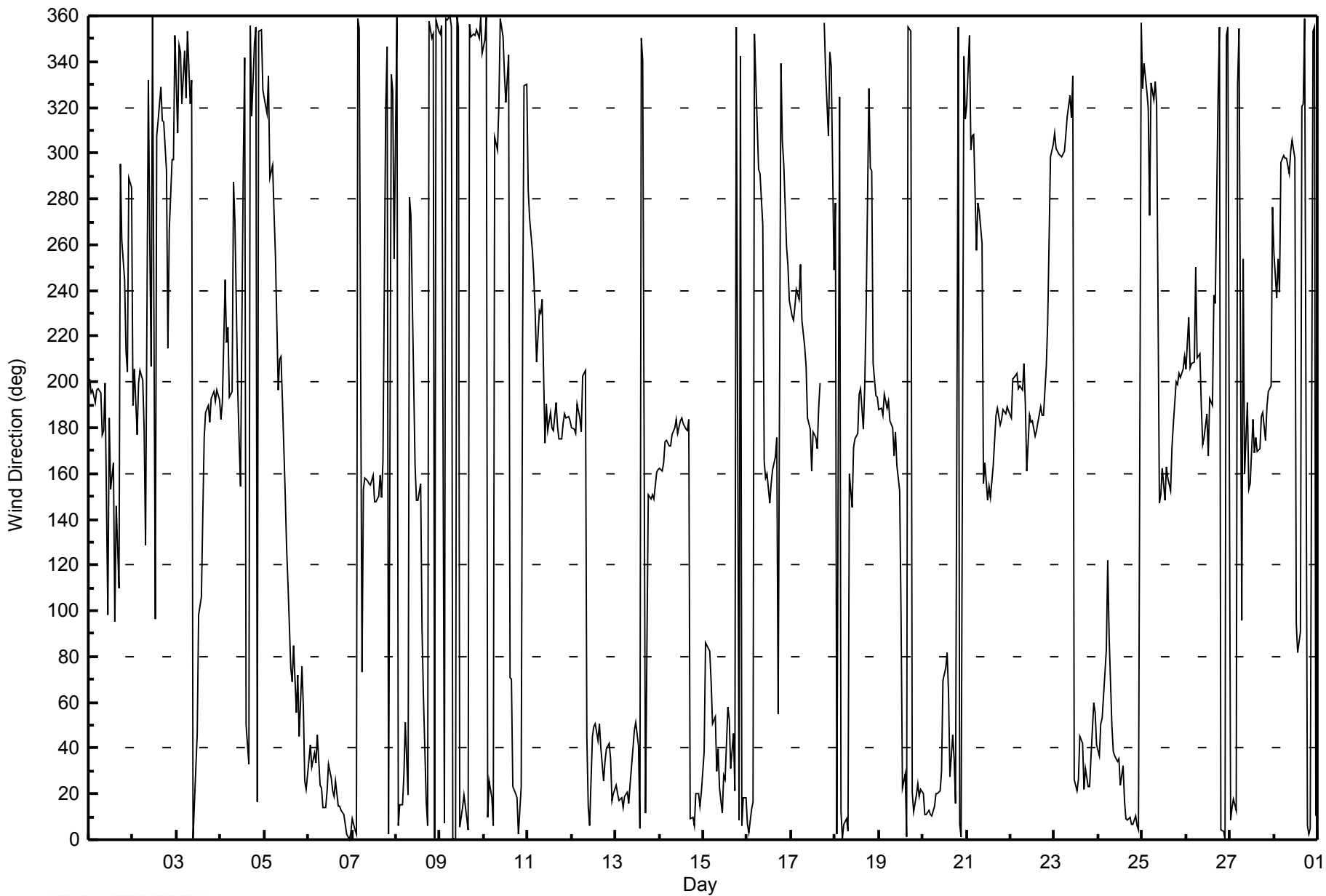


Direction of Maximum Speed: 184 deg on Feb 14 13:00																				Hours in Service: 672							
Direction of Maximum Daily Speed Average: 172.3 deg on Feb 14																				Hours of Data: 671							
Direction of Minimum Speed: 249 deg on Feb 18 00:00										Direction of Minimum Daily Speed Average: 0.5 deg on Feb 16										Hours of Missing Data: 1							
Monthly Average Direction: 269.4 deg																								Percent Operational Time: 99.9			
Day	Hourly Period Ending At (MST)																								Daily Average		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	201	195	197	191	197	197	196	177	179	200	98	184	153	165	95	146	110	296	262	245	214	204	289	285	200.1		
2-Feb	190	205	177	200	205	201	179	129	332	263	207	360	97	307	314	329	314	314	292	215	267	297	297	351	279.4		
3-Feb	309	347	344	321	345	324	353	321	332	0	31	46	98	106	142	176	187	190	183	193	196	192	196	192	181.3		
4-Feb	183	191	245	217	224	194	196	288	271	197	175	154	295	341	50	33	356	316	348	355	17	353	354	328	250.3		
5-Feb	324	318	334	289	295	274	256	196	210	211	192	151	127	112	75	69	85	55	72	45	75	58	26	22	40.1		
6-Feb	35	42	32	38	33	46	24	23	14	14	22	33	27	21	19	26	14	15	13	11	7	2	0	3	20.8		
7-Feb	9	4	2	359	355	73	153	158	157	155	155	160	148	148	150	159	150	165	321	347	3	335	327	254	144.7		
8-Feb	359	6	15	15	28	51	19	281	272	237	164	148	148	155	92	62	17	6	358	350	352	0	358	354	25.8		
9-Feb	352	356	8	359	358	360	355	1	0	360	355	6	14	20	15	4	356	351	352	351	354	350	360	344	359.2		
10-Feb	350	359	10	26	18	6	307	302	320	359	351	334	322	343	71	70	23	20	18	3	23	218	329	330	358.3		
11-Feb	284	271	257	247	230	209	231	230	236	173	190	179	186	180	179	191	181	175	175	182	186	184	185	183	186.7		
12-Feb	180	180	177	190	184	178	202	205	45	15	6	45	49	51	43	51	40	25	34	39	42	35	17	20	61.6		
13-Feb	24	20	17	18	14	19	21	16	24	40	47	51	41	5	350	340	12	83	151	149	151	149	160	162	75.5		
14-Feb	162	161	164	174	175	172	172	177	180	184	178	183	184	182	179	179	184	9	10	6	20	20	14	21	172.3		
15-Feb	38	86	85	83	69	50	54	30	39	23	12	28	26	58	53	31	47	22	355	9	343	6	19	19	36.9		
16-Feb	7	3	13	17	352	312	293	291	268	166	158	160	147	155	162	167	175	55	339	305	296	259	251	236	183.6		
17-Feb	229	227	233	240	236	251	227	215	207	184	180	161	178	176	171	189	200	MS	357	335	307	344	338	249	196.3		
18-Feb	279	2	324	12	1	7	9	4	160	145	171	175	178	194	197	180	199	232	328	294	292	208	194	193	197.7		
19-Feb	188	189	186	194	189	192	183	180	168	178	164	153	98	23	29	1	355	353	21	12	19	24	19	22	72.5		
20-Feb	20	11	11	13	11	10	14	20	20	21	30	69	75	82	64	27	46	35	16	355	7	1	342	315	22.9		
21-Feb	321	352	301	308	308	257	278	275	261	156	165	148	155	149	163	175	186	188	181	184	188	186	189	187	182.2		
22-Feb	184	201	202	204	197	198	196	208	190	161	186	183	183	176	179	183	189	185	185	207	226	262	298	304	196.1		
23-Feb	309	302	299	299	298	301	308	316	325	315	334	26	21	26	45	42	22	31	23	23	36	60	55	41	351.3		
24-Feb	37	51	53	63	83	122	89	49	39	37	34	35	24	32	17	9	9	10	7	7	11	6	4	357	25.1		
25-Feb	329	339	327	319	273	331	323	331	321	147	151	162	149	163	158	153	172	182	200	199	203	202	206	211	184.0		
26-Feb	206	228	206	208	209	250	211	212	190	172	175	186	168	193	190	238	234	324	355	5	4	0	352	355	213.1		
27-Feb	9	14	18	13	330	354	96	254	160	191	153	156	184	169	176	170	171	185	187	174	189	196	199	276	174.1		
28-Feb	256	237	254	239	296	299	298	298	291	301	306	297	94	82	91	320	321	359	6	2	5	353	355	11	322.0		
331.0	342.7	358.6	334.1	318.7	296.8	251.9	277.0	263.2	143.6	139.0	130.0	132.1	128.6	124.8	126.3	118.1	20.1	16.3	10.0	19.1	10.3	343.0	337.7				
Diurnal Average																											
MS - Missing																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



**WBEA**  
**Hourly Averages**

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





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																		Hours in Service: 672									
Maximum Value: 102 deg on Feb 16 23:00																		Hours of Data: 671									
Minimum Value: 9 deg on Feb 8 13:00																		Hours of Missing Data: 1									
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 14 Q <sub>1</sub> = 17 Median = 28 Q <sub>3</sub> = 39 P <sub>90</sub> = 50 P <sub>99</sub> = 86																		Hours of Calibration: 0									
Percent Operational Time: 99.9																											
Day	Hourly Period Ending At (MST)																								Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	12	11	14	16	17	15	18	22	22	38	52	71	41	23	36	29	62	29	68	41	33	41	30	38	71		
2-Feb	34	28	33	24	37	40	38	78	92	76	70	71	30	38	23	21	12	20	16	23	27	12	18	18	92		
3-Feb	58	48	33	48	25	35	19	27	32	22	43	66	19	37	45	18	15	16	21	15	13	15	15	16	66		
4-Feb	14	17	35	19	25	19	21	55	56	33	16	15	63	51	41	43	22	15	17	23	33	29	96	21	96		
5-Feb	15	13	63	65	59	23	64	34	20	39	90	17	37	44	36	40	25	45	36	46	35	45	42	36	90		
6-Feb	43	42	45	47	43	46	35	36	34	29	36	38	36	33	30	37	30	29	29	28	25	25	22	25	47		
7-Feb	26	21	20	22	15	51	16	14	13	15	14	15	14	18	16	19	12	21	62	16	18	22	24	57	62		
8-Feb	34	31	37	30	43	52	36	65	13	28	35	10	9	13	54	40	26	21	21	14	19	18	24	17	65		
9-Feb	20	23	24	23	24	22	25	26	29	32	28	33	33	35	33	30	28	22	24	27	24	21	37	24	37		
10-Feb	24	26	27	38	35	25	21	19	19	32	47	24	24	30	44	39	37	35	25	18	24	59	59	19	59		
11-Feb	58	29	52	37	24	36	27	38	28	29	17	20	19	15	17	16	17	15	15	15	16	15	16	15	58		
12-Feb	14	13	14	16	19	15	20	71	85	30	34	48	48	48	44	42	40	41	46	43	42	45	36	39	85		
13-Feb	41	41	34	34	32	35	40	33	38	47	46	42	41	31	35	25	31	30	20	13	12	15	15	15	47		
14-Feb	15	16	16	16	15	15	15	14	16	15	15	16	16	16	13	13	13	74	27	24	47	43	33	37	74		
15-Feb	53	34	33	31	43	48	48	38	42	43	35	42	51	45	44	41	42	40	28	23	32	26	35	32	53		
16-Feb	35	33	24	34	20	30	22	19	67	29	15	26	17	12	14	13	21	72	37	32	66	29	102	70	102		
17-Feb	33	43	72	49	30	29	30	36	22	18	23	16	17	17	15	17	24	MS	18	44	58	31	82	87	87		
18-Feb	39	25	37	30	25	28	33	70	37	86	23	16	17	21	26	16	17	51	26	25	38	39	14	13	86		
19-Feb	15	12	12	11	13	16	14	17	16	15	16	20	42	40	54	30	21	22	44	31	34	33	35	35	54		
20-Feb	33	30	31	35	32	32	33	37	33	37	39	36	36	47	62	37	47	55	28	16	20	17	34	16	62		
21-Feb	23	51	36	29	49	75	22	61	35	52	18	28	14	10	13	15	15	14	12	14	15	14	14	15	75		
22-Feb	15	16	20	17	19	13	15	16	22	9	17	16	17	19	15	15	17	12	15	17	27	62	40	12	62		
23-Feb	13	12	13	14	14	13	15	16	19	30	23	44	41	42	45	43	37	39	36	40	44	48	41	42	48		
24-Feb	39	42	41	34	22	18	38	42	40	43	41	43	35	39	36	30	29	30	29	30	31	28	24	20	43		
25-Feb	13	13	56	40	67	46	75	51	80	16	15	22	12	12	14	11	11	15	11	23	30	29	20	20	80		
26-Feb	12	27	19	19	18	19	23	23	24	23	20	19	14	41	16	41	32	80	17	24	23	24	19	21	80		
27-Feb	32	33	34	32	11	18	70	34	57	49	16	49	49	20	18	12	11	13	15	19	13	24	22	27	70		
28-Feb	39	27	45	30	27	18	18	17	20	18	21	86	27	59	31	89	27	31	34	23	25	32	26	21	89		
																		Diurnal Maximum									
																		58 51 72 65 67 75 75 78 92 86 90 86 63 59 62 89 62 80 68 46 66 62 102 87									
MS - Missing																											



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 7, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Other: <input type="checkbox"/> Repair		
Start Time (MST)	9:55	End Time (MST)	15:45
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
Old Cal Gas Conc	51 ppm	Old Cal Gas Exp Date	May 29th 2014
Old Gas Cert Ref	LL107923		
New cal gas conc	50 ppm	New cal gas exp date	Sep 26 2017
Ne cal gas Ref	SA140071A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403
DACS voltage range	0-5000 mv	DACS channel #	SE1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-689	-689
Analyzer Range (mv)	5000	5000	Lamp voltage	730	741
Calculated slope	1.001082	0.996174	Chamber temp.	42.0	43.0
Calculated intercept	0.510899	0.884922	Pressure (mmHg)	746.0	746.0
Analyzer Background	39.9	42.8	Flow (lpm)	0.500	0.500
Analyzer Coefficient	0.760	0.802	Intensity	359xx	356xx

Analyzer make Thermo 43C Analyzer serial # 509110888

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.0	-0.1	NA
as found span	5500	81.5	755.7	750.0	1.008
calibrator zero	5500	0.0	0.0	-0.1	NA
high point	5500	78.1	710.0	712.4	0.997
second point	5500	43.8	398.2	398.2	1.000
third point	5500	21.9	199.1	198.2	1.004
as left zero	5500	0.0	0.0	0.1	NA
as left span	5500	78.1	710.0	720.3	0.986
Average Correction Factor					1.000

Corrected As found 750.1 Previous response 754.4 % change 0.6%

#### Notes:

Calibration cylinder changed after as founds. Span adjusted after cylinder change.

Calibration Performed By:

Zack Eastman



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

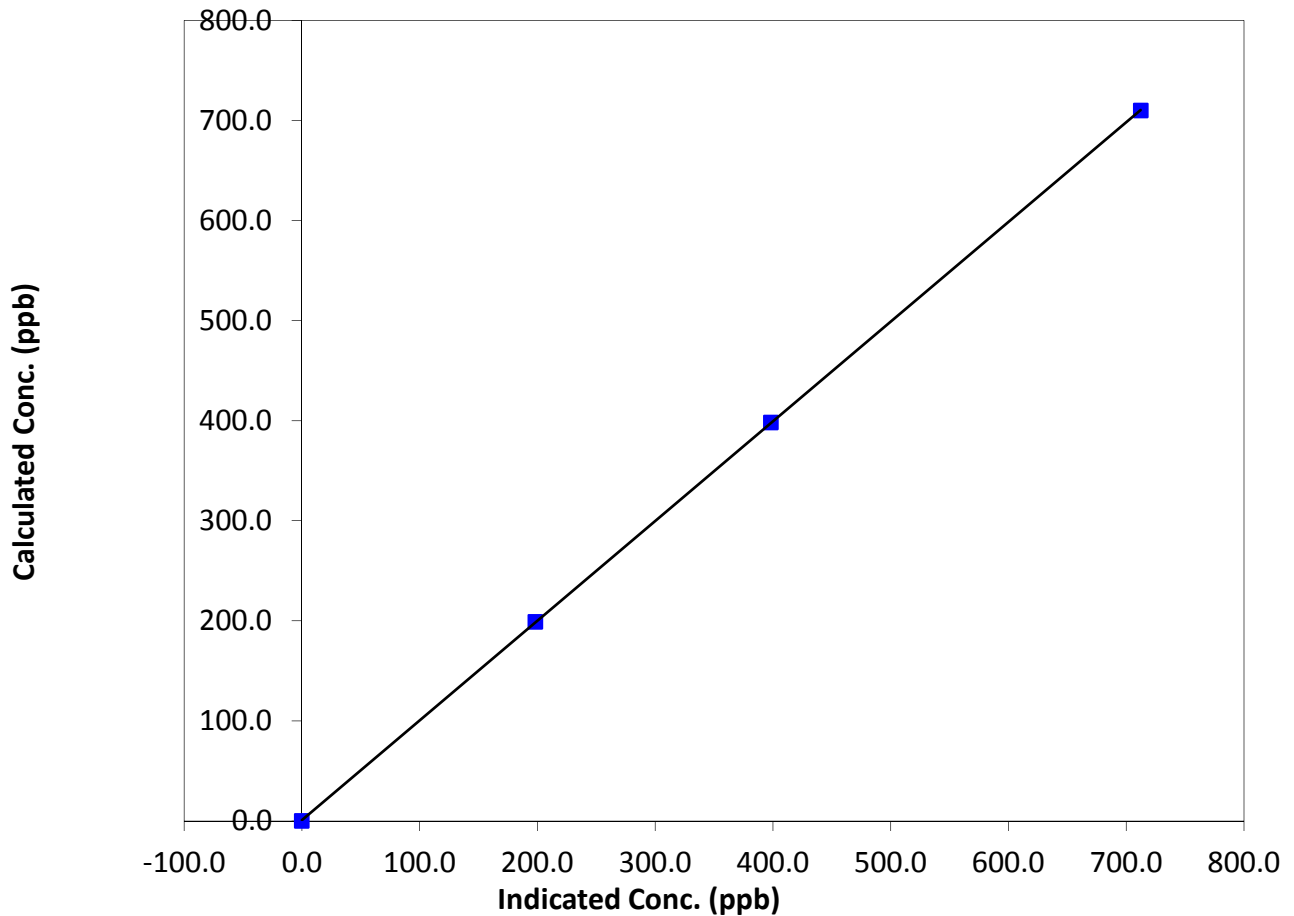
### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 7, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	15:45
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	-0.1	N/A	Correlation Coefficient	0.999993
710.0	712.4	0.9966		
398.2	398.2	1.0000	Slope	0.996174
199.1	198.2	1.0045		
			Intercept	0.884922

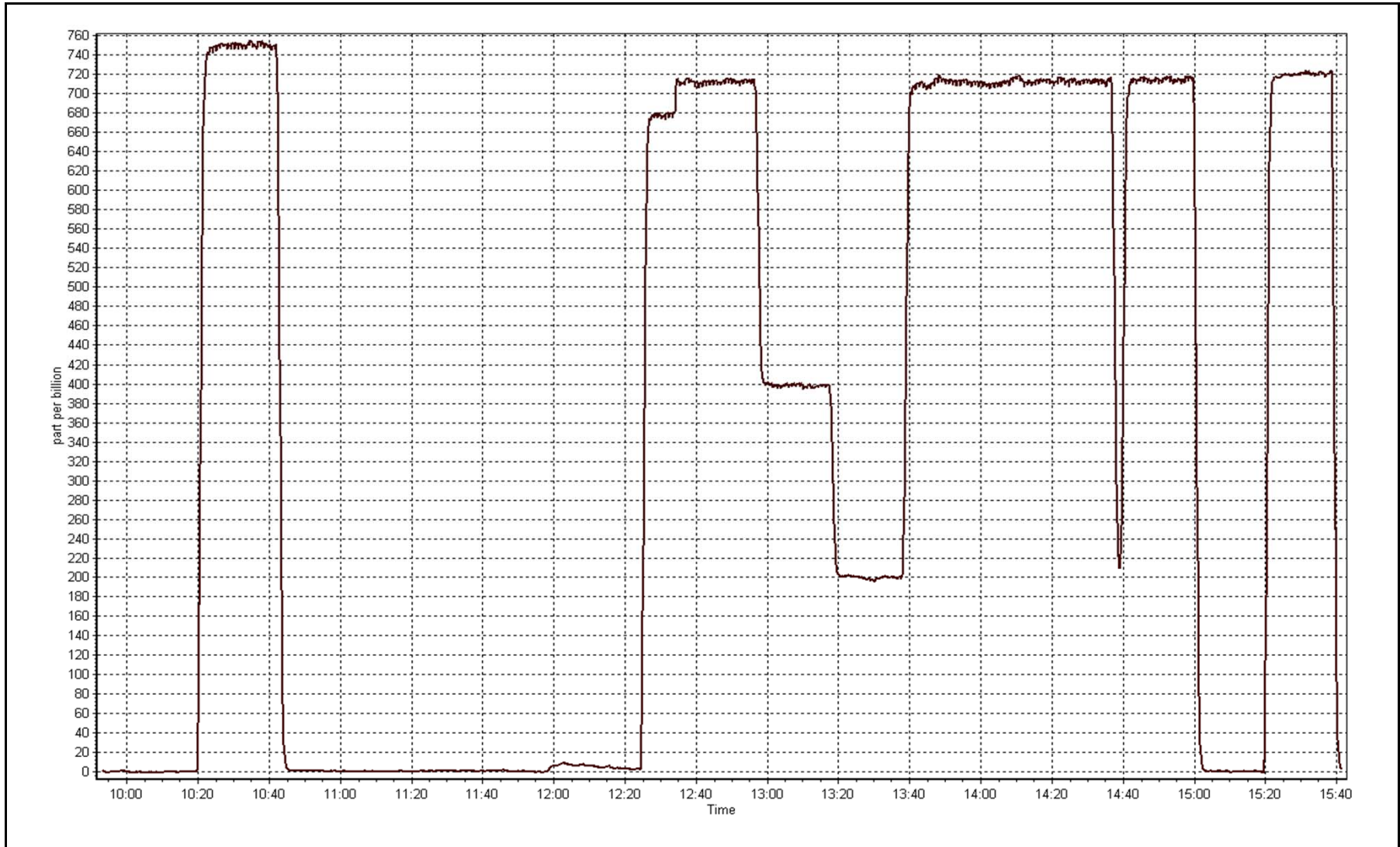
**SO<sub>2</sub> Calibration Curve**





SO2 Calibration Plot

Date: February 5, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 9, 2015	Previous Calibration	January 8, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	11:45	End Time (MST)	15:35
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	1730512
Cal Gas Concentration	10.6 ppm H2S	Cal Gas Expiry Date	Dec 21 2012
Gas Cert Reference	LL27480	SO2 gas conc.	50.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	5000	DACS channel #	digital

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-859	-859
Analyzer Range (input)	100	100	Lamp voltage	1169	1169
Calculated slope	1.000977	0.999917	Chamber temp.	45	45
Calculated intercept	0.082284	0.060480	Pressure	678	678
Analyzer Background	1.59	1.63	Flow	0.419	0.419
Analyzer Coefficient	0.976	0.976	Intensity	80	80
			Converter temp.	800	800

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

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6500	0.0	0.00	0.00	NA
as found span	6500	46.0	75.0	74.9	1.001
SO2 scrubber check	5500	21.9	199.1	0.59	NA
calibrator zero	6500	0.0	0.00	0.04	NA
high point	6500	46.0	75.0	75.0	1.000
second point	6500	24.6	40.1	40.0	1.004
third point	6500	12.3	20.1	19.9	1.007
as left zero	6500	0.0	0.0	0.04	NA
as left span	6500	46.0	75.0	75.2	0.998
Average Correction Factor					1.003

Corrected As found	74.9	Previous response	74.9	% change	-0.1%
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#### Notes:

zero adjusted after inlet filter changed, span did not require an adjustment. Sox scrubber test performed after as found zero, before span. Scrubber efficiency calculated at 99.7%

Calibration Performed By:

Zack Eastman



# Wood Buffalo Environmental Association

## TRS Calibration Summary

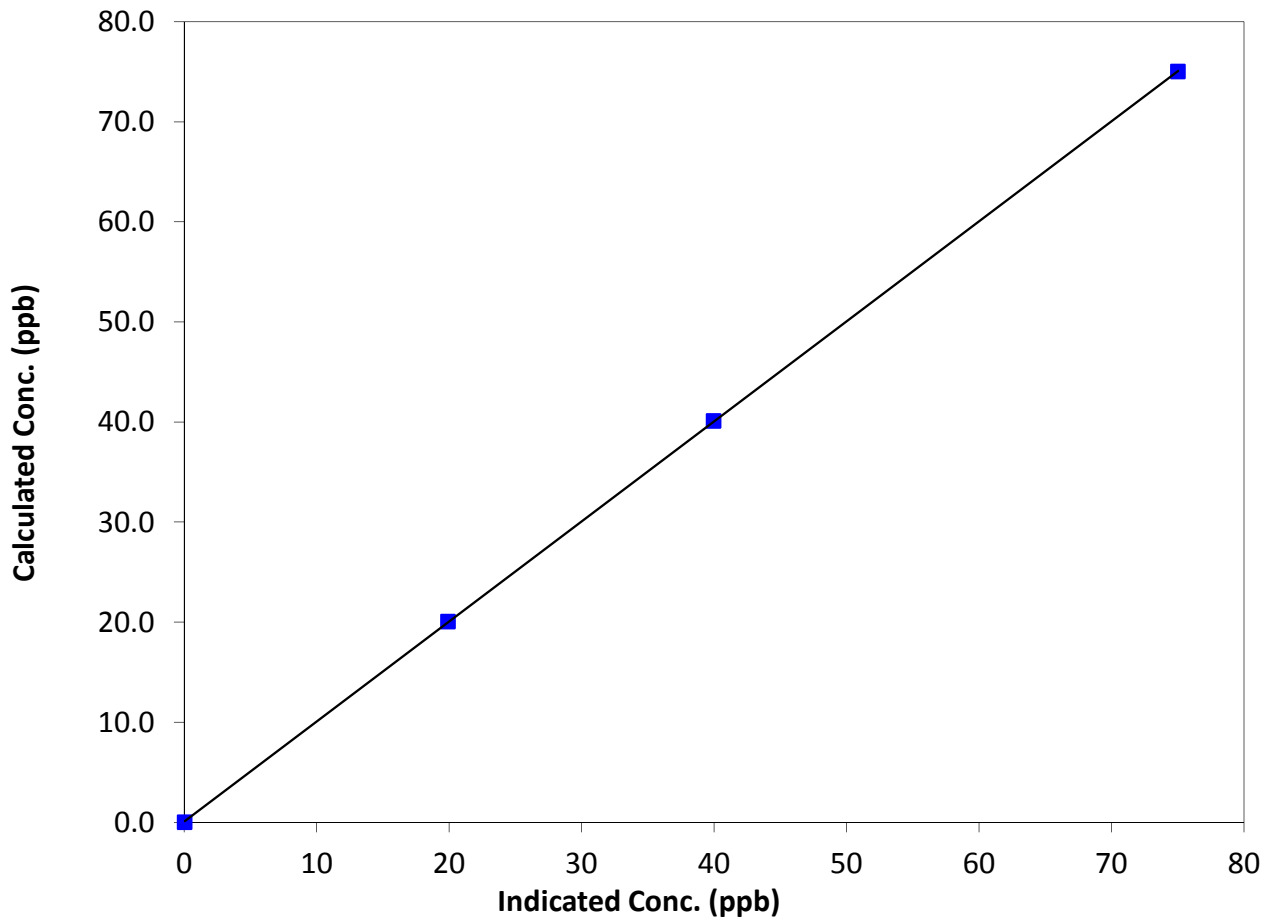
### Station Information

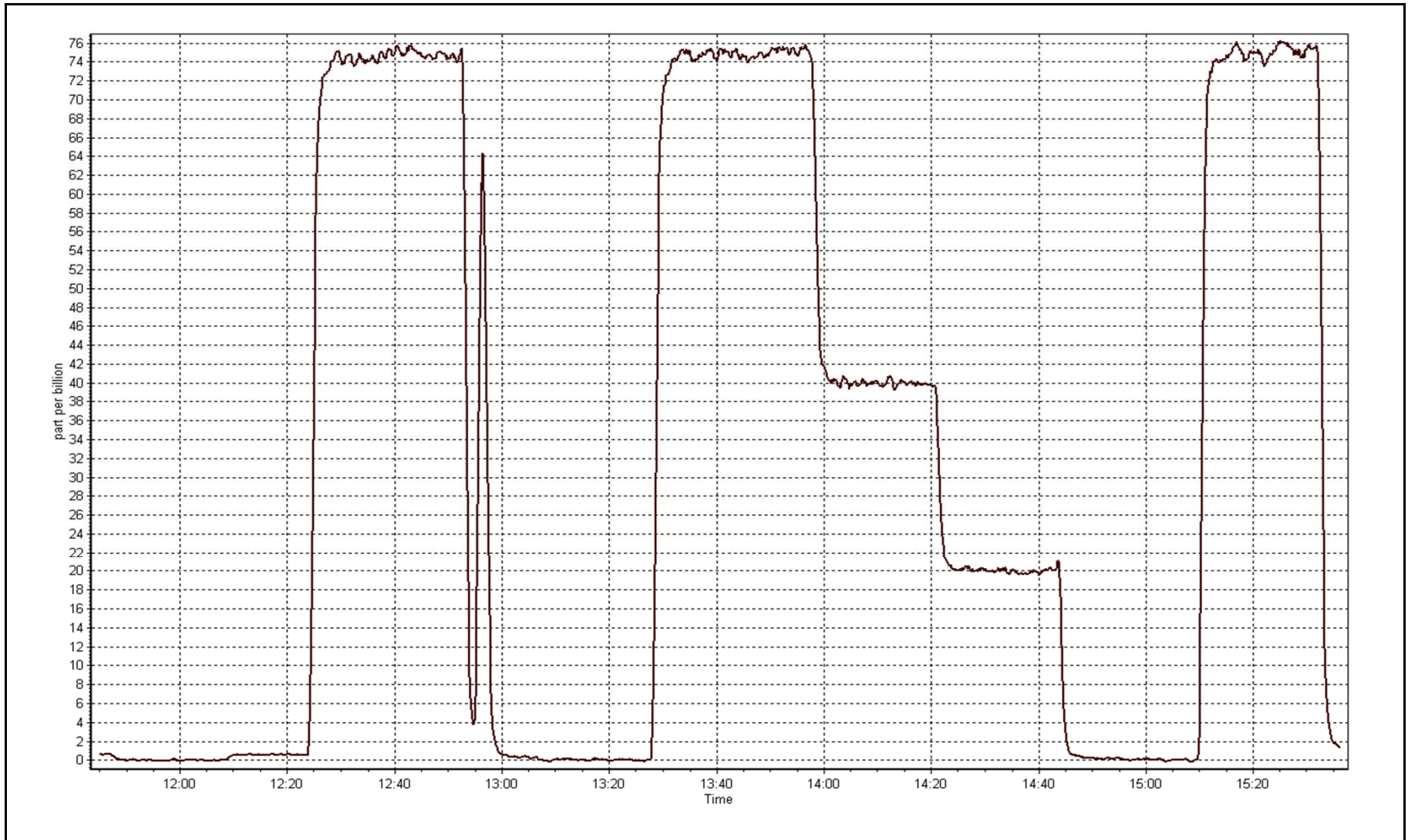
Calibration Date	February 9, 2015	Previous Calibration	January 8, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	11:45	End Time (MST)	15:35
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153461

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999990
75.0	75.0	0.9998		
40.1	40.0	1.0037	Slope	0.999917
20.1	19.9	1.0070		
			Intercept	0.060480

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Thursday, February 05, 2015	Prev Calibration	Wednesday, January 07, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	15:45
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	1730512
Old Gas Cert Ref	LL107923	Old Cal Gas Exp Date	May 29th 2014
Old CH4 Cal Gas Conc.	510.0 ppm	Old CH4 Equiv Conc.	1076.5 ppm
Old C3H8 Cal Gas Conc.	206.0 ppm	New cal gas exp date	Sep 26 2017
New gas cert ref	SA140071A		
New CH4 Cal gas conc	499.0	New CH4 equiv conc	1054.5 ppm
New C3H8 Cal gas conc	202.0		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2403

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	35.0	35.0
THC Range (input)	50	50	Flame Temp	401.0	401.0
NMHC Range (ppm)	50	50	Carrier Pressure	40.0	40.0
NMHC Range (input)	50	50	Fuel Pressure	42.0	42.0
THC Calc slope	1.001827	0.979056	Air Pressure	32.0	32.0
THC Calc intercept	0.021426	0.039206	Det Temp	175.0	175.0
NMHC Calc slope	1.003334	0.980125	Filter Temp	175.0	175.0
NMHC Calc intercept	-0.002846	0.016740	Column Temp	74.0	74.0

Analyzer make Thermo 55i Analyzer serial # 1331259520

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.0	0.00	0.00	N/A
as found span	5500	81.5	15.95	15.80	1.010
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	78.1	14.97	15.28	0.980
second point	5500	43.8	8.40	8.51	0.987
third point	5500	21.9	4.20	4.21	0.997
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	78.1	14.97	15.34	0.976
Average Correction Factor					0.988

Corrected As found 15.80 Previous response 15.90 % change 0.6%

**Notes:**

Calibration cylinder changed after as founds, span adjusted after cylinder change.

Calibration Performed By: Zack Eastman



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	8.39	8.26	1.016
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	78.1	7.89	8.04	0.981
second point	5500	43.8	4.42	4.49	0.985
third point	5500	21.9	2.21	2.22	0.996
calibrator zero					
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	78.1	7.89	8.08	0.976
Average Correction Factor					0.988

Corrected As found      8.26      Previous response      8.37      % change      1.3%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0	0.00	0.00	N/A
as found span	5500	81.5	7.56	7.53	1.004
calibrator zero	5500	0.0	0.00	0.00	N/A
high point	5500	78.1	7.09	7.24	0.979
second point	5500	43.8	3.97	4.01	0.991
third point	5500	21.9	1.99	1.99	0.998
calibrator zero					
as left zero	5500	0.0	0.00	0.00	N/A
as left span	5500	78.1	7.09	7.26	0.976
Average Correction Factor					

Corrected As found      7.53      Previous response      7.53      % change      0.0%



# Wood Buffalo Environmental Association

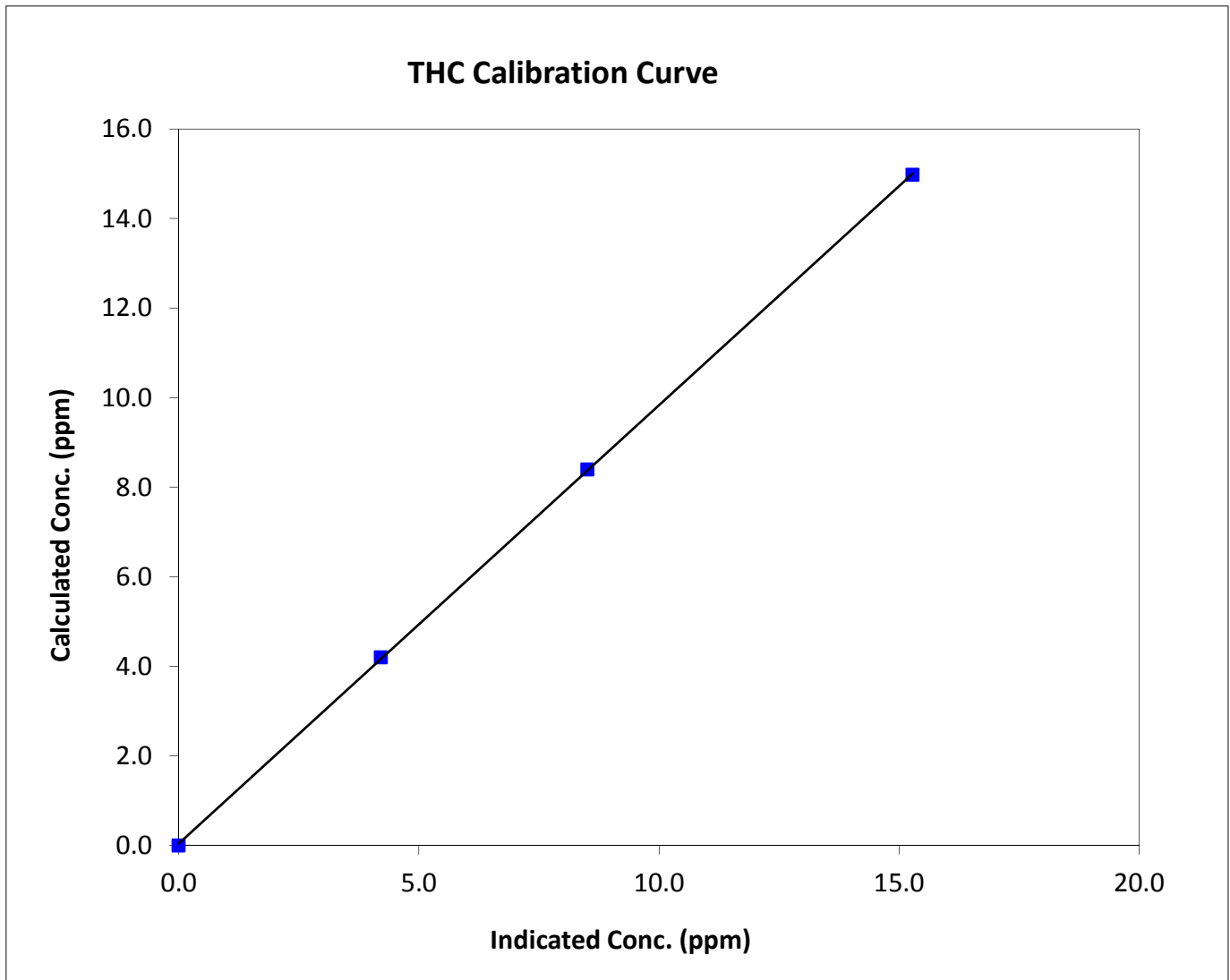
## THC Calibration Summary

### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 7, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	15:45
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	N/A	Correlation Coefficient	0.999965
14.97	15.28	0.9800		
8.40	8.51	0.9868	Slope	0.979056
4.20	4.21	0.9973		
			Intercept	0.039206





# Wood Buffalo Environmental Association

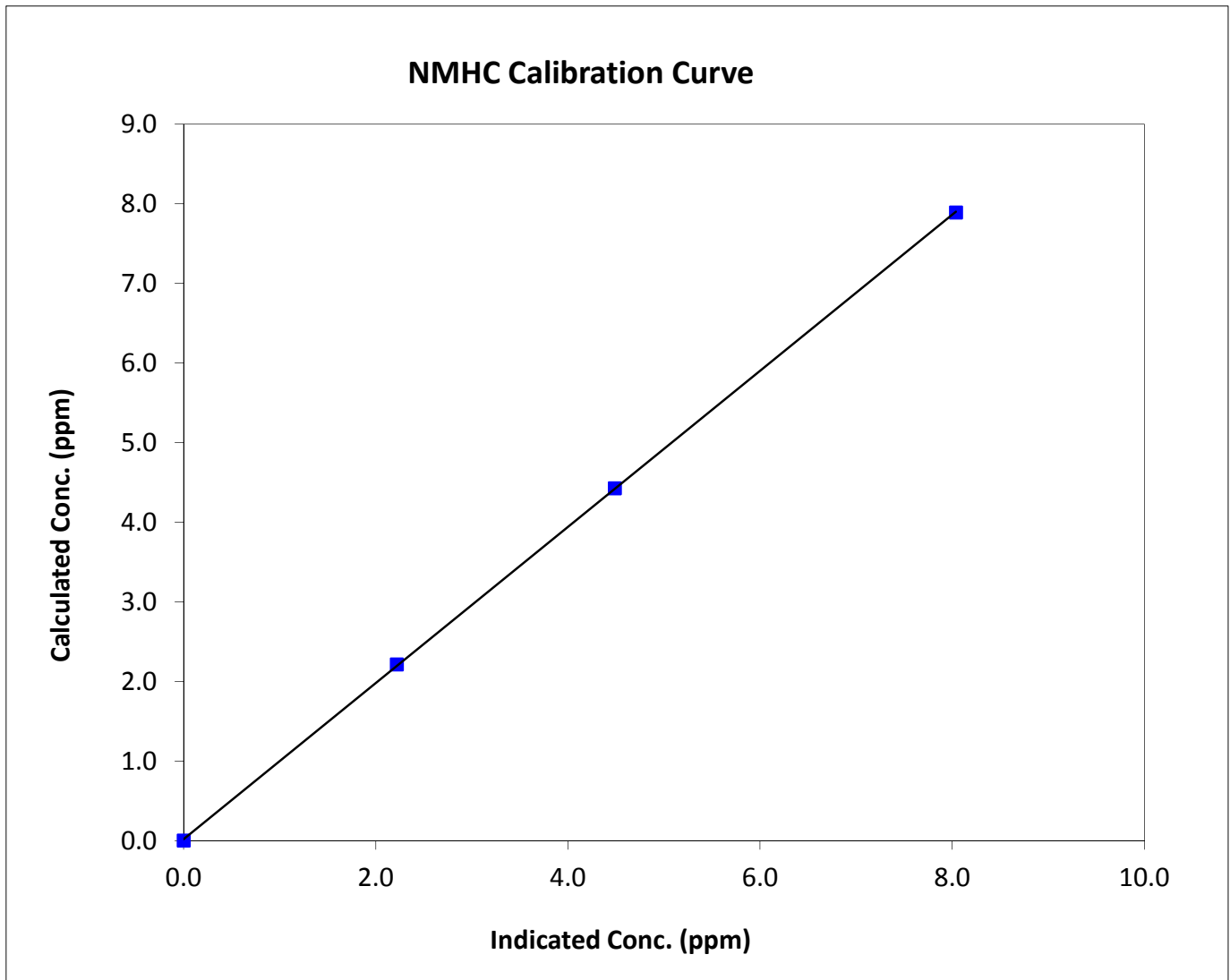
## NMHC Calibration Summary

### Station Information

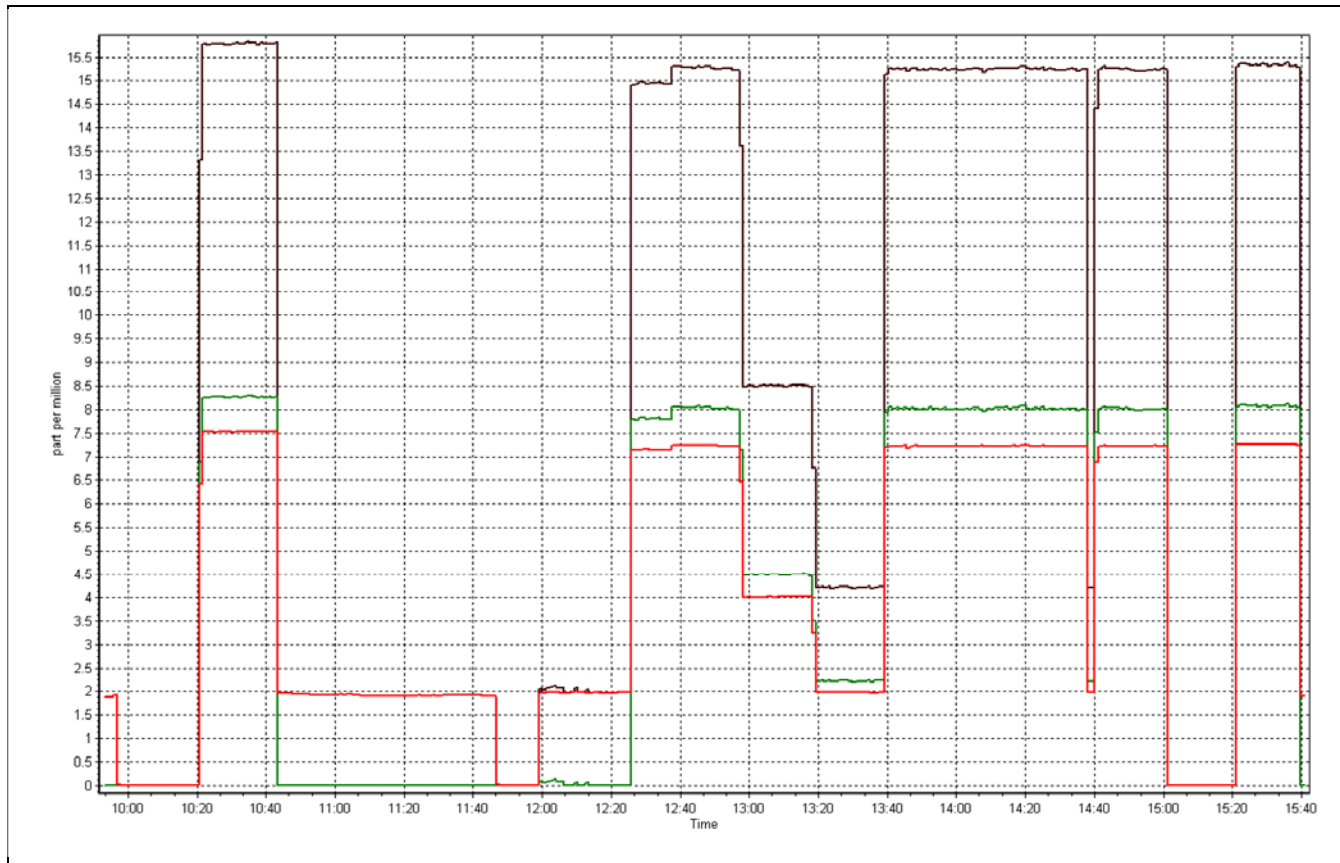
Calibration Date	February 5, 2015	Previous Calibration	January 7, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	15:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259520

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999977
7.89	8.04	0.9811		
4.42	4.49	0.9853	Slope	0.980125
2.21	2.22	0.9964		
			Intercept	0.016740









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	13:45	End Time (MST)	16:03
Barometric Pressure	N/A mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1730512
NO2 calibration used	Friday, January 09, 2015	Transfer Standard	na
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	5000	DACS channel #	Digital

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	24.0	24.0
Analyzer Range (input)	500	500	Lamp temp.	53.0	53.0
Calculated slope	0.994676	0.991621	Pressure	684.0	684.0
Calculated intercept	-0.018150	0.159105	Flow cell A	0.734	0.734
Analyzer Background	-0.3	-0.3	Flow cell B	0.737	0.737
Analyzer Coefficient	1.010	1.010	Cell A Intensity	84xxx	84xxx
			Cell B Intensity	79xxx	79xxx

Analyzer make Thermo 49i Analyzer serial # 1300156233

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5500	0.00	0.0	-0.4	N/A
as found span	5000	1.10	401.0	404.0	0.993
calibrator zero	5500	0.00	0.0	-0.4	N/A
high point	5000	1.10	401.0	404.0	0.993
second point	5000	0.60	207.0	209.0	0.990
third point	5000	0.35	107.0	107.8	0.993
calibrator zero					
as left zero	N/A	0.00	0.0	0.0	NA
as left span	N/A	1.10	401.0	407.0	0.985
Average Correction Factor					0.992

Corrected As found 404.4 Previous response 403.2 % change -0.3%  
Average Correction

#### Notes:

O3 referenced to January calibration due to unknown changes by February NOX calibration cylinder replacement. No adjustments performed.

Calibration Performed By: Zack Eastman



# Wood Buffalo Environmental Association

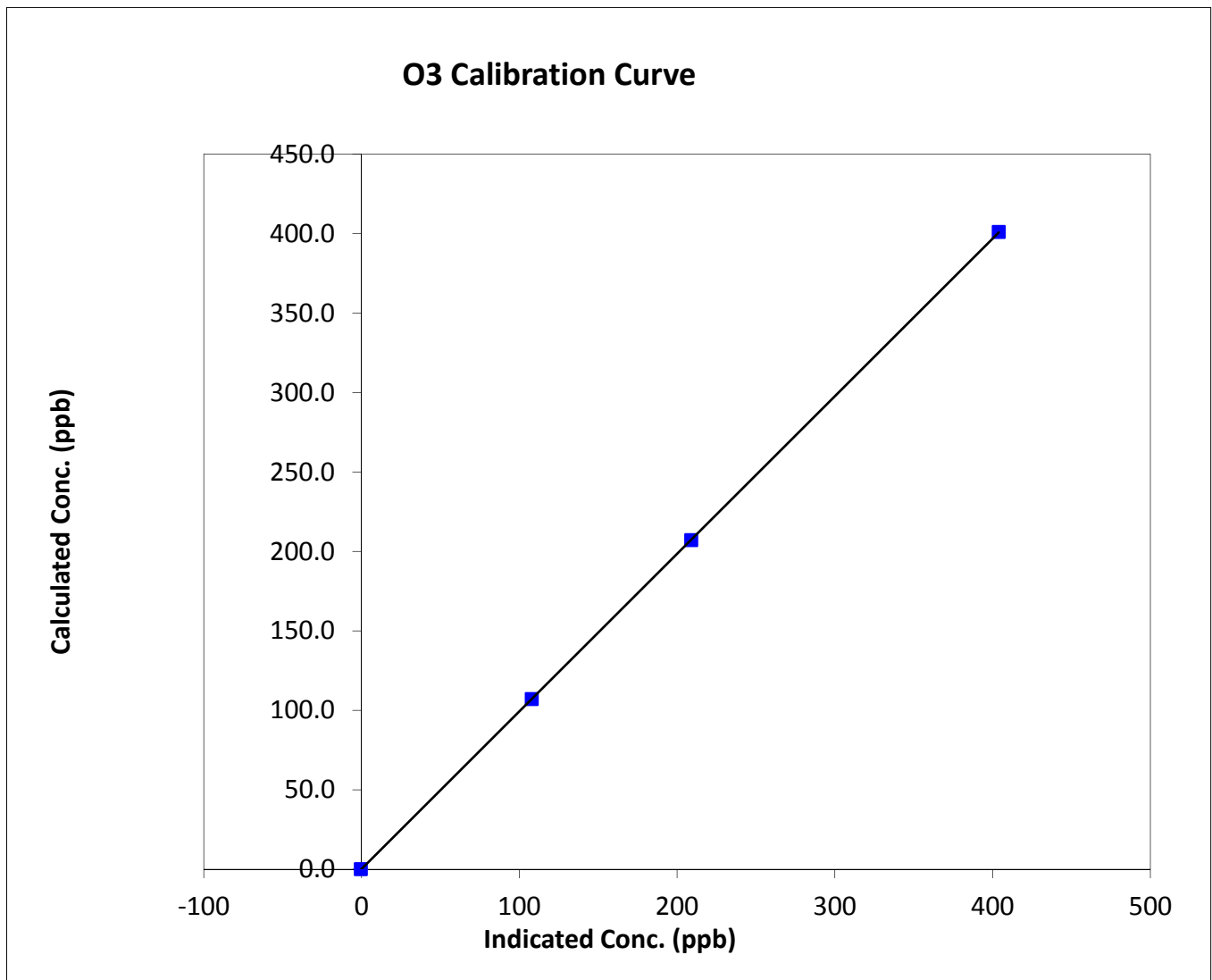
## O<sub>3</sub> Calibration Summary

### Station Information

Calibration Date	Friday, February 06, 2015	Previous Calibration	January 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	13:45	End Time (MST)	16:03
Analyzer make	Thermo 49i	Analyzer serial #	1300156233

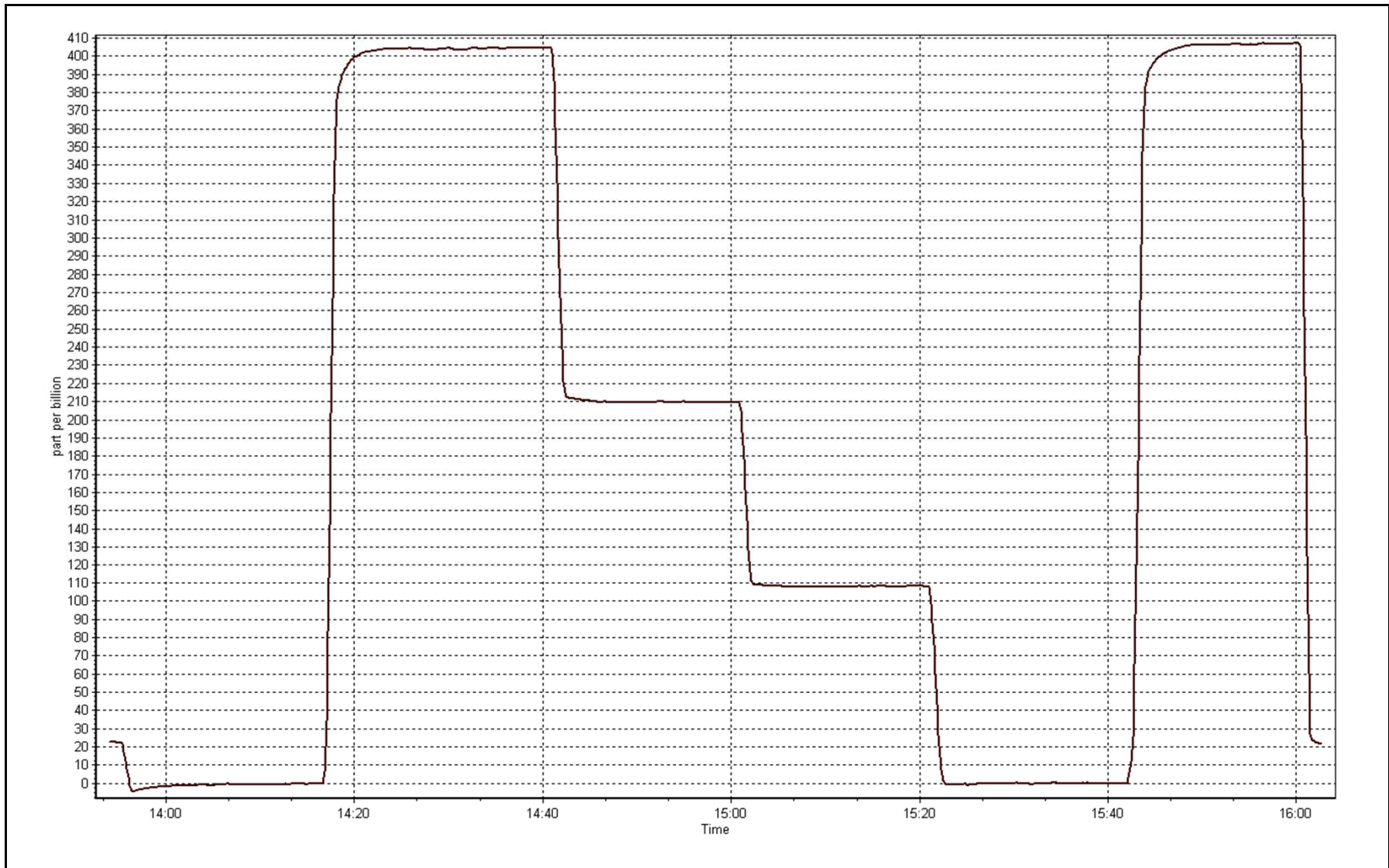
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999997
401.0	404.0	0.9926		
207.0	209.0	0.9904	Slope	0.991621
107.0	107.8	0.9926		
			Intercept	0.159105



O3 Calibration Plot

Date: February 6, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Reason:	Routine		
Start Time (MST)	9:55	End Time (MST)	15:45
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	1730512
Old NO Cal Gas Conc	50.6 ppm	Old Cal Gas Expiry Date	May 29th 2014
Old NO <sub>x</sub> Cal Gas Conc	50.6 ppm	Old Cal Gas Serial #	LL107923
New NO cal gas conc	52.8 ppm	New cal gas exp date	SA140071A
New Nox cal gas conc	52.8 ppm	New cal gas serial #	Sept 26 2017

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
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Parameter		NO <sub>x</sub>	NO	NO <sub>2</sub>
MV conversion	Analyzer Range (ppb)	5000	5000	5000
	Analyzer Range (mv)	5000	5000	5000
Before	Data Slope	1.007002	1.004408	1.011969
	Data Offset	0.768919	1.090710	0.124862
After	Data Slope	1.001305	1.003579	1.004842
	Data Offset	0.596914	0.633565	0.607503
Channel #		digital	digital	digital
Voltage Range		0-5000mv	0-5000mv	0-5000mv

### Analyzer Information

Analyzer make/model	Thermo 42i NO/NO <sub>2</sub> /NO <sub>x</sub> Analyzer	Analyzer serial #	1218153357
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Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.885	ppb	0.815	ppb
NO <sub>x</sub> coefficient	0.997	ppb	1.000	ppb
NO <sub>2</sub> coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	6.3		5.8	
NO <sub>x</sub> bkgrnd	6.4		5.9	
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	326.0	Deg C	326.0	Deg C
PMT Temp	-2.7	Deg C	-2.7	Deg C
O <sub>3</sub> flow	ok	ccm	ok	ccm
R Cell Press	206.0	mmHg	206.0	mmHg
Sample Flow	503.0	ccm	503.0	ccm

**Notes:**

Calibration cylinder changed after as founds, span adjusted after cylinder change. Negative dip in Nox during third GPT point related to mistake in span point initiation, not reflective of issue with instrument or cal system.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date: February 5, 2015 Station Number: AMS 1

### 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 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
as found zero	5500	0.0	0.0	0.0	0.0	-0.10	-0.10	0.00	N/A	N/A
as found span	5500	81.5	749.8	749.8	0.0	744.7	745.5	0.8	1.007	1.006
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
high point	5500	78.1	749.8	749.8	0.0	748.7	747.0	1.7	1.001	1.004
second point	5500	43.8	420.5	420.5	0.0	419.0	418.0	1.0	1.004	1.006
third point	5500	21.9	210.2	210.2	0.0	208.2	207.6	0.6	1.010	1.013
calibrator zero	5500	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as left zero	5500	0.0	0.0	0.0	0.0	0.2	0.0	0.1	N/A	N/A
as left span	5500	78.1	749.8	368.0	381.8	748.1	371.6	376.4	1.002	0.990
Average Correction Factor									1.005	1.007

Corrected As found NO<sub>x</sub>= 744.8 NO= 745.6 Percent Change NO<sub>x</sub>= -0.1% NO= 0.0%  
 Previous Response NO<sub>x</sub>= 743.8 NO= 745.4

### GPT Calibration Data

Dilution Flow 5500 ccm Source Gas Flow 78.10 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <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			N/A	
1st NO <sub>2</sub> (300)	N/A	368.0	378.0	743.1	368.0	375.0	0.995	1.000	1.008	99.2%
2nd NO <sub>2</sub> (200)	N/A	548.2	197.8	742.7	548.2	198.5	0.995	1.000	0.996	100.4%
3rd NO <sub>2</sub> (100)	N/A	640.8	105.2	742.6	640.8	101.8	0.996	1.000	1.033	96.8%
4th NO <sub>2</sub> (0)	746.0	N/A	1.5	747.5	746.0	1.5	0.989	1.000	N/A	N/A
Average Correction Factor							0.994	1.000	1.013	98.8%

Calibration Performed By: Zack Eastman



# Wood Buffalo Environmental Association

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

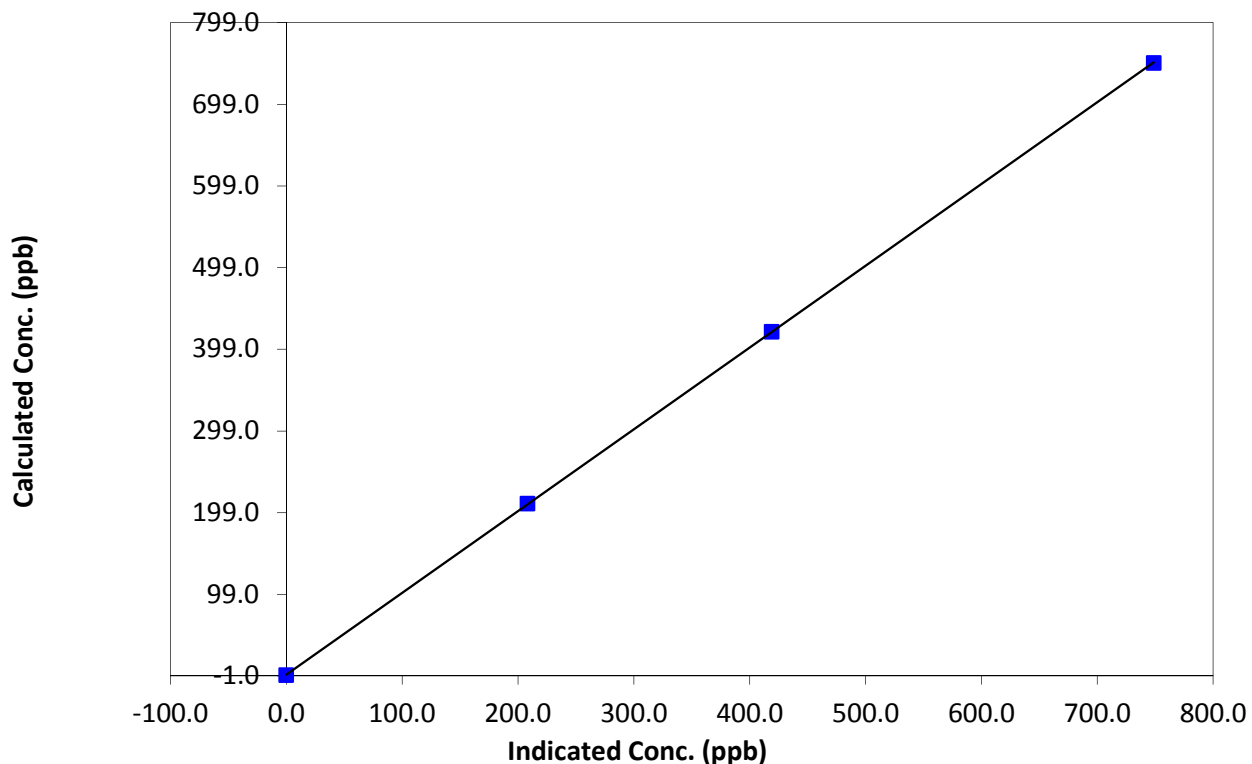
### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	15:45
Analyzer make	Thermo 42i NO/NO2/NOx Analyzer	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
749.8	748.7	1.0014		
420.5	419.0	1.0035	Slope	1.001305
210.2	208.2	1.0098		
0.0	-0.1	0.0000	Intercept	0.596914

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

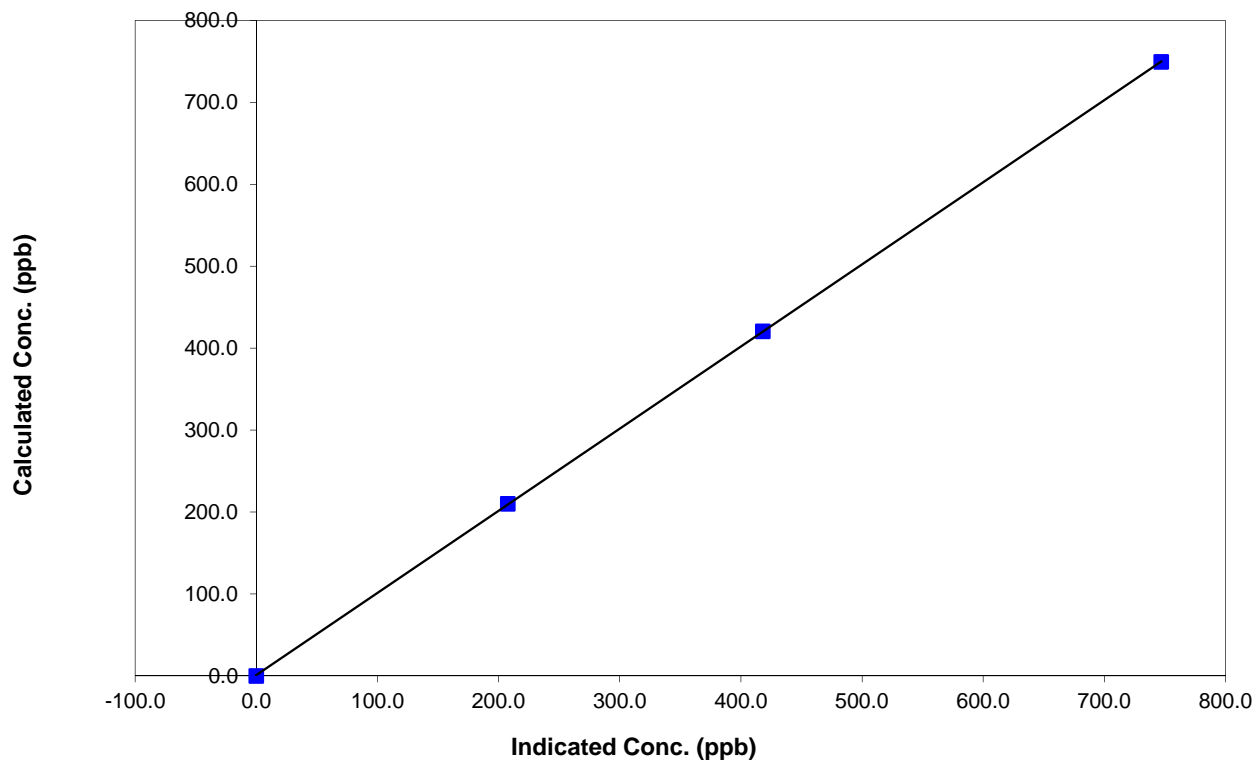
### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 9, 2015
Station Name	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	15:45
Analyzer make	Thermo 42i NO/NO2/NOx Analyzer	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
749.8	747.0	1.0037		
420.5	418.0	1.0059	Slope	1.003579
210.2	207.6	1.0127		
0.0	-0.1	0.0000	Intercept	0.633565

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

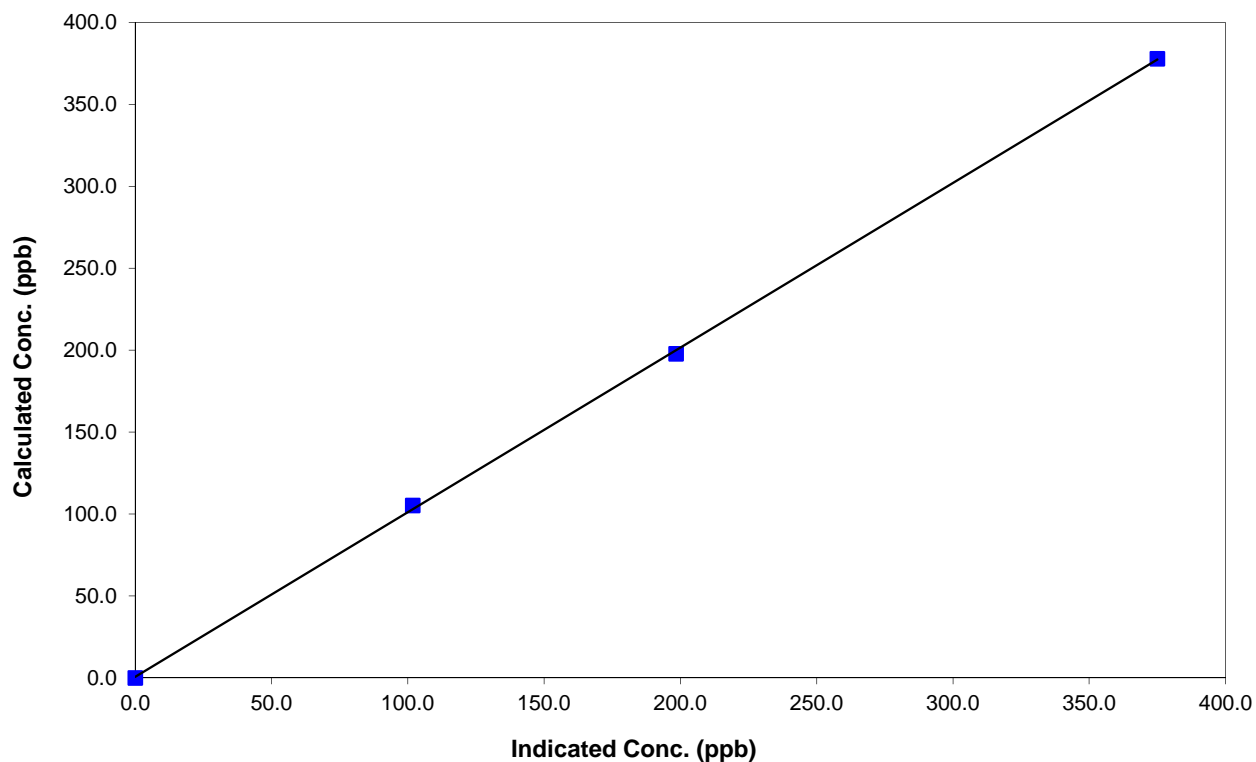
### Station Information

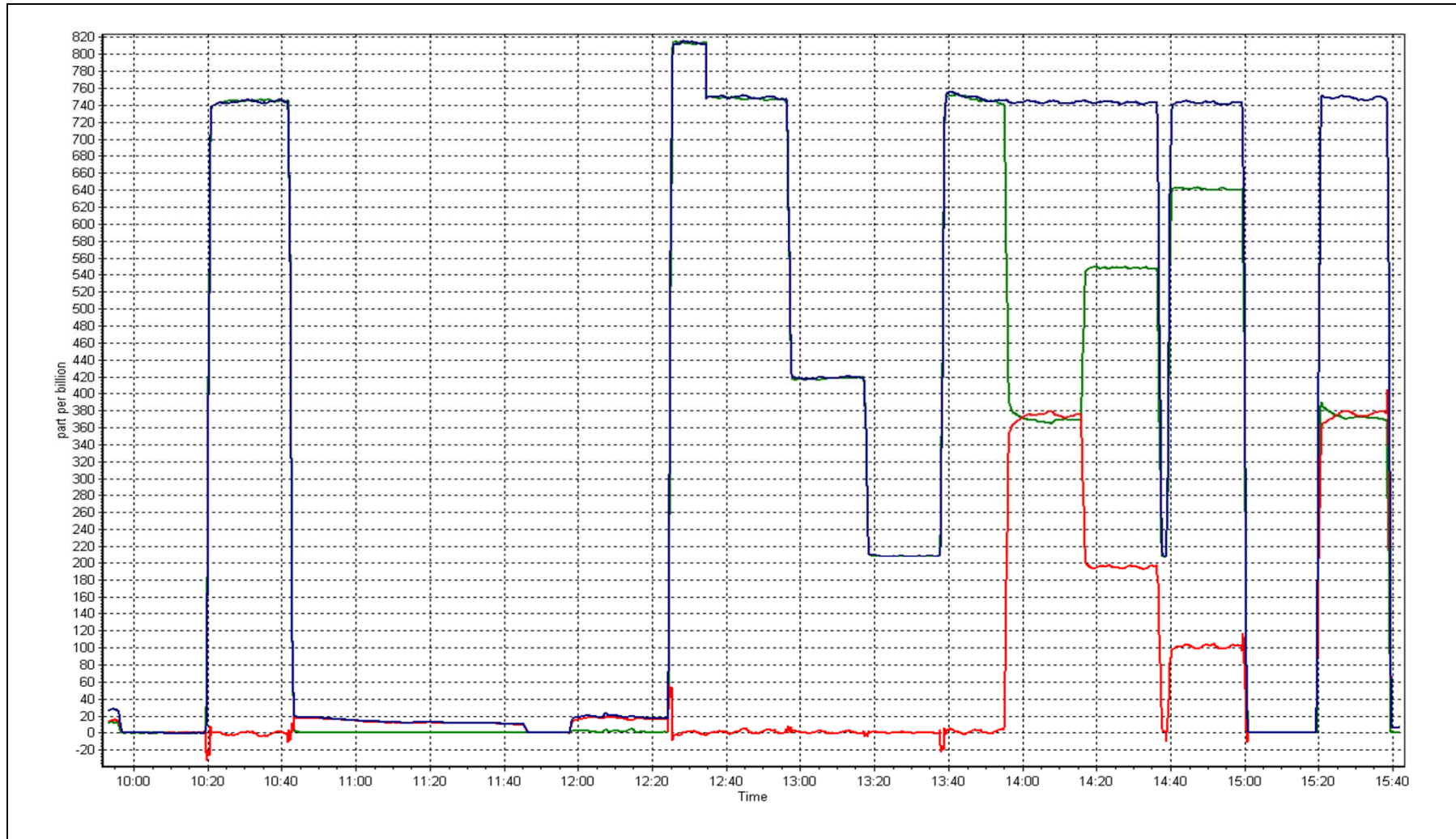
Calibration Date	February 5, 2015	Previous Calibration	January 9, 2015
Station Number	Bertha Ganter - Fort McKay	Station Number	AMS 1
Start Time (MST)	9:55	End Time (MST)	15:45
Analyzer make	Thermo 42i NO/NO <sub>2</sub> /NO <sub>x</sub> Analyzer	Analyzer serial #	1218153357

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999856
378.0	375.0	1.0080		
197.8	198.5	0.9965	Slope	1.004842
105.2	101.8	1.0334		
			Intercept	0.607503

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 2**  
**MILDRED LAKE**  
**February 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
 FEBRUARY 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	640	32	32	100.00	48	0	10	0
H2S (ppb) Average	639	33	33	100.00	6	0	2	0
THC (ppm) Average	640	32	32	100.00	3.6	-	2.7	-
Temperature (C) Average	672	0	0	100.00	2.1	-	-2.5	-
Relative Humidity (%) Average	672	0	0	100.00	94	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	27	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILDRED LAKE (AMS 2)  
 FEBRUARY 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	640	2.6	4	-	0	1	1	1	2	7	48
H2S (ppb) Average	639	0.6	1	-	0	0	0	0	1	1	6
THC (ppm) Average	640	2.37	0.3	-	2	2.1	2.2	2.3	2.5	2.8	3.6
Temperature 2 m (C) Average	672	-16.83	7.1	-	-35.9	-25	-22.3	-17.8	-12	-7.1	2.1
Relative Humidity (%) Average	672	74.4	7	-	49	65	71	76	79	82	94
Wind Speed 10 m (km/h) Average	672	9	5	-	1	4	6	8	11	15	27
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

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

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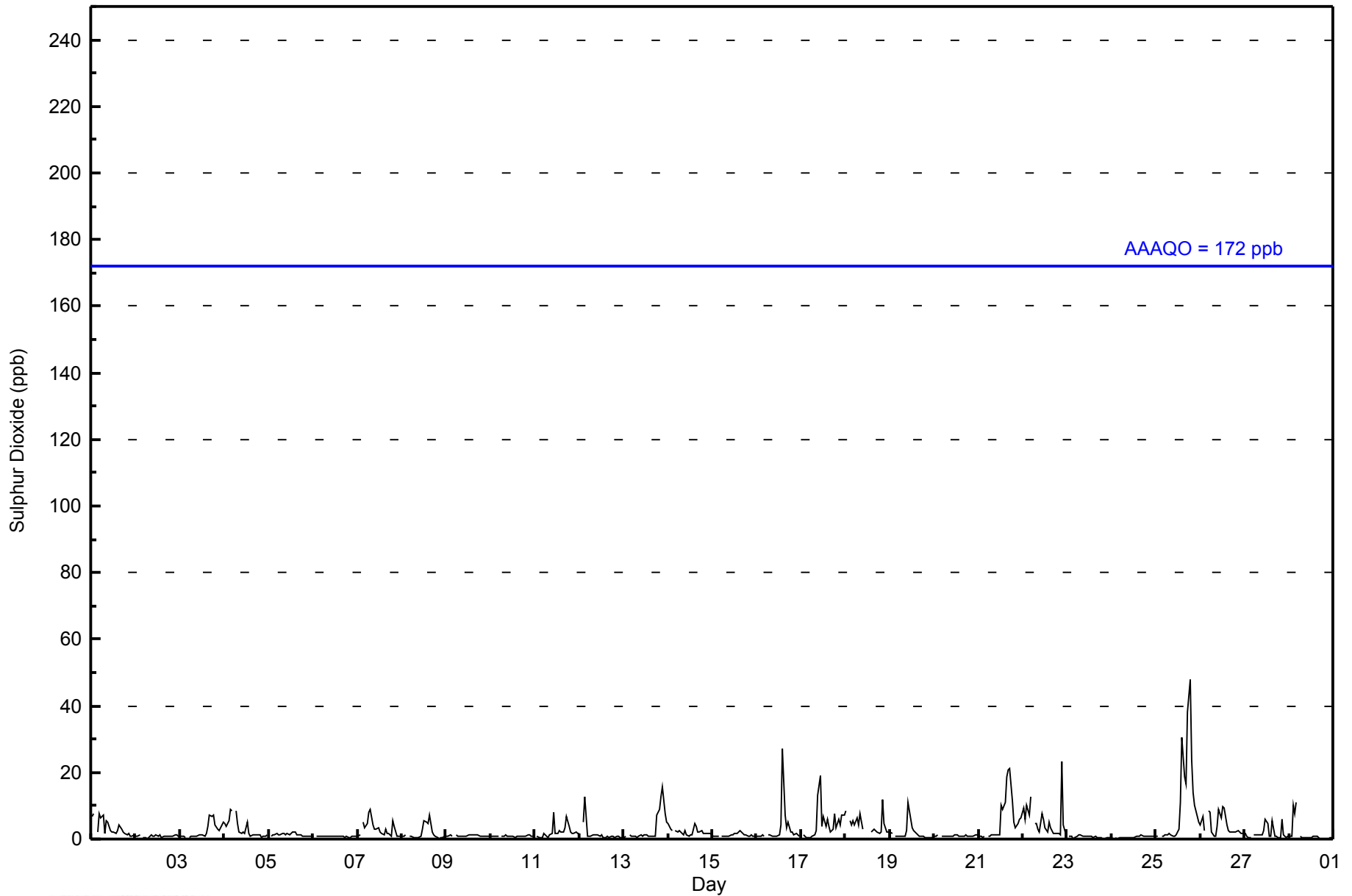


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 48 ppb on Feb 25 19:00										Maximum Daily Average: 10.3 ppb on Feb 25										Hours of Data: 640						
Minimum Value: 0 ppb on Feb 24 04:00										Minimum Daily Average: 0.6 ppb on Feb 24										Hours of Missing Data: 32						
Maximum Diurnal Average: 4.2 ppb at hour 15										Minimum Diurnal Average: 1.7 ppb at hour 8										Hours of Calibration: 32						
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> =2 P <sub>90</sub> =7 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-Feb	7	7	Z	2	8	7	7	2	6	5	3	2	2	2	2	4	3	2	2	1	1	1	1	1	3.4	8
2-Feb	1	1	1	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
3-Feb	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	2	4	7	7	7	4	3	3	3	5	2.5	7
4-Feb	5	4	5	9	9	Z	8	5	2	2	2	2	5	2	1	1	1	1	1	1	1	1	1	1	3.0	9
5-Feb	Z	1	1	1	2	1	1	2	2	1	2	1	2	2	2	1	1	1	1	1	1	1	1	1	1.3	2
6-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
7-Feb	1	1	Z	5	3	5	8	9	4	3	3	3	2	2	1	3	2	2	1	5	4	1	1	1	3.1	9
8-Feb	1	1	1	Z	1	1	1	0	0	0	1	3	6	5	5	7	2	1	1	0	0	0	1	1	1.7	7
9-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1
10-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
11-Feb	Z	1	0	0	1	2	1	1	1	2	8	2	2	2	2	2	3	7	4	2	2	2	2	2	2.1	8
12-Feb	2	Z	5	13	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.6	13
13-Feb	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	7	9	13	16	8	5	3.1	16
14-Feb	5	3	2	Z	2	2	2	2	2	1	3	1	1	1	1	5	4	2	2	3	2	2	2	2	2.2	5
15-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1.2	2
16-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	4	27	7	3	5	2	2	1	2	1	1	1	2.9	27
17-Feb	Z	1	1	0	0	0	1	1	3	13	19	4	7	4	6	4	2	3	8	3	6	4	7	7	4.6	19
18-Feb	9	Z	6	4	6	4	6	4	8	3	C	C	C	C	2	3	2	2	2	2	12	5	2	2	4.4	12
19-Feb	2	2	Z	1	1	1	1	1	1	2	11	6	3	3	2	1	1	1	1	1	0	0	0	1	1.9	11
20-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
21-Feb	1	1	1	1	Z	1	1	1	1	1	1	10	9	11	19	21	21	11	5	3	5	6	6	6	6.0	21
22-Feb	9	6	10	7	13	Z	5	5	3	2	8	6	3	2	5	3	2	2	2	2	1	23	4	1	5.4	23
23-Feb	Z	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0.6	1
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.6	1
25-Feb	1	1	Z	1	1	1	1	2	1	1	1	1	3	11	30	19	16	38	48	24	14	10	7	5	10.3	48
26-Feb	4	7	3	Z	8	8	2	1	1	4	9	6	10	9	4	3	2	2	2	2	2	2	2	2	4.2	10
27-Feb	2	1	1	0	Z	1	1	1	1	1	2	6	5	1	1	6	1	1	1	1	1	6	1	1	1.8	6
28-Feb	1	1	10	7	11	Z	1	1	1	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	1.7	11
																								Diurnal Average	Diurnal Maximum	
2.3 1.9 2.4 2.6 3.1 1.8 2.0 1.7 1.7 2.0 3.0 2.1 2.7 2.6 4.2 3.6 2.9 3.8 3.9 2.7 2.8 3.1 2.0 1.9																								9	7	
9 7 10 13 13 8 8 9 8 13 19 6 10 11 30 19 21 38 48 24 14 23 8 7																										
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 - February 2015





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	616	96.25	96.25
11 - 20	16	2.50	98.75
21 - 60	8	1.25	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: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

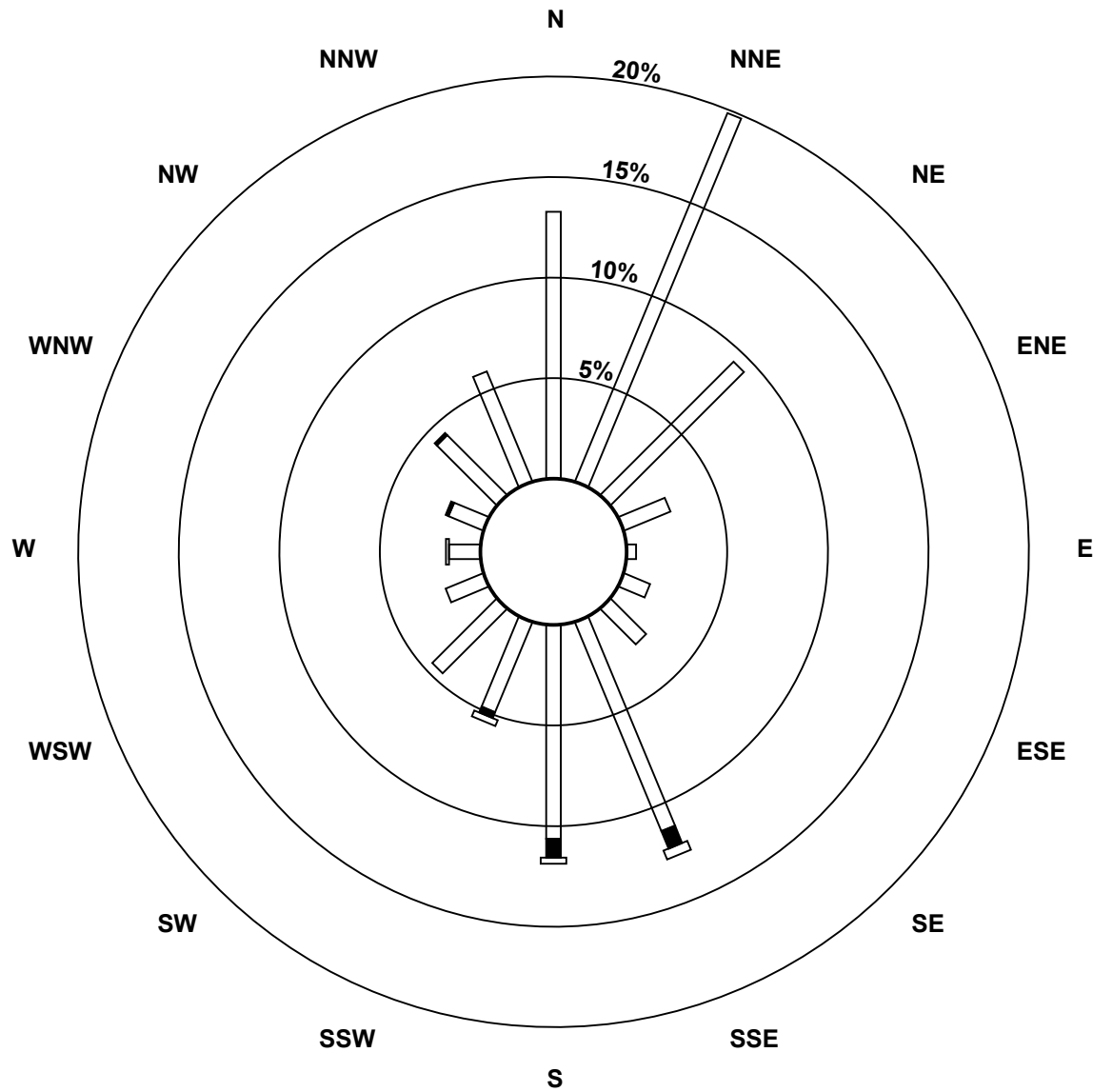
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	85	127	60	16	3	9	16	72	68	31	29	13	10	12	27	38	616
11 - 20	0	0	0	0	0	0	0	6	6	2	0	0	0	1	1	0	16
21 - 60	0	0	0	0	0	0	0	3	2	2	0	0	1	0	0	0	8
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	127	60	16	3	9	16	81	76	35	29	13	11	13	28	38	640

Total Number of Valid Hours: 640

Total Number of Hours: 672

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

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



**Classes (ppb)**

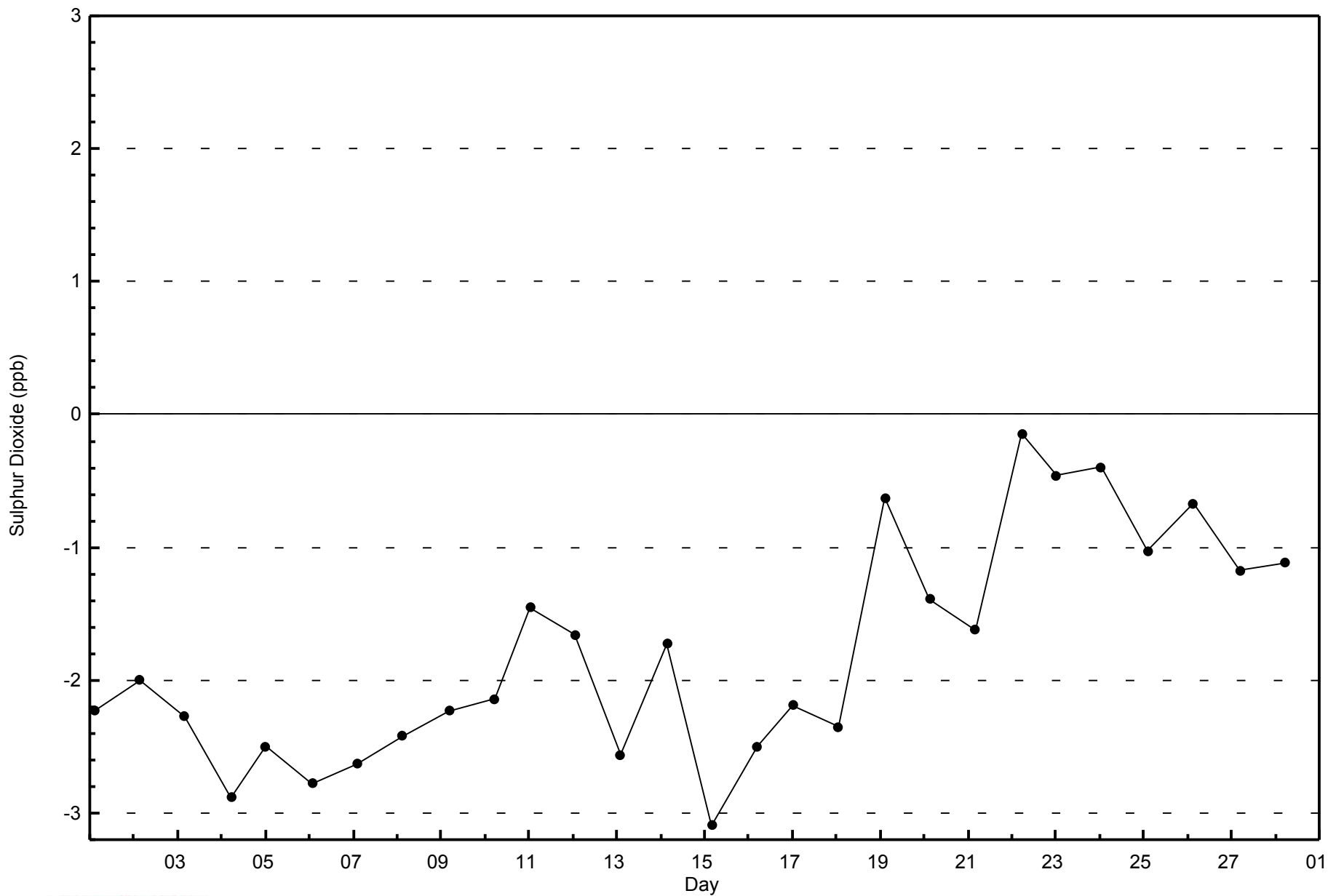


**Total Number of Valid Hours: 640**



WBEA  
Zero Responses

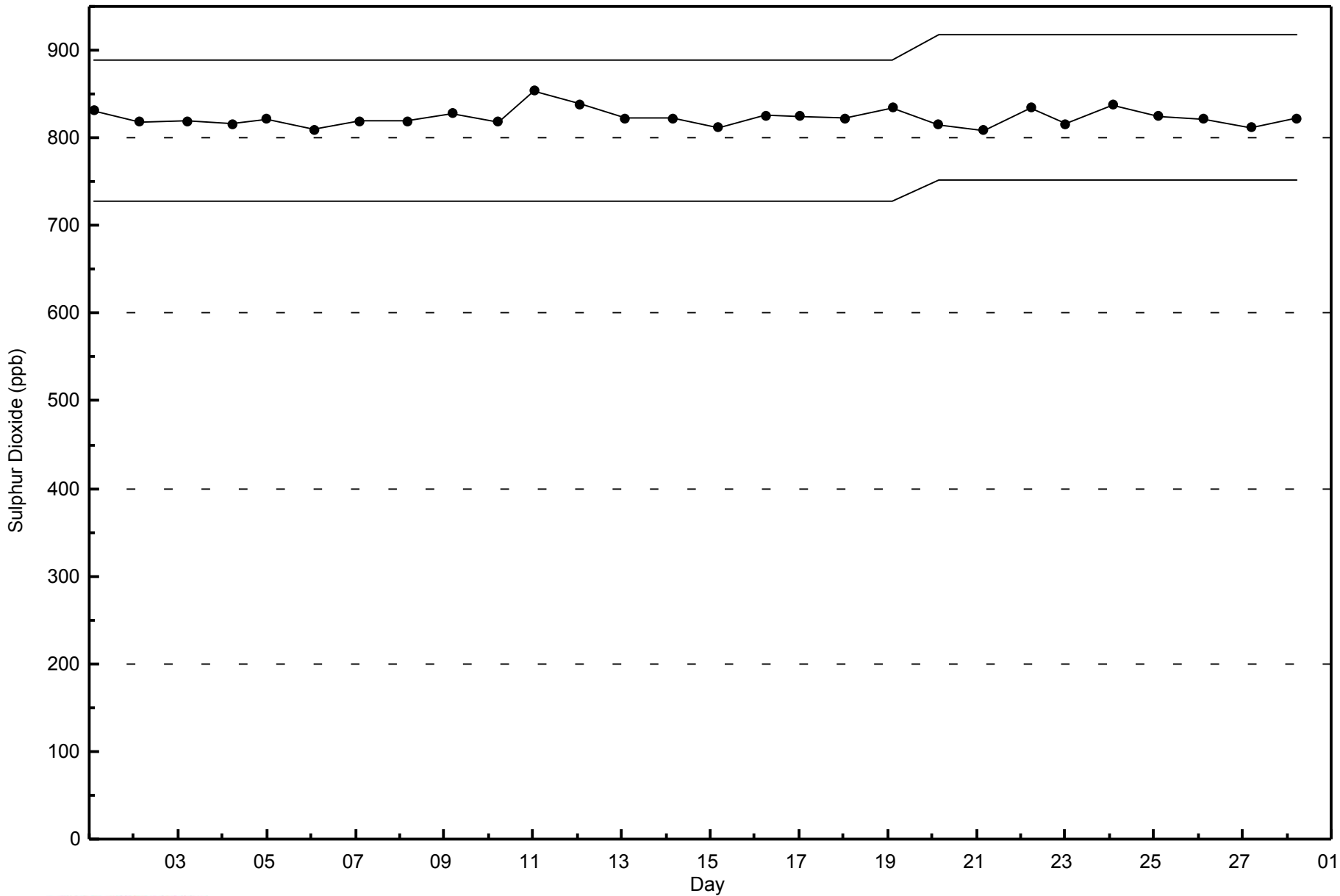
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mildred Lake - February 2015





WBEA  
Span Responses

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





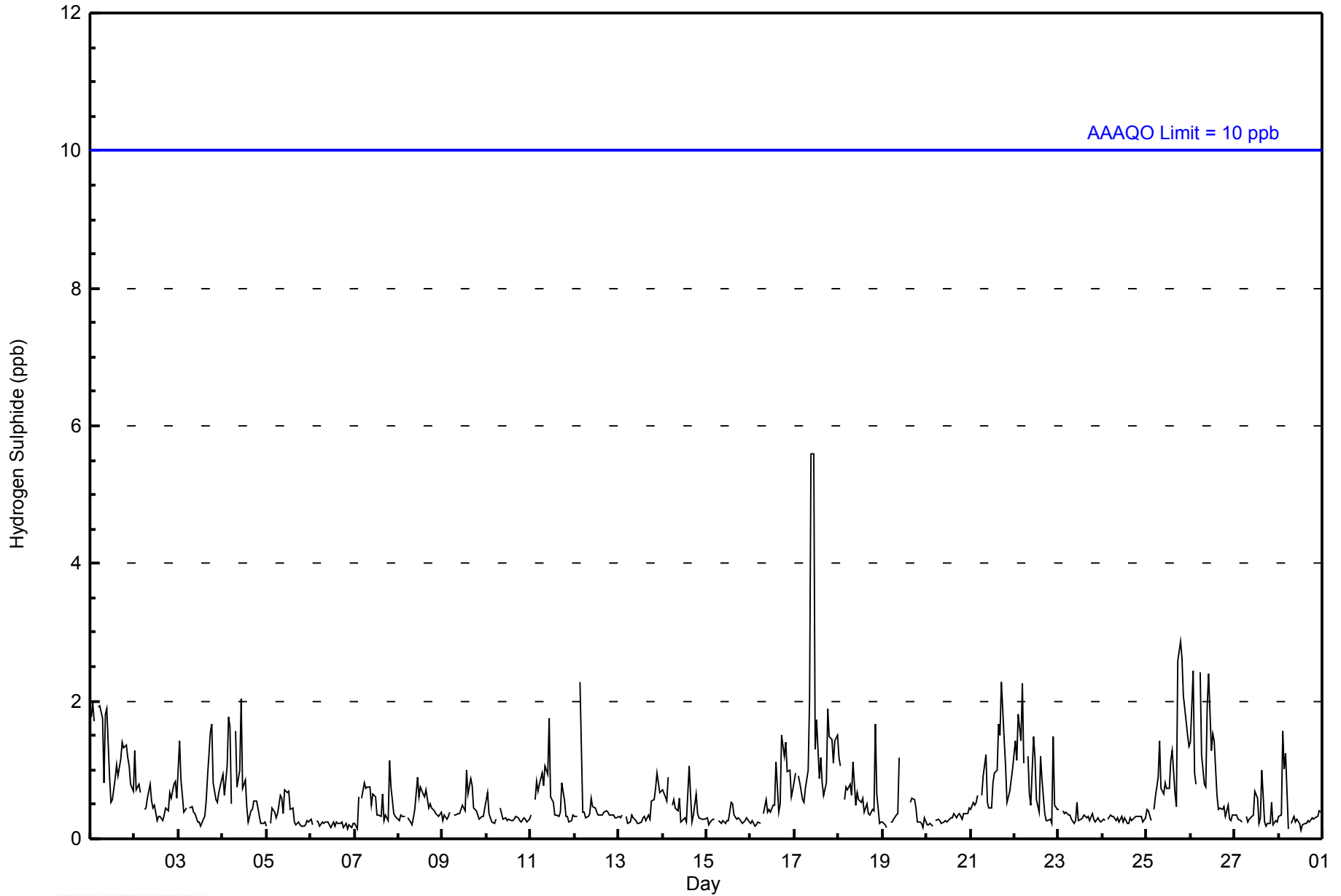
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																							
Maximum Value: 6 ppb on Feb 17 11:00										Maximum Daily Average: 1.5 ppb on Feb 17										Hours of Data: 639																													
Minimum Value: 0 ppb on Feb 28 13:00										Minimum Daily Average: 0.2 ppb on Feb 6										Hours of Missing Data: 33																													
Maximum Diurnal Average: 0.9 ppb at hour 11										Minimum Diurnal Average: 0.5 ppb at hour 17										Hours of Calibration: 33																													
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> =2										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	2	2	2	Z	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2																							
2-Feb	1	1	1	1	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.6	1																							
3-Feb	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	1	1	1	0.6	2																							
4-Feb	1	1	1	2	2	1	Z	2	1	1	2	1	1	0	0	0	0	1	1	0	0	0	0	0	0.8	2																							
5-Feb	0	Z	0	0	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
6-Feb	0	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																							
7-Feb	0	0	1	Z	1	1	1	1	1	0	1	1	0	0	0	1	0	0	0	1	1	0	0	0	0.5	1																							
8-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0.4	1																							
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0.4	1																							
10-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
11-Feb	0	Z	1	1	1	1	1	1	1	1	2	1	1	0	0	0	0	1	1	0	0	0	0	0	0.6	2																							
12-Feb	0	0	Z	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2																							
13-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.4	1																							
14-Feb	1	1	1	1	Z	0	1	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0.5	1																							
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.3	1																							
16-Feb	0	0	0	0	0	0	Z	0	1	0	0	0	0	0	1	0	1	2	1	1	1	1	1	1	0.6	2																							
17-Feb	1	Z	1	1	1	1	1	1	2	6	6	1	2	1	1	1	1	1	1	2	1	1	1	1	1.5	6																							
18-Feb	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	0	0	2	1	0	0	0.6	2																							
19-Feb	0	0	0	Z	0	0	0	0	0	1	C	C	C	C	C	1	1	1	0	0	0	0	0	0	0.4	1																							
20-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
21-Feb	0	1	0	1	1	Z	1	1	1	1	0	0	1	1	1	2	2	2	1	1	1	1	1	1	0.9	2																							
22-Feb	1	1	2	1	2	1	Z	1	1	0	1	1	1	0	1	1	0	0	0	0	0	1	0	0	0.9	2																							
23-Feb	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
24-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
25-Feb	0	0	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	0	3	3	3	2	2	2	1	1.2	3																							
26-Feb	1	2	1	1	Z	2	1	1	1	2	2	1	2	1	1	0	0	0	0	0	0	0	0	0	1.0	2																							
27-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0.3	1																							
28-Feb	0	0	2	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2																							
																								0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.8	0.9	0.5	0.5	0.5	0.6	0.5	0.5	0.7	0.7	0.6	0.6	0.5	0.5	0.5	Diurnal Average	
																								2	2	2	2	2	2	2	2	2	2	6	6	1	2	1	1	2	2	3	3	3	2	2	2	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**  
**Mildred Lake - February 2015**





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	634	99.22	99.22
3 - 4	3	0.47	99.69
5 - 7	2	0.31	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

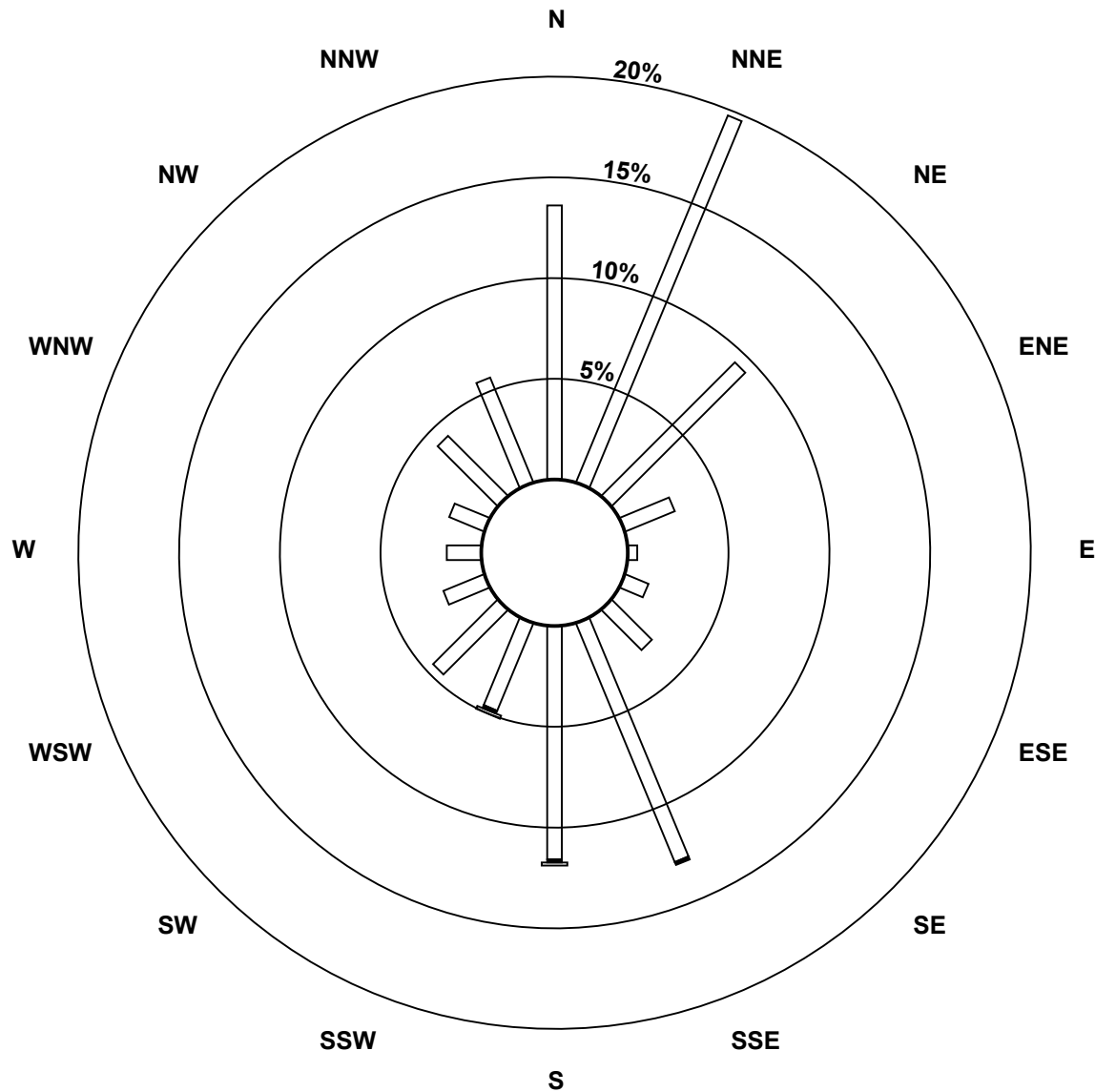
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	87	126	60	17	3	8	18	82	74	30	29	14	11	12	27	36	634
3 - 4	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
5 - 7	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	87	126	60	17	3	8	18	83	76	32	29	14	11	12	27	36	639

Total Number of Valid Hours: 639

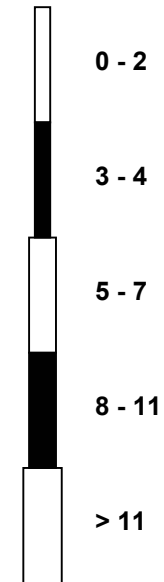
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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



Classes (ppb)

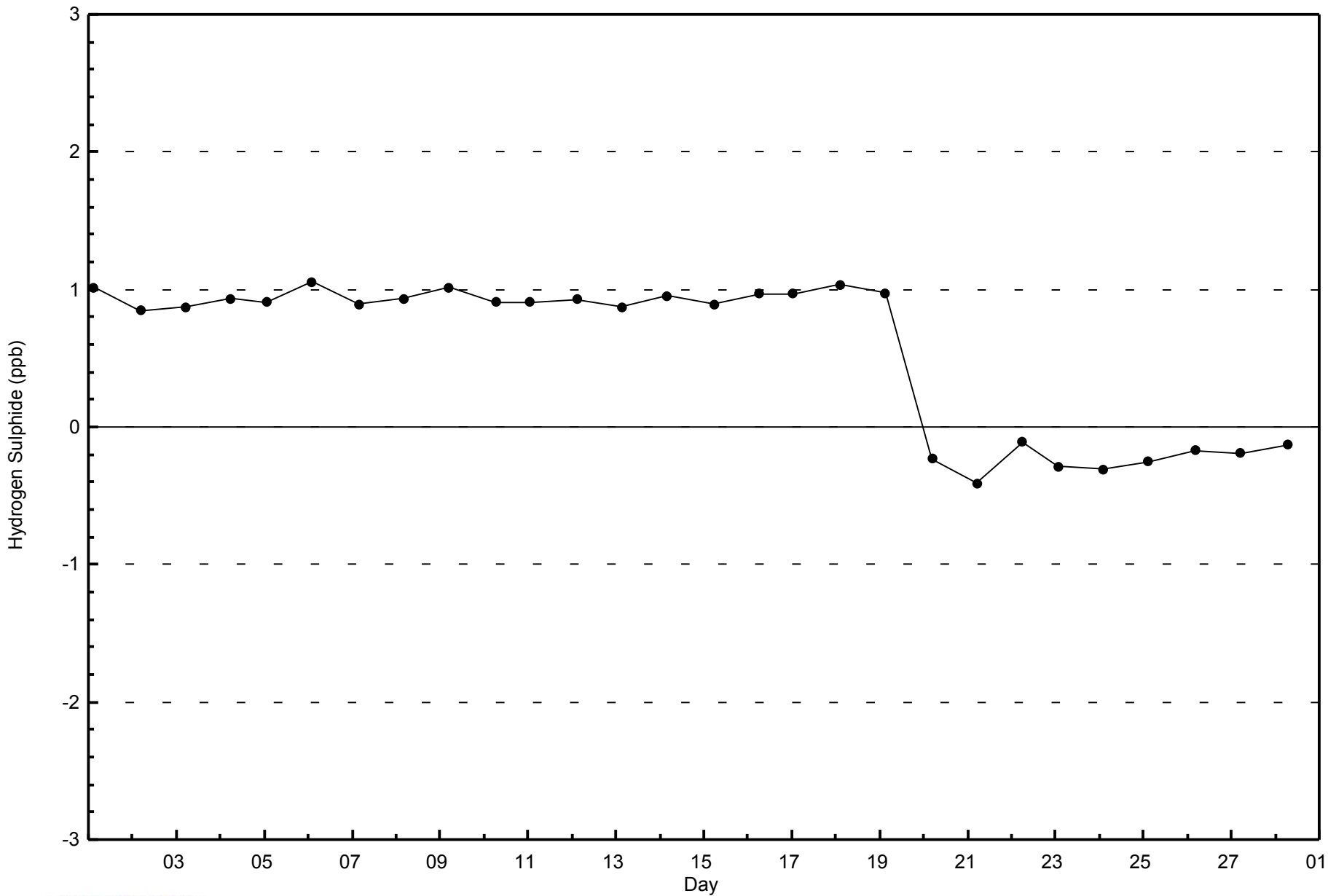


Total Number of Valid Hours: 639



WBEA  
Zero Responses

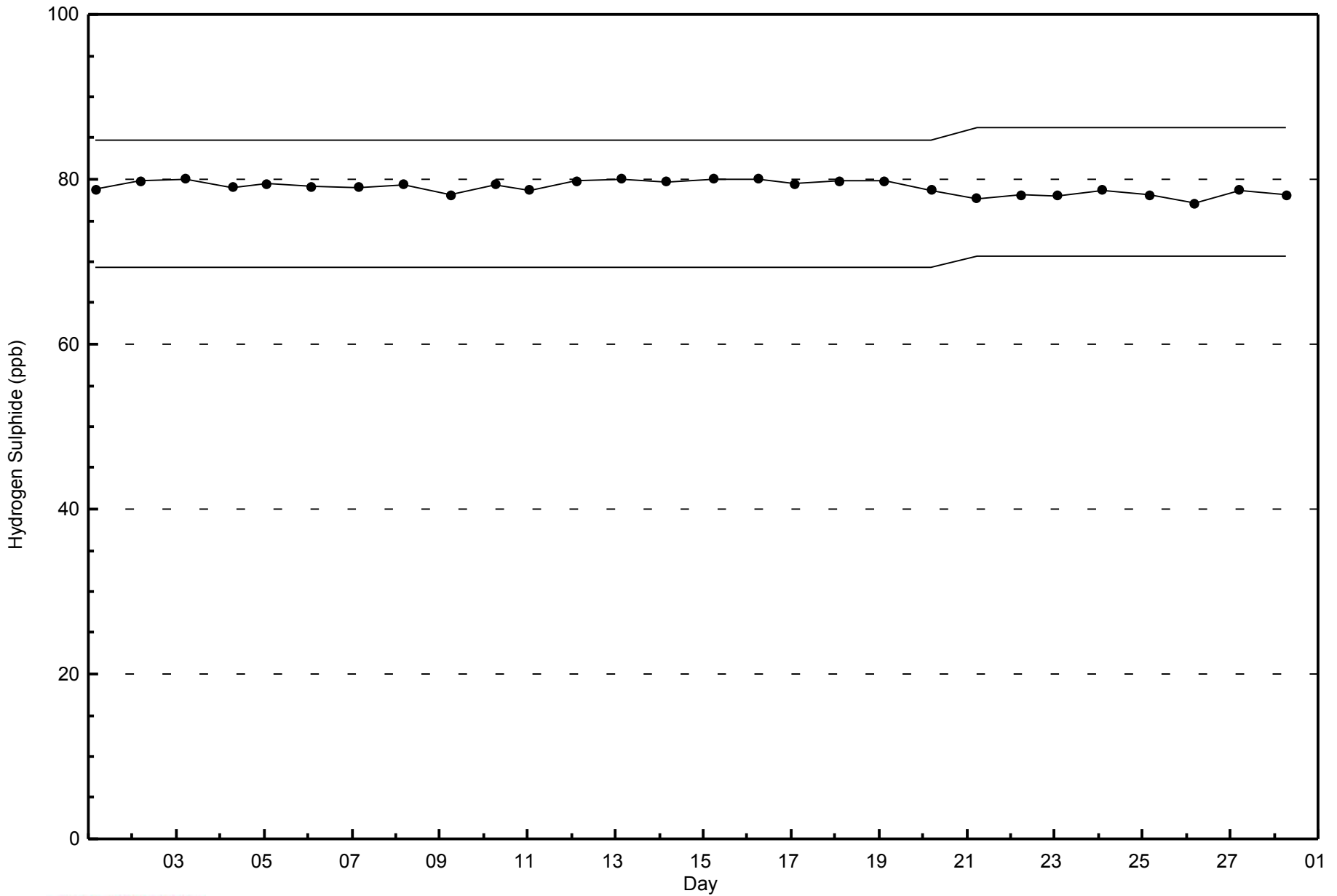
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mildred Lake - February 2015





WBEA  
Span Responses

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





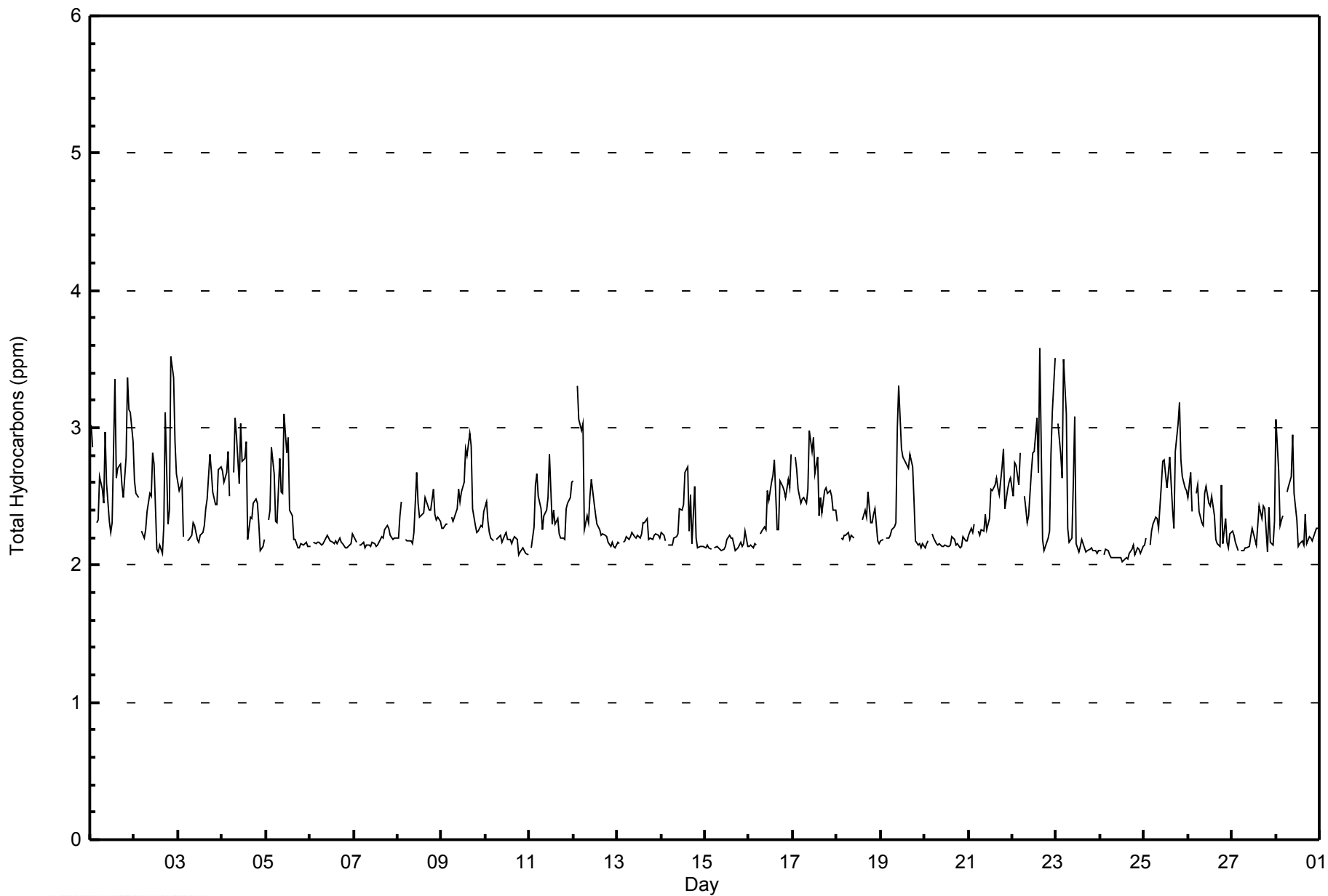
Maximum Value: 3.6 ppm on Feb 22 16:00		Maximum Daily Average: 2.7 ppm on Feb 1		Hours in Service: 672																						
Minimum Value: 2.0 ppm on Feb 24 13:00		Minimum Daily Average: 2.1 ppm on Feb 24		Hours of Data: 640																						
Maximum Diurnal Average: 2.5 ppm at hour 11		Minimum Diurnal Average: 2.3 ppm at hour 7		Hours of Missing Data: 32																						
Monthly Average: 2.37 ppm		Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.3 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.8 P <sub>99</sub> = 3.4		Hours of Calibration: 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-Feb	3.0	2.9	Z	2.3	2.3	2.6	2.5	2.5	3.0	2.6	2.3	2.2	2.3	3.4	2.6	2.7	2.7	2.6	2.5	2.8	3.4	3.1	3.1	2.9	2.7	3.4
2-Feb	2.6	2.5	2.5	Z	2.2	2.2	2.3	2.4	2.5	2.5	2.8	2.7	2.1	2.1	2.1	2.1	2.3	3.1	2.3	2.4	3.5	3.4	2.9	2.7	2.5	3.5
3-Feb	2.5	2.6	2.6	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.5	2.8	2.7	2.5	2.4	2.4	2.7	2.7	2.4	2.8
4-Feb	2.7	2.6	2.7	2.8	2.5	Z	2.7	3.1	2.9	2.6	3.0	2.8	2.8	2.9	2.2	2.4	2.3	2.5	2.5	2.5	2.3	2.1	2.1	2.2	2.6	3.1
5-Feb	Z	2.3	2.4	2.9	2.7	2.3	2.3	2.8	2.5	2.5	3.1	2.8	2.9	2.4	2.4	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.4	3.1
6-Feb	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2
7-Feb	2.2	2.2	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3
8-Feb	2.2	2.4	2.5	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.7	2.5	2.4	2.4	2.4	2.5	2.4	2.4	2.4	2.6	2.4	2.3	2.4	2.3	2.3	2.7
9-Feb	2.3	2.3	2.3	2.3	Z	2.4	2.3	2.4	2.4	2.6	2.5	2.5	2.6	2.8	2.8	3.0	2.9	2.4	2.3	2.2	2.3	2.3	2.3	2.4	2.4	3.0
10-Feb	2.5	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.5
11-Feb	Z	2.1	2.3	2.6	2.7	2.5	2.4	2.3	2.4	2.4	2.5	2.8	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.4	2.4	2.5	2.6	2.4	2.8
12-Feb	2.6	Z	3.3	3.1	3.0	3.0	2.3	2.4	2.3	2.5	2.6	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.4	3.3
13-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3
14-Feb	2.2	2.2	2.2	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.4	2.4	2.4	2.7	2.7	2.3	2.5	2.2	2.6	2.2	2.1	2.1	2.1	2.1	2.3	2.7
15-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.2
16-Feb	2.1	2.1	2.1	2.2	2.1	Z	2.2	2.2	2.3	2.3	2.5	2.5	2.6	2.7	2.8	2.3	2.3	2.6	2.6	2.5	2.5	2.6	2.6	2.8	2.4	2.8
17-Feb	Z	2.8	2.7	2.5	2.4	2.5	2.5	2.5	2.6	3.0	2.8	2.9	2.7	2.8	2.4	2.5	2.4	2.5	2.6	2.5	2.5	2.5	2.4	2.4	2.6	3.0
18-Feb	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	2.3	2.4	2.3	2.5	2.3	2.3	2.4	2.4	2.2	2.2	2.3	2.5
19-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	3.0	3.3	2.8	2.8	2.8	2.7	2.7	2.8	2.7	2.5	2.2	2.1	2.2	2.1	2.2	2.5	3.3
20-Feb	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2
21-Feb	2.2	2.3	2.2	2.3	Z	2.3	2.2	2.3	2.2	2.4	2.3	2.3	2.6	2.5	2.6	2.6	2.6	2.5	2.7	2.9	2.4	2.5	2.6	2.6	2.4	2.9
22-Feb	2.5	2.7	2.7	2.6	2.8	Z	2.5	2.4	2.3	2.4	2.7	2.8	2.8	3.1	2.7	3.6	2.2	2.1	2.1	2.2	2.2	2.8	3.1	3.5	2.6	3.6
23-Feb	Z	3.0	2.8	2.6	3.5	3.1	2.3	2.2	2.2	2.6	3.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.4	3.5
24-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
25-Feb	2.1	2.2	Z	2.1	2.2	2.3	2.4	2.3	2.3	2.6	2.8	2.8	2.6	2.7	2.8	2.4	2.3	2.8	3.0	3.2	2.8	2.6	2.6	2.5	2.5	3.2
26-Feb	2.5	2.7	2.4	Z	2.5	2.6	2.4	2.3	2.3	2.5	2.6	2.4	2.4	2.5	2.4	2.2	2.2	2.1	2.6	2.2	2.3	2.2	2.1	2.2	2.4	2.7
27-Feb	2.2	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.3	2.4	2.3	2.4	2.4	2.1	2.4	2.2	2.1	2.3	2.2	2.4
28-Feb	3.1	2.7	2.3	2.3	2.4	Z	2.5	2.6	2.6	3.0	2.5	2.3	2.1	2.2	2.2	2.1	2.4	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	3.1
																								Diurnal Average		
																								Diurnal Maximum		
																								2.4		
																								3.1		
																								2.3		
																								3.5		
																								2.4		
																								3.5		
																								2.3		
																								3.1		
																								2.4		
																								3.5		
																								2.3		
																								3.5		

Z - zerospan C - Calibration



**WBEA**  
**Hourly Averages**

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







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

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	3	0.47	0.47
2.1 - 3.0	616	96.25	96.72
3.1 - 10.0	21	3.28	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

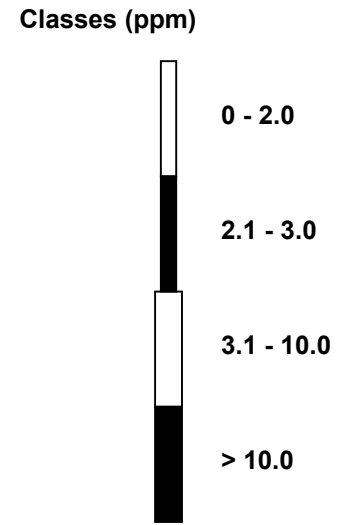
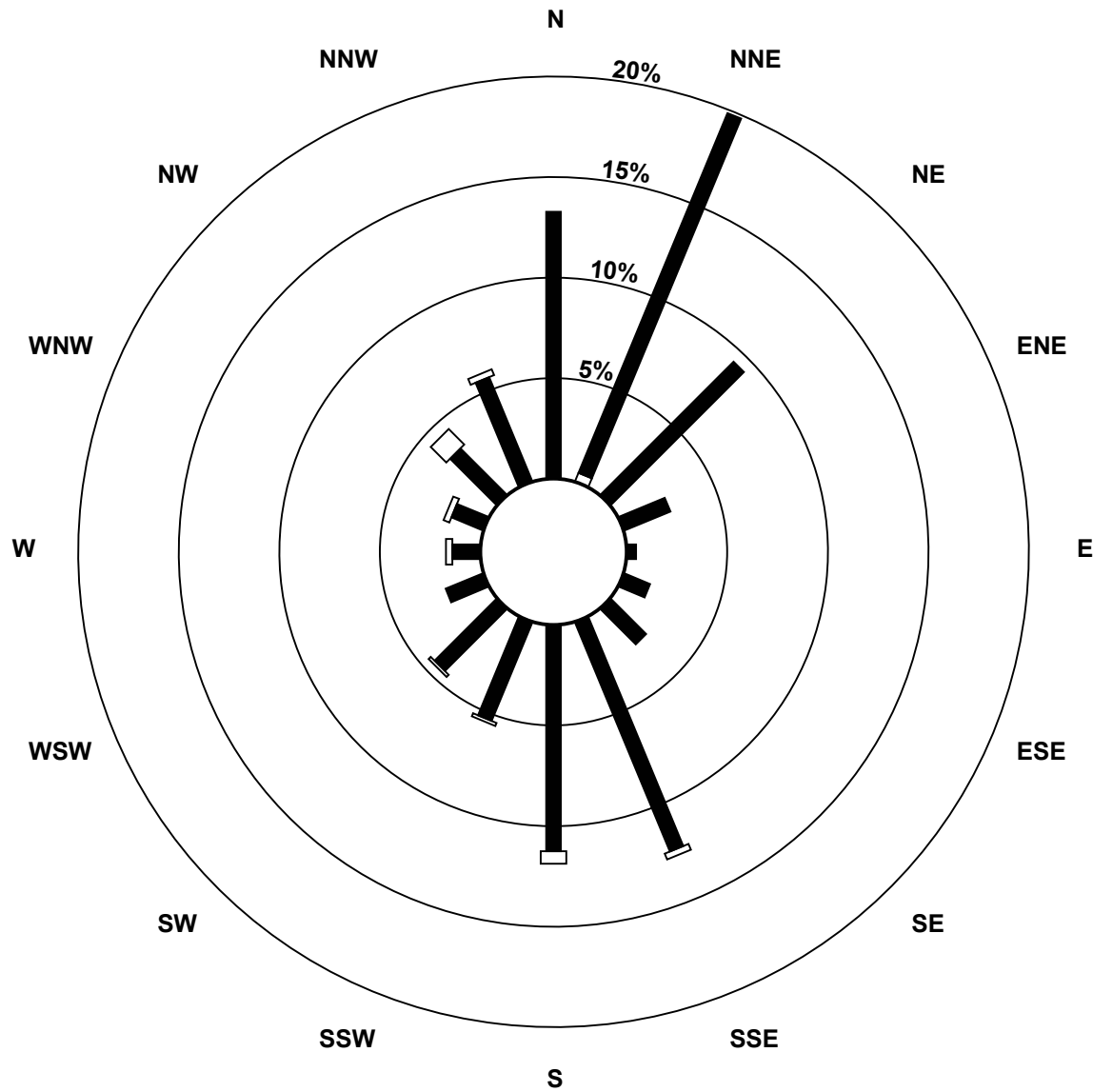
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
2.1 - 3.0	85	124	60	16	3	9	16	79	72	34	28	13	9	11	21	36	616
3.1 - 10.0	0	0	0	0	0	0	0	2	4	1	1	0	2	2	7	2	21
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	127	60	16	3	9	16	81	76	35	29	13	11	13	28	38	640

Total Number of Valid Hours: 640

Total Number of Hours: 672

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

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

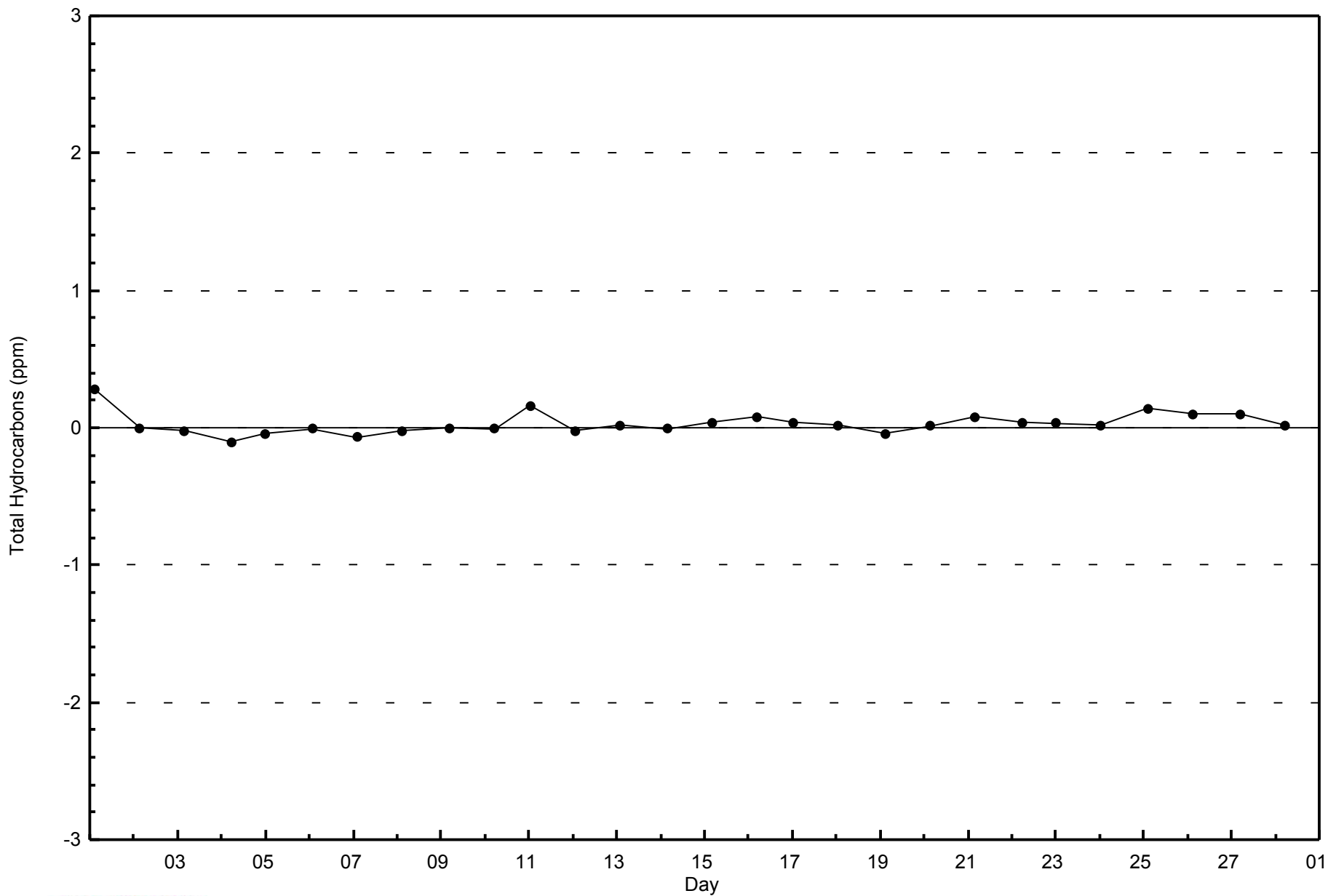


**Total Number of Valid Hours: 640**



WBEA  
Zero Responses

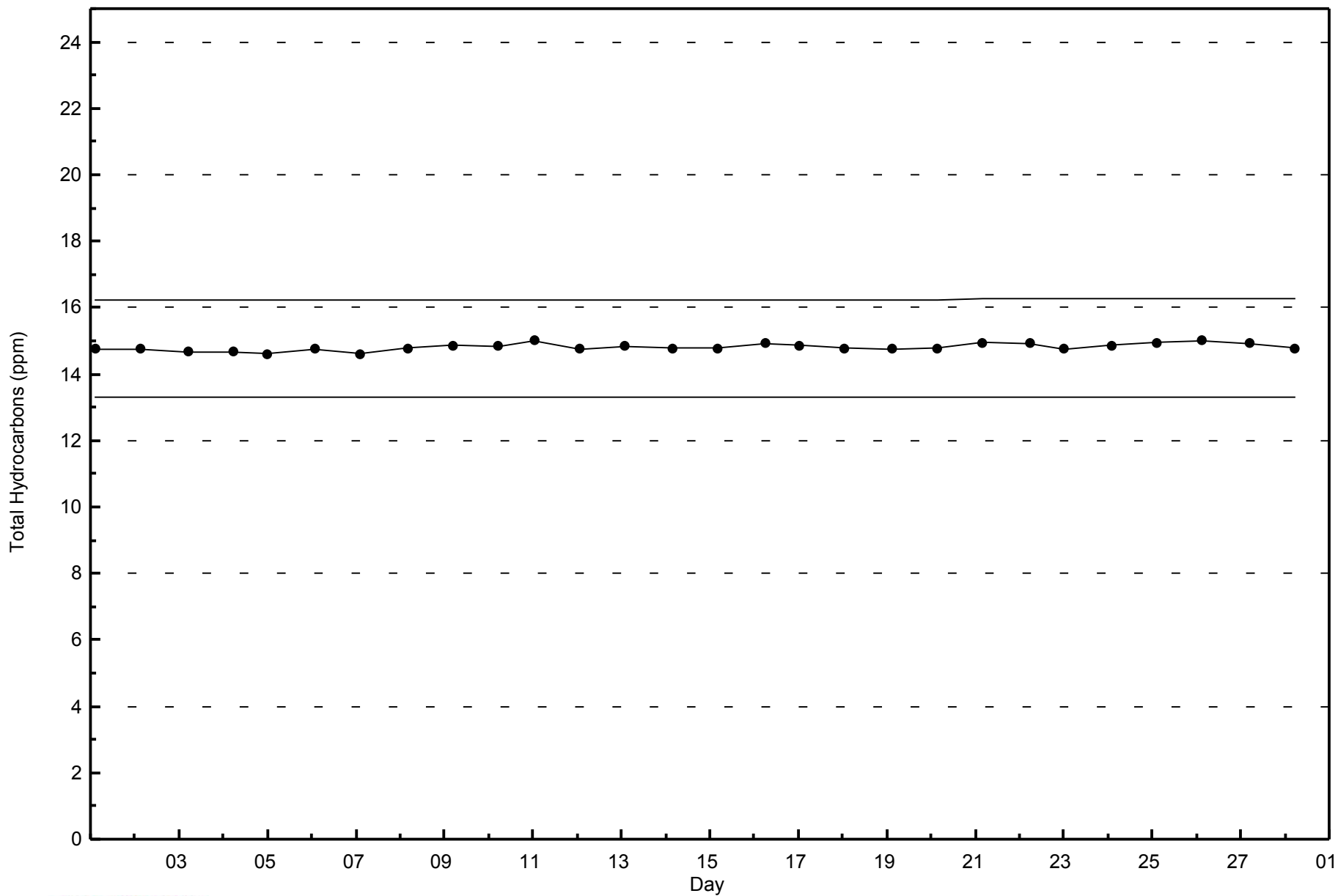
Total Hydrocarbons (THC) - ppm  
Mildred Lake - February 2015





WBEA  
Span Responses

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



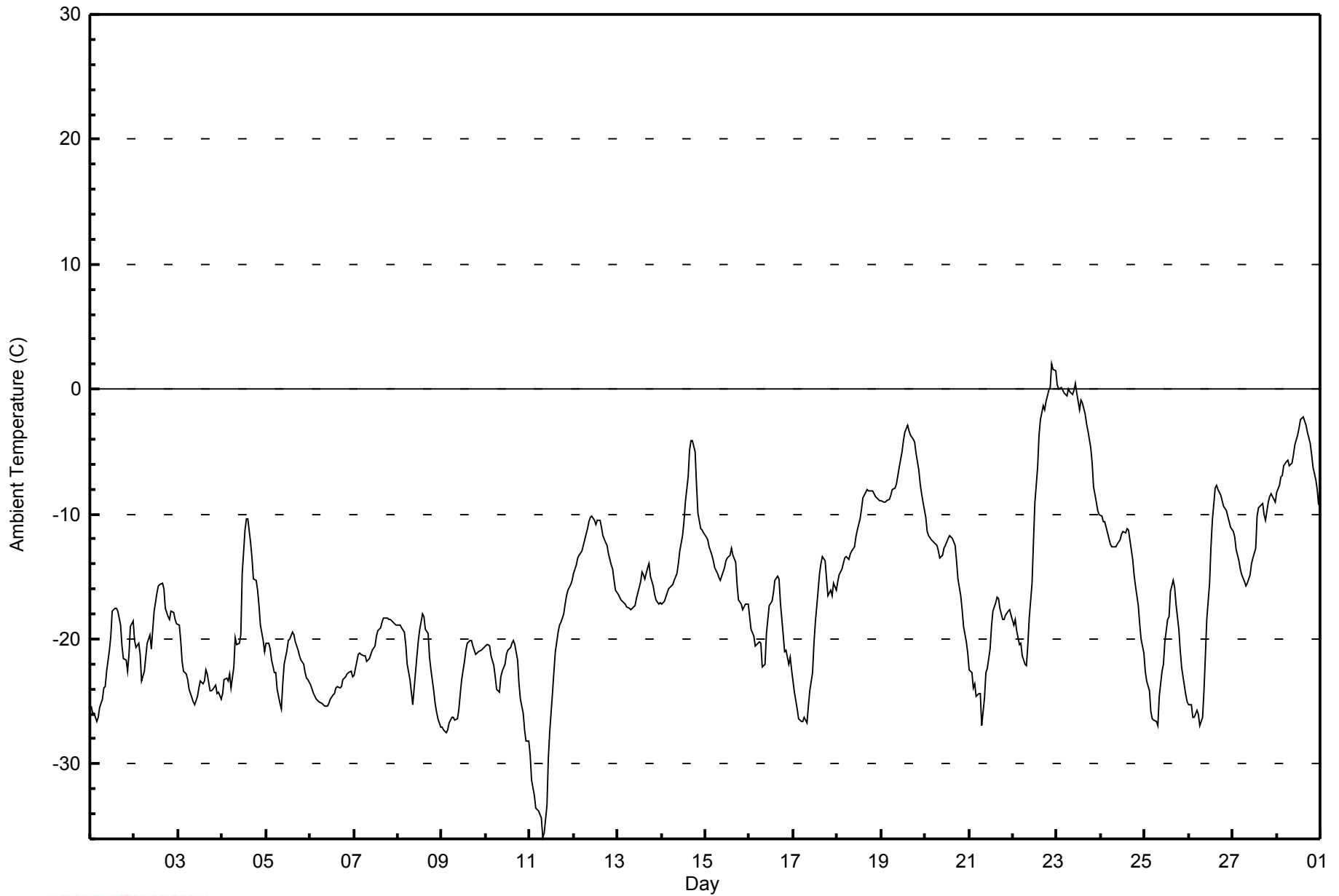


Maximum Value: 2.1 C on Feb 22 22:00		Maximum Daily Average: -2.5 C on Feb 23		Hours in Service: 672																						
Minimum Value: -35.9 C on Feb 11 08:00		Minimum Daily Average: -25.6 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.3 C at hour 16		Minimum Diurnal Average: -19.7 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.83 C		Percentiles: P <sub>1</sub> = -33.5 P <sub>10</sub> = -25.0 Q <sub>1</sub> = -22.3 Median = -17.8 Q <sub>3</sub> = -12.0 P <sub>90</sub> = -7.1 P <sub>99</sub> = 0.1		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-Feb	-25.3	-25.9	-25.9	-26.6	-26.3	-25.4	-24.8	-23.9	-23.8	-22.6	-20.9	-19.7	-17.8	-17.6	-17.5	-17.8	-18.9	-20.6	-21.6	-21.7	-22.6	-21.3	-19.0	-18.6	-21.9	-17.5
2-Feb	-20.1	-20.6	-20.4	-21.2	-23.4	-22.6	-21.4	-20.4	-19.7	-20.7	-19.3	-17.7	-16.3	-15.8	-15.7	-15.5	-16.0	-17.5	-18.2	-18.5	-17.8	-17.9	-18.4	-18.7	-18.9	-15.5
3-Feb	-18.9	-20.1	-21.8	-22.6	-22.8	-23.3	-24.0	-24.7	-25.0	-25.2	-24.6	-23.9	-23.4	-23.6	-23.3	-22.5	-22.9	-24.1	-24.2	-24.0	-23.7	-24.3	-24.3	-24.8	-23.4	-18.9
4-Feb	-24.3	-23.2	-23.2	-23.3	-22.7	-24.0	-22.2	-19.8	-20.5	-20.3	-19.6	-14.7	-11.3	-10.3	-10.4	-12.3	-13.5	-15.2	-15.3	-16.1	-17.3	-18.9	-20.1	-21.0	-18.3	-10.3
5-Feb	-20.3	-20.4	-20.8	-21.7	-22.7	-22.7	-24.1	-25.1	-25.6	-23.6	-22.0	-20.9	-20.1	-20.0	-19.5	-19.7	-20.2	-20.9	-21.3	-21.7	-22.0	-22.6	-23.2	-23.3	-21.8	-19.5
6-Feb	-23.7	-24.1	-24.4	-24.8	-25.0	-25.0	-25.1	-25.2	-25.4	-25.4	-25.2	-24.8	-24.5	-24.3	-24.0	-23.9	-23.9	-23.8	-23.3	-23.0	-22.8	-22.7	-22.5	-23.0	-24.2	-22.5
7-Feb	-22.9	-21.8	-21.2	-21.2	-21.2	-21.3	-21.4	-21.8	-21.6	-21.3	-20.9	-20.6	-19.8	-19.4	-19.1	-18.6	-18.4	-18.3	-18.3	-18.4	-18.5	-18.7	-18.8	-18.9	-20.1	-18.3
8-Feb	-18.8	-18.9	-19.1	-19.5	-20.5	-22.0	-23.2	-24.3	-25.3	-23.9	-21.3	-20.1	-19.2	-18.0	-18.2	-19.2	-19.5	-21.4	-22.5	-24.2	-25.2	-25.9	-26.3	-27.1	-21.8	-18.0
9-Feb	-27.1	-27.3	-27.5	-27.3	-26.8	-26.3	-26.3	-26.5	-26.4	-25.5	-24.4	-23.2	-21.8	-20.9	-20.3	-20.1	-20.1	-20.6	-21.2	-21.1	-21.0	-20.9	-20.8	-20.7	-23.5	-20.1
10-Feb	-20.5	-20.4	-20.6	-21.3	-22.1	-23.0	-24.1	-24.3	-23.0	-22.6	-22.0	-21.2	-20.9	-20.7	-20.3	-20.1	-20.5	-21.6	-23.6	-24.8	-26.0	-27.3	-28.2	-28.2	-22.8	-20.1
11-Feb	-29.2	-31.3	-32.5	-33.6	-33.6	-33.8	-34.3	-35.9	-35.5	-33.3	-29.5	-27.4	-24.3	-22.6	-21.0	-19.4	-18.9	-18.6	-17.9	-17.2	-16.5	-16.1	-15.7	-15.3	-25.6	-15.3
12-Feb	-14.7	-14.1	-13.5	-13.3	-12.9	-12.6	-12.1	-11.2	-10.6	-10.3	-10.1	-10.4	-10.8	-10.5	-10.5	-11.1	-11.8	-12.3	-12.5	-13.1	-14.0	-14.4	-15.4	-16.0	-12.4	-10.1
13-Feb	-16.4	-16.6	-16.9	-17.1	-17.2	-17.4	-17.6	-17.6	-17.5	-17.3	-16.8	-16.3	-15.5	-14.7	-14.8	-15.2	-14.3	-13.9	-15.0	-15.8	-16.4	-16.9	-17.2	-17.1	-16.3	-13.9
14-Feb	-17.2	-17.0	-16.7	-16.3	-16.0	-15.8	-15.6	-15.3	-14.8	-14.0	-12.9	-11.8	-10.6	-9.1	-7.1	-4.9	-4.2	-4.1	-5.0	-7.7	-9.9	-11.1	-11.3	-11.5	-11.7	-4.1
15-Feb	-11.8	-12.1	-12.6	-13.3	-13.7	-14.3	-14.8	-15.0	-15.3	-15.0	-14.3	-13.8	-13.6	-13.3	-12.7	-13.3	-13.9	-15.6	-16.8	-17.2	-17.6	-17.5	-17.3	-17.3	-14.7	-11.8
16-Feb	-18.2	-19.2	-19.8	-20.5	-20.5	-20.3	-20.4	-22.2	-22.0	-19.5	-18.4	-17.3	-17.0	-16.3	-15.3	-14.9	-15.2	-17.1	-19.7	-21.1	-20.9	-22.0	-21.5	-22.5	-19.2	-14.9
17-Feb	-24.3	-24.9	-25.5	-26.4	-26.6	-26.6	-26.3	-26.7	-25.4	-24.1	-22.7	-20.4	-18.7	-16.1	-14.8	-13.9	-13.4	-13.7	-15.2	-16.6	-16.1	-16.5	-15.5	-16.1	-20.3	-13.4
18-Feb	-15.5	-14.9	-14.4	-13.9	-13.5	-13.4	-13.6	-13.2	-13.0	-12.6	-11.9	-11.2	-10.4	-9.5	-8.7	-8.3	-8.0	-8.1	-8.1	-8.2	-8.4	-8.6	-8.8	-8.9	-11.1	-8.0
19-Feb	-9.0	-9.0	-9.0	-9.0	-8.8	-8.5	-8.1	-7.9	-7.6	-6.9	-6.3	-5.0	-4.1	-3.5	-2.9	-3.4	-3.7	-4.0	-4.2	-5.1	-6.4	-7.6	-8.3	-9.1	-6.6	-2.9
20-Feb	-10.3	-11.4	-11.7	-12.0	-12.2	-12.3	-12.5	-12.9	-13.6	-13.2	-12.7	-12.5	-11.9	-11.7	-11.9	-12.0	-12.5	-13.8	-15.2	-16.5	-17.7	-19.0	-20.2	-21.1	-13.8	-10.3
21-Feb	-22.4	-22.7	-23.9	-23.5	-24.6	-24.3	-24.4	-26.9	-24.7	-22.7	-22.3	-20.8	-19.0	-17.8	-17.1	-16.6	-16.7	-17.6	-18.4	-18.5	-18.1	-17.8	-17.7	-18.1	-20.7	-16.6
22-Feb	-18.9	-18.4	-19.3	-20.5	-20.3	-21.3	-22.0	-22.1	-20.4	-18.3	-15.5	-12.3	-9.1	-6.2	-3.6	-2.4	-1.4	-1.7	-0.9	0.0	0.1	2.1	1.6	1.4	-10.4	2.1
23-Feb	0.3	0.1	0.2	-0.1	-0.3	-0.6	0.0	-0.2	-0.4	-0.1	0.4	-0.4	-1.6	-0.9	-1.1	-2.0	-2.8	-3.3	-4.7	-5.9	-7.9	-9.1	-9.7	-10.0	-2.5	0.4
24-Feb	-10.2	-10.6	-10.6	-11.0	-12.0	-12.4	-12.6	-12.6	-12.4	-12.0	-11.6	-11.4	-11.5	-11.2	-11.3	-12.1	-13.6	-14.9	-15.7	-17.3	-18.8	-20.0	-21.2	-21.2	-13.3	-10.2
25-Feb	-22.5	-23.3	-24.2	-25.8	-26.4	-26.4	-26.6	-26.9	-24.6	-22.6	-22.0	-20.2	-18.4	-18.2	-16.2	-15.3	-15.9	-17.2	-19.2	-20.9	-22.2	-23.1	-24.5	-25.0	-22.0	-15.3
26-Feb	-25.3	-25.3	-26.3	-26.2	-25.7	-26.0	-26.9	-26.3	-24.1	-21.4	-18.4	-15.5	-12.6	-10.5	-8.0	-7.8	-8.0	-8.5	-8.9	-9.3	-9.7	-10.2	-10.6	-11.1	-16.8	-7.8
27-Feb	-11.3	-11.8	-12.9	-13.7	-14.4	-14.9	-15.4	-15.8	-15.5	-14.9	-14.0	-13.6	-12.7	-10.1	-9.5	-9.4	-9.2	-10.0	-10.5	-9.1	-8.6	-8.3	-8.8	-9.1	-11.8	-8.3
28-Feb	-8.3	-7.7	-7.0	-6.9	-6.2	-5.8	-5.7	-6.1	-5.9	-5.3	-4.5	-3.7	-3.1	-2.5	-2.2	-2.6	-2.8	-3.5	-4.3	-5.2	-6.2	-7.2	-8.0	-9.2	-5.4	-2.2
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	266	39.58	39.58
-20 - 0	398	59.23	98.81
0 - 10	8	1.19	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



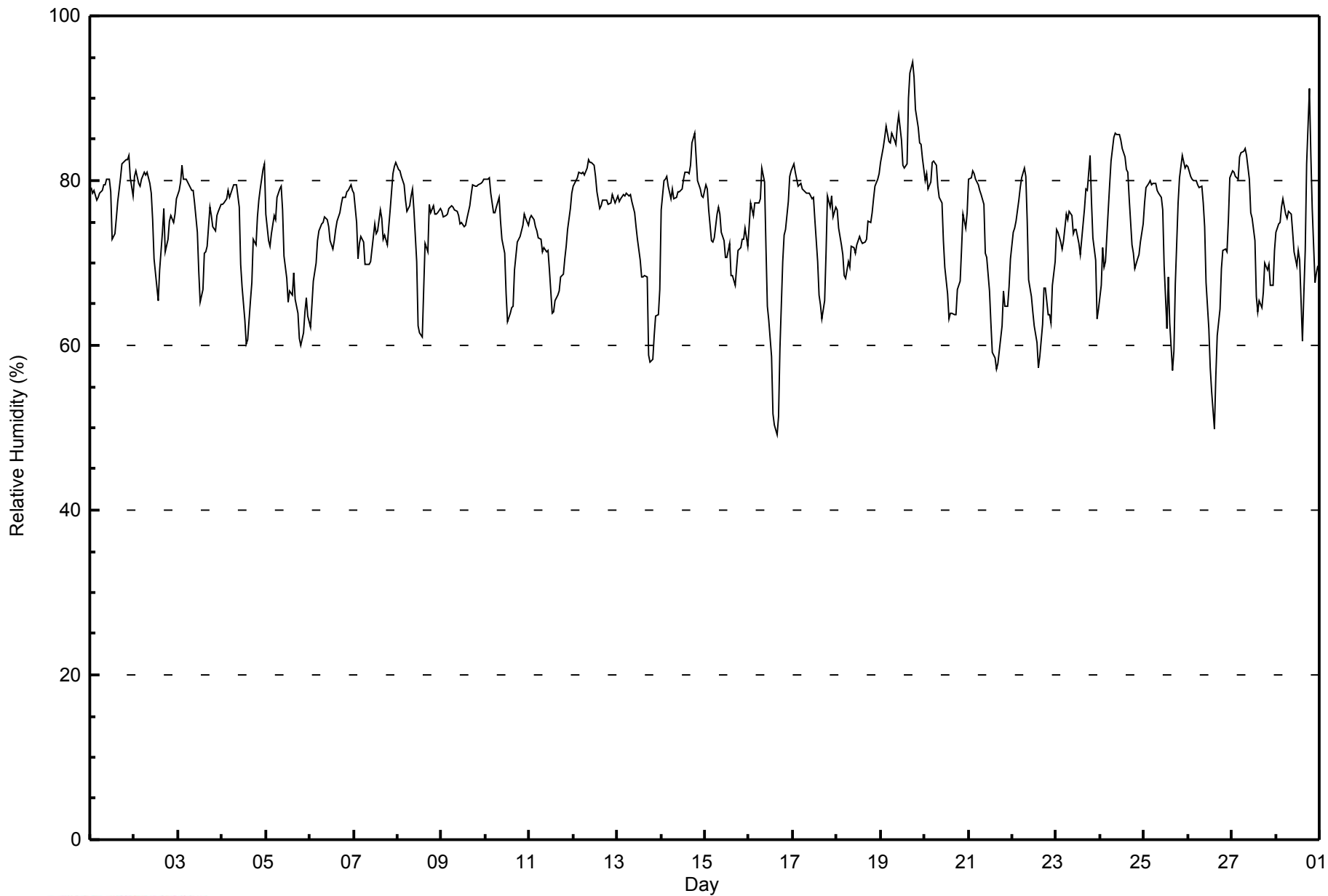


Maximum Value: 94 % on Feb 19 18:00																		Maximum Daily Average: 86.0 % on Feb 19						Hours in Service: 672																									
Minimum Value: 49 % on Feb 16 16:00																		Minimum Daily Average: 69.1 % on Feb 22						Hours of Data: 672																									
Maximum Diurnal Average: 78.3 % at hour 8																		Minimum Diurnal Average: 67.9 % at hour 15						Hours of Missing Data: 0																									
Monthly Average: 74.4 %																		Percentiles: P <sub>1</sub> = 57 P <sub>10</sub> = 65 Q <sub>1</sub> = 71 Median = 76 Q <sub>3</sub> = 79 P <sub>90</sub> = 82 P <sub>99</sub> = 88						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-Feb	79	79	79	78	78	78	79	80	79	80	80	79	73	74	75	77	80	82	82	83	83	83	80	78	79.1	83																							
2-Feb	80	81	80	79	80	81	81	81	80	78	75	70	67	65	69	74	77	71	73	75	76	75	76	78	76.0	81																							
3-Feb	79	80	82	80	80	80	80	79	79	77	74	69	65	67	71	71	72	77	76	74	74	76	76	77	75.6	82																							
4-Feb	77	77	78	79	78	78	80	79	79	77	70	67	63	60	61	65	68	73	72	76	78	79	81	82	74.1	82																							
5-Feb	76	73	72	74	76	75	78	79	79	77	71	68	65	67	66	69	66	64	61	60	61	64	66	64	69.5	79																							
6-Feb	62	65	68	70	73	74	75	75	76	75	74	73	72	73	74	75	76	77	78	78	79	79	79	79	74.1	79																							
7-Feb	78	75	70	72	73	73	70	70	70	70	72	75	74	74	76	75	73	73	72	74	76	81	82	82	74.2	82																							
8-Feb	81	81	80	80	78	76	77	78	79	76	70	62	62	61	67	72	71	77	76	77	76	76	76	77	74.5	81																							
9-Feb	76	76	76	76	77	77	77	76	76	76	75	75	74	75	75	77	78	80	79	79	79	80	80	80	77.0	80																							
10-Feb	80	80	80	78	76	76	77	78	75	73	71	66	63	64	65	65	69	73	73	73	75	76	75	75	73.2	80																							
11-Feb	75	76	75	74	74	73	73	71	72	71	72	69	64	64	65	66	67	68	69	70	72	74	77	79	71.3	79																							
12-Feb	79	80	80	81	81	81	81	82	83	82	82	82	80	79	77	77	78	78	78	77	77	78	78	77	79.4	83																							
13-Feb	78	77	78	78	78	78	78	78	77	76	74	73	70	68	68	69	68	59	58	58	61	64	64	67	70.8	78																							
14-Feb	76	80	80	81	79	78	79	78	78	79	79	79	80	81	81	81	82	85	86	83	80	79	78	78	79.9	86																							
15-Feb	80	79	76	73	73	73	76	77	76	74	73	71	71	72	68	68	67	70	71	72	73	73	74	72	73.0	80																							
16-Feb	75	77	76	77	77	77	78	81	80	72	65	63	59	52	50	49	51	60	70	73	74	77	81	81	69.8	81																							
17-Feb	82	81	80	79	80	79	79	78	79	78	78	78	75	70	66	65	63	65	71	78	77	78	76	77	75.5	82																							
18-Feb	76	74	72	71	68	68	70	70	72	72	71	72	73	73	72	73	73	75	75	76	78	79	80	81	73.5	81																							
19-Feb	82	84	85	87	85	85	86	85	84	87	88	85	82	81	82	90	93	94	93	89	86	84	84	83	86.0	94																							
20-Feb	80	81	79	80	82	82	82	79	78	77	73	70	66	63	64	64	64	64	67	68	72	76	74	76	73.3	82																							
21-Feb	80	80	81	81	80	80	79	78	77	71	71	67	63	59	58	57	58	59	62	67	65	65	67	70	69.8	81																							
22-Feb	74	74	75	78	79	80	82	81	75	68	66	64	62	60	57	59	62	67	67	64	64	63	67	70	69.1	82																							
23-Feb	74	74	73	72	73	76	75	76	76	74	74	74	72	71	73	77	79	83	77	73	70	63	64	73.8	83																								
24-Feb	67	72	69	70	77	79	82	85	86	86	86	85	84	83	81	81	78	72	71	69	71	71	73	75	77.2	86																							
25-Feb	77	79	80	80	80	80	80	79	79	78	76	70	62	68	63	57	59	67	77	80	82	83	82	82	74.9	83																							
26-Feb	82	81	80	80	80	79	79	79	77	74	68	62	57	54	50	56	61	64	69	71	72	71	75	80	71.0	82																							
27-Feb	81	81	80	80	83	83	84	84	83	80	76	75	73	66	64	65	65	67	70	69	70	67	67	71	74.4	84																							
28-Feb	74	75	75	77	78	76	75	76	76	74	71	70	71	70	61	66	72	82	91	83	77	68	69	70	74.0	91																							
																								77.3	77.5	77.2	77.3	77.6	77.7	78.2	78.3	77.8	76.2	74.1	71.9	69.4	68.4	67.9	69.3	70.4	72.2	74.0	74.1	74.2	74.6	75.0	75.9	Diurnal Average	
																								82	84	85	87	85	85	86	85	86	87	88	85	84	83	82	90	93	94	93	89	86	84	84	83	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





Maximum Speed: 27 km/h on Feb 14 04:00		Maximum Daily Speed Average: 13.0 km/h on Feb 14		Hours in Service: 672																							
Minimum Speed Value: 1 km/h on Feb 21 10:00		Minimum Daily Speed Average: 0.8 km/h on Feb 4		Hours of Data: 672																							
Maximum Diurnal Speed Average: 3.5 km/h at hour 19		Minimum Diurnal Speed Average: 0.3 km/h at hour 9		Hours of Missing Data: 0																							
Monthly Average Velocity: 1.6 km/h 49.2 deg		Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 15 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-Feb	S8	S4	S5	SSW6	SSE5	S5	S5	S4	SE4	ESE2	N6	NNE4	W3	W5	SW3	SW2	ENE3	ENE2	NNE3	SW4	SW5	W7WNW10	WNW8	SW1.8	WNW10		
2-Feb	SW4	WSW5	W7	WSW4	SSW4	SSE5	SW5	W6	W6	NW8	W7	NNW9NNW10	NNW6	NNW8	NNE5	NNW4	NNW8	N6	NNW5	NW8	NW11WNW10	WNW8	WNW4.7	NW11			
3-Feb	W4	N1	NNE4	N4	NNE4	NNE8	N7	N6	N6	N8	NNE9	NNE10	N9	NNW2	SSE3	SE6	SE8	SSE8	S7	S7	S10	S8	S9	SSE10	E1.2	SSE10	
4-Feb	SSE11	SSE12	SSE11	S8	SSW10	S10	S12	S11	SW4	N1	SSW6	WSW7WNW13	NW12	N10	NNE9	NNE7	N7	N10	NNE6	NE8	N6	NNW6	NNW6	WSW0.8	WNW13		
5-Feb	NNW10	NW10	NNW11	NW7	NNW5	N5	NNW5	W3	SSW5	SW4	NNW4	SW4	SSE3	ESE2	NE1	NE7	ENE8	ENE7	NE8	NE7	NE5	NE5	NNE7	N3.2	NNW11		
6-Feb	NE9	NE8	NE10	NE10	NE9	NE10	NNE11	NNE11	NNE12	NNE12	NE13	NE12	NNE14	NNE13	NNE14	NNE12	NNE13	NNE12	NNE10	NE9	NE7	NE7	ENE7	NE7	NE10.3	NNE14	
7-Feb	ENE7	ESE10	SSE17	SSE13	SSE15	SSE14	SSE18	SSE19	SSE19	SSE19	SSE17	SSE17	SE14	SSE13	SE12	SSE11	SSE11	SSE9	S7	SE3	NE4	NNE4	N6	NNE5	SSE10.2	SSE19	
8-Feb	N6	N4	N6	NNE7	NE11	NE11	NE7	NNE5	NNW5	NNW4	SW5	SW5	S3	NNE1	ESE2	ENE5	NE6	NNE9	NNE9	N11	N11	N12	NNE9	NNE10	NNE5.4	N12	
9-Feb	N10	NNE10	NNE9	N10	NNE10	NNE11	N10	N13	NNE10	N6	N7	N8	N8	N9	N10	N10	N9	N8	N9	N8	NNW9	N8	N8	N8	N9.0	N13	
10-Feb	N7	N6	N10	NNE11	NNE12	NNE11	NNE6	NNW5	N7	NNW10	N7	NNW10	NNW12	NNW11	NNW9	NNE6	N8	NNE11	NE11	NE10	NE7	NE5	NNE6	NNE6	N7.7	NNE12	
11-Feb	N5	N2	WSW2	SW3	SW5	SSW4	S4	SSW5	SSW4	SSW4	SSE9	S11	S11	S13	S16	S14	SSE19	SSE21	SSE21	SSE22	S21	S22	S20	S17	S10.5	SSE22	
12-Feb	S12	S12	SSE9	S8	S7	SSW7	SSW9	WSW7	WSW6	WNW5	N6	N11	NNE11	NNE9	NE9	NE10	NNE12	NNE11	NE11	NE11	NE10	NE10	NNE12	NNE12	NE3.3	S12	
13-Feb	NNE10	NE10	NNE11	NNE10	NNE10	NE10	NNE10	NNE9	NE10	NE12	NNE12	NNE12	NNE12	NNE11	N10	N8	NNE4	SE17	SSE22	SSE24	SSE23	SSE24	SSE26	SSE24	E6.0	SSE26	
14-Feb	SSE23	SSE23	SSE24	SSE27	SSE25	SSE25	SSE24	SSE24	SSE23	SSE20	S20	S23	S23	S19	SSE13	S11	S11	SSW7	N17	NNE16	NNE12	NNE9	NNE8	NE5	SSE13.0	SSE27	
15-Feb	NE4	NE6	ENE6	ENE7	ENE6	NE9	NE9	NE9	NE9	NNE8	NNE9	NNE11	NNE9	NNE11	NNE12	NE10	NE10	NNE8	NNE8	NNE6	N5	NNE6	NNE9	NNE7.6	NNE12		
16-Feb	NNE9	NNE6	NNE8	NNE6	N7	N5	NNW5	N4	N4	NNE5	SW5	SW5	NW7	NW4	SSW4	S3	SSE4	ESE4	ENE3	N6	N7	NNW5	NNW5	NW2	N2.9	NNE9	
17-Feb	SSE3	SSW3	SSW3	SW3	SW3	SW4	SW4	SSW4	S4	S4	SSW5	SSE6	SSE8	SSE8	SE8	SE9	SE8	SE6	SE4	SE3	SSE5	SSE4	SSE6	SE6	SSE4.4	SE9	
18-Feb	SSE9	SSE7	SSE14	SSE12	SSE11	SSE12	SSE9	SSE10	SSE10	SSE12	SSE10	SE10	SE9	SSE11	S9	SSE8	S8	SSE5	SSE7	S9	SSE9	S12	S10	S7	SSE9.5	SSE14	
19-Feb	S7	SSW7	S8	S9	SSW11	S8	S8	S8	S8	SE5	S5	SSW4	WNW1	NNW3	NNW5	N10	N9	N7	NNE8	NNE13	NNE17	NNE17	NNE16	NNE17	NNE1.4	NNE17	
20-Feb	NNE16	NNE17	NNE17	NNE15	NNE14	NNE13	NNE13	NNE13	NNE11	NE10	NNE11	NE9	NE10	NNE9	N14	N11	NNE8	NE7	NE9	NNE10	NNE10	N7	N8	N6	NNE11.0	NNE17	
21-Feb	N6	N5	N7	N7	N6	NNE6	NNE6	SSE2	ESE1	NW1	NE2	SSW6	S6	S5	SSE8	SSE9	SSE9	SSE8	SSE8	S7	S9	S11	S11	SSE10	SSE2.8	S11	
22-Feb	SSE8	S9	S10	SSE8	S8	S3	S7	SSW6	SSW7	SSW4	SSE9	S10	S15	SSE14	SSE12	S11	SW10	SW11	SW10	WSW10	WSW10	W14	NW14	NW17	SSW6.6	NW17	
23-Feb	NW15	NW15	NW16	NW16	NW16	NW16	NW20	NW16	NNW15	NW9	NW12	N14	NNE12	NNE13	NNE12	NNE12	NNE14	NNE18	NNE16	NE16	ENE13	ENE10	ENE8	N10.8	NW20		
24-Feb	NE7	NE7	ESE10	ESE10	ESE11	E12	E11	ENE8	ENE8	ENE9	NE8	NE9	NNE10	NNE12	NNE15	NNE15	NNE16	NNE17	NNE17	NNE17	NNE16	NNE15	NNE13	N11	NE9.9	NNE17	
25-Feb	N8	N7	NNW5	NNW4	NW3	NNW4	N5	N5	N5	NNW4	WSW3	SW5	SW4	NW2	S2	S4	S5	SSE6	S5	SSW5	SSW5	SSW5	SSW5	SSW6	W1.2	N8	
26-Feb	S5	SSW4	SSW6	SSW6	S6	S4	SSW7	SSW8	SSW7	S7	SSE11	SSE12	SSE11	SSE8	SW5	WSW9	WSW11	W5	N8	N8	NNE8	NNE11	N10	N7	SSW2.4	SSE12	
27-Feb	N9	N9	NNE11	NNE10	NE5	NNE7	NE6	NE5	SE2	S5	S5	S5	E2	SSW7	S11	S11	SW10	SW8	SW7	SSW9	WSW5	WSW8	WSW7	WNW8	WSW1.4	NNE11	
28-Feb	WNW8	WNW10	WNW10	WNW8	WNW11	NW15	NW16	NW14	NW14	NW14	NW14	NW12	NNW11	NNW12	N11	NNW10	NNE7	NW8	N12	NNE8	N15	N13	N12	N6	NNE5	NNW9.5	NW16
NE1.6 NE1.2 ENE1.2 E1.1 E1.0 ENE1.5 ENE0.9 E0.3 NNE0.3 NE1.1 E0.8 E0.8 NE1.5 NE1.4 NE1.8 ENE2.4 ENE1.9 ENE2.5 NE3.5 NE3.3 NE3.1 NNE2.3 NNE2.1 NNE2.3																								Diurnal Average			
SSE23 SSE23 SSE24 SSE27 SSE25 SSE25 SSE24 SSE24 SSE23 SSE20 S20 S23 S23 S19 S16 NNE15 SSE19 SSE21 SSE22 SSE24 SSE23 SSE24 SSE26 SSE24																								Diurnal Maximum			
All monthly, daily, and diurnal averages have been calculated using vector methods																											



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

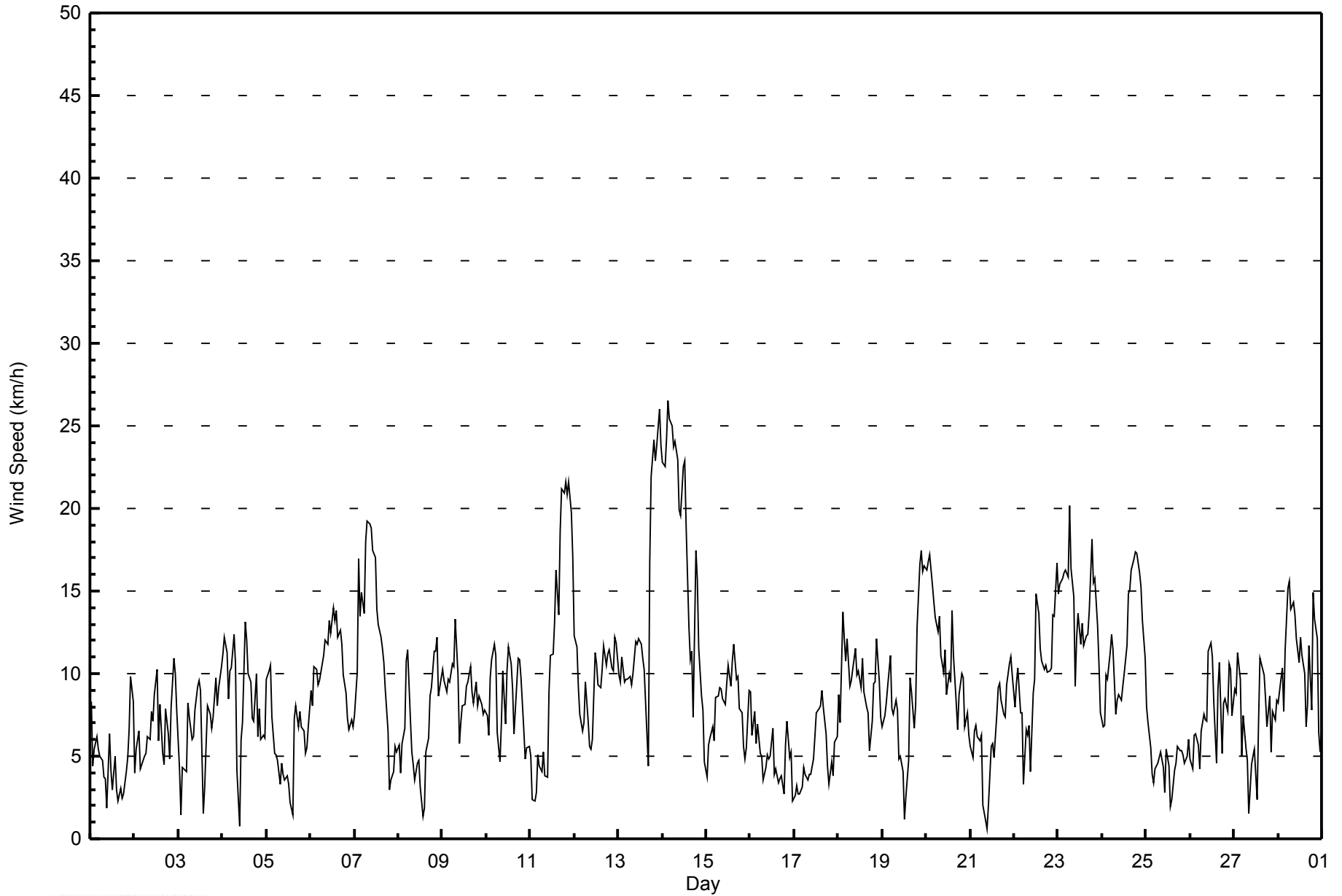
**Wind Speed (WS) - km/h**  
**Mildred Lake - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 13 21:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: 1 km/h on Feb 16 09:00																																						
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> = 4 P <sub>99</sub> = 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-Feb	2	3	2	2	1	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1	3	3	3	3														
2-Feb	2	3	2	2	1	2	2	2	3	3	2	5	2	2	1	1	4	1	1	1	2	2	2	2														
3-Feb	2	2	1	3	1	2	2	1	1	2	3	2	2	3	1	1	2	1	1	2	2	2	3	3														
4-Feb	3	3	3	2	2	3	2	3	3	1	2	3	4	3	2	2	2	2	2	2	3	2	1	1														
5-Feb	2	2	2	1	1	1	1	1	1	1	2	1	1	1	3	2	2	2	2	2	2	1	1	3														
6-Feb	3	2	3	3	2	2	3	3	2	3	4	3	3	3	3	3	3	3	2	2	2	1	2	2														
7-Feb	2	2	4	4	3	5	5	5	4	4	4	3	4	3	3	3	2	2	3	1	1	1	1	1														
8-Feb	2	2	1	2	3	3	2	1	1	2	1	1	1	2	1	1	1	2	1	2	2	2	2	2														
9-Feb	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2														
10-Feb	1	2	2	3	3	3	2	1	1	2	2	3	3	2	2	2	2	3	3	3	2	1	2	2														
11-Feb	1	1	2	2	1	1	1	1	1	2	2	3	3	3	3	3	4	4	4	4	4	4	4	3														
12-Feb	2	2	2	2	1	2	2	2	2	2	3	2	2	2	2	2	3	2	3	3	4	3	3	3														
13-Feb	3	3	3	2	2	3	3	3	2	3	3	3	3	2	2	2	2	4	5	5	7	6	6	5														
14-Feb	5	5	5	5	5	4	4	5	4	4	4	4	4	4	2	3	2	3	3	4	3	4	2	2														
15-Feb	2	1	1	2	3	2	2	3	3	2	2	2	2	2	3	3	2	3	2	2	1	1	2	2														
16-Feb	2	2	2	1	1	1	1	1	1	1	1	1	2	3	1	1	1	1	2	1	1	1	2	2														
17-Feb	1	1	1	2	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	2	1	1	2														
18-Feb	2	3	4	3	3	3	3	3	2	4	3	2	2	2	2	2	2	1	2	2	2	2	2	1														
19-Feb	2	1	2	2	2	2	2	2	2	1	1	1	1	1	3	2	1	1	2	4	4	5	5	6														
20-Feb	5	5	5	4	3	3	3	3	3	3	3	2	3	3	3	2	2	1	2	2	2	2	1	1														
21-Feb	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	2	1	1	2	2	2	2	2														
22-Feb	2	2	1	2	1	2	1	1	1	1	2	2	3	3	2	3	3	2	3	3	3	5	4	4														
23-Feb	3	4	4	4	4	4	4	4	3	3	3	4	2	3	3	3	3	5	5	4	5	3	3	2														
24-Feb	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	4	4	4	4	4	4	4	3	2														
25-Feb	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1														
26-Feb	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	2	1	2	2	3	2	2														
27-Feb	3	2	3	3	1	2	2	1	2	1	1	1	1	3	2	1	2	2	1	2	2	3	2	3														
28-Feb	2	3	3	4	4	4	4	3	4	4	3	3	3	3	3	2	4	3	2	4	3	3	2	1														
														5	5	5	5	5	5	5	5	5	4	4	4	4	4	5	4	4	4	5	5	5	7	6	6	6
														Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	160	23.81	23.81
6 - 11	366	54.46	78.27
12 - 19	120	17.86	96.13
20 - 28	26	3.87	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

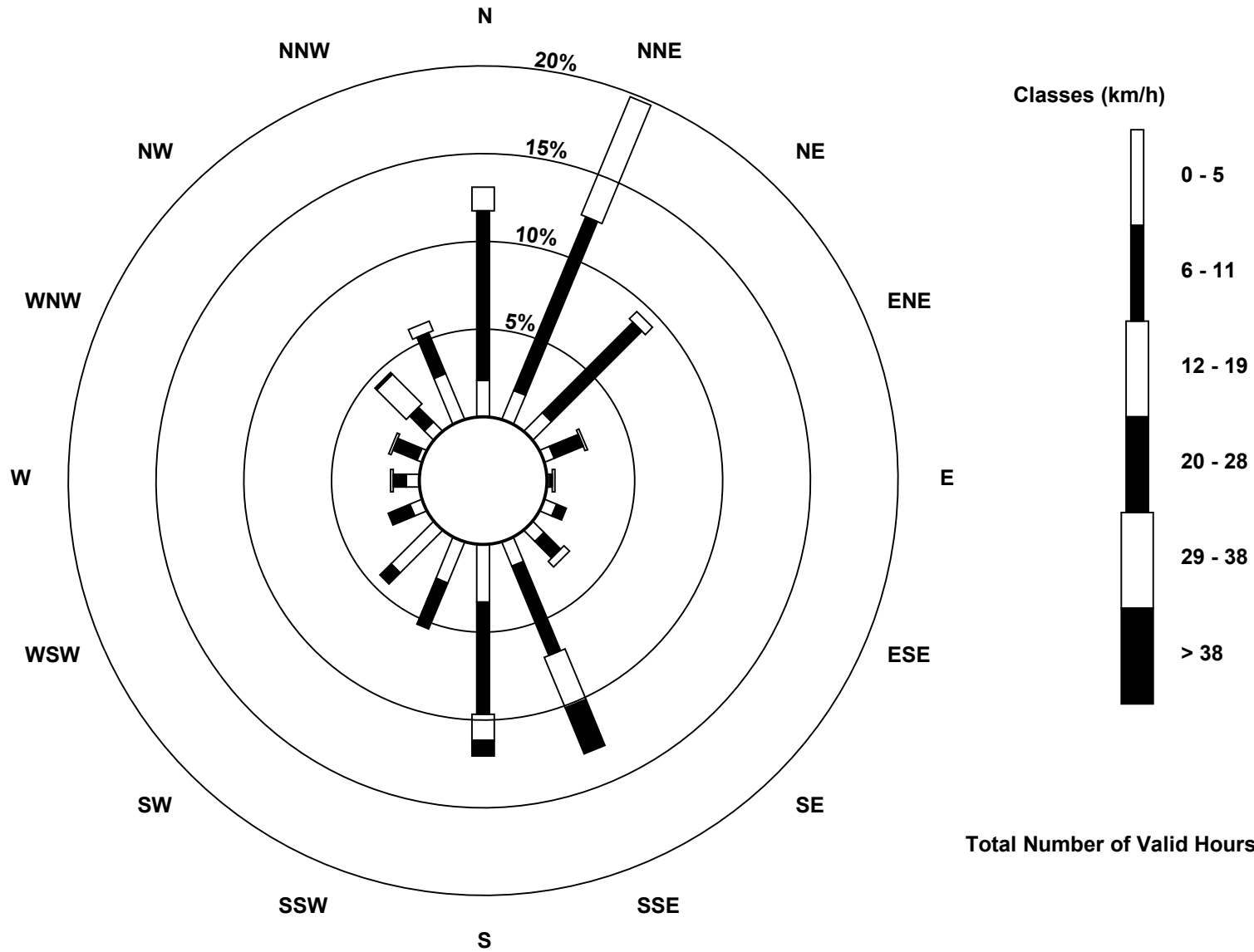
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	12	10	4	1	5	6	10	22	17	23	5	5	2	5	19	160
6 - 11	65	72	49	12	1	4	9	37	43	19	6	9	5	10	8	17	366
12 - 19	9	49	4	1	1	0	3	21	10	0	0	0	1	1	16	4	120
20 - 28	0	0	0	0	0	0	0	19	6	0	0	0	0	0	1	0	26
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>	88	133	63	17	3	9	18	87	81	36	29	14	11	13	30	40	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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



Total Number of Valid Hours: 672





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

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

Direction of Maximum Speed: 164 deg on Feb 14 04:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 159.5 deg on Feb 14	Hours of Data: 672
Direction of Minimum Speed: 311 deg on Feb 21 10:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 4	Percent Operational Time: 100.0
Monthly Average Direction: 254.2 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-Feb	177	181	174	212	158	177	177	170	125	107	5	15	273	279	235	229	61	61	30	229	225	272	290	292	223.2
2-Feb	235	247	271	240	204	165	220	259	261	314	275	338	344	346	336	16	335	340	1	330	308	304	299	293	303.0
3-Feb	264	349	17	11	22	14	11	9	352	11	27	15	359	333	157	129	135	160	174	176	184	176	171	168	79.1
4-Feb	164	168	167	179	194	187	169	172	231	355	209	248	293	312	352	26	30	355	356	14	36	9	345	343	241.1
5-Feb	330	325	332	325	339	8	344	262	213	220	340	221	157	112	36	44	62	66	55	43	49	47	43	24	10.7
6-Feb	36	37	48	54	45	38	32	33	24	31	38	39	28	22	21	21	20	24	32	39	53	48	67	35	34.2
7-Feb	69	116	155	148	156	154	157	159	156	154	154	157	142	154	142	159	160	165	169	136	40	19	11	13	148.4
8-Feb	7	5	11	31	34	44	45	21	339	347	218	227	190	28	118	57	36	14	14	8	7	9	13	13	18.3
9-Feb	11	13	16	10	13	12	8	6	14	6	3	3	2	0	6	11	5	359	358	5	348	354	0	359	5.6
10-Feb	1	1	6	27	25	27	17	334	349	344	353	340	328	328	343	20	10	28	38	34	38	35	19	22	7.6
11-Feb	6	354	238	220	224	198	188	209	201	192	162	173	175	176	169	178	166	165	165	167	171	172	172	171	173.6
12-Feb	173	172	164	176	184	193	209	243	245	296	352	4	14	29	45	40	29	30	35	39	39	36	29	20	39.7
13-Feb	23	35	26	23	17	36	33	33	35	42	27	29	31	21	0	358	22	129	157	158	151	156	158	159	86.5
14-Feb	157	156	157	164	165	166	165	167	168	166	172	172	170	170	160	186	179	213	11	31	31	29	30	41	159.5
15-Feb	54	53	72	68	62	44	35	42	41	36	23	15	18	20	14	13	40	42	31	29	26	349	15	22	32.0
16-Feb	14	23	26	18	10	5	334	353	354	24	218	235	313	319	198	174	163	103	70	2	9	335	333	319	358.1
17-Feb	168	202	199	224	234	219	214	196	191	181	200	168	148	162	146	144	136	140	144	142	153	153	166	144	165.6
18-Feb	158	156	164	160	165	166	150	147	152	158	157	142	142	155	170	162	176	159	154	169	160	170	172	177	160.0
19-Feb	180	197	189	190	196	188	183	188	181	145	170	195	301	337	339	354	355	357	19	21	16	30	21	19	32.2
20-Feb	25	21	17	18	15	17	16	23	21	34	28	39	35	29	359	1	17	42	38	19	14	9	4	5	19.9
21-Feb	349	8	358	359	4	17	27	161	123	311	37	213	181	171	162	156	150	155	168	174	176	170	169	165	155.3
22-Feb	158	182	172	165	175	176	180	198	210	209	158	174	172	165	153	179	214	219	221	237	252	280	305	312	202.0
23-Feb	312	316	307	319	312	311	321	326	330	324	323	7	30	15	21	30	32	32	22	27	53	66	60	57	355.1
24-Feb	50	53	106	118	102	101	94	75	68	58	47	44	28	22	27	27	14	12	15	18	13	15	12	9	39.3
25-Feb	356	355	348	330	322	336	349	355	350	336	249	215	228	314	189	181	170	157	171	197	194	197	216	211	263.3
26-Feb	172	200	195	193	171	182	204	205	206	185	160	162	161	160	225	254	250	273	359	5	13	16	11	4	198.3
27-Feb	4	11	18	16	34	20	50	48	133	180	187	183	100	212	189	177	221	223	225	211	254	249	254	289	239.4
28-Feb	300	297	294	288	300	305	307	309	304	314	320	327	339	353	345	25	321	358	16	11	7	6	5	31	330.2
Diurnal Average																									
	35.3	40.9	74.6	83.1	89.0	67.3	72.4	84.4	24.7	42.7	80.1	85.8	43.7	38.4	48.6	60.0	61.1	61.6	46.6	44.0	42.6	30.7	22.6	15.9	

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



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

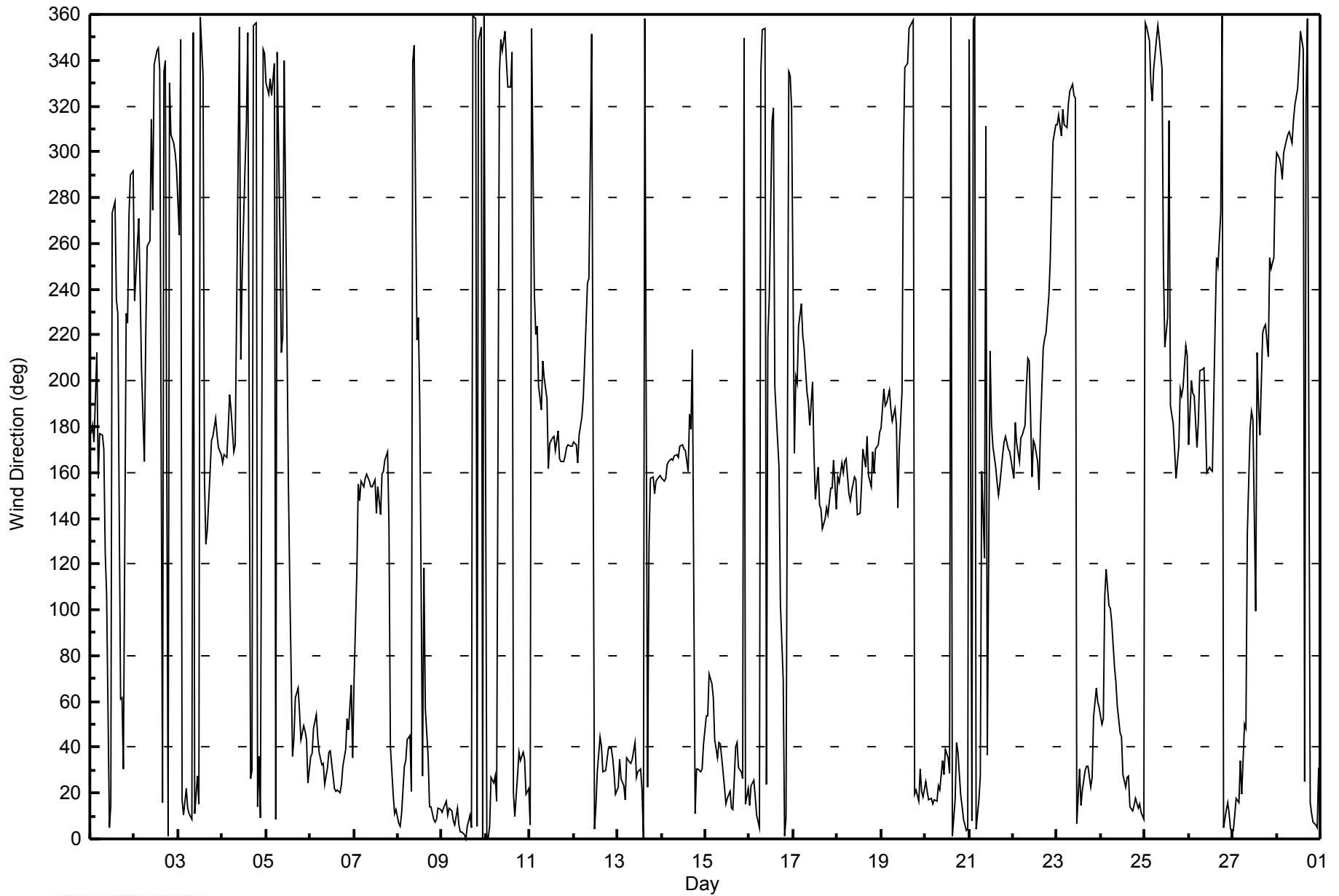
**Wind Direction (WD) - deg**  
**Mildred Lake - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Feb 1 13:00		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: 7 deg on Feb 26 08:00																										
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 17 Q <sub>3</sub> = 21 P <sub>90</sub> = 33 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-Feb	11	52	18	15	17	49	46	51	26	42	23	46	91	28	26	78	20	42	60	15	19	27	19	29	91	
2-Feb	53	42	23	44	20	36	20	21	33	24	19	36	14	23	13	23	74	17	12	15	14	13	13	15	74	
3-Feb	38	74	21	16	13	12	11	13	12	17	21	22	14	72	49	34	14	13	11	13	15	13	11	13	74	
4-Feb	17	14	15	13	16	19	15	15	40	80	18	28	19	17	23	19	16	12	16	17	20	21	13	15	80	
5-Feb	12	10	12	15	21	16	18	42	15	24	51	45	43	59	88	20	15	17	19	15	17	14	18	19	88	
6-Feb	17	19	18	16	16	16	15	16	15	15	16	18	17	15	15	16	14	14	17	15	19	16	22	27	27	
7-Feb	33	22	16	18	15	18	16	16	16	15	15	14	19	21	18	16	14	14	27	27	30	19	9	13	33	
8-Feb	19	18	14	16	18	18	17	19	34	18	23	28	55	90	77	13	15	12	13	10	11	10	12	11	90	
9-Feb	11	14	14	13	14	14	11	12	13	23	13	15	13	14	11	13	13	12	12	14	11	13	17	14	23	
10-Feb	12	17	14	19	15	15	14	11	13	12	17	23	15	13	17	22	12	21	14	16	16	16	18	20	23	
11-Feb	12	42	37	42	12	19	31	15	15	34	16	15	14	14	12	16	15	12	12	11	11	12	12	11	42	
12-Feb	12	12	13	19	15	21	12	25	24	37	29	14	18	21	24	20	17	17	16	18	18	19	19	16	37	
13-Feb	18	20	18	16	18	17	19	18	21	18	19	20	21	17	19	14	45	15	15	14	17	16	15	14	45	
14-Feb	14	15	14	12	12	11	11	11	10	12	12	12	11	11	13	15	17	48	13	19	20	18	17	25	48	
15-Feb	25	20	19	19	18	19	18	20	19	18	22	22	18	21	19	16	18	18	15	14	19	28	24	17	28	
16-Feb	17	15	15	14	12	15	22	24	14	28	21	33	38	70	30	33	31	18	38	20	13	20	15	75	75	
17-Feb	44	25	42	29	15	13	10	22	26	27	18	20	23	19	21	18	16	12	11	17	19	30	18	16	44	
18-Feb	18	23	15	14	18	13	20	17	19	21	21	18	21	21	20	18	18	16	19	13	12	12	12	16	23	
19-Feb	19	13	15	13	12	18	18	15	16	24	22	24	81	49	50	13	10	11	18	19	15	18	18	17	81	
20-Feb	17	17	15	15	13	15	16	17	15	20	23	28	25	31	13	13	23	14	14	14	12	14	10	11	31	
21-Feb	13	15	11	10	14	11	14	35	69	80	88	22	20	22	15	15	16	14	11	11	13	14	11	10	88	
22-Feb	16	18	10	11	15	43	16	24	12	26	16	17	13	13	15	19	18	15	19	21	23	26	16	15	43	
23-Feb	14	15	16	14	15	15	13	13	11	17	15	37	18	18	17	23	19	19	19	19	18	18	17	17	37	
24-Feb	19	22	13	16	11	11	12	17	16	16	17	17	21	16	16	17	15	14	14	16	15	16	14	13	22	
25-Feb	13	10	13	14	16	17	12	16	18	14	62	17	38	71	66	29	16	12	14	14	12	14	15	12	71	
26-Feb	22	35	13	19	17	24	10	7	9	17	13	14	14	15	38	25	20	43	13	15	13	14	12	13	43	
27-Feb	13	14	17	24	18	15	30	28	77	23	23	29	67	58	17	13	16	15	16	17	36	26	24	23	77	
28-Feb	16	16	21	34	24	16	16	15	16	16	15	15	19	23	23	30	26	23	15	16	13	13	12	17	34	
		53	74	42	44	24	49	46	51	77	80	88	46	91	90	88	78	74	48	60	27	36	30	24	75	
		Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

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



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 8, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:30
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Cal Gas Concentration	59.4 ppm	Cal Gas Expiry Date	3/26/2012
Gas Cert Reference	cc307191		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8364
DACS voltage range	0-5v	DACS channel #	SE1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-652	-652
Analyzer Range (mv)	1000	1000	Lamp voltage	780	781
Calculated slope	1.006009	1.002241	Chamber temp.	45.0	45.1
Calculated intercept	1.013991	1.827246	Pressure (mmHg)	713.9	695.0
Analyzer Background	28.6	26.9	Flow (lpm)	0.459	0.491
Analyzer Coefficient	1.111	1.111	Intensity	90	90

Analyzer make TEI 431 Analyzer serial # JC1404901075

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-2.4	NA
as found span	5000	69.9	830.4	838.0	0.991
calibrator zero	5000	0.0	0.0	-0.4	0.000
high point	5000	69.9	830.4	827.5	1.004
second point	5000	35.4	420.6	417.1	1.008
third point	5000	17.7	210.3	206.6	1.018
calibrator zero					
as left zero	5000	0.0	0.0	-0.5	0.000
as left span	5000	69.9	830.4	828.0	1.003
Average Correction Factor					1.010

Corrected As found 840.3 Previous response 824.4 % change -1.9%

#### Notes:

Pump changed after as founds. Filter changed after as founds. Adjusted zero.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

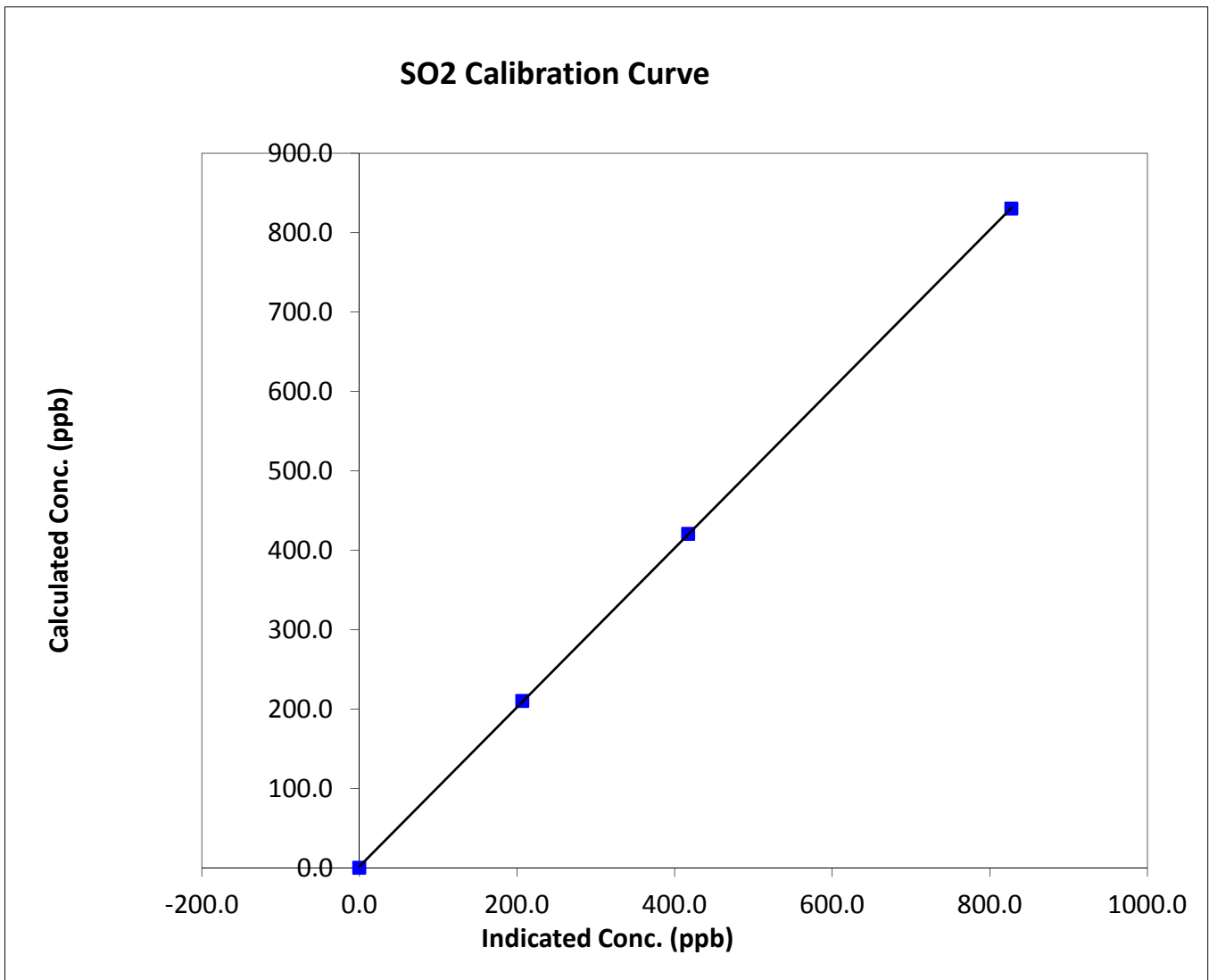
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 8, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:45	End Time (MST)	13:30
Analyzer make	TEI 43I	Analyzer serial #	JC1404901075

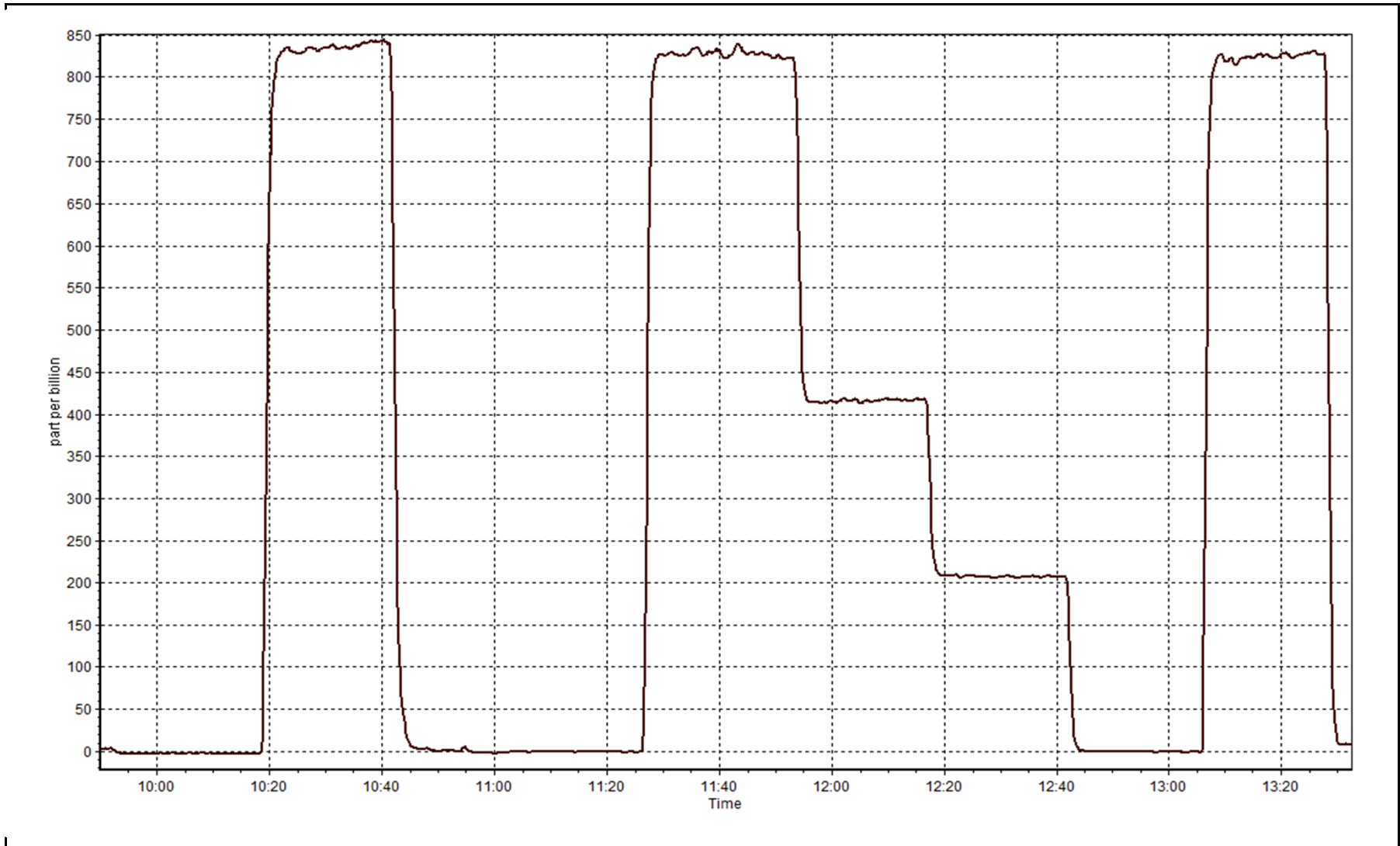
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999986
830.4	827.5	1.0036		
420.6	417.1	1.0083	Slope	1.002241
210.3	206.6	1.0180		
			Intercept	1.827246



SO2 Calibration Plot

Date: February 18, 2015





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 16, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:15
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11541008
Cal Gas Concentration	5.04 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference		SO2 gas conc.	59.4 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8364
DACS voltage range	0-5v	DACS channel #	SE2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-601	-601
Analyzer Range (mv)	100	100	Lamp voltage	775	776
Calculated slope	1.002259	1.004184	Chamber temp.	45	45
Calculated intercept	-0.625935	0.240560	Pressure	532.3	543.0
Analyzer Background	13.5	14.4	Flow	0.986	1.000
Analyzer Coefficient	0.917	0.909	Intensity	87	86
			Converter temp.	328	326

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

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	1.1	NA
as found span	4000	63.5	80.0	81.3	0.984
SO2 scrubber check	5000	17.7	210.3	0.9	NA
calibrator zero	4000	0.0	0.0	-0.2	NA
high point	4000	63.5	80.0	79.4	1.007
second point	4000	31.8	40.1	39.8	1.008
third point	4000	15.9	20.0	19.5	1.025
calibrator zero					
as left zero	5000	0.0	0.0	-0.1	NA
as left span	4000	63.5	80.0	79.4	1.008
Average Correction Factor					1.013

Corrected As found	80.2	Previous response	80.5	% change	0.3%
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#### Notes:

Filter changed after as founds. Scrubber check completed after as found zero. Adjusted zero and span.

Calibration Performed By:

Devin Russell





# Wood Buffalo Environmental Association

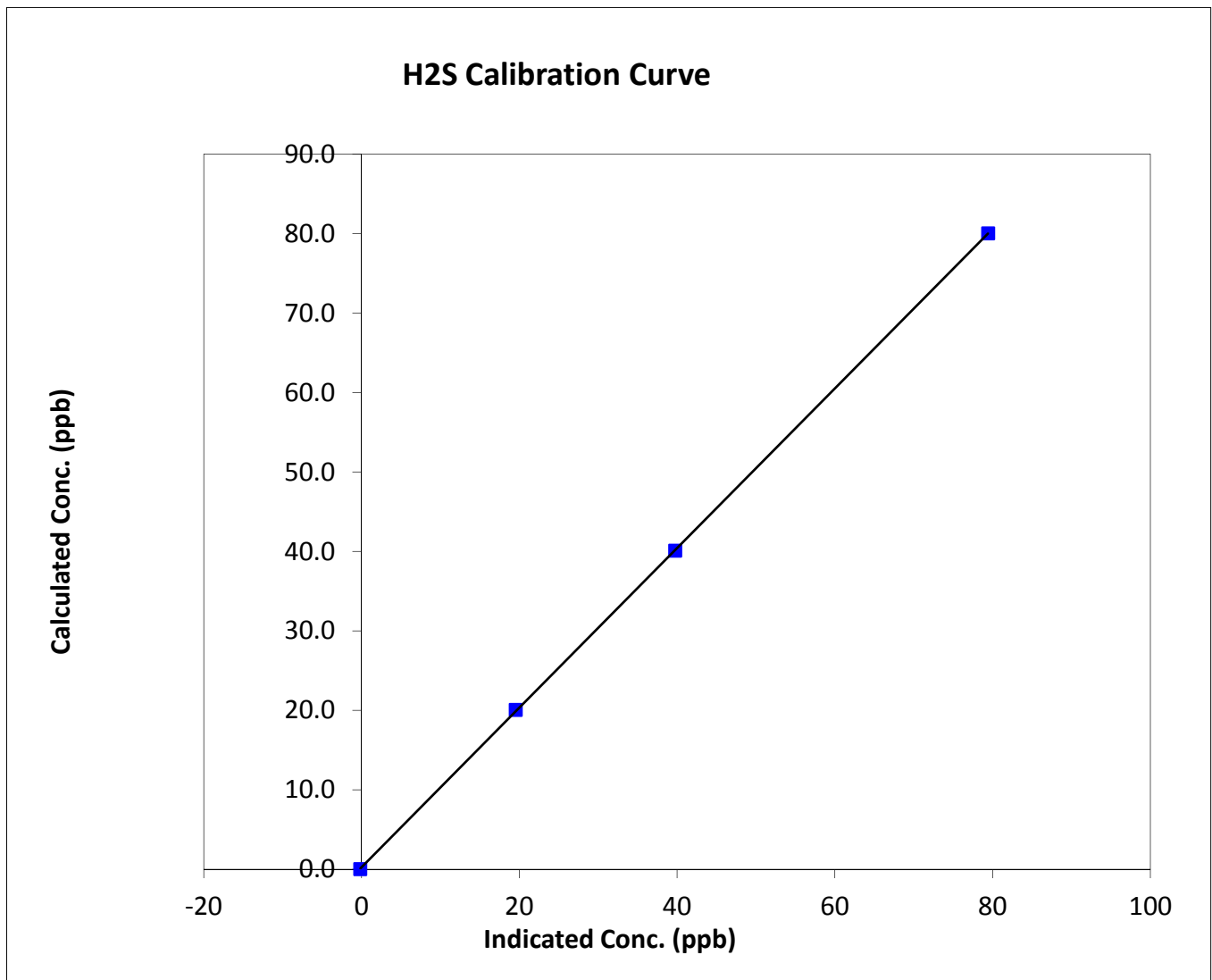
## H2S Calibration Summary

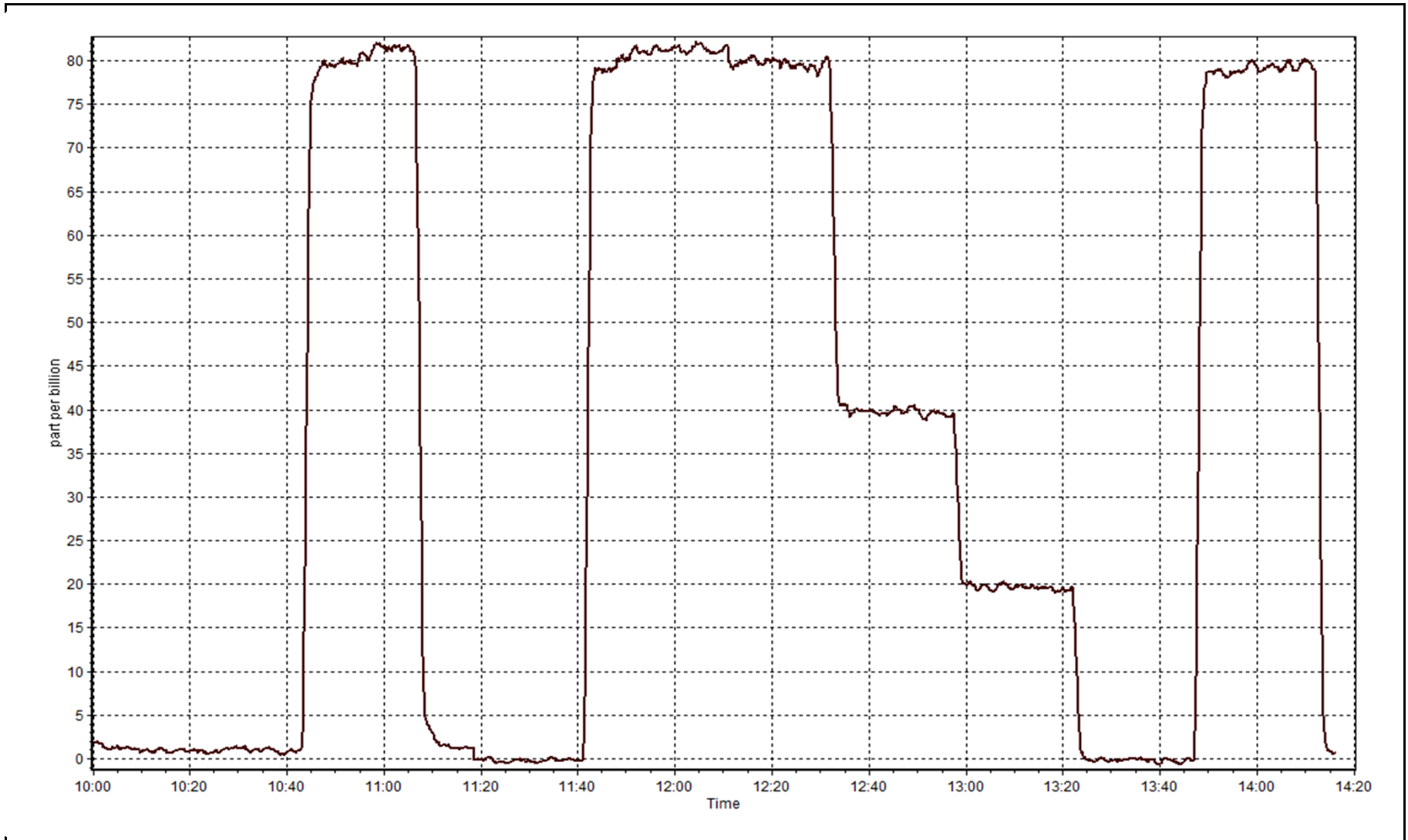
### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 16, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	10:00	End Time (MST)	14:15
Analyzer make	TEI 450i	Analyzer serial #	815129107

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999987
80.0	79.4	1.0073		
40.1	39.8	1.0077	Slope	1.004184
20.0	19.5	1.0253		
			Intercept	0.240560







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 8, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	13:30
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11541008
Gas Cert Reference	cc307191	Cal Gas Expiry Date	3/26/2012
CH4 Cal Gas Conc.	505 ppm	CH4 Equiv Conc.	1060.5 ppm
C3H8 Cal Gas Conc.	202 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8364
DACS voltage range	0-5v	DACS channel #	SE3

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	25	25	Air or Bypass press	39.8	39.8
Calculated slope	0.999560	0.997139	Fuel Pressure	25.6	25.6
Calculated intercept	-0.038050	0.018237			
BKG	2.38	2.40			
COEF	4.812	4.850			

Analyzer make 51i-LT Analyzer serial # 1300156231

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.02	N/A
as found span	5000	69.9	14.83	14.71	1.008
calibrator zero	5000	0.0	0.00	-0.02	N/A
high point	5000	69.9	14.83	14.85	0.998
second point	5000	35.4	7.51	7.51	1.000
third point	5000	17.7	3.75	3.75	1.001
calibrator zero					
as left zero	5000	0.0	0.00	-0.06	N/A
as left span	5000	69.9	14.83	14.79	1.002
Average Correction Factor					1.000

Corrected As found 14.73 Previous response 14.87 % change 1.0%

#### Notes:

Filter changed after as founds. Span adjusted.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

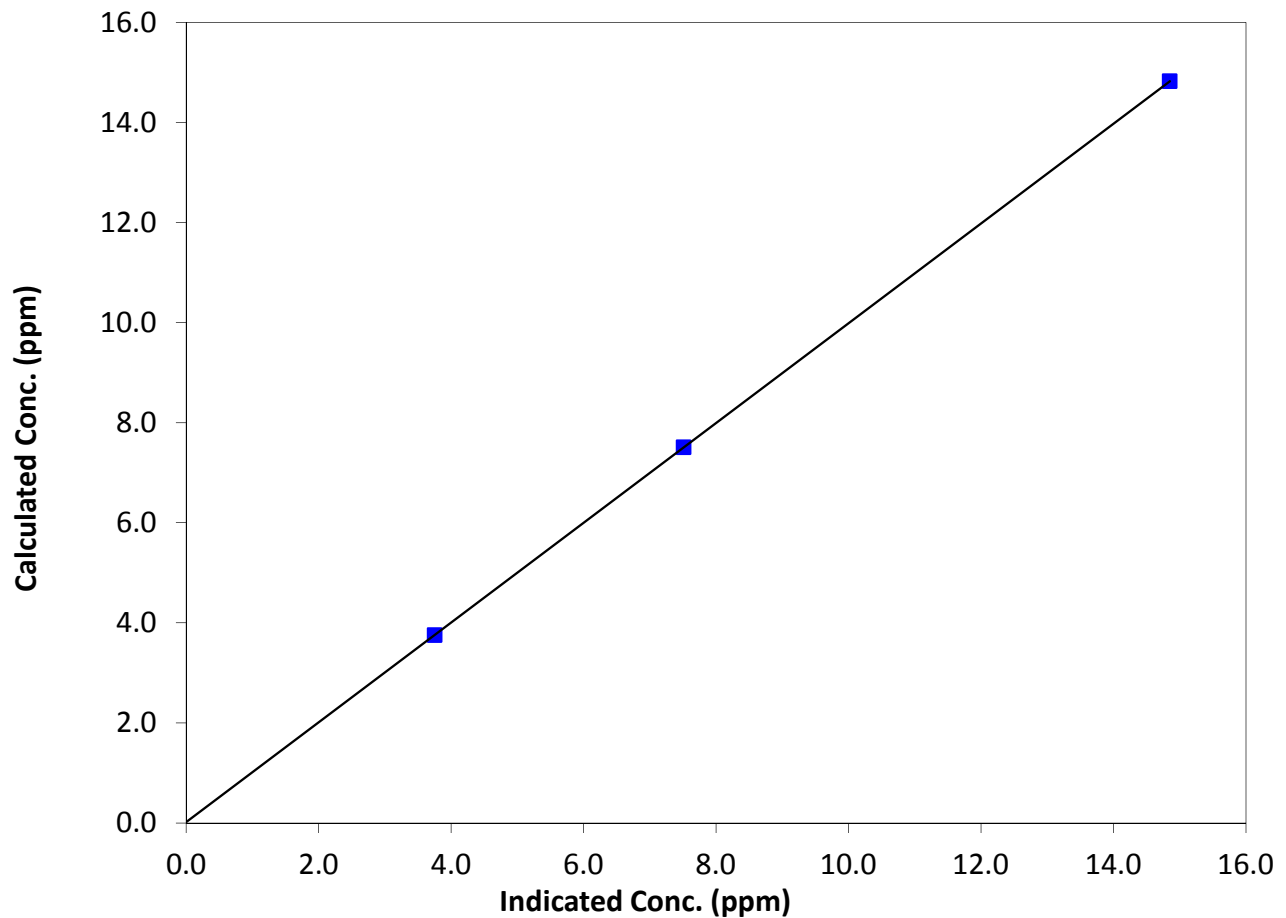
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 8, 2015
Station Name	Mildred Lake	Station Number	AMS 2
Start Time (MST)	9:45	End Time (MST)	13:30
Analyzer make	51i-LT	Analyzer serial #	1300156231

### Calibration Data

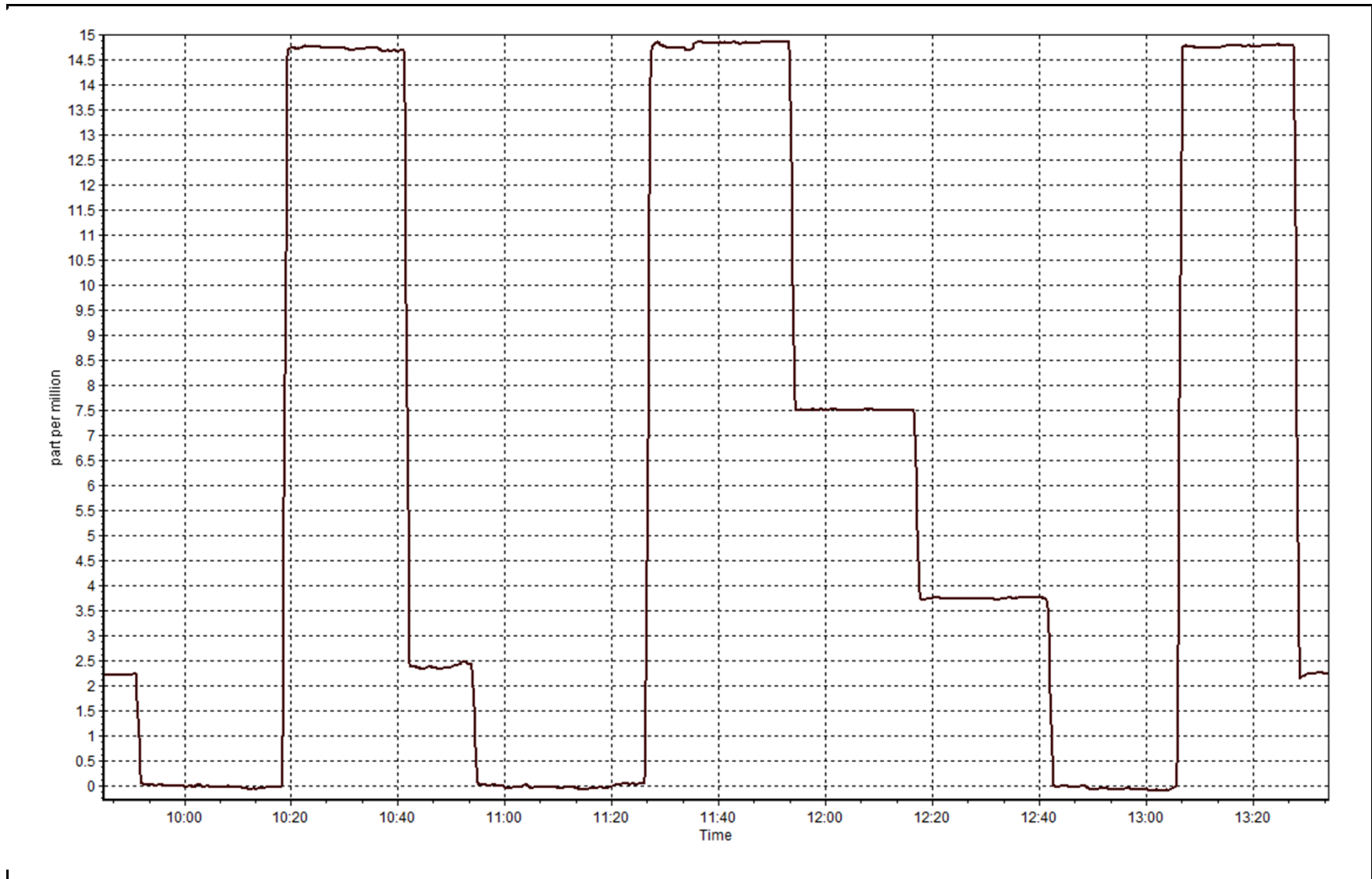
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	N/A	Correlation Coefficient	1.000000
14.83	14.85	0.9984		
7.51	7.51	0.9998	Slope	0.997139
3.75	3.75	1.0011		
			Intercept	0.018237

### THC Calibration Curve



THC Calibration Plot

Date: February 18, 2015



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 3  
LOWER CAMP METEOROLOGY  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
 FEBRUARY 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	672	0	0	100.00	2.1	-	-1.8	-
Temperature 45 m (C) Average	672	0	0	100.00	2.3	-	-1.9	-
Temperature 100 m (C) Average	672	0	0	100.00	2.8	-	-2.3	-
Temperature 167 m (C) Average	672	0	0	100.00	3	-	-2.6	-
Relative Humidity 20 m (%) Average	672	0	0	100.00	92	-	-	-
Relative Humidity 45 m (%) Average	672	0	0	100.00	92	-	-	-
Relative Humidity 100 m (%) Average	672	0	0	100.00	94	-	-	-
Relative Humidity 167 m (%) Average	672	0	0	100.00	94	-	-	-
Wind Speed 20 m (km/h) Average	672	0	0	100.00	28	-	-	-
Wind Speed 45 m (km/h) Average	672	0	0	100.00	37	-	-	-
Wind Speed 100 m (km/h) Average	672	0	0	100.00	49	-	-	-
Wind Speed 167 m (km/h) Average	672	0	0	100.00	51	-	-	-
Wind Direction 20 m (deg) Average	672	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	672	0	0	100.00	-	-	-	-
Wind Direction 100 m (deg) Average	672	0	0	100.00	-	-	-	-
Wind Direction 167 m (deg) Average	672	0	0	100.00	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	672	0	0	100.00	0.5	-	-	-
Vertical Wind Speed 45 m (km/h) Average	672	0	0	100.00	1.8	-	-	-
Vertical Wind Speed 100 m (km/h) Average	672	0	0	100.00	4.7	-	-	-
Vertical Wind Speed 167 m (km/h) Average	672	0	0	100.00	4	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP MET TOWER (AMS 3)  
 FEBRUARY 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	672	-16.95	7.6	-	-35.6	-26.2	-22.5	-17.7	-11.6	-7	2.1
Temperature 45 m (C) Average	672	-16.75	7.4	-	-34.2	-25.6	-22.1	-17.8	-11.7	-7.1	2.3
Temperature 100 m (C) Average	672	-16.41	6.8	-	-32.3	-23.9	-21.4	-17.4	-12.3	-7.3	2.8
Temperature 167 m (C) Average	672	-16.37	6.5	-	-30	-23.8	-21.2	-17.2	-12.6	-7.4	3
Relative Humidity 20 m (%) Average	672	72.1	7	-	46	62	68	74	77	80	92
Relative Humidity 45 m (%) Average	672	70.7	7	-	44	61	66	72	76	78	92
Relative Humidity 100 m (%) Average	672	72.4	7	-	47	62	68	74	78	81	94
Relative Humidity 167 m (%) Average	672	72.7	8	-	50	62	68	74	78	81	94
Wind Speed 20 m (km/h) Average	672	7.4	5	-	0	2	4	6	10	14	28
Wind Speed 45 m (km/h) Average	672	9.9	6	-	0	3	5	9	13	18	37
Wind Speed 100 m (km/h) Average	672	14.2	8	-	0	5	9	13	17	25	49
Wind Speed 167 m (km/h) Average	672	16.7	9	-	0	6	11	15	21	28	51
Wind Direction 20 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Wind Direction 100 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Wind Direction 167 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	672	-0.05	0.2	-	-0.8	-0.3	-0.1	0	0	0.1	0.5
Vertical Wind Speed 45 m (km/h) Average	672	0.14	0.5	-	-1.3	-0.3	-0.2	0	0.4	0.9	1.8
Vertical Wind Speed 100 m (km/h) Average	672	0.3	0.7	-	-2.9	-0.2	-0.1	0.1	0.5	1.2	4.7
Vertical Wind Speed 167 m (km/h) Average	672	0.44	0.7	-	-2.4	-0.2	0	0.2	0.6	1.4	4

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

OPERATIONAL NOTES

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

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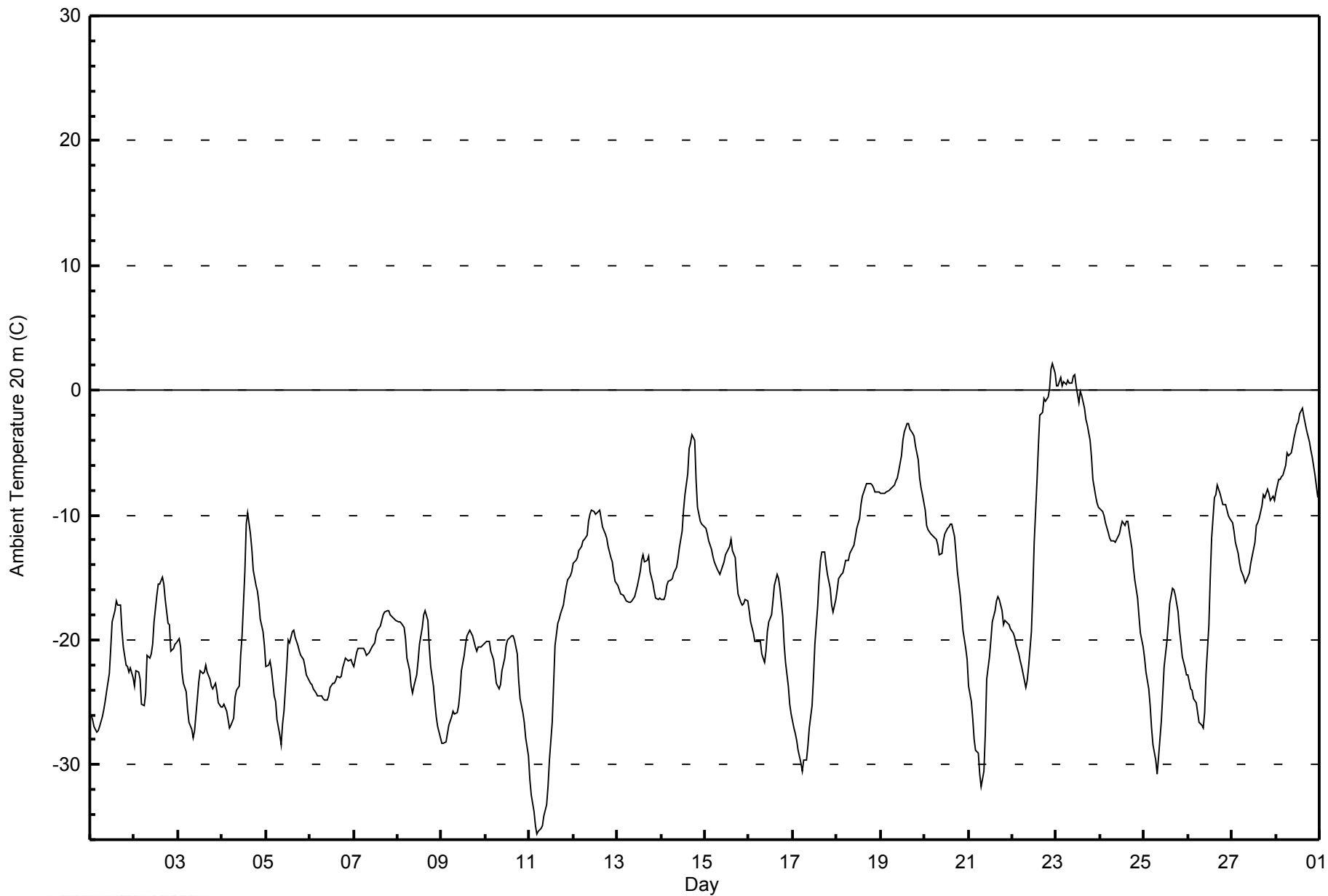


Maximum Value: 2.1 C on Feb 22 23:00		Maximum Daily Average: -1.8 C on Feb 23		Hours in Service: 672																						
Minimum Value: -35.6 C on Feb 11 05:00		Minimum Daily Average: -25.9 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.8 C at hour 16		Minimum Diurnal Average: -20.3 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.95 C		Percentiles: P <sub>1</sub> = -33.9 P <sub>10</sub> = -26.2 Q <sub>1</sub> = -22.5 Median = -17.7 Q <sub>3</sub> = -11.6 P <sub>90</sub> = -7.0 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-Feb	-26.0	-26.3	-26.9	-27.4	-27.2	-26.9	-26.2	-25.6	-24.9	-24.2	-22.7	-20.6	-18.6	-17.6	-16.8	-17.2	-17.2	-19.2	-20.6	-22.0	-22.1	-22.5	-22.2	-23.0	-22.7	-16.8
2-Feb	-23.7	-22.4	-22.6	-23.1	-25.2	-25.2	-24.2	-21.2	-21.4	-21.2	-20.3	-18.5	-16.4	-15.6	-15.5	-15.0	-15.5	-16.8	-18.7	-18.8	-20.9	-20.7	-20.4	-20.2	-20.2	-15.0
3-Feb	-19.9	-20.6	-22.6	-23.5	-24.1	-25.6	-26.6	-27.2	-27.9	-27.2	-24.8	-23.4	-22.4	-22.7	-22.6	-22.0	-22.5	-23.1	-23.7	-23.9	-23.5	-24.1	-25.0	-25.4	-23.9	-19.9
4-Feb	-25.3	-25.1	-25.7	-26.3	-27.1	-26.8	-26.2	-24.5	-24.0	-23.7	-21.2	-19.7	-14.5	-10.7	-9.8	-11.5	-12.7	-14.4	-15.6	-16.1	-17.0	-18.3	-19.3	-20.4	-19.8	-9.8
5-Feb	-22.1	-22.0	-21.7	-22.3	-24.5	-25.0	-26.4	-27.7	-28.4	-26.7	-25.7	-22.1	-20.0	-20.2	-19.3	-19.2	-19.8	-20.4	-20.9	-21.2	-21.6	-22.1	-22.8	-23.0	-22.7	-19.2
6-Feb	-23.4	-23.6	-23.9	-24.3	-24.5	-24.5	-24.5	-24.7	-24.8	-24.8	-24.5	-23.8	-23.5	-23.5	-23.2	-23.0	-23.1	-22.9	-22.2	-21.5	-21.6	-21.7	-21.6	-21.9	-23.4	-21.5
7-Feb	-22.2	-21.0	-20.7	-20.7	-20.7	-20.7	-20.9	-21.2	-21.0	-20.8	-20.6	-20.2	-19.5	-19.2	-18.9	-18.4	-18.0	-17.8	-17.7	-17.7	-18.0	-18.2	-18.3	-18.5	-19.6	-17.7
8-Feb	-18.6	-18.5	-18.7	-19.0	-19.9	-21.4	-22.5	-23.7	-24.2	-23.6	-22.8	-21.7	-20.4	-19.0	-18.0	-17.7	-18.4	-20.6	-22.2	-23.7	-25.1	-26.1	-27.0	-27.8	-21.7	-17.7
9-Feb	-28.3	-28.3	-28.2	-27.5	-26.9	-26.2	-25.7	-25.9	-25.9	-25.3	-24.2	-22.5	-21.3	-20.3	-19.7	-19.3	-19.4	-19.7	-20.5	-20.9	-20.6	-20.5	-20.5	-20.3	-23.2	-19.3
10-Feb	-20.2	-20.1	-20.1	-20.9	-21.5	-22.5	-23.4	-23.9	-23.5	-22.5	-21.4	-20.5	-20.0	-19.8	-19.7	-19.7	-20.0	-21.1	-23.3	-24.7	-25.8	-26.6	-27.8	-29.3	-22.4	-19.7
11-Feb	-31.2	-32.5	-33.8	-34.9	-35.6	-35.3	-35.1	-34.8	-34.1	-33.3	-31.8	-29.6	-26.6	-23.6	-20.5	-18.7	-18.4	-17.9	-17.2	-16.4	-15.7	-15.2	-14.8	-14.5	-25.9	-14.5
12-Feb	-13.8	-13.6	-13.5	-12.9	-12.6	-12.1	-11.9	-11.6	-10.5	-10.0	-9.6	-9.7	-9.9	-9.8	-9.6	-10.3	-11.0	-11.6	-11.8	-12.5	-13.4	-13.8	-14.6	-15.3	-11.9	-9.6
13-Feb	-15.7	-16.0	-16.3	-16.5	-16.6	-16.9	-17.0	-17.0	-16.9	-16.5	-16.1	-15.6	-14.5	-13.6	-13.2	-13.7	-13.6	-13.3	-14.5	-15.4	-16.1	-16.7	-16.8	-16.6	-15.6	-13.2
14-Feb	-16.8	-16.8	-16.4	-15.6	-15.3	-15.2	-15.1	-14.7	-14.2	-13.5	-12.6	-11.2	-9.6	-8.4	-6.7	-4.6	-4.2	-3.5	-4.0	-7.2	-9.3	-10.5	-10.7	-10.9	-11.1	-3.5
15-Feb	-11.1	-11.5	-12.1	-12.8	-13.3	-13.8	-14.3	-14.5	-14.7	-14.4	-13.7	-13.2	-13.0	-12.5	-11.9	-12.8	-13.4	-15.1	-16.3	-16.9	-17.2	-17.2	-16.8	-16.8	-14.1	-11.1
16-Feb	-17.6	-18.5	-19.4	-20.1	-20.1	-20.1	-20.1	-21.1	-21.8	-20.9	-19.3	-18.5	-18.0	-16.8	-15.6	-14.7	-15.1	-15.9	-18.1	-20.4	-21.8	-23.7	-25.1	-26.0	-19.5	-14.7
17-Feb	-27.0	-27.5	-28.1	-28.8	-29.8	-30.5	-29.7	-29.6	-28.5	-27.1	-25.2	-23.1	-20.3	-17.3	-15.2	-13.6	-12.9	-12.9	-14.0	-14.8	-15.8	-17.2	-17.8	-16.8	-21.8	-12.9
18-Feb	-16.0	-15.1	-14.7	-14.7	-14.2	-13.6	-13.6	-13.1	-12.8	-12.4	-11.7	-11.1	-10.3	-9.1	-8.5	-7.8	-7.5	-7.4	-7.4	-7.6	-7.8	-8.1	-8.1	-8.2	-10.9	-7.4
19-Feb	-8.3	-8.2	-8.2	-8.2	-8.0	-7.9	-7.8	-7.6	-7.2	-7.0	-6.5	-5.3	-4.0	-3.3	-2.7	-2.6	-3.1	-3.4	-3.7	-4.5	-5.6	-7.0	-7.8	-8.4	-6.1	-2.6
20-Feb	-9.5	-10.8	-11.2	-11.5	-11.6	-11.7	-12.0	-12.4	-13.2	-13.0	-12.1	-11.5	-11.1	-11.0	-10.7	-10.7	-11.8	-13.0	-14.5	-16.4	-17.7	-19.2	-20.7	-21.6	-13.3	-9.5
21-Feb	-23.7	-25.0	-26.3	-27.9	-28.9	-29.1	-30.8	-31.7	-30.6	-27.5	-23.2	-21.4	-20.0	-18.6	-17.6	-16.8	-16.6	-16.7	-17.7	-18.8	-18.5	-18.6	-18.8	-19.1	-22.7	-16.6
22-Feb	-19.5	-19.7	-20.3	-21.1	-21.7	-22.2	-23.2	-23.8	-23.3	-22.1	-19.3	-16.1	-12.2	-7.2	-4.5	-1.9	-1.8	-0.7	-0.9	-0.5	0.2	1.7	2.1	1.4	-11.5	2.1
23-Feb	0.3	0.3	1.0	0.4	0.7	0.5	0.8	0.6	0.6	1.1	1.2	0.4	-0.9	0.0	-0.4	-1.4	-2.3	-2.8	-4.0	-5.3	-7.2	-8.5	-9.1	-9.4	-1.8	1.2
24-Feb	-9.6	-9.7	-10.0	-10.6	-11.4	-11.8	-12.0	-12.1	-11.9	-11.4	-11.0	-10.5	-10.8	-10.5	-10.5	-11.3	-12.8	-14.1	-15.2	-16.7	-18.1	-19.5	-20.6	-20.6	-12.7	-9.6
25-Feb	-21.5	-22.6	-23.9	-25.3	-27.0	-28.4	-29.6	-30.8	-29.5	-26.5	-24.4	-22.1	-20.1	-18.7	-17.1	-15.9	-16.0	-16.5	-17.8	-19.2	-20.2	-21.4	-22.3	-22.8	-22.5	-15.9
26-Feb	-22.8	-23.9	-24.0	-24.7	-25.0	-25.8	-26.6	-26.8	-27.0	-25.8	-22.7	-18.9	-15.1	-11.8	-8.6	-8.4	-7.6	-8.3	-8.7	-9.1	-9.2	-9.6	-10.1	-10.3	-17.1	-7.6
27-Feb	-10.6	-11.3	-12.2	-13.1	-13.9	-14.4	-15.0	-15.4	-15.2	-14.6	-13.8	-13.3	-12.2	-10.8	-10.6	-10.2	-9.3	-8.4	-8.5	-8.0	-8.2	-8.8	-8.5	-8.8	-11.5	-8.0
28-Feb	-8.2	-7.2	-7.1	-6.9	-6.8	-6.0	-5.0	-5.2	-5.0	-4.4	-3.8	-2.7	-2.6	-1.9	-1.4	-2.1	-2.6	-3.2	-4.1	-4.7	-5.4	-6.8	-7.7	-8.6	-5.0	-1.4
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	270	40.18	40.18
-20 - 0	386	57.44	97.62
0 - 10	16	2.38	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



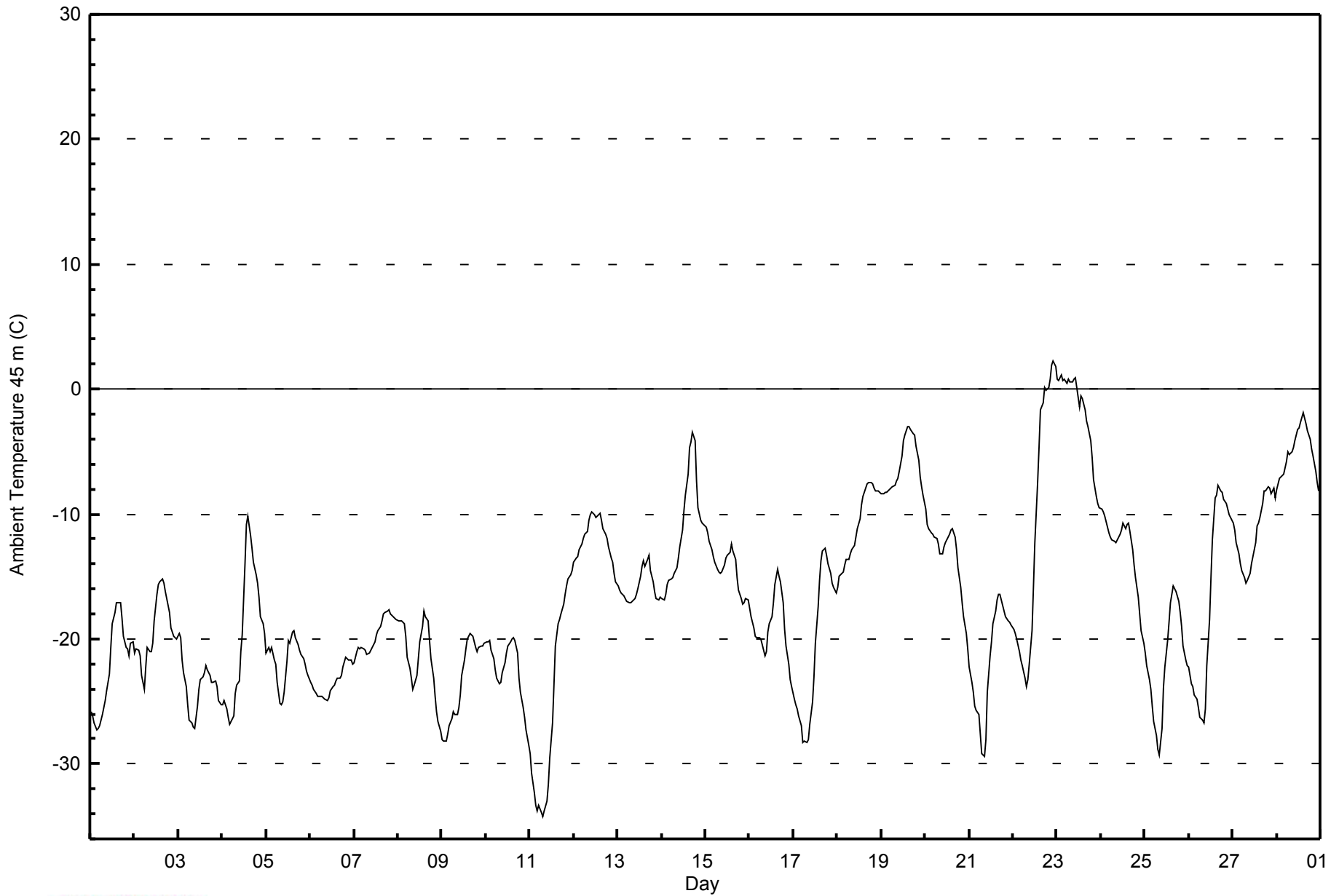
Maximum Value: 2.3 C on Feb 22 23:00		Maximum Daily Average: -1.9 C on Feb 23		Hours in Service: 672																																													
Minimum Value: -34.2 C on Feb 11 08:00		Minimum Daily Average: -25.4 C on Feb 11		Hours of Data: 672																																													
Maximum Diurnal Average: -13.0 C at hour 16		Minimum Diurnal Average: -19.9 C at hour 8		Hours of Missing Data: 0																																													
Monthly Average: -16.75 C		Percentiles: P <sub>1</sub> = -32.8 P <sub>10</sub> = -25.6 Q <sub>1</sub> = -22.1 Median = -17.8 Q <sub>3</sub> = -11.7 P <sub>90</sub> = -7.1 P <sub>99</sub> = 0.8		Hours of Calibration: 0																																													
				Percent Operational Time: 100.0																																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	-25.8	-26.2	-26.7	-27.2	-27.2	-26.9	-26.0	-25.5	-24.9	-24.2	-22.8	-20.7	-18.8	-17.9	-17.1	-17.1	-17.0	-18.3	-19.8	-20.7	-20.7	-21.4	-20.3	-20.3	-22.2	-17.0																							
2-Feb	-21.1	-20.8	-20.9	-21.4	-22.9	-24.0	-22.2	-20.7	-21.0	-21.0	-20.3	-18.5	-16.4	-15.6	-15.4	-15.2	-16.2	-17.3	-17.9	-19.1	-19.8	-19.8	-20.0	-19.3	-15.2																								
3-Feb	-19.6	-19.9	-21.7	-22.7	-23.8	-25.3	-26.5	-26.7	-27.1	-27.2	-25.4	-24.0	-23.2	-23.0	-22.7	-22.2	-22.5	-22.9	-23.4	-23.5	-23.3	-23.8	-24.9	-25.3	-23.8	-19.6																							
4-Feb	-25.2	-24.9	-25.6	-26.2	-26.9	-26.6	-26.2	-24.3	-23.7	-23.3	-21.0	-19.7	-13.9	-10.9	-10.1	-11.7	-12.7	-13.9	-14.9	-15.6	-16.7	-18.2	-18.8	-19.6	-19.6	-10.1																							
5-Feb	-21.1	-20.7	-21.0	-20.7	-21.7	-22.0	-23.5	-25.1	-25.2	-25.1	-24.3	-21.8	-20.1	-20.3	-19.5	-19.4	-19.9	-20.4	-20.9	-21.2	-21.6	-22.1	-22.6	-22.9	-21.8	-19.4																							
6-Feb	-23.4	-23.7	-24.0	-24.4	-24.6	-24.6	-24.6	-24.8	-24.9	-24.9	-24.7	-24.1	-23.8	-23.7	-23.4	-23.1	-23.2	-22.9	-22.2	-21.5	-21.6	-21.7	-21.7	-22.0	-23.5	-21.5																							
7-Feb	-21.9	-21.0	-20.7	-20.8	-20.7	-20.8	-20.9	-21.2	-21.1	-20.9	-20.6	-20.3	-19.7	-19.4	-19.0	-18.5	-18.0	-17.9	-17.8	-17.7	-18.0	-18.3	-18.3	-18.4	-19.7	-17.7																							
8-Feb	-18.6	-18.5	-18.6	-18.7	-19.8	-21.5	-22.4	-23.2	-24.0	-23.7	-22.9	-21.6	-20.2	-19.0	-17.7	-18.2	-18.5	-20.1	-21.5	-23.2	-24.6	-25.8	-26.6	-27.4	-21.5	-17.7																							
9-Feb	-28.0	-28.2	-28.2	-27.6	-27.0	-26.3	-25.8	-26.1	-26.0	-25.5	-24.5	-22.9	-21.7	-20.8	-20.1	-19.6	-19.6	-19.8	-20.7	-21.0	-20.7	-20.6	-20.5	-20.4	-23.4	-19.6																							
10-Feb	-20.3	-20.2	-20.1	-20.9	-21.6	-22.4	-23.2	-23.6	-23.5	-22.7	-21.9	-21.1	-20.6	-20.2	-20.0	-19.9	-20.1	-21.1	-23.1	-24.3	-25.4	-26.3	-27.2	-28.5	-22.4	-19.9																							
11-Feb	-29.2	-30.8	-32.3	-33.3	-33.8	-33.4	-33.9	-34.2	-33.7	-33.0	-31.6	-29.5	-26.7	-23.7	-20.6	-18.7	-18.4	-18.0	-17.2	-16.4	-15.8	-15.2	-14.9	-14.5	-25.4	-14.5																							
12-Feb	-13.9	-13.6	-13.4	-12.8	-12.4	-12.0	-11.6	-11.4	-10.5	-10.0	-9.8	-10.0	-10.3	-10.2	-9.9	-10.5	-11.1	-11.7	-11.9	-12.6	-13.5	-13.8	-14.8	-15.4	-12.0	-9.8																							
13-Feb	-15.8	-16.1	-16.4	-16.6	-16.7	-16.9	-17.1	-17.1	-17.0	-16.7	-16.4	-16.0	-15.0	-14.2	-13.8	-14.1	-13.6	-13.3	-14.5	-15.4	-16.2	-16.8	-16.8	-16.7	-15.8	-13.3																							
14-Feb	-16.8	-16.8	-16.4	-15.7	-15.3	-15.2	-15.1	-14.7	-14.3	-13.6	-12.7	-11.3	-9.7	-8.4	-6.8	-4.6	-4.3	-3.5	-4.1	-7.4	-9.5	-10.5	-10.7	-10.9	-11.2	-3.5																							
15-Feb	-11.1	-11.6	-12.1	-12.8	-13.4	-13.9	-14.4	-14.6	-14.8	-14.7	-14.0	-13.5	-13.3	-13.1	-12.4	-13.0	-13.6	-15.1	-16.1	-16.7	-17.2	-17.1	-16.7	-16.9	-14.3	-11.1																							
16-Feb	-17.6	-18.2	-19.1	-19.7	-19.9	-19.9	-20.0	-20.4	-21.4	-21.0	-19.5	-18.7	-18.2	-17.1	-15.7	-14.4	-15.0	-15.4	-17.1	-19.2	-20.5	-22.0	-23.3	-23.8	-19.0	-14.4																							
17-Feb	-24.9	-25.3	-25.6	-26.1	-26.9	-28.3	-28.2	-28.3	-28.0	-26.8	-25.0	-23.1	-20.3	-17.4	-15.3	-13.7	-13.0	-12.7	-13.3	-13.9	-14.8	-15.5	-15.9	-16.3	-20.8	-12.7																							
18-Feb	-15.8	-15.0	-14.7	-14.6	-14.1	-13.6	-13.6	-13.2	-12.8	-12.5	-11.8	-11.2	-10.4	-9.3	-8.6	-7.9	-7.6	-7.5	-7.5	-7.6	-7.9	-8.1	-8.2	-8.3	-10.9	-7.5																							
19-Feb	-8.3	-8.3	-8.3	-8.2	-8.1	-8.0	-7.8	-7.6	-7.3	-7.1	-6.6	-5.4	-4.2	-3.6	-3.0	-2.9	-3.3	-3.5	-3.7	-4.5	-5.7	-7.1	-7.8	-8.5	-6.2	-2.9																							
20-Feb	-9.6	-10.8	-11.2	-11.5	-11.6	-11.8	-12.0	-12.4	-13.1	-13.2	-12.6	-12.3	-11.8	-11.7	-11.2	-11.2	-11.8	-12.8	-14.3	-15.9	-17.1	-18.2	-19.6	-20.8	-13.3	-9.6																							
21-Feb	-22.3	-23.4	-24.2	-25.4	-25.7	-26.0	-27.6	-29.2	-29.4	-28.1	-24.2	-21.4	-20.2	-18.8	-17.8	-16.9	-16.5	-16.5	-17.3	-17.7	-18.2	-18.6	-18.6	-18.8	-21.8	-16.5																							
22-Feb	-19.3	-19.6	-20.1	-21.0	-21.6	-22.1	-23.2	-23.8	-23.3	-22.0	-19.4	-15.8	-12.3	-7.4	-4.6	-1.7	-1.1	0.1	-0.1	0.2	0.9	1.9	2.3	1.8	-11.3	2.3																							
23-Feb	0.8	0.7	1.1	0.6	0.8	0.5	0.8	0.6	0.6	0.8	1.0	0.1	-1.4	-0.6	-0.8	-1.7	-2.5	-3.0	-4.1	-5.5	-7.3	-8.6	-9.2	-9.5	-1.9	1.1																							
24-Feb	-9.7	-9.8	-10.1	-10.7	-11.5	-11.8	-12.1	-12.2	-12.2	-12.0	-11.6	-11.3	-10.8	-11.1	-10.8	-10.7	-11.4	-12.8	-14.1	-15.1	-16.6	-18.0	-19.3	-20.4	-12.8	-9.7																							
25-Feb	-21.1	-22.1	-23.3	-24.0	-25.4	-26.6	-27.7	-28.9	-29.3	-27.2	-23.9	-22.3	-20.2	-18.6	-17.1	-15.7	-16.0	-16.2	-17.0	-17.9	-19.0	-20.6	-21.6	-22.2	-21.8	-15.7																							
26-Feb	-22.2	-23.6	-23.8	-24.4	-24.8	-25.5	-26.2	-26.5	-26.7	-25.6	-22.2	-18.5	-15.1	-12.0	-8.7	-8.5	-7.6	-8.1	-8.3	-8.8	-9.1	-9.6	-10.0	-10.3	-16.9	-7.6																							
27-Feb	-10.7	-11.3	-12.3	-13.2	-13.9	-14.5	-15.1	-15.5	-15.3	-14.7	-14.0	-13.4	-12.3	-11.0	-10.7	-10.3	-9.1	-8.1	-8.2	-7.9	-7.9	-8.4	-7.9	-8.7	-11.4	-7.9																							
28-Feb	-8.0	-7.1	-7.1	-6.9	-6.8	-5.7	-5.0	-5.2	-5.1	-4.7	-4.1	-3.3	-3.1	-2.7	-1.9	-2.4	-2.8	-3.3	-4.0	-4.8	-5.3	-6.6	-7.5	-8.1	-5.1	-1.9																							
																								-17.9	-18.1	-18.5	-18.8	-19.2	-19.5	-19.7	-19.9	-19.8	-19.3	-18.1	-16.8	-15.5	-14.3	-13.4	-13.0	-13.1	-13.4	-14.1	-14.8	-15.4	-16.1	-16.5	-16.9	Diurnal Average	
																								0.8	0.7	1.1	0.6	0.8	0.5	0.8	0.6	0.6	0.8	1.0	0.1	-1.4	-0.6	-0.8	-1.7	-1.1	0.1	-0.1	0.2	0.9	1.9	2.3	1.8	Diurnal Maximum	





**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	262	38.99	38.99
-20 - 0	392	58.33	97.32
0 - 10	18	2.68	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

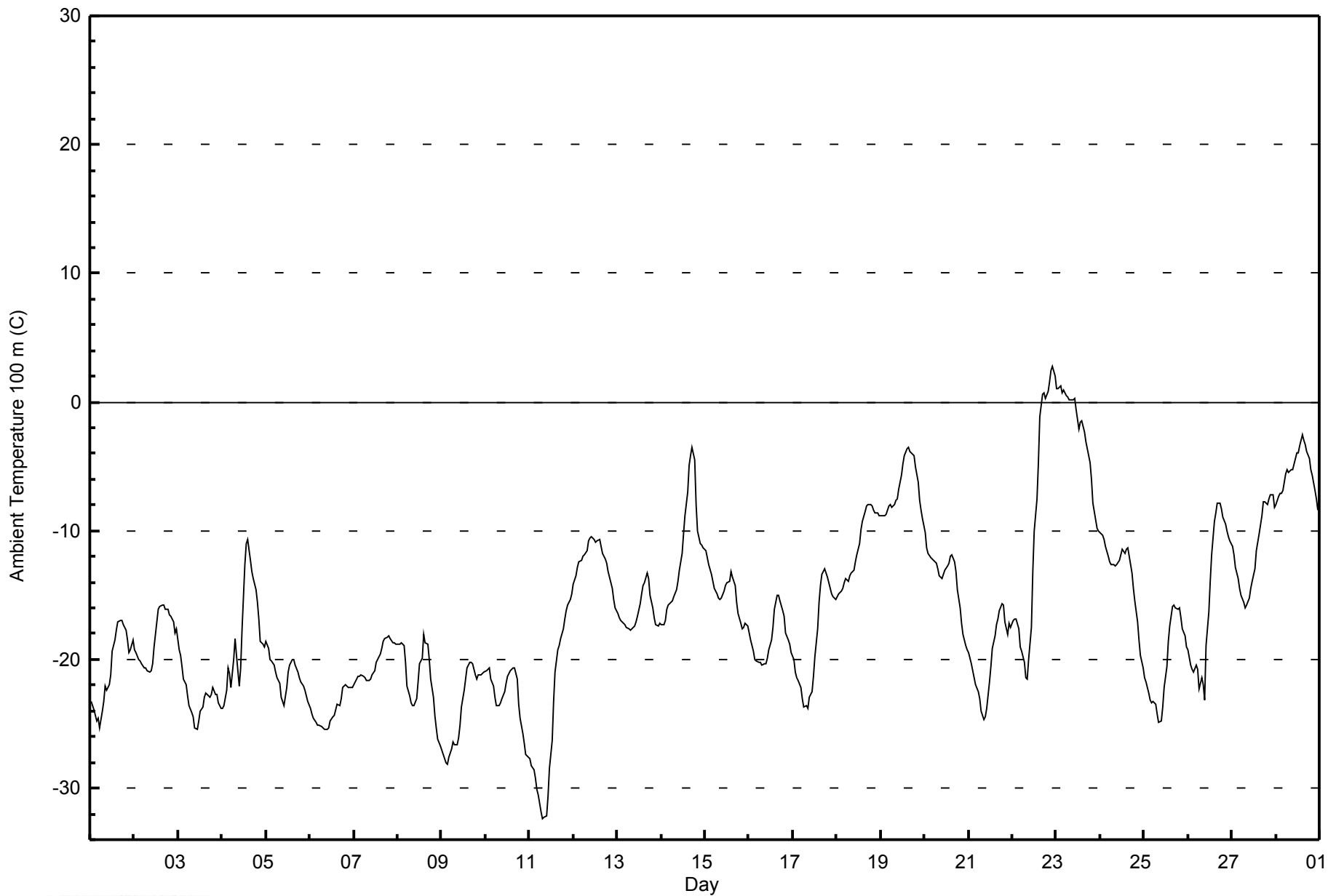


Maximum Value: 2.8 C on Feb 22 23:00		Maximum Daily Average: -2.3 C on Feb 23		Hours in Service: 672																						
Minimum Value: -32.3 C on Feb 11 08:00		Minimum Daily Average: -24.4 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.3 C at hour 17		Minimum Diurnal Average: -18.8 C at hour 9		Hours of Missing Data: 0																						
Monthly Average: -16.41 C		Percentiles: P <sub>1</sub> = -29.7 P <sub>10</sub> = -23.9 Q <sub>1</sub> = -21.4 Median = -17.4 Q <sub>3</sub> = -12.3 P <sub>90</sub> = -7.3 P <sub>99</sub> = 1.0		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-Feb	-23.3	-23.6	-23.9	-24.8	-24.6	-25.3	-24.0	-23.3	-22.0	-22.4	-22.0	-21.2	-19.3	-18.5	-17.8	-17.1	-16.9	-17.0	-17.3	-17.8	-18.5	-19.4	-19.3	-18.5	-20.7	-16.9
2-Feb	-19.2	-19.4	-20.0	-20.1	-20.3	-20.6	-20.7	-20.9	-21.0	-20.9	-20.3	-19.0	-17.0	-16.2	-15.9	-15.7	-15.8	-16.1	-16.1	-16.5	-16.7	-17.1	-17.9	-17.6	-18.4	-15.7
3-Feb	-19.2	-19.7	-20.5	-21.5	-22.0	-22.8	-23.6	-24.2	-24.5	-25.3	-25.4	-24.8	-24.1	-23.7	-22.9	-22.6	-22.7	-23.0	-22.7	-22.2	-22.7	-22.7	-23.4	-23.8	-22.9	-19.2
4-Feb	-23.7	-23.6	-22.3	-20.7	-21.1	-22.2	-20.0	-18.4	-19.7	-22.0	-20.7	-17.6	-12.7	-11.0	-10.7	-12.3	-13.1	-13.7	-14.6	-15.6	-16.9	-18.6	-18.9	-19.0	-17.9	-10.7
5-Feb	-18.6	-19.1	-20.0	-20.2	-20.5	-21.0	-21.4	-21.8	-23.0	-23.3	-23.6	-22.2	-21.0	-20.5	-20.0	-20.4	-20.9	-21.5	-21.8	-22.1	-22.4	-22.9	-23.2	-21.3	-18.6	
6-Feb	-23.8	-24.3	-24.6	-24.9	-25.1	-25.1	-25.2	-25.3	-25.5	-25.5	-25.3	-24.8	-24.4	-24.3	-23.9	-23.5	-23.6	-23.0	-22.2	-21.9	-22.1	-22.2	-22.2	-22.2	-24.0	-21.9
7-Feb	-22.0	-21.5	-21.3	-21.3	-21.2	-21.3	-21.4	-21.7	-21.6	-21.5	-21.2	-20.9	-20.3	-20.0	-19.6	-19.1	-18.6	-18.4	-18.3	-18.2	-18.4	-18.7	-18.7	-18.8	-20.2	-18.2
8-Feb	-18.8	-18.8	-18.7	-19.0	-20.3	-22.0	-22.8	-23.4	-23.6	-23.6	-23.0	-21.7	-20.4	-19.9	-18.0	-18.7	-18.8	-20.0	-21.5	-22.9	-24.4	-25.4	-26.2	-26.7	-21.6	-18.0
9-Feb	-27.1	-27.4	-28.0	-28.1	-27.5	-26.9	-26.4	-26.7	-26.6	-26.0	-25.1	-23.7	-22.4	-21.5	-20.7	-20.2	-20.2	-20.3	-21.2	-21.6	-21.2	-21.2	-21.1	-21.0	-23.8	-20.2
10-Feb	-20.8	-20.8	-20.7	-21.5	-22.1	-22.9	-23.5	-23.6	-23.4	-23.0	-22.6	-21.8	-21.3	-20.9	-20.7	-20.6	-20.6	-21.6	-23.4	-24.6	-25.8	-26.5	-27.3	-27.6	-22.8	-20.6
11-Feb	-27.7	-28.2	-28.5	-29.2	-30.1	-30.5	-31.8	-32.3	-32.3	-32.1	-30.6	-28.5	-26.3	-23.3	-21.0	-19.3	-18.9	-18.4	-17.6	-16.8	-16.2	-15.7	-15.4	-14.9	-24.4	-14.9
12-Feb	-14.2	-13.5	-12.9	-12.4	-12.3	-12.0	-11.8	-11.5	-10.8	-10.6	-10.4	-10.7	-10.9	-10.8	-10.6	-11.2	-11.7	-12.2	-12.5	-13.2	-14.1	-14.4	-15.4	-16.0	-12.3	-10.4
13-Feb	-16.4	-16.7	-17.0	-17.2	-17.3	-17.5	-17.7	-17.7	-17.6	-17.4	-17.1	-16.7	-15.6	-14.9	-14.2	-14.0	-13.3	-13.8	-15.0	-16.0	-16.8	-17.3	-17.4	-17.2	-16.3	-13.3
14-Feb	-17.3	-17.3	-16.9	-16.1	-15.7	-15.6	-15.5	-15.1	-14.6	-13.9	-13.1	-11.7	-10.2	-8.9	-7.0	-4.9	-4.2	-3.5	-4.5	-7.9	-10.1	-11.0	-11.2	-11.3	-11.6	-3.5
15-Feb	-11.6	-12.0	-12.7	-13.4	-14.0	-14.4	-14.9	-15.2	-15.4	-15.3	-14.7	-14.3	-14.0	-13.9	-13.2	-13.6	-14.3	-15.5	-16.4	-17.2	-17.6	-17.5	-17.2	-17.4	-14.8	-11.6
16-Feb	-18.0	-18.5	-19.4	-20.0	-20.2	-20.2	-20.3	-20.4	-20.4	-20.3	-19.9	-19.2	-18.4	-17.5	-16.1	-15.0	-15.0	-15.4	-16.2	-16.7	-18.0	-18.5	-18.8	-19.5	-18.4	-15.0
17-Feb	-20.0	-21.0	-21.4	-21.6	-22.1	-23.0	-23.7	-23.6	-23.9	-22.9	-22.5	-21.4	-19.8	-17.6	-15.6	-14.2	-13.4	-12.9	-13.2	-13.6	-14.4	-14.9	-15.1	-15.3	-18.6	-12.9
18-Feb	-15.1	-14.9	-14.7	-14.4	-14.0	-13.7	-13.9	-13.5	-13.3	-13.0	-12.5	-11.9	-11.0	-10.0	-9.3	-8.5	-8.1	-8.0	-8.0	-8.1	-8.4	-8.7	-8.7	-8.8	-11.3	-8.0
19-Feb	-8.8	-8.8	-8.9	-8.7	-8.1	-8.0	-8.2	-8.0	-7.7	-7.5	-6.7	-5.7	-4.9	-4.2	-3.6	-3.5	-3.8	-4.0	-4.1	-5.1	-6.2	-7.6	-8.4	-9.0	-6.7	-3.5
20-Feb	-10.2	-11.3	-11.7	-12.1	-12.2	-12.3	-12.5	-12.9	-13.5	-13.7	-13.4	-13.1	-12.7	-12.5	-12.0	-11.9	-12.4	-13.2	-14.6	-16.0	-17.2	-18.0	-18.9	-19.2	-13.6	-10.2
21-Feb	-19.5	-20.4	-20.9	-21.4	-21.9	-22.5	-23.1	-24.1	-24.6	-24.5	-23.9	-21.8	-20.6	-19.1	-18.1	-17.3	-16.8	-16.2	-15.7	-15.8	-17.1	-18.0	-17.2	-17.6	-19.9	-15.7
22-Feb	-16.9	-16.8	-16.9	-17.6	-19.1	-19.4	-20.3	-21.4	-21.5	-20.0	-17.6	-13.2	-10.1	-7.6	-4.7	-1.1	0.6	0.7	0.3	0.8	1.6	2.4	2.8	2.0	-9.7	2.8
23-Feb	1.1	1.0	1.3	0.7	1.0	0.5	0.4	0.2	0.1	0.1	0.3	-0.5	-2.1	-1.5	-1.4	-2.3	-3.1	-3.6	-4.7	-6.1	-7.9	-9.2	-9.8	-10.1	-2.3	1.3
24-Feb	-10.2	-10.4	-10.7	-11.2	-12.0	-12.4	-12.6	-12.7	-12.8	-12.6	-12.3	-11.9	-11.4	-11.7	-11.4	-11.3	-12.0	-13.3	-14.5	-15.5	-17.1	-18.5	-19.6	-20.7	-13.3	-10.2
25-Feb	-21.4	-21.8	-22.7	-23.1	-23.4	-23.2	-23.4	-24.2	-24.9	-24.8	-23.7	-22.2	-20.5	-18.6	-17.4	-15.9	-15.8	-16.0	-16.1	-16.0	-16.7	-17.6	-18.1	-19.0	-20.3	-15.8
26-Feb	-19.3	-20.4	-20.7	-21.0	-20.5	-20.8	-22.3	-21.4	-21.9	-23.1	-19.0	-16.3	-14.0	-11.9	-9.2	-8.7	-7.8	-7.9	-8.3	-8.9	-9.5	-10.0	-10.5	-10.8	-15.2	-7.8
27-Feb	-11.2	-11.9	-12.8	-13.7	-14.5	-15.0	-15.6	-16.0	-15.8	-15.2	-14.5	-13.9	-12.9	-11.5	-10.9	-10.3	-8.9	-7.7	-7.8	-8.0	-7.6	-7.2	-7.2	-8.2	-11.6	-7.2
28-Feb	-8.0	-7.3	-7.1	-7.1	-6.9	-5.6	-5.2	-5.5	-5.3	-5.3	-4.8	-4.0	-3.9	-3.4	-2.5	-3.0	-3.3	-3.8	-4.4	-5.2	-5.7	-6.9	-7.5	-8.4	-5.4	-2.5
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	245	36.46	36.46
-20 - 0	408	60.71	97.17
0 - 10	19	2.83	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

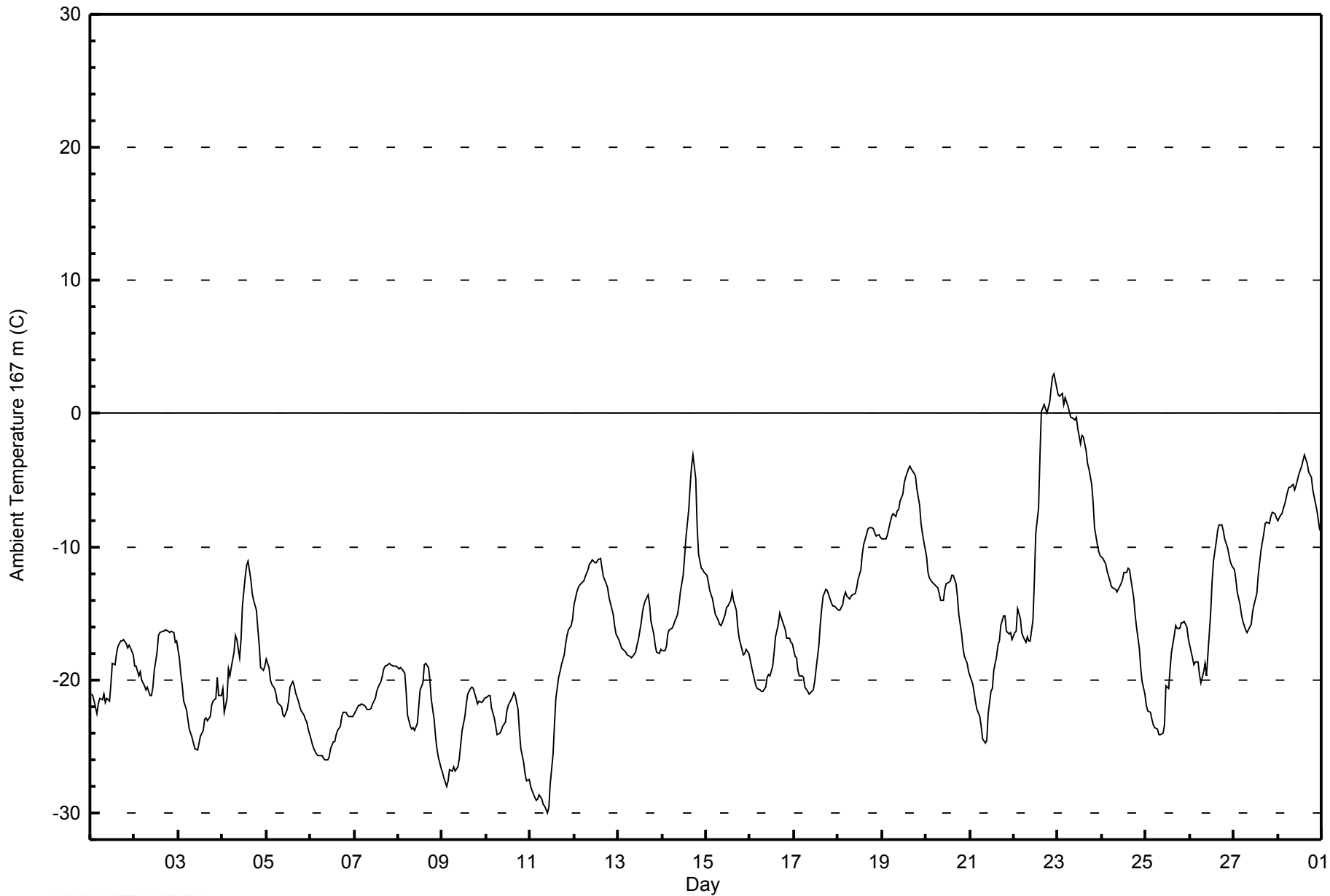


Maximum Value: 3.0 C on Feb 22 23:00		Maximum Daily Average: -2.6 C on Feb 23		Hours in Service: 672																						
Minimum Value: -30.0 C on Feb 11 10:00		Minimum Daily Average: -24.4 C on Feb 6		Hours of Data: 672																						
Maximum Diurnal Average: -13.7 C at hour 17		Minimum Diurnal Average: -18.4 C at hour 10		Hours of Missing Data: 0																						
Monthly Average: -16.37 C		Percentiles: P <sub>1</sub> = -28.9 P <sub>10</sub> = -23.8 Q <sub>1</sub> = -21.2 Median = -17.2 Q <sub>3</sub> = -12.6 P <sub>90</sub> = -7.4 P <sub>99</sub> = 1.3		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-Feb	-21.1	-21.2	-21.5	-22.6	-21.8	-21.3	-21.5	-21.1	-21.7	-21.4	-21.5	-20.3	-18.8	-18.8	-18.1	-17.5	-17.1	-17.0	-16.9	-17.3	-17.6	-17.4	-17.6	-18.1	-19.6	-16.9
2-Feb	-19.0	-19.0	-19.7	-19.4	-20.0	-20.4	-20.8	-20.5	-21.2	-21.1	-20.6	-19.3	-17.9	-16.7	-16.4	-16.3	-16.3	-16.2	-16.3	-16.4	-16.3	-16.5	-17.2	-17.1	-18.4	-16.2
3-Feb	-18.4	-19.6	-20.5	-21.6	-22.3	-22.9	-23.7	-24.3	-24.7	-25.2	-25.2	-24.8	-24.2	-23.8	-22.9	-22.9	-23.1	-22.8	-21.9	-21.6	-21.4	-19.8	-21.2	-21.1	-22.5	-18.4
4-Feb	-20.7	-22.4	-21.4	-19.2	-19.7	-19.0	-17.9	-16.7	-17.0	-18.4	-16.9	-14.5	-12.3	-11.4	-11.1	-12.5	-13.5	-14.1	-14.8	-16.1	-17.4	-19.0	-19.3	-19.0	-16.8	-11.1
5-Feb	-18.5	-19.1	-20.0	-20.3	-20.7	-21.0	-21.7	-21.9	-22.0	-22.7	-22.8	-21.6	-20.5	-20.1	-20.4	-21.0	-21.5	-22.1	-22.4	-22.7	-22.9	-23.2	-23.8	-21.5	-18.5	
6-Feb	-24.4	-24.9	-25.2	-25.6	-25.7	-25.7	-25.7	-25.9	-26.0	-26.0	-25.8	-25.2	-24.7	-24.6	-24.2	-23.8	-23.5	-22.8	-22.4	-22.5	-22.7	-22.8	-22.7	-22.7	-24.4	-22.4
7-Feb	-22.5	-22.1	-21.9	-21.9	-21.8	-21.9	-22.0	-22.3	-22.2	-22.1	-21.8	-21.4	-20.9	-20.6	-20.1	-19.7	-19.2	-19.0	-18.8	-18.7	-18.9	-19.0	-19.0	-19.0	-20.7	-18.7
8-Feb	-19.1	-19.1	-19.2	-19.5	-20.9	-22.6	-23.4	-23.7	-23.6	-23.8	-23.3	-22.0	-20.7	-20.2	-18.9	-18.7	-19.0	-20.0	-21.5	-22.9	-24.2	-25.2	-25.8	-26.7	-21.8	-18.7
9-Feb	-27.0	-27.3	-28.0	-27.6	-26.8	-26.8	-26.5	-26.8	-26.5	-25.9	-24.9	-23.8	-22.7	-21.8	-21.1	-20.6	-20.5	-20.6	-21.4	-21.8	-21.6	-21.7	-21.6	-21.4	-23.9	-20.5
10-Feb	-21.3	-21.2	-21.1	-22.2	-22.8	-23.5	-24.1	-24.0	-23.8	-23.5	-23.2	-22.4	-21.9	-21.5	-21.3	-21.0	-21.2	-22.2	-23.9	-25.1	-26.2	-27.0	-27.5	-27.5	-23.3	-21.0
11-Feb	-28.0	-28.3	-28.8	-29.0	-28.9	-28.7	-29.0	-29.4	-29.5	-30.0	-29.6	-27.8	-25.6	-23.3	-21.4	-19.8	-19.4	-18.9	-18.1	-17.3	-16.7	-16.3	-15.9	-15.4	-24.0	-15.4
12-Feb	-14.3	-13.4	-13.1	-12.9	-12.7	-12.5	-12.2	-11.7	-11.3	-11.2	-10.9	-11.2	-11.0	-10.9	-11.6	-12.2	-12.8	-13.1	-13.8	-14.6	-15.0	-15.9	-16.6	-12.8	-10.9	
13-Feb	-17.0	-17.3	-17.6	-17.8	-17.9	-18.1	-18.3	-18.3	-18.2	-17.9	-17.4	-16.9	-15.7	-14.9	-14.3	-14.0	-13.6	-14.3	-15.6	-16.6	-17.4	-17.9	-18.0	-17.7	-16.8	-13.6
14-Feb	-17.8	-17.8	-17.5	-16.6	-16.2	-16.1	-16.0	-15.6	-15.0	-14.3	-13.4	-12.1	-10.8	-9.3	-7.2	-5.4	-4.0	-3.1	-4.9	-8.4	-10.6	-11.6	-11.8	-11.9	-12.0	-3.1
15-Feb	-12.2	-12.6	-13.3	-14.0	-14.6	-15.1	-15.5	-15.8	-16.0	-15.7	-15.1	-14.6	-14.4	-14.1	-13.4	-14.1	-14.8	-16.1	-16.9	-17.7	-18.1	-18.0	-17.7	-18.0	-15.3	-12.2
16-Feb	-18.5	-19.1	-20.0	-20.5	-20.7	-20.8	-20.8	-20.9	-20.6	-19.8	-19.6	-19.7	-19.0	-18.0	-16.8	-15.8	-15.0	-15.2	-15.9	-16.3	-16.9	-16.8	-17.2	-17.2	-18.4	-15.0
17-Feb	-18.2	-18.4	-19.3	-19.7	-19.7	-19.8	-20.6	-20.8	-21.1	-20.9	-20.8	-20.1	-19.1	-17.3	-15.8	-14.7	-13.7	-13.2	-13.3	-13.7	-14.3	-14.5	-14.5	-14.7	-17.4	-13.2
18-Feb	-14.8	-14.8	-14.4	-13.7	-13.5	-13.7	-14.0	-13.7	-13.6	-13.5	-13.1	-12.5	-11.7	-10.6	-9.9	-9.1	-8.7	-8.6	-8.6	-8.7	-9.0	-9.2	-9.1	-9.3	-11.6	-8.6
19-Feb	-9.4	-9.4	-9.4	-9.1	-8.2	-7.7	-7.5	-7.8	-7.3	-7.2	-6.6	-6.1	-5.2	-4.7	-4.1	-4.0	-4.2	-4.5	-4.7	-5.7	-6.8	-8.2	-9.0	-9.6	-6.9	-4.0
20-Feb	-10.8	-11.9	-12.3	-12.7	-12.8	-12.9	-13.1	-13.5	-14.0	-14.0	-13.2	-12.7	-12.6	-12.6	-12.1	-12.2	-12.8	-13.7	-15.0	-16.5	-17.6	-18.2	-18.7	-19.4	-14.0	-10.8
21-Feb	-19.7	-20.4	-21.0	-21.7	-22.3	-22.7	-23.5	-24.4	-24.8	-24.6	-22.5	-20.9	-20.6	-19.3	-18.2	-17.3	-17.0	-16.0	-15.2	-15.2	-16.4	-16.6	-16.5	-16.9	-19.7	-15.2
22-Feb	-16.5	-16.4	-14.6	-15.4	-16.5	-16.8	-17.2	-16.8	-17.0	-17.1	-15.5	-12.5	-9.0	-7.1	-3.2	0.1	0.7	0.4	0.1	0.9	1.9	2.8	3.0	2.0	-8.3	3.0
23-Feb	1.4	1.3	1.5	0.6	1.2	0.5	0.1	-0.2	-0.4	-0.5	-0.3	-1.1	-2.3	-1.6	-1.8	-2.8	-3.7	-4.2	-5.3	-6.7	-8.5	-9.8	-10.4	-10.7	-2.6	1.5
24-Feb	-10.9	-11.0	-11.3	-11.8	-12.6	-12.9	-13.1	-13.2	-13.4	-13.2	-12.8	-12.5	-11.9	-11.9	-11.6	-11.8	-12.5	-13.9	-15.0	-16.0	-17.6	-19.0	-20.1	-21.1	-13.8	-10.9
25-Feb	-21.9	-22.3	-22.4	-23.0	-23.4	-23.6	-23.7	-24.1	-24.1	-24.1	-23.3	-20.4	-20.6	-19.1	-17.9	-16.6	-15.9	-16.1	-16.1	-15.7	-15.8	-15.6	-16.1	-16.9	-19.9	-15.6
26-Feb	-17.4	-18.4	-18.9	-18.6	-18.7	-19.6	-20.2	-19.3	-18.8	-19.7	-18.1	-15.0	-12.7	-11.1	-9.7	-8.7	-8.3	-8.3	-8.8	-9.4	-10.0	-10.6	-11.1	-11.4	-14.3	-8.3
27-Feb	-11.8	-12.5	-13.4	-14.3	-15.1	-15.6	-16.2	-16.5	-16.2	-15.8	-14.9	-14.4	-13.6	-12.1	-11.2	-10.2	-9.0	-8.2	-8.2	-8.2	-7.7	-7.4	-7.5	-7.8	-12.0	-7.4
28-Feb	-8.0	-7.7	-7.5	-7.1	-6.8	-5.8	-5.5	-5.5	-5.4	-5.7	-5.4	-4.6	-4.3	-3.9	-3.1	-3.4	-3.8	-4.4	-4.8	-5.7	-6.3	-7.3	-8.1	-8.8	-5.8	-3.1
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	222	33.04	33.04
-20 - 0	434	64.58	97.62
0 - 10	16	2.38	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



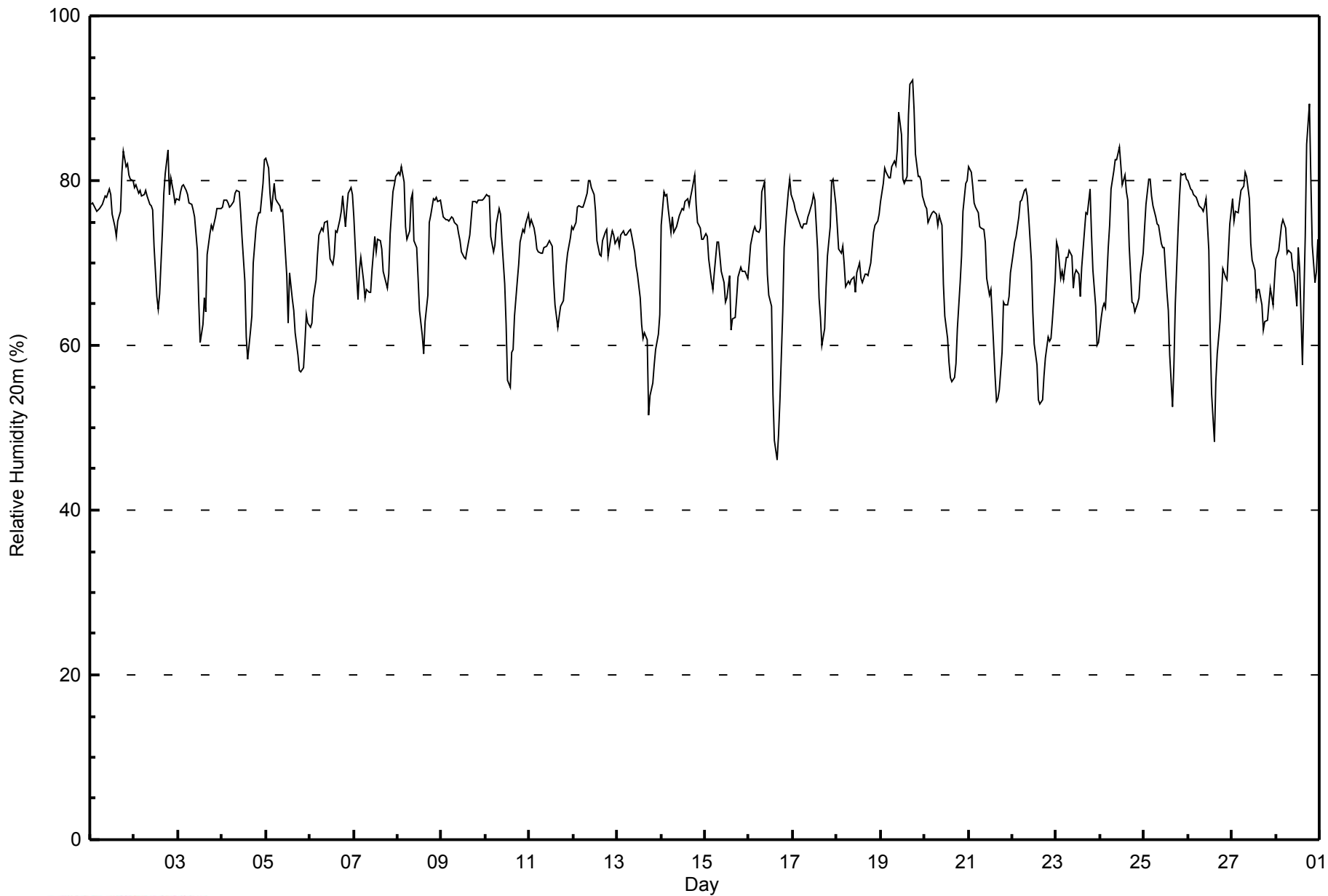


Maximum Value: 92 % on Feb 19 18:00																		Maximum Daily Average: 82.8 % on Feb 19																		Hours in Service: 672												
Minimum Value: 46 % on Feb 16 16:00																		Minimum Daily Average: 66.0 % on Feb 13																		Hours of Data: 672												
Maximum Diurnal Average: 75.6 % at hour 9																		Minimum Diurnal Average: 64.6 % at hour 15																		Hours of Missing Data: 0												
Monthly Average: 72.1 %																		Percentiles: P <sub>1</sub> = 53 P <sub>10</sub> = 62 Q <sub>1</sub> = 68 Median = 74 Q <sub>3</sub> = 77 P <sub>90</sub> = 80 P <sub>99</sub> = 85																		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-Feb	77	77	77	76	76	77	77	78	78	78	79	78	76	74	73	75	76	81	84	82	82	81	80	80	78.0	84																						
2-Feb	79	80	79	79	78	78	79	78	77	77	76	72	66	64	66	74	78	81	84	78	80	78	77	78	76.6	84																						
3-Feb	78	79	79	80	79	78	77	77	76	76	72	65	60	62	66	64	71	74	75	74	76	77	77	77	73.6	80																						
4-Feb	77	78	78	77	77	77	77	79	79	79	76	73	68	61	58	62	64	70	74	75	76	76	80	83	73.8	83																						
5-Feb	83	82	78	76	80	78	77	77	76	76	74	68	63	69	66	64	62	59	57	57	57	60	64	63	69.4	83																						
6-Feb	62	63	66	68	71	73	74	74	75	75	73	71	70	71	74	74	75	76	78	74	77	78	79	78	72.9	79																						
7-Feb	76	68	66	69	71	68	66	67	66	66	69	73	71	73	73	72	69	68	67	69	74	79	80	80	70.8	80																						
8-Feb	81	81	82	80	74	73	74	78	79	73	72	68	64	61	59	63	66	75	76	78	78	78	77	78	73.6	82																						
9-Feb	77	76	75	75	75	76	75	75	75	74	73	71	71	70	72	73	75	77	78	77	78	78	78	78	75.0	78																						
10-Feb	78	78	78	73	71	72	75	77	76	73	68	63	56	55	59	59	64	68	70	73	74	74	75	76	70.1	78																						
11-Feb	75	75	74	73	72	71	71	71	72	72	72	73	72	68	65	62	64	65	65	67	70	71	73	74	70.3	75																						
12-Feb	74	75	77	77	77	77	77	78	80	80	79	78	76	73	71	71	73	74	74	71	73	74	73	72	75.2	80																						
13-Feb	73	72	73	74	73	73	74	74	73	71	70	69	66	63	61	62	61	52	54	56	58	59	61	64	66.0	74																						
14-Feb	75	79	78	78	77	74	76	74	74	75	76	77	76	77	78	77	78	79	81	77	75	74	73	73	76.2	81																						
15-Feb	74	73	71	68	67	69	73	72	71	69	68	65	66	68	62	63	63	66	68	70	69	69	69	68	68.3	74																						
16-Feb	70	72	74	74	74	74	74	79	80	75	69	66	65	54	48	46	49	53	64	72	75	79	80	78	68.5	80																						
17-Feb	77	76	76	75	74	74	75	75	76	76	77	78	78	71	66	63	60	62	67	71	74	80	80	77	73.3	80																						
18-Feb	75	72	71	72	70	67	68	67	68	68	66	69	70	68	68	69	69	69	70	72	74	75	75	76	70.2	76																						
19-Feb	77	80	82	81	80	80	82	82	82	84	88	86	80	80	80	88	92	92	89	83	80	80	80	78	82.8	92																						
20-Feb	77	77	75	76	76	76	76	75	76	75	67	63	61	58	56	56	56	58	62	68	71	76	80	80	69.6	80																						
21-Feb	82	81	79	77	77	76	74	74	74	73	68	66	67	63	56	53	54	55	59	65	65	65	66	69	68.3	82																						
22-Feb	71	72	73	76	77	78	79	79	78	76	70	64	60	58	53	53	53	56	59	61	61	61	63	68	66.6	79																						
23-Feb	73	72	68	69	68	71	71	72	71	67	69	69	66	69	74	76	76	79	74	69	65	60	60	60	69.8	79																						
24-Feb	63	65	65	65	72	75	79	81	82	83	84	82	80	81	79	78	72	65	65	64	65	66	69	71	72.9	84																						
25-Feb	74	77	80	80	78	77	76	75	75	72	72	72	66	64	59	53	58	65	74	78	81	81	81	80	72.8	81																						
26-Feb	80	79	79	78	78	77	77	77	76	77	78	72	61	54	48	56	59	63	66	69	68	68	71	75	70.3	80																						
27-Feb	78	75	76	76	78	79	79	81	80	78	72	70	69	66	67	67	65	62	63	63	65	67	65	68	71.2	81																						
28-Feb	70	72	73	75	75	74	71	72	71	69	69	65	72	69	58	66	73	84	89	80	72	68	69	73	72.1	89																						
																								75.2	75.1	75.1	74.9	74.8	74.7	75.1	75.5	75.6	74.5	73.1	70.9	68.5	66.5	64.6	65.5	66.9	68.7	71.1	71.3	72.0	72.7	73.4	74.1	Diurnal Average
																								83	82	82	81	80	80	82	82	82	84	88	86	80	81	80	88	92	92	89	83	82	81	81	83	Diurnal Maximum



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	46	6.85	6.85
60 - 80	566	84.23	91.07
80 - 100	60	8.93	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

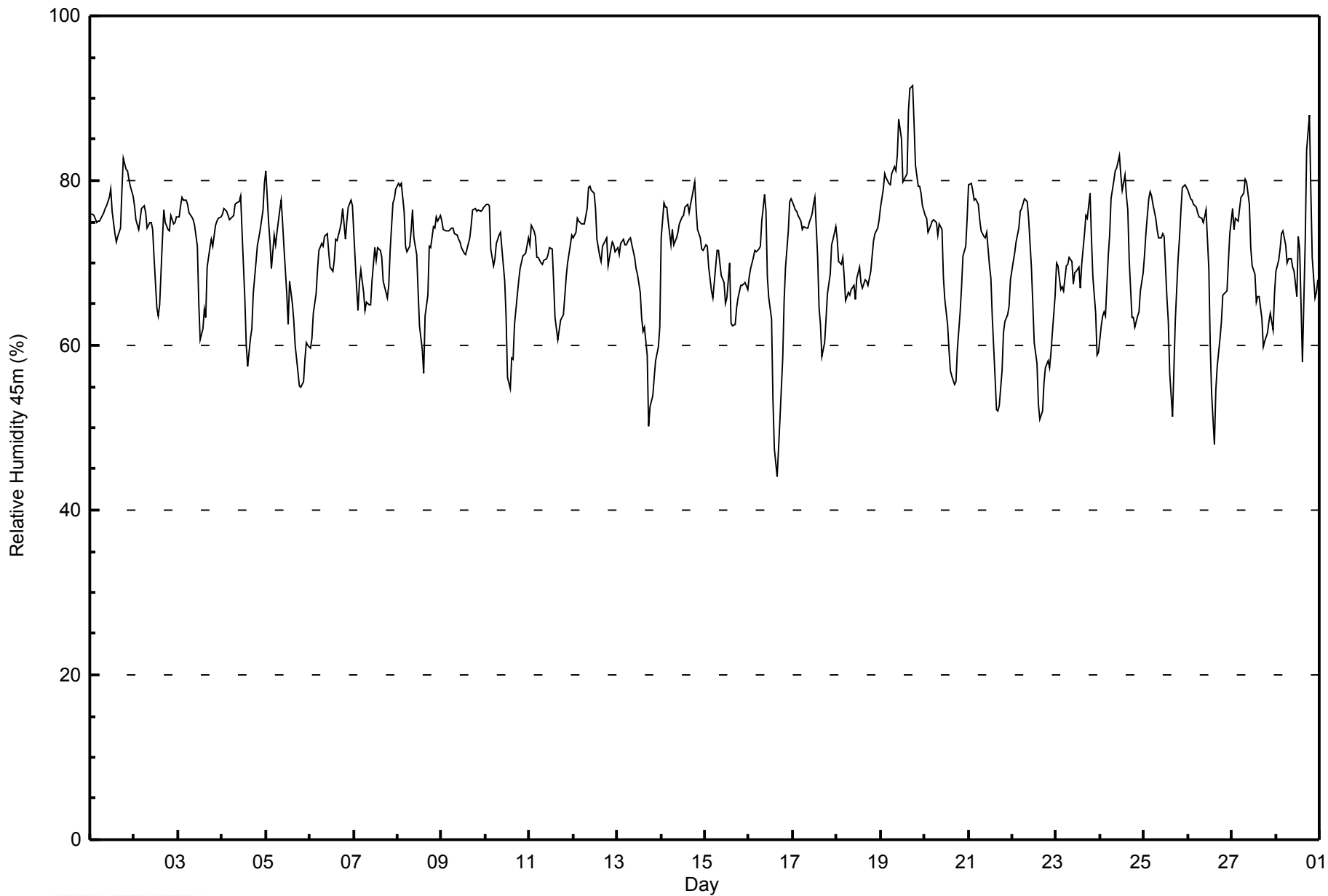


Maximum Value: 92 % on Feb 19 18:00														Maximum Daily Average: 82.1 % on Feb 19														Hours in Service: 672	
Minimum Value: 44 % on Feb 16 16:00														Minimum Daily Average: 65.2 % on Feb 13														Hours of Data: 672	
Maximum Diurnal Average: 74.4 % at hour 9														Minimum Diurnal Average: 64.1 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 70.7 %														Percentiles: P <sub>1</sub> = 51 P <sub>10</sub> = 61 Q <sub>1</sub> = 66 Median = 72 Q <sub>3</sub> = 76 P <sub>90</sub> = 78 P <sub>99</sub> = 85														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-Feb	76	76	76	75	75	75	76	76	77	77	78	79	76	74	73	73	74	79	83	81	81	80	79	78	76.9	83			
2-Feb	77	75	74	75	77	77	76	74	75	75	74	71	65	64	65	73	76	75	74	74	76	75	75	76	73.6	77			
3-Feb	76	77	78	78	78	77	76	76	75	75	72	65	61	62	64	63	70	72	73	72	74	75	76	76	72.5	78			
4-Feb	76	77	76	76	75	75	76	77	77	77	78	74	66	60	57	61	62	66	70	72	73	74	76	80	72.2	80			
5-Feb	81	75	73	69	73	72	74	76	78	75	72	66	63	68	65	63	60	57	55	55	56	58	60	60	66.8	81			
6-Feb	60	61	64	66	69	72	72	72	73	74	71	69	69	70	73	73	74	75	77	73	75	77	78	77	71.4	78			
7-Feb	74	67	64	68	69	66	64	65	65	65	68	72	70	72	72	71	68	67	66	67	71	77	78	79	69.4	79			
8-Feb	80	79	80	76	72	71	72	74	77	73	71	67	62	59	57	64	66	72	72	74	74	76	75	76	71.6	80			
9-Feb	75	74	74	74	74	74	74	74	73	73	72	72	71	71	72	73	75	76	77	76	76	76	76	77	74.2	77			
10-Feb	77	77	77	72	70	71	72	73	74	72	68	63	56	55	58	58	63	66	68	69	71	71	71	73	68.5	77			
11-Feb	72	75	74	73	71	71	70	70	70	70	71	72	72	68	63	61	62	63	64	66	68	70	72	73	69.2	75			
12-Feb	73	74	75	75	75	75	75	77	79	79	79	78	77	73	71	70	72	73	73	70	72	73	72	71	74.2	79			
13-Feb	72	71	72	73	72	72	73	73	72	71	69	69	66	63	62	62	59	50	53	54	56	58	60	62	65.2	73			
14-Feb	73	77	77	77	75	72	74	72	73	74	75	76	76	77	77	76	77	78	80	77	74	73	72	72	75.1	80			
15-Feb	72	72	69	67	66	68	72	71	70	68	68	65	66	70	63	62	63	65	66	67	67	68	68	67	67.4	72			
16-Feb	68	69	71	71	71	72	72	75	78	76	68	66	63	53	48	44	48	51	58	65	70	74	77	78	66.2	78			
17-Feb	77	76	76	76	75	74	74	74	74	75	76	77	78	71	65	63	59	60	63	66	69	72	73	74	71.6	78			
18-Feb	73	70	70	71	68	65	66	66	67	67	66	68	69	68	67	68	68	67	69	71	73	74	74	75	69.2	75			
19-Feb	77	79	81	80	80	80	81	82	81	83	88	85	80	80	81	88	91	92	87	82	79	79	79	77	82.1	92			
20-Feb	76	75	74	75	75	75	75	73	75	74	68	66	63	60	57	56	55	56	60	64	67	71	72	75	68.2	76			
21-Feb	79	80	79	78	78	77	75	74	73	73	74	70	68	63	56	52	52	53	57	62	63	64	65	68	68.0	80			
22-Feb	70	71	73	74	76	77	78	78	77	75	69	65	60	58	53	51	52	55	57	58	57	59	62	66	65.5	78			
23-Feb	70	70	67	67	67	70	70	71	70	67	69	69	69	67	70	74	76	75	78	73	68	64	59	59	69.1	78			
24-Feb	62	64	64	64	71	73	78	80	81	82	83	81	79	81	78	76	70	63	63	62	63	64	67	69	71.6	83			
25-Feb	71	74	78	79	78	77	76	74	73	73	73	73	66	63	57	51	57	63	70	73	76	79	80	79	71.4	80			
26-Feb	79	78	78	77	77	76	76	75	75	76	76	69	60	54	48	55	57	61	63	66	66	67	70	74	68.8	79			
27-Feb	77	74	75	75	77	78	78	80	80	77	72	70	69	65	66	66	63	60	60	62	63	64	62	66	69.9	80			
28-Feb	69	70	72	74	74	72	70	71	70	69	69	66	73	72	58	65	73	84	88	79	71	66	66	68	71.2	88			
73.6														73.5														Diurnal Average	
81														80														Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	59	8.78	8.78
60 - 80	584	86.90	95.68
80 - 100	29	4.32	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

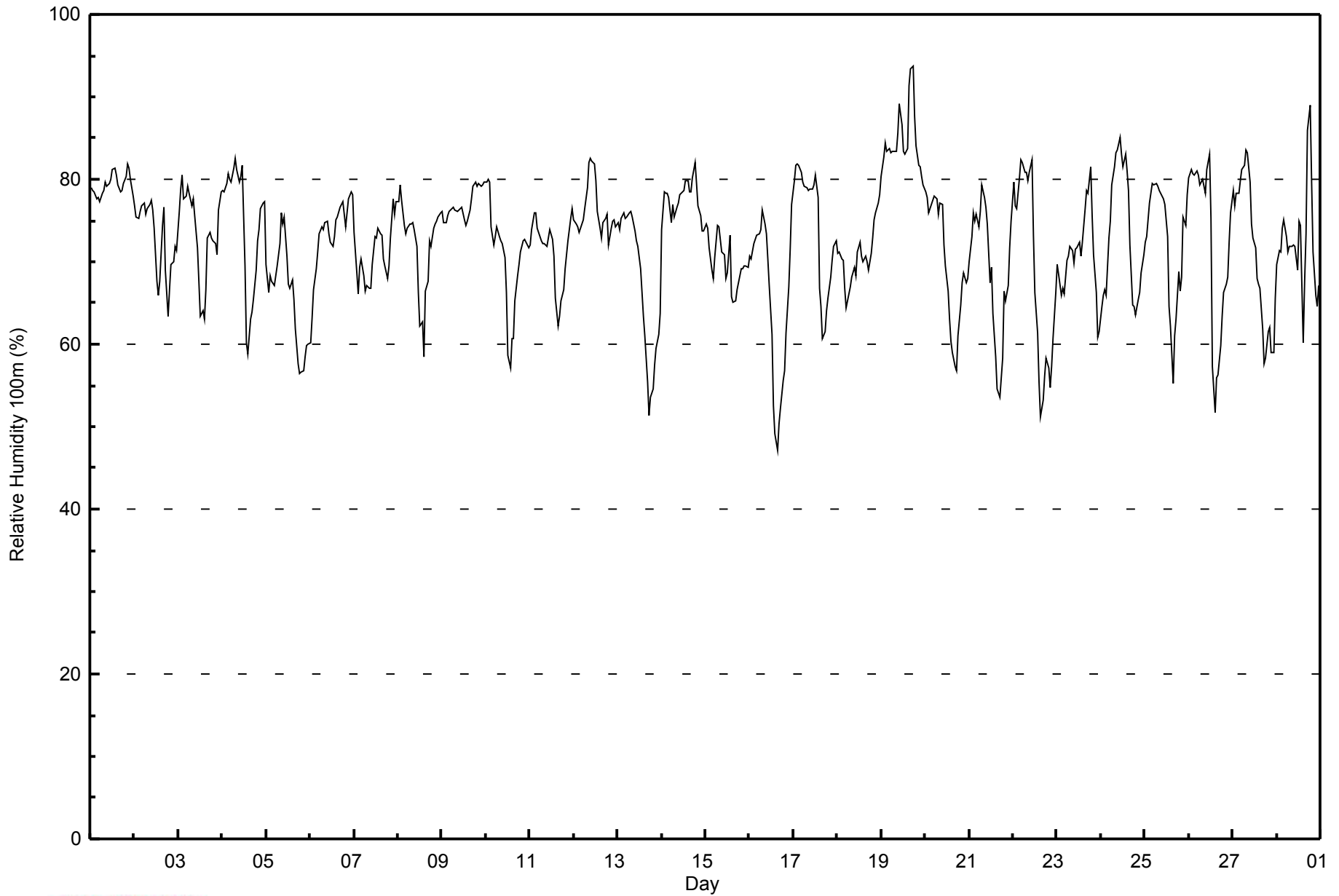


Maximum Value: 94 % on Feb 19 18:00														Maximum Daily Average: 84.7 % on Feb 19														Hours in Service: 672	
Minimum Value: 47 % on Feb 16 16:00														Minimum Daily Average: 65.4 % on Feb 16														Hours of Data: 672	
Maximum Diurnal Average: 76.5 % at hour 9														Minimum Diurnal Average: 66.7 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 72.4 %														Percentiles: P <sub>1</sub> = 52 P <sub>10</sub> = 62 Q <sub>1</sub> = 68 Median = 74 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 P <sub>99</sub> = 86														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-Feb	79	79	78	78	78	77	78	79	80	79	79	80	81	81	81	79	79	79	79	80	82	81	80	78	79.4	82			
2-Feb	77	75	75	76	77	77	76	77	77	78	76	74	68	66	68	74	77	69	63	67	70	70	72	71	72.9	78			
3-Feb	76	79	80	78	78	79	78	77	78	76	72	68	63	64	63	67	73	74	73	73	72	71	76	78	73.5	80			
4-Feb	79	79	79	81	80	80	81	82	81	80	80	82	70	60	59	63	64	65	69	73	74	76	77	77	74.6	82			
5-Feb	70	66	68	68	67	68	70	72	76	75	75	71	67	67	68	65	62	58	56	57	57	58	60	60	65.9	76			
6-Feb	60	63	67	69	71	73	74	74	75	75	73	72	72	73	75	75	77	77	77	74	76	78	78	78	73.3	78			
7-Feb	74	69	66	69	70	68	66	67	67	67	70	73	73	74	73	73	70	69	68	70	73	78	76	77	70.8	78			
8-Feb	77	79	77	74	73	74	75	75	75	74	72	66	62	63	58	66	68	73	72	74	75	75	75	76	72.0	79			
9-Feb	76	75	75	76	76	76	77	76	76	76	77	77	75	74	75	76	78	79	80	79	79	79	79	80	76.9	80			
10-Feb	80	80	80	74	72	73	74	73	73	72	71	66	59	57	61	61	65	68	70	71	73	73	72	72	70.4	80			
11-Feb	72	74	76	76	74	74	73	72	72	72	73	74	73	71	66	62	63	65	67	69	71	72	75	76	71.3	76			
12-Feb	75	75	74	74	75	75	77	79	82	83	82	82	80	76	74	73	75	75	76	72	74	75	75	74	76.3	83			
13-Feb	75	74	75	76	75	75	76	76	75	74	72	72	69	66	63	61	55	51	54	54	57	60	61	64	67.2	76			
14-Feb	74	78	78	78	78	75	77	75	77	77	78	78	79	80	80	78	79	80	82	80	77	76	74	74	77.5	82			
15-Feb	75	74	72	69	68	71	74	74	73	71	71	68	69	73	66	65	65	67	67	69	69	69	70	69	69.9	75			
16-Feb	71	70	72	73	73	73	74	76	75	73	70	67	61	53	49	47	50	52	56	57	61	67	72	77	65.4	77			
17-Feb	80	82	82	82	81	80	79	79	79	79	79	79	80	78	67	65	61	62	64	66	68	70	72	73	74.3	82			
18-Feb	71	71	70	70	67	64	66	67	68	69	68	71	72	71	70	71	70	69	71	73	75	76	77	78	70.7	78			
19-Feb	80	83	84	83	84	83	83	83	83	86	89	87	83	83	84	91	93	94	88	84	82	82	80	79	84.7	94			
20-Feb	78	78	76	77	78	78	78	76	77	77	72	70	66	63	60	59	57	57	61	65	67	69	68	68	69.7	78			
21-Feb	70	73	76	75	76	74	76	79	78	77	75	67	69	64	58	55	54	53	58	66	65	67	72	75	68.9	79			
22-Feb	80	77	76	80	82	82	81	81	80	81	82	73	66	61	55	51	53	56	58	57	55	57	61	66	68.9	82			
23-Feb	70	68	66	67	66	70	71	72	71	70	71	72	72	71	72	76	79	78	81	76	71	66	61	62	70.8	81			
24-Feb	65	66	67	66	73	75	79	82	83	84	85	83	82	83	81	79	72	65	65	64	65	66	69	71	73.6	85			
25-Feb	72	73	77	78	80	79	79	79	79	78	78	77	73	65	62	55	61	63	69	66	68	75	74	78	72.5	80			
26-Feb	80	81	81	81	81	81	79	80	79	78	81	83	75	57	52	56	56	60	63	66	67	68	72	76	72.3	83			
27-Feb	79	77	78	78	80	81	82	84	83	80	75	73	72	68	67	67	62	58	58	62	62	59	59	66	71.1	84			
28-Feb	70	71	71	74	75	73	71	72	72	72	72	69	75	74	60	68	73	86	89	80	71	66	65	67	72.3	89			
74.4														74.6														Diurnal Average	
80														83														Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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







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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	49	7.29	7.29
60 - 80	542	80.65	87.95
80 - 100	81	12.05	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

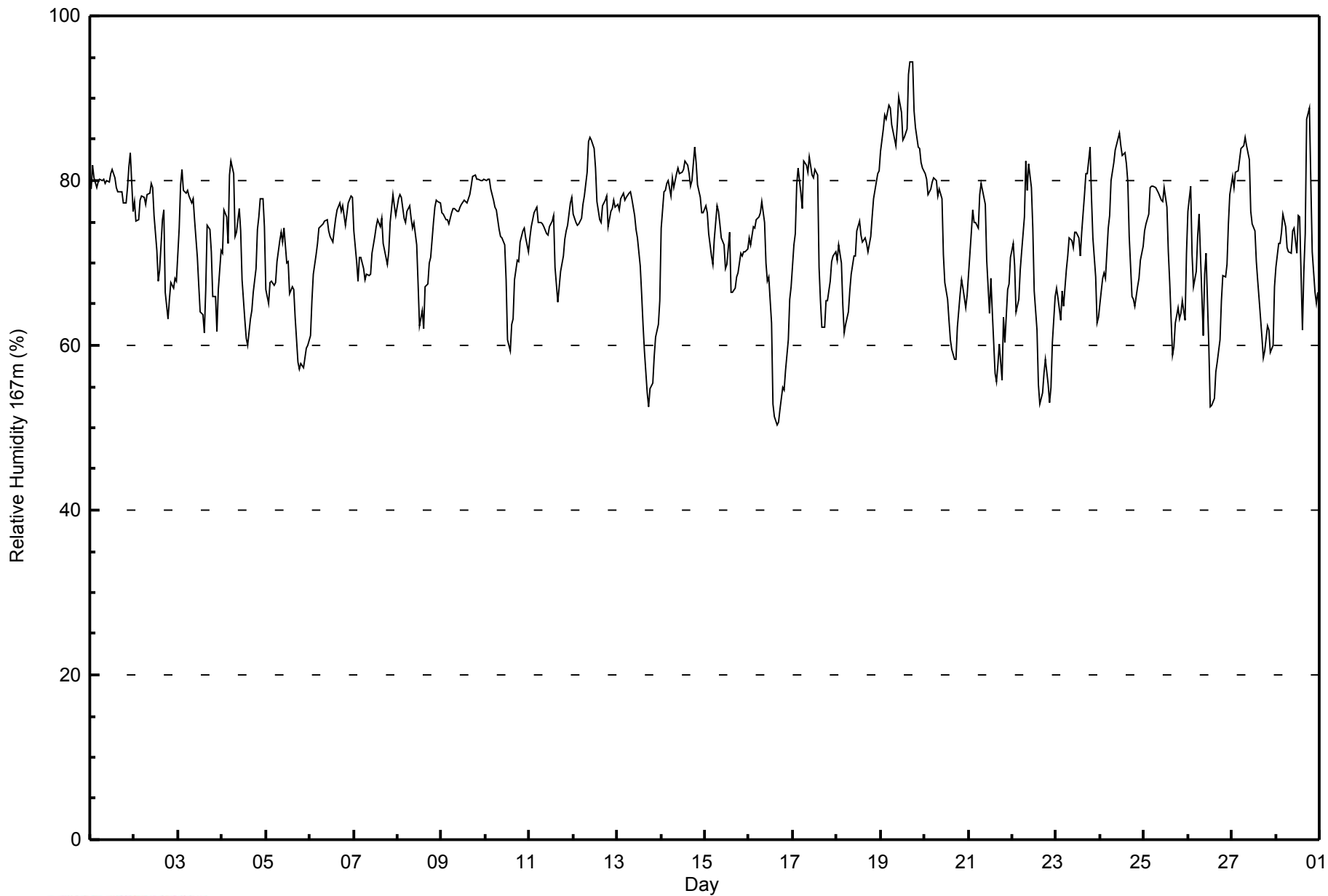


Maximum Value: 94 % on Feb 19 18:00																		Maximum Daily Average: 87.0 % on Feb 19						Hours in Service: 672		
Minimum Value: 50 % on Feb 16 16:00																		Minimum Daily Average: 65.0 % on Feb 16						Hours of Data: 672		
Maximum Diurnal Average: 76.9 % at hour 7																		Minimum Diurnal Average: 68.0 % at hour 15						Hours of Missing Data: 0		
Monthly Average: 72.7 %																		Percentiles: P <sub>1</sub> = 53 P <sub>10</sub> = 62 Q <sub>1</sub> = 68 Median = 74 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 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-Feb	79	82	80	79	80	80	80	80	80	80	80	81	81	80	79	79	79	79	77	77	79	82	83	76	79.7	83
2-Feb	78	75	75	78	78	78	77	78	79	80	79	76	72	68	69	75	77	67	63	66	68	67	68	68	73.2	80
3-Feb	74	80	81	79	78	79	78	77	78	75	71	67	64	64	62	67	75	74	71	66	66	62	67	72	71.9	81
4-Feb	71	77	76	72	81	82	81	73	74	77	74	68	63	61	60	63	64	66	69	74	76	78	78	74	72.2	82
5-Feb	67	65	68	68	67	68	70	73	74	73	74	70	66	67	67	63	58	57	58	57	58	60	60	60	65.7	74
6-Feb	61	65	69	71	72	74	75	75	75	75	74	73	73	74	75	77	77	76	77	75	76	77	78	78	73.9	78
7-Feb	74	70	68	71	71	69	68	69	68	69	71	73	74	75	74	75	72	72	70	71	75	78	77	76	72.1	78
8-Feb	78	78	78	75	75	76	77	75	74	75	72	67	62	64	62	67	68	70	71	75	77	78	77	77	72.9	78
9-Feb	76	76	75	75	75	76	77	77	76	76	77	77	78	77	77	78	79	80	81	80	80	80	80	80	77.7	81
10-Feb	80	80	80	79	78	77	76	74	73	73	72	68	61	59	63	63	68	70	70	73	74	74	73	71	72.1	80
11-Feb	73	74	76	76	77	75	75	75	74	74	73	74	75	76	70	65	67	69	71	73	74	75	77	78	73.6	78
12-Feb	76	75	75	75	75	77	78	81	85	85	85	84	81	77	75	75	77	78	78	74	76	77	78	77	78.1	85
13-Feb	77	76	78	79	78	78	79	79	78	76	74	73	70	66	63	59	54	53	55	55	59	61	63	66	68.6	79
14-Feb	74	79	79	80	80	78	80	79	81	81	81	81	82	82	81	79	80	84	82	80	78	76	76	76	79.8	84
15-Feb	77	76	74	71	70	73	77	76	75	73	72	69	70	74	66	67	67	68	69	71	71	71	71	72	71.7	77
16-Feb	73	72	74	74	75	76	76	77	75	70	68	68	63	53	51	50	51	52	55	55	57	61	66	67	65.0	77
17-Feb	72	74	80	81	78	77	82	82	81	83	81	80	81	81	69	65	62	62	65	65	68	70	71	71	74.3	83
18-Feb	70	72	70	65	62	62	64	67	69	71	71	74	75	73	73	73	72	71	73	76	78	79	81	81	71.7	81
19-Feb	84	86	88	88	89	89	87	85	84	87	90	88	85	85	86	93	94	94	89	86	84	84	82	82	87.0	94
20-Feb	81	80	78	79	80	80	80	78	79	78	71	68	66	63	61	59	58	58	62	66	68	67	65	66	70.5	81
21-Feb	69	74	76	75	75	74	78	80	78	77	70	64	68	64	57	56	58	60	56	63	60	67	67	71	68.2	80
22-Feb	72	70	64	66	69	71	76	82	79	82	79	74	67	62	55	53	54	57	58	55	53	55	60	66	65.8	82
23-Feb	67	66	63	67	65	69	71	73	73	72	74	74	73	71	74	78	81	81	84	78	73	68	63	63	71.6	84
24-Feb	67	68	69	68	74	76	80	82	84	84	86	84	83	83	82	80	73	66	66	65	67	68	70	72	74.9	86
25-Feb	74	75	76	79	79	79	79	79	79	78	77	79	77	71	68	59	60	63	65	63	64	65	63	71	71.7	79
26-Feb	76	79	71	67	69	73	76	66	61	69	71	60	53	53	53	57	58	61	65	68	68	70	75	78	66.6	79
27-Feb	81	79	81	81	83	84	84	85	84	83	76	75	74	70	68	66	61	58	59	62	62	59	60	67	72.6	85
28-Feb	70	72	72	74	76	74	72	71	71	74	74	71	76	76	62	69	74	88	89	80	71	66	65	66	73.1	89
																		73.9 74.8 74.8 74.7 75.3 75.9 76.9 76.7 76.4 76.7 75.6 73.6 71.9 70.4 68.0 68.4 68.7 69.0 69.6 69.8 70.0 70.5 71.2 72.2						Diurnal Average		
																		84 86 88 88 89 89 87 85 85 87 90 88 85 85 86 93 94 94 89 86 84 84 83 82						Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	48	7.14	7.14
60 - 80	519	77.23	84.38
80 - 100	105	15.63	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 28 km/h on Feb 14 04:00		Maximum Daily Speed Average: 14.9 km/h on Feb 14		Hours in Service: 672																						
Minimum Speed Value: 0 km/h on Feb 11 04:00		Minimum Daily Speed Average: 1.2 km/h on Feb 19		Hours of Data: 672																						
Maximum Diurnal Speed Average: 2.3 km/h at hour 4		Minimum Diurnal Speed Average: 0.1 km/h at hour 14		Hours of Missing Data: 0																						
Monthly Average Velocity: 1.4 km/h 111.3 deg		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 6 Q <sub>3</sub> = 10 P <sub>90</sub> = 14 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-Feb	SSE13	SSE9	SSE11	SSE12	SSE12	SSE10	SSE9	SSE7	SSE9	SSE6	NNW1	NE0	W4	W7	WNW4	WSW4	WNW1	WSW1	W2	SW1	SSE2	SE4	SE4	SSE5	SSE4.3	SSE13
2-Feb	SE9	SSE6	SSE5	SSE6	SSE10	SSE11	SSE9	SSE3	SE4	WSW3	WSW5	SW3	S1	WSW2	SW2	N1	ESE1	NNW3	NNW2	WSW2	SE2	W4	W9	WNW4	S2.3	SSE11
3-Feb	NW5	WNW4	NNW4	NW2	NNW4	NNW4	NW3	NNW3	NW3	NNW2	NNW6	N7	N5	WSW2	SW3	SSE4	SE5	SSE5	SSE6	SSE10	SSE12	SSE18	SSE11	SSE12	SSE1.5	SSE18
4-Feb	SSE14	SE9	SE11	SSE15	SSE14	SSE14	SE11	SSE14	SE6	NW1	SSE2	SSE4	NW2	NNW8	NNW8	N7	N6	NNW3	NNW6	N5	N7	NNW5	NNW3	NW3	SE2.5	SSE15
5-Feb	NNW3	NNE2	NNE2	NW2	NW3	NNW4	NNW3	ESE0	SE2	NNW1	WSW0	S1	SSW1	SSW2	WSW0	NE5	NE5	NE4	NNE4	NE3	NNE4	N3	NW3	NNE1.6	NE5	
6-Feb	NNE5	NNE6	NE8	NE7	NNE6	NNE6	NNE7	NNE7	NNE8	N7	NNE9	NNE8	N10	N10	N11	N10	N10	N7	N5	E5	E5	ENE5	E4	NE4	NNE6.4	N11
7-Feb	ENE4	SE10	SE16	SE15	SE15	SE15	SE17	SE17	SE18	SSE19	SE16	SE16	SE12	SE12	SE12	SE10	SSE10	SSE10	SSE8	SSE4	NNE2	NNW3	N3	NNW1	SE10.1	SSE19
8-Feb	N3	N2	NNW3	N5	NNE7	N6	N4	NNW3	NNW2	W1	WSW4	SW3	SSW2	W2	SSW2	N3	N4	N5	N4	N6	N5	N6	N5	N4	NNW2.9	NNE7
9-Feb	N4	N5	N4	N4	N4	NNW4	NNW5	NNW6	NNW4	NW4	NNW4	NNW3	NNW5	NNW6	NNW5	NNW5	NNW6	NNW6	NNW7	NNW5	NNW5	NNW6	NNW5	NNW6	NNW5.0	NNW7
10-Feb	NNW6	NNW5	NNW7	NNE10	NNE10	N8	NNW4	NW2	NNW2	NNW4	NNW7	NNW7	NNW9	NNW8	N6	N6	N7	NNE9	NNE7	N4	NNW3	NNW3	NW4	NNW3	N5.6	NNE10
11-Feb	NNW3	NNW3	NW2	S0	W0	SSE1	SW1	SSE3	SSE8	SSE11	SSE10	SSE9	SSE7	SSE7	SSE13	SSE18	SSE21	SSE21	SSE22	SSE23	SSE24	SSE25	S22	S19	SSE10.6	SSE25
12-Feb	SSE19	SSE15	SSE12	SSE10	SSE9	SSE8	SSE9	SSE4	S2	WNW2	N4	NNW8	N7	N8	NNE6	NNE7	N8	N7	N8	NNE8	NNE8	NE7	N10	N10	ENE2.1	SSE19
13-Feb	NNE8	NNE8	NNE8	N8	NNE8	NNE8	NNE7	NNE7	NNE7	NNE7	N10	N10	N8	N6	NNW5	N6	ENE3	SE15	SE17	SSE21	SE22	SE23	SSE23	SSE22	E4.3	SSE23
14-Feb	SE22	SE23	SSE23	SSE28	SSE28	SSE26	SSE27	SSE26	SSE24	SSE23	SSE22	SSE25	SSE26	SSE21	SSE16	SSE17	SSE16	SSE10	N10	N13	N9	N7	N7	N5	SSE14.9	SSE28
15-Feb	NNE3	ENE4	ENE4	NE3	NNE4	NNE6	NNE5	NNE5	N7	N6	N7	N7	N8	N6	N7	NNE7	NNE8	NNE7	NNW5	NNW4	NNW4	NW5	N6	N5	N5.2	N8
16-Feb	N7	N4	NNW5	NW4	NW5	NW4	NW3	N2	NW2	W2	W4	WSW6	WSW9	WSW7	SSW3	S2	SSE4	SSE4	WNW2	NW3	NW3	N2	SSE2	SE2	WNW2.1	WSW9
17-Feb	SE2	SE3	SE1	SSE1	SE0	SSE2	SSE4	SSE3	SSE7	SSE12	SSE8	SSE9	SSE11	SSE10	SSE8	SSE6	SSE5	SSE3	NE0	ESE1	N1	NNW3	N3	SE3	SSE3.8	SSE12
18-Feb	SSE3	SSE4	SSE5	S5	S4	S7	SSE6	SSE4	SSE9	SE10	SSE10	SSE11	SSE10	SE10	SSE8	SSE7	SSE8	SSE9	SSE10	SSE10	SSE9	SSE11	S9	S6	SSE7.6	SSE11
19-Feb	SSE8	S9	SSE5	SSE3	S6	S5	SSE6	SSE5	SE5	SE5	SSE7	SSE4	SW0	WNW2	N2	NNW6	NNW6	NNW5	N7	N10	N10	N11	N13	N12	NE1.2	N13
20-Feb	NNE11	N14	N11	N12	N12	N12	N11	N12	N9	NNE7	N7	N7	N8	NNE8	N8	NNW6	NE6	NNE4	N5	NNW4	NNW5	NNW3	NNW3	NW3	N7.7	N14
21-Feb	NW4	NW3	NNW4	NNW4	NW3	NNW3	NNW3	NNW2	NW3	NW2	WNW1	SW3	S3	SSE4	SSE9	SSE11	SSE11	SSE7	SSE4	SSE10	SE8	SE5	SE13	SE12	SSE2.8	SE13
22-Feb	SSE12	SSE11	SSE17	SE7	SSE9	SSE10	SE8	SE8	SE7	SSE10	SSE9	SSE12	SSE14	SE9	SSE11	SSE19	SSE15	SSE12	SSE17	SSE17	SSE9WNW11WNW11	N7	N7	SSE9.1	SSE19	
23-Feb	N7	NNW8	NW14	NNW8WNW17	NW15	NW19	NW14	NW12	NNW7	NW9	N9	N7	NNE7	N9	NNE9	NNE9	NNE9	NNE9	NNE12	NNE12	NE11	ENE9	ENE6	NE5	NNW8.3	NW19
24-Feb	NE4	E6	ESE9	SE10	ESE9	ESE7	ESE5	E5	ENE5	ENE5	NE4	NE6	NE5	N10	NNE10	N12	N14	N13	N13	N14	N12	N8	N8	NNE6.0	N14	
25-Feb	NNW6	NNW5	WNW3	WNW2	NNW2	NNW3	NNW3	NNW3	NNW3	NNW1	WSW2	WSW5	WSW6	WSW6	WSW5	SW3	S2	SSE5	SSE4	SSE3	SSE4	SSE5	SSE8	SSE7	SW1.4	SSE8
26-Feb	SSE10	SSE8	SSE10	SSE11	SE12	SSE10	SSE11	SSE12	SSE14	SSE15	SSE15	SSE12	SSE14	SSE8	S2	W6	W12	WNW3	NNW3	N3	NNW4	N7	NNW6	NNW6	SSE5.2	SSE15
27-Feb	NNW6	N7	NNW8	N6	NNE5	N5	NE5	NE2	WSW1	SSW2	SE2	SSE3	SSW3	S5	SSE11	SSE13	SSE10	S4	S3	S5	S6	S6	WSW8	W8	S1.4	SSE13
28-Feb	WNW3	W9	W7	W8	W9	NW7	NW13	NW12	NW14	NW9	NW10	NNW8	N6	NNW7	N6	NNE5	WNW5	N10	N5	N9	N8	NNW6	NNW2	N2	NW6.5	NW14
ESE1.8 ESE1.5 SE2.0 ESE2.3 ESE1.9 ESE1.8 ESE1.6 ESE1.6 SE1.8 SE2.0 SE1.1 SE1.6 SE1.0 ESE0.1 ESE0.9 ESE1.5 ESE1.5 E1.6 ENE1.5 E1.8 E1.9 ENE1.1 E0.5 E0.7																								Diurnal Average		
SE22 SE23 SSE23 SSE28 SSE28 SSE26 SSE27 SSE26 SSE24 SSE23 SSE22 SSE25 SSE26 SSE21 SSE16 SSE19 SSE21 SSE21 SSE22 SSE23 SSE24 SSE25 SSE23 SSE22																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										

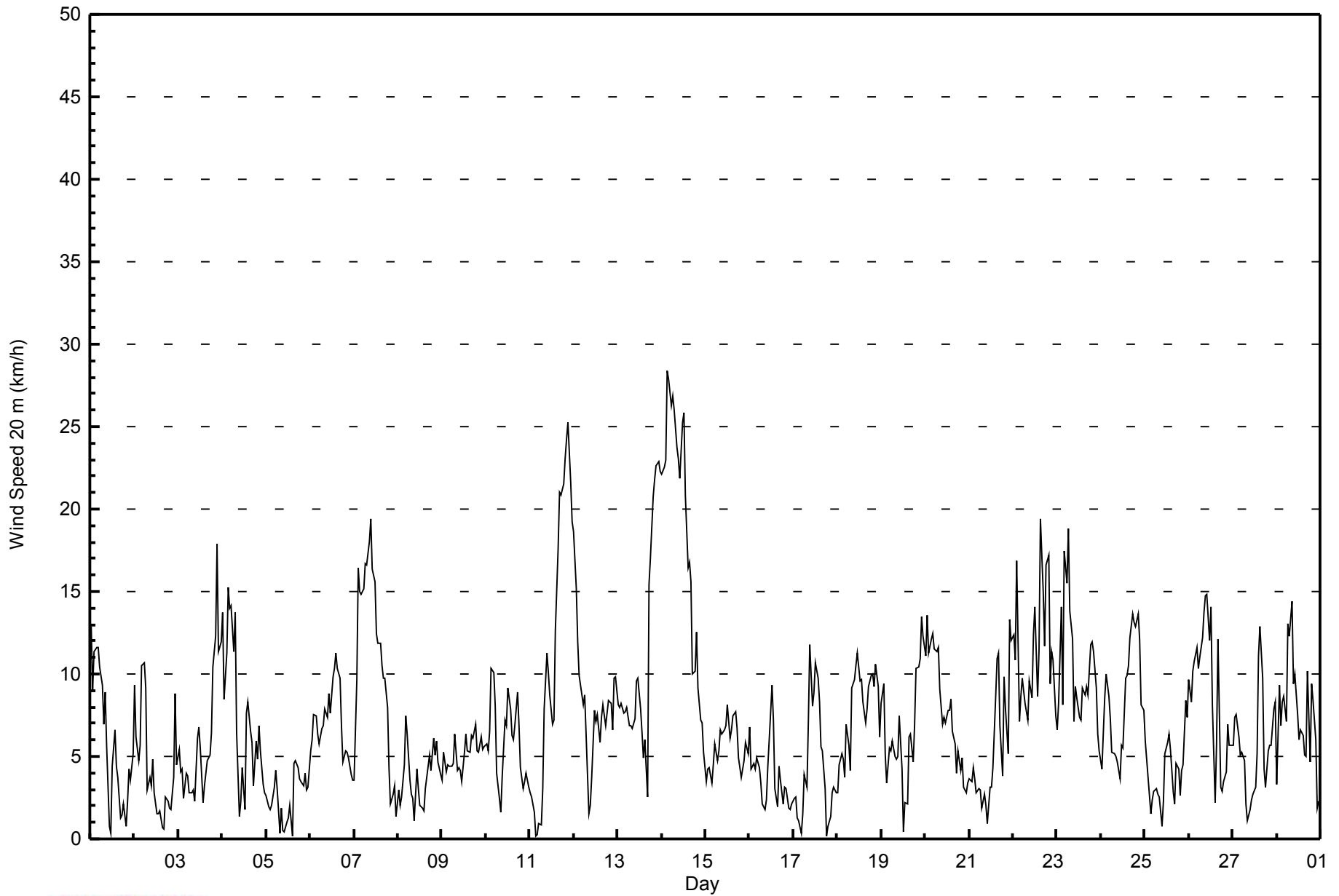


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 672											
Maximum Value: 8 km/h on Feb 14 04:00														Hours of Data: 672											
Minimum Value: 0 km/h on Feb 11 05:00														Hours of Missing Data: 0											
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7														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-Feb	3	3	3	3	5	3	3	3	2	3	1	1	3	3	2	2	1	1	2	1	1	2	2	2	5
2-Feb	2	3	1	3	2	3	4	2	2	3	2	2	1	2	1	1	1	1	1	2	1	3	3	3	4
3-Feb	3	2	2	2	1	1	1	1	1	1	3	3	2	2	2	2	1	3	2	3	3	3	5	6	6
4-Feb	4	4	2	5	4	4	4	5	6	2	2	1	3	3	3	2	2	1	2	2	2	2	1	1	6
5-Feb	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	2
6-Feb	2	3	3	3	3	2	3	3	3	3	4	3	3	3	3	3	3	3	2	4	3	2	2	3	4
7-Feb	3	5	5	5	5	5	6	6	5	6	5	5	5	5	4	4	3	3	3	2	1	1	1	1	6
8-Feb	1	1	1	2	3	3	2	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	1	2	3
9-Feb	2	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	2	2	2	2	2	2	3	2	3
10-Feb	2	2	2	4	4	3	2	1	1	3	2	3	3	3	2	2	2	3	2	2	1	1	1	1	4
11-Feb	1	1	1	1	0	1	1	1	3	2	2	2	2	3	5	5	6	6	6	6	6	6	6	4	6
12-Feb	4	3	3	3	2	2	2	2	2	2	2	3	3	3	2	3	3	2	3	3	3	3	4	4	4
13-Feb	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	5	5	6	7	7	7	8	7	8
14-Feb	7	7	8	8	8	7	8	7	7	7	5	6	7	5	4	3	4	3	3	4	4	3	3	2	8
15-Feb	2	2	2	2	2	3	2	3	3	2	3	3	3	2	3	3	3	3	2	1	2	2	3	2	3
16-Feb	2	2	1	1	1	1	2	1	1	1	2	2	2	3	1	1	3	2	1	2	2	1	1	1	3
17-Feb	1	1	1	1	1	2	1	1	2	2	2	2	3	3	2	2	2	2	1	1	1	1	1	1	3
18-Feb	2	2	2	3	2	3	3	2	4	4	4	3	3	4	3	3	2	3	3	3	3	3	3	3	4
19-Feb	3	3	3	2	3	3	2	2	2	2	2	2	1	2	2	3	2	2	4	4	4	5	5	5	5
20-Feb	5	5	4	4	4	4	3	4	3	3	3	3	3	4	3	2	2	2	2	2	2	2	2	1	5
21-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	2	3	3	1	3	3	3	3	3	3
22-Feb	2	4	4	4	5	4	3	3	3	4	3	3	5	5	4	4	3	4	3	3	5	6	5	2	6
23-Feb	2	3	5	3	6	5	6	4	4	3	3	5	3	3	3	4	4	4	6	5	5	5	3	2	6
24-Feb	2	3	3	4	3	3	3	3	2	2	2	3	3	3	4	4	5	4	4	4	4	4	3	3	5
25-Feb	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2	1	1	2	2	1	2	2
26-Feb	2	2	2	3	2	3	3	4	4	4	4	4	4	3	2	3	4	2	1	2	1	2	2	2	4
27-Feb	2	3	3	3	2	2	2	1	1	1	1	1	1	2	3	2	4	3	1	2	3	2	4	5	5
28-Feb	4	3	3	4	4	4	6	5	6	5	4	3	3	3	3	2	3	5	2	4	3	3	1	1	6
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	293	43.60	43.60
6 - 11	272	40.48	84.08
12 - 19	81	12.05	96.13
20 - 28	26	3.87	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

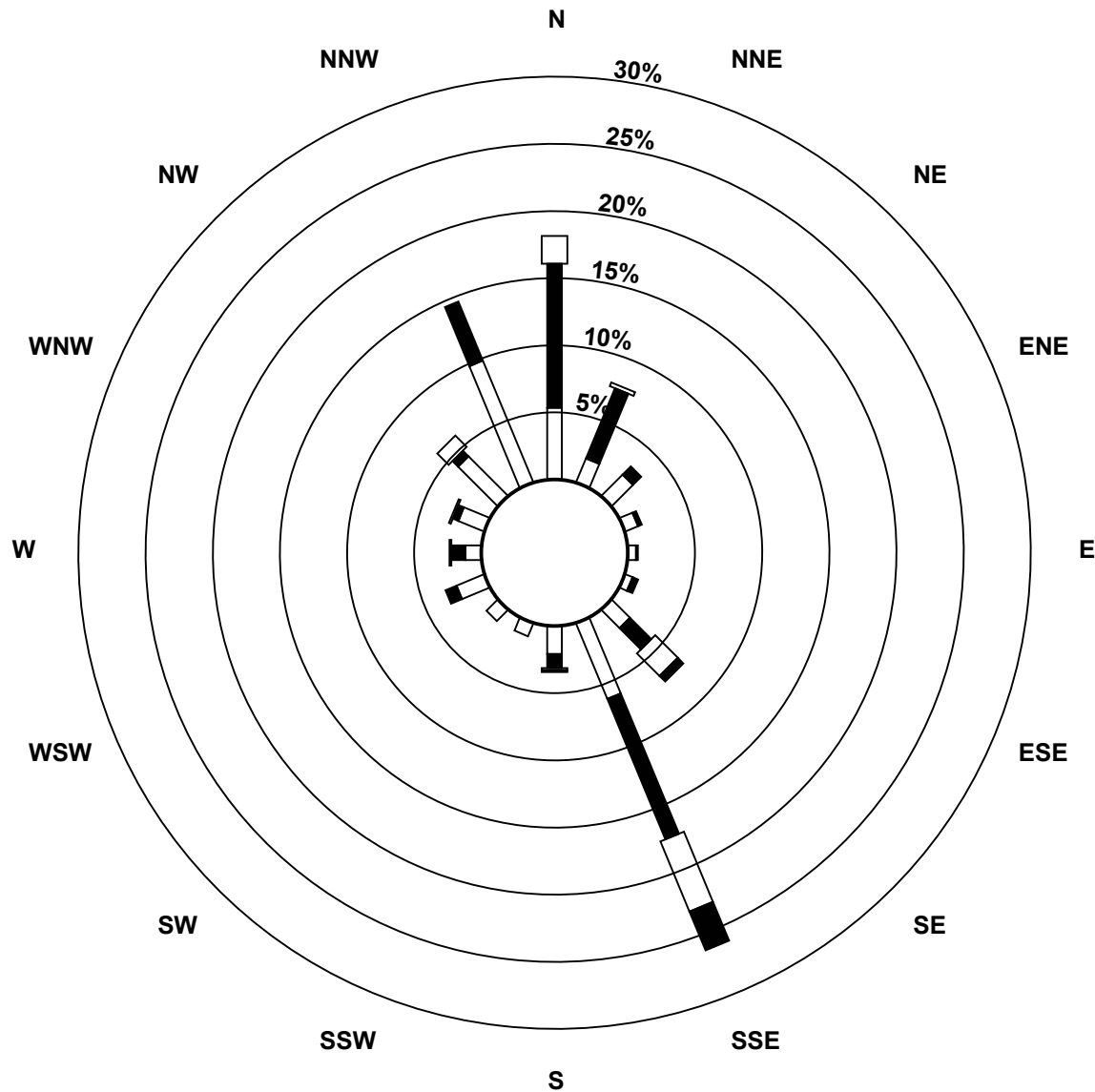
Total Number of Valid Hours: 672

Total Number of Hours: 672

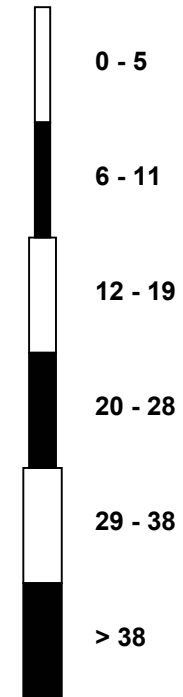


**Wood Buffalo Environmental Association  
Wind Rose Feb 2015**

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



**Classes (km/h)**



**Total Number of Valid Hours: 672**



Maximum Speed: 37 km/h on Feb 14 05:00		Maximum Daily Speed Average: 18.7 km/h on Feb 14		Hours in Service: 672																						
Minimum Speed Value: 0 km/h on Feb 5 15:00		Minimum Daily Speed Average: 0.9 km/h on Feb 27		Hours of Data: 672																						
Maximum Diurnal Speed Average: 2.8 km/h at hour 21		Minimum Diurnal Speed Average: 0.5 km/h at hour 14		Hours of Missing Data: 0																						
Monthly Average Velocity: 1.6 km/h 91.1 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 9 Q <sub>3</sub> = 13 P <sub>90</sub> = 18 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-Feb	SSE15	SSE11	SSE13	SSE15	SSE15	SSE13	SSE11	SSE9	SSE11	SSE6	NNW1	NE1	W6	W9	WNNW5	WSW5	WNNW1	WSW1	W2	SW2	SSE2	SE7	SE2	SSE4	SSE5.1	SSE15
2-Feb	SE6	SSE6	SSE4	SSE3	SSE8	SSE14	SSE7	SSE3	SE3	WSW5	WSW8	SW3	S1	WSW1	SW2	N1	ESE1	NNW5	NNW5	WSW4	SE2	W8	W12	WNNW8	SSW2.0	SSE14
3-Feb	NNW8	WNNW7	NNW7	NW4	NNW6	NNW6	NW4	NNW5	NW4	NNW5	NNW9	N9	N8	WSW2	SW3	SSE5	SE7	SSE8	SSE9	SSE13	SSE14	SSE20	SSE14	SSE15	SSE1.2	SSE20
4-Feb	SSE17	SE11	SE14	SSE21	SSE17	SSE17	SE16	SSE19	SE8	NW2	SE1	SSE5	NW4	NNW10	NNW11	N10	N9	NNW6	NNW9	N7	N11	NNW8	NNW6	NW4	ESE2.7	SSE21
5-Feb	NNW4	NNE4	NNE3	NW6	NW3	NNW6	NNE6	ESE1	SE6	WNNW3	WSW2	S1	SSW1	SSW2	WSW0	NE7	NE7	NNE6	NE5	NE5	NNE7	N6	NW5	NNE2.5	NE7	
6-Feb	NNE9	NNE9	NE12	NE11	NNE10	NNE9	NNE11	NNE11	NNE12	N11	NNE14	NNE12	N14	N14	N16	N14	N14	N10	N7	E7	E8	ENE7	E6	NE5	NNE9.5	N16
7-Feb	ENE5	SE12	SE21	SE19	SE19	SE20	SE22	SE22	SE24	SSE27	SE21	SE20	SE17	SE16	SE15	SE13	SSE12	SSE12	SSE9	SSE5	NNE3	NNW4	N5	NNW3	SE13.0	SSE27
8-Feb	N5	N3	NNW4	N7	NNE12	N9	N5	NNW5	NNW3	W2	WSW5	SW3	SSW2	W2	SSW1	N3	N5	N8	N7	N8	N8	N9	N7	N7	N4.6	NNE12
9-Feb	N5	N8	N6	N6	N6	NNW6	NNW6	NNW8	NNW6	NW5	NNW5	NNW4	NNW6	NNW8	NNW7	NNW7	NNW8	NNW8	NNW9	NNW7	NNW7	NNW8	NNW7	NNW7	NNW6.6	NNW9
10-Feb	NNW8	NNW7	NNW9	NNE16	NNE15	N12	NNW6	NW4	NNW3	NNW5	NNW9	NNW9	NNW12	NNW10	N8	N9	N9	NNE13	NNE11	N7	NNW5	NNW5	NW5	NNW5	N8.0	NNE16
11-Feb	NNW5	NNW3	NW2	S1	W2	SSE4	SW4	SSE7	SSE11	SSE13	SSE13	SSE10	SSE8	SSE9	SSE17	SSE21	SSE27	SSE28	SSE29	SSE30	SSE28	SSE27	S23	S20	SSE13.2	SSE30
12-Feb	SSE21	SSE17	SSE15	SSE12	SSE10	SSE10	SSE9	SSE4	S2	WNNW3	N5	NNW10	N9	N10	NNE9	NNE12	N12	N10	N11	NNE12	NNE12	NE10	N15	N14	NE3.3	SSE21
13-Feb	NNE12	NNE12	NNE12	N11	NNE12	NNE13	NNE11	NNE11	NNE10	NNE11	N14	N13	N10	N9	NNW6	N8	ENE3	SE20	SE22	SSE27	SE29	SE29	SSE29	SSE29	E5.9	SSE29
14-Feb	SE29	SE30	SSE30	SSE37	SSE37	SSE36	SSE37	SSE35	SSE32	SSE31	SSE28	SSE29	SSE29	SSE23	SSE20	SSE19	SSE20	SSE11	N15	N19	N14	N10	N10	N8	SSE18.7	SSE37
15-Feb	NNE6	ENE7	ENE6	NE5	NNE7	NNE9	NNE8	NNE8	N9	N9	N9	N10	N11	N8	N10	NNE12	NNE12	NNE11	NNW8	NNW6	NNW6	NW6	N8	N7	N7.7	NNE12
16-Feb	N10	N7	NNW7	NW6	NW7	NW6	NW6	N4	NW3	W4	W5	WSW7	WSW11	WSW9	SSW3	S2	SSE6	SSE5	WNNW2	NW5	NW4	N2	SSE1	SE3	WNNW2.9	WSW11
17-Feb	SE6	SE7	SE4	SSE3	SSE3	SSE7	SSE9	SSE8	SSE10	SSE13	SSE9	SSE10	SSE12	SSE12	SSE10	SSE7	SSE7	SSE5	NE1	ESE4	N3	NNW2	N2	SE6	SSE6.0	SSE13
18-Feb	SSE5	SSE6	SSE7	S6	S5	S8	SSE7	SSE6	SSE12	SE12	SSE12	SSE13	SSE11	SE12	SSE10	SSE9	SSE9	SSE12	SSE12	SSE13	SSE12	SSE14	S10	S7	SSE9.4	SSE14
19-Feb	SSE10	S10	SSE6	SSE4	S7	S7	SSE8	SSE7	SE6	SE6	SSE9	SSE4	SW0	WNNW3	N3	NNW8	NNW9	NNW7	N11	N15	N15	N17	N20	N19	NNE2.1	N20
20-Feb	NNE17	N19	N17	N17	N17	N16	N16	N17	N13	NNE10	N11	N10	N11	NNE11	N12	NNW9	NE9	NNE7	N9	NNW7	NNW8	NNW7	NNW5	NW4	N11.4	N19
21-Feb	NW6	NW5	NNW5	NNW6	NW5	NNW4	NNW4	NNW3	NW4	NW3	WNNW2	SW3	S3	SSE5	SSE9	SSE12	SSE13	SSE11	SSE8	SSE14	SE11	SE8	SE16	SE14	SSE3.3	SE16
22-Feb	SSE16	SSE16	SSE22	SE13	SSE13	SSE14	SE11	SE11	SE9	SSE11	SSE10	SSE13	SSE18	SE11	SSE16	SSE22	SSE17	SSE12	SSE16	SSE18	SSE9	WNNW16	WNNW15	N11	SSE10.9	SSE22
23-Feb	N10	NNW12	NW19	NNW12	WNNW24	NW20	NW24	NW18	NW15	NNW9	NW11	N12	N10	NNE10	N13	NNE14	NNE14	NNE13	NNE18	NNE18	NE18	ENE13	ENE9	NE8	N11.5	WNNW24
24-Feb	NE6	E9	ESE12	SE13	ESE11	ESE10	ESE8	E7	ENE7	ENE6	NE5	NE9	NE8	N13	N15	NNE16	N19	N20	N18	N18	N19	N16	N12	N11	NNE8.7	N20
25-Feb	NNW9	NNW8	WNNW4	WNNW3	NNW3	NNW3	NNW5	NNW5	NNW4	NNW2	WSW2	WSW6	WSW6	WSW7	WSW6	SW3	S3	SSE8	SSE8	SSE7	SSE6	SSE7	SSE9	SSE8	SW1.6	NNW9
26-Feb	SSE10	SSE10	SSE12	SSE13	SE14	SSE11	SSE13	SSE15	SSE18	SSE17	SSE18	SSE18	SSE19	SSE10	S2	W8	W16	WNNW5	NNW5	N6	NNW6	N10	NNW9	NNW8	SSE6.0	SSE19
27-Feb	NNW8	N10	NNW11	N9	NNE8	N7	NE7	NE3	WSW1	SSW2	SE2	SSE3	SSW3	S5	SSE12	SSE13	SSE10	S5	S4	S5	S6	S5	WSW12	W13	SSW0.9	SSE13
28-Feb	WNNW6	W12	W10	W13	W13	NW10	NW17	NW17	NW19	NW13	NW12	NNW9	N8	NNW9	N9	NNE8	WNNW6	N13	N7	N14	N12	NNW9	NNW4	N4	NW9.0	NW19
E1.9 E1.8 ESE2.3 ESE2.6 ESE2.1 ESE2.3 ESE1.9 ESE2.2 SE2.4 SE2.1 SE1.0 ESE1.7 ESE1.1 NNE0.5 ENE1.2 ENE1.9 E1.9 E2.2 NE2.4 ENE2.5 ENE2.8 NE1.7 NNE1.2 NE1.2																								Diurnal Average		
SE29 SE30 SSE30 SSE37 SSE37 SSE36 SSE37 SSE35 SSE32 SSE31 SSE28 SSE29 SSE29 SSE23 SSE20 SSE22 SSE27 SSE28 SSE29 SSE30 SE29 SE29 SSE29 SSE29																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										

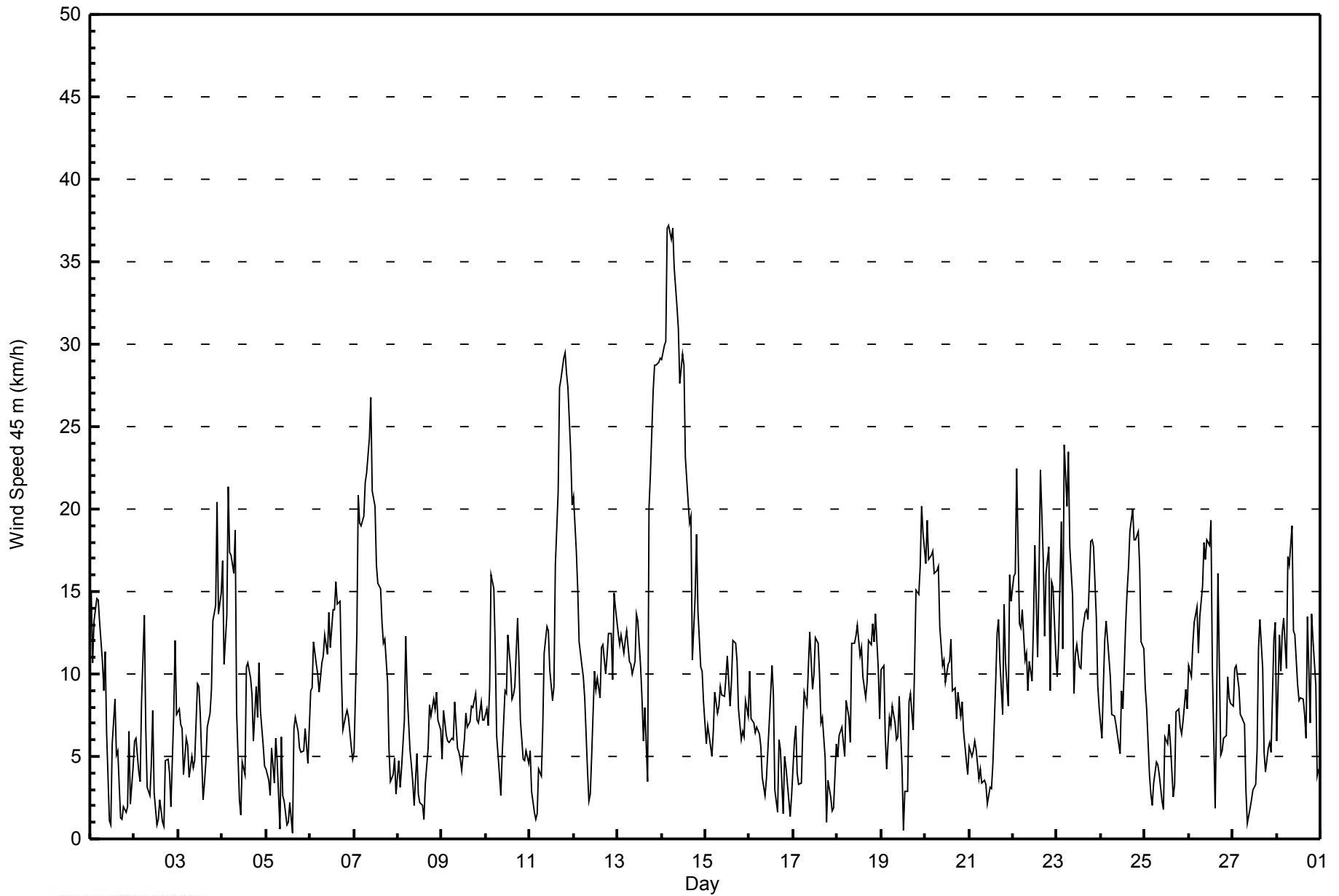


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 672																								
Maximum Value: 8 km/h on Feb 13 23:00														Hours of Data: 672																								
Minimum Value: 1 km/h on Feb 25 10:00														Hours of Missing Data: 0																								
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> = 8														Hours of Calibration: 0																								
														Percent Operational Time: 100.0																								
Day	Hourly Period Ending At (MST)																								Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24														
1-Feb	3	3	3	3	5	3	3	3	2	3	1	1	3	2	2	2	1	1	2	1	1	2	2	3	5													
2-Feb	3	2	2	2	4	2	4	2	2	3	2	2	1	2	2	1	1	2	2	2	1	3	4	4	4													
3-Feb	3	2	1	1	1	2	2	1	1	2	3	3	2	2	2	2	1	4	2	3	3	2	5	6	6													
4-Feb	3	4	2	4	4	3	4	4	7	2	2	1	5	3	3	3	2	1	3	2	3	2	1	1	7													
5-Feb	2	1	1	2	1	1	2	1	3	1	1	1	1	1	1	3	2	2	2	2	2	2	2	2	3													
6-Feb	3	3	3	3	3	2	3	3	3	3	4	3	3	3	3	3	3	3	2	5	4	2	2	3	5													
7-Feb	3	5	5	4	5	5	6	6	6	6	6	5	5	5	5	4	4	3	3	3	1	1	1	1	6													
8-Feb	1	1	1	3	3	4	2	1	1	1	1	1	1	2	1	1	2	2	2	2	1	3	1	3	4													
9-Feb	3	2	2	2	2	2	2	3	2	2	1	1	2	2	2	2	2	2	3	3	2	2	3	2	3													
10-Feb	2	2	3	5	5	4	2	1	1	3	2	4	3	3	3	3	3	2	3	2	2	2	1	2	5													
11-Feb	2	1	1	1	1	2	1	1	2	2	2	2	2	3	6	5	7	7	6	6	6	7	6	5	7													
12-Feb	4	3	2	2	1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	4	4	3	4	4	4													
13-Feb	4	4	4	3	4	4	3	3	3	3	3	3	3	3	2	2	7	5	6	7	8	7	8	7	8													
14-Feb	7	7	8	8	7	7	8	8	7	7	6	6	8	6	3	3	4	4	4	5	5	4	3	2	8													
15-Feb	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	3	2	2	2	4	2	4	4													
16-Feb	3	2	1	1	1	2	2	1	1	1	2	2	2	3	1	1	4	3	2	2	2	1	1	1	4													
17-Feb	1	1	2	1	1	3	1	2	1	2	2	2	2	3	2	2	2	2	1	2	1	1	1	2	3													
18-Feb	2	3	3	3	3	3	4	3	4	4	4	3	3	4	3	3	2	3	3	3	4	4	3	3	4													
19-Feb	3	3	3	2	4	3	3	3	2	2	1	2	1	1	2	3	2	2	5	5	4	6	6	5	6													
20-Feb	6	5	5	4	4	4	3	4	3	4	4	3	4	4	3	3	3	2	2	2	2	2	1	2	6													
21-Feb	1	1	2	1	1	1	1	1	1	1	1	2	1	2	2	1	2	2	2	2	4	3	3	2	4													
22-Feb	2	3	3	5	6	4	4	4	3	4	3	2	5	5	4	4	3	4	3	2	4	7	5	3	7													
23-Feb	2	4	5	3	6	6	6	4	4	3	3	6	3	4	3	4	4	5	7	6	6	5	3	2	7													
24-Feb	2	3	3	4	3	3	3	3	2	2	2	3	3	3	4	5	5	5	4	5	4	4	3	3	5													
25-Feb	2	2	1	1	1	1	1	1	1	1	1	2	2	2	2	1	2	2	1	1	1	3	1	2	3													
26-Feb	2	2	2	3	2	2	3	3	2	3	2	3	3	4	2	4	4	3	2	2	2	2	2	2	4													
27-Feb	3	3	3	3	3	2	2	1	1	1	1	1	1	2	2	1	3	2	2	2	3	3	6	7	7													
28-Feb	6	3	4	6	5	4	6	6	6	5	3	3	3	4	3	3	4	5	3	5	3	4	2	1	6													
														7	7	8	8	7	7	8	8	7	7	6	6	8	6	6	5	7	7	7	7	8	7	8	7	
														Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

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





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

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

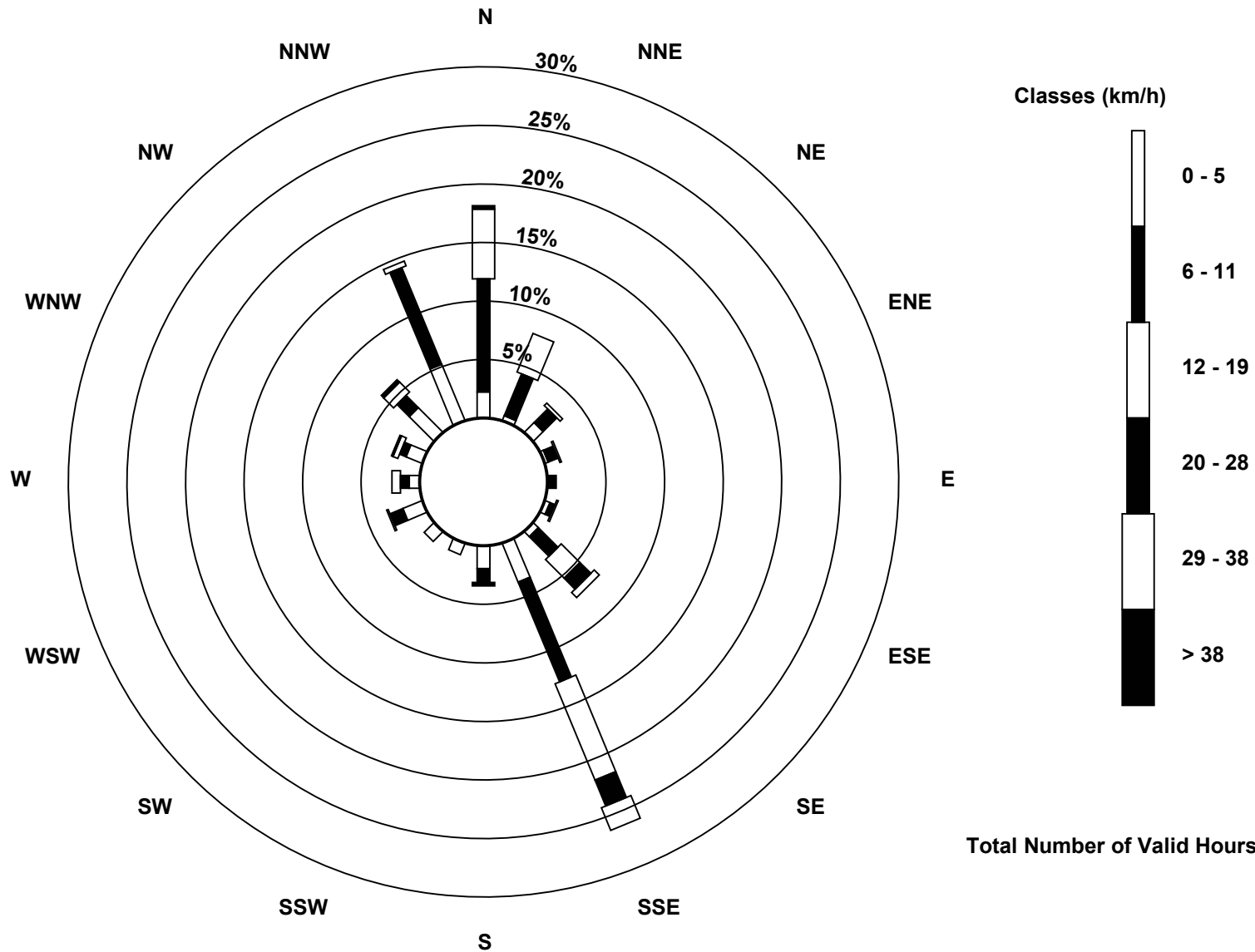
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	170	25.30	25.30
6 - 11	289	43.01	68.30
12 - 19	163	24.26	92.56
20 - 28	32	4.76	97.32
29 - 38	18	2.68	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

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



**Total Number of Valid Hours: 672**



Maximum Speed: 49 km/h on Feb 14 04:00	Maximum Daily Speed Average: 24.0 km/h on Feb 14	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 8 15:00	Minimum Daily Speed Average: 1.3 km/h on Feb 25	Hours of Data: 672
Maximum Diurnal Speed Average: 4.5 km/h at hour 19	Minimum Diurnal Speed Average: 1.0 km/h at hour 9	Hours of Missing Data: 0
Monthly Average Velocity: 2.0 km/h 65.6 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 9 Median = 13 Q <sub>3</sub> = 17 P <sub>90</sub> = 25 P <sub>99</sub> = 44	Percent Operational Time: 100.0

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	SSE14	SSE14	SSE15	SSE11	SSE15	SSE12	SSE8	S5	S5	SE2	NNW3	NW5	WNW6	W8	W6	W5	N3	NNE3	NNE3	WSW2	SW7	WSW9	W12	W11	SSW3.7	SSE15	
2-Feb	WSW10	WSW16	WSW17	WSW16	SW11	SSW6	SW11	WSW11	WSW9	W7	W10	NW3	NNW2	NNW3	WSW4	NW3	W1	NW11	NNW12	WNW6	W12	WNW18	NNW16	W17	W8.3	NNW18	
3-Feb	W18	W10	NNW8	N9	N7	N12	N12	N10	NNW12	N13	N14	N13	N10	WNW2	SSW1	ESE5	SE12	SE15	SE19	SSE19	SSE20	SSE21	SSE21	SSE22	ESE1.4	SSE22	
4-Feb	SSE25	SSE21	SSE20	SSE25	SSE17	SSE18	SSE25	SSE29	S8	N4	SW6	SW10	W20	NNW18	NNW14	NNE13	NNE12	NNW13	N15	N11	N13	N10	NNW9	NNW10	SSE2.2	SSE29	
5-Feb	NW16	NW17	NW9	NW11	NNW12	N13	N10	W8	SW6	WSW2	WSW5	WSW2	SE3	SSE2	NNE1	NE8	NE10	NE10	NNE8	NE7	NE9	NE13	NE12	N8	N5.5	NW17	
6-Feb	NNE14	NNE12	NE15	NNE13	NNE12	NNE12	NNE14	NNE15	NNE17	NNE15	NNE17	NNE15	NNE17	N17	N19	NNE16	NNE16	NNE11	ENE9	E12	E12	E11	ESE10	ESE9	NNE12.0	N19	
7-Feb	ESE14	SE19	SE29	SE26	SE28	SE27	SE30	SE32	SE34	SE36	SE29	SE28	SE23	SE22	SE23	SE19	SE16	SSE17	SSE14	SE9	E4	NE5	NNE6	NNW6	SE19.4	SE36	
8-Feb	N6	N5	N7	NNE11	NNE19	NNE14	NNE8	N7	NNW8	NW4	W4	SW3	SSE2	NW2	SSW0	NNE4	NE8	NNE12	N13	NNW15	NNW15	NNW16	NNW12	NNW13	N7.7	NNE19	
9-Feb	NNW14	NNW15	NNW11	NNW9	NNW8	N10	NNW9	NNW12	N9	NNW6	NNW5	NNW5	NNW6	NNW8	NNW8	NNW10	NNW10	NNW10	NNW13	NNW11	NW10	NNW12	NNW12	NNW10	NNW9.6	NNW15	
10-Feb	NNW11	NNW10	NNW14	NNE22	N22	N16	N11	NNW10	NNW10	NNW11	NNW11	NNW11	NNW11	NNW16	NNW13	NNW11	N10	N11	NNE18	NNE17	NNE11	NNE10	NNE9	NNE8	NNE10	N11.9	N22
11-Feb	N9	NNW6	W3	SW2	S3	SSE7	SE14	SSE9	SE13	SE13	SE16	SSE10	SSE10	SSE15	SE26	SSE29	SE38	SE39	SE40	SSE39	SSE35	SSE34	SSE29	SSE26	SSE17.8	SE40	
12-Feb	SSE24	SSE16	SSE14	S11	S10	S8	SSW7	SW9	WSW8	W6	NNW7	NNW12	N11	N11	NNE11	NNE15	NNE15	NNE14	N14	NNE16	NNE16	NNE13	N19	N19	NNE3.9	SSE24	
13-Feb	NNE17	NNE16	N17	N15	NNE15	NNE16	NNE15	NNE14	NNE13	NNE14	N16	N16	N12	N9	N4	NNE5	ESE13	SE29	SE32	SE38	SE39	SE39	SE39	SE40	E9.5	SE40	
14-Feb	SE42	SE43	SE44	SE49	SE47	SE48	SE48	SE46	SE44	SE43	SSE35	SSE34	SSE34	SSE28	SSE18	SSE22	S9	N19	N23	N19	N15	N14	NNE12	SE24.0	SE49		
15-Feb	NNE8	NE10	ENE10	NE8	NNE10	NNE11	NNE10	NNE12	NNE12	N11	N11	N13	N13	N10	N11	NNE15	NNE15	NNE17	N13	N10	N11	NNW10	N14	N11	NNE11.0	NNE17	
16-Feb	N15	N12	N11	N11	N10	N9	NNW8	NW8	NNW8	NNW7	NW5	W7	W9	W8	SW2	WNW1	SSE7	SE8	ESE4	NNW6	NNW9	NW7	WNW5	W5	NNW4.8	N15	
17-Feb	S2	SW3	S2	WSW5	WSW8	SW5	S3	S3	SSE6	SE13	SSE10	SE9	SE15	SE12	SE11	SE10	SE11	SE10	SE6	SE12	SE11	SE10	SE11	SE19	SSE7.6	SE19	
18-Feb	SE20	SE15	SE18	SE15	SE15	SE17	SE16	SE14	SE21	SE18	SE16	SE16	SE14	SE15	SE12	SE11	SSE12	SE16	SSE15	SE18	SSE16	SSE19	SSE15	SSE11	SE15.5	SE21	
19-Feb	SSE13	SSE11	SSE7	S6	S12	S13	SSE13	SSE13	SSE9	SE8	SE9	SSE3	NW2	NW3	NNW4	NNW11	NNW14	NNW11	N17	N22	N22	N24	N29	N27	NNE3.4	N29	
20-Feb	NNE24	N28	N25	N25	N24	N22	N22	N24	N19	NNE15	NNE15	N11	N14	NNE14	N15	NNW11	NNE12	NNE12	NNE14	N13	N14	N13	NNW12	NNW14	N16.9	N28	
21-Feb	NNW14	N12	NNW11	N14	NNW11	N9	N6	NE5	N4	NW6	NW5	WSW2	SSE4	SE4	SE8	SE12	SE15	SE17	SSE18	SSE21	SE21	SE17	SSE20	SSE21	ESE4.2	SSE21	
22-Feb	SSE22	SSE23	SSE30	SSE27	SSE23	SSE19	SSE17	SSE19	SSE13	SSE9	SSE12	SSE15	SSE23	SE18	SSE22	S22	S15	SSW17	S12	SSW11	SW14	W29	WNW28	NW24	S13.7	SSE30	
23-Feb	NNW21	NNW27	WNW36	NW22	WNW41	WNW36	NW36	NNW29	NNW24	NNW12	NNW15	N16	N13	NNE15	N16	NNE18	NNE19	NNE18	NNE26	NNE25	NE24	ENE19	ENE12	NE9	NNW16.7	WNW41	
24-Feb	NE8	E13	ESE17	ESE19	ESE15	ESE16	ESE14	E14	E11	ENE9	NE7	NE11	NE10	N15	NNE19	NNE22	N25	N28	N26	N27	N26	N24	N19	N18	NNE12.2	N28	
25-Feb	NNW16	NNW16	NNW12	NW7	NW7	NW7	NNW7	NW6	NW6	W4	NNW5	W3	W5	W5	WNW4	SW2	SSE4	SE9	SSE12	SSE11	SSE10	SSE11	S12	SSE10	WNW1.3	NNW16	
26-Feb	SSE12	SSE17	SSE15	SSE16	SSE21	SSE19	SSE17	SSE22	SSE17	SSE18	SSE19	SE21	SE19	SE11	SW2	WSW18	WSW24	W13	NW9	N13	N11	N15	N15	N13	SSE6.7	WSW24	
27-Feb	N13	N16	N15	N13	NNE10	N10	NE9	NE5	NNE2	S2	SE2	S3	SW5	S5	SSE9	SSE10	SSW10	SW14	SW17	SW13	WSW13	WSW17	WSW20	W21	W3.6	W21	
28-Feb	WNW16	W20	WSW17	WSW20	WSW19	WNW20	WNW32	WNW31	WNW32	NW21	NW17	NW11	N12	NNW11	NNW12	N10	WNW9	NNW19	N12	N21	N19	N16	N10	NNE8	NW14.3	WNW32	
NE1.5 NE1.1 ESE1.5 ESE2.1 ESE1.7 E2.2 E1.9 ESE1.7 ESE1.0 E2.2 ENE1.5 E1.7 ENE1.4 NE1.5 ENE2.3 ENE3.1 E3.0 ENE3.4 NE4.5 NE4.0 NE3.7 NNE2.6 N2.4 N2.3																								Diurnal Average			
SE42 SE43 SE44 SE49 SE47 SE48 SE48 SE46 SE44 SE43 SSE35 SSE34 SSE34 SSE28 SE26 SSE29 SE38 SE39 SE40 SSE39 SE39 SE39 SE39 SE40																								Diurnal Maximum			

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



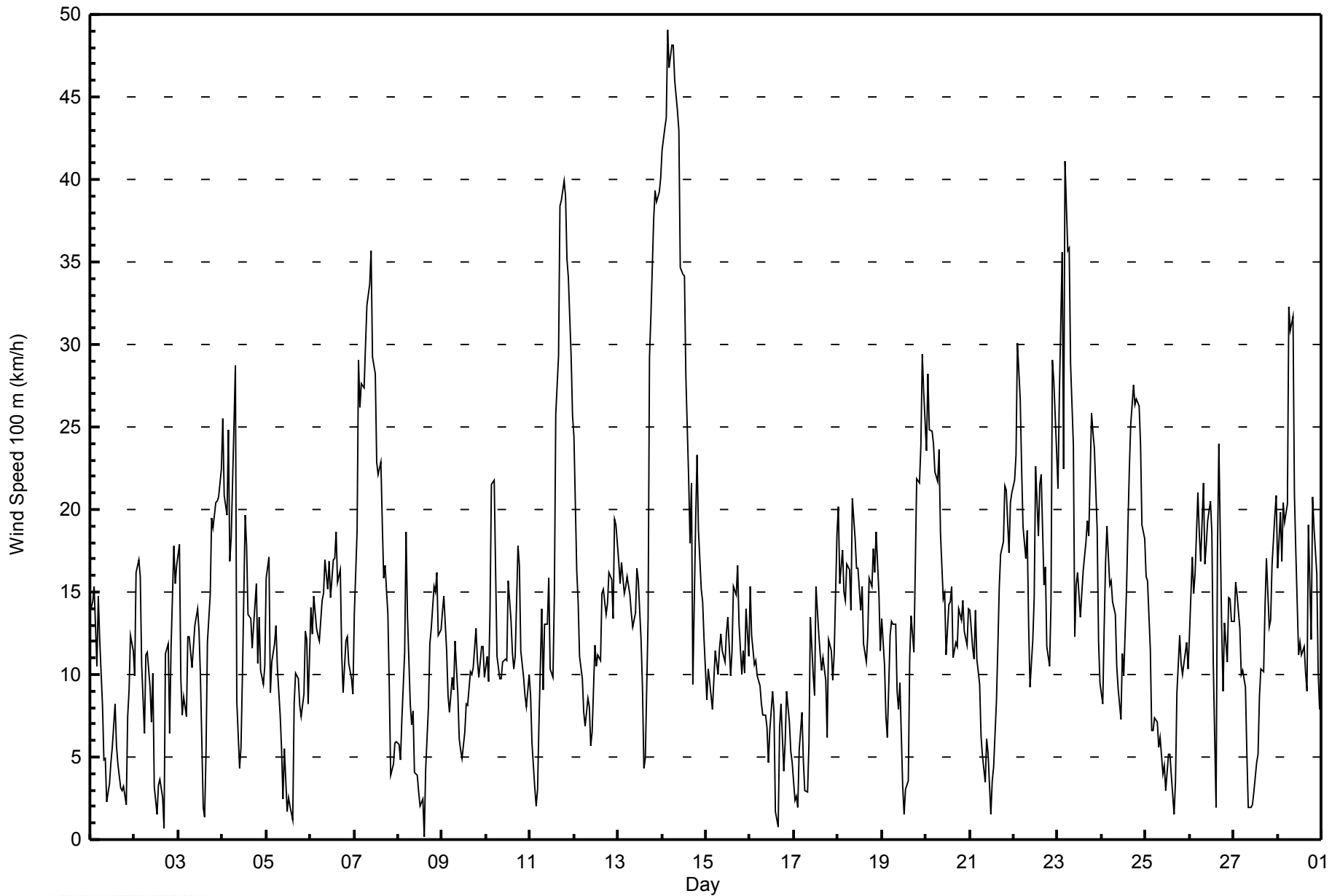
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 13 17:00 Minimum Value: 1 km/h on Feb 1 18:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 7																	Hours in Service: 672 Hours of Data: 672 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-Feb	3	2	2	3	3	3	2	2	2	1	3	2	2	2	2	2	1	1	1	2	2	2	3	3	3
2-Feb	2	3	2	2	2	3	3	4	4	5	3	4	2	2	2	2	1	5	3	2	3	3	3	1	5
3-Feb	4	3	3	4	2	1	2	1	2	3	3	3	2	2	2	2	1	2	2	3	4	4	3	4	4
4-Feb	3	5	3	4	5	5	5	5	6	2	2	4	4	4	3	2	2	3	3	3	3	2	1	2	6
5-Feb	2	2	4	2	3	1	2	1	3	1	2	1	2	1	1	2	2	3	2	2	2	2	2	2	4
6-Feb	3	2	3	2	2	2	2	2	2	2	3	2	2	2	2	2	2	3	3	4	4	2	3	3	4
7-Feb	3	5	5	4	4	5	5	5	4	4	4	4	4	3	3	4	3	4	3	4	1	1	1	1	5
8-Feb	2	2	1	3	3	4	3	1	1	2	1	1	2	1	1	2	2	3	2	2	1	2	2	1	4
9-Feb	1	1	1	2	1	2	2	2	2	2	1	1	2	2	2	2	2	2	2	3	2	3	4	3	4
10-Feb	1	2	3	3	5	4	2	1	2	2	2	3	3	3	2	2	1	3	3	2	2	2	2	2	5
11-Feb	1	2	1	1	1	3	2	3	3	2	3	3	2	3	7	6	7	4	4	4	6	7	7	5	7
12-Feb	5	3	3	2	2	2	2	3	5	4	4	2	1	2	2	2	3	2	2	3	3	3	3	2	5
13-Feb	3	3	3	3	3	3	2	3	2	3	2	2	2	3	3	2	9	5	4	5	6	5	7	6	9
14-Feb	5	5	6	5	5	4	4	5	4	5	4	6	7	6	3	4	3	4	4	3	3	4	2	2	7
15-Feb	2	2	2	3	3	3	2	3	3	2	3	3	3	2	3	2	3	3	2	2	2	2	4	2	4
16-Feb	3	2	2	2	2	2	1	1	1	1	2	2	2	4	1	1	2	1	2	3	2	2	2	2	4
17-Feb	1	1	1	1	1	3	1	1	2	2	3	3	3	2	1	1	2	2	1	3	2	2	2	4	4
18-Feb	4	3	3	3	3	4	4	3	3	4	4	3	3	3	2	3	2	2	3	3	5	5	4	3	5
19-Feb	3	3	3	3	5	5	2	3	2	2	2	2	1	1	2	2	2	1	6	5	4	5	6	4	6
20-Feb	6	5	4	4	3	2	2	3	4	3	3	2	2	3	2	2	2	2	3	2	2	2	1	1	6
21-Feb	1	2	2	2	1	2	1	2	2	1	2	1	1	1	1	1	2	2	1	2	2	4	2	2	4
22-Feb	2	2	3	2	2	3	3	3	3	3	4	4	4	3	3	3	5	6	3	3	5	8	5	4	8
23-Feb	3	4	5	5	5	6	5	4	4	4	3	6	2	2	2	3	4	5	6	6	5	6	3	2	6
24-Feb	1	3	3	3	3	3	3	4	2	2	2	3	2	3	3	3	3	3	3	4	3	3	3	2	4
25-Feb	2	2	1	2	2	1	1	1	2	1	1	1	2	3	1	1	2	2	1	2	1	2	2	2	3
26-Feb	2	5	3	3	2	1	2	2	3	2	2	2	1	3	3	5	3	2	4	2	1	2	2	2	5
27-Feb	2	3	3	3	2	2	3	2	2	1	1	2	2	2	3	2	4	2	1	4	4	2	3	7	7
28-Feb	6	4	3	4	3	7	6	5	5	6	4	3	2	4	3	2	5	6	4	5	3	3	2	3	7
Diurnal Maximum																									





**WBEA**  
**Hourly Averages**

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





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

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

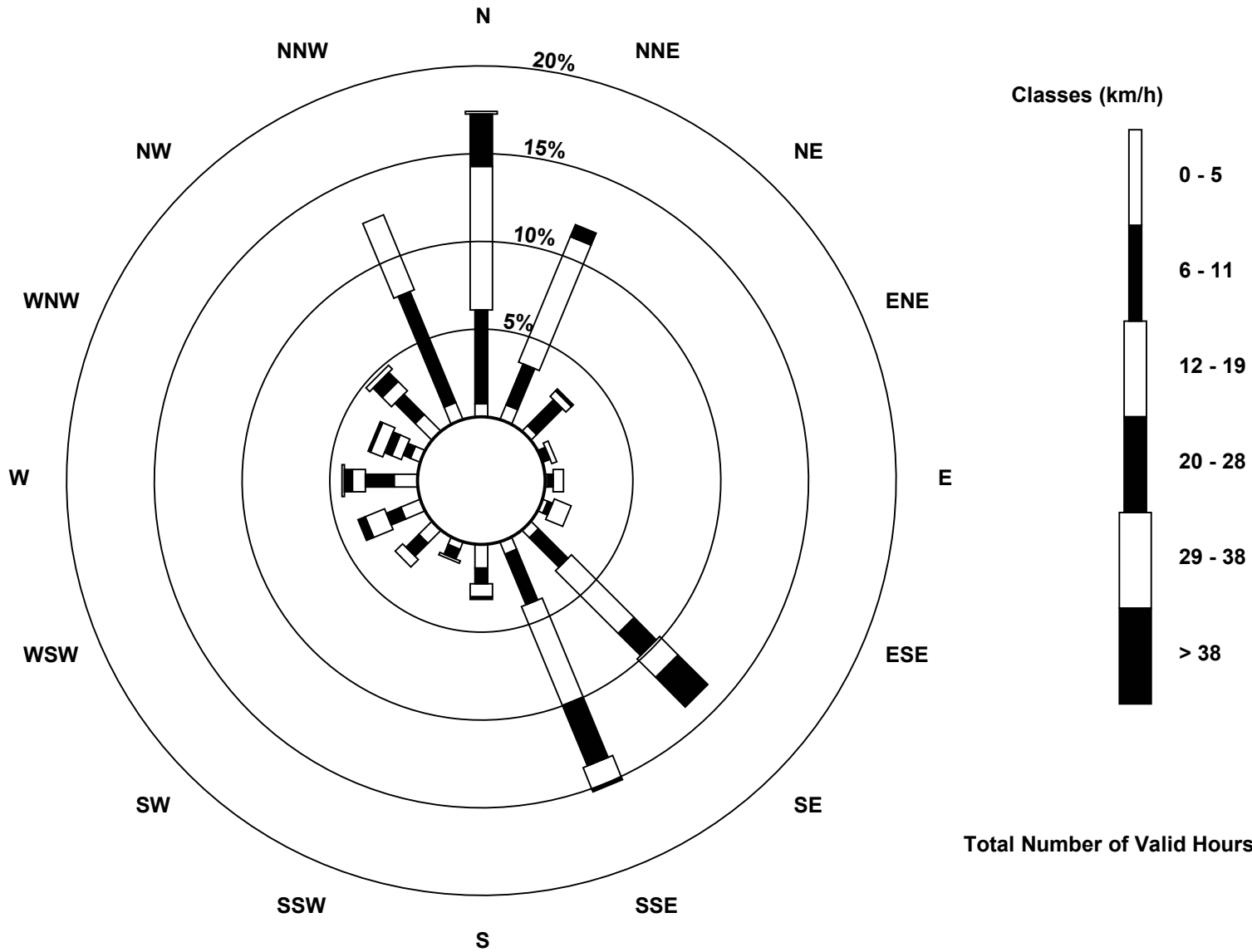
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	82	12.20	12.20
6 - 11	205	30.51	42.71
12 - 19	261	38.84	81.55
20 - 28	78	11.61	93.15
29 - 38	28	4.17	97.32
> 38	18	2.68	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

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





Maximum Speed: 51 km/h on Feb 14 04:00		Maximum Daily Speed Average: 23.6 km/h on Feb 14		Hours in Service: 672																							
Minimum Speed Value: 0 km/h on Feb 3 15:00		Minimum Daily Speed Average: 0.9 km/h on Feb 3		Hours of Data: 672																							
Maximum Diurnal Speed Average: 5.5 km/h at hour 19		Minimum Diurnal Speed Average: 0.8 km/h at hour 13		Hours of Missing Data: 0																							
Monthly Average Velocity: 2.0 km/h 51.6 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 6 Q <sub>1</sub> = 11 Median = 15 Q <sub>3</sub> = 21 P <sub>90</sub> = 28 P <sub>99</sub> = 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-Feb	S17	S16	S18	S17	S12	S9	S8	SW9	SW9	WNW5	NNW12	NNE9	N6	WNW6	WNW4	W5	N4	NE5	NE6	WSW1	SW9	W17	WNW21	WNW22	WSW4.2	WNW22	
2-Feb	W16	W20	W20	W17	W12	WSW12	WSW14	W18	WSW19	WNW10	WNW9	NW8	NNW8	NNW7	W6	NW4	WNW4	NW19	NNW17	NW13	WNW19	WNW28	NW25	NW18	WNW12.9	WNW28	
3-Feb	W17	WNW11	N8	NNE11	NNE13	NNE17	NNE19	NNE16	N14	NNE16	NNE16	N14	N10	NNW2	ESE0	SSE5	SE14	SSE16	SSE19	S25	S25	SSW26	S20	S20	ESE0.9	SSW26	
4-Feb	S26	SSE29	S26	S25	SSE22	SSE25	SSE32	S30	S19	S8	WSW15	WSW31	W28	WNW23	NNW15	NNE14	NNE14	N15	N21	N12	NNE16	N13	N12	NNW17	SW5.1	SSE32	
5-Feb	NNW22	NNW24	NNW18	NNW17	N19	NNE22	NNE16	NNE16	NW7	W3	W4	NW5	W1	ESE4	ESE1	N4	NE9	NE11	NE12	NE11	NE10	NE12	NE17	NE17	NNE13	N9.3	NNW24
6-Feb	NNE17	NNE13	NE16	NE14	NNE14	NNE14	NNE16	NNE17	NNE19	NNE16	NNE18	NE15	NNE16	NNE16	NNE18	NE16	NE16	E13	E12	ESE16	E15	ESE12	ESE12	ESE12	NE13.0	NNE19	
7-Feb	ESE18	SE22	SE31	SE29	SE31	SE31	SE33	SE36	SE37	SE37	SE31	SE30	SE24	SE24	SE25	SE21	SE18	SSE17	SSE15	SSE11	E2	NE2	N5	N7	SE21.3	SE37	
8-Feb	N7	N8	NNE10	NNE15	NNE22	NNE17	NNE12	NE10	NE5	NNW5	WSW4	SSW4	SW3	WNW2	W1	NNE5	NE9	NE15	NE20	NNE15	NNE14	NNE16	NNE16	NNE13	NNE9.1	NNE22	
9-Feb	NNE13	N13	NNE11	NNE8	NNE10	NNE13	NNE12	N14	NNE11	NNE8	NNE8	N9	N7	N9	N10	N12	N11	N11	N12	N11	NNW10	NNW12	NNW13	NNW9	N10.4	N14	
10-Feb	N12	N9	N15	NNE22	NNE24	NNE18	NNE15	N13	NNW13	NNW14	NNW13	NNW12	NNW17	NNW14	NNW12	N10	N12	NNE20	NE23	NNE18	NNE17	NNE15	NE18	NE21	N14.6	NNE24	
11-Feb	NNE14	NNE10	NNE4	NE1	SW5	SSW6	S7	S13	S19	S15	SSE19	SSE15	S14	SSE16	SSE25	SSE29	SSE38	SSE40	SSE39	SSE36	SSE33	SSE36	SSE30	SSE27	SSE18.1	SSE40	
12-Feb	S21	SSW16	SSW13	SSW11	SSW11	SW10	SW14	WSW19	WSW14	W10	NNW7	NNW12	N10	NNE11	NNE10	NNE14	NNE15	NNE15	NNE16	NNE17	NNE17	NNE16	NNE19	N20	NNW3.7	S21	
13-Feb	NNE18	NNE17	NNE17	NNE15	NNE16	NNE17	NNE15	NNE14	NNE14	NE14	NNE15	NNE15	NNE11	NNE8	ESE5	ESE7	SE21	SE32	SE35	SE41	SE43	SE42	SE43	SE44	E11.7	SE44	
14-Feb	SE46	SE48	SE50	SSE51	SSE48	SSE47	SSE47	SSE44	SSE40	SSE38	SSE31	SSE32	SSE33	SSE29	S21	S20	S19	SW18	N19	NNE22	NNE17	NNE17	NNE15	NNE13	SSE23.6	SSE51	
15-Feb	NE10	NE12	ENE12	NE11	NE12	NE13	NNE10	NNE13	NNE13	NNE13	N11	N12	N14	N10	N12	NNE16	NNE15	NNE20	NNE19	NNE13	N15	N13	N18	NNE12	NNE12.8	NNE20	
16-Feb	N18	N15	NNE14	NNE17	NNE14	NNE12	N9	NNW8	N9	N9	N6	WNW6	WNW8	WNW8	WNW4	W6	SW7	S3	NNE1	NNW7	N8	NW12	NW15	NW15	NNW7.6	N18	
17-Feb	NNW9	NNW7	NNW2	W2	N4	NNE4	W2	SW6	SW6	SSE8	SSE11	S11	SSE13	SSE9	SE13	SE12	SE13	SSE13	SE13	SE19	SE19	SE20	SE26	SSE8.0	SE26		
18-Feb	SE27	SE21	SE24	SE26	SE24	SE24	SE25	SE19	SE25	SE23	SE18	SE17	SE15	SE16	SE11	SSE11	SSE13	SE17	SSE16	SSE16	SSE15	SSE19	SSE19	SSE14	SE18.8	SE27	
19-Feb	SSE12	S13	S9	S9	SSW11	S12	S11	S11	SSW7	S3	S4	SW4	NW3	NW4	NW5	NNW12	N13	N12	NNE20	N24	N24	NNE27	N33	N29	N4.1	N33	
20-Feb	NNE26	N32	N27	N27	N26	N25	N23	N25	N22	NNE15	NNE14	N11	N15	NNE15	N15	N12	NNE13	NNE14	NNE21	NNE17	NNE21	NNE19	NNE17	N16	N19.3	N32	
21-Feb	N20	N18	N17	N20	N17	NNE15	NNE11	NE11	N7	NNW7	N5	ESE0	S4	S4	SSE6	SSE9	SE16	SSE17	SSE19	SSE20	SSE23	SSE24	SSE24	S24	ESE3.5	SSE24	
22-Feb	SSE23	S27	SSW20	S19	S21	S21	SSE24	S26	SSE24	SSE19	SSE17	SSE19	SSE25	SSE21	S24	SSW23	SW23	SSW25	SSW20	SW21	SW26	W42	WNW36	NW34	SSW17.8	W42	
23-Feb	NW33	NW39	WNW47	NW33	WNW49	WNW47	NW44	NW36	NW30	NNW14	NW17	N18	NNE13	NNE16	N16	NNE19	NNE21	NNE20	NNE28	NNE26	NE26	ENE21	ENE14	ENE11	NNW20.4	WNW49	
24-Feb	ENE10	E15	ESE18	ESE19	ESE18	ESE19	ESE19	E18	E14	ENE11	NE8	ENE12	NE10	NNE14	NNE19	NNE24	N27	N30	N31	N31	N29	N27	N23	N23	NE14.0	N31	
25-Feb	N18	N18	N18	N12	N12	N10	N9	N8	NNW7	NW4	NW3	N3	WNW5	NW5	WNW4	WSW4	SSW3	SE9	SSE11	S11	S14	S18	S22	S19	NW1.2	S22	
26-Feb	S17	SSE22	S25	S24	S27	S26	S27	S28	S27	S25	SSE19	SSE18	S10	S10	WSW6	WSW24	WSW26	W16	NW11	N17	NNE13	NNE17	N17	N15	S9.8	S28	
27-Feb	N16	N17	N16	N14	NNE11	NNE11	NE11	NE8	NNE4	SSE1	S1	SSW4	SW8	SW8	SSW7	SSW9	SW16	SW17	SW20	WSW18	WSW23	WSW26	WSW27	WNW25	W6.2	WSW27	
28-Feb	WNW25	WNW22	W20	W25	W23	WNW29	WNW42	WNW40	WNW39	NW27	NW20	NW12	NNW13	NNW13	NNW13	N10	WNW13	NNW22	N17	N25	N24	N20	N14	NNE12	NW18.4	WNW42	
NNE2.5 NNE1.6 ENE1.2 ENE1.7 ENE2.1 ENE2.3 E1.8 SE0.8 S1.0 ESE1.5 ENE1.3 E1.0 NE0.8 NNE1.2 NE1.5 NE2.0 E2.3 ENE3.2 NE5.5 NE4.5 NE3.9 NNE2.7 NNE3.8 N3.8																								Diurnal Average			
SE46 SE48 SE50 SSE51 WNW49 SSE47 SSE47 SSE44 SSE40 SSE38 SSE31 SSE32 SSE33 SSE29 SSE25 SSE29 SSE38 SSE40 SSE39 SE41 SE43 W42 SE43 SE44																								Diurnal Maximum			
All monthly, daily, and diurnal averages have been calculated using vector methods																											

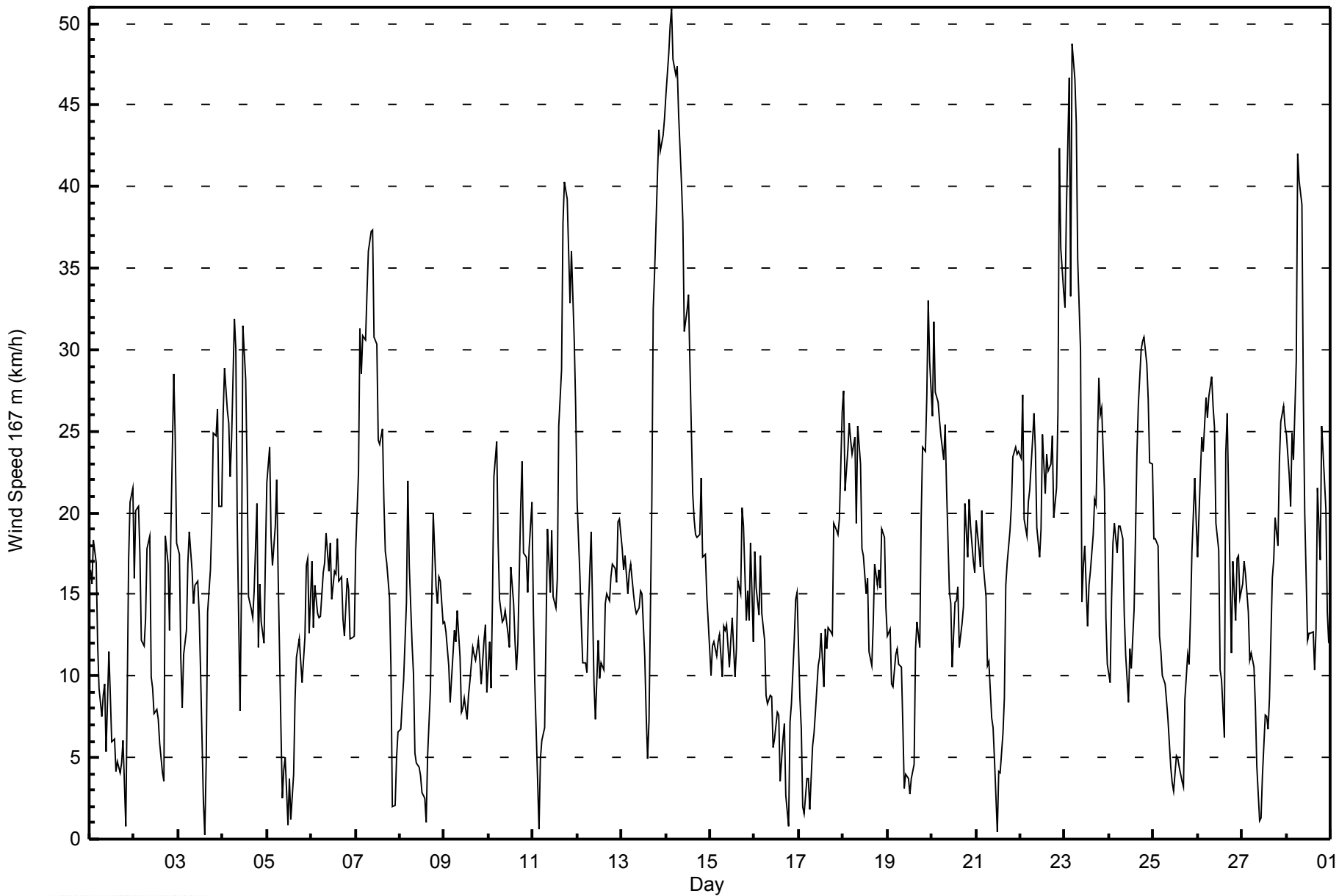


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 13 17:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 0 km/h on Feb 11 04:00																									
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 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-Feb	2	2	2	3	2	2	2	2	2	1	2	2	1	2	2	1	1	1	2	1	4	3	3	4	4
2-Feb	2	3	2	3	2	2	3	3	3	5	4	3	3	3	2	2	2	6	2	3	3	4	3	2	6
3-Feb	4	4	3	3	2	2	1	1	1	2	4	3	2	3	1	3	2	2	3	2	3	4	2	2	4
4-Feb	5	4	3	3	3	4	5	5	7	2	7	2	3	4	3	1	2	2	3	3	3	2	1	4	7
5-Feb	2	3	3	1	3	2	4	2	1	2	1	1	1	1	2	2	2	2	3	3	2	2	2	2	4
6-Feb	2	2	3	2	2	2	2	2	3	3	3	3	2	2	2	2	2	5	4	4	5	2	3	4	5
7-Feb	3	4	4	3	3	4	4	4	4	4	4	3	4	3	3	3	3	4	3	3	1	1	2	1	4
8-Feb	2	2	1	3	3	5	3	2	1	3	1	1	1	1	1	2	2	3	4	1	1	2	2	1	5
9-Feb	1	2	2	1	2	1	1	2	1	1	1	2	1	1	2	2	1	2	1	3	2	2	3	2	3
10-Feb	1	2	3	3	5	5	2	1	3	2	2	3	3	3	2	2	1	4	2	3	3	4	3	3	5
11-Feb	2	3	1	0	3	1	2	2	2	2	3	3	3	2	7	6	8	4	5	6	6	6	5	3	8
12-Feb	4	2	2	1	1	2	2	2	5	4	3	1	2	2	2	2	3	3	3	3	3	3	3	2	5
13-Feb	3	4	3	2	3	3	3	3	3	3	2	2	3	2	3	3	8	4	4	4	6	5	6	5	8
14-Feb	4	4	5	6	6	5	5	7	5	6	5	6	5	5	3	2	3	3	3	3	4	4	3	2	7
15-Feb	2	2	3	2	4	3	2	3	4	2	2	3	2	2	3	2	3	3	3	3	2	2	4	3	4
16-Feb	3	2	2	3	3	3	1	1	1	1	1	2	1	3	2	3	2	1	1	3	1	3	1	1	3
17-Feb	2	1	2	2	1	1	1	1	2	3	2	2	2	1	1	2	2	2	2	2	2	2	2	3	3
18-Feb	3	2	2	2	2	4	3	2	3	3	4	3	3	3	3	3	2	2	3	3	5	4	3	3	5
19-Feb	4	3	3	3	2	2	2	2	2	1	1	1	2	2	2	2	1	1	6	6	4	6	6	5	6
20-Feb	7	5	4	4	3	3	3	3	4	3	3	2	3	3	3	2	2	3	2	3	3	3	1	1	7
21-Feb	2	2	3	2	2	2	2	2	2	1	1	1	1	1	1	2	3	2	2	2	3	3	3	3	3
22-Feb	3	3	2	2	3	3	3	3	3	2	2	3	3	5	3	3	4	5	4	3	4	5	6	5	6
23-Feb	3	3	3	6	3	4	5	4	4	4	3	5	3	2	2	3	3	5	6	7	5	6	3	2	7
24-Feb	1	3	2	3	2	3	2	3	2	2	2	3	2	3	3	4	4	3	4	3	3	3	3	2	4
25-Feb	2	1	2	1	1	2	1	1	1	1	1	1	2	2	1	1	1	2	2	1	2	2	2	2	2
26-Feb	2	3	2	2	2	2	3	2	2	3	2	4	2	2	5	2	3	2	4	2	2	2	3	2	5
27-Feb	2	3	3	3	2	2	3	2	3	1	1	3	2	3	2	3	4	2	2	3	4	2	2	3	4
28-Feb	2	5	2	2	3	7	4	3	2	6	4	3	2	4	3	2	5	6	4	5	3	3	2	3	7
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

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





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

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

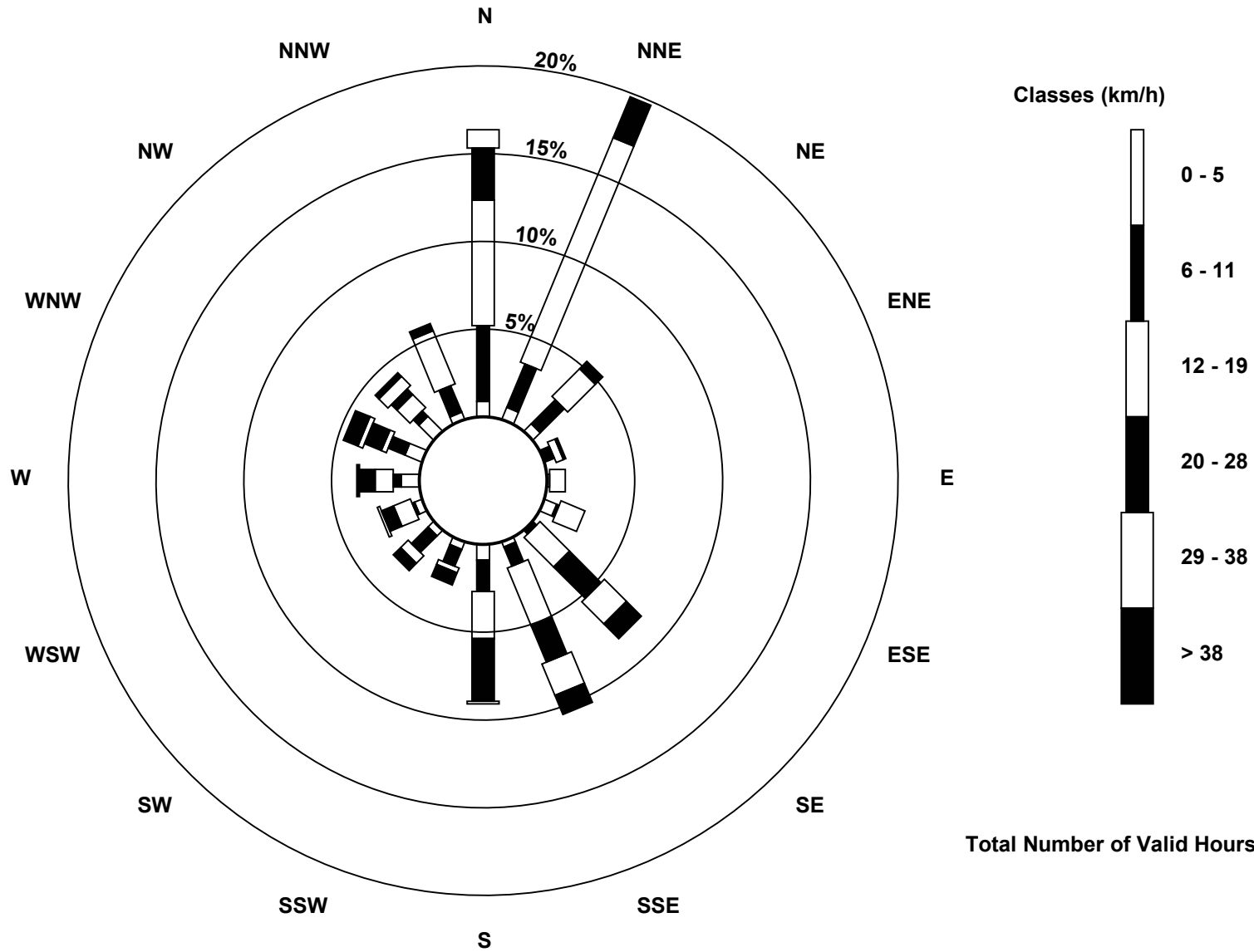
<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	63	9.38	9.38
6 - 11	128	19.05	28.42
12 - 19	284	42.26	70.68
20 - 28	131	19.49	90.18
29 - 38	41	6.10	96.28
> 38	25	3.72	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

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



**Total Number of Valid Hours: 672**





Direction of Maximum Speed: 152 deg on Feb 14 04:00		Hours in Service:	672
Direction of Maximum Daily Speed Average: 150.1 deg on Feb 14		Hours of Data:	672
Direction of Minimum Speed: 189 deg on Feb 11 04:00		Hours of Missing Data:	0
Direction of Minimum Daily Speed Average: 1.2 deg on Feb 19		Percent Operational Time:	100.0
Monthly Average Direction: 323.3 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-Feb	154	153	152	151	152	154	152	149	152	161	347	40	263	265	293	252	284	247	281	231	149	145	135	160	164.0
2-Feb	146	166	155	150	147	148	147	161	133	254	249	231	184	238	216	354	114	344	339	252	143	275	277	297	178.7
3-Feb	313	294	332	320	345	332	315	332	317	344	347	358	4	252	227	157	144	153	157	157	154	156	151	153	161.0
4-Feb	149	144	143	149	147	148	145	148	145	305	157	162	315	334	344	6	357	341	347	359	3	343	342	323	127.8
5-Feb	328	13	16	305	319	328	336	112	136	295	251	184	199	193	258	40	53	35	30	41	45	31	11	326	12.8
6-Feb	25	20	37	36	24	17	16	19	16	11	29	18	6	357	3	1	1	359	4	81	92	76	88	51	21.0
7-Feb	70	132	140	135	137	139	143	144	146	147	141	138	128	136	138	144	152	159	167	168	20	343	355	343	140.4
8-Feb	354	352	348	354	25	6	352	341	336	269	256	224	199	259	200	352	355	354	349	360	357	354	3	356	348.5
9-Feb	350	2	354	350	350	346	345	333	333	323	334	343	333	333	342	341	330	330	335	333	331	332	336	331	337.9
10-Feb	331	330	341	18	15	1	343	315	345	339	332	345	342	344	354	9	1	13	13	356	333	340	316	329	351.5
11-Feb	344	330	309	189	265	154	223	152	152	156	160	152	149	155	153	165	156	152	151	157	163	166	169	169	159.7
12-Feb	167	161	151	155	152	156	153	154	180	297	353	347	354	0	18	13	7	11	6	12	26	36	9	2	63.6
13-Feb	16	17	13	10	16	28	14	19	20	30	5	2	355	352	341	4	59	134	145	149	144	145	151	149	90.7
14-Feb	144	145	148	152	153	152	151	153	153	153	156	160	164	163	154	162	157	163	2	6	10	3	358	10	150.1
15-Feb	27	58	59	39	32	31	18	17	7	4	359	8	0	351	356	24	25	23	348	345	345	318	357	2	10.4
16-Feb	352	354	332	323	320	323	320	351	315	270	262	249	258	251	203	190	164	155	295	326	309	351	155	131	289.5
17-Feb	140	140	146	151	164	165	153	154	158	159	163	156	156	153	163	154	152	159	43	106	1	347	355	143	153.9
18-Feb	162	164	166	175	181	172	164	163	147	145	152	149	150	141	148	152	161	153	160	157	160	164	177	171	157.7
19-Feb	163	169	155	149	176	174	162	155	143	144	159	155	236	302	9	335	336	334	6	6	1	11	8	7	49.4
20-Feb	17	1	10	3	2	358	359	0	0	14	10	3	8	12	6	348	36	21	3	344	337	343	345	321	3.0
21-Feb	325	322	329	346	322	331	346	340	317	321	298	223	169	151	157	154	154	151	149	148	141	134	145	146	152.2
22-Feb	154	154	156	139	148	147	135	136	142	157	157	151	151	143	150	158	150	162	155	154	150	285	298	349	154.4
23-Feb	354	332	314	327	303	312	314	317	319	328	319	5	7	16	2	28	17	19	19	17	41	62	57	53	348.5
24-Feb	48	90	108	124	116	115	104	87	69	67	38	47	39	1	9	16	9	5	360	1	358	355	354	355	30.8
25-Feb	334	345	286	292	345	328	335	334	334	329	248	253	246	251	249	223	181	164	162	157	152	156	153	152	228.8
26-Feb	150	151	154	153	145	151	154	151	153	150	150	150	150	150	187	263	276	283	340	354	346	358	348	338	155.5
27-Feb	345	351	348	358	12	0	48	51	256	199	146	165	193	179	159	156	155	176	177	174	181	174	247	265	178.3
28-Feb	301	281	267	265	260	308	321	322	312	326	321	336	357	345	350	18	282	350	355	358	353	346	331	355	322.6
113.7 115.0 124.3 120.8 120.0 118.9 118.3 118.0 130.8 140.2 143.7 131.7 130.7 103.1 103.5 106.6 105.8 96.0 61.3 81.8 80.4 76.1 78.9 84.5																									
Diurnal Average																									

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

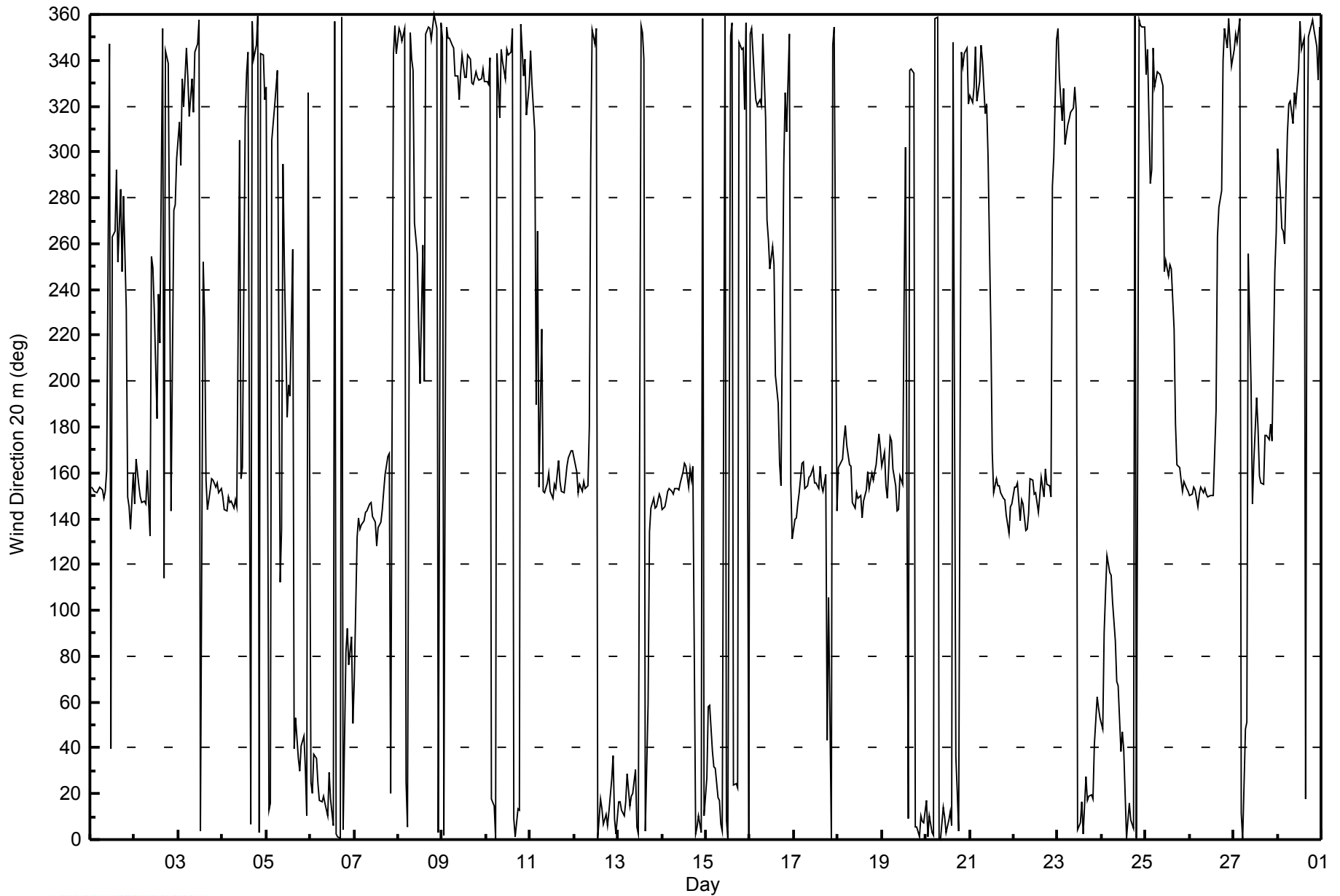


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 103 deg on Feb 11 05:00																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: 6 deg on Feb 22 20:00																									
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 11 Q <sub>1</sub> = 16 Median = 21 Q <sub>3</sub> = 29 P <sub>90</sub> = 45 P <sub>99</sub> = 93																									
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-Feb	9	9	9	12	11	12	12	12	11	14	76	97	34	24	25	25	56	58	40	76	39	29	32	34	97
2-Feb	9	31	17	19	7	13	16	54	41	89	37	30	50	58	62	86	83	29	40	77	69	53	19	33	89
3-Feb	34	25	25	54	18	25	31	16	21	34	18	23	30	71	50	23	16	17	12	8	10	6	14	18	71
4-Feb	12	20	10	12	10	10	15	14	51	70	40	16	85	29	23	19	16	20	26	12	14	19	20	19	85
5-Feb	35	31	68	45	33	25	53	92	60	90	90	45	43	33	101	40	21	23	30	29	24	18	23	29	101
6-Feb	22	24	20	23	22	21	20	21	20	21	22	23	18	16	16	16	16	22	34	42	34	21	28	51	51
7-Feb	56	24	15	15	15	16	17	15	15	15	15	15	19	21	19	16	16	14	17	38	33	27	15	45	56
8-Feb	30	40	23	20	24	27	32	13	31	61	17	29	17	66	37	58	15	13	19	12	14	12	12	21	66
9-Feb	17	16	24	22	23	21	25	20	24	26	28	32	25	23	22	21	15	17	17	17	16	15	24	20	32
10-Feb	16	17	19	22	22	16	20	22	36	29	18	21	20	25	25	20	14	22	19	22	30	33	22	34	36
11-Feb	34	35	49	100	103	48	73	28	12	8	13	12	16	15	17	14	16	15	14	11	10	10	10	8	103
12-Feb	7	8	9	9	9	14	10	35	65	92	45	23	23	19	26	21	20	23	18	21	23	28	25	20	92
13-Feb	23	25	24	22	23	22	23	23	25	26	18	17	24	22	31	19	67	16	16	15	16	15	13	14	67
14-Feb	14	14	14	12	13	13	13	13	13	15	12	9	9	10	9	10	9	12	14	25	19	23	21	19	25
15-Feb	32	20	29	37	32	22	32	28	23	23	21	26	21	26	26	23	25	25	16	21	21	15	32	24	37
16-Feb	22	24	16	18	15	17	28	32	55	30	23	15	13	20	23	24	24	35	61	38	43	49	35	50	61
17-Feb	21	25	60	57	89	77	11	18	12	7	11	11	10	12	12	19	17	31	95	85	60	24	35	39	95
18-Feb	51	24	24	24	35	14	23	30	20	20	16	15	20	20	19	20	12	14	13	15	15	16	14	19	51
19-Feb	16	15	52	43	37	42	20	33	18	19	10	17	83	73	81	20	16	16	22	22	21	24	22	21	83
20-Feb	25	19	21	18	16	16	16	16	14	23	28	28	26	26	24	23	21	22	18	22	21	33	64	29	64
21-Feb	18	12	19	19	24	22	20	34	24	23	93	21	26	20	9	9	8	13	16	9	22	40	11	10	93
22-Feb	9	17	10	39	36	27	17	30	18	10	10	10	13	29	15	8	8	22	6	6	35	45	27	18	45
23-Feb	16	21	19	20	15	17	14	16	14	18	19	40	25	27	20	23	24	26	24	24	26	26	22	23	40
24-Feb	22	24	19	19	18	22	34	34	26	24	32	26	37	19	21	21	20	17	15	15	14	16	18	15	37
25-Feb	14	23	28	36	26	27	21	20	26	63	21	15	15	17	14	15	29	10	12	26	23	10	7	10	63
26-Feb	7	12	9	9	8	8	9	10	11	10	11	17	12	18	37	31	17	43	22	24	18	16	20	15	43
27-Feb	18	19	20	24	22	18	31	39	97	37	33	30	29	23	12	7	22	28	21	20	32	27	42	67	97
28-Feb	82	17	23	26	23	35	24	23	18	26	19	24	34	28	25	37	37	18	21	20	16	22	57	21	82
																			82 40 68 100 103 77 73 92 97 92 93 97 85 73 101 86 83 58 95 85 69 53 64 67						
																			Diurnal Maximum						



**WBEA**  
**Hourly Averages**

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





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

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

Direction of Maximum Speed: 143 deg on Feb 14 05:00 Direction of Maximum Daily Speed Average: 137.9 deg on Feb 14	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0
Direction of Minimum Speed: 340 deg on Feb 5 15:00 Direction of Minimum Daily Speed Average: 0.9 deg on Feb 27	Percent Operational Time: 100.0
Monthly Average Direction: 328.4 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-Feb	141	140	139	139	140	142	144	137	139	145	335	300	259	259	280	243	352	250	283	266	189	143	213	225	156.7
2-Feb	154	203	223	204	146	138	163	199	138	261	250	234	154	255	223	336	77	338	338	250	206	258	268	273	218.9
3-Feb	291	276	316	326	342	333	332	340	330	322	343	353	358	245	220	138	127	140	142	146	145	147	142	143	138.0
4-Feb	139	136	136	139	136	137	133	138	132	327	155	144	288	319	340	7	357	330	344	346	359	339	339	325	105.1
5-Feb	330	313	359	288	316	319	307	323	146	157	150	196	181	174	340	36	45	30	21	35	38	24	13	334	8.0
6-Feb	18	14	29	28	19	12	11	12	12	7	22	13	2	352	358	357	356	354	2	79	90	76	85	56	16.3
7-Feb	83	124	133	128	130	132	134	135	138	138	133	130	120	126	128	132	141	148	156	153	39	348	346	335	131.0
8-Feb	348	348	343	351	19	360	353	328	332	257	256	234	170	282	202	359	3	344	342	343	343	345	352	347	344.5
9-Feb	338	355	345	345	345	341	341	330	330	318	329	338	327	328	338	336	324	324	328	327	325	324	330	324	332.4
10-Feb	326	325	337	12	10	355	340	320	315	329	325	338	335	337	347	2	356	7	11	351	345	339	320	325	347.3
11-Feb	327	289	308	232	241	155	165	147	140	141	146	138	137	144	143	152	145	141	141	144	150	157	160	161	148.5
12-Feb	158	152	141	146	146	151	153	160	218	277	349	342	348	358	16	9	2	6	0	8	20	29	5	358	42.3
13-Feb	13	10	7	6	12	20	9	14	15	23	0	357	353	349	335	352	63	126	136	139	135	136	141	139	75.6
14-Feb	137	137	139	142	143	141	141	142	140	142	144	150	155	154	143	153	147	156	358	2	5	359	354	7	137.9
15-Feb	24	52	52	36	25	25	12	10	3	359	355	6	357	346	353	19	20	20	344	340	342	318	355	360	6.9
16-Feb	349	350	332	328	324	324	316	330	320	275	258	242	255	246	198	157	149	132	303	333	308	334	168	161	298.4
17-Feb	151	149	162	176	164	147	153	156	147	143	148	140	142	141	148	141	139	140	124	127	133	330	99	134	145.2
18-Feb	141	148	148	156	158	157	147	146	136	133	139	137	139	129	137	142	150	143	148	146	147	151	167	159	144.9
19-Feb	150	159	147	147	166	163	146	143	134	133	145	141	263	307	358	330	330	329	1	1	357	7	6	3	35.0
20-Feb	11	357	6	359	356	353	354	357	357	10	8	359	5	9	3	343	28	20	1	336	332	326	324	322	358.4
21-Feb	318	320	323	331	323	325	319	334	319	322	296	218	155	136	144	142	140	140	136	139	133	128	138	140	138.8
22-Feb	142	143	145	139	139	138	130	133	132	143	142	139	141	134	140	153	146	164	151	148	156	274	286	332	147.6
23-Feb	333	317	301	317	293	300	304	307	310	322	309	0	2	13	358	21	12	15	14	12	35	57	51	47	342.8
24-Feb	41	85	101	117	109	109	100	83	66	60	36	43	38	356	5	11	4	0	355	356	353	349	349	347	25.2
25-Feb	331	340	309	288	304	325	326	328	328	354	254	246	246	250	247	220	149	150	146	139	142	145	135	132	217.1
26-Feb	135	137	141	140	137	138	140	139	140	137	139	141	140	140	180	257	266	282	332	345	342	355	345	336	141.2
27-Feb	340	345	346	351	10	355	39	43	277	183	133	154	190	172	149	143	151	186	193	181	202	198	245	253	208.0
28-Feb	291	273	254	253	248	300	308	308	300	312	311	331	350	340	343	13	275	344	346	351	347	342	341	354	313.4
	83.5	93.9	103.4	105.2	100.4	101.1	103.0	103.7	113.3	116.2	106.1	97.9	88.1	34.5	66.4	69.4	76.5	70.7	43.3	59.0	56.3	47.9	22.8	31.1	
	Diurnal Average																								

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

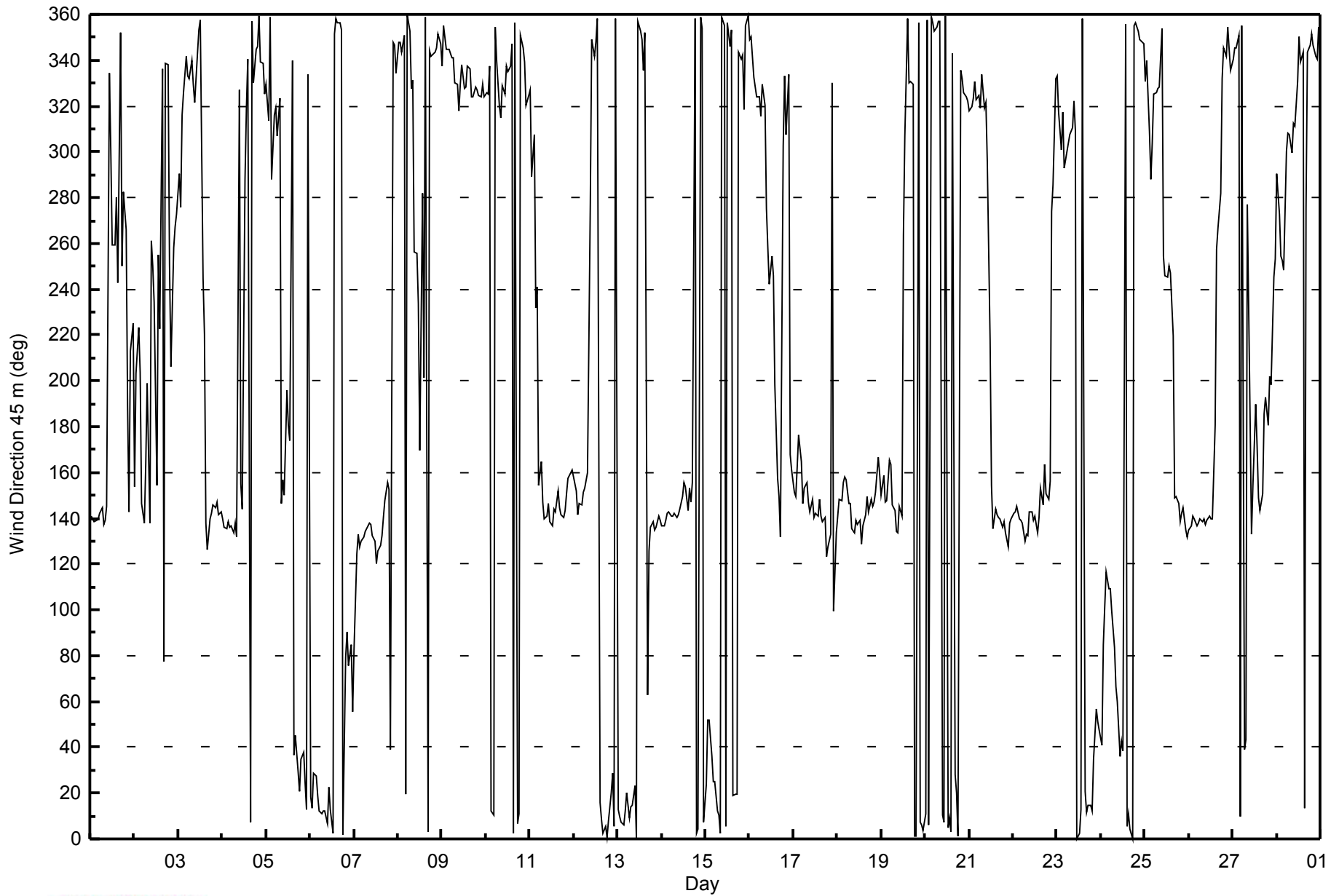


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																	Hours in Service: 672								
Maximum Value: 104 deg on Feb 5 15:00																	Hours of Data: 672								
Minimum Value: 4 deg on Feb 21 20:00																	Hours of Missing Data: 0								
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 8 Q <sub>1</sub> = 11 Median = 15 Q <sub>3</sub> = 21 P <sub>90</sub> = 37 P <sub>99</sub> = 77																	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-Feb	6	7	5	6	8	8	10	9	6	12	69	78	21	16	21	17	50	43	62	52	50	11	67	41	78
2-Feb	27	29	29	37	26	10	30	66	66	72	11	41	73	71	69	77	63	22	23	18	44	17	13	21	77
3-Feb	23	15	24	21	13	21	26	7	18	18	12	16	22	74	47	19	11	10	9	6	9	5	9	12	74
4-Feb	9	16	6	5	4	6	9	8	42	75	63	17	92	27	26	14	14	13	21	11	12	16	15	14	92
5-Feb	32	27	59	20	25	13	34	100	9	30	37	66	60	34	104	14	17	17	25	28	17	13	14	20	104
6-Feb	16	18	14	17	13	14	14	14	13	15	15	16	13	13	11	11	11	13	31	37	25	14	23	46	46
7-Feb	51	18	11	11	11	11	11	11	10	9	11	11	13	16	14	13	13	12	15	34	27	24	11	21	51
8-Feb	18	24	12	15	16	21	23	11	15	37	11	39	29	59	62	31	16	8	13	9	9	7	10	17	62
9-Feb	26	11	18	17	18	15	20	15	18	21	20	23	20	21	18	16	11	13	12	13	12	12	21	14	26
10-Feb	12	13	17	15	16	12	15	15	27	21	15	18	15	19	20	12	9	18	15	14	22	26	15	20	27
11-Feb	14	25	49	74	56	18	14	10	7	6	10	7	11	12	13	13	13	10	9	9	10	9	8	7	74
12-Feb	6	7	5	5	8	10	11	32	69	84	39	21	20	14	18	15	14	18	14	17	17	22	16	15	84
13-Feb	16	18	18	16	15	15	17	17	20	19	12	12	19	18	28	12	69	13	12	10	11	11	10	9	69
14-Feb	10	10	10	9	9	9	8	9	10	11	9	8	8	9	7	8	10	12	23	14	17	18	14	15	23
15-Feb	20	15	23	26	24	15	21	20	17	17	15	19	15	19	20	17	19	19	13	15	17	13	28	19	28
16-Feb	19	17	12	12	11	11	11	18	22	20	16	10	9	20	26	36	26	20	72	21	24	32	47	36	72
17-Feb	11	9	18	16	12	10	6	7	5	6	10	8	6	8	9	13	12	13	42	40	28	50	54	16	54
18-Feb	29	17	19	21	30	11	18	22	15	15	12	12	18	17	15	15	10	10	11	11	13	14	11	18	30
19-Feb	13	12	42	39	28	33	16	20	13	15	8	18	86	64	64	14	13	13	17	16	16	17	16	15	86
20-Feb	17	14	15	14	12	12	12	12	10	17	20	22	20	21	16	18	16	15	15	12	13	10	17	23	23
21-Feb	17	14	24	11	12	18	19	15	20	21	39	28	31	18	6	6	6	6	8	4	12	20	7	7	39
22-Feb	5	8	5	20	23	15	13	20	15	9	9	6	8	20	10	6	9	24	9	5	42	37	23	17	42
23-Feb	13	17	15	17	11	14	11	13	13	15	16	38	18	19	14	18	17	18	17	17	19	19	17	17	38
24-Feb	16	18	13	14	13	15	24	25	18	19	27	18	30	15	14	15	14	12	11	12	11	12	14	12	30
25-Feb	11	16	16	17	37	25	13	13	22	16	41	12	14	17	12	30	20	5	6	8	7	7	5	8	41
26-Feb	5	10	7	5	5	6	6	6	5	6	4	8	6	12	54	23	11	32	17	14	14	13	15	13	54
27-Feb	14	17	18	21	16	14	25	32	92	45	31	29	31	22	10	5	28	25	18	21	32	32	34	61	92
28-Feb	58	13	13	17	12	30	19	18	13	23	15	21	25	22	21	30	35	17	15	16	13	14	40	13	58
																	58 29 59 74 56 33 34 100 92 84 69 78 92 74 104 77 69 43 72 52 50 50 67 61								
Diurnal Maximum																									



WBEA  
Hourly Averages

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





Direction of Maximum Speed: 145 deg on Feb 14 04:00																				Hours in Service: 672							
Direction of Maximum Daily Speed Average: 141.0 deg on Feb 14																				Hours of Data: 672							
Direction of Minimum Speed: 210 deg on Feb 8 15:00										Direction of Minimum Daily Speed Average: 1.3 deg on Feb 25										Hours of Missing Data: 0							
Monthly Average Direction: 315.5 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-Feb	154	156	153	162	154	149	166	172	172	140	348	310	286	269	276	263	1	29	27	249	233	242	268	280	196.7		
2-Feb	246	248	250	244	235	212	231	240	240	273	265	305	339	331	251	322	276	321	334	290	277	284	287	278	266.9		
3-Feb	264	277	330	360	359	352	354	355	332	351	3	356	357	294	203	122	131	141	146	159	156	163	155	154	122.8		
4-Feb	150	151	160	155	161	156	151	156	173	353	232	234	265	302	335	14	13	344	351	353	8	354	342	328	163.4		
5-Feb	319	314	313	315	346	1	349	280	227	239	255	244	129	149	20	38	49	35	31	42	43	40	34	3	355.7		
6-Feb	20	18	35	33	25	21	19	20	16	15	28	23	13	4	9	14	12	25	61	96	99	92	104	102	30.6		
7-Feb	116	129	136	132	135	135	137	138	140	139	136	135	125	128	130	133	139	147	153	146	81	43	15	348	133.3		
8-Feb	351	2	357	12	24	15	17	1	342	315	280	227	165	319	210	24	39	14	11	346	341	344	347	346	358.7		
9-Feb	341	342	347	343	347	349	347	342	349	336	333	336	338	339	345	344	341	339	333	336	325	329	332	331	339.3		
10-Feb	337	335	345	13	11	2	358	339	327	327	330	335	334	334	346	3	354	14	26	14	18	12	14	20	356.2		
11-Feb	351	332	277	219	179	147	146	151	145	143	137	155	155	152	145	150	145	145	144	147	151	156	158	158	149.0		
12-Feb	159	168	164	176	176	185	202	230	245	268	344	343	354	7	20	14	12	13	11	13	23	31	9	4	16.8		
13-Feb	16	15	10	10	12	23	15	16	19	27	7	4	10	357	350	21	121	129	139	140	138	138	142	141	88.0		
14-Feb	140	139	142	145	146	144	145	145	145	145	149	153	156	153	164	160	190	3	8	9	9	5	15	15	141.0		
15-Feb	32	51	57	49	33	29	17	16	12	7	0	8	358	351	358	20	22	24	7	2	357	343	4	8	14.4		
16-Feb	358	359	357	1	359	357	331	326	334	347	315	265	271	273	236	296	153	131	119	335	340	322	283	272	334.2		
17-Feb	191	214	189	241	247	231	182	188	153	142	151	143	143	141	134	132	132	140	132	140	136	134	141	137	148.0		
18-Feb	136	137	140	140	144	146	140	142	138	134	137	135	135	128	136	144	148	140	149	145	147	150	164	157	141.9		
19-Feb	149	165	161	171	173	172	155	154	154	135	141	147	309	314	330	335	338	338	5	4	3	9	8	6	29.9		
20-Feb	12	1	6	2	360	358	358	360	5	16	13	5	10	12	5	347	30	24	16	355	352	354	345	341	3.4		
21-Feb	340	356	345	352	346	355	10	40	353	320	317	240	152	137	137	134	137	143	147	147	145	142	152	153	123.6		
22-Feb	152	155	157	153	153	154	155	148	149	153	147	159	158	144	147	169	190	207	188	202	223	261	282	307	173.5		
23-Feb	307	304	295	308	293	295	306	311	314	324	311	1	7	15	0	19	15	17	15	15	38	61	57	53	336.2		
24-Feb	56	93	108	120	113	112	107	96	79	65	46	51	48	3	12	16	7	4	1	359	355	356	354	354	33.0		
25-Feb	342	339	338	322	322	326	331	324	321	275	337	274	278	279	284	234	162	136	147	154	154	156	169	168	285.7		
26-Feb	160	154	159	157	155	153	157	157	159	147	147	144	146	144	235	258	257	265	323	353	2	5	360	350	162.4		
27-Feb	352	355	354	0	13	4	39	54	24	180	139	178	214	191	159	151	205	223	220	219	247	249	249	260	264.1		
28-Feb	287	278	258	254	252	300	297	296	293	306	310	326	349	335	338	11	288	346	354	354	351	349	355	19	310.7		
51.4	46.8	109.8	105.5	102.0	81.9	97.2	118.7	113.9	94.8	77.8	85.2	77.4	38.6	59.6	58.3	79.4	67.1	54.9	52.9	49.1	30.8	9.9	8.8				
Diurnal Average																											
All monthly, daily, and diurnal averages have been calculated using vector methods																											



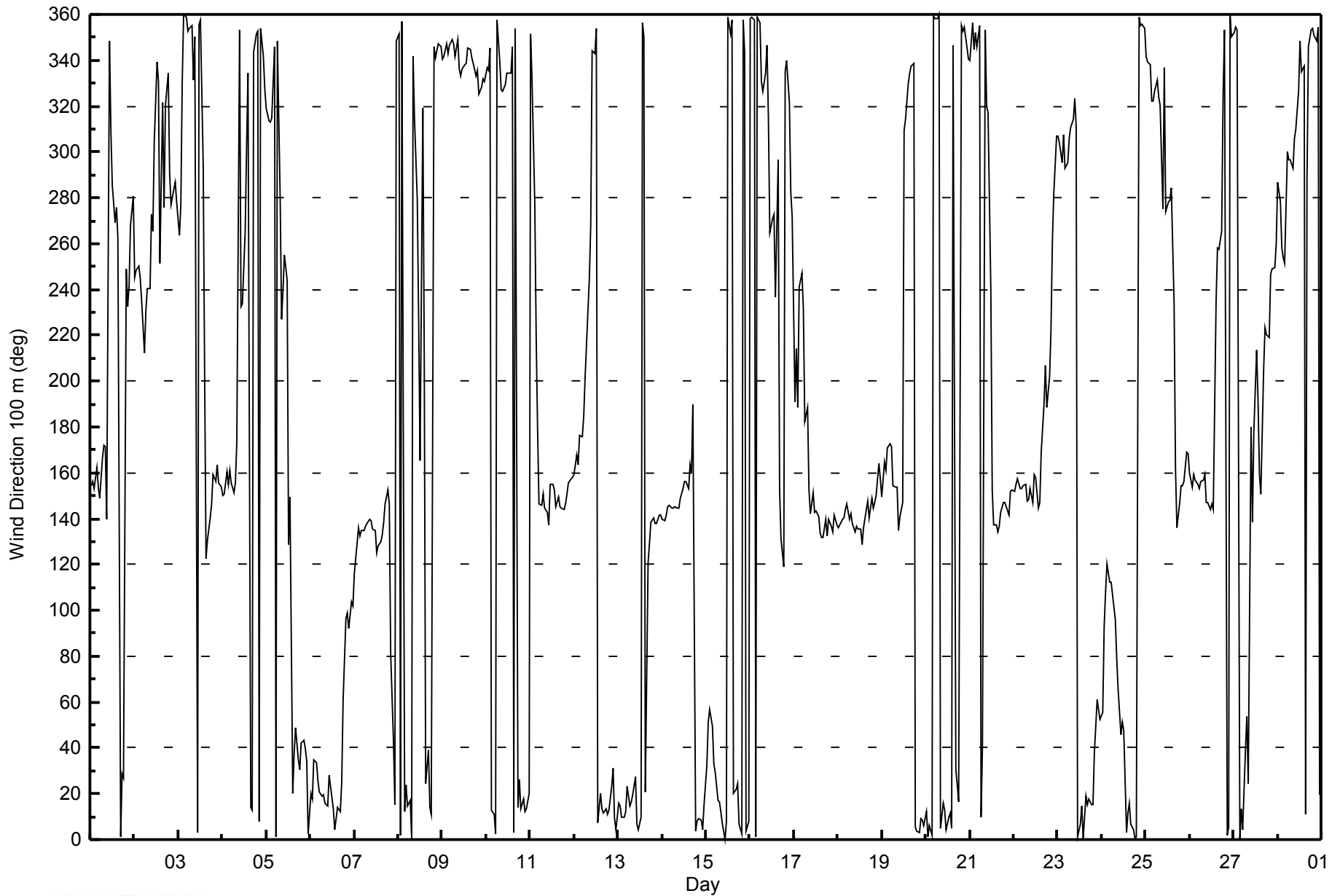
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Feb 8 15:00 Minimum Value: 2 deg on Feb 21 19:00 Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 14 P <sub>90</sub> = 26 P <sub>99</sub> = 71																	Hours in Service: 672 Hours of Data: 672 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-Feb	8	5	7	10	9	12	14	19	15	30	58	24	13	12	19	26	28	16	15	59	13	13	17	21	59
2-Feb	13	6	5	6	6	24	12	16	28	55	9	59	84	57	69	33	71	21	10	28	12	12	9	8	84
3-Feb	11	15	35	13	13	6	7	7	7	14	10	10	13	72	64	18	5	5	6	5	5	7	7	8	72
4-Feb	5	9	6	6	12	9	6	4	50	35	30	18	13	13	28	8	9	13	17	6	13	14	9	5	50
5-Feb	7	7	10	8	14	7	14	32	25	29	10	33	45	27	69	31	11	11	17	20	12	9	6	17	69
6-Feb	10	10	10	11	8	9	8	8	7	8	9	12	8	8	7	9	7	23	30	16	13	8	13	14	30
7-Feb	11	12	5	5	5	6	6	5	5	4	5	5	8	7	6	7	8	9	13	17	16	20	12	11	20
8-Feb	11	14	9	12	9	15	17	17	8	32	12	30	51	44	104	25	11	15	13	4	3	4	4	4	104
9-Feb	4	5	7	10	13	9	12	9	10	18	14	14	13	13	12	10	8	9	7	8	8	7	12	11	18
10-Feb	7	8	13	9	10	9	9	10	7	8	10	13	10	14	13	8	7	17	9	12	15	18	16	14	18
11-Feb	15	20	23	52	24	14	7	10	9	9	8	11	16	8	7	9	7	4	4	4	7	8	7	6	52
12-Feb	6	7	6	6	7	16	16	18	37	47	29	15	17	11	10	8	9	10	10	11	11	13	11	9	47
13-Feb	10	10	10	9	11	10	11	10	14	13	8	9	17	16	77	42	25	7	5	5	6	5	5	5	77
14-Feb	4	4	5	4	4	3	3	4	4	4	6	6	6	6	7	7	14	22	19	9	10	12	8	8	22
15-Feb	18	10	15	20	20	13	12	15	11	12	10	9	10	12	15	12	11	11	10	12	11	12	19	11	20
16-Feb	11	11	11	11	11	10	11	12	6	8	26	17	13	25	64	92	16	11	41	21	9	22	11	28	92
17-Feb	39	38	38	10	5	27	23	31	11	5	9	14	5	7	5	6	6	6	9	8	7	11	6	5	39
18-Feb	6	7	6	8	10	7	7	7	6	8	8	7	10	11	10	10	7	6	10	7	10	11	9	13	13
19-Feb	9	9	25	28	17	16	8	9	12	9	5	22	63	37	37	9	6	6	11	10	10	10	9	9	63
20-Feb	10	8	8	7	6	6	6	7	7	9	12	16	11	12	11	15	12	9	12	9	8	11	6	4	16
21-Feb	6	10	9	6	10	4	13	12	37	15	18	57	30	11	6	4	5	5	2	3	5	9	6	6	57
22-Feb	4	5	3	3	7	9	11	10	15	8	6	5	5	8	6	7	15	16	12	15	19	10	15	11	19
23-Feb	9	8	7	11	4	8	7	7	7	12	10	35	11	8	8	10	9	11	10	12	15	13	14	13	35
24-Feb	12	10	8	7	7	8	10	13	13	12	14	12	25	11	10	9	8	6	6	6	8	11	7	7	25
25-Feb	6	6	4	8	9	8	5	10	27	39	29	25	21	19	18	45	15	6	5	5	5	9	9	10	45
26-Feb	8	10	8	7	4	4	6	4	6	8	4	3	3	9	66	9	4	13	21	8	7	8	10	8	66
27-Feb	9	11	13	17	11	10	18	16	80	67	22	28	22	23	17	12	29	5	4	8	11	5	5	24	80
28-Feb	13	8	7	6	10	14	9	8	6	12	10	15	17	17	15	22	26	18	10	10	8	7	11	9	26
																	39 38 38 52 24 27 23 32 80 67 58 59 84 72 104 92 71 23 41 59 19 22 19 28								
Diurnal Maximum																									





**WBEA**  
**Hourly Averages**

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





Maximum Value: 0.5 km/h on Feb 11 23:00		Maximum Daily Average: 0.1 km/h on Feb 2		Hours in Service: 672																						
Minimum Value: -0.8 km/h on Feb 3 21:00		Minimum Daily Average: -0.2 km/h on Feb 14		Hours of Data: 672																						
Maximum Diurnal Average: 0.0 km/h at hour 24		Minimum Diurnal Average: -0.1 km/h at hour 14		Hours of Missing Data: 0																						
Monthly Average: -0.05 km/h		Percentiles: $P_1 = -0.5$ $P_{10} = -0.3$ $Q_1 = -0.1$ Median = 0.0 $Q_3 = 0.0$ $P_{90} = 0.1$ $P_{99} = 0.3$		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0.0	0.1	0.1	-0.1	-0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.4	0.2	-0.1	0.0	-0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.4
2-Feb	0.4	0.2	0.3	0.3	0.2	0.3	0.3	0.1	0.1	-0.1	-0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.1	-0.1	-0.4	-0.1	0.1	0.4
3-Feb	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.0	-0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	-0.8	0.1	0.2	0.2	-0.1	0.2
4-Feb	-0.5	-0.5	-0.2	-0.5	-0.1	-0.3	-0.3	-0.2	0.1	0.0	0.0	0.1	0.0	-0.1	-0.2	0.0	-0.1	0.0	-0.2	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.1
5-Feb	0.0	0.0	0.0	0.0	0.1	-0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	-0.1	0.3	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.3
6-Feb	-0.1	0.0	-0.1	-0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	-0.2	-0.4	-0.3	-0.4	-0.2	-0.2	-0.2	-0.2	0.0	-0.1	0.0	-0.3	-0.1	0.1
7-Feb	-0.1	-0.1	-0.2	-0.4	-0.3	-0.3	-0.3	-0.1	-0.3	0.0	-0.4	-0.2	-0.2	-0.4	0.0	0.1	0.0	-0.1	0.1	0.1	-0.1	0.0	0.0	0.1	-0.1	0.1
8-Feb	0.0	0.0	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.2	0.0	0.4	0.0	-0.1	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.4
9-Feb	-0.2	-0.2	0.0	-0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	-0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1
10-Feb	0.0	0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.3	-0.1	-0.1	-0.2	0.0	-0.1	0.0	-0.1	-0.1	0.1
11-Feb	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.2	0.2	0.1	0.1	-0.2	0.1	0.1	0.1	-0.1	-0.1	-0.1	-0.1	-0.3	0.2	0.5	0.3	0.1	0.5
12-Feb	0.4	0.0	-0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.1	0.0	-0.2	-0.3	-0.4	0.2	0.0	-0.2	-0.1	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	0.0	0.4
13-Feb	-0.1	-0.1	0.0	-0.1	-0.2	0.0	0.0	0.0	-0.1	-0.2	-0.2	-0.4	-0.2	-0.2	0.0	-0.1	-0.2	-0.3	-0.1	-0.2	-0.2	-0.4	-0.5	-0.3	-0.2	0.0
14-Feb	-0.5	-0.1	-0.3	-0.6	-0.2	-0.2	-0.4	-0.2	-0.1	-0.2	-0.3	-0.4	0.2	0.0	-0.3	0.0	0.0	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	-0.2	0.2
15-Feb	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-0.1	-0.1	-0.3	-0.4	0.0	-0.3	-0.1	0.0	0.1	0.0	0.1	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.1
16-Feb	0.0	-0.1	-0.2	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.1	0.1	0.0	-0.5	-0.3	-0.2	0.0	0.0	0.1	0.0	-0.1	0.0	0.0	0.1	0.1	0.0	0.1
17-Feb	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.1	-0.2	0.0	-0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
18-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	-0.3	-0.1	-0.2	0.1	-0.1	-0.2	0.0	0.0	-0.1	0.0	0.0	0.0	-0.1	0.5	0.2	0.0	0.5
19-Feb	-0.1	0.0	0.1	0.1	0.2	-0.1	-0.4	-0.3	0.0	-0.1	-0.1	0.1	0.1	-0.1	0.1	0.1	0.0	0.2	0.1	-0.2	-0.2	-0.2	-0.2	-0.2	0.0	0.2
20-Feb	-0.3	-0.4	0.0	-0.2	-0.4	-0.3	-0.3	-0.2	-0.3	-0.1	0.0	-0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	0.0
21-Feb	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	-0.3	0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.1	-0.4	-0.3	-0.3	-0.1	-0.1	0.4
22-Feb	-0.4	-0.1	-0.2	0.1	-0.3	-0.1	-0.2	-0.4	-0.1	0.0	0.1	0.0	-0.1	0.0	-0.1	0.1	0.3	0.3	0.3	0.5	0.2	-0.5	-0.3	0.1	0.0	0.5
23-Feb	0.1	0.0	-0.1	-0.1	-0.3	-0.3	-0.4	-0.2	-0.4	-0.1	-0.1	0.0	-0.2	0.3	-0.4	0.0	-0.1	-0.2	0.0	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	0.3
24-Feb	0.0	0.0	-0.1	-0.2	-0.2	0.0	0.0	0.0	-0.1	-0.1	0.1	0.0	0.0	-0.5	0.0	-0.1	-0.3	-0.4	-0.4	-0.2	-0.4	-0.3	-0.2	0.0	-0.2	0.1
25-Feb	-0.1	-0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	-0.2	-0.3	-0.4	-0.3	-0.2	-0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.0	0.3
26-Feb	0.3	0.0	0.1	0.0	-0.1	0.1	0.1	0.2	0.0	-0.1	-0.5	-0.7	-0.5	-0.4	-0.1	-0.2	-0.5	0.0	0.0	-0.1	0.0	-0.2	0.0	0.1	-0.1	0.3
27-Feb	0.1	0.0	0.0	0.1	0.0	-0.1	-0.2	-0.1	0.0	0.0	0.3	-0.1	-0.1	0.1	-0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.0	0.0	0.0	0.3
28-Feb	0.0	-0.3	-0.2	-0.1	-0.1	0.0	-0.1	0.1	-0.1	0.0	-0.2	-0.1	0.3	-0.1	0.1	0.0	0.0	-0.2	0.0	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.3
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.7 km/h on Feb 14 05:00		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 0.1 km/h on Feb 11 05:00																									
Percentiles: P <sub>1</sub> = 0.1 P <sub>10</sub> = 0.3 Q <sub>1</sub> = 0.7 Median = 1.2 Q <sub>3</sub> = 1.8 P <sub>90</sub> = 2.5 P <sub>99</sub> = 4.2																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	1.4	1.2	1.3	1.6	1.6	1.6	1.1	0.9	1.3	0.7	0.6	0.6	1.2	1.4	1.2	0.7	0.2	0.2	0.2	0.2	0.2	0.5	0.9	0.7	1.6
2-Feb	1.1	1.0	0.7	0.8	0.9	1.1	0.8	1.0	1.0	0.9	0.9	0.8	0.8	0.7	0.6	0.5	0.2	0.4	0.2	0.3	0.4	0.9	1.2	1.0	1.2
3-Feb	1.1	0.6	0.5	0.3	0.5	0.6	0.5	0.3	0.2	0.4	1.3	1.7	1.6	1.1	0.7	0.7	0.7	1.0	0.8	1.0	1.7	1.7	1.4	1.4	1.7
4-Feb	1.9	1.6	1.2	2.4	1.9	1.7	2.1	2.3	1.3	0.4	0.5	0.8	1.3	1.6	1.6	1.5	1.0	0.4	0.9	0.6	1.1	0.9	0.3	0.2	2.4
5-Feb	0.3	0.3	0.2	0.2	0.4	0.4	0.6	0.3	0.2	0.1	0.3	0.4	0.5	0.6	0.7	1.3	1.1	1.0	1.0	0.9	0.7	0.8	0.5	0.5	1.3
6-Feb	1.3	1.6	1.9	1.8	1.6	1.4	1.7	1.8	1.9	1.7	2.2	2.0	2.2	1.9	2.2	1.9	1.9	1.4	1.1	1.5	1.4	1.2	0.9	1.2	2.2
7-Feb	1.3	2.1	3.0	2.6	2.7	2.8	3.2	3.1	3.4	3.7	3.1	3.0	2.6	2.5	2.4	2.1	1.8	1.7	1.3	0.7	0.4	0.4	0.5	0.3	3.7
8-Feb	0.5	0.4	0.3	0.6	1.7	1.7	0.9	0.2	0.3	0.4	0.9	0.6	0.5	1.0	0.7	1.0	0.6	0.6	0.6	0.7	0.7	0.8	0.6	0.6	1.7
9-Feb	0.6	0.8	0.8	1.0	1.1	1.1	1.0	1.3	1.0	1.0	1.1	1.1	1.3	1.5	1.3	1.3	1.2	1.2	1.3	1.2	1.0	1.2	1.2	1.0	1.5
10-Feb	1.1	1.0	1.4	2.4	2.5	1.6	0.7	0.3	0.4	1.1	1.4	1.6	2.0	1.8	1.6	1.5	1.2	1.9	1.4	0.8	0.7	0.8	0.4	0.4	2.5
11-Feb	0.5	0.2	0.1	0.1	0.1	0.1	0.2	0.3	1.0	1.2	1.4	1.4	1.2	1.2	2.6	2.7	3.7	3.8	3.8	3.8	3.1	3.0	2.4	1.8	3.8
12-Feb	1.8	1.5	1.4	0.9	0.9	1.0	0.9	0.7	0.8	1.0	1.1	1.5	1.6	1.6	1.7	1.9	1.8	1.6	1.7	2.0	2.0	1.6	2.3	2.1	2.3
13-Feb	2.0	2.0	2.0	1.8	1.9	2.0	1.8	1.7	1.7	1.9	2.1	2.0	1.9	1.5	1.3	1.3	1.5	2.9	3.1	3.8	4.2	4.1	4.0	4.0	4.2
14-Feb	4.0	4.2	4.3	4.5	4.7	4.6	4.6	4.4	4.4	4.3	3.5	3.2	3.1	2.6	2.2	1.9	2.2	1.5	2.1	2.7	2.2	1.7	1.5	1.2	4.7
15-Feb	0.9	1.0	1.1	1.0	1.3	1.5	1.3	1.4	1.6	1.5	1.6	1.9	1.8	1.6	1.7	1.9	2.0	1.5	0.8	0.7	0.8	0.7	1.5	1.2	2.0
16-Feb	1.3	0.7	0.6	0.5	0.5	0.5	0.4	0.2	0.1	0.5	1.1	1.1	1.3	1.3	0.6	0.4	0.7	0.4	0.3	0.3	0.3	0.1	0.2	0.2	1.3
17-Feb	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.9	1.2	0.8	1.2	1.4	1.5	1.1	1.1	0.9	0.4	0.2	0.4	0.4	0.3	0.4	0.6	1.5
18-Feb	0.9	0.9	1.2	0.8	0.9	1.1	1.3	1.1	2.0	2.0	1.9	1.9	1.6	2.0	1.5	1.3	1.1	1.5	1.4	1.7	1.7	1.9	1.4	1.3	2.0
19-Feb	1.4	1.3	1.3	1.0	1.2	1.1	1.4	1.3	0.8	0.9	1.0	0.9	0.8	0.9	1.1	1.3	1.3	0.9	1.8	2.4	2.3	2.9	3.2	2.9	3.2
20-Feb	2.9	3.0	2.6	2.6	2.4	2.2	2.2	2.4	1.6	1.8	2.1	1.8	2.1	2.2	2.2	1.4	1.3	0.7	1.0	0.7	0.8	0.4	0.4	0.2	3.0
21-Feb	0.3	0.1	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.4	0.7	0.7	0.9	1.2	1.1	1.3	1.1	1.0	0.6	1.0	1.5	1.3	1.4	1.3	1.5
22-Feb	1.3	1.8	2.1	2.2	2.2	2.0	1.4	2.1	1.3	1.1	1.3	1.6	2.1	1.8	2.3	1.9	1.3	1.3	1.2	1.6	1.1	2.2	2.2	1.4	2.3
23-Feb	1.1	1.7	2.8	1.5	3.2	2.9	3.3	2.5	2.1	1.5	1.8	2.4	1.9	2.2	1.9	2.2	2.5	2.3	3.1	3.1	2.9	2.4	1.5	1.3	3.3
24-Feb	0.9	1.5	1.8	2.0	1.7	1.6	1.4	1.5	1.1	1.1	1.1	1.6	1.7	1.8	2.4	2.5	2.8	2.9	2.5	2.5	2.4	2.3	1.7	1.4	2.9
25-Feb	1.0	0.7	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	1.0	0.9	1.0	0.9	0.4	0.3	0.4	0.4	0.2	0.2	0.2	0.4	0.4	1.0
26-Feb	0.7	1.0	1.0	1.2	1.1	1.0	1.4	1.5	2.0	2.0	1.8	2.1	2.2	1.7	0.7	1.3	2.1	0.8	0.4	0.6	0.8	1.4	1.3	1.1	2.2
27-Feb	1.2	1.6	1.5	1.5	1.2	1.1	1.1	0.6	0.7	0.5	0.8	0.9	0.9	1.1	1.3	1.1	1.1	0.7	0.6	0.9	0.9	1.1	1.2	1.6	1.6
28-Feb	1.2	1.5	1.2	1.6	1.6	1.7	3.1	2.8	3.0	2.4	2.0	1.7	1.9	1.8	1.5	1.5	1.1	2.1	1.1	2.1	1.7	1.2	0.5	0.3	3.1
	4.0	4.2	4.3	4.5	4.7	4.6	4.6	4.4	4.4	4.3	3.5	3.2	3.1	2.6	2.6	2.7	3.7	3.8	3.8	3.8	4.2	4.1	4.0	4.0	
	Diurnal Maximum																								



Maximum Value: 1.8 km/h on Feb 14 07:00																				Maximum Daily Average: 0.9 km/h on Feb 14					Hours in Service: 672				
Minimum Value: -1.3 km/h on Feb 23 07:00																				Minimum Daily Average: -0.3 km/h on Feb 23					Hours of Data: 672				
Maximum Diurnal Average: 0.2 km/h at hour 9																				Minimum Diurnal Average: 0.1 km/h at hour 22					Hours of Missing Data: 0				
Monthly Average: 0.14 km/h																				Percentiles: P <sub>1</sub> = -0.8 P <sub>10</sub> = -0.3 Q <sub>1</sub> = -0.2 Median = 0.0 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.9 P <sub>99</sub> = 1.6					Hours of Calibration: 0				
																				Percent Operational Time: 100.0									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	0.8	0.7	1.0	0.8	0.7	0.8	0.7	0.8	1.0	0.5	0.1	0.6	0.2	0.0	-0.1	-0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.1	0.0	0.4	1.0			
2-Feb	0.5	-0.2	-0.2	0.0	0.7	1.4	0.5	-0.1	0.3	-0.1	-0.2	0.3	0.2	0.3	0.1	0.2	0.1	-0.2	-0.1	-0.1	0.0	-0.4	-0.9	-0.2	0.1	1.4			
3-Feb	-0.5	-0.3	-0.5	-0.2	-0.5	-0.3	-0.2	-0.3	-0.2	-0.2	-0.2	-0.3	0.0	0.0	0.1	0.4	0.4	0.3	0.4	0.5	-0.7	0.9	0.9	0.9	0.0	0.9			
4-Feb	0.4	-0.4	0.4	0.8	0.9	0.4	0.5	0.7	0.6	-0.1	0.2	0.3	-0.1	-0.3	-0.5	0.0	-0.1	-0.2	-0.3	-0.3	-0.2	-0.3	-0.3	-0.1	0.1	0.9			
5-Feb	-0.2	-0.1	0.0	-0.2	-0.1	-0.2	-0.1	0.0	0.4	0.2	0.2	0.0	0.2	-0.1	0.3	0.0	0.3	0.0	-0.1	-0.1	0.1	0.1	-0.1	-0.2	0.0	0.4			
6-Feb	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.1	-0.2	-0.4	-0.4	-0.5	-0.4	-0.4	-0.3	0.1	0.3	0.2	0.3	-0.1	0.0	0.3			
7-Feb	0.3	0.4	0.8	0.5	0.7	0.8	0.9	1.0	1.0	1.2	0.9	0.9	0.6	0.6	0.9	0.8	0.5	0.4	0.5	0.3	-0.1	-0.1	-0.1	0.0	0.6	1.2			
8-Feb	-0.2	-0.1	-0.1	-0.2	0.1	-0.1	-0.2	-0.2	-0.2	-0.1	-0.2	-0.2	0.0	0.7	0.1	0.1	-0.1	-0.4	-0.3	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.7			
9-Feb	-0.2	-0.3	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	-0.2	0.1	0.3	0.2	-0.1	-0.1	0.0	-0.3	-0.2	-0.2	-0.1	-0.3	-0.3	-0.1	-0.2	-0.1	0.3			
10-Feb	-0.3	-0.1	-0.1	-0.3	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.4	-0.2	-0.4	-0.4	-0.2	-0.2	-0.3	-0.2	-0.1	-0.3	-0.3	-0.2	-0.3	-0.3	-0.2	-0.1			
11-Feb	-0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.4	0.9	0.8	0.6	0.5	0.3	0.5	0.9	1.1	1.6	1.5	1.4	1.6	1.3	1.5	1.4	1.0	0.7	1.6			
12-Feb	1.1	0.8	0.9	1.0	0.9	1.0	0.7	0.4	0.2	0.1	-0.1	-0.4	-0.3	-0.3	0.2	-0.1	-0.1	0.1	-0.1	-0.1	-0.2	0.1	-0.2	-0.1	0.2	1.1			
13-Feb	0.0	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	0.0	-0.1	0.0	-0.2	-0.4	-0.2	-0.2	0.0	-0.2	0.0	0.7	0.9	0.9	1.3	1.2	1.1	1.3	0.2	1.3			
14-Feb	1.2	1.0	1.2	1.2	1.6	1.6	1.8	1.7	1.7	1.5	1.1	1.4	1.7	1.1	0.9	0.9	1.1	0.3	-0.1	-0.3	-0.1	-0.1	-0.2	-0.1	0.9	1.8			
15-Feb	0.0	0.3	0.2	0.2	0.1	0.0	0.0	-0.1	-0.2	-0.3	-0.3	0.0	-0.4	-0.2	-0.3	0.1	0.0	0.1	-0.2	-0.1	-0.1	-0.3	-0.1	0.0	-0.1	0.3			
16-Feb	-0.2	-0.2	-0.4	-0.3	-0.3	-0.3	-0.2	-0.1	0.0	-0.1	0.3	0.1	-0.5	-0.4	-0.2	0.1	0.3	0.4	0.1	-0.1	-0.1	0.0	0.1	0.1	-0.1	0.4			
17-Feb	0.3	0.5	0.2	0.0	0.1	0.4	0.4	0.4	0.7	0.8	0.4	0.8	0.4	0.6	0.4	0.5	0.5	0.4	0.2	0.2	0.2	0.0	0.2	0.2	0.4	0.8			
18-Feb	0.1	0.2	0.2	0.1	0.0	0.2	0.5	0.3	0.5	0.3	0.6	0.4	0.6	0.5	0.3	0.6	0.4	0.5	0.6	0.7	0.7	0.6	0.9	0.4	0.4	0.9			
19-Feb	0.2	0.1	0.3	0.3	0.3	0.0	-0.2	-0.1	0.3	0.3	0.3	0.4	0.1	0.0	0.4	0.0	-0.2	0.0	-0.1	-0.2	-0.3	-0.3	-0.3	-0.3	0.0	0.4			
20-Feb	-0.4	-0.5	-0.1	-0.4	-0.4	-0.4	-0.6	-0.3	-0.3	0.0	0.1	-0.3	0.1	0.0	-0.1	-0.1	0.2	0.0	-0.3	-0.3	-0.3	-0.3	-0.2	-0.1	-0.2	0.2			
21-Feb	-0.3	-0.2	-0.1	-0.2	-0.2	0.0	-0.1	0.0	0.0	0.0	0.3	-0.2	0.1	0.0	0.5	0.7	0.8	0.9	0.3	0.9	0.1	-0.3	0.3	0.7	0.2	0.9			
22-Feb	0.3	0.7	1.2	0.8	0.2	0.4	0.3	-0.1	0.1	0.6	0.6	0.9	0.8	0.4	0.6	1.1	1.5	0.7	1.2	1.4	0.6	-1.0	-0.7	-0.2	0.5	1.5			
23-Feb	-0.4	-0.3	-0.7	-0.5	-1.1	-0.8	-1.3	-0.7	-0.9	-0.4	-0.5	0.0	-0.1	0.3	-0.4	0.0	0.0	-0.1	0.0	0.0	0.3	0.3	0.1	0.0	-0.3	0.3			
24-Feb	0.2	0.4	0.5	0.4	0.3	0.3	0.4	0.3	0.2	0.2	0.3	0.3	-0.5	-0.3	0.0	-0.4	-0.5	-0.4	-0.4	-0.5	-0.6	-0.6	-0.2	-0.2	0.0	0.5			
25-Feb	-0.5	-0.2	-0.1	0.0	0.0	-0.1	-0.1	0.0	-0.1	0.0	-0.2	-0.3	-0.5	-0.2	-0.3	-0.2	0.2	0.5	0.6	0.5	0.5	0.5	0.7	0.7	0.1	0.7			
26-Feb	0.9	0.6	0.8	0.9	0.4	0.7	1.0	1.2	1.2	0.8	0.3	0.1	0.5	0.2	-0.1	-0.3	-0.8	-0.1	-0.2	-0.2	0.0	-0.2	-0.3	-0.1	0.3	1.2			
27-Feb	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.6	0.0	-0.1	0.2	0.5	0.8	0.6	0.1	0.0	0.2	0.2	0.2	-0.1	0.0	0.1	0.8			
28-Feb	-0.1	-0.5	-0.2	0.1	0.0	-0.4	-0.4	-0.4	-0.9	-0.3	-0.5	-0.4	0.3	-0.1	-0.1	0.1	0.0	-0.4	-0.1	-0.3	-0.1	-0.2	-0.1	-0.1	-0.2	0.3			
																								Diurnal Average					
																								Diurnal Maximum					



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

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

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.3 km/h on Feb 14 09:00 Minimum Value: 0.1 km/h on Feb 1 18:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 0.8 Median = 1.2 Q <sub>3</sub> = 1.8 P <sub>90</sub> = 2.5 P <sub>99</sub> = 3.9																								Hours in Service: 672 Hours of Data: 672 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-Feb	1.3	1.1	1.1	1.3	1.3	1.4	0.8	0.7	0.9	0.6	0.7	0.7	1.3	1.5	1.3	0.6	0.2	0.1	0.1	0.2	0.3	0.8	1.0	0.8	1.5
2-Feb	1.0	1.2	1.0	1.0	0.9	0.9	1.1	1.3	1.2	1.2	0.9	0.9	0.8	0.9	0.7	0.6	0.3	0.5	0.2	0.4	0.4	1.1	1.5	1.3	1.5
3-Feb	1.4	0.8	0.5	0.4	0.6	0.6	0.7	0.3	0.3	0.5	1.4	1.6	1.8	1.2	0.8	0.8	0.7	0.9	0.9	1.2	1.9	1.7	1.5	1.5	1.9
4-Feb	2.0	2.0	1.0	1.7	1.1	1.3	1.7	1.7	1.1	0.4	0.5	0.8	1.5	1.9	1.6	1.6	1.0	0.6	0.9	0.5	1.2	0.9	0.3	0.2	2.0
5-Feb	0.4	0.5	0.3	0.3	0.5	0.4	0.8	0.4	0.3	0.2	0.3	0.3	0.5	0.5	0.7	1.2	1.1	1.0	1.1	1.0	0.8	0.8	0.6	0.6	1.2
6-Feb	1.3	1.6	1.7	1.7	1.5	1.5	1.7	1.8	1.9	1.8	2.1	2.1	2.2	1.9	2.1	1.8	1.8	1.5	1.1	1.6	1.5	1.1	1.0	1.3	2.2
7-Feb	1.5	2.0	2.8	2.4	2.6	2.5	2.8	2.8	3.0	3.2	2.8	2.7	2.5	2.4	2.3	2.1	1.7	1.7	1.4	0.8	0.4	0.4	0.4	0.4	3.2
8-Feb	0.5	0.3	0.3	0.7	1.8	1.9	1.1	0.3	0.3	0.4	0.7	0.6	0.4	1.2	0.7	1.0	0.6	0.6	0.7	0.7	0.7	0.6	0.5	0.5	1.9
9-Feb	0.6	0.6	0.8	1.0	1.1	1.1	1.2	1.6	1.2	1.0	1.1	1.2	1.4	1.6	1.3	1.4	1.2	1.3	1.5	1.4	1.2	1.4	1.5	1.1	1.6
10-Feb	1.2	1.2	1.6	2.5	2.6	1.6	0.8	0.3	0.4	1.2	1.6	1.7	2.2	2.0	1.6	1.3	1.0	1.8	1.4	0.9	0.8	0.9	0.6	0.7	2.6
11-Feb	0.7	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.9	1.0	1.2	1.1	1.0	1.2	2.6	2.7	3.4	3.6	3.5	3.5	3.1	3.4	2.9	2.0	3.6
12-Feb	1.7	1.3	1.0	0.7	0.6	1.0	0.9	0.9	1.0	1.2	1.1	1.6	1.6	1.5	1.6	1.8	1.9	1.8	1.7	2.0	1.9	1.7	2.3	2.3	2.3
13-Feb	2.0	2.0	2.0	1.8	1.8	2.0	1.9	1.7	1.7	1.9	2.0	1.8	1.9	1.5	1.3	1.1	1.6	2.7	2.9	3.4	3.9	3.7	3.6	3.6	3.9
14-Feb	3.6	3.8	3.9	4.0	4.0	4.2	4.0	3.9	4.3	4.2	3.2	3.0	3.2	2.6	1.8	1.6	2.0	1.6	2.2	2.8	2.3	1.8	1.6	1.2	4.3
15-Feb	0.9	1.1	1.2	1.2	1.5	1.4	1.4	1.4	1.6	1.5	1.5	1.9	1.7	1.6	1.7	2.0	1.9	1.5	1.0	0.9	1.1	0.8	1.7	1.3	2.0
16-Feb	1.4	0.9	0.7	0.7	0.7	0.7	0.5	0.2	0.2	0.5	1.1	1.1	1.2	1.0	0.6	0.4	0.6	0.4	0.3	0.4	0.3	0.2	0.2	0.3	1.4
17-Feb	0.4	0.4	0.3	0.4	0.3	0.4	0.5	0.4	0.8	0.9	0.8	1.1	1.1	1.3	1.0	1.0	0.8	0.5	0.3	0.5	0.5	0.4	0.5	0.7	1.3
18-Feb	1.1	1.1	1.4	1.0	1.2	1.2	1.4	1.2	2.0	2.0	1.9	1.9	1.7	2.0	1.4	1.4	1.1	1.3	1.5	1.6	1.8	1.9	1.6	1.5	2.0
19-Feb	1.5	1.6	1.4	1.1	1.3	1.2	1.4	1.4	0.9	0.8	0.8	0.8	0.9	1.1	1.1	1.5	1.6	1.1	1.8	2.5	2.7	2.9	3.5	3.0	3.5
20-Feb	3.0	3.1	2.8	2.6	2.4	2.2	2.2	2.4	1.6	1.8	2.1	1.8	2.2	2.2	2.1	1.7	1.2	0.8	1.0	0.9	1.1	0.5	0.4	0.3	3.1
21-Feb	0.3	0.2	0.4	0.5	0.4	0.2	0.2	0.4	0.3	0.4	0.8	0.8	0.9	1.2	0.9	0.9	0.8	0.7	0.7	0.8	1.4	1.3	1.4	1.2	1.4
22-Feb	1.1	1.6	1.6	2.5	2.4	2.1	1.5	2.2	1.4	1.0	1.1	1.0	1.6	1.8	2.0	1.7	1.1	1.7	1.2	1.5	1.4	2.7	2.5	2.0	2.7
23-Feb	1.4	2.2	3.3	1.9	3.3	3.4	3.6	3.0	2.5	1.7	2.1	2.6	1.9	2.2	1.9	2.2	2.4	2.3	3.2	3.1	2.9	2.3	1.5	1.2	3.6
24-Feb	0.9	1.5	1.8	1.9	1.7	1.7	1.7	1.6	1.2	1.1	1.0	1.6	1.7	1.7	2.3	2.6	2.7	2.8	2.5	2.5	2.4	2.4	1.8	1.7	2.8
25-Feb	1.3	0.8	0.4	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.4	0.7	0.8	0.9	0.7	0.4	0.3	0.5	0.5	0.3	0.3	0.4	0.4	0.4	1.3
26-Feb	0.8	1.0	1.1	1.0	1.1	1.0	1.2	1.3	1.4	1.6	1.2	1.8	1.7	1.5	0.8	1.5	2.2	1.0	0.6	0.7	1.0	1.5	1.4	1.4	2.2
27-Feb	1.4	1.8	1.8	1.5	1.2	1.1	1.2	0.7	0.7	0.7	0.9	0.9	1.0	1.3	1.2	0.8	1.1	0.9	0.8	1.0	1.1	1.2	1.0	1.4	1.8
28-Feb	1.5	1.7	1.3	1.7	1.5	2.2	3.7	3.4	3.2	2.8	2.2	1.8	2.1	2.0	1.8	1.5	1.3	2.2	1.2	2.3	1.9	1.3	0.6	0.3	3.7
3.6 3.8 3.9 4.0 4.0 4.2 4.0 3.9 4.3 4.2 3.2 3.0 3.2 2.6 2.6 2.7 3.4 3.6 3.5 3.5 3.9 3.7 3.6 3.6																									
Diurnal Maximum																									



Maximum Value: 4.7 km/h on Feb 11 21:00																				Maximum Daily Average: 1.7 km/h on Feb 14					Hours in Service: 672	
Minimum Value: -2.9 km/h on Feb 3 21:00																				Minimum Daily Average: -0.2 km/h on Feb 2					Hours of Data: 672	
Maximum Diurnal Average: 0.5 km/h at hour 19																				Minimum Diurnal Average: 0.1 km/h at hour 2					Hours of Missing Data: 0	
Monthly Average: 0.30 km/h																				Percentiles: $P_1 = -0.7$ $P_{10} = -0.2$ $Q_1 = -0.1$ Median = 0.1 $Q_3 = 0.5$ $P_{90} = 1.2$ $P_{99} = 3.8$					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-Feb	0.5	0.4	0.6	0.6	0.3	0.5	0.0	0.1	0.1	0.2	-0.1	0.1	-0.1	0.1	-0.1	0.0	0.0	-0.1	0.0	0.1	0.1	0.2	-0.4	-0.5	0.1	0.6
2-Feb	-0.1	-0.8	-0.3	0.0	-0.1	0.0	-0.2	-1.2	-0.3	-0.3	-0.4	0.1	0.2	0.4	0.2	0.2	0.0	-0.1	-0.2	-0.1	-0.1	-0.3	-0.3	0.0	-0.2	0.4
3-Feb	-0.3	-0.4	0.0	0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	-0.1	0.2	0.2	0.4	0.6	0.6	1.2	0.6	-2.9	-0.4	0.9	1.3	0.0	1.3	
4-Feb	0.1	-1.3	-0.3	1.4	0.6	0.1	1.4	1.3	0.3	0.0	-0.1	-0.3	0.2	-0.3	-0.5	0.3	0.0	0.0	-0.1	0.0	-0.3	-0.2	-0.3	0.1	1.4	
5-Feb	-0.5	-0.5	-0.2	-0.4	-0.2	-0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.3	0.1	0.3	-0.1	0.3	-0.2	-0.1	0.0	0.0	-0.1	0.3	
6-Feb	0.1	0.1	0.1	0.0	-0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.1	0.0	0.0	0.0	-0.1	0.0	0.4	0.4	0.5	0.1	0.2	0.3	0.1	0.5
7-Feb	0.6	1.2	1.2	0.7	0.9	1.1	1.7	1.6	1.6	1.5	1.4	1.1	1.0	1.5	1.7	1.4	0.8	1.4	1.4	0.7	0.0	-0.1	-0.1	0.2	1.0	1.7
8-Feb	-0.1	-0.1	-0.1	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.2	0.1	0.2	0.1	0.3	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.3
9-Feb	-0.1	-0.2	-0.1	0.0	0.0	-0.1	0.0	0.0	0.1	-0.2	0.1	0.3	0.6	0.2	0.0	-0.1	0.0	0.0	-0.2	-0.1	-0.4	-0.4	-0.3	-0.2	-0.1	0.6
10-Feb	-0.2	-0.1	0.1	0.1	-0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	-0.3	0.0	-0.4	-0.4	0.0	0.2	0.2	0.0	-0.1	0.3	0.0	0.1	-0.1	0.3
11-Feb	-0.2	0.0	-0.1	0.0	0.1	0.5	0.9	0.6	0.7	0.4	0.4	0.5	0.4	0.7	2.0	4.0	3.9	3.2	3.2	4.1	4.7	2.5	1.4	1.4	1.5	4.7
12-Feb	0.5	0.4	0.2	0.1	0.0	0.2	-0.1	0.4	1.2	0.2	-0.1	-0.3	0.1	0.0	0.0	0.4	0.5	0.5	0.0	-0.1	-0.5	0.0	0.2	0.2	0.2	1.2
13-Feb	0.3	0.2	0.1	0.5	0.3	0.0	0.2	0.2	0.2	0.5	0.0	-0.3	0.3	-0.2	0.0	-0.1	0.6	1.3	1.8	1.8	2.0	2.1	2.2	1.7	0.6	2.2
14-Feb	1.2	1.2	1.3	1.6	2.8	2.8	2.5	3.3	4.0	3.8	3.9	3.1	2.5	1.6	1.1	0.6	1.0	-0.3	0.6	0.3	0.8	-0.2	0.3	0.0	1.7	4.0
15-Feb	0.0	0.1	0.0	0.0	0.2	0.0	0.4	0.2	0.2	0.0	-0.1	0.1	-0.2	-0.1	-0.7	0.3	0.5	0.2	-0.2	0.0	-0.1	-0.1	-0.2	0.4	0.0	0.5
16-Feb	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	0.0	0.6	0.3	-0.3	-0.2	-0.1	-0.1	0.5	0.5	0.3	0.0	-0.1	-0.1	-0.2	-0.1	0.0	0.6
17-Feb	0.1	0.0	0.1	0.0	0.0	-0.1	0.0	0.1	0.5	1.4	0.7	0.5	0.5	0.5	0.4	0.6	0.7	0.5	0.2	0.4	0.5	0.5	0.6	0.8	0.4	1.4
18-Feb	0.9	0.3	0.6	0.5	0.2	0.8	1.3	0.7	1.7	1.3	0.5	0.5	0.5	1.1	0.6	0.6	0.3	0.6	0.9	1.7	2.1	2.0	1.5	0.9	0.9	2.1
19-Feb	0.3	-0.6	0.5	0.9	0.3	-0.3	0.5	0.9	0.5	0.3	0.5	0.0	0.3	0.4	0.9	-0.1	-0.2	0.0	0.0	0.4	0.6	0.4	-0.3	0.2	0.3	0.9
20-Feb	0.3	0.3	0.4	0.3	0.1	0.0	0.0	0.2	0.2	0.5	0.4	-0.5	-0.1	0.0	-0.3	0.2	0.3	0.1	-0.2	0.0	-0.1	-0.1	-0.2	-0.1	0.1	0.5
21-Feb	-0.2	0.1	-0.1	-0.2	-0.1	0.0	0.0	0.0	0.0	-0.3	-0.1	0.3	0.0	-0.1	0.3	0.4	0.6	1.6	1.2	1.2	1.4	-0.6	-0.5	0.5	0.2	1.6
22-Feb	0.3	1.6	1.9	3.7	1.1	0.8	-0.5	1.3	-0.5	0.3	0.7	0.4	0.9	0.8	1.0	0.4	0.1	0.4	0.0	0.0	0.4	-0.5	-0.3	0.4	0.6	3.7
23-Feb	-0.7	0.2	-0.4	-0.3	-0.8	-0.4	-1.2	-0.4	-0.2	0.0	-0.7	0.3	-0.1	0.1	0.0	0.2	0.0	0.5	0.5	0.3	0.1	0.0	0.0	0.1	-0.1	0.5
24-Feb	0.1	0.2	0.4	0.8	0.6	0.4	0.4	0.6	0.1	0.0	0.3	0.2	0.4	-0.1	0.2	0.3	-0.2	0.3	0.1	0.2	0.1	-0.1	0.2	0.0	0.2	0.8
25-Feb	-0.4	-0.4	-0.1	-0.1	-0.1	0.0	0.0	-0.1	0.0	0.0	-0.2	-0.2	-0.7	-0.2	-0.6	-0.2	0.2	0.6	0.9	0.5	0.5	0.6	0.2	0.1	0.0	0.9
26-Feb	0.4	0.4	0.1	0.6	0.0	0.7	0.7	1.0	1.0	1.0	1.0	1.5	0.8	0.7	-0.2	0.4	0.1	0.3	-0.1	0.0	0.2	0.4	0.1	-0.1	0.4	1.5
27-Feb	0.0	0.1	0.1	0.1	-0.2	0.2	0.0	-0.3	0.3	0.0	0.5	-0.1	-0.1	0.0	0.1	0.3	0.3	0.8	0.6	0.4	0.6	1.1	0.6	0.9	0.3	1.1
28-Feb	-0.2	-0.4	0.5	1.2	0.9	-0.3	0.2	0.7	0.0	1.0	-0.1	-0.2	0.2	0.3	0.1	0.3	-0.2	-0.2	0.0	0.0	0.1	0.0	-0.1	0.0	0.2	1.2
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 4.0 km/h on Feb 11 22:00 Minimum Value: 0.1 km/h on Feb 1 19:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.8 Median = 1.3 Q <sub>3</sub> = 1.8 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.5																				Hours in Service: 672 Hours of Data: 672 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-Feb	0.9	0.8	1.0	1.3	0.9	1.0	0.9	0.7	0.6	0.3	0.4	0.6	0.8	1.4	1.0	0.5	0.2	0.1	0.1	0.2	0.7	1.6	1.6	1.4	1.6
2-Feb	1.4	1.1	1.2	1.5	0.8	0.7	1.0	2.0	2.0	1.4	1.0	1.0	1.3	1.3	1.1	0.8	0.4	1.0	0.4	0.5	0.8	1.3	1.2	1.0	2.0
3-Feb	1.9	0.9	0.7	0.5	0.9	0.6	0.6	0.5	0.8	0.9	1.3	1.7	1.7	1.1	0.9	0.9	0.6	0.9	1.2	1.9	2.2	1.8	1.9	1.8	2.2
4-Feb	2.0	2.3	1.5	1.5	1.5	1.2	1.3	1.5	1.0	0.5	0.5	1.5	1.7	2.3	1.5	1.4	0.9	0.4	0.9	0.5	1.2	1.2	0.5	0.4	2.3
5-Feb	0.7	0.9	0.6	0.6	1.0	0.7	1.2	0.6	0.6	0.4	0.4	0.3	0.4	0.3	0.8	1.4	1.2	1.2	1.6	1.3	1.2	0.8	0.7	0.9	1.6
6-Feb	1.4	1.5	1.9	1.8	1.4	1.4	1.6	1.6	1.5	1.4	2.0	1.8	1.5	1.4	1.3	1.3	0.9	1.8	1.6	2.1	1.9	1.2	1.3	1.4	2.1
7-Feb	1.8	2.4	2.4	2.1	2.1	2.5	2.6	2.5	2.7	2.3	2.3	2.2	2.4	2.0	2.1	2.0	1.8	1.8	1.7	0.8	0.4	0.3	0.2	0.3	2.7
8-Feb	0.2	0.2	0.4	1.0	2.0	2.4	1.7	0.5	0.3	0.3	0.4	0.4	0.4	1.2	0.9	0.7	0.6	0.7	1.0	0.5	0.5	0.4	0.4	0.5	2.4
9-Feb	0.5	0.5	0.5	0.9	0.8	0.9	1.2	1.5	1.0	0.8	1.1	1.2	1.5	1.6	1.4	1.4	1.0	1.1	1.3	1.1	0.9	1.1	1.4	1.0	1.6
10-Feb	0.8	0.8	1.2	2.2	2.8	1.7	0.9	0.5	0.5	1.3	1.9	2.3	2.5	2.3	1.5	0.9	0.8	1.7	1.5	1.5	1.4	1.8	1.3	1.6	2.8
11-Feb	1.0	0.4	0.2	0.3	0.4	0.5	0.6	0.6	0.8	0.9	0.9	1.0	1.1	1.4	2.2	2.8	3.1	3.0	3.2	3.0	3.4	4.0	3.2	2.4	4.0
12-Feb	1.7	1.2	0.9	0.7	0.7	1.1	1.1	1.7	1.6	1.5	0.9	1.3	1.4	1.1	1.5	1.5	1.6	1.8	1.6	1.9	1.9	2.0	2.1	1.9	2.1
13-Feb	2.2	1.9	1.7	1.7	1.6	2.0	1.9	1.7	1.9	2.2	1.4	1.5	1.5	1.7	1.1	1.1	2.0	2.6	2.7	3.0	3.5	3.3	3.3	3.2	3.5
14-Feb	2.8	3.0	3.2	3.6	3.9	3.5	3.4	3.4	3.2	3.0	2.9	3.3	3.5	3.0	1.9	1.7	1.8	1.7	1.8	2.2	2.4	2.1	1.4	1.2	3.9
15-Feb	1.3	1.0	1.5	1.7	1.8	1.7	1.3	1.7	1.9	1.5	1.5	1.5	1.6	1.6	1.5	2.0	2.2	1.6	1.4	1.5	1.2	0.9	2.0	1.4	2.2
16-Feb	1.2	1.0	1.2	1.1	1.1	0.9	0.4	0.3	0.1	0.4	1.4	1.4	1.3	1.2	0.9	0.7	0.7	0.4	0.5	0.5	0.6	0.3	0.3	0.4	1.4
17-Feb	0.4	0.4	0.3	0.3	0.4	0.5	0.5	0.3	0.6	0.6	0.7	0.6	0.9	0.9	0.8	1.0	0.8	0.7	0.7	1.2	0.9	0.9	0.8	0.9	1.2
18-Feb	1.6	1.5	1.9	1.6	1.9	2.1	1.6	1.4	1.7	2.1	2.0	2.1	2.0	2.1	1.7	1.4	1.2	1.3	1.9	1.6	1.6	1.7	1.7	1.8	2.1
19-Feb	1.7	1.7	1.9	1.8	1.4	1.6	1.6	1.4	1.0	0.5	0.6	0.4	1.0	1.4	1.2	1.4	1.4	0.9	1.8	2.6	2.7	3.0	3.2	3.0	3.2
20-Feb	3.1	2.9	2.6	2.2	2.0	1.8	1.7	1.9	1.2	2.1	2.1	1.7	2.0	2.1	1.9	1.8	1.3	1.0	1.3	1.4	1.2	0.8	0.5	0.3	3.1
21-Feb	0.6	0.3	0.5	0.8	0.8	0.2	0.4	0.7	0.7	0.4	0.6	0.9	0.5	0.7	0.5	0.7	1.0	1.0	0.9	1.0	1.3	2.1	1.9	1.4	2.1
22-Feb	1.1	1.7	1.5	1.2	1.8	1.2	1.2	1.4	1.4	0.9	0.8	0.8	1.5	1.9	1.5	1.5	1.3	2.0	1.3	1.4	1.8	2.6	2.1	2.4	2.6
23-Feb	1.7	2.4	2.5	2.3	2.0	2.8	2.9	2.5	2.3	1.9	2.1	2.7	1.6	2.2	1.4	2.3	2.6	2.8	3.5	2.9	3.2	2.9	1.9	1.5	3.5
24-Feb	1.1	1.5	1.7	1.6	1.6	1.7	1.9	1.8	1.4	1.3	1.2	1.9	1.6	1.1	1.8	2.3	2.3	2.2	2.0	2.2	1.8	2.2	1.7	1.5	2.3
25-Feb	1.1	0.8	0.2	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.3	0.4	0.9	0.9	0.6	0.5	0.3	0.3	0.5	0.5	0.5	0.6	0.8	0.8	1.1
26-Feb	1.0	1.4	1.0	1.0	1.0	0.9	1.1	1.1	1.1	1.0	1.0	1.2	1.1	1.0	0.9	1.1	0.8	0.5	0.8	0.8	0.8	1.3	1.4	1.2	1.4
27-Feb	1.2	1.7	1.9	1.7	1.4	1.3	1.6	1.1	0.8	0.7	1.0	0.9	1.3	1.3	1.2	1.1	1.3	1.0	1.0	1.3	1.3	1.2	1.1	1.2	1.9
28-Feb	1.6	1.3	1.2	1.4	1.4	2.7	3.1	2.6	2.0	2.7	2.1	2.2	1.8	2.5	2.0	1.7	1.5	2.0	1.4	2.1	1.7	1.1	0.8	0.7	3.1
3.1 3.0 3.2 3.6 3.9 3.5 3.4 3.4 3.2 3.0 2.9 3.3 3.5 3.0 2.2 2.8 3.1 3.0 3.5 3.0 3.5 4.0 3.3 3.2																									
Diurnal Maximum																									



Maximum Value: 4.0 km/h on Feb 11 16:00		Maximum Daily Average: 1.5 km/h on Feb 14		Hours in Service: 672																							
Minimum Value: -2.4 km/h on Feb 3 21:00		Minimum Daily Average: -0.1 km/h on Feb 2		Hours of Data: 672																							
Maximum Diurnal Average: 0.8 km/h at hour 18		Minimum Diurnal Average: 0.2 km/h at hour 1		Hours of Missing Data: 0																							
Monthly Average: 0.44 km/h		Percentiles: $P_1 = -0.7$ $P_{10} = -0.2$ $Q_1 = 0.0$ Median = 0.2 $Q_3 = 0.6$ $P_{90} = 1.4$ $P_{99} = 3.1$		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-Feb	0.4	0.5	0.6	0.6	0.1	0.4	0.3	0.4	0.6	0.0	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.5	0.2	-0.5	-0.5	0.2	0.6	
2-Feb	0.0	-0.3	0.5	0.2	0.0	0.2	0.1	-1.2	0.2	-0.2	-0.2	-0.2	-0.2	0.3	0.2	-0.1	0.0	0.1	-0.4	-0.1	0.1	-0.2	-0.2	0.0	-0.1	0.5	
3-Feb	-0.1	-0.1	0.3	0.2	0.2	0.0	0.0	0.0	0.2	-0.1	-0.1	-0.5	-0.1	0.4	0.1	0.2	1.0	0.8	0.8	-0.3	-2.4	0.6	0.8	1.5	0.1	1.5	
4-Feb	-0.3	-1.8	-0.6	0.3	0.8	0.5	1.2	-0.2	0.6	0.4	0.6	0.8	1.0	-0.1	-0.5	0.5	0.2	0.1	0.2	0.1	0.1	-0.4	-0.1	-0.2	0.1	1.2	
5-Feb	-0.4	-0.5	-0.4	-0.5	-0.1	0.1	0.3	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.4	0.2	0.2	-0.1	0.2	0.3	0.0	-0.1	0.2	0.3	0.1	0.0	0.4
6-Feb	0.2	0.1	0.1	0.0	-0.3	0.1	0.1	0.2	0.1	0.2	0.1	0.5	0.2	0.0	0.2	0.2	0.4	1.1	1.3	1.0	0.7	0.5	0.5	0.7	0.3	1.3	
7-Feb	1.0	1.3	1.5	1.1	1.0	1.6	1.7	2.0	1.3	1.2	1.6	1.3	1.3	2.0	2.2	2.0	1.2	1.9	1.7	0.6	0.1	0.1	0.0	0.2	1.3	2.2	
8-Feb	0.0	0.0	-0.1	-0.2	0.1	-0.2	0.0	0.1	0.1	0.0	0.2	0.4	0.1	-0.1	0.2	0.2	0.4	0.4	0.9	0.2	0.4	0.4	0.3	0.1	0.2	0.9	
9-Feb	0.3	0.1	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.0	0.2	0.2	0.0	0.1	-0.1	-0.1	-0.1	0.0	0.1	0.3	
10-Feb	0.0	0.1	0.2	0.1	-0.2	-0.1	0.0	0.1	-0.1	-0.3	-0.2	-0.1	-0.4	0.2	-0.6	-0.7	0.0	0.3	0.7	0.0	0.1	0.3	0.4	0.2	0.0	0.7	
11-Feb	0.1	0.1	0.0	0.1	0.4	0.4	0.1	0.2	0.1	0.2	0.8	0.8	0.4	0.9	2.2	4.0	3.8	3.2	3.2	3.9	4.0	1.8	1.2	0.8	1.4	4.0	
12-Feb	0.5	1.6	0.9	1.4	1.0	0.8	0.7	1.7	2.3	0.7	-0.2	-0.3	0.4	-0.1	-0.1	0.3	0.6	0.4	0.0	-0.1	-0.3	-0.1	0.1	0.3	0.5	2.3	
13-Feb	0.3	0.3	-0.1	0.3	0.2	0.1	0.3	0.5	0.2	0.5	-0.1	-0.3	0.6	-0.2	0.3	0.5	1.1	2.0	2.2	1.9	2.4	2.5	2.2	1.6	0.8	2.5	
14-Feb	1.1	1.1	1.3	1.4	2.6	2.6	2.3	3.3	3.7	3.7	3.1	2.3	1.7	0.7	0.4	0.1	1.2	1.0	0.8	0.2	0.8	-0.2	0.4	0.0	1.5	3.7	
15-Feb	-0.1	0.2	-0.1	0.1	0.2	0.1	0.4	0.2	0.3	0.0	-0.1	-0.2	-0.3	-0.3	-0.7	0.5	0.5	0.5	-0.2	-0.2	-0.2	0.1	0.2	0.4	0.1	0.5	
16-Feb	0.0	-0.2	-0.3	-0.1	-0.2	0.1	0.0	-0.1	0.0	0.2	0.5	0.3	-0.2	-0.1	0.1	0.2	0.4	0.3	0.1	0.1	0.1	-0.1	-0.2	-0.2	0.0	0.5	
17-Feb	-0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.5	0.5	0.5	0.4	0.3	0.5	0.4	0.7	1.0	1.2	0.7	0.9	0.9	1.2	1.5	1.4	1.8	0.6	1.8	
18-Feb	1.8	1.0	1.2	1.6	1.2	1.5	2.2	1.3	2.8	2.0	0.9	0.8	0.5	1.4	0.5	0.4	0.1	0.6	0.9	2.0	2.3	2.2	2.3	1.5	1.4	2.8	
19-Feb	0.1	-0.4	0.4	1.1	1.2	0.6	0.7	0.8	0.6	0.4	0.2	0.2	0.2	0.1	0.7	0.1	0.0	0.1	0.1	0.3	0.6	0.4	-0.1	0.5	0.4	1.2	
20-Feb	0.4	0.1	0.4	0.3	0.1	-0.2	-0.2	0.2	0.2	0.7	0.4	-0.4	-0.3	-0.3	-0.3	0.4	0.4	0.3	0.0	-0.1	0.0	0.1	0.3	0.2	0.1	0.7	
21-Feb	0.2	0.3	-0.1	-0.1	-0.1	0.1	0.0	0.1	-0.2	-0.2	-0.1	0.0	0.1	0.1	0.2	0.3	0.6	1.3	0.5	1.0	1.3	-0.6	-1.0	0.2	0.2	1.3	
22-Feb	0.2	1.0	1.4	1.2	0.3	0.5	-0.2	1.7	-0.2	0.5	0.6	1.0	1.1	0.7	0.2	2.2	2.2	2.4	1.6	1.7	2.2	0.6	0.3	1.2	1.0	2.4	
23-Feb	-0.3	0.9	0.4	0.0	-0.4	-0.1	-0.8	-0.2	-0.2	0.3	-0.5	0.7	-0.1	0.0	0.3	0.2	-0.1	0.7	1.0	0.4	0.2	0.4	0.4	0.3	0.1	1.0	
24-Feb	0.4	0.4	0.7	1.1	0.9	0.6	1.0	1.4	0.7	0.4	0.3	0.2	0.6	0.0	0.6	0.4	-0.1	0.2	0.1	0.1	0.1	0.1	0.4	0.1	0.4	1.4	
25-Feb	-0.2	-0.1	0.0	0.1	0.1	0.2	0.1	0.1	0.1	0.0	-0.1	0.0	-0.4	0.0	-0.5	0.1	0.2	0.6	1.0	0.2	0.2	0.2	0.1	-0.2	0.1	1.0	
26-Feb	0.3	0.5	0.0	-0.2	-0.8	0.0	0.5	-0.2	0.3	0.9	0.8	1.3	0.4	0.6	0.1	1.2	0.7	0.9	0.1	0.1	0.4	0.6	0.4	0.0	0.4	1.3	
27-Feb	0.2	0.0	0.3	0.1	-0.2	0.1	0.0	-0.4	0.6	-0.1	0.1	0.0	0.3	0.4	0.2	0.1	1.4	1.6	1.5	1.1	1.2	1.4	1.0	0.9	0.5	1.6	
28-Feb	0.3	-0.1	0.8	1.6	0.9	0.0	2.0	2.3	0.6	2.0	0.2	-0.1	0.2	0.2	0.3	0.1	-0.1	-0.1	0.1	0.2	0.2	0.1	0.0	0.3	0.5	2.3	
																								Diurnal Average			
																								Diurnal Maximum			





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0																				Hours in Service: 672					
Maximum Value: 4.7 km/h on Feb 14 05:00																				Hours of Data: 672					
Minimum Value: 0.1 km/h on Feb 25 10:00																				Hours of Missing Data: 0					
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.4 Q <sub>1</sub> = 0.7 Median = 1.2 Q <sub>3</sub> = 1.8 P <sub>90</sub> = 2.3 P <sub>99</sub> = 3.8																				Hours of Calibration: 0					
																				Percent Operational Time: 100.0					
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	0.7	0.7	0.6	0.6	0.7	0.6	0.8	1.1	0.8	0.3	0.3	0.6	0.6	0.8	0.8	0.8	0.3	0.2	0.1	0.2	0.6	1.3	1.0	1.2	1.3
2-Feb	1.1	0.7	0.7	0.9	0.9	0.7	0.9	1.6	2.0	1.6	0.9	1.1	1.5	1.3	1.3	0.9	0.8	0.8	0.5	0.5	1.0	1.3	1.1	0.7	2.0
3-Feb	0.9	1.0	0.6	0.6	0.9	0.8	0.7	0.4	0.9	1.3	1.4	1.7	1.9	1.1	0.7	0.4	0.6	0.9	1.1	1.6	1.3	1.8	1.1	1.2	1.9
4-Feb	2.0	1.6	1.3	1.1	1.3	1.5	1.6	1.3	1.0	0.6	0.8	0.8	1.2	2.2	1.2	1.1	0.7	0.4	0.9	0.7	1.3	1.5	0.9	0.7	2.2
5-Feb	0.9	0.9	1.0	0.8	1.4	0.7	1.3	0.6	0.4	0.2	0.2	0.2	0.2	0.2	0.7	1.5	1.1	1.0	1.7	1.4	0.9	0.5	0.6	1.0	1.7
6-Feb	1.3	1.5	1.6	1.7	1.2	1.4	1.5	1.5	1.4	1.6	1.7	1.7	1.6	1.3	1.3	1.2	1.1	1.9	1.9	2.3	1.9	1.1	1.6	1.5	2.3
7-Feb	1.8	2.3	2.2	1.8	1.8	1.9	2.4	2.3	2.7	2.6	2.3	2.0	2.3	1.6	1.7	1.7	1.7	1.9	1.8	1.0	0.5	0.2	0.2	0.3	2.7
8-Feb	0.2	0.3	0.6	1.1	1.7	2.7	1.8	0.6	0.2	0.4	0.4	0.4	0.4	0.8	0.8	0.6	0.3	0.6	1.2	0.5	0.6	0.3	0.6	0.5	2.7
9-Feb	0.4	0.3	0.3	0.5	0.5	0.5	0.8	0.8	0.6	0.6	0.6	1.0	1.0	1.2	1.1	0.9	0.8	0.4	0.5	0.5	0.7	0.6	0.6	0.5	1.2
10-Feb	0.4	0.4	0.8	2.1	2.9	1.9	1.2	0.6	0.6	1.2	1.8	2.2	2.5	2.5	1.5	1.0	0.9	1.5	1.2	1.7	1.5	2.0	1.3	1.4	2.9
11-Feb	1.0	0.6	0.2	0.1	0.2	0.4	0.3	0.4	0.6	0.6	0.8	0.8	0.9	1.3	2.6	2.9	3.2	3.5	3.8	3.6	3.9	3.8	2.8	2.1	3.9
12-Feb	1.2	0.8	0.7	0.6	0.7	1.2	1.1	1.6	1.6	1.5	0.9	1.3	1.6	1.1	1.5	1.5	1.8	2.0	1.8	1.7	2.0	2.0	2.1	2.0	2.1
13-Feb	2.2	2.2	1.6	2.0	1.6	2.0	2.0	2.0	2.0	2.1	1.5	1.5	1.8	1.7	1.5	1.6	2.1	2.3	2.5	2.9	3.0	3.2	3.5	3.3	3.5
14-Feb	2.6	2.4	2.6	3.9	4.7	4.4	4.1	4.0	3.5	3.3	3.3	3.0	2.9	2.5	1.3	1.0	1.5	1.9	2.1	2.3	2.6	2.2	1.6	1.3	4.7
15-Feb	1.2	0.9	1.2	1.5	1.7	1.7	1.6	2.0	2.1	1.6	1.5	1.6	1.7	1.6	1.6	2.0	2.3	1.2	1.4	1.8	1.3	1.2	2.1	1.8	2.3
16-Feb	1.5	1.2	1.6	1.3	1.4	1.1	0.5	0.5	0.3	0.5	1.4	1.5	0.9	1.3	1.1	0.8	0.6	0.4	0.6	0.7	0.4	0.2	0.3	0.3	1.6
17-Feb	0.3	0.2	0.2	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.6	0.9	1.1	0.9	0.9	0.8	1.3	1.0	0.9	1.0	1.2	1.3
18-Feb	1.3	1.4	1.5	1.1	1.9	2.2	1.6	1.3	1.6	2.1	1.8	2.0	2.0	2.0	1.9	1.6	1.2	1.3	2.0	1.9	1.9	1.8	1.5	1.9	2.2
19-Feb	1.8	1.2	1.6	1.4	1.0	1.2	1.0	0.8	0.8	0.4	0.4	0.3	0.8	1.0	1.2	0.9	0.5	0.6	1.9	2.8	3.1	3.5	3.4	3.0	3.5
20-Feb	3.5	3.2	2.8	2.6	2.1	2.0	1.9	2.0	1.4	2.4	2.5	1.9	2.2	2.4	2.1	1.6	1.3	0.8	1.1	1.9	1.5	1.0	0.6	0.5	3.5
21-Feb	0.9	0.5	0.9	0.9	1.0	0.3	0.5	0.9	0.9	0.7	0.3	0.5	0.4	0.4	0.5	0.7	1.0	1.0	1.0	1.0	1.4	2.3	1.8	1.2	2.3
22-Feb	1.3	1.3	1.1	1.2	1.3	0.9	1.1	1.1	1.0	1.1	0.7	1.1	1.6	1.5	0.8	1.0	1.8	2.1	1.7	1.4	1.8	2.0	2.3	2.7	2.7
23-Feb	1.6	1.7	1.7	2.4	1.3	1.8	2.5	2.5	2.1	1.8	2.2	2.5	1.5	2.2	1.5	2.4	2.6	2.9	3.7	2.9	3.0	2.5	1.7	1.4	3.7
24-Feb	1.0	1.2	1.4	1.3	1.4	1.4	1.5	1.7	1.4	1.2	1.1	1.8	1.8	1.1	2.0	2.3	2.3	2.5	2.2	2.3	2.1	2.1	1.7	1.4	2.5
25-Feb	1.2	0.9	0.2	0.3	0.4	0.5	0.6	0.3	0.2	0.1	0.2	0.3	0.7	1.1	0.5	0.4	0.3	0.4	0.6	0.5	0.4	0.4	0.5	0.7	1.2
26-Feb	0.7	1.1	1.0	0.8	1.0	1.0	0.9	0.9	0.8	0.9	1.2	1.6	0.9	0.9	0.8	0.7	0.6	0.4	0.8	0.9	1.2	1.6	1.7	1.2	1.7
27-Feb	1.3	1.8	1.9	1.8	1.6	1.5	1.5	1.2	1.1	0.6	0.5	0.8	1.2	1.5	0.9	1.1	1.3	1.0	0.9	1.2	1.3	1.2	1.1	1.4	1.9
28-Feb	1.2	1.3	1.2	1.1	1.5	2.9	2.4	1.8	1.5	2.9	2.1	2.3	1.8	2.5	2.2	1.6	1.8	1.9	1.3	2.2	1.7	1.3	1.0	0.6	2.9
3.5 3.2 2.8 3.9 4.7 4.4 4.1 4.0 3.5 3.3 3.3 3.0 2.9 2.5 2.6 2.9 3.2 3.5 3.8 3.6 3.9 3.8 3.5 3.3																									
Diurnal Maximum																									

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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 4  
BUFFALO VIEWPOINT  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
 FEBRUARY 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	640	32	32	100.00	25	0	6	0
H2S (ppb) Average	639	33	33	100.00	3	0	1	0
THC (ppm) Average	640	32	32	100.00	4.3	-	2.6	-
Temperature (C) Average	672	0	0	100.00	3.1	-	-2.5	-
Relative Humidity (%) Average	672	0	0	100.00	94	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	30	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BUFFALO VIEWPOINT (AMS 4)  
 FEBRUARY 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	640	0.9	2	-	0	0	0	0	1	2	25
H2S (ppb) Average	639	0.3	0	-	0	0	0	0	0	1	3
THC (ppm) Average	640	2.34	0.2	-	2.1	2.2	2.2	2.3	2.4	2.6	4.3
Temperature 2 m (C) Average	672	-16.89	7.4	-	-38.1	-25.3	-22	-17.9	-11.9	-7.3	3.1
Relative Humidity (%) Average	672	74.1	7	-	44	63	71	76	79	82	94
Wind Speed 10 m (km/h) Average	672	10.9	5	-	0	5	7	10	14	17	30
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

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

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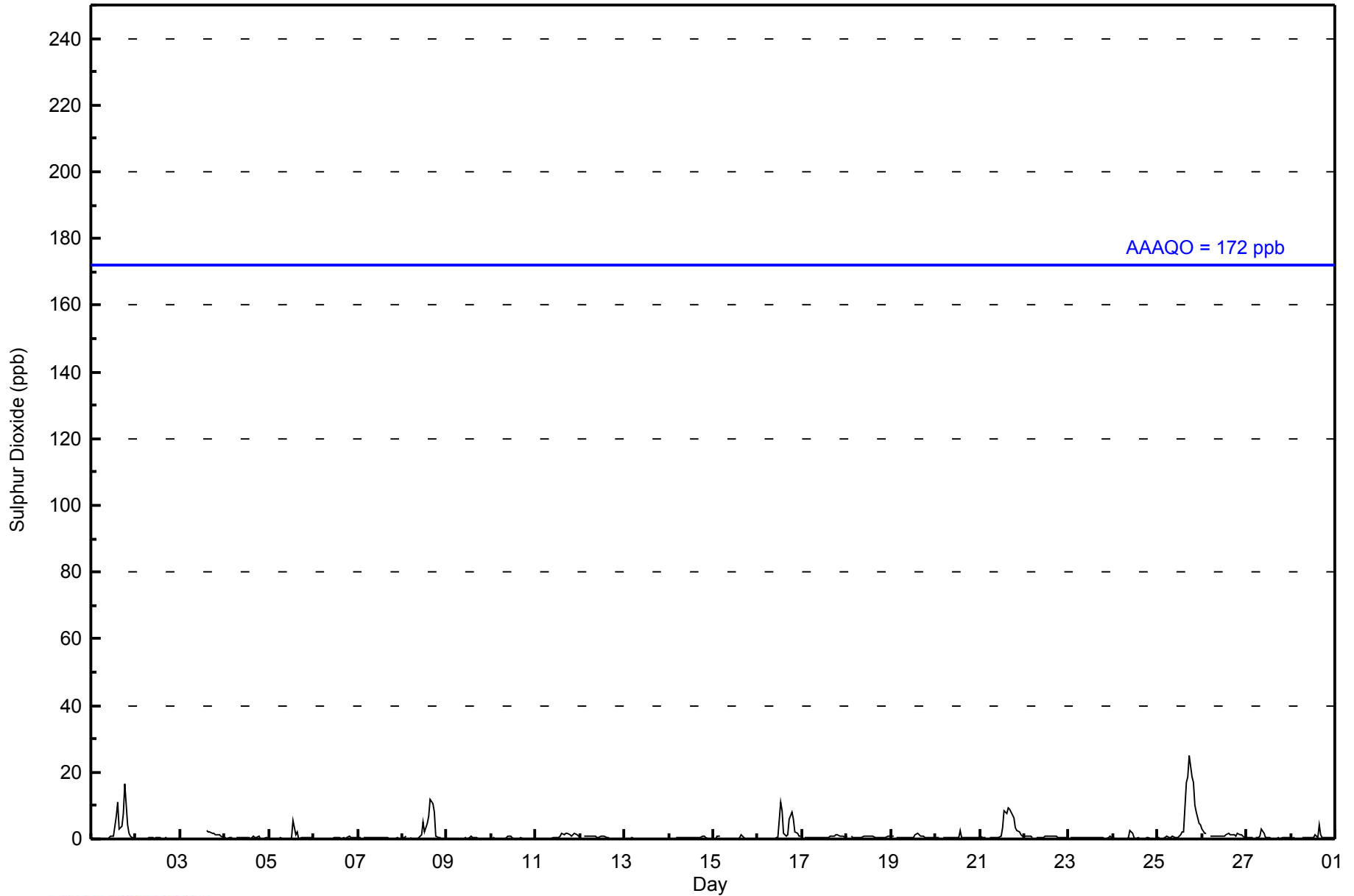


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 25 ppb on Feb 25 18:00										Maximum Daily Average: 5.8 ppb on Feb 25										Hours of Data: 640						
Minimum Value: 0 ppb on Feb 4 22:00										Minimum Daily Average: 0.1 ppb on Feb 13										Hours of Missing Data: 32						
Maximum Diurnal Average: 2.3 ppb at hour 18										Minimum Diurnal Average: 0.3 ppb at hour 8										Hours of Calibration: 32						
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> =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-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	1	7	11	3	4	7	17	4	2	1	0	0	2.6	17
2-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	3	2	2	2	2	1	1	1	1	0	0.8	3
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0.3	1
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	6	1	2	0	0	0	0	0	0	0	0	0.6	6
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
7-Feb	0	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-Feb	0	1	1	Z	0	0	0	0	0	0	1	5	2	5	7	12	11	8	1	0	0	0	0	0	2.4	12
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1
10-Feb	0	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
11-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	1	1	1	2	1	1	1	0.7	2
12-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.5	1
13-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.3	1
15-Feb	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.2	1
16-Feb	0	0	0	0	0	Z	0	0	0	0	1	11	8	2	1	1	6	8	6	2	2	1	1	1	2.2	11
17-Feb	Z	1	1	0	0	0	0	0	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1
18-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
19-Feb	1	1	Z	1	1	1	1	1	1	1	1	0	1	2	1	1	1	1	1	0	0	0	0	0	0.6	2
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0.4	2
21-Feb	1	1	0	0	Z	1	1	0	0	1	1	1	3	8	8	9	9	8	7	3	2	2	1	1	3.0	9
22-Feb	1	1	1	1	1	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	1
23-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
24-Feb	0	Z	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	3
25-Feb	0	1	Z	0	1	1	1	0	1	0	0	1	1	2	2	17	19	25	19	17	10	8	5	4	5.8	25
26-Feb	3	2	2	Z	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	1.2	3
27-Feb	1	0	0	0	Z	0	0	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	3
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	4	1	0	0	0	0	0	0	0	0.5	4
																								Diurnal Average		
																								Diurnal Maximum		
0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.5 0.5 0.6 1.0 1.8 1.6 2.2 2.0 2.3 2.2 1.5 0.9 0.8 0.6 0.5																										
3 2 2 1 1 1 1 1 1 3 3 2 5 11 8 11 17 19 25 19 17 10 8 5 4																										
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 - February 2015





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	630	98.44	98.44
11 - 20	9	1.41	99.84
21 - 60	1	0.16	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: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

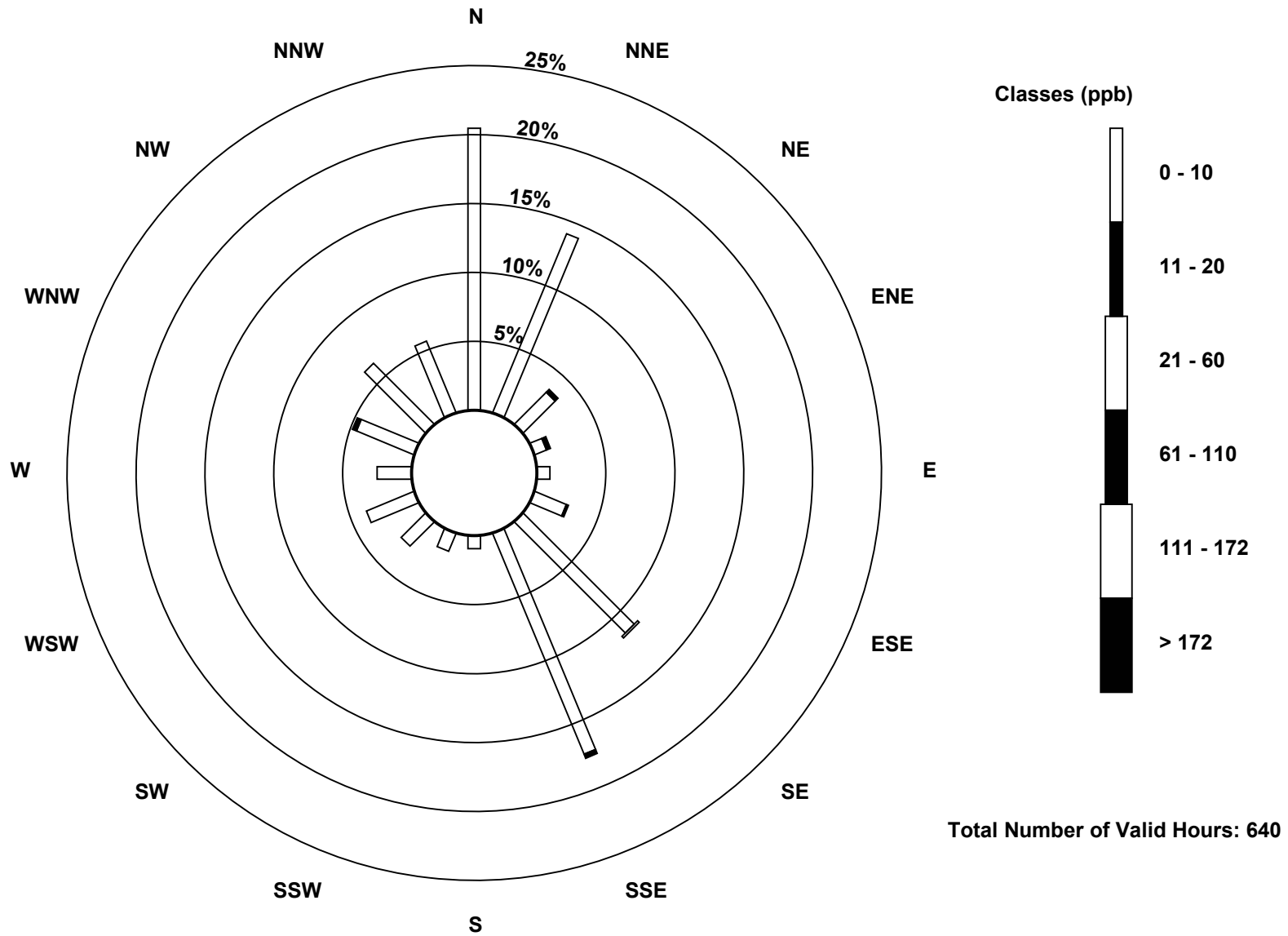
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	131	90	21	6	6	16	73	111	6	9	16	24	16	29	40	36	630
11 - 20	0	0	2	2	0	1	0	2	0	0	0	0	0	2	0	0	9
21 - 60	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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>	131	90	23	8	6	17	74	113	6	9	16	24	16	31	40	36	640

Total Number of Valid Hours: 640

Total Number of Hours: 672

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

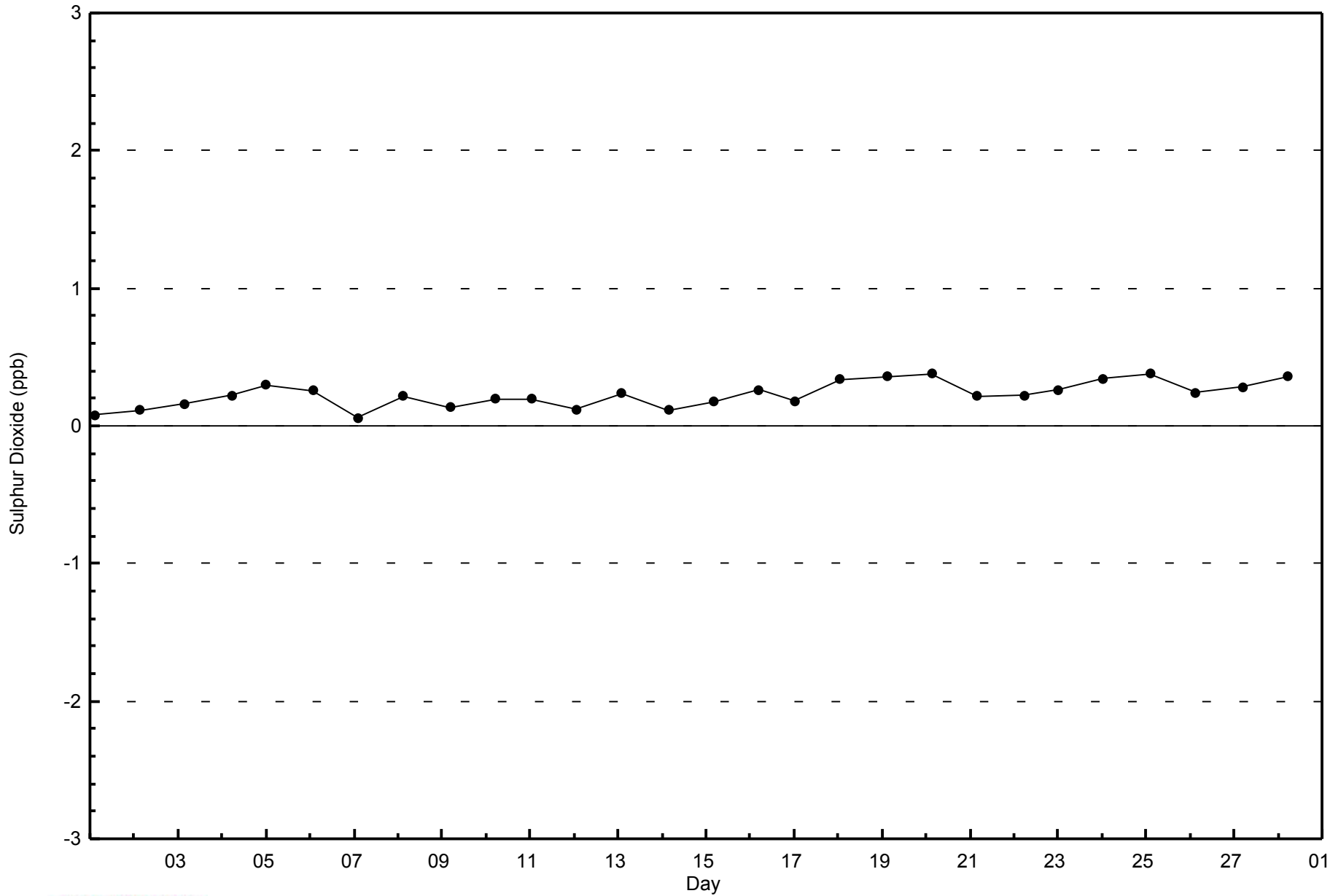
**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint (AMS 4)**





WBEA  
Zero Responses

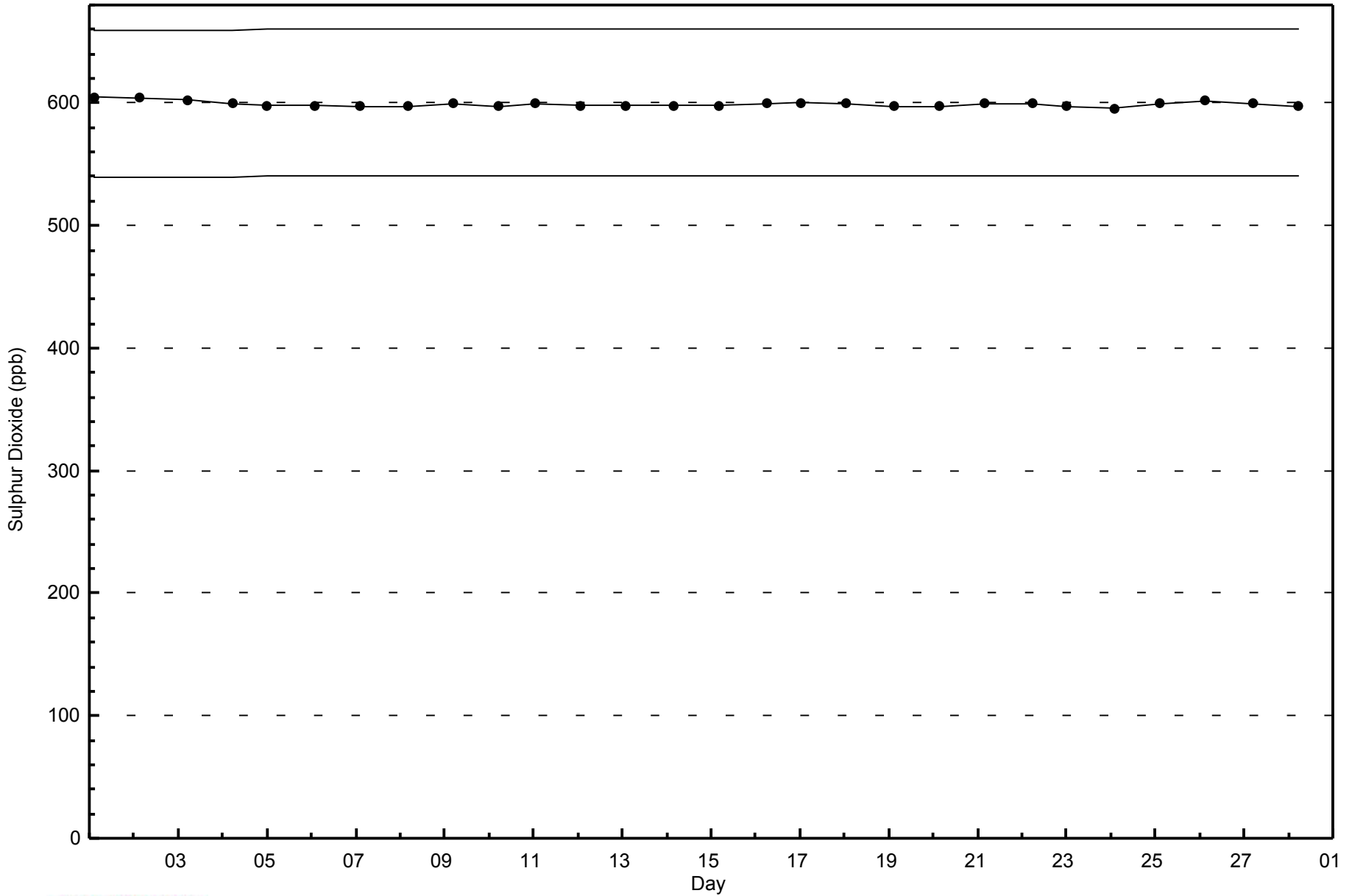
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Buffalo Viewpoint - February 2015





WBEA  
Span Responses

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





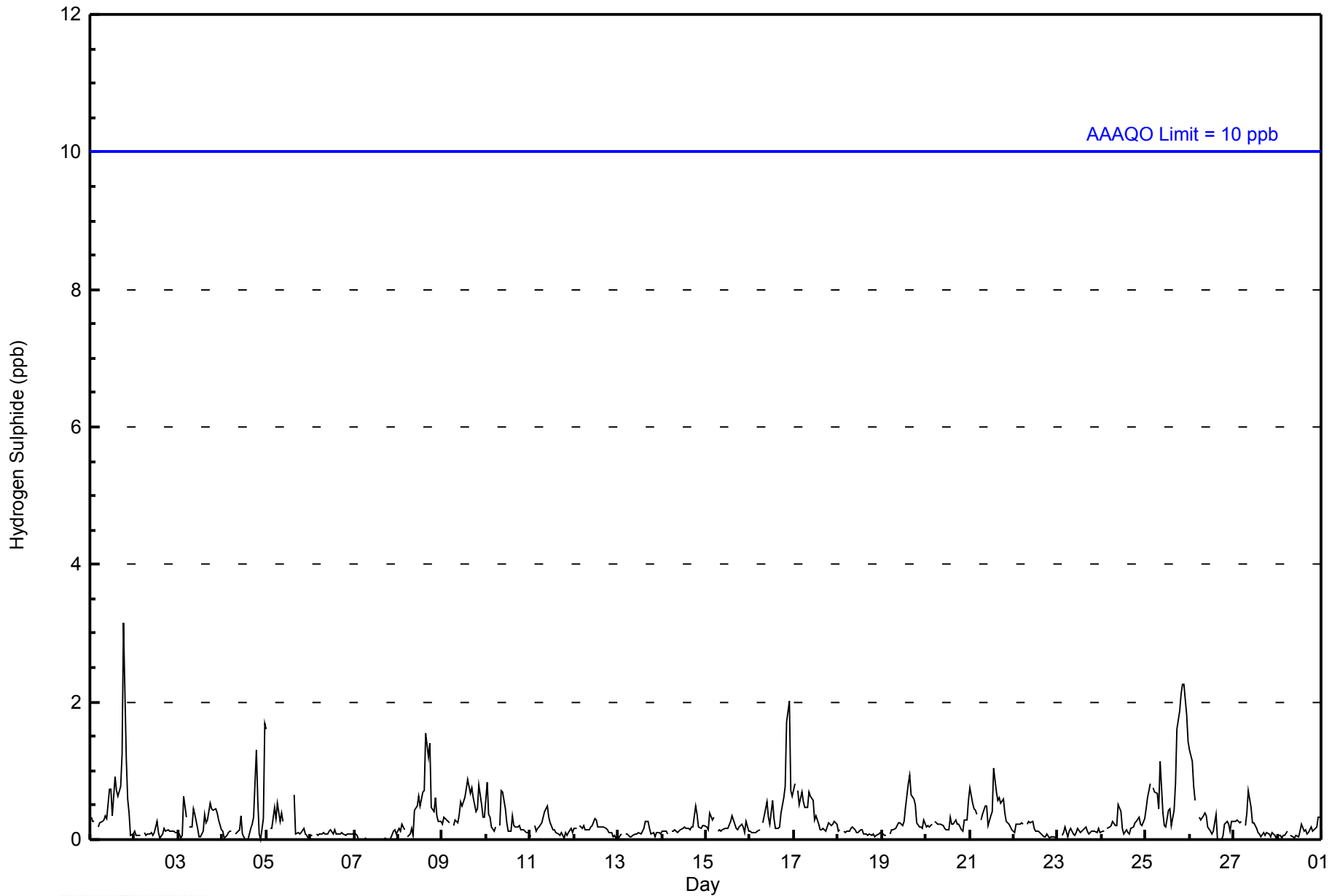
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 3 ppb on Feb 1 19:00										Maximum Daily Average: 1.0 ppb on Feb 25										Hours of Data: 639						
Minimum Value: 0 ppb on Feb 4 13:00										Minimum Daily Average: 0.0 ppb on Feb 7										Hours of Missing Data: 33						
Maximum Diurnal Average: 0.4 ppb at hour 19										Minimum Diurnal Average: 0.2 ppb at hour 6										Hours of Calibration: 33						
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: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	1	1	1	1	1	3	1	1	0	0	0	0.6	3
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Feb	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.3	1
4-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0.3	2
5-Feb	2	Z	0	0	0	0	1	0	0	0	C	C	C	C	C	1	0	0	0	0	0	0	0	0	0.3	2
6-Feb	0	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
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	2	1	1	0	0	1	0	0	0	0.5	2
9-Feb	0	0	0	0	0	Z	0	0	0	0	1	0	1	1	1	1	1	1	0	0	1	0	0	0	0.5	1
10-Feb	1	0	0	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
11-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Feb	0	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-Feb	0	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
15-Feb	0	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-Feb	0	0	0	0	0	0	Z	0	0	1	0	0	1	0	0	0	0	0	1	1	2	2	1	1	0.5	2
17-Feb	1	Z	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
18-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.3	1
20-Feb	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
21-Feb	1	1	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1
22-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
24-Feb	0	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
25-Feb	0	1	1	Z	1	1	1	0	1	0	0	0	0	0	0	0	1	2	2	2	2	2	2	1	1.0	2
26-Feb	1	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
27-Feb	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
28-Feb	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
	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.3	Diurnal Average	
	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	2	1	2	3	2	2	2	2	2	Diurnal Maximum	
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





WBEA  
Hourly Averages

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





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	638	99.84	99.84
3 - 4	1	0.16	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

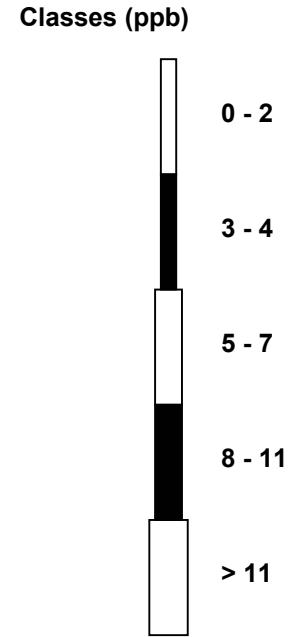
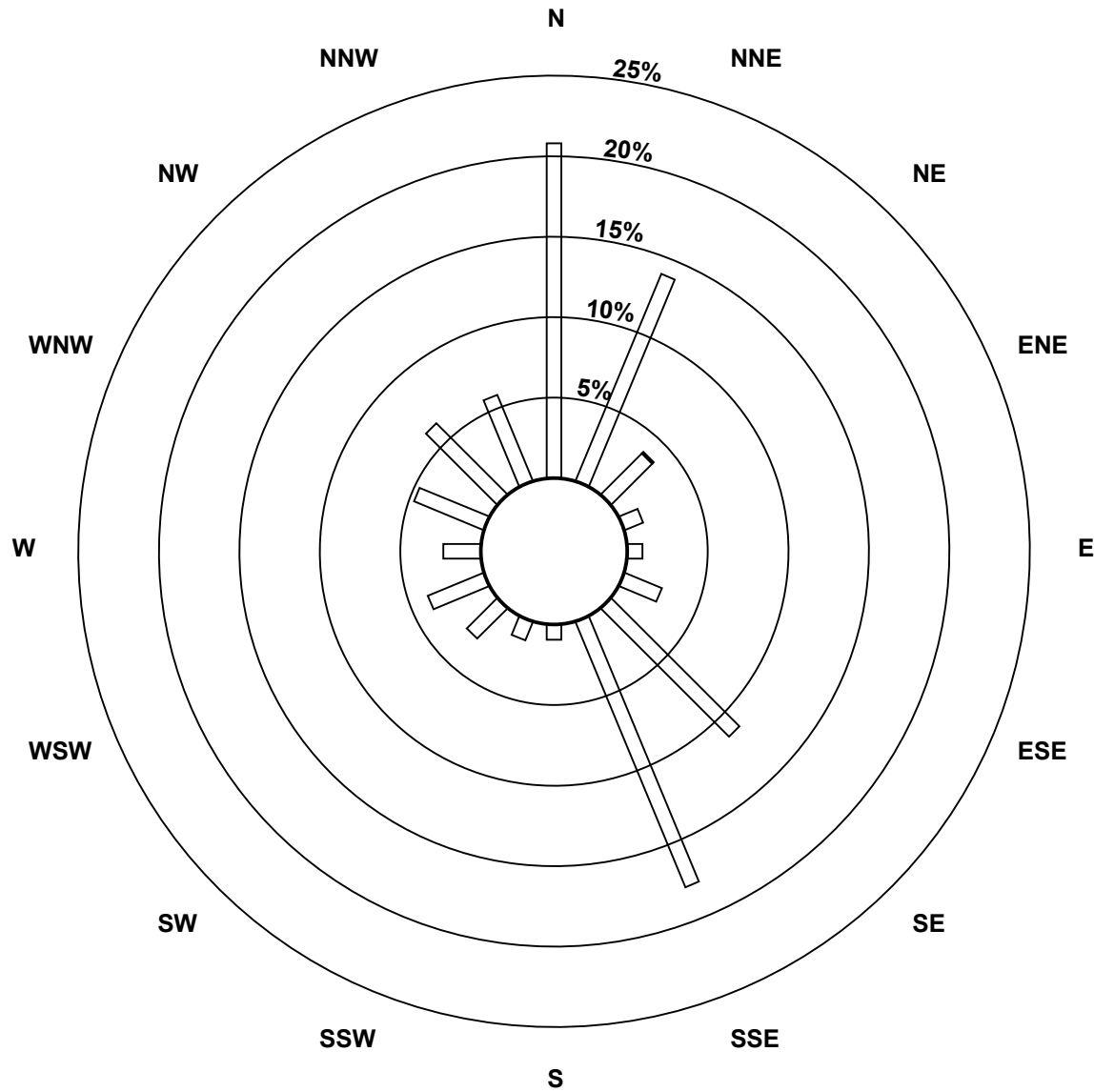
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	133	89	23	8	6	16	72	114	6	8	17	24	15	30	40	37	638
3 - 4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	133	89	24	8	6	16	72	114	6	8	17	24	15	30	40	37	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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

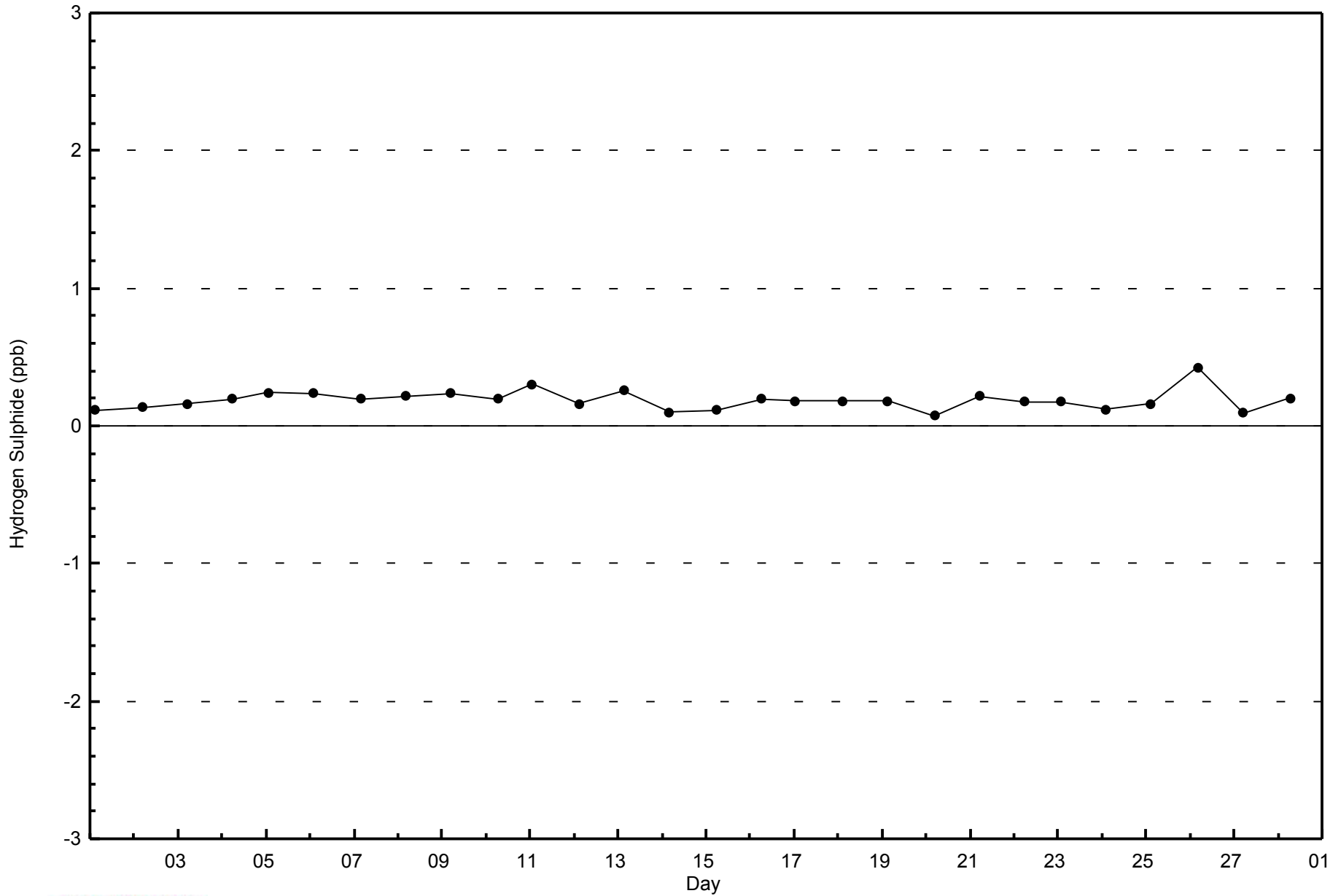


Total Number of Valid Hours: 639



WBEA  
Zero Responses

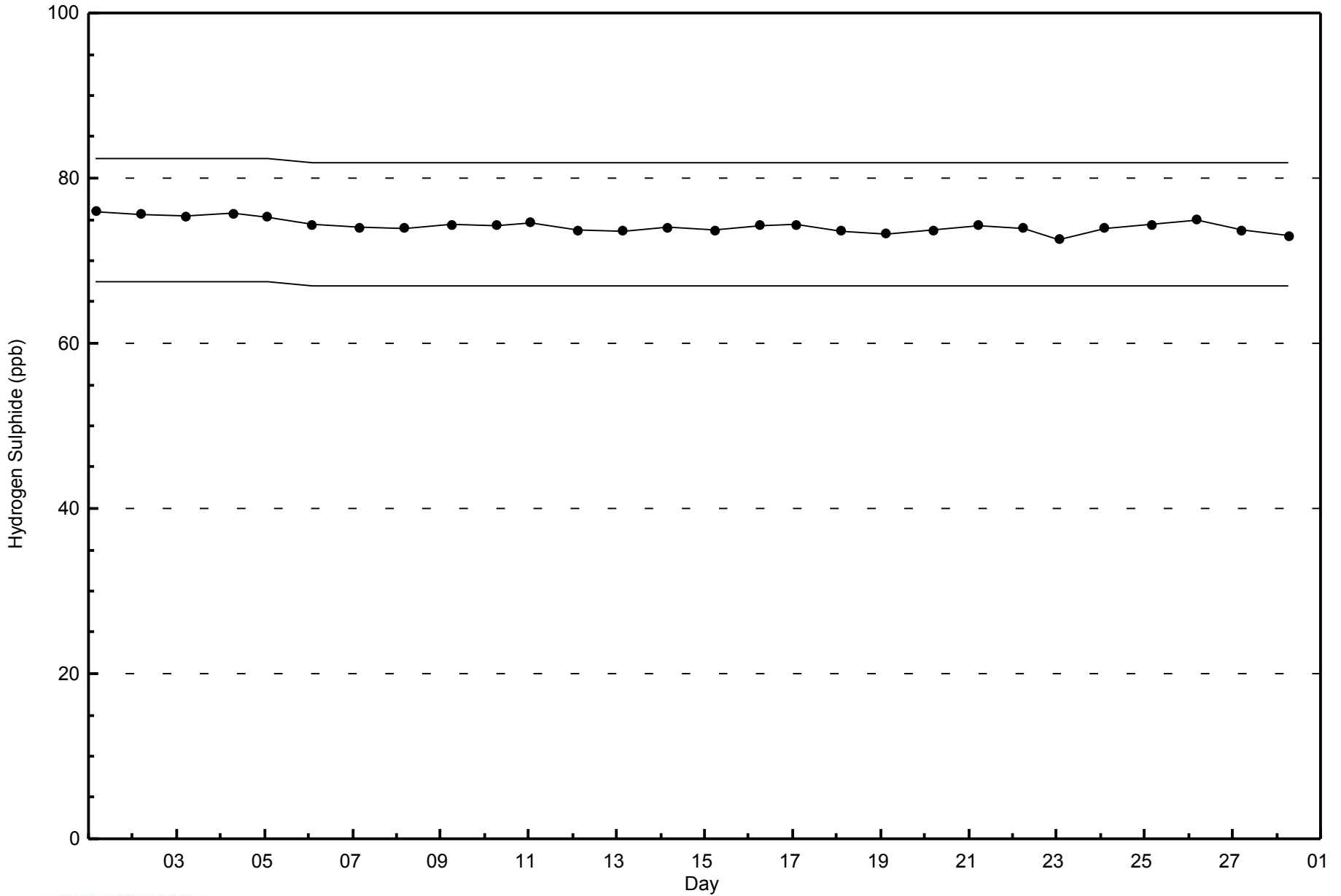
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Buffalo Viewpoint - February 2015





WBEA  
Span Responses

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





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

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

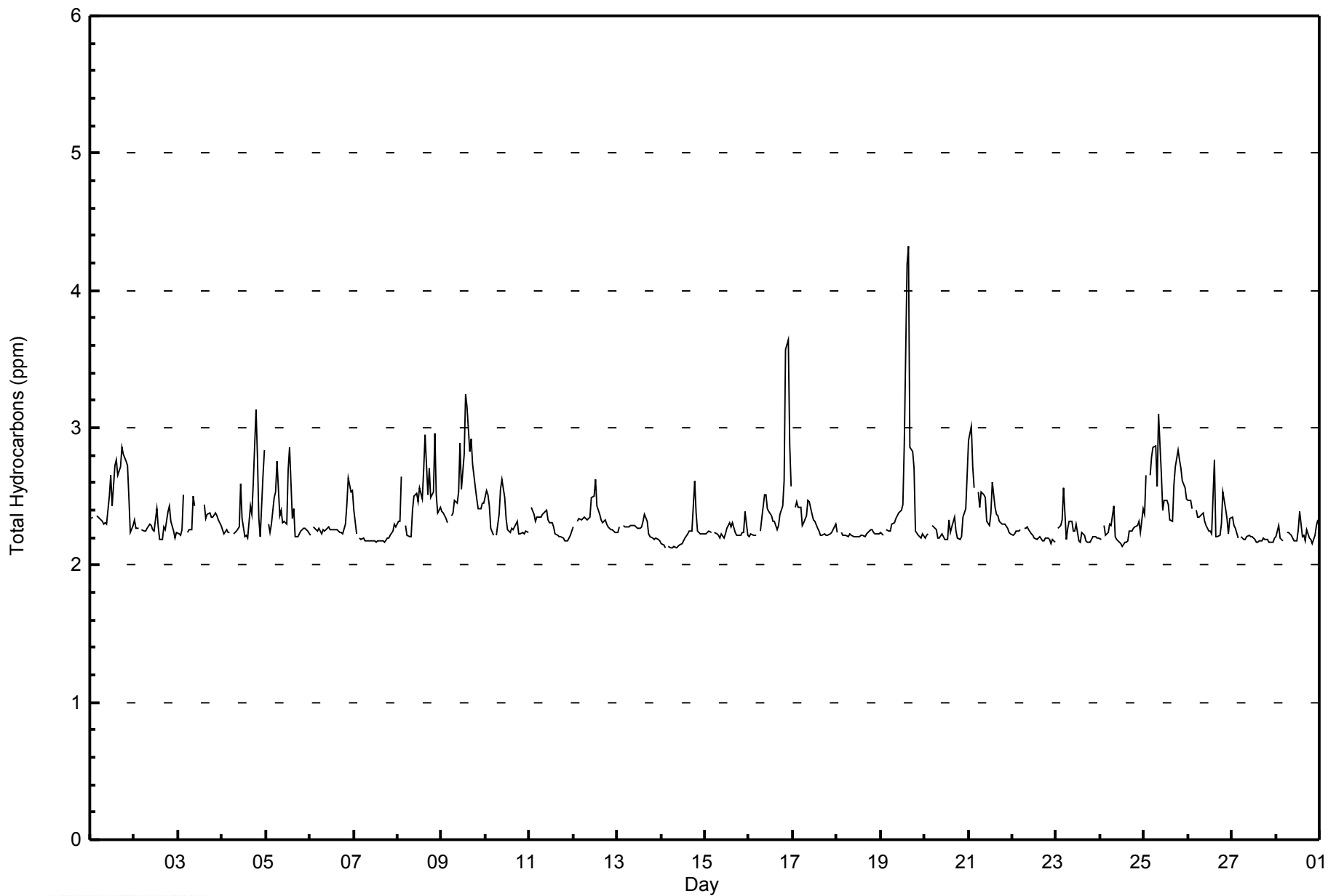
Maximum Value: 4.3 ppm on Feb 19 16:00																Maximum Daily Average: 2.6 ppm on Feb 25										Hours in Service: 672	
Minimum Value: 2.1 ppm on Feb 14 03:00																Minimum Daily Average: 2.2 ppm on Feb 27										Hours of Data: 640	
Maximum Diurnal Average: 2.4 ppm at hour 15																Minimum Diurnal Average: 2.3 ppm at hour 7										Hours of Missing Data: 32	
Monthly Average: 2.34 ppm																Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 2.2 Median = 2.3 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 2.6 P <sub>99</sub> = 3.1										Hours of Calibration: 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-Feb	2.3	2.3	Z	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.5	2.6	2.4	2.7	2.8	2.7	2.7	2.9	2.8	2.8	2.7	2.5	2.2	2.3	2.5	2.9	
2-Feb	2.3	2.3	2.3	Z	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.4	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.3	2.4	
3-Feb	2.2	2.2	2.3	2.5	Z	2.2	2.3	2.3	2.5	2.4	C	C	C	C	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.5	
4-Feb	2.3	2.2	2.3	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.6	2.3	2.2	2.2	2.2	2.4	2.4	2.6	3.1	2.8	2.3	2.2	2.6	2.8	2.4	3.1
5-Feb	Z	2.3	2.2	2.3	2.5	2.5	2.8	2.4	2.4	2.3	2.3	2.3	2.7	2.9	2.3	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.4	2.9	
6-Feb	2.2	Z	2.3	2.3	2.2	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	2.2	2.3	2.4	2.6	2.5	2.5	2.3	2.6	
7-Feb	2.4	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	
8-Feb	2.3	2.3	2.6	Z	2.3	2.2	2.2	2.2	2.4	2.5	2.5	2.5	2.6	2.5	2.7	3.0	2.5	2.7	2.5	2.5	3.0	2.5	2.4	2.4	2.5	3.0	
9-Feb	2.4	2.4	2.3	2.3	Z	2.4	2.4	2.5	2.4	2.5	2.9	2.6	2.8	3.2	3.2	2.8	2.9	2.7	2.6	2.5	2.4	2.4	2.4	2.5	2.6	3.2	
10-Feb	2.5	2.5	2.4	2.3	2.2	Z	2.2	2.4	2.6	2.6	2.5	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	2.2	2.6	
11-Feb	Z	2.4	2.4	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
12-Feb	2.3	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.5	2.6	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.6	
13-Feb	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	
14-Feb	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.6	
15-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.2	2.2	2.2	2.4	
16-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.3	2.5	2.5	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.4	2.6	3.6	3.6	2.9	2.6	2.5	3.6	
17-Feb	Z	2.4	2.5	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.5		
18-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.3	
19-Feb	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.9	4.2	4.3	2.9	2.8	2.7	2.2	2.2	2.2	2.2	2.2	2.5	4.3	
20-Feb	2.2	2.2	2.2	Z	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.7	2.3	2.7	
21-Feb	2.9	3.0	2.7	2.6	Z	2.5	2.4	2.5	2.5	2.5	2.3	2.3	2.4	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.5	3.0	
22-Feb	2.2	2.2	2.2	2.2	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
23-Feb	Z	2.3	2.3	2.3	2.6	2.2	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.6	
24-Feb	2.2	Z	2.3	2.2	2.2	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.4	2.2	2.4	
25-Feb	2.4	2.7	Z	2.7	2.8	2.9	2.9	2.6	3.1	2.7	2.4	2.5	2.5	2.4	2.3	2.3	2.6	2.7	2.8	2.8	2.7	2.6	2.6	2.5	2.6	3.1	
26-Feb	2.5	2.5	2.4	Z	2.4	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.2	2.2	2.8	2.2	2.2	2.2	2.3	2.5	2.4	2.3	2.2	2.3	2.4	2.8	
27-Feb	2.3	2.3	2.3	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
28-Feb	2.2	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.4	
																								Diurnal Average			
																								Diurnal Maximum			
2.3																								2.9			
2.3																								3.0			
2.3																								2.7			
2.3																								2.7			
2.3																								2.8			
2.3																								2.9			
2.3																								2.9			
2.3																								2.6			
2.3																								3.1			
2.3																								2.7			
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2.3																								2.8			
2.3																								3.2			
2.4																								4.2			
2.4																								4.3			
2.3																								2.9			
2.4																								2.9			
2.4																								3.1			
2.3																								2.8			
2.4																								3.6			
2.3																								3.6			
2.3																								2.9			
2.3																								2.8			

Z - zerospan      C - Calibration



**WBEA**  
**Hourly Averages**

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







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

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	632	98.75	98.75
3.1 - 10.0	8	1.25	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

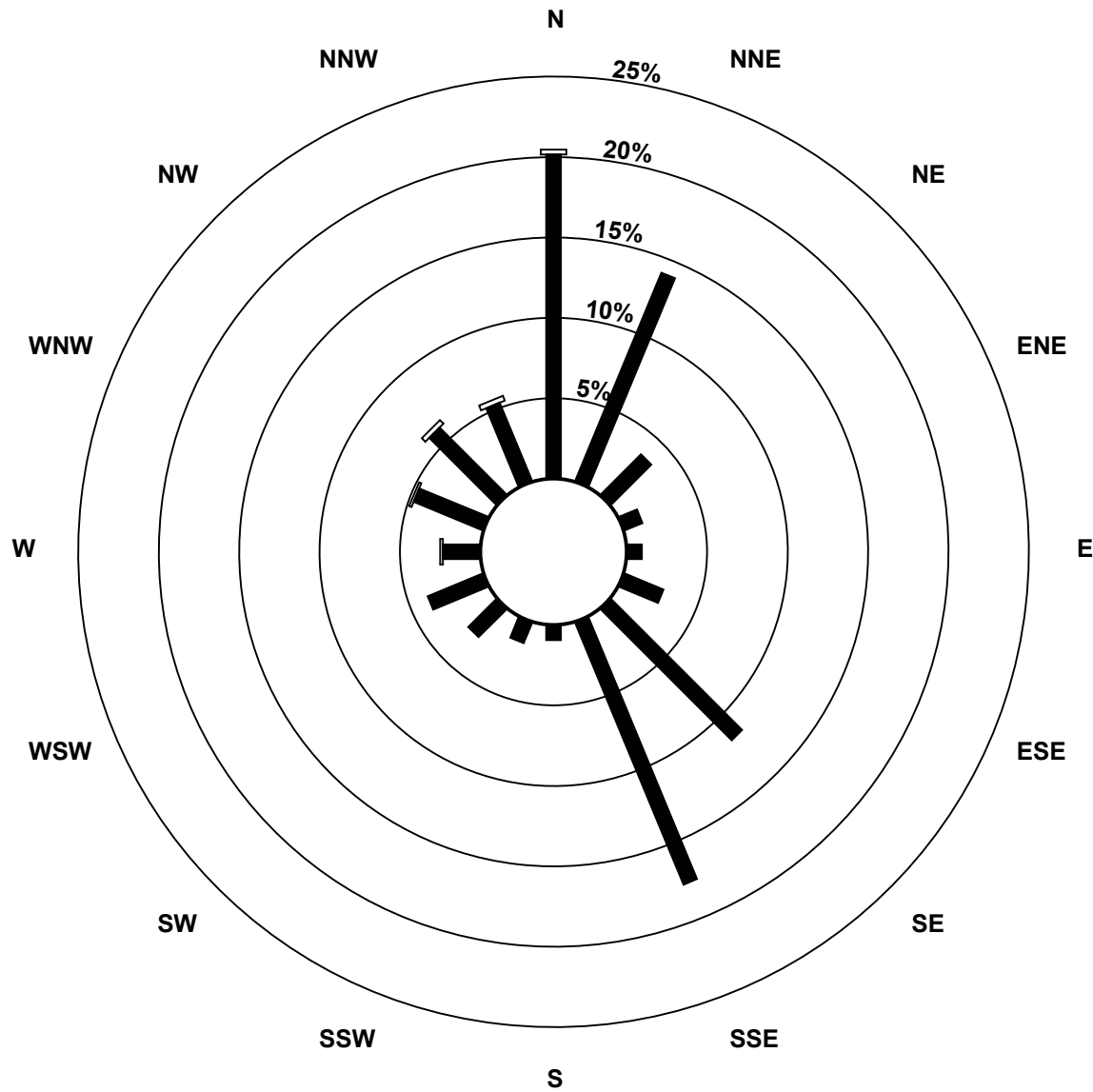
Concentration Ranges (ppm)	Wind Direction																Totals	
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	129	90	23	8	6	17	74	113	6	9	16	24	15	30	38	34	632	
3.1 - 10.0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	8	
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Totals</b>	131	90	23	8	6	17	74	113	6	9	16	24	16	31	40	36	640	

Total Number of Valid Hours: 640

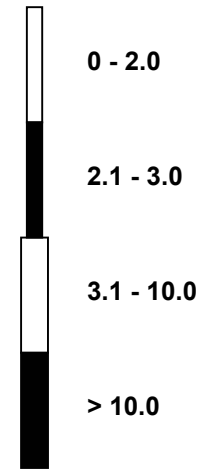
Total Number of Hours: 672

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

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



**Classes (ppm)**

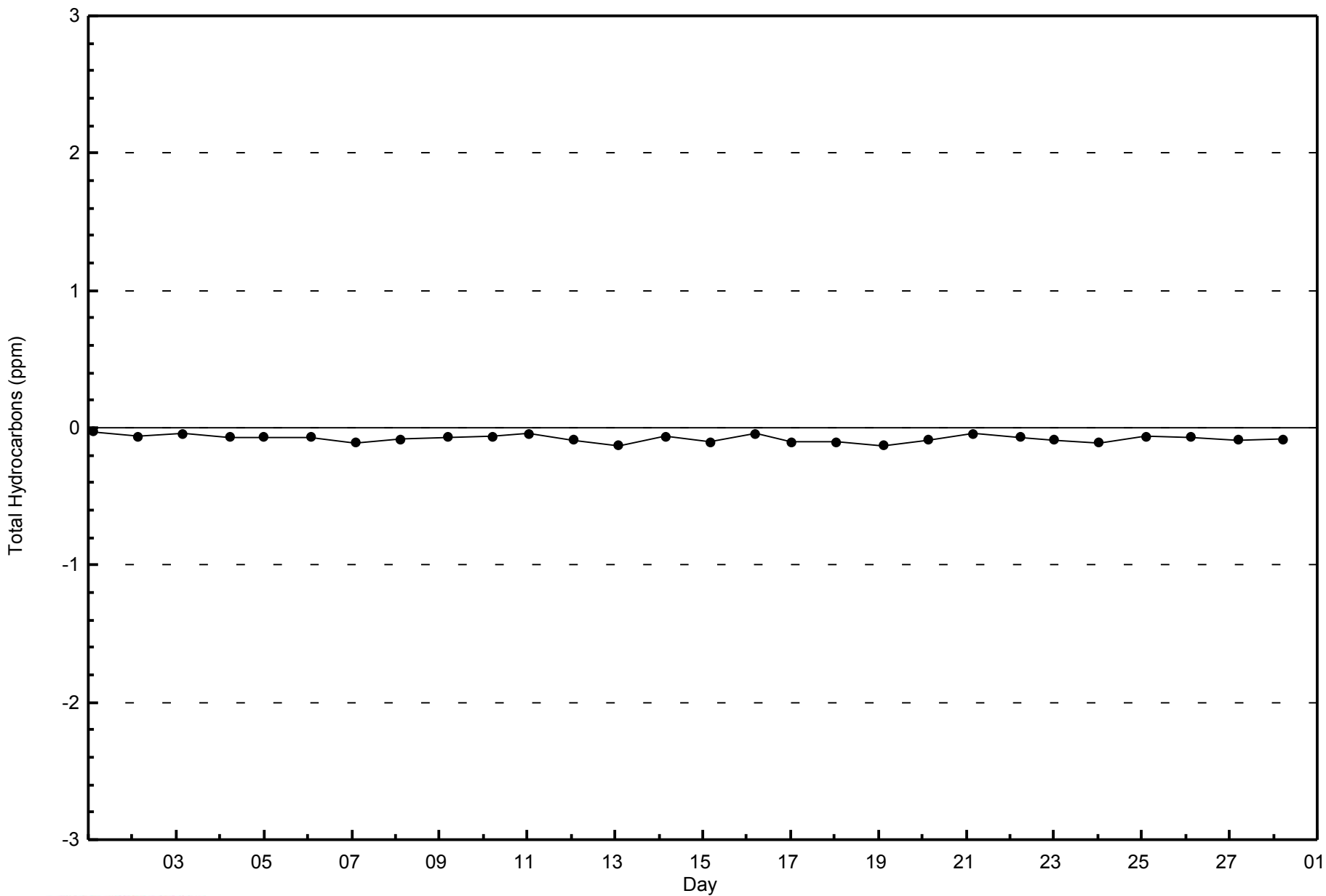


**Total Number of Valid Hours: 640**



WBEA  
Zero Responses

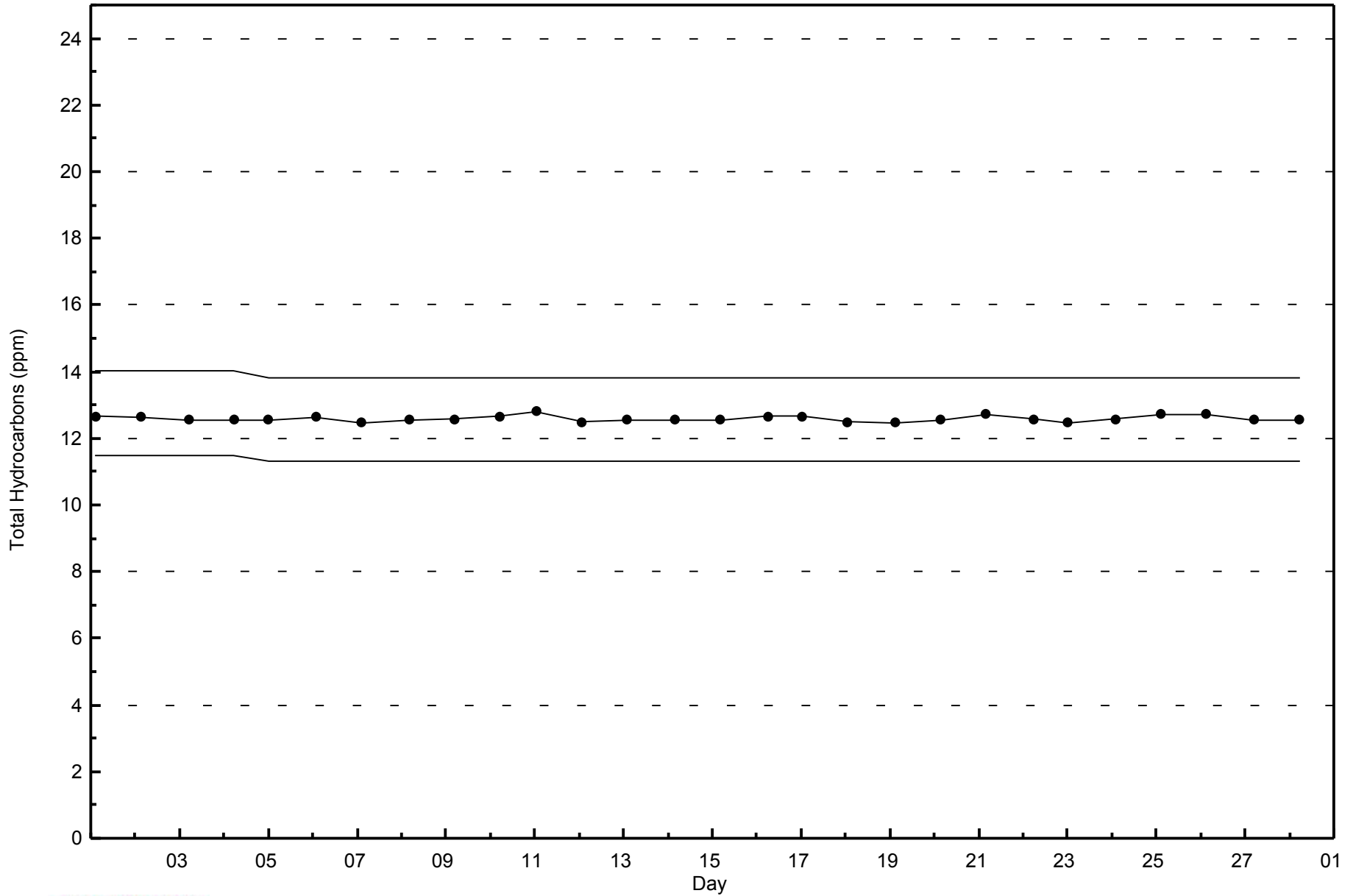
Total Hydrocarbons (THC) - ppm  
Buffalo Viewpoint - February 2015





WBEA  
Span Responses

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





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

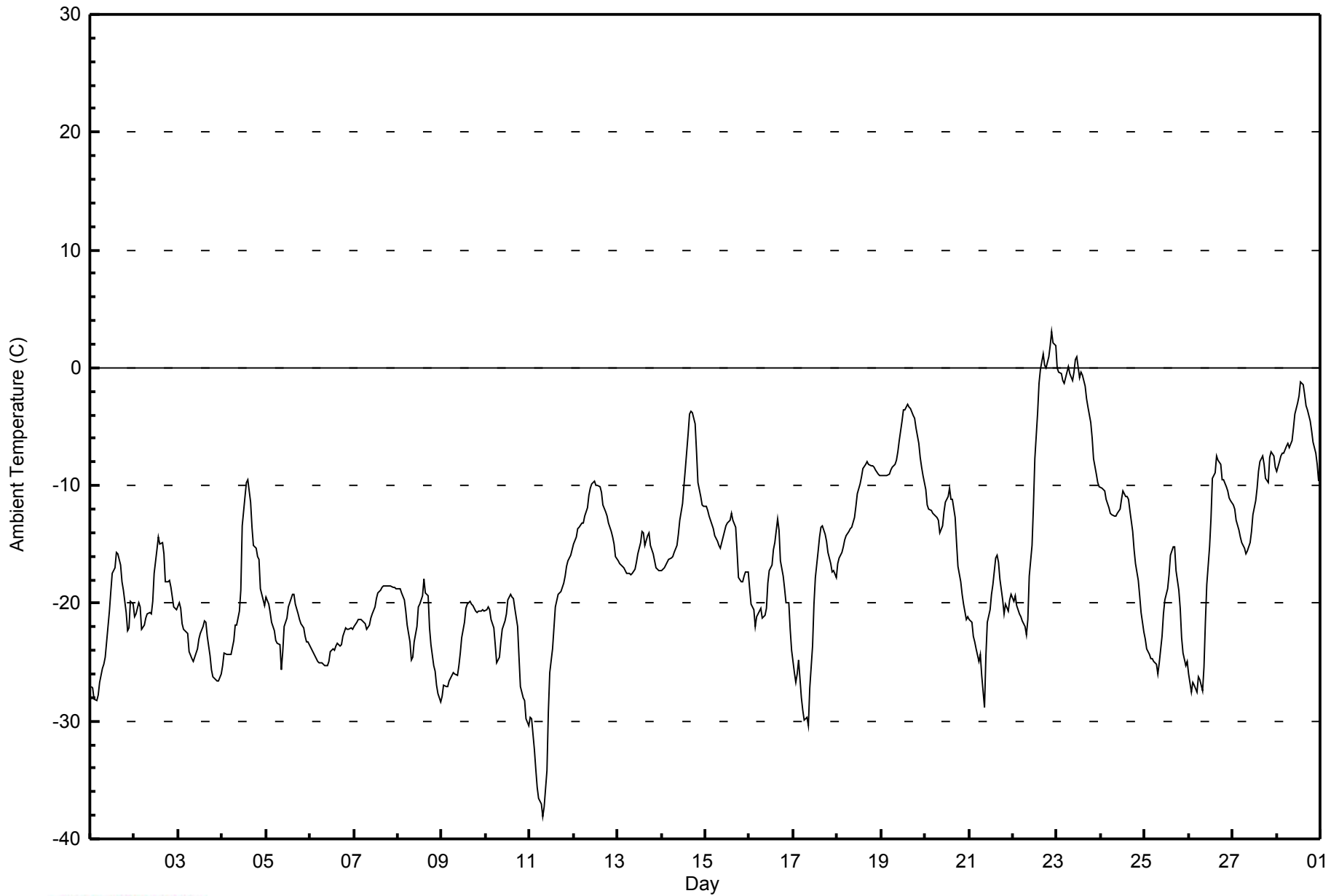
**Ambient Temperature (AT) - C**  
**Buffalo Viewpoint - February 2015**

Maximum Value: 3.1 C on Feb 22 22:00		Maximum Daily Average: -2.5 C on Feb 23		Hours in Service: 672																						
Minimum Value: -38.1 C on Feb 11 08:00		Minimum Daily Average: -26.0 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.7 C at hour 16		Minimum Diurnal Average: -20.0 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.89 C		Percentiles: P <sub>1</sub> = -34.0 P <sub>10</sub> = -25.3 Q <sub>1</sub> = -22.0 Median = -17.9 Q <sub>3</sub> = -11.9 P <sub>90</sub> = -7.3 P <sub>99</sub> = 0.9		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-Feb	-27.1	-27.2	-28.2	-28.3	-27.7	-26.7	-25.6	-25.2	-24.6	-23.3	-20.7	-19.0	-17.4	-16.9	-15.7	-15.8	-16.8	-18.2	-18.9	-20.8	-22.3	-22.0	-19.8	-20.1	-22.0	-15.7
2-Feb	-21.1	-20.9	-20.0	-20.3	-22.3	-21.8	-21.3	-20.9	-20.8	-20.9	-19.8	-17.4	-15.4	-14.4	-14.9	-14.8	-15.8	-18.1	-18.1	-18.1	-18.7	-20.3	-20.4	-20.5	-19.0	-14.4
3-Feb	-20.0	-20.4	-21.7	-22.2	-22.5	-22.6	-24.1	-24.7	-24.9	-24.6	-23.8	-23.1	-22.6	-22.0	-21.5	-21.6	-22.8	-24.5	-25.7	-26.2	-26.5	-26.6	-26.6	-26.0	-23.6	-20.0
4-Feb	-25.3	-24.3	-24.4	-24.3	-24.3	-24.3	-23.1	-21.9	-21.8	-20.7	-18.9	-13.4	-10.9	-9.7	-9.5	-11.4	-13.5	-15.1	-15.3	-16.0	-16.2	-18.8	-19.7	-20.2	-18.5	-9.5
5-Feb	-19.4	-20.1	-20.8	-21.6	-22.3	-23.2	-23.4	-23.5	-25.6	-24.1	-22.0	-21.2	-20.3	-19.9	-19.3	-19.3	-20.1	-20.9	-21.3	-21.7	-22.1	-22.7	-23.2	-23.3	-21.7	-19.3
6-Feb	-23.7	-24.0	-24.3	-24.7	-24.9	-25.0	-25.1	-25.2	-25.3	-25.2	-24.9	-24.1	-23.9	-24.0	-23.6	-23.4	-23.6	-23.5	-22.8	-22.1	-22.2	-22.2	-22.1	-22.2	-23.8	-22.1
7-Feb	-22.0	-21.6	-21.4	-21.3	-21.4	-21.6	-21.8	-22.2	-21.8	-21.3	-20.9	-20.3	-19.6	-19.2	-18.8	-18.6	-18.5	-18.5	-18.5	-18.6	-18.6	-18.6	-18.7	-18.8	-20.1	-18.5
8-Feb	-18.8	-18.7	-19.1	-19.7	-20.6	-21.8	-23.2	-24.8	-24.6	-23.3	-22.0	-20.3	-20.1	-19.3	-17.9	-19.2	-19.4	-22.1	-23.5	-25.3	-25.8	-27.0	-27.6	-28.3	-22.2	-17.9
9-Feb	-27.9	-27.0	-27.1	-27.1	-26.6	-26.1	-25.9	-26.0	-26.1	-25.3	-24.2	-22.9	-21.6	-20.5	-20.1	-19.9	-20.1	-20.2	-20.6	-20.7	-20.7	-20.7	-20.5	-20.6	-23.3	-19.9
10-Feb	-20.6	-20.3	-20.5	-21.3	-22.1	-23.5	-25.1	-24.6	-23.3	-22.2	-21.5	-20.9	-19.8	-19.3	-19.4	-19.6	-20.4	-22.0	-24.6	-27.1	-28.0	-28.3	-29.8	-30.3	-23.1	-19.3
11-Feb	-29.7	-29.8	-32.4	-34.1	-35.6	-36.6	-37.1	-38.1	-37.3	-34.2	-29.2	-25.9	-23.9	-22.1	-20.3	-19.3	-19.1	-19.0	-18.3	-17.6	-16.9	-16.4	-15.9	-15.4	-26.0	-15.4
12-Feb	-14.9	-14.4	-13.7	-13.5	-13.2	-13.2	-12.6	-11.9	-10.8	-10.2	-9.8	-9.6	-10.0	-10.0	-10.1	-10.6	-11.6	-12.3	-12.6	-13.1	-13.9	-14.4	-15.0	-16.0	-12.4	-9.6
13-Feb	-16.4	-16.6	-16.8	-17.0	-17.2	-17.4	-17.5	-17.6	-17.5	-17.1	-16.5	-15.8	-14.9	-13.9	-14.0	-15.1	-14.3	-14.0	-15.1	-15.8	-16.4	-17.0	-17.2	-17.2	-16.2	-13.9
14-Feb	-17.3	-17.0	-16.7	-16.5	-16.3	-16.1	-16.0	-15.6	-15.1	-14.2	-13.0	-11.5	-10.0	-8.6	-5.6	-3.9	-3.6	-3.8	-4.8	-7.1	-9.8	-10.9	-11.7	-11.7	-11.5	-3.6
15-Feb	-11.8	-12.2	-12.5	-13.3	-13.6	-14.2	-14.7	-15.1	-15.3	-14.9	-13.9	-13.4	-13.2	-13.0	-12.3	-12.9	-13.6	-15.6	-17.9	-18.2	-18.2	-17.7	-17.4	-17.4	-14.7	-11.8
16-Feb	-18.8	-20.1	-20.6	-22.0	-21.2	-20.7	-20.5	-21.3	-21.1	-20.4	-18.3	-17.2	-16.7	-15.5	-14.8	-12.8	-13.8	-16.4	-17.7	-18.8	-20.0	-20.0	-22.2	-24.0	-18.9	-12.8
17-Feb	-25.9	-26.7	-26.0	-24.8	-28.0	-29.1	-29.9	-29.6	-30.3	-27.2	-23.6	-20.1	-17.8	-15.5	-14.3	-13.6	-13.4	-14.2	-14.7	-15.6	-16.6	-17.3	-17.2	-17.8	-21.2	-13.4
18-Feb	-16.6	-16.1	-15.7	-15.2	-14.7	-14.3	-13.9	-13.6	-13.5	-12.7	-11.8	-10.7	-9.9	-9.3	-8.5	-8.1	-7.9	-8.2	-8.3	-8.3	-8.4	-8.7	-9.0	-9.1	-11.4	-7.9
19-Feb	-9.2	-9.2	-9.2	-9.1	-9.0	-8.7	-8.4	-8.2	-7.8	-7.1	-6.2	-4.5	-3.5	-3.6	-3.2	-3.3	-3.5	-4.1	-4.3	-5.1	-6.4	-7.6	-8.4	-9.1	-6.6	-3.2
20-Feb	-10.4	-11.6	-12.0	-12.2	-12.3	-12.5	-12.7	-13.0	-14.0	-13.4	-12.2	-11.4	-11.0	-10.3	-11.1	-11.2	-12.7	-14.9	-16.9	-18.1	-19.2	-20.1	-21.4	-21.2	-14.0	-10.3
21-Feb	-21.3	-21.6	-22.8	-23.3	-23.9	-25.0	-24.4	-26.2	-28.8	-24.5	-21.7	-20.5	-19.3	-18.3	-16.1	-15.9	-16.5	-17.9	-19.8	-20.9	-20.1	-20.7	-19.7	-19.3	-21.2	-15.9
22-Feb	-19.8	-19.4	-20.2	-20.8	-21.1	-21.5	-21.9	-22.7	-21.4	-17.6	-15.1	-11.7	-7.7	-3.8	-1.3	-0.2	1.1	0.2	0.0	0.9	1.9	3.1	2.1	1.9	-9.8	3.1
23-Feb	0.0	-0.3	-0.4	-1.0	-1.3	-0.3	0.1	-0.5	-1.1	-0.4	0.7	0.9	-0.9	-0.3	-0.6	-1.5	-2.6	-3.4	-4.7	-5.9	-7.7	-9.1	-9.8	-10.1	-2.5	0.9
24-Feb	-10.2	-10.4	-10.5	-11.2	-11.8	-12.3	-12.5	-12.5	-12.6	-12.4	-12.0	-11.1	-10.5	-10.9	-10.9	-11.1	-12.1	-13.9	-15.4	-16.6	-18.0	-19.3	-20.8	-22.4	-13.4	-10.2
25-Feb	-23.1	-23.9	-24.4	-24.7	-24.7	-25.0	-25.2	-26.0	-25.1	-22.8	-20.9	-19.7	-18.7	-17.6	-15.9	-15.2	-15.2	-17.2	-18.9	-20.5	-22.9	-24.2	-25.2	-25.0	-21.7	-15.2
26-Feb	-26.0	-27.6	-26.8	-26.9	-27.6	-26.2	-26.5	-27.4	-25.4	-21.6	-18.3	-15.2	-12.8	-9.4	-8.9	-7.5	-7.8	-8.2	-9.5	-9.5	-10.1	-10.5	-11.0	-11.3	-17.2	-7.5
27-Feb	-11.6	-12.0	-12.9	-13.8	-14.4	-14.9	-15.3	-15.8	-15.6	-14.9	-13.9	-12.5	-11.3	-10.2	-8.7	-7.9	-7.5	-8.2	-9.4	-9.7	-7.6	-7.1	-7.5	-8.4	-11.3	-7.1
28-Feb	-8.8	-8.0	-7.5	-7.3	-7.3	-6.7	-6.4	-6.8	-6.1	-5.1	-3.9	-3.0	-2.4	-1.2	-1.4	-2.3	-3.2	-3.6	-4.5	-5.4	-6.3	-7.2	-8.3	-9.6	-5.5	-1.2
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	267	39.73	39.73
-20 - 0	393	58.48	98.21
0 - 10	12	1.79	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



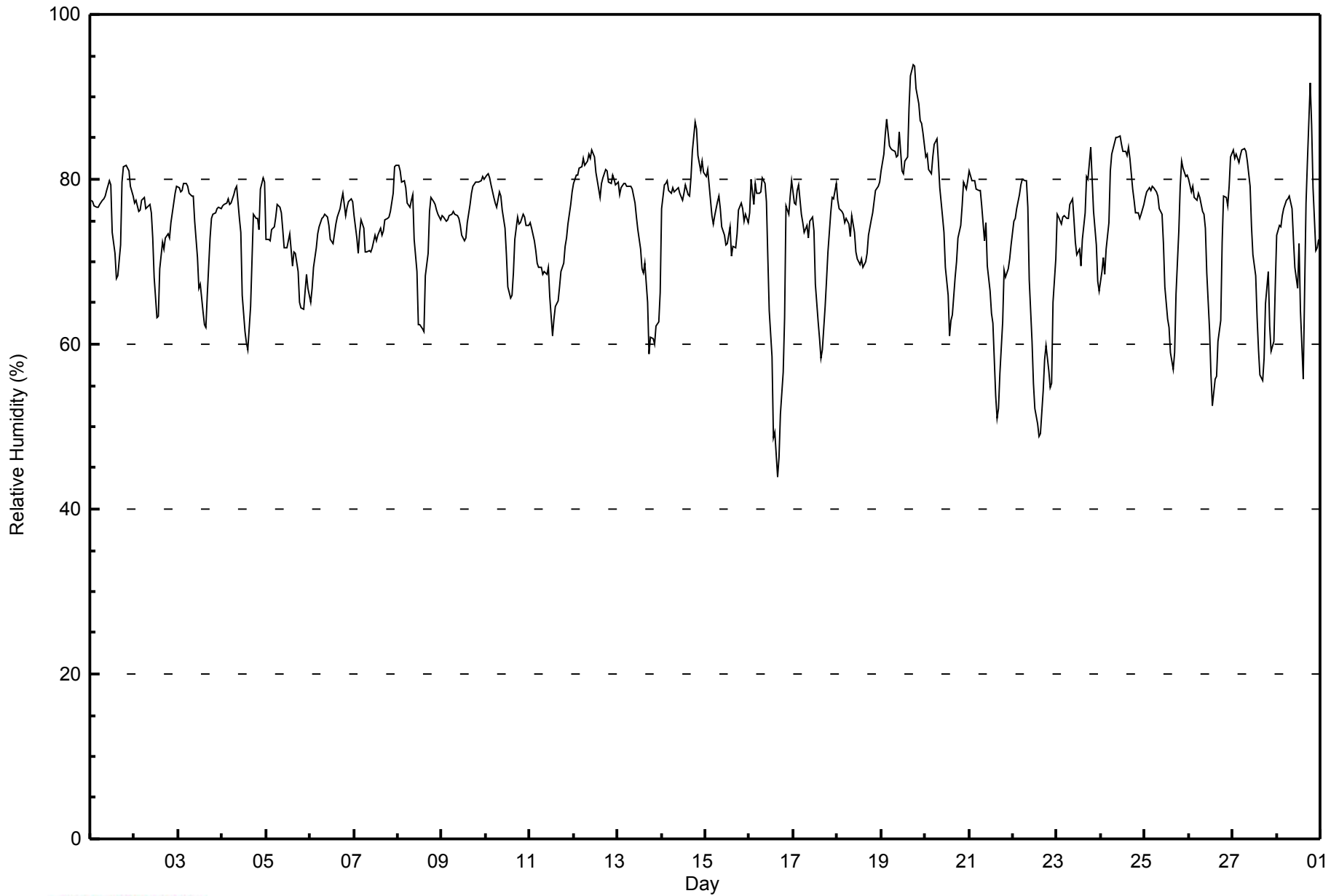


Maximum Value: 94 % on Feb 19 18:00																		Maximum Daily Average: 85.7 % on Feb 19						Hours in Service: 672																								
Minimum Value: 44 % on Feb 16 16:00																		Minimum Daily Average: 64.9 % on Feb 22						Hours of Data: 672																								
Maximum Diurnal Average: 77.8 % at hour 6																		Minimum Diurnal Average: 66.1 % at hour 15						Hours of Missing Data: 0																								
Monthly Average: 74.1 %																		Percentiles: P <sub>1</sub> = 51 P <sub>10</sub> = 63 Q <sub>1</sub> = 71 Median = 76 Q <sub>3</sub> = 79 P <sub>90</sub> = 82 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-Feb	77	77	77	77	77	77	77	78	78	79	80	79	74	71	68	68	72	80	82	82	81	81	79	78	77.0	82																						
2-Feb	77	77	76	76	77	78	76	77	77	76	73	68	63	63	69	72	72	73	73	73	75	77	78	79	74.0	79																						
3-Feb	79	78	79	79	79	79	78	78	78	75	70	67	67	64	62	62	66	73	75	76	76	76	77	77	73.8	79																						
4-Feb	77	77	77	78	77	77	78	79	79	75	74	66	61	60	59	65	70	76	75	75	74	79	80	80	73.7	80																						
5-Feb	73	73	73	74	74	76	77	77	76	74	72	72	72	73	70	71	71	69	65	64	64	66	69	67	71.3	77																						
6-Feb	65	67	69	72	73	74	75	75	76	75	74	73	72	73	75	75	76	78	78	76	77	77	78	77	74.2	78																						
7-Feb	76	73	71	73	75	74	71	71	71	71	72	73	73	73	74	73	74	75	75	75	76	78	81	82	74.3	82																						
8-Feb	82	81	80	80	79	77	77	78	78	73	69	62	62	62	62	68	71	76	78	77	77	76	76	75	74.0	82																						
9-Feb	76	75	75	75	76	76	76	76	76	75	74	73	73	73	75	77	78	79	80	80	80	80	80	80	76.5	80																						
10-Feb	81	81	80	79	78	77	77	78	78	76	74	71	67	66	66	69	73	75	75	75	76	75	74	74	74.8	81																						
11-Feb	75	74	73	71	70	69	69	68	69	68	69	66	61	63	64	65	67	69	70	72	73	75	77	78	69.8	78																						
12-Feb	79	80	81	81	82	82	82	82	83	82	84	83	81	80	78	80	80	81	81	80	79	81	80	79	80.9	84																						
13-Feb	80	78	79	79	79	79	79	79	79	77	75	74	72	69	69	70	65	59	61	61	60	62	63	66	71.4	80																						
14-Feb	76	79	80	80	79	78	79	78	79	79	78	78	79	78	78	80	83	87	86	83	81	82	81	80	80.0	87																						
15-Feb	80	81	79	76	75	76	77	78	76	74	73	72	72	74	71	72	72	73	76	77	76	75	76	75	75.3	81																						
16-Feb	76	80	77	79	78	78	79	80	80	77	71	64	58	49	49	44	46	51	57	63	77	76	78	80	68.6	80																						
17-Feb	77	77	79	79	76	75	74	74	73	75	76	74	67	63	61	58	59	65	68	71	76	78	78	80	72.1	80																						
18-Feb	77	76	76	76	75	75	75	73	76	74	71	70	70	70	69	70	71	73	75	76	77	79	79	80	74.3	80																						
19-Feb	81	83	85	87	84	84	84	83	83	83	86	81	81	82	83	89	93	94	94	91	89	87	87	86	85.7	94																						
20-Feb	83	83	81	81	83	84	85	82	79	75	74	69	66	61	63	64	68	70	73	74	77	80	79	80	75.5	85																						
21-Feb	81	80	80	80	79	79	79	77	73	75	69	66	64	63	54	51	52	56	63	69	68	69	70	72	69.5	81																						
22-Feb	75	75	76	78	79	80	80	80	77	68	60	55	52	50	49	49	54	58	60	57	55	55	65	70	64.9	80																						
23-Feb	76	75	75	75	76	75	75	77	78	75	72	71	71	69	73	76	80	80	84	80	76	72	68	67	74.8	84																						
24-Feb	69	71	68	72	75	81	83	84	85	85	85	84	83	83	83	84	83	79	77	76	76	75	76	77	79.0	85																						
25-Feb	78	78	79	79	79	79	78	78	76	76	72	67	63	62	59	57	59	66	74	79	82	81	80	81	73.5	82																						
26-Feb	80	78	79	78	77	78	78	76	76	74	69	62	56	53	56	56	60	63	72	78	78	77	79	83	71.5	83																						
27-Feb	84	83	83	82	83	84	84	83	82	79	74	71	68	63	59	56	56	58	65	69	62	59	60	67	71.4	84																						
28-Feb	73	74	74	76	76	77	78	78	76	73	69	67	72	64	56	67	77	82	92	87	79	71	72	73	74.3	92																						
																								77.2	77.4	77.2	77.6	77.5	77.8	77.8	77.8	77.3	75.7	73.6	70.6	68.6	67.0	66.1	67.3	69.5	71.9	74.4	74.9	75.0	75.0	75.7	76.5	Diurnal Average
																								84	83	85	87	84	84	85	84	85	85	86	84	83	83	83	89	93	94	94	91	89	87	87	86	Diurnal Maximum



**WBEA**  
**Hourly Averages**

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





Maximum Speed: 30 km/h on Feb 19 22:00		Maximum Daily Speed Average: 13.9 km/h on Feb 23		Hours in Service:	672																					
Minimum Speed Value: 0 km/h on Feb 8 12:00		Minimum Daily Speed Average: 0.6 km/h on Feb 25		Hours of Data:	672																					
Maximum Diurnal Speed Average: 5.4 km/h at hour 19		Minimum Diurnal Speed Average: 0.6 km/h at hour 9		Hours of Missing Data:	0																					
Monthly Average Velocity: 2.8 km/h 19.9 deg		Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 14 P <sub>90</sub> = 17 P <sub>99</sub> = 27		Percent Operational Time:	100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	SSE9	SSE9	SSE9	SSE9	SSE8	SSE7	SSE5	SSE8	SSE9	SSE2	N5	N6	NNW4	W5	WNW4	N2	NE4	ENE6	NE2	SW4	SSW6	WSW9	W14	W10	SSW2.3	W14
2-Feb	WSW8	WSW10	WSW14	WSW11	SSW7	SW5	WSW9	W12	W11	W14	NNW13	NW7	N6	NW9	WNW7	NW5	NW9	WNW9	WNW9	W8	W9	NNW11	W10	WNW8	W8.2	WSW14
3-Feb	WNW9	W11	NW9	NW5	NNW5	N9	N10	N7	NW7	N12	N7	N9	N6	NNE5	NE5	ESE6	SE10	SSE12	SSE11	SE13	SE15	SE14	SE15	SSE13	ENE1.5	SE15
4-Feb	SSE14	SSE16	SSE11	SSE11	SSE12	SSE12	SSE12	SSE11	SSW4	WSW3	SW6	WSW11	W15	NNW16	NNW18	N14	NNE11	NNW8	NW15	NW12	NNW14	NNE13	NNW11	NW13	W2.5	WNW18
5-Feb	NW17	NW15	NW16	NW13	NNW13	N11	NW6	SW5	S5	S3	WSW3	W3	NNE6	NE6	NNE4	NNE5	NE10	NE10	NE13	NE10	NE9	NNE10	NNE8	NNE11	N5.7	NW17
6-Feb	N13	NNE13	NNE14	NNE15	NNE15	NNE14	NNE17	NNE15	NNE17	NNE17	NNE17	NNE16	NNE18	NNE18	NNE19	NNE17	NNE18	NNE15	NE10	E12	E9	E9	E9	E9	NNE13.2	NNE19
7-Feb	ESE11	SE13	SE14	SE13	SE12	SE12	SE14	SE16	SE16	SE17	SE16	SE14	SE13	SE11	SE12	SE12	SSE10	SSE7	SE5	SE3	NE2	N4	N6	N4	SE9.5	SE17
8-Feb	NNE4	NNW4	N6	NNE10	NNE13	NNE16	NNE11	N7	NW5	WSW2	WSW4	SW0	NNE6	NNE6	NE5	ENE8	ENE5	N7	NNE12	NNW10	NNW9	N12	N10	N11	N6.6	NNE16
9-Feb	NNW8	N12	N11	N11	N9	N11	N11	N13	N12	N6	N7	N7	N7	N7	N8	N11	NNW10	N10	N14	N11	NNW9	NNW9	NNW8	NNW8	N9.4	N14
10-Feb	NNW9	NNW7	N14	N15	N16	N13	N10	NNW7	NW6	NNW8	NW8	NW12	NNW15	NNW14	NW13	N9	N7	N15	NNE14	N10	NNE10	NNE11	NNE9	NNE10	N10.1	N16
11-Feb	NNW5	WNW2	SW2	SSE5	SSE6	SSE8	SSE9	SSE10	SSE9	SSE8	SE9	SSE12	SSE14	SSE12	SSE17	SSE17	SSE19	SSE18	SSE17	SSE17	SSE17	SSE18	SSE17	SSE13	SSE11.0	SSE19
12-Feb	SSE10	SSE9	SE7	SE5	SSE4	SSE6	SSE7	SSW6	SW7	WNW3	NW10	N11	N12	NNE12	NNE12	N13	NNE15	NNE14	NNE15	NNE17	NNE17	NNE16	NNE17	N18	NNE6.0	N18
13-Feb	N17	NNE16	N16	N15	N16	NNE16	NNE15	NNE15	NNE14	NNE14	N16	NNE14	NNE13	N12	N12	NNE8	E8	ESE17	SE16	SE17	SE22	SE21	SE22	SE22	NE8.2	SE22
14-Feb	SE22	SE22	SE23	SSE23	SSE22	SSE21	SSE20	SSE20	SSE20	SSE19	SSE19	SSE20	SSE20	SSE16	SSE9	SSE10	SSE9	S9	N17	N22	NNE18	NNE15	N10	NNE9	SE10.6	SSE23
15-Feb	NNE8	NE5	NE9	ENE7	NE8	NNE11	NNE11	NNE14	NNE15	NNE10	N9	N11	N11	N10	N7	N15	NNE12	NNE15	N11	N10	N11	N11	N12	N15	NNE10.3	N15
16-Feb	N16	N11	N14	N10	N10	N8	NNW7	N4	WNW3	W3	N2	N4	WNW7	NNE4	NE5	WSW2	S4	SE8	ESE4	WNW5	NNW6	W4	SW4	SW5	N3.6	N16
17-Feb	SW5	SSE5	S4	WSW4	SW4	SSW5	SSE6	SSE6	SE8	SE7	SSE5	SE6	SE8	SE8	ESE8	ESE10	SE9	SE8	SE7	SE6	SSE6	SSE6	SSE7	SSE9	SSE5.8	ESE10
18-Feb	SSE8	SSE7	SSE8	SSE7	SSE6	SE5	SE5	SE6	SE7	SE8	SE10	SE9	ESE8	SE9	SE8	SE8	SSE7	SE6	SE5	SE7	SSE9	SSE11	SSE10	SSE8	SE7.4	SSE11
19-Feb	SSE9	SSE9	SSE8	SSE8	S8	SSE8	SSE8	SSE8	SSE7	SE6	SSE5	SSE1	NNE5	N5	N6	NW7	N13	N12	N14	N21	N26	N30	N27	N27	NNE4.8	NNE30
20-Feb	N28	N25	N26	N20	N18	N16	N16	N20	N17	N12	NNE9	NNE9	N9	N8	N14	N13	N11	NNE8	NNE11	N9	NNW9	NNW8	NNW9	NW8	N13.5	N28
21-Feb	NW8	WNW7	NNW8	NNW8	N9	N4	NNW5	N3	SSW3	WNW1	NNE5	NNE6	NNE6	NNE6	ESE5	SE9	SE11	SE9	SE9	SSE11	SSE13	SE14	SE16	SSE15	ESE2.4	SE16
22-Feb	SE13	SSE14	SSE12	SSE10	SSE10	SSE8	SSE9	SSE7	SSE8	SE7	SE9	SE8	SSE12	SSE13	SSE13	SSE12	SSW14	SSW13	SSE10	SSW9	SW17	WSW27	WNW17	NW23	S7.9	WSW27
23-Feb	NW18	NW19	NNW17	NNW17	NW17	NNW24	NW27	NW20	NW20	NNW10	NW14	NNW15	NNE11	N12	N12	N17	NNE17	NNE21	N29	NNE25	NNE23	NE17	NE11	NE10	NNW13.9	N29
24-Feb	NE8	NE7	ESE9	ESE11	ESE10	ESE10	ESE10	ENE9	ENE9	NE10	NE7	NE11	NE10	N14	N19	N21	N24	N27	N24	N23	N23	N24	N18	N15	NNE11.5	N27
25-Feb	NNW14	NW10	NW8	NW7	NNW6	NW4	WNW6	WNW5	WNW6	NNW4	NW5	NNE5	NNE5	NNE5	NNE5	NE5	ESE4	SE10	SSE9	SSE8	SE10	SSE10	SSE11	SSE10	NNW0.6	NNW14
26-Feb	SSE11	SSE11	SSE12	SSE11	SE10	SE9	SE7	SSE8	SE8	SE8	SE11	SE9	SE10	ESE3	N6	WSW12	WSW13	WSW6	NNW6	NNW15	N12	N16	N12	N13	SE2.0	N16
27-Feb	N15	N17	N18	N17	NNE9	N9	NNE8	ENE4	SE4	SSE5	WSW3	N1	NW4	WSW8	WSW10	SW11	SW11	SW9	SSE9	SSE8	SW11	SW12	WSW13	W13	WNW2.7	N18
28-Feb	W8	WSW8	WSW11	WSW13	WSW14	NNW17	NNW20	NNW14	NNW16	NNW16	NW15	NW15	NW15	NNW15	NW13	N11	WNW8	NW14	NNE10	N24	N24	N21	N14	NNE10	NW11.2	N24
N2.9 N1.6 N2.0 NNE1.7 NNE1.9 NNE2.6 NNE2.0 NE1.1 NNE0.6 NNE0.9 N1.4 NNE2.7 NNE3.6 N3.7 N3.8 NNE3.8 NNE2.9 NE3.6 NNE5.4 NNE4.9 NNE4.2 NNE4.2 N3.2 N3.6																								Diurnal Average		
N28 N25 N26 SSE23 SSE22 WNW24 NW27 NW20 SSE20 SSE19 SSE19 SSE20 SSE20 NNE18 NNE19 N21 N24 N27 N29 NNE25 N26 NNE30 N27 N27																								Diurnal Maximum		

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

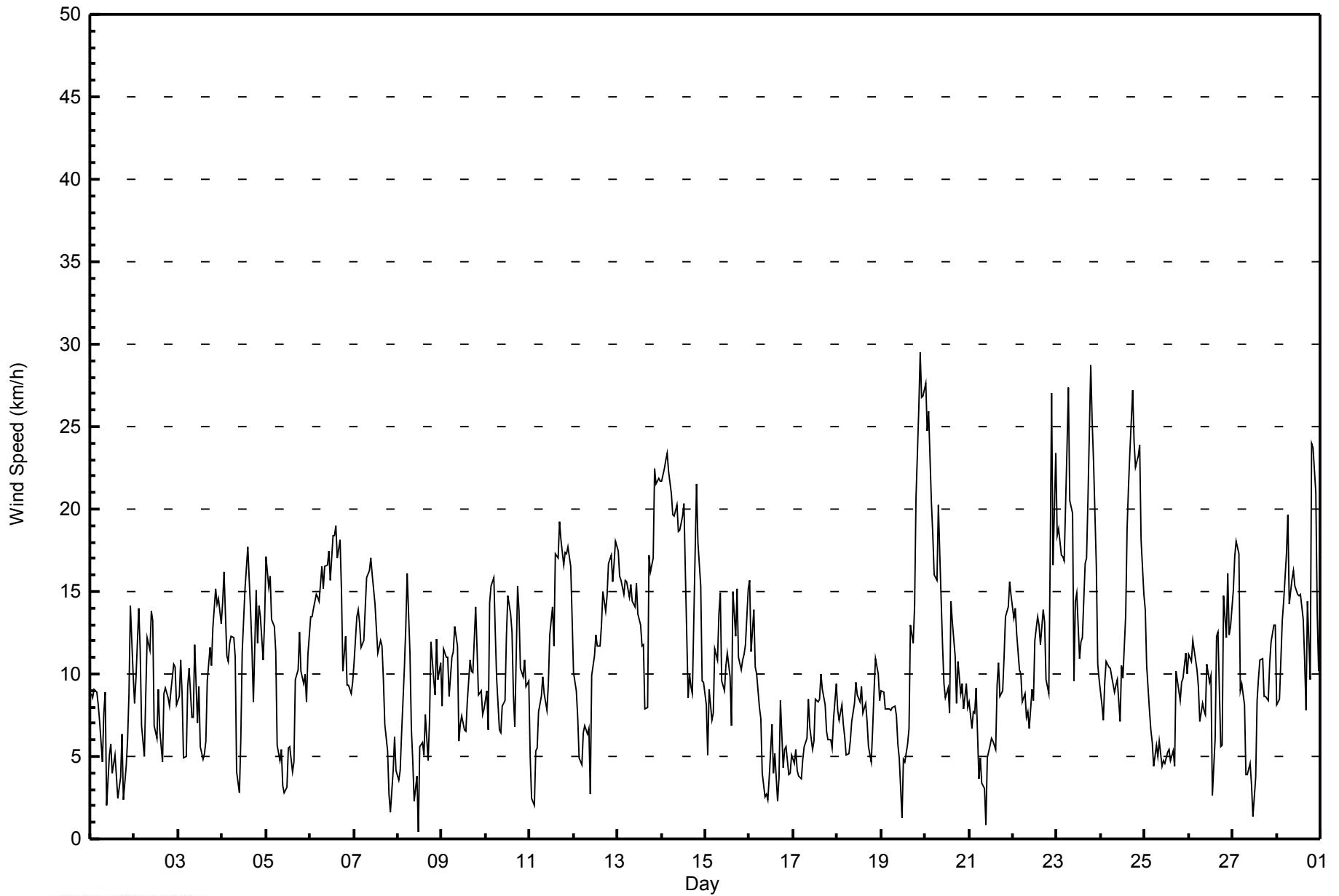


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 14 19:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Feb 11 07:00																									
Percentiles: 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> = 4 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-Feb	1	1	1	1	1	2	2	2	1	2	1	1	1	1	1	1	2	1	1	1	2	3	2	3	3
2-Feb	3	4	2	2	2	3	3	2	3	3	3	2	2	2	1	4	1	1	1	2	1	2	1	1	4
3-Feb	2	2	2	2	2	1	1	1	2	2	2	2	1	1	2	1	1	1	1	1	1	1	1	2	2
4-Feb	2	3	3	3	3	3	3	3	2	1	2	4	3	4	4	3	2	2	3	2	3	2	2	4	4
5-Feb	2	2	2	2	2	1	2	2	1	1	1	1	1	2	1	1	4	3	3	3	2	2	2	3	4
6-Feb	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	2	3	4
7-Feb	3	4	4	3	3	3	3	4	4	5	4	4	3	3	3	3	3	2	2	1	1	2	1	1	5
8-Feb	1	2	2	3	3	4	3	1	1	1	1	1	1	2	1	1	3	2	1	1	1	1	2	1	4
9-Feb	2	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	2	2	3	2	2	2	2	3
10-Feb	1	2	4	3	3	4	2	2	2	2	3	3	3	2	3	2	1	5	3	1	2	1	1	2	5
11-Feb	1	1	2	1	1	1	1	1	1	1	3	3	4	4	4	5	5	5	4	5	4	5	4	3	5
12-Feb	2	2	2	2	1	1	1	2	2	3	2	2	2	2	2	2	3	3	3	3	3	3	4	3	4
13-Feb	3	3	3	2	2	3	3	3	3	3	3	2	2	2	2	3	5	4	4	4	6	6	6	6	6
14-Feb	6	6	6	6	6	6	5	5	5	5	5	5	5	5	2	3	2	3	7	5	4	5	2	2	7
15-Feb	2	2	2	2	3	3	2	3	4	3	2	2	2	3	3	2	2	2	1	1	2	2	2	3	4
16-Feb	3	1	2	1	2	2	2	1	1	1	1	1	2	1	1	1	2	2	1	2	1	2	1	2	3
17-Feb	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2	2	2	1	1	1	1	1	1	1	2
18-Feb	1	2	2	2	1	1	2	1	2	3	3	2	2	2	2	2	2	2	1	2	2	3	2	2	3
19-Feb	2	2	2	2	2	1	2	2	2	1	1	1	2	2	2	1	2	2	2	6	4	6	5	6	6
20-Feb	6	4	4	3	3	2	3	4	3	2	3	1	2	2	3	2	2	1	2	2	2	1	2	2	6
21-Feb	1	1	1	2	1	2	2	2	1	1	1	1	1	1	2	2	2	2	1	1	2	2	2	2	2
22-Feb	2	2	2	1	2	2	2	2	2	2	2	2	3	3	3	4	4	3	3	3	5	5	5	4	5
23-Feb	3	3	5	3	3	6	5	4	3	4	3	4	4	3	2	3	4	4	5	5	6	4	2	3	6
24-Feb	2	2	3	3	3	3	3	2	2	2	2	2	2	2	3	4	3	4	3	3	3	4	3	2	4
25-Feb	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3
26-Feb	1	2	1	1	2	2	2	1	1	2	2	2	2	3	2	3	2	2	2	3	2	2	2	2	3
27-Feb	4	2	3	4	2	2	3	2	1	2	1	1	2	2	3	3	2	2	1	2	2	3	3	4	4
28-Feb	2	2	2	3	3	5	4	3	3	3	3	3	4	3	4	4	4	6	3	5	4	4	1	3	6
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	98	14.58	14.58
6 - 11	316	47.02	61.61
12 - 19	211	31.40	93.01
20 - 28	45	6.70	99.70
29 - 38	2	0.30	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

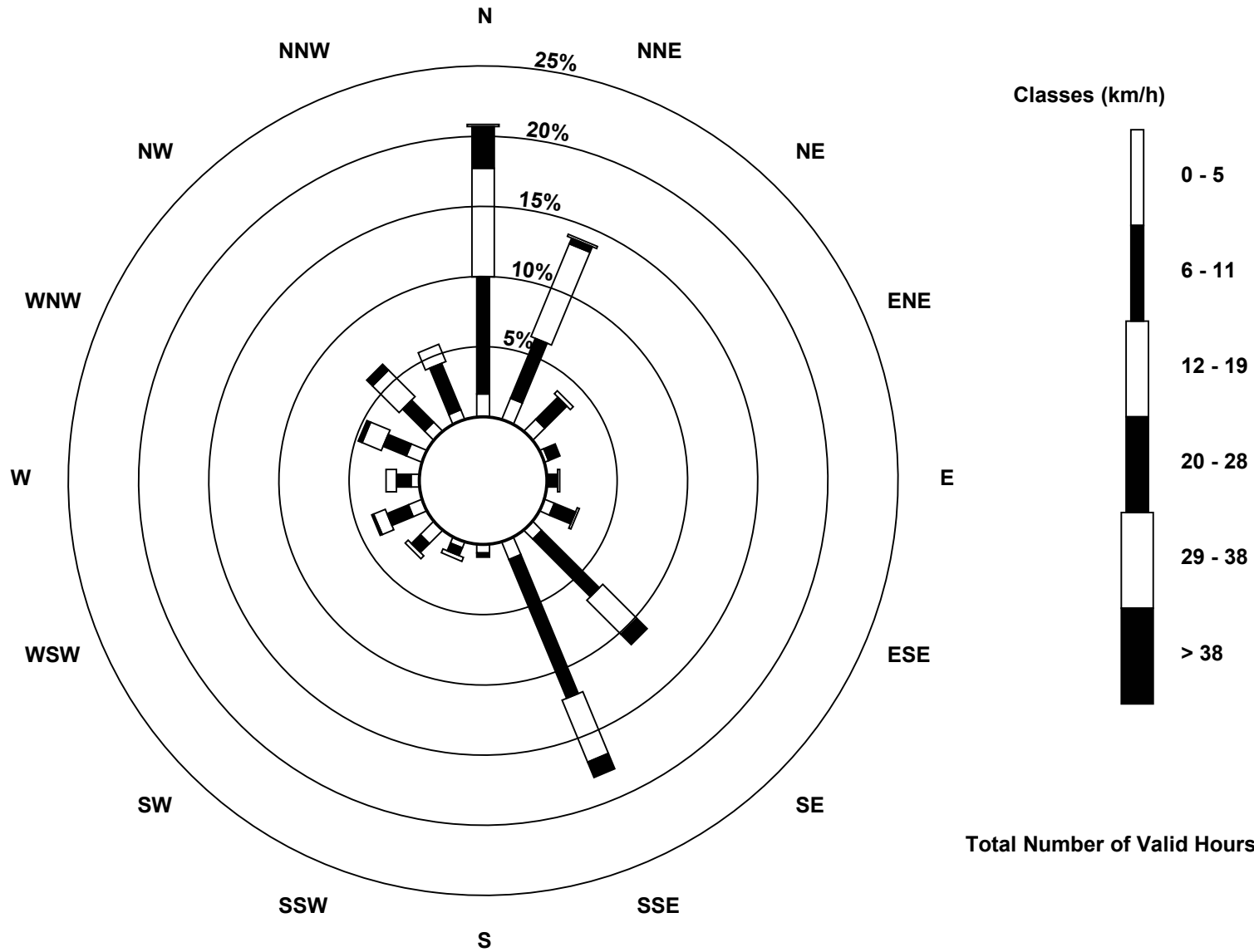
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	11	11	8	2	0	5	6	9	4	3	9	7	4	8	6	5	98
6 - 11	56	31	15	6	5	11	39	72	2	4	6	11	7	12	15	24	316
12 - 19	52	48	2	0	1	1	23	32	0	2	2	6	5	10	18	9	211
20 - 28	20	3	0	0	0	0	7	8	0	0	0	1	0	2	4	0	45
29 - 38	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	140	94	25	8	6	17	75	121	6	9	17	25	16	32	43	38	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

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







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

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

Direction of Maximum Speed: 11 deg on Feb 19 22:00																				Hours in Service: 672							
Direction of Maximum Daily Speed Average: 341.8 deg on Feb 23																				Hours of Data: 672							
Direction of Minimum Speed: 232 deg on Feb 8 12:00										Direction of Minimum Daily Speed Average: 0.6 deg on Feb 25										Hours of Missing Data: 0							
Monthly Average Direction: 313.0 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-Feb	161	160	165	167	162	156	162	155	160	160	9	5	331	280	299	359	55	57	46	221	202	253	278	268	193.4		
2-Feb	245	246	256	249	210	236	250	263	271	281	282	308	3	304	300	307	316	302	291	274	270	285	279	289	276.1		
3-Feb	285	279	315	321	345	7	1	353	323	3	5	355	2	12	38	111	143	147	148	145	140	141	142	153	75.1		
4-Feb	147	150	155	160	168	153	154	159	206	257	214	250	270	300	296	355	13	334	320	323	336	13	340	312	280.9		
5-Feb	314	311	306	308	343	355	314	224	175	172	237	260	23	41	31	20	42	39	38	37	55	25	19	18	356.2		
6-Feb	11	14	26	31	21	19	16	22	16	17	26	23	14	14	14	15	12	20	37	83	82	87	100	95	27.3		
7-Feb	106	125	136	135	138	133	136	140	140	141	140	138	133	133	135	138	147	152	144	124	50	357	4	355	133.1		
8-Feb	22	348	355	15	13	24	25	3	317	240	253	232	17	22	46	57	72	2	12	343	343	358	355	358	8.0		
9-Feb	346	359	4	1	6	9	1	360	359	350	358	357	353	349	357	354	347	349	357	356	332	345	343	346	354.9		
10-Feb	348	345	357	6	5	2	354	337	324	331	317	319	335	328	319	356	10	11	21	2	13	27	14	22	353.8		
11-Feb	344	296	225	155	168	147	153	159	156	156	140	150	152	159	147	155	147	149	148	151	154	157	156	155	153.0		
12-Feb	156	147	143	144	162	147	165	204	218	285	317	358	8	13	15	8	16	12	12	18	14	15	12	2	17.5		
13-Feb	6	17	7	4	2	17	15	12	12	18	11	15	13	9	3	21	96	121	129	133	134	136	140	140	50.0		
14-Feb	141	142	142	148	151	150	150	153	152	153	154	157	158	154	157	164	149	174	360	6	17	14	3	14	138.6		
15-Feb	21	45	45	61	46	27	32	25	21	19	5	358	0	360	359	1	20	20	7	6	10	358	0	10	15.6		
16-Feb	7	10	7	3	8	357	348	354	283	268	349	10	298	13	37	255	191	134	111	288	331	266	232	224	351.6		
17-Feb	231	159	182	248	233	192	159	151	145	145	156	140	130	131	123	121	125	132	127	135	151	161	152	147	147.3		
18-Feb	152	151	157	151	156	133	135	133	145	145	145	132	122	124	142	132	149	136	134	144	148	159	161	161	144.4		
19-Feb	159	164	165	158	170	160	162	165	157	141	152	167	15	7	355	319	352	349	354	8	3	11	10	8	19.4		
20-Feb	9	5	358	359	360	355	355	3	4	5	20	23	2	355	353	353	352	32	25	352	343	335	343	306	359.8		
21-Feb	308	303	335	330	352	354	346	356	204	297	18	29	28	18	114	129	132	141	141	157	155	146	146	147	117.9		
22-Feb	146	153	148	148	148	160	161	157	157	146	135	135	148	155	153	157	204	196	154	195	222	250	288	308	179.2		
23-Feb	308	309	295	297	307	299	316	312	315	291	304	336	25	358	358	7	15	16	11	15	30	42	48	43	341.8		
24-Feb	39	54	114	112	110	105	106	78	58	56	53	40	35	11	10	9	358	2	2	359	355	353	354	349	21.7		
25-Feb	342	323	318	318	329	322	290	289	292	296	307	13	18	27	26	39	103	134	152	162	145	150	163	159	348.1		
26-Feb	155	165	157	154	145	144	167	154	144	141	130	131	132	119	5	256	257	247	335	340	4	6	1	358	135.2		
27-Feb	360	359	5	7	16	9	17	69	128	155	248	357	326	241	240	235	227	217	164	159	233	229	238	263	290.4		
28-Feb	280	256	254	250	254	290	289	285	291	302	305	308	320	342	319	9	295	326	17	6	0	2	1	19	317.8		
5.6 10.5 8.3 21.7 30.9 31.0 16.1 34.3 16.0 29.5 8.3 19.2 22.4 9.7 9.1 23.5 33.4 40.6 31.6 22.1 23.0 15.6 9.0 3.5																								Diurnal Average			
All monthly, daily, and diurnal averages have been calculated using vector methods																											

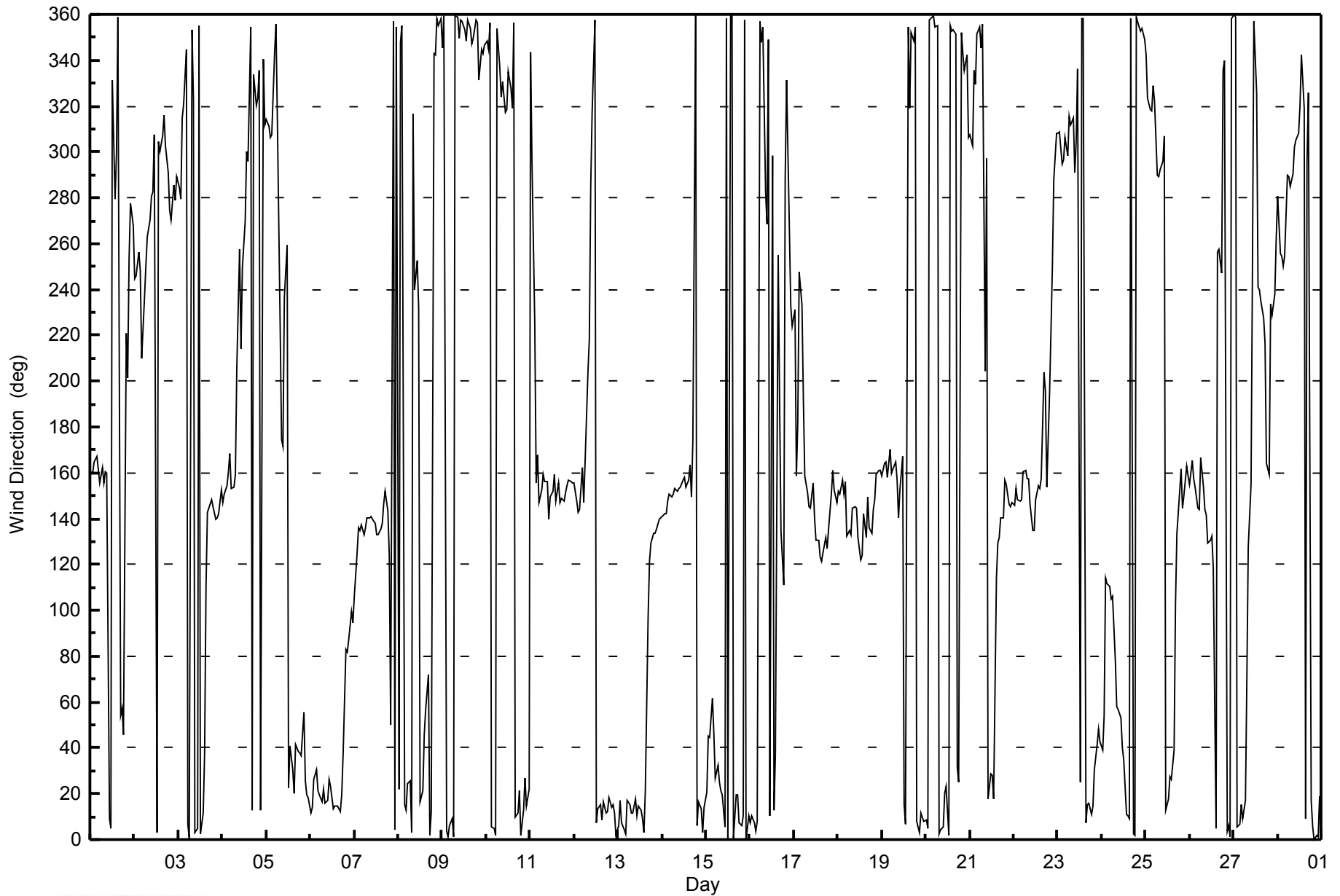


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 94 deg on Feb 19 12:00		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 4 deg on Feb 26 03:00																									
Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 15 Q <sub>3</sub> = 18 P <sub>90</sub> = 28 P <sub>99</sub> = 67																									
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	8	8	7	10	12	17	27	17	13	74	17	19	37	25	32	63	58	16	67	35	22	29	11	27	74
2-Feb	32	28	10	11	28	62	26	11	15	14	13	41	37	19	18	23	28	8	7	9	14	11	10	12	62
3-Feb	12	11	25	33	30	9	11	12	29	13	15	11	17	14	21	41	11	6	9	7	5	6	6	10	41
4-Feb	10	13	15	14	17	16	17	15	54	49	21	17	16	15	13	23	12	17	12	12	27	13	17	12	54
5-Feb	9	9	9	9	17	12	37	28	27	40	35	45	16	19	29	25	17	16	18	17	17	13	13	16	45
6-Feb	13	13	16	14	13	13	11	13	12	13	13	14	12	12	11	13	12	14	20	19	18	18	18	17	20
7-Feb	17	17	17	17	17	17	17	16	16	17	17	18	20	19	18	18	18	17	21	29	65	40	10	16	65
8-Feb	27	37	20	11	10	12	11	12	16	50	34	90	10	13	20	12	26	11	9	10	11	10	13	11	90
9-Feb	16	12	11	11	15	12	13	12	12	18	13	14	16	22	13	12	12	13	12	13	18	14	19	15	22
10-Feb	12	17	13	16	14	12	12	20	24	17	22	16	13	15	16	20	14	15	9	11	12	7	8	7	24
11-Feb	25	59	68	10	18	9	7	6	10	18	17	19	17	20	17	18	18	16	17	16	17	17	17	16	68
12-Feb	16	14	15	21	20	13	12	29	22	67	24	14	12	14	15	13	15	12	11	13	13	13	15	14	67
13-Feb	15	14	13	14	15	13	14	12	14	13	14	13	15	14	15	14	42	16	16	16	16	16	18	17	42
14-Feb	16	16	17	18	17	18	17	17	17	16	17	16	16	16	20	18	17	24	59	14	15	13	13	12	59
15-Feb	13	22	17	18	24	14	14	14	15	16	14	13	13	13	18	14	16	13	10	12	10	15	14	12	24
16-Feb	12	12	12	12	15	15	21	27	41	27	59	37	21	36	14	66	52	11	21	28	14	39	26	31	66
17-Feb	23	33	39	32	26	25	11	14	10	10	20	17	15	16	16	15	13	10	6	10	13	26	7	11	39
18-Feb	14	14	14	18	18	18	17	17	20	19	19	20	26	21	20	18	22	15	15	16	16	16	17	17	26
19-Feb	15	15	15	13	18	16	17	16	15	17	23	94	57	51	22	21	11	11	13	15	16	13	13	15	94
20-Feb	14	16	15	15	15	12	14	14	13	15	16	19	15	15	12	13	13	10	8	18	14	15	20	10	20
21-Feb	12	13	10	8	10	63	31	45	23	81	16	16	17	15	43	14	13	9	6	10	10	8	9	11	81
22-Feb	8	11	10	9	13	9	11	12	13	18	15	20	18	19	17	24	17	16	22	24	16	12	22	11	24
23-Feb	9	11	15	12	11	12	11	11	9	20	13	32	15	14	12	16	13	13	14	14	15	18	19	18	32
24-Feb	15	28	17	16	16	17	16	19	15	18	20	14	15	12	12	13	16	16	17	14	14	14	14	11	28
25-Feb	14	12	9	11	11	18	11	22	17	21	28	31	15	15	15	13	42	7	9	9	6	10	6	9	42
26-Feb	6	9	4	5	8	8	10	9	11	13	14	16	14	83	32	15	12	36	25	16	10	12	11	12	83
27-Feb	13	14	15	12	13	13	18	42	24	42	38	88	59	27	22	18	14	16	17	24	17	15	16	17	88
28-Feb	13	18	12	16	12	14	13	13	13	11	12	11	17	20	17	25	48	29	21	18	15	13	11	11	48
	32	59	68	33	30	63	37	45	54	81	59	94	59	83	43	66	58	36	67	35	65	40	26	31	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

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



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 5, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:30
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	51.00 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107926		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	11

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-592	-592
Analyzer Range (mv)	1000	1000	Lamp voltage	840	840
Calculated slope	0.990742	0.994962	Chamber temp.	45.2	45.4
Calculated intercept	-0.379581	-0.202835	Pressure (mmHg)	701.8	700.6
Analyzer Background	9.4	9.3	Flow (lpm)	0.502	0.501
Analyzer Coefficient	0.885	0.877	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	58.8	599.8	606.8	0.988
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	58.8	599.8	602.6	0.995
second point	5000	29.4	299.9	303.0	0.990
third point	5000	14.7	149.9	149.9	1.000
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	58.8	599.8	602.5	0.995
Average Correction Factor					0.995

Corrected As found 606.5 Previous response 605.7 % change -0.1%

#### Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

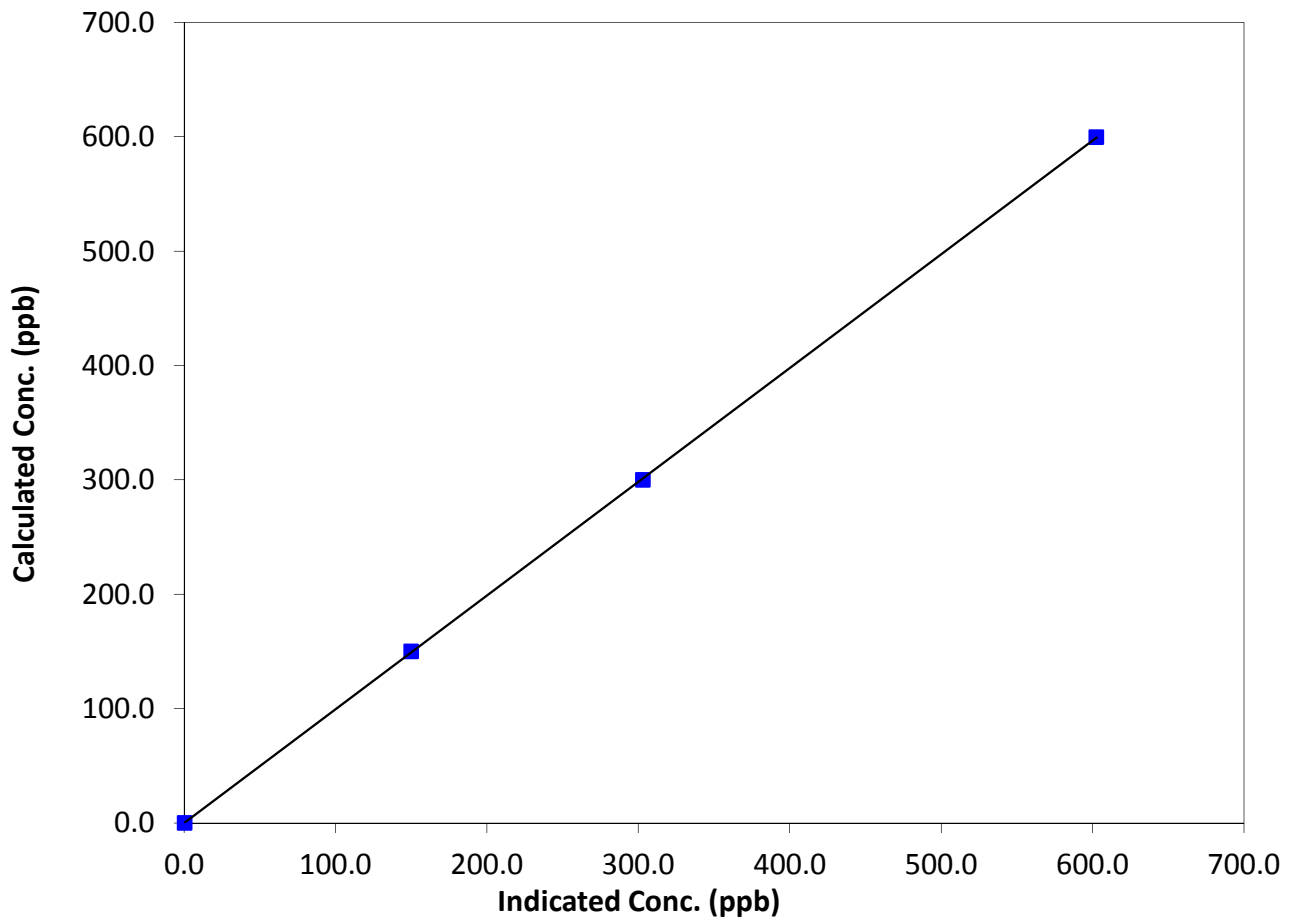
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 5, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:30	End Time (MST)	13:30
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

### Calibration Data

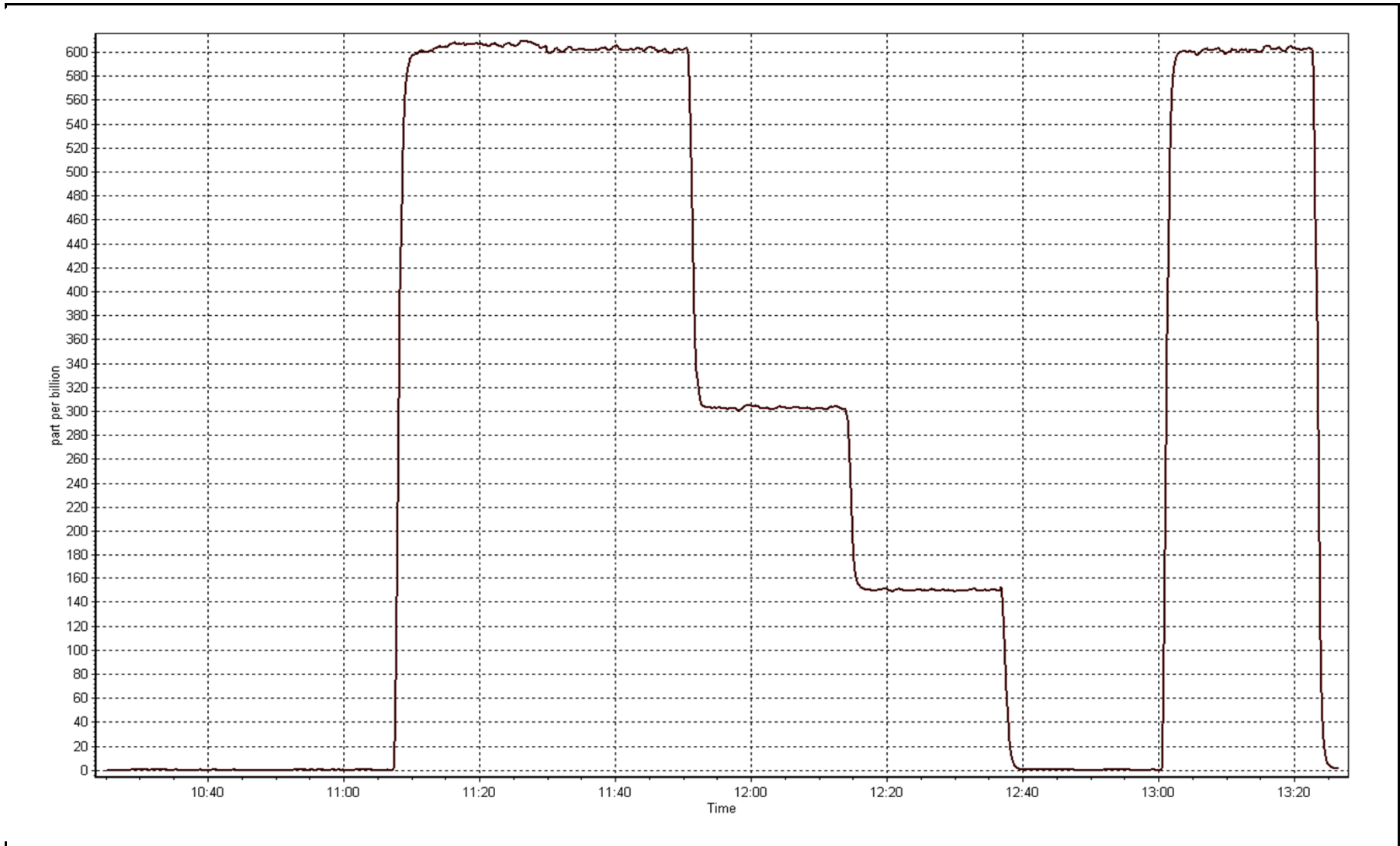
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999984
599.8	602.6	0.9954		
299.9	303.0	0.9897	Slope	0.994962
149.9	149.9	1.0002		
			Intercept	-0.202835

### SO<sub>2</sub> Calibration Curve



SO2 Calibration Plot

Date: February 3, 2015





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 5, 2014	Previous Calibration	January 12, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	14:40
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11551008
Cal Gas Concentration	9.75 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL101590	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	dig

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-617	-617
Analyzer Range (mv)	100	100	Lamp voltage	871	872
Calculated slope	0.999893	0.999405	Chamber temp.	45	45
Calculated intercept	-0.198681	-0.338715	Pressure	551.1	549.9
Analyzer Background	14.2	13.9	Flow	1.054	1.053
Analyzer Coefficient	0.868	0.852	Intensity	94	94
			Converter temp.	330	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	5000	0.0	0.0	0.2	NA
as found span	6000	46.1	74.9	76.0	0.986
SO2 scrubber check	5000	14.7	149.9	3.0	NA
calibrator zero	6000	0.0	0.0	0.2	NA
high point	6000	46.1	74.9	75.1	0.997
second point	6000	25.8	41.9	42.6	0.985
third point	6000	15.3	24.9	25.3	0.985
calibrator zero					
as left zero	5000	0.0	0.0	0.6	NA
as left span	6000	46.1	74.9		
Average Correction Factor					0.989

Corrected As found	75.8	Previous response	75.1	% change	-0.9%
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#### Notes:

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

Calibration Performed By:

Devin Russell





# Wood Buffalo Environmental Association

## H2S Calibration Summary

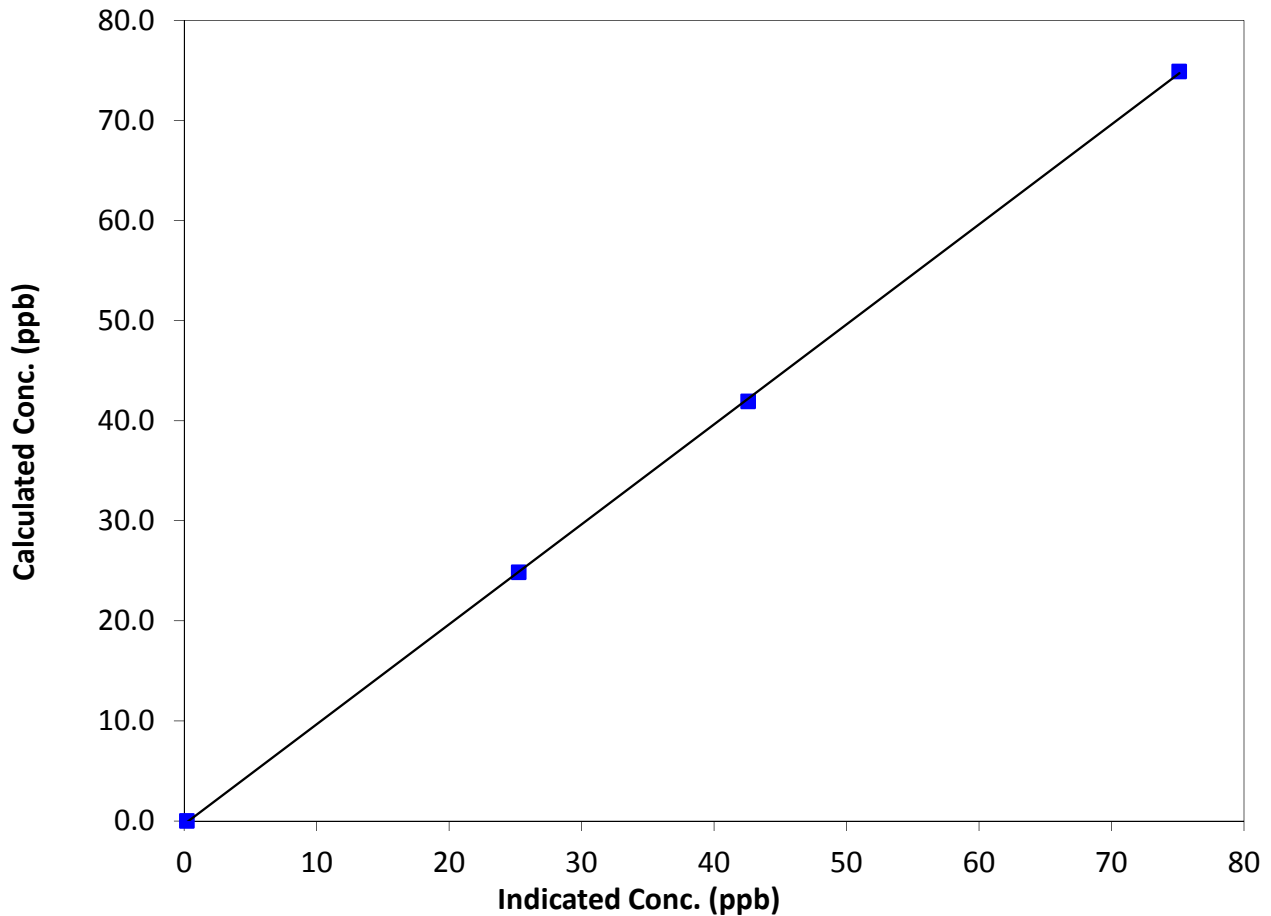
### Station Information

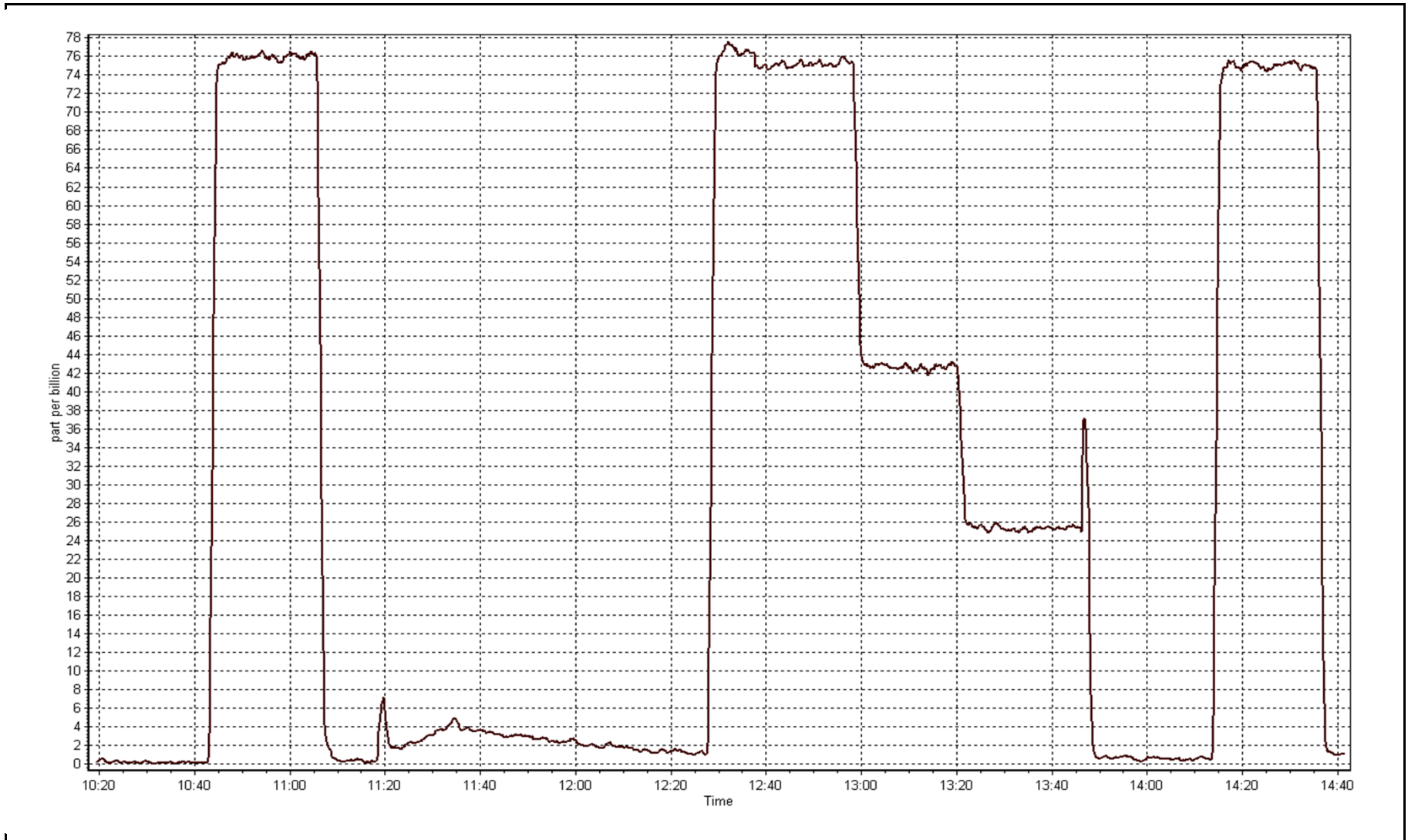
Calibration Date	February 5, 2014	Previous Calibration	January 12, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:20	End Time (MST)	14:40
Analyzer make	TEI 450i	Analyzer serial #	1336160094

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999953
74.9	75.1	0.9972		
41.9	42.6	0.9846	Slope	0.999405
24.9	25.3	0.9847		
			Intercept	-0.338715

### H2S Calibration Curve







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Tuesday, February 03, 2015	Previous Calibration	Monday, January 05, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:30
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	LL107926	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1067.8 ppm
C3H8 Cal Gas Conc.	201 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	19

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.5	8.5
Analyzer Range (mv)	25	25	Air or Bypass press	30.4	30.4
Calculated slope	1.000654	0.997009	Fuel Pressure	19.8	19.8
Calculated intercept	-0.033347	0.026688			
BKG	1.3	1.3			
COEF	4.066	4.046			

Analyzer make TEI 51i-LT Analyzer serial # 1201650671

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.04	N/A
as found span	5000	58.8	12.56	12.64	0.993
calibrator zero	5000	0.0	0.00	-0.04	N/A
high point	5000	58.8	12.56	12.56	1.000
second point	5000	29.4	6.28	6.28	1.000
third point	5005	14.7	3.14	3.13	1.002
calibrator zero					
as left zero	5000	0.0	0.00	-0.03	N/A
as left span	5000	58.8	12.56	12.57	0.999
Average Correction Factor					1.000

Corrected As found 12.68 Previous response 12.58 % change -0.8%

#### Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

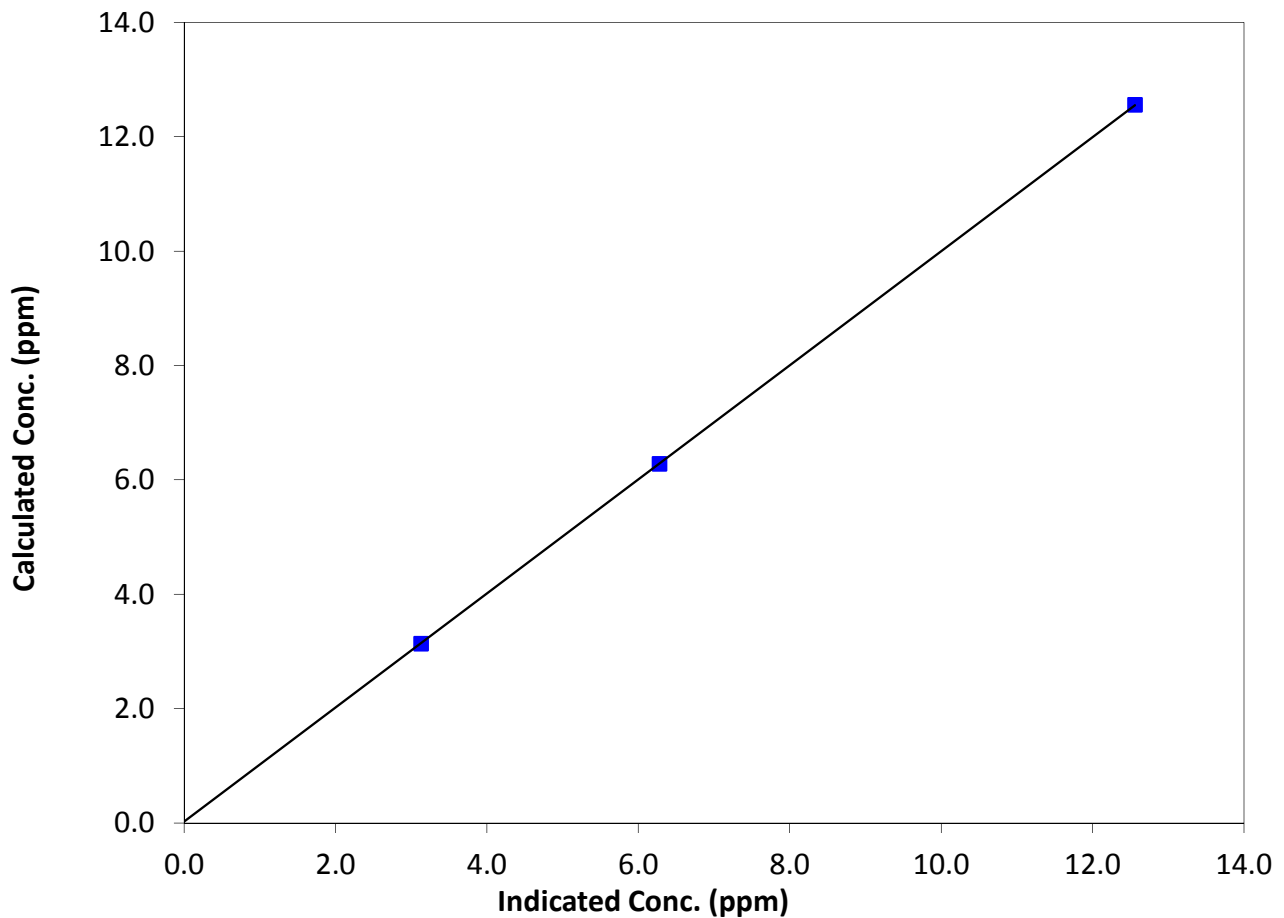
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 5, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:30	End Time (MST)	13:30
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

### Calibration Data

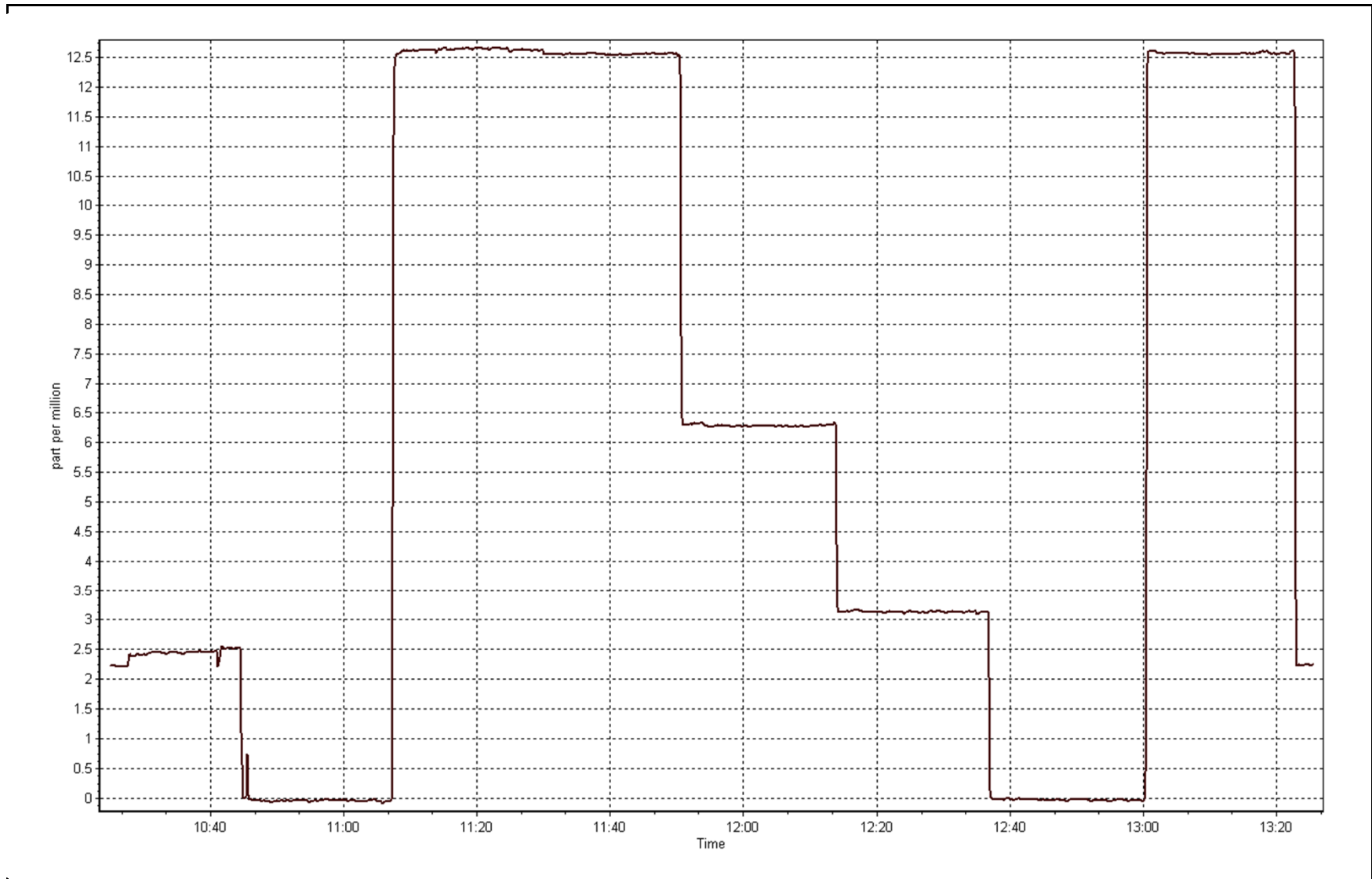
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999995
12.56	12.56	0.9997		
6.28	6.28	0.9997	Slope	0.997009
3.14	3.13	1.0019		
			Intercept	0.026688

**THC Calibration Curve**



THC Calibration Plot

Date: February 3, 2015





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 5, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:30
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	51.00 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107926		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	11

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-592	-592
Analyzer Range (mv)	1000	1000	Lamp voltage	840	840
Calculated slope	0.990742	0.994962	Chamber temp.	45.2	45.4
Calculated intercept	-0.379581	-0.202835	Pressure (mmHg)	701.8	700.6
Analyzer Background	9.4	9.3	Flow (lpm)	0.502	0.501
Analyzer Coefficient	0.885	0.877	Intensity	85	85

Analyzer make TEI 43i Analyzer serial # JC1327300932

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	58.8	599.8	606.8	0.988
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	58.8	599.8	602.6	0.995
second point	5000	29.4	299.9	303.0	0.990
third point	5000	14.7	149.9	149.9	1.000
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	58.8	599.8	602.5	0.995
Average Correction Factor					0.995

Corrected As found 606.5 Previous response 605.7 % change -0.1%

#### Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

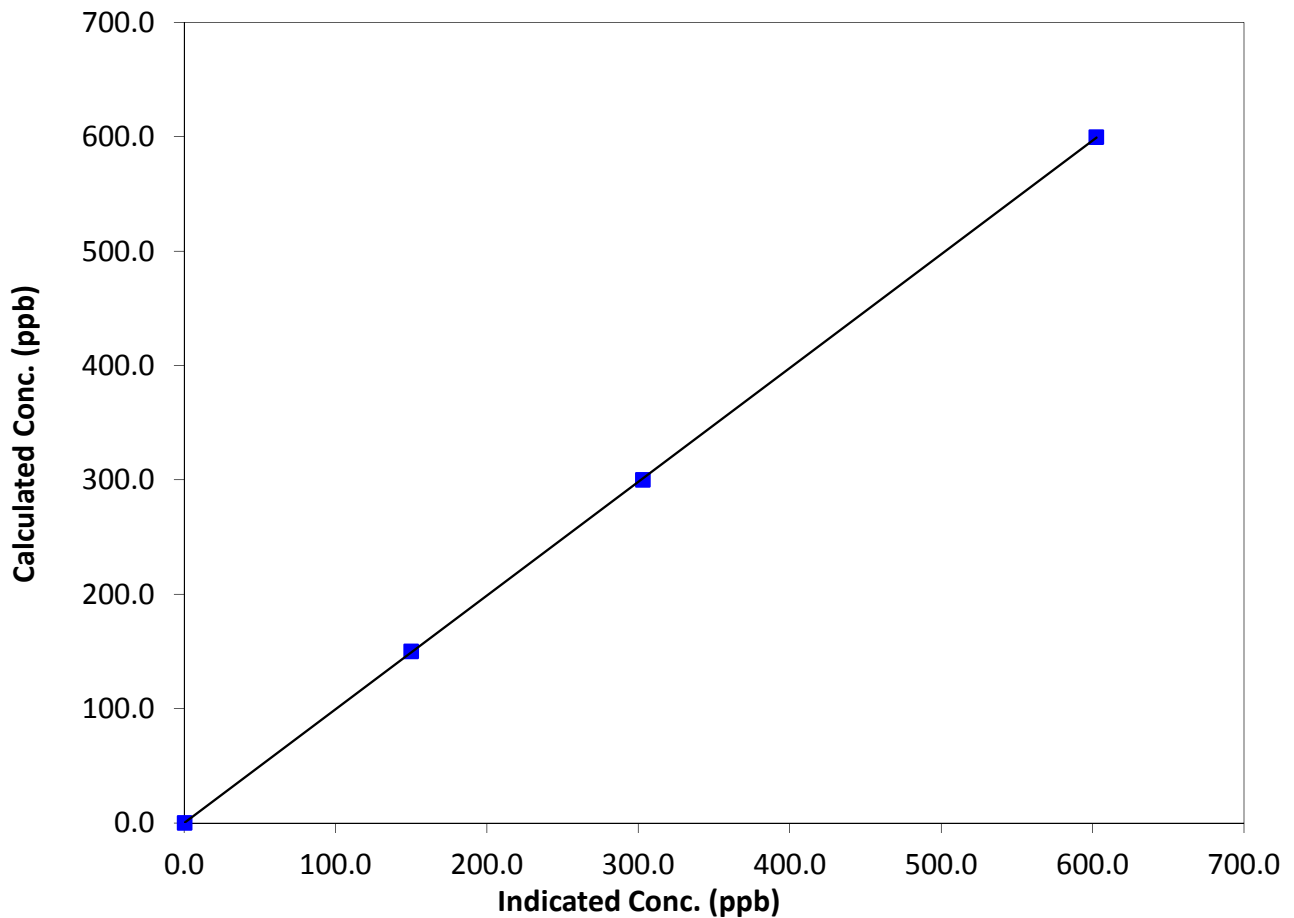
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 5, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:30	End Time (MST)	13:30
Analyzer make	TEI 43i	Analyzer serial #	JC1327300932

### Calibration Data

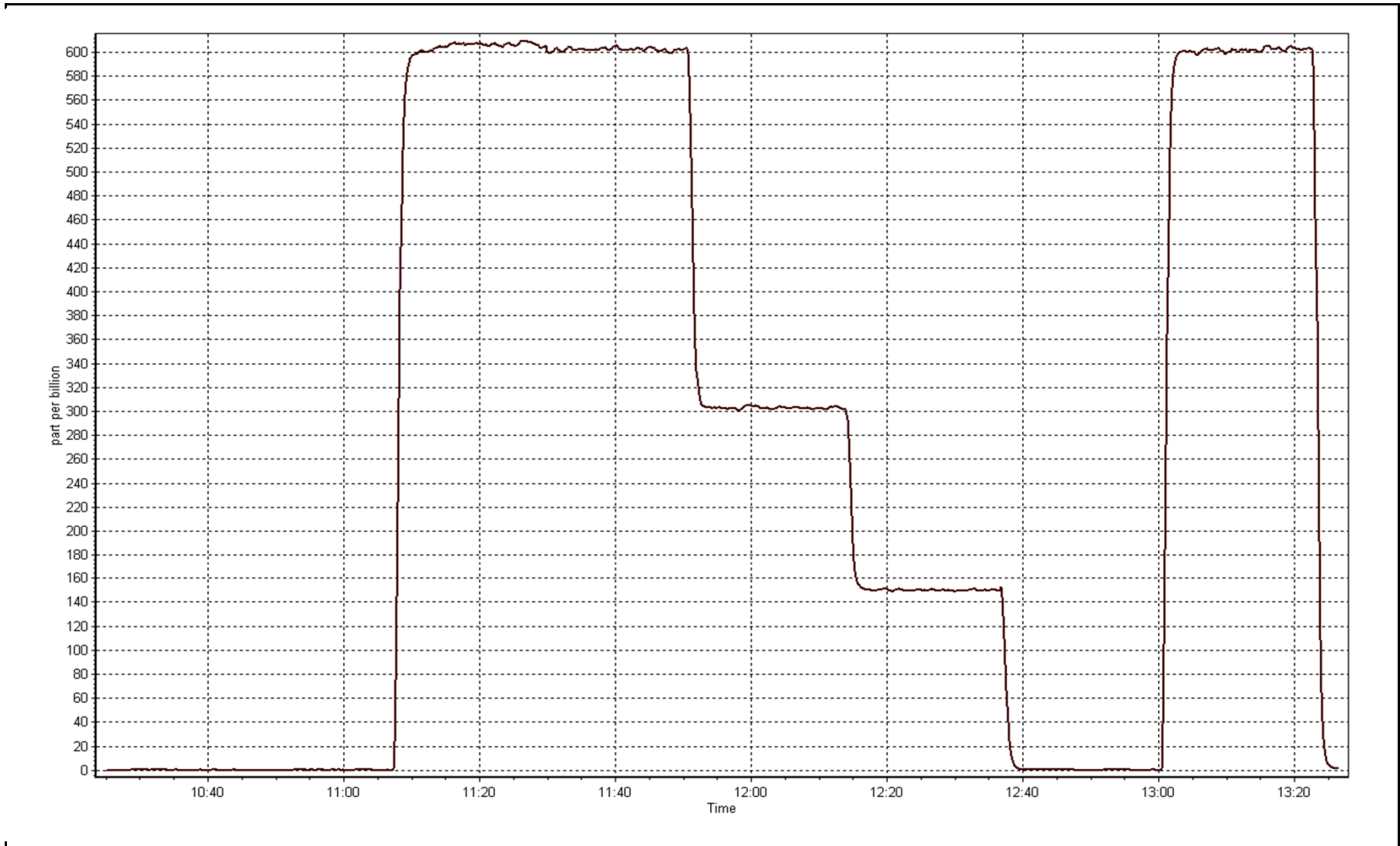
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999984
599.8	602.6	0.9954		
299.9	303.0	0.9897	Slope	0.994962
149.9	149.9	1.0002		
			Intercept	-0.202835

### SO<sub>2</sub> Calibration Curve



SO2 Calibration Plot

Date: February 3, 2015







# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 5, 2014	Previous Calibration	January 12, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:20	End Time (MST)	14:40
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11551008
Cal Gas Concentration	9.75 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL101590	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	dig

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-617	-617
Analyzer Range (mv)	100	100	Lamp voltage	871	872
Calculated slope	0.999893	0.999405	Chamber temp.	45	45
Calculated intercept	-0.198681	-0.338715	Pressure	551.1	549.9
Analyzer Background	14.2	13.9	Flow	1.054	1.053
Analyzer Coefficient	0.868	0.852	Intensity	94	94
			Converter temp.	330	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	5000	0.0	0.0	0.2	NA
as found span	6000	46.1	74.9	76.0	0.986
SO2 scrubber check	5000	14.7	149.9	3.0	NA
calibrator zero	6000	0.0	0.0	0.2	NA
high point	6000	46.1	74.9	75.1	0.997
second point	6000	25.8	41.9	42.6	0.985
third point	6000	15.3	24.9	25.3	0.985
calibrator zero					
as left zero	5000	0.0	0.0	0.6	NA
as left span	6000	46.1	74.9		
Average Correction Factor					0.989

Corrected As found	75.8	Previous response	75.1	% change	-0.9%
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#### Notes:

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

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## H2S Calibration Summary

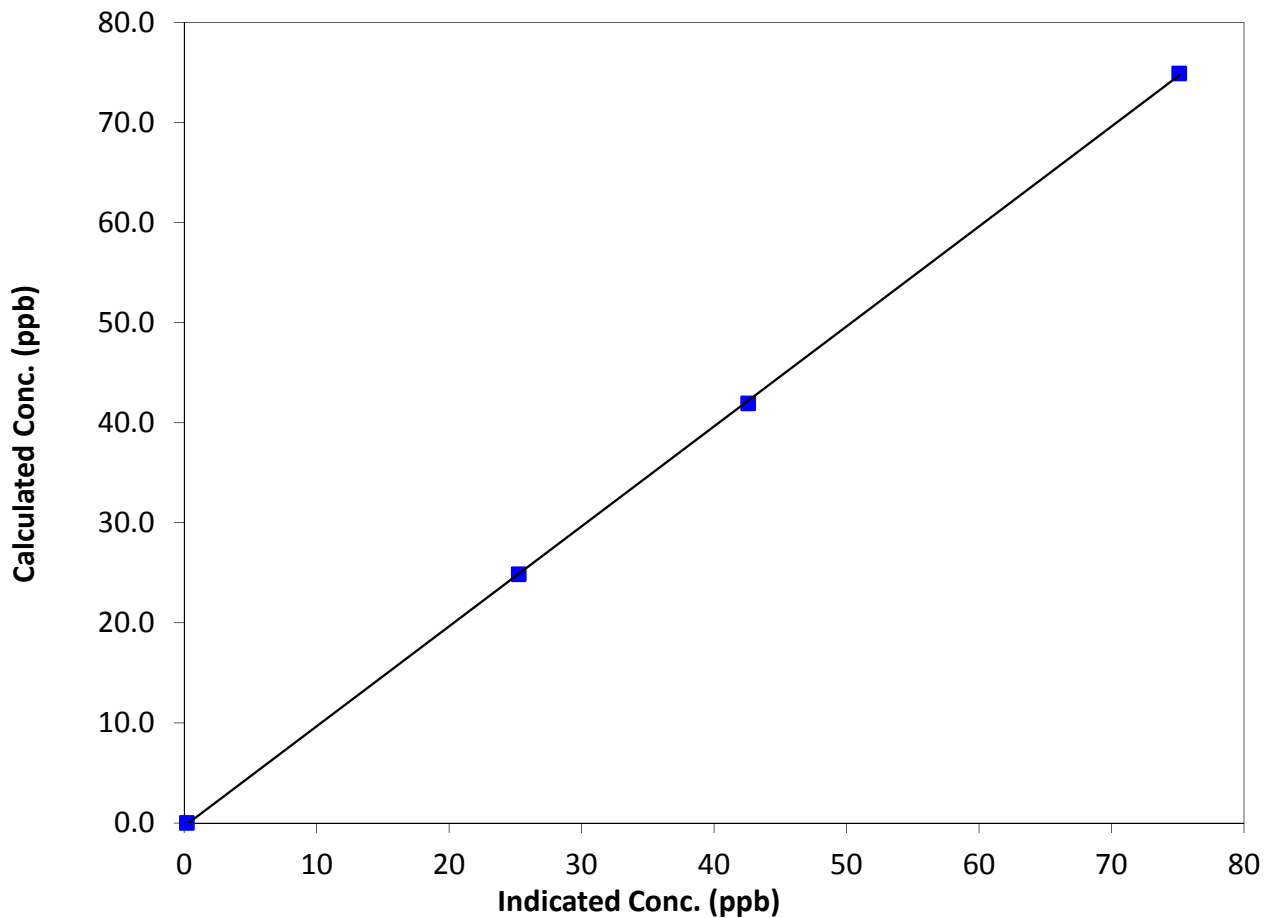
### Station Information

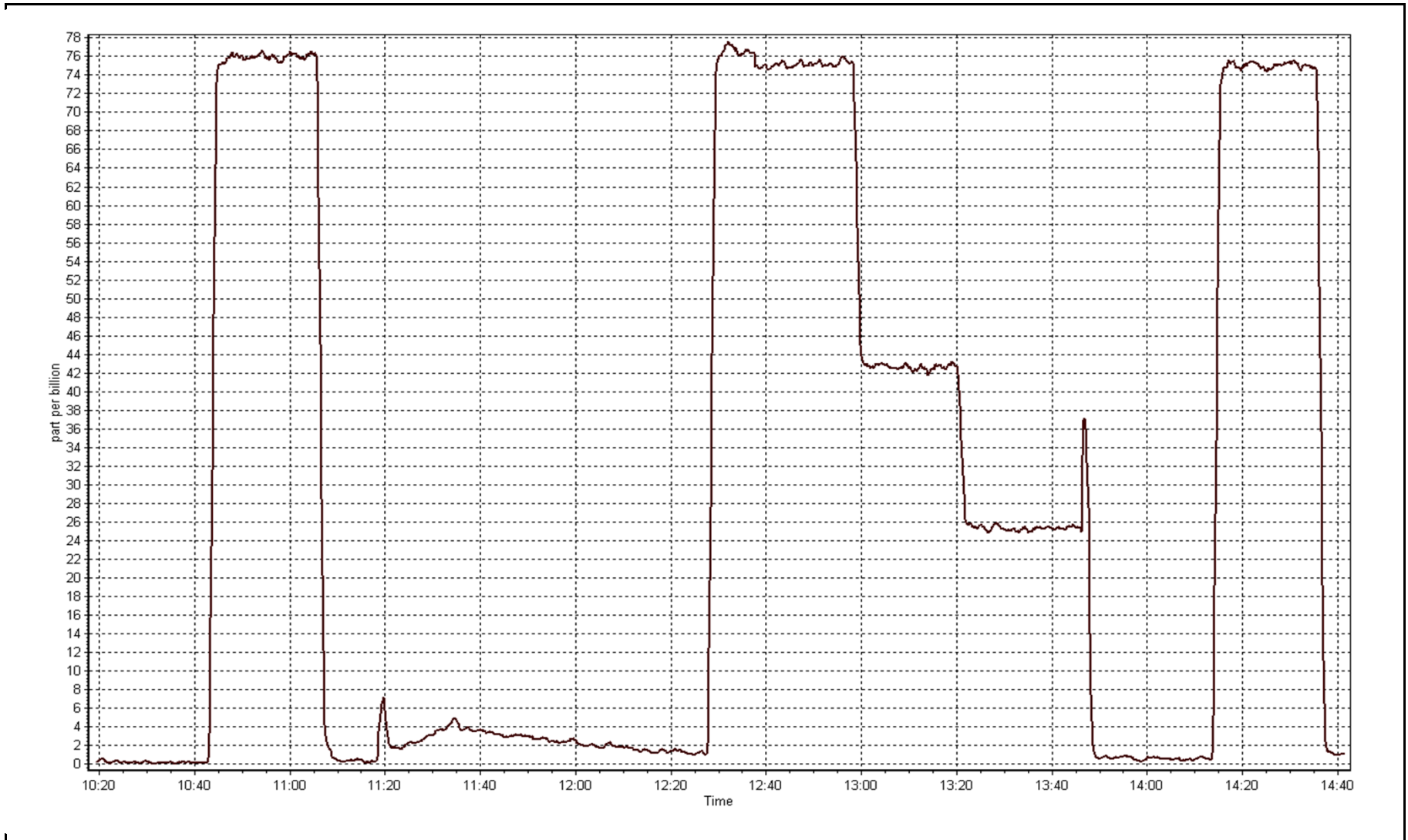
Calibration Date	February 5, 2014	Previous Calibration	January 12, 2014
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:20	End Time (MST)	14:40
Analyzer make	TEI 450i	Analyzer serial #	1336160094

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999953
74.9	75.1	0.9972		
41.9	42.6	0.9846	Slope	0.999405
24.9	25.3	0.9847		
			Intercept	-0.338715

### H2S Calibration Curve







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Tuesday, February 03, 2015	Previous Calibration	Monday, January 05, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	13:30
Barometric Pressure	747 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	LL107926	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1067.8 ppm
C3H8 Cal Gas Conc.	201 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2635
DACS voltage range	0-5V	DACS channel #	19

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.5	8.5
Analyzer Range (mv)	25	25	Air or Bypass press	30.4	30.4
Calculated slope	1.000654	0.997009	Fuel Pressure	19.8	19.8
Calculated intercept	-0.033347	0.026688			
BKG	1.3	1.3			
COEF	4.066	4.046			

Analyzer make TEI 51i-LT Analyzer serial # 1201650671

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.04	N/A
as found span	5000	58.8	12.56	12.64	0.993
calibrator zero	5000	0.0	0.00	-0.04	N/A
high point	5000	58.8	12.56	12.56	1.000
second point	5000	29.4	6.28	6.28	1.000
third point	5005	14.7	3.14	3.13	1.002
calibrator zero					
as left zero	5000	0.0	0.00	-0.03	N/A
as left span	5000	58.8	12.56	12.57	0.999
Average Correction Factor					1.000

Corrected As found 12.68 Previous response 12.58 % change -0.8%

#### Notes:

Adjusted span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

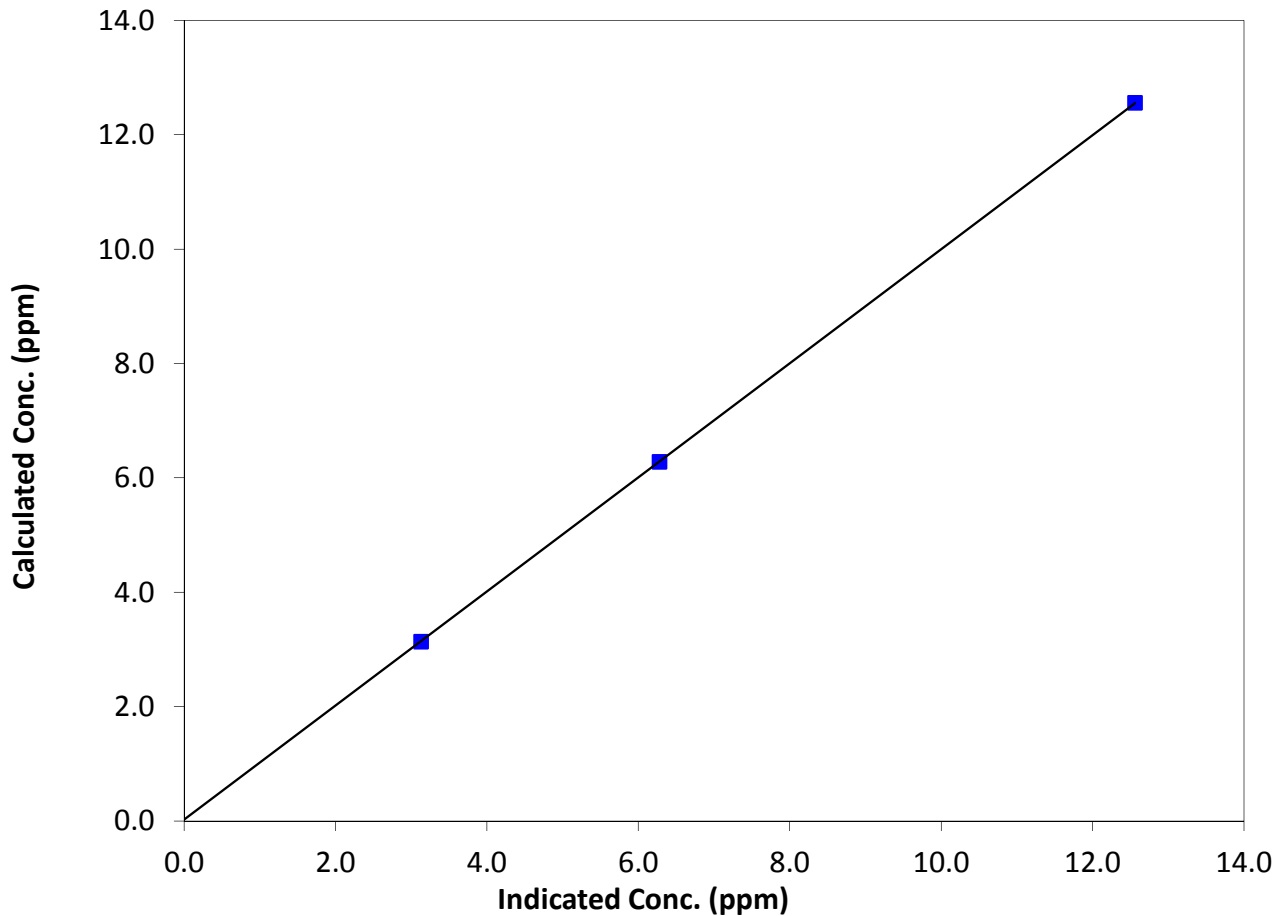
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 5, 2015
Station Name	Buffalo Viewpoint	Station Number	AMS 4
Start Time (MST)	10:30	End Time (MST)	13:30
Analyzer make	TEI 51i-LT	Analyzer serial #	1201650671

### Calibration Data

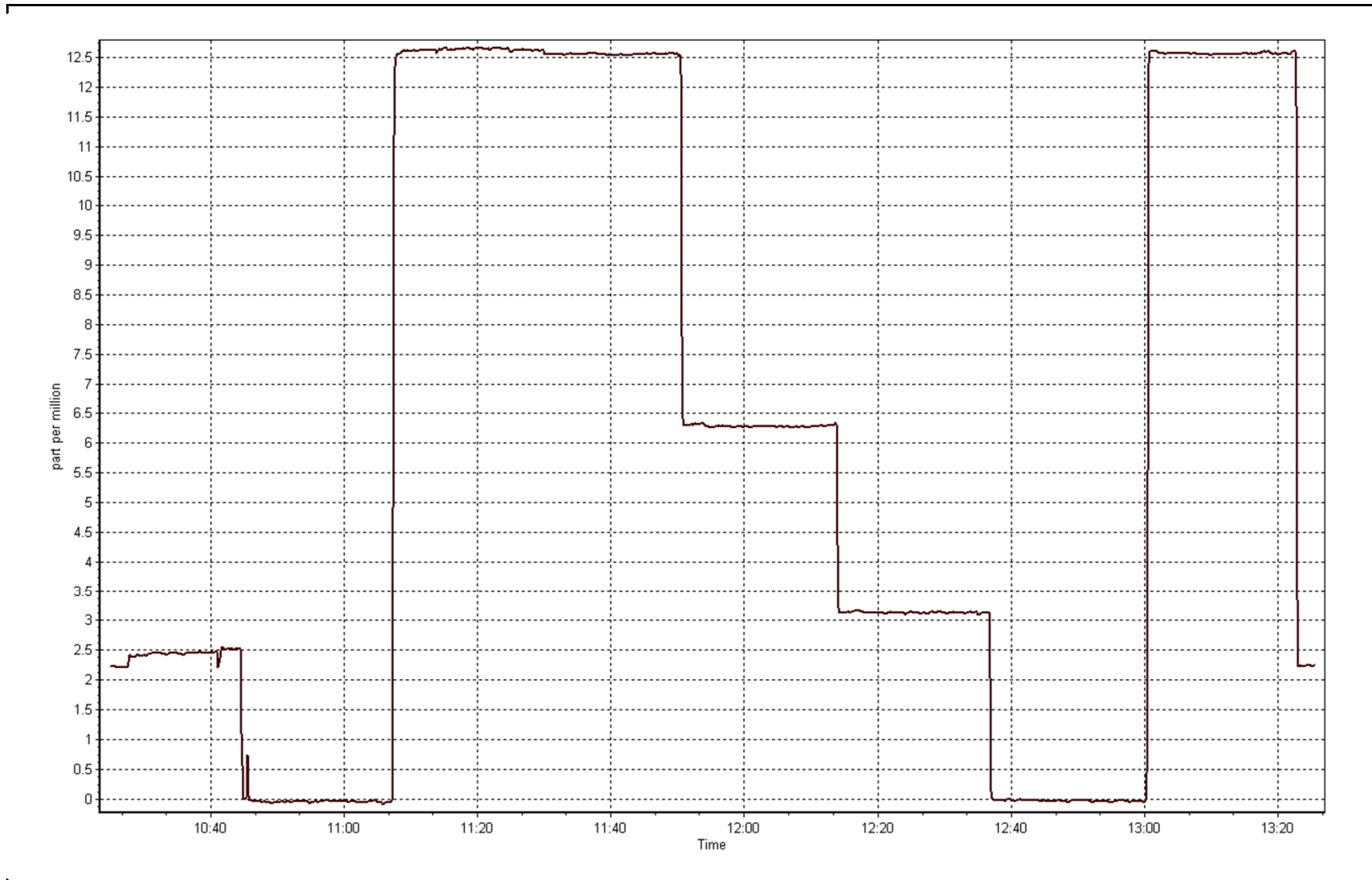
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.04	N/A	Correlation Coefficient	0.999995
12.56	12.56	0.9997		
6.28	6.28	0.9997	Slope	0.997009
3.14	3.13	1.0019		
			Intercept	0.026688

THC Calibration Curve



THC Calibration Plot

Date: February 3, 2015



**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 5  
MANNIX  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
FEBRUARY 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	638	34	34	100.00	91	0	11	0
H2S (ppb) Average	638	34	34	100.00	3	0	2	0
THC (ppm) Average	624	38	48	98.51	3.8	-	2.9	-
Temperature 2 m (C) Average	672	0	0	100.00	2.3	-	-2.5	-
Temperature 20 m (C) Average	672	0	0	100.00	2.9	-	-2.5	-
Temperature 45 m (C) Average	672	0	0	100.00	3	-	-2.6	-
Temperature 75 m (C) Average	672	0	0	100.00	3	-	-2.8	-
Temperature 90 m (C) Average	672	0	0	100.00	3	-	-2.9	-
Relative Humidity 2 m (%) Average	672	0	0	100.00	92	-	-	-
Relative Humidity 20 m (%) Average	672	0	0	100.00	93	-	-	-
Relative Humidity 45 m (%) Average	672	0	0	100.00	93	-	-	-
Relative Humidity 75 m (%) Average	672	0	0	100.00	94	-	-	-
Relative Humidity 90 m (%) Average	672	0	0	100.00	95	-	-	-
Wind Speed 20 m (km/h) Average	672	0	0	100.00	28	-	-	-
Wind Speed 45 m (km/h) Average	670	0	2	99.70	37	-	-	-
Wind Speed 75 m (km/h) Average	620	0	52	92.26	41	-	-	-
Wind Speed 90 m (km/h) Average	638	0	34	94.94	42	-	-	-
Wind Direction 20 m (deg) Average	672	0	0	100.00	-	-	-	-
Wind Direction 45 m (deg) Average	670	0	2	99.70	-	-	-	-
Wind Direction 75 m (deg) Average	620	0	52	92.26	-	-	-	-
Wind Direction 90 m (deg) Average	638	0	34	94.94	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	672	0	0	100.00	0.8	-	-	-
Vertical Wind Speed 45 m (km/h) Average	670	0	2	99.70	1.5	-	-	-
Vertical Wind Speed 75 m (km/h) Average	620	0	52	92.26	1.9	-	-	-
Vertical Wind Speed 90 m (km/h) Average	638	0	34	94.94	4.7	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MANNIX (AMS 5)  
 FEBRUARY 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	638	3	7	-	0	0	0	1	2	7	91
H2S (ppb) Average	638	0.6	1	-	0	0	0	0	1	1	3
THC (ppm) Average	624	2.31	0.3	-	2.1	2.1	2.2	2.2	2.4	2.6	3.8
Temperature 2 m (C) Average	672	-16.65	6.9	-	-33.6	-24.5	-21.8	-18.1	-11.8	-7.3	2.3
Temperature 20 m (C) Average	672	-16.48	6.7	-	-32.7	-24.2	-21.4	-17.5	-12.2	-7.2	2.9
Temperature 45 m (C) Average	672	-16.45	6.6	-	-32.3	-23.8	-21.3	-17.5	-12.4	-7.6	3
Temperature 75 m (C) Average	672	-16.37	6.4	-	-30.1	-23.4	-21.1	-17.3	-12.6	-7.7	3
Temperature 90 m (C) Average	672	-16.35	6.4	-	-29.1	-23.4	-21	-17.1	-12.7	-7.4	3
Relative Humidity 2 m (%) Average	672	73.5	7	-	50	64	70	75	78	80	92
Relative Humidity 20 m (%) Average	672	73.2	7	-	46	63	69	75	78	81	93
Relative Humidity 45 m (%) Average	672	73	8	-	46	62	69	74	78	81	93
Relative Humidity 75 m (%) Average	672	73.3	8	-	46	62	69	75	78	81	94
Relative Humidity 90 m (%) Average	672	73.9	8	-	47	63	69	75	79	82	95
Wind Speed 20 m (km/h) Average	672	10.6	5	-	1	5	7	10	13	18	28
Wind Speed 45 m (km/h) Average	670	14.5	7	-	0	6	10	14	19	24	37
Wind Speed 75 m (km/h) Average	620	16.9	9	-	0	5	11	16	23	30	41
Wind Speed 90 m (km/h) Average	638	18.1	9	-	1	6	11	18	24	32	42
Wind Direction 20 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Wind Direction 45 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-
Wind Direction 75 m (deg) Average	620	-	-	-	-	-	-	-	-	-	-
Wind Direction 90 m (deg) Average	638	-	-	-	-	-	-	-	-	-	-
Vertical Wind Speed 20 m (km/h) Average	672	0	0.3	-	-0.7	-0.4	-0.2	-0.1	0.2	0.4	0.8
Vertical Wind Speed 45 m (km/h) Average	670	0.18	0.4	-	-1	-0.4	-0.2	0.1	0.5	0.8	1.5
Vertical Wind Speed 75 m (km/h) Average	620	0.19	0.4	-	-0.8	-0.3	-0.1	0.1	0.4	0.7	1.9
Vertical Wind Speed 90 m (km/h) Average	638	0.6	1	-	-1.7	-0.4	0	0.4	1	2	4.7

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	05 Feb 2015 02:00	05 Feb 2015 11:00	10	Analyzer failure - Daily QA check failure
Wind Speed. Wind Direction, Vertical Wind Speed 45 m	01 Feb 2015 12:00	01 Feb 2015 13:00	2	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 75 m	01 Feb 2015 01:00	03 Feb 2015 04:00	52	Flat line in sensor output signal - Sensor frozen
Wind Speed. Wind Direction, Vertical Wind Speed 90 m	01 Feb 2015 01:00	02 Feb 2015 10:00	34	Flat line in sensor output signal - Sensor frozen

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Summary of Hour Averages

Mannix - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 91 ppb on Feb 20 21:00	Maximum Daily Average: 11.4 ppb on Feb 20		Hours of Data:	638
Minimum Value: 0 ppb on Feb 24 06:00	Minimum Daily Average: 0.3 ppb on Feb 6		Hours of Missing Data:	34
Maximum Diurnal Average: 6.8 ppb at hour 20	Minimum Diurnal Average: 1.0 ppb at hour 11		Hours of Calibration:	34
Monthly Average: 3.0 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> =7 P <sub>99</sub> =34		Percent Operational Time:	100.0

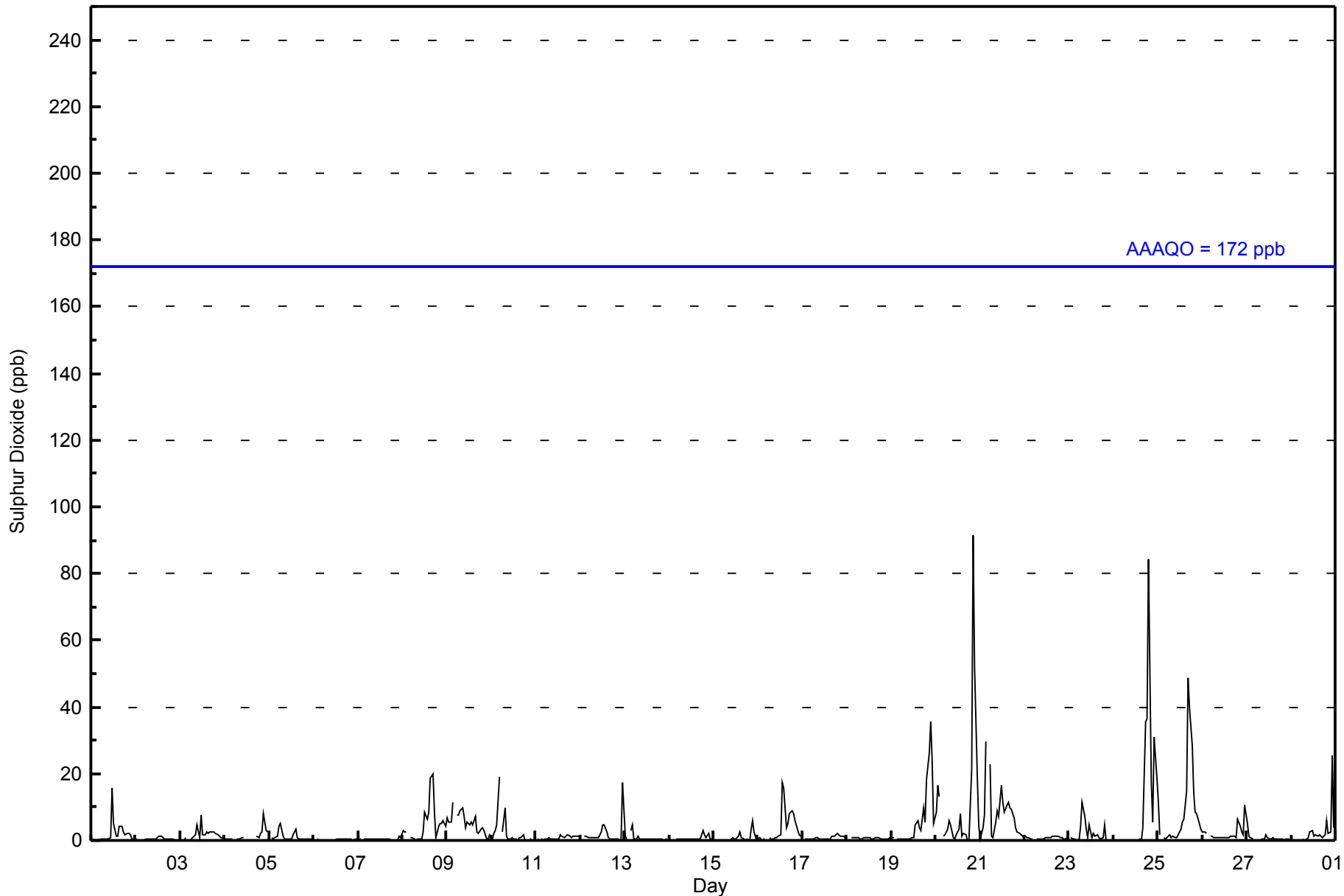
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	1	16	5	1	1	4	4	2	2	2	2	2	1	0	2.0	16
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1
3-Feb	0	0	0	1	Z	0	0	1	2	5	1	8	2	2	2	2	3	3	3	2	2	1	1	1	1.7	8
4-Feb	1	0	0	0	0	Z	0	0	1	1	1	C	C	C	C	C	C	1	1	2	3	8	3	3	--	8
5-Feb	Z	1	0	1	1	4	5	1	1	0	0	0	1	2	3	1	0	0	0	1	0	0	0	0	1.1	5
6-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.3	1
8-Feb	3	2	3	Z	1	1	0	0	0	1	1	2	8	6	8	19	20	8	1	4	5	5	6	4	4.8	20
9-Feb	7	5	6	12	Z	8	8	9	10	7	4	5	5	6	5	7	3	2	3	4	3	0	0	2	5.2	12
10-Feb	0	2	3	5	19	Z	3	10	1	0	1	1	0	0	0	1	1	2	0	0	0	0	0	0	2.2	19
11-Feb	Z	0	0	0	0	0	1	1	1	0	0	0	1	2	1	1	1	2	1	1	1	1	1	1	0.8	2
12-Feb	1	Z	1	1	1	1	1	1	1	1	1	2	5	5	2	1	0	0	0	0	0	0	1	17	1.9	17
13-Feb	1	0	Z	3	5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	5
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	0	3	2	1	2	0	0	0.6	3
15-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	3	1	0	0	0	0	4	6	2	0	0.9	6
16-Feb	1	1	0	0	0	Z	1	1	0	1	1	2	18	15	4	5	8	9	8	6	3	2	1	1	3.8	18
17-Feb	Z	1	1	0	0	0	1	1	1	0	0	0	0	0	1	1	1	2	2	1	1	1	1	1	0.8	2
18-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
19-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	5	6	4	3	10	5	18	26	36	24	5	1	6.5	36
20-Feb	8	17	13	Z	1	2	3	6	4	1	0	2	4	8	1	2	2	0	0	21	91	52	18	4	11.4	91
21-Feb	0	4	7	30	Z	23	1	1	6	9	7	17	12	8	10	11	10	9	7	4	3	2	2	1	8.0	30
22-Feb	1	1	1	1	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0.8	1
23-Feb	Z	1	0	0	0	0	4	11	7	3	1	5	1	2	1	2	1	0	1	5	0	0	0	0	2.0	11
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	35	37	84	17	6	31	19	10.2	84
25-Feb	12	2	Z	1	1	1	2	1	1	1	1	2	3	5	6	15	49	40	28	14	8	8	5	3	9.1	49
26-Feb	3	2	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	4	2	2	10	2.0	10
27-Feb	5	1	1	0	Z	0	0	0	0	0	2	1	0	1	1	1	0	0	0	0	0	0	0	0	0.7	5
28-Feb	0	0	0	0	0	Z	0	0	0	1	2	3	1	2	1	2	1	1	2	6	2	3	25	4	2.5	25
	1.9	1.8	1.8	2.5	1.5	1.9	1.2	1.8	1.5	1.3	1.0	2.6	2.1	2.9	2.8	3.0	4.2	4.7	3.9	6.8	6.5	5.1	4.6	2.9		Diurnal Average
	12	17	13	30	19	23	8	11	10	9	7	17	12	18	15	19	49	40	37	84	91	52	31	19		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  
Mannix - February 2015





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	601	94.20	94.20
11 - 20	21	3.29	97.49
21 - 60	14	2.19	99.69
61 - 110	2	0.31	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Mannix - February 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	59	89	13	17	16	17	87	89	12	9	9	27	36	37	36	48	601
11 - 20	8	0	0	1	3	1	1	1	0	0	0	0	0	1	3	2	21
21 - 60	8	3	0	0	0	1	1	1	0	0	0	0	0	0	0	0	14
61 - 110	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	77	92	13	18	19	19	89	91	12	9	9	27	36	38	39	50	638

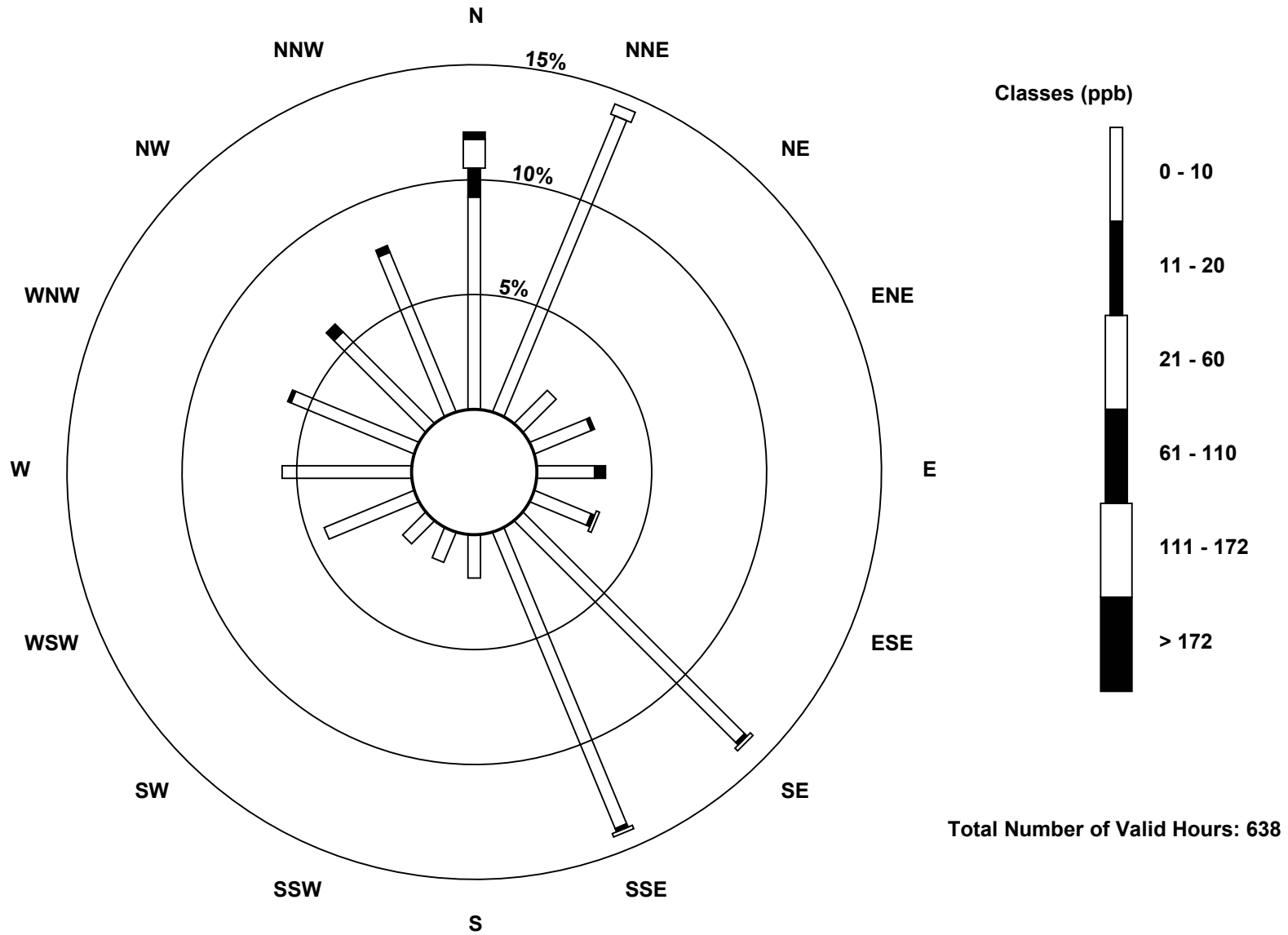
Total Number of Valid Hours: 638

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

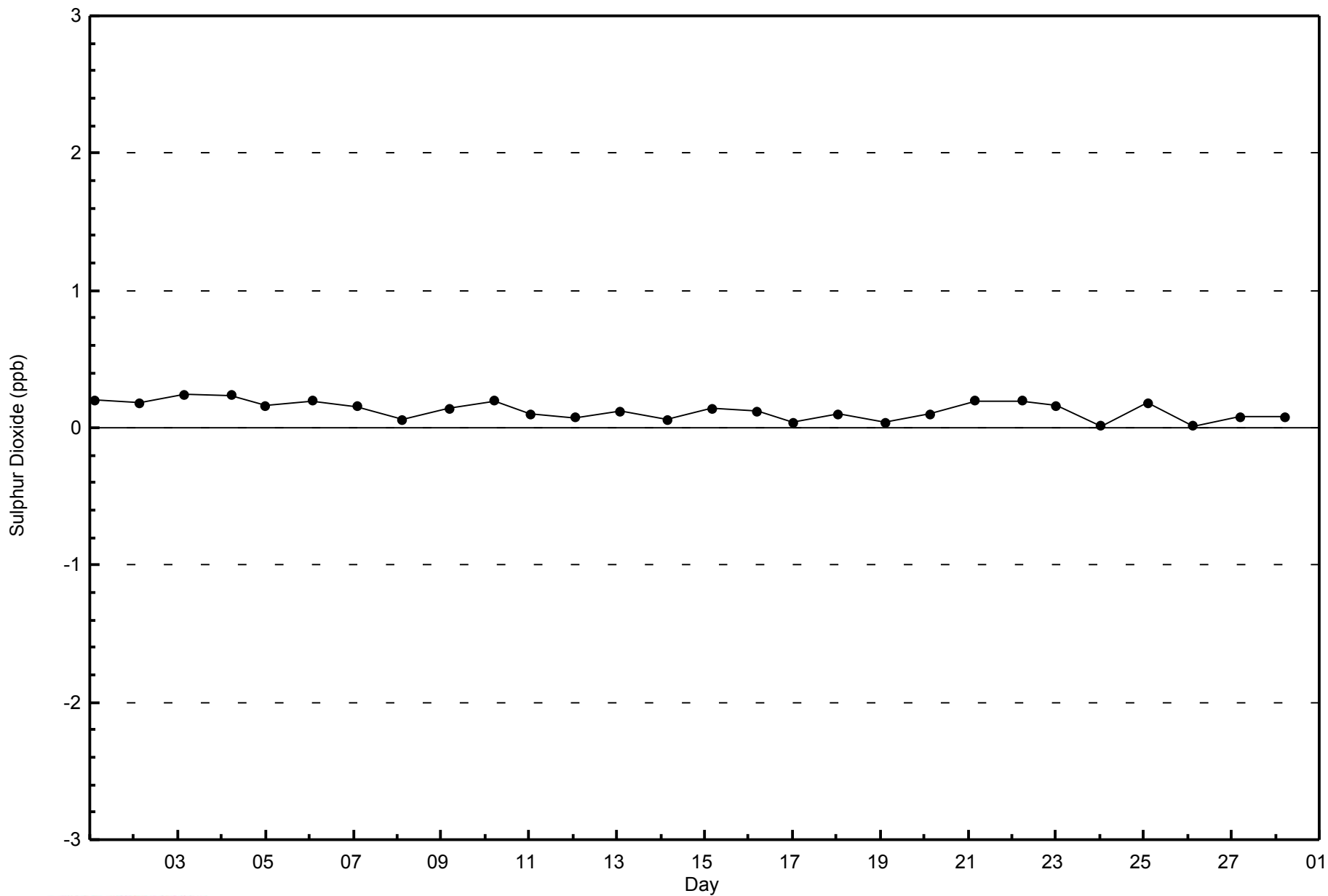
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix (AMS 5)





WBEA  
Zero Responses

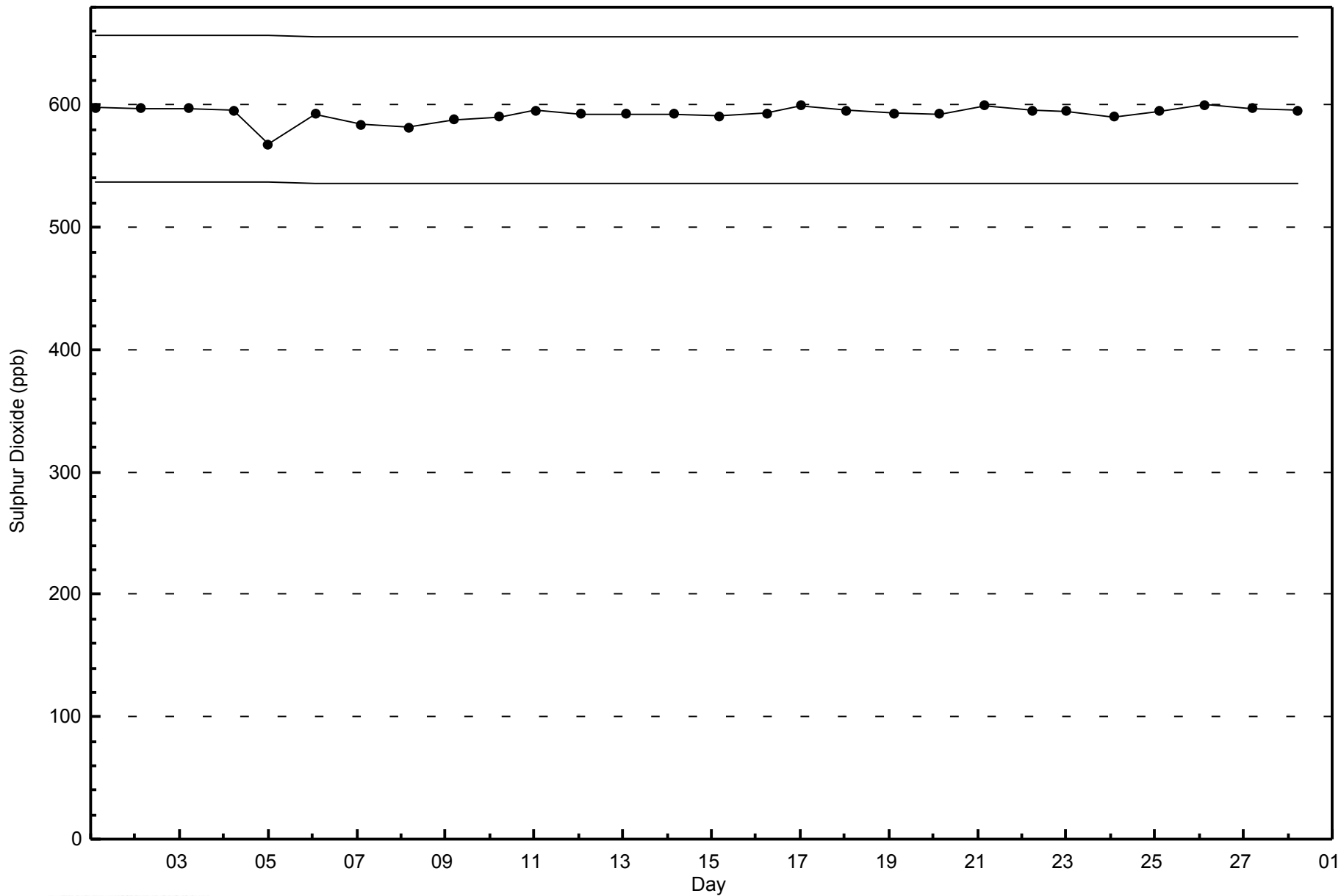
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Mannix - February 2015





WBEA  
Span Responses

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



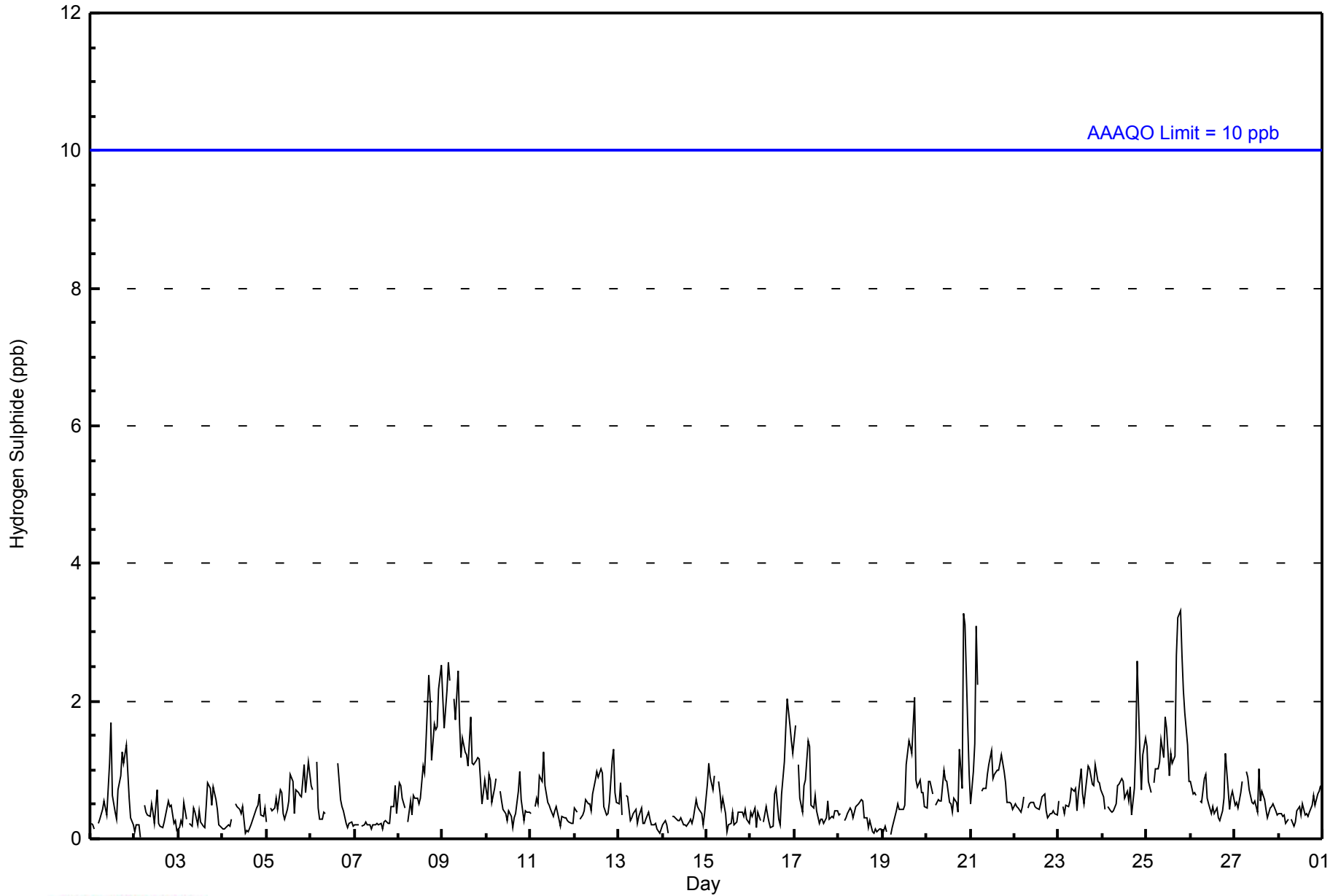


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 3 ppb on Feb 25 19:00										Maximum Daily Average: 1.5 ppb on Feb 25										Hours of Data: 638						
Minimum Value: 0 ppb on Feb 2 04:00										Minimum Daily Average: 0.3 ppb on Feb 7										Hours of Missing Data: 34						
Maximum Diurnal Average: 0.8 ppb at hour 21										Minimum Diurnal Average: 0.5 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> =1 P <sub>90</sub> =1 P <sub>99</sub> =2										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	0	Z	0	0	0	1	0	0	1	2	1	0	0	1	1	1	1	1	1	0	0	0	0.6	2
2-Feb	0	0	0	0	Z	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0.3	1
3-Feb	0	0	0	1	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0.4	1
4-Feb	0	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.3	1
5-Feb	0	Z	0	0	0	1	0	1	1	0	0	0	1	1	1	0	1	1	1	1	1	1	1	1	0.6	1
6-Feb	1	1	Z	1	0	0	0	0	0	C	C	C	C	C	C	1	1	0	0	0	0	0	0	0	--	1
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.3	1
8-Feb	1	1	1	0	Z	0	1	0	1	1	1	1	1	1	1	1	2	2	1	2	2	2	2	3	1.1	3
9-Feb	2	2	2	3	2	Z	2	2	2	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1.5	3
10-Feb	1	1	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.5	1
11-Feb	0	Z	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
12-Feb	0	0	Z	0	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0.6	1
13-Feb	0	1	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
14-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.3	1
15-Feb	1	1	1	1	1	Z	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	1	1	2	2	2	1	1	1	0.7	2
17-Feb	2	Z	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0.6	2
18-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.3	1
19-Feb	0	0	0	Z	0	0	0	0	1	0	0	0	0	1	1	1	1	2	1	1	1	1	1	0	0.6	2
20-Feb	0	1	1	1	Z	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	3	3	2	1	0.9	3
21-Feb	1	1	1	3	2	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.0	3
22-Feb	1	0	0	0	0	1	Z	0	1	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0.5	1
23-Feb	1	Z	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
24-Feb	1	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	3	1	1	1	1	0.8	3
25-Feb	1	1	1	Z	1	1	1	1	1	1	2	2	1	1	1	1	3	3	3	3	2	2	1	1	1.5	3
26-Feb	1	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	1	1	0.6	1
27-Feb	0	1	0	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	1	0	0	0.6	1
28-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	1	0.4	1
0.6 0.6 0.6 0.7 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.6 0.5 0.6 0.7 0.7 0.7 0.8 0.8 0.7 0.6 0.6										Diurnal Average																
2 2 2 3 2 1 2 2 2 2 2 2 2 1 1 1 2 3 3 3 3 3 3 2 3										Diurnal Maximum																
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	628	98.43	98.43
3 - 4	10	1.57	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: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

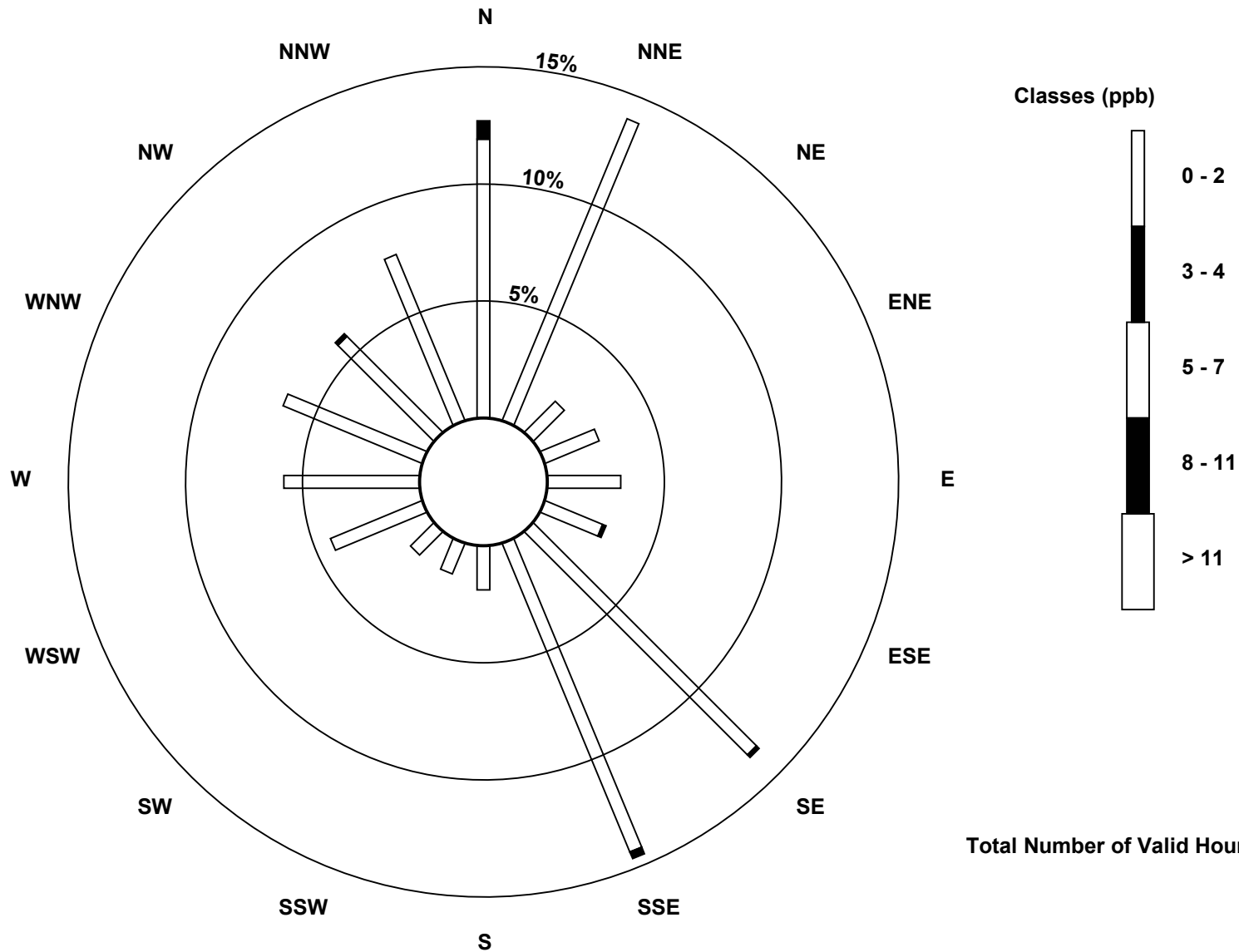
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	76	89	12	16	20	17	86	91	12	9	9	27	37	41	37	49	628
3 - 4	5	0	0	0	0	1	1	2	0	0	0	0	0	0	1	0	10
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	89	12	16	20	18	87	93	12	9	9	27	37	41	38	49	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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



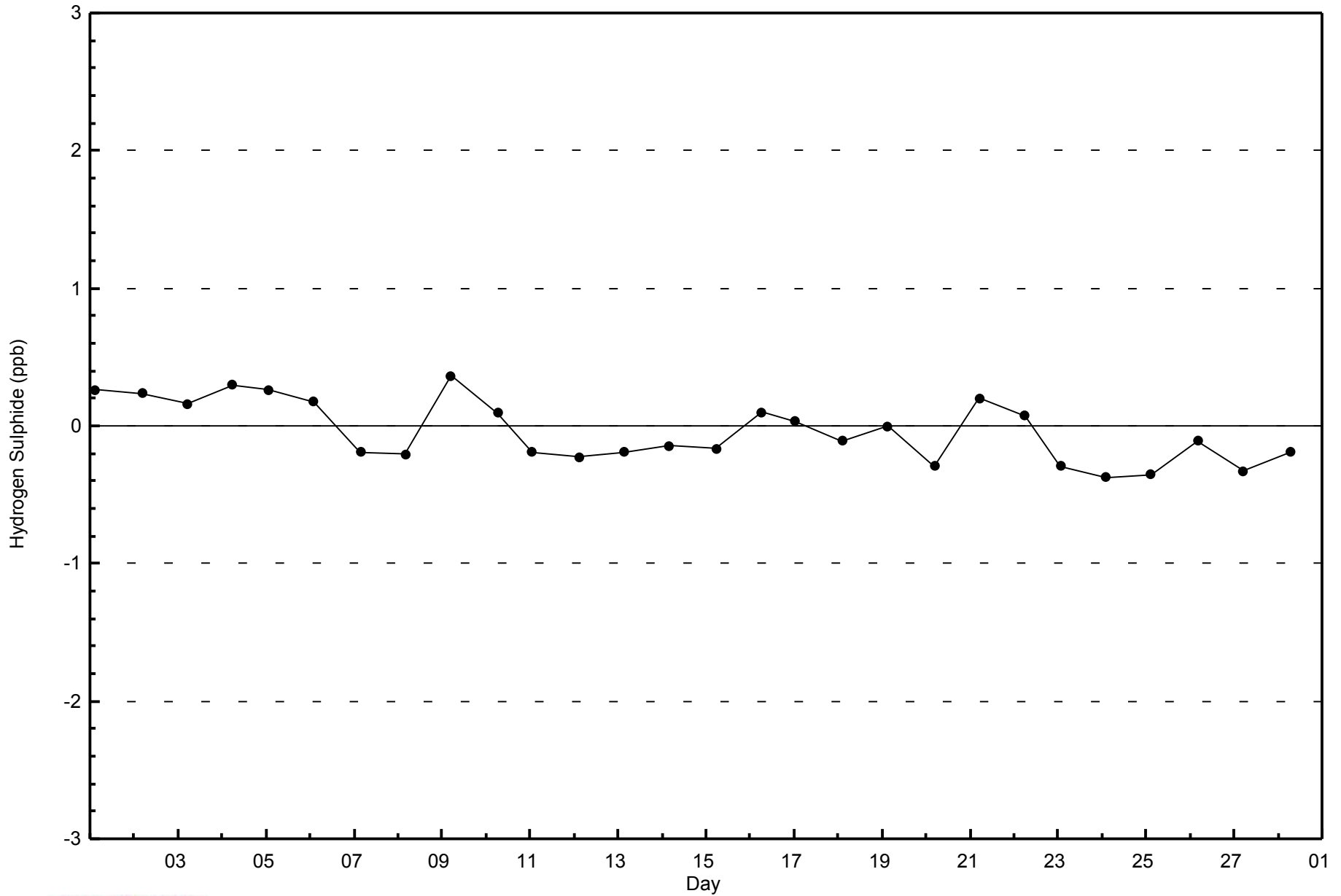
Total Number of Valid Hours: 638





WBEA  
Zero Responses

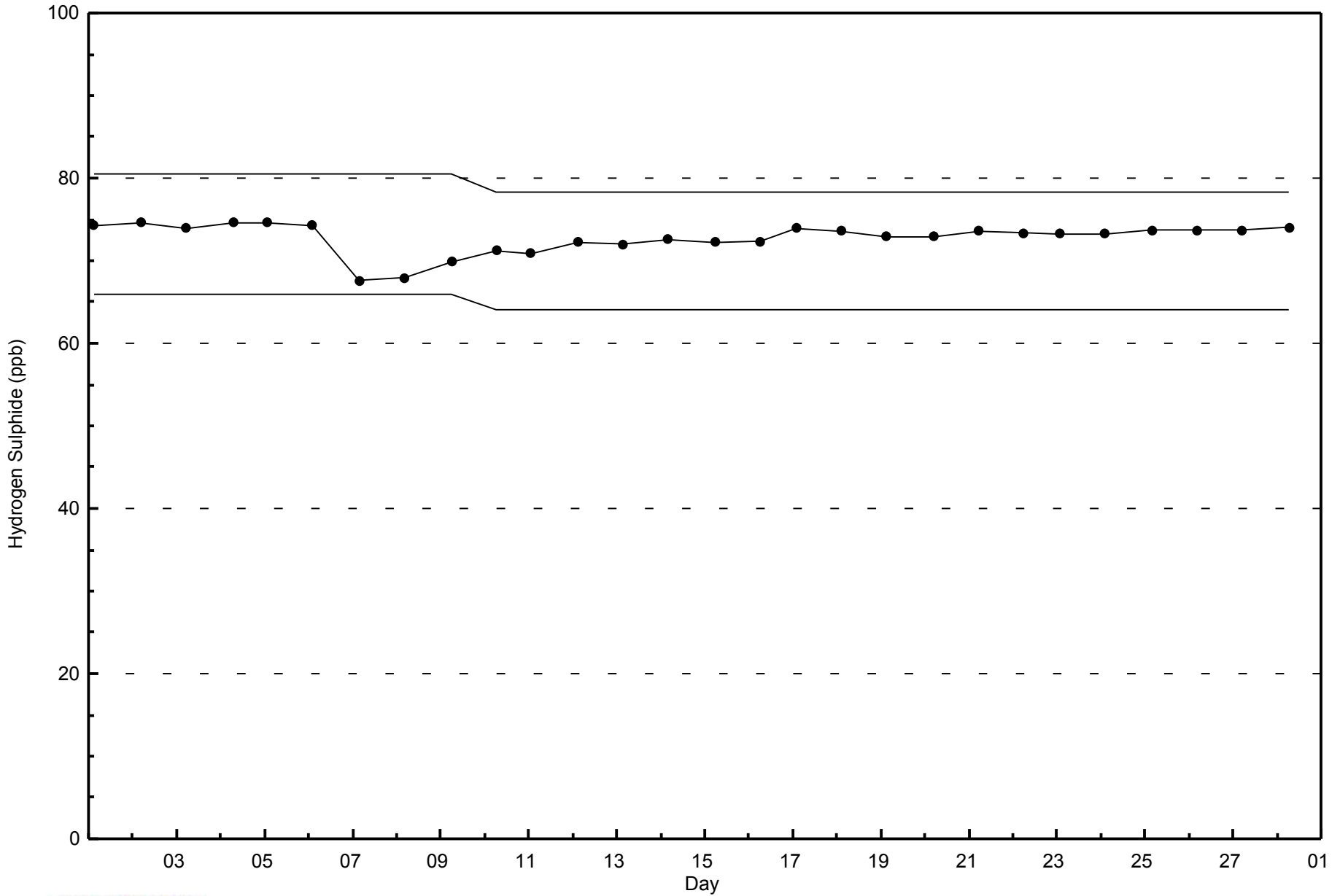
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Mannix - February 2015





WBEA  
Span Responses

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



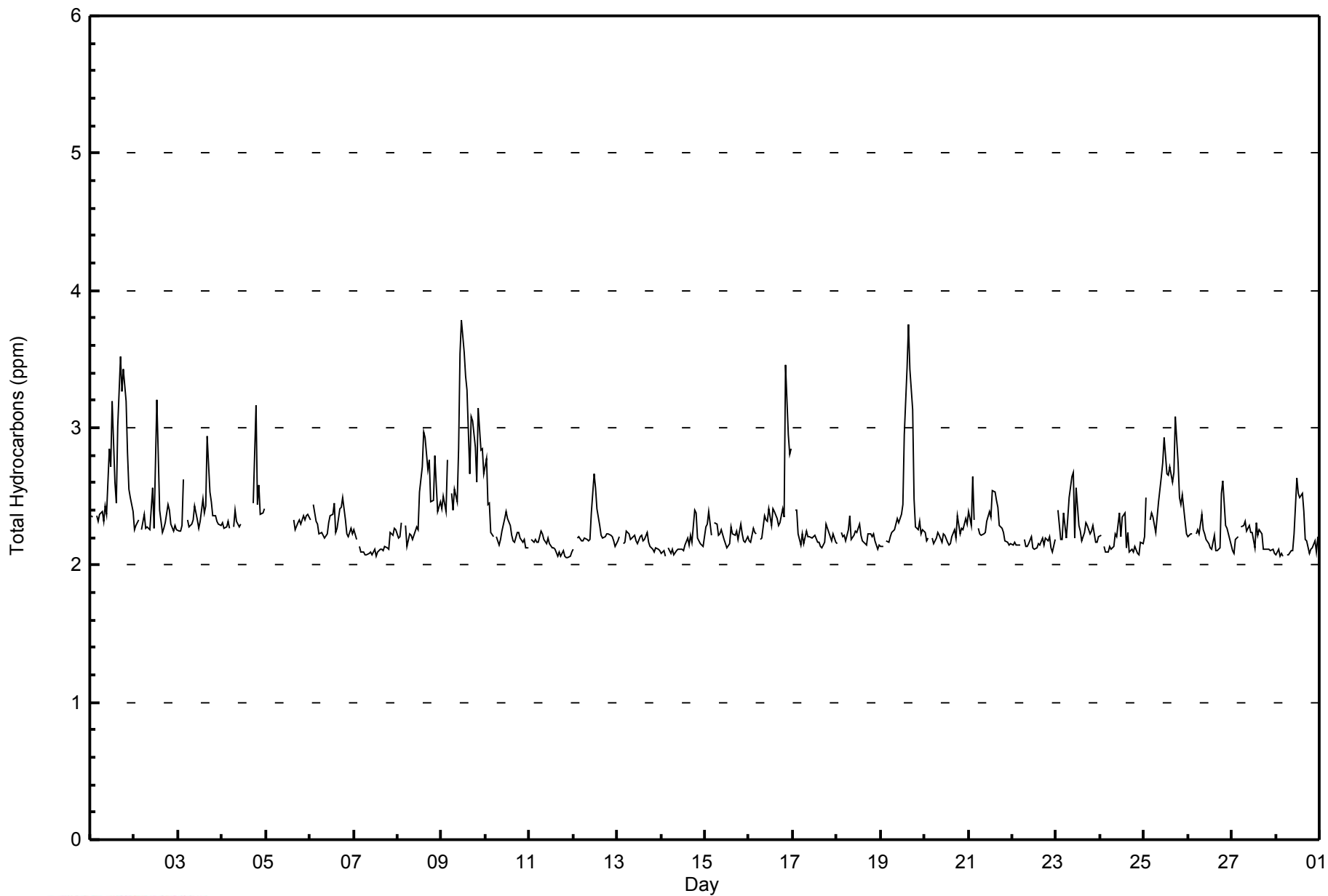


Maximum Value: 3.8 ppm on Feb 9 12:00														Maximum Daily Average: 2.9 ppm on Feb 9														Hours in Service: 672	
Minimum Value: 2.1 ppm on Feb 11 22:00														Minimum Daily Average: 2.1 ppm on Feb 11														Hours of Data: 624	
Maximum Diurnal Average: 2.4 ppm at hour 13														Minimum Diurnal Average: 2.2 ppm at hour 5														Hours of Missing Data: 48	
Monthly Average: 2.31 ppm														Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.2 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 2.6 P <sub>99</sub> = 3.4														Hours of Calibration: 38	
																												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-Feb	2.4	2.4	Z	2.4	2.3	2.4	2.4	2.3	2.4	2.4	2.8	2.7	3.2	2.6	2.5	3.0	3.5	3.3	3.4	3.2	2.8	2.6	2.5	2.4	2.7	3.5			
2-Feb	2.3	2.3	2.3	Z	2.3	2.4	2.3	2.3	2.3	2.4	2.6	2.3	3.2	2.8	2.4	2.2	2.3	2.3	2.4	2.4	2.3	2.2	2.3	2.3	2.4	3.2			
3-Feb	2.2	2.2	2.3	2.6	Z	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.5	2.4	2.4	2.9	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.9			
4-Feb	2.3	2.3	2.3	2.3	Z	2.3	2.3	2.4	2.3	2.3	2.3	C	C	C	C	C	C	2.5	3.2	2.4	2.6	2.4	2.4	2.4	3.2				
5-Feb	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4				
6-Feb	2.3	Z	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.4	2.5	2.2	2.3	2.4	2.4	2.5	2.3	2.2	2.2	2.3	2.2	2.3	2.5			
7-Feb	2.3	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.1	2.3			
8-Feb	2.2	2.2	2.3	Z	2.3	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.7	3.0	2.9	2.7	2.8	2.5	2.5	2.8	2.6	2.4	2.5	2.4	3.0			
9-Feb	2.4	2.5	2.4	2.8	Z	2.5	2.4	2.6	2.5	2.8	3.5	3.8	3.6	3.4	3.3	2.7	3.1	3.1	2.9	2.6	3.1	2.8	2.8	2.7	2.9	3.8			
10-Feb	2.8	2.4	2.5	2.2	2.2	Z	2.2	2.1	2.2	2.3	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.3	2.8			
11-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2			
12-Feb	2.1	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.7	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.7			
13-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2			
14-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.4	2.4	2.2	2.1	2.1	2.1	2.2	2.4			
15-Feb	2.3	2.3	2.4	2.2	Z	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.4			
16-Feb	2.2	2.2	2.3	2.2	2.2	Z	2.2	2.2	2.4	2.3	2.3	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.4	2.3	3.5	2.9	2.8	2.8	2.4	3.5			
17-Feb	Z	2.4	2.4	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4			
18-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.4	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.4			
19-Feb	2.1	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	3.0	3.4	3.8	3.4	3.1	2.5	2.3	2.3	2.3	2.2	2.3	2.5	3.8			
20-Feb	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.4	2.2	2.3	2.3	2.3	2.3	2.2	2.4			
21-Feb	2.4	2.3	2.6	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.5	2.5	2.5	2.4	2.3	2.3	2.2	2.2	2.2	2.1	2.2	2.3	2.6			
22-Feb	2.1	2.2	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2			
23-Feb	Z	2.4	2.2	2.2	2.4	2.2	2.3	2.5	2.6	2.7	2.2	2.6	2.3	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.7			
24-Feb	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.2	2.4	2.4	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.4			
25-Feb	2.2	2.5	Z	2.3	2.4	2.3	2.2	2.3	2.5	2.6	2.8	2.9	2.7	2.7	2.7	2.6	2.7	3.1	2.7	2.5	2.4	2.5	2.3	2.2	2.5	3.1			
26-Feb	2.2	2.2	2.2	Z	2.2	2.3	2.2	2.4	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.5	2.6	2.3	2.3	2.2	2.2	2.2	2.6			
27-Feb	2.1	2.1	2.2	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3			
28-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.6	2.5	2.5	2.5	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.6			
																												Diurnal Average	
																												Diurnal Maximum	
Z - zerospan														C - Calibration														AF - Analyzer Failure	



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	603	96.63	96.63
3.1 - 10.0	21	3.37	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 624

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

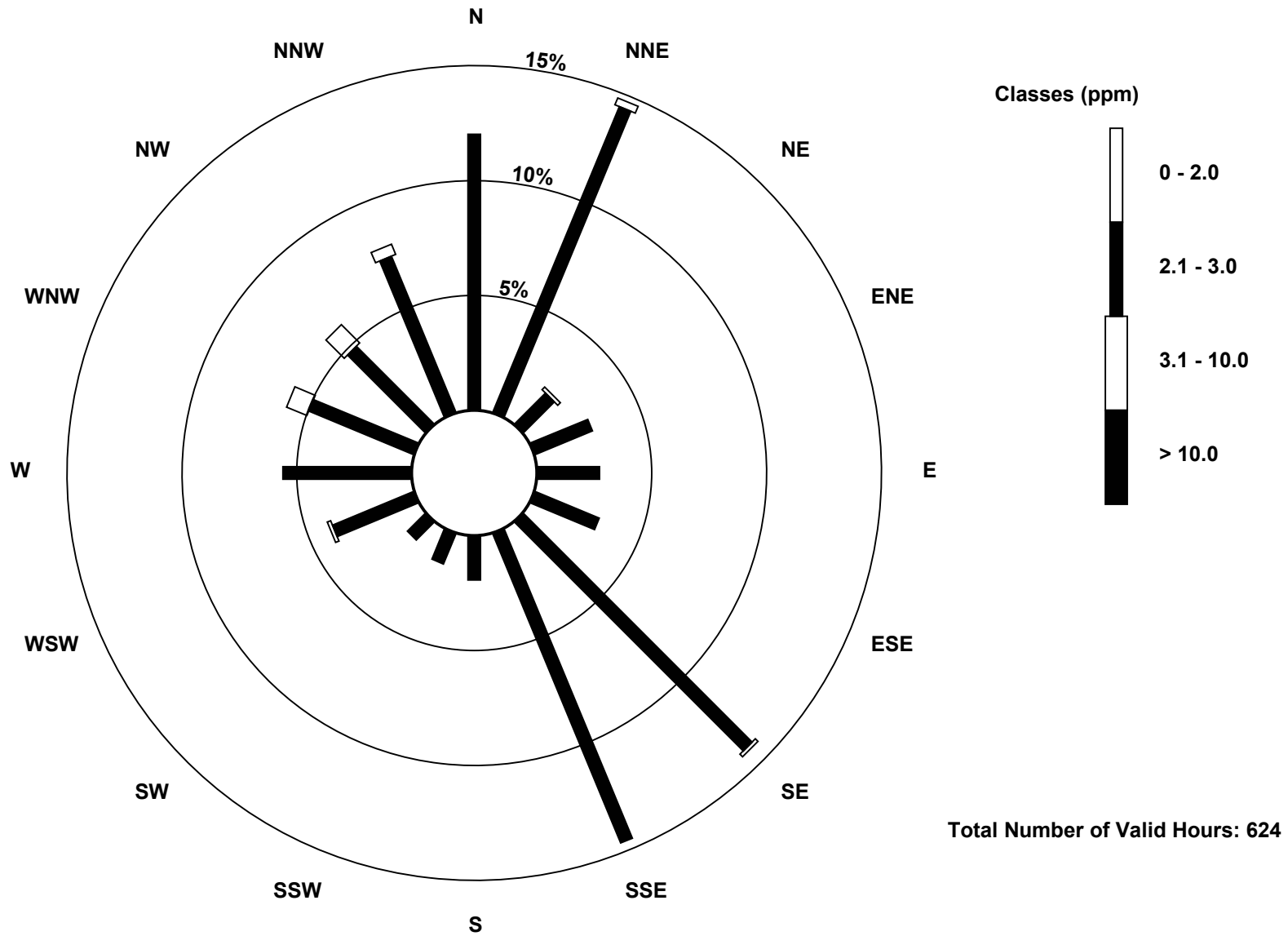
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	75	90	12	17	17	19	88	91	12	9	7	24	35	31	30	46	603
3.1 - 10.0	0	2	1	0	0	0	1	0	0	0	0	1	0	6	7	3	21
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	75	92	13	17	17	19	89	91	12	9	7	25	35	37	37	49	624

Total Number of Valid Hours: 624

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

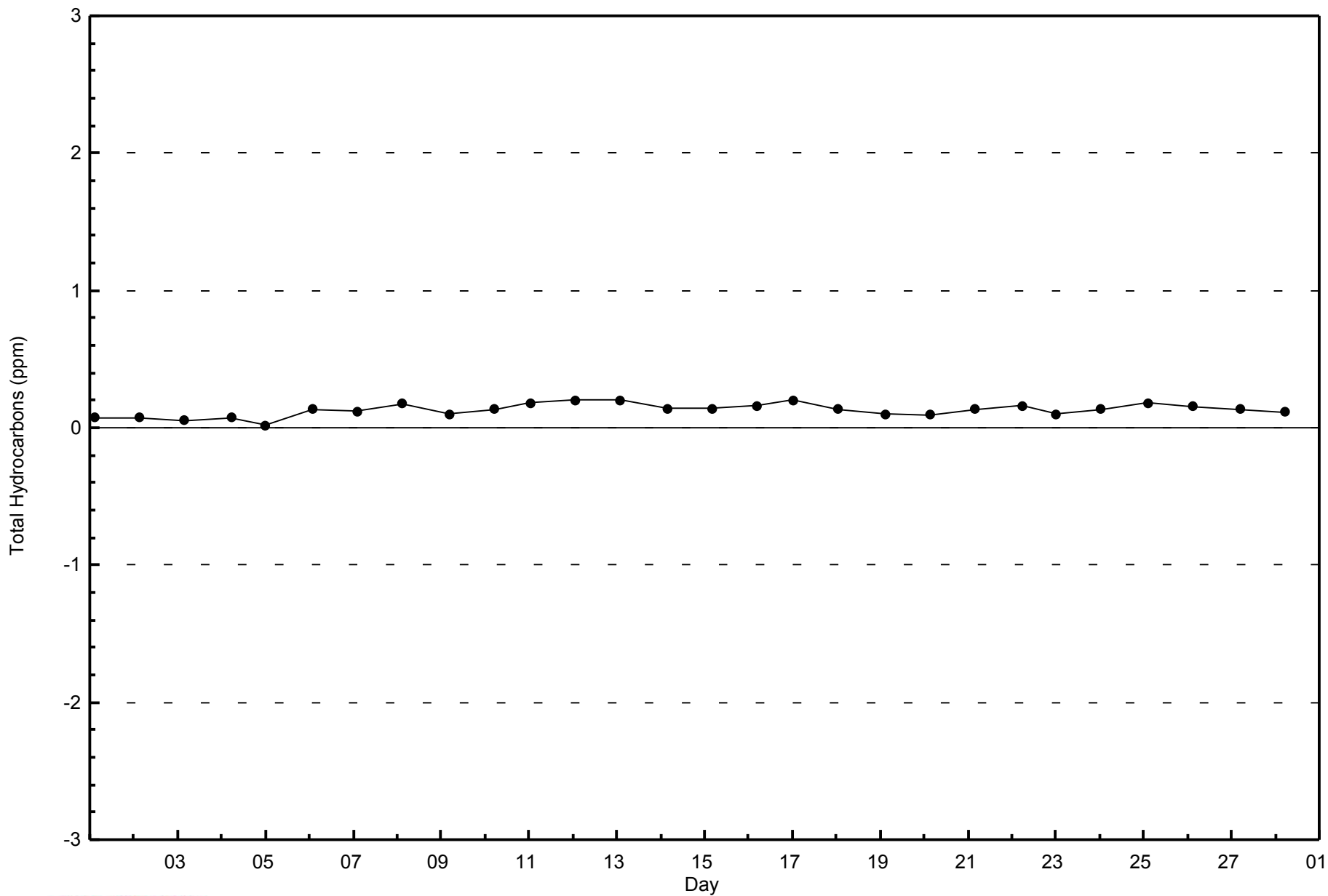
Total Hydrocarbons (THC) - ppm  
Mannix (AMS 5)





WBEA  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Mannix - February 2015

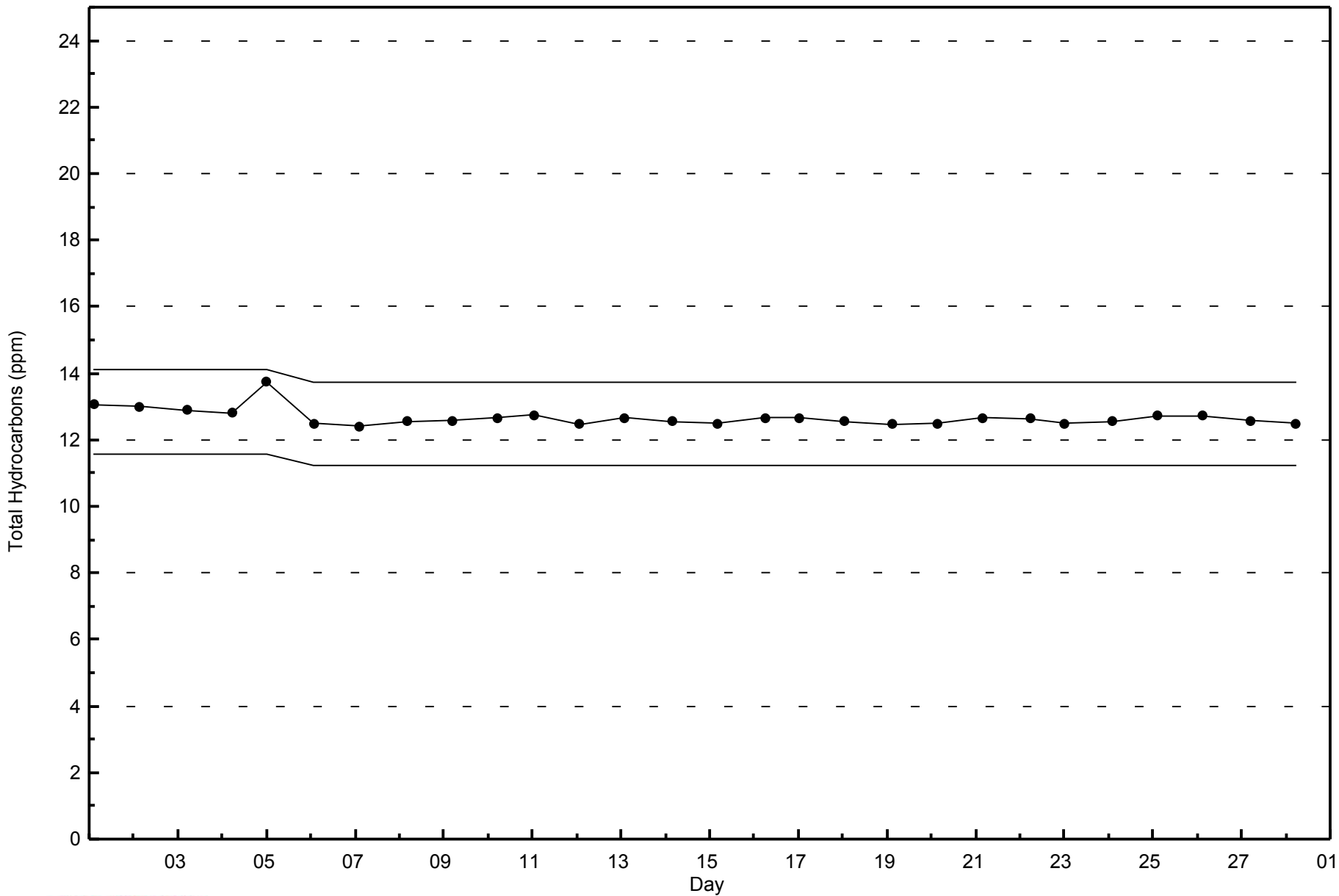






WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Mannix - February 2015



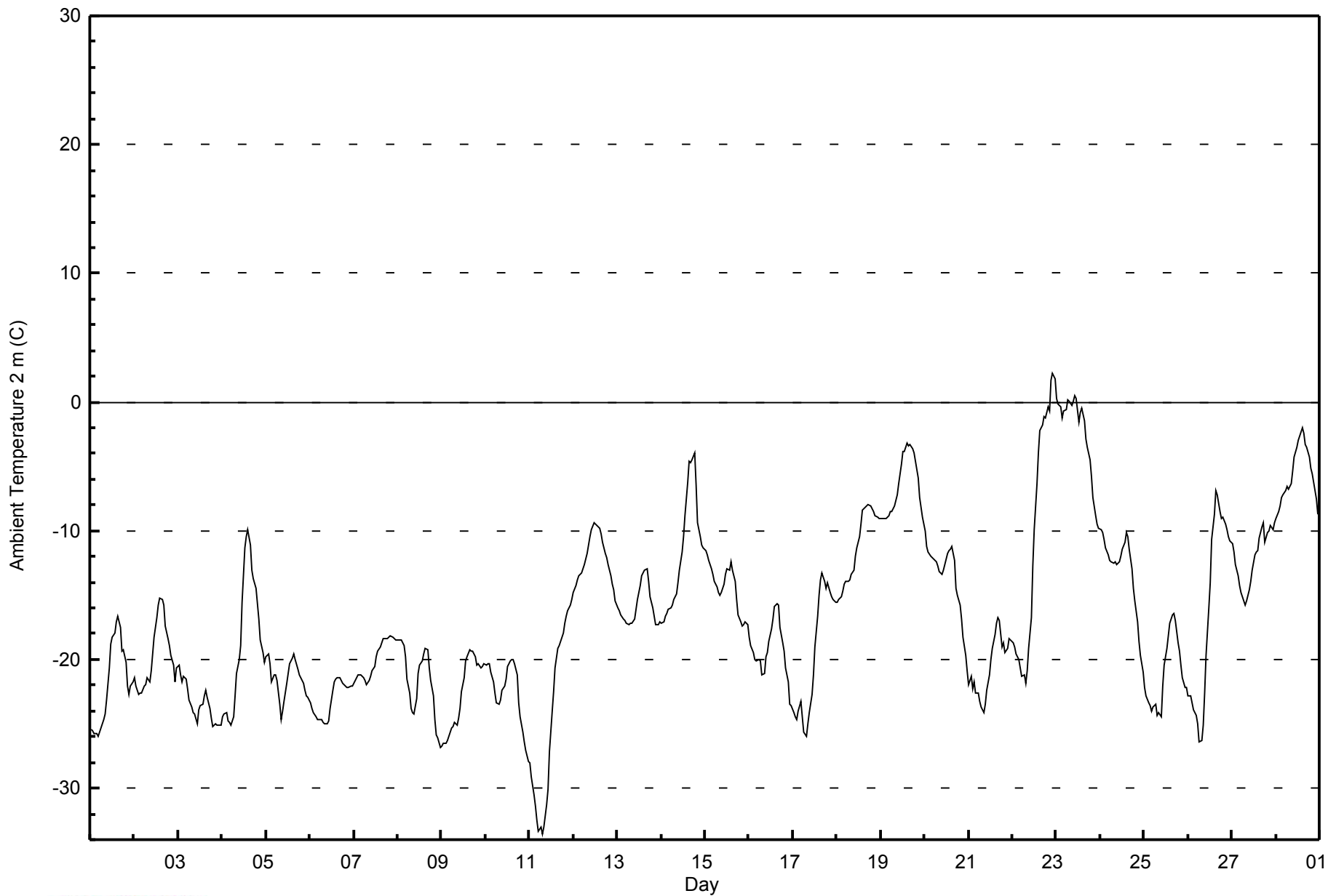


Maximum Value: 2.3 C on Feb 22 23:00		Maximum Daily Average: -2.5 C on Feb 23		Hours in Service: 672																						
Minimum Value: -33.6 C on Feb 11 08:00		Minimum Daily Average: -24.8 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.0 C at hour 16		Minimum Diurnal Average: -19.3 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.65 C		Percentiles: P <sub>1</sub> = -30.9 P <sub>10</sub> = -24.5 Q <sub>1</sub> = -21.8 Median = -18.1 Q <sub>3</sub> = -11.8 P <sub>90</sub> = -7.3 P <sub>99</sub> = 0.2		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-Feb	-25.4	-25.5	-25.7	-25.8	-26.0	-25.6	-25.0	-24.7	-24.3	-23.1	-20.7	-18.8	-18.2	-17.9	-17.1	-16.6	-17.5	-19.4	-19.3	-20.2	-22.1	-22.7	-22.0	-21.8	-21.9	-16.6
2-Feb	-21.4	-22.1	-22.7	-22.6	-22.6	-22.1	-21.9	-21.4	-21.7	-20.9	-19.6	-18.3	-16.8	-15.8	-15.2	-15.3	-15.8	-17.4	-18.4	-18.9	-19.7	-20.4	-21.7	-20.6	-19.7	-15.2
3-Feb	-20.4	-21.2	-21.7	-21.3	-21.6	-22.3	-23.2	-23.7	-24.1	-24.2	-25.0	-23.9	-23.6	-23.5	-22.8	-22.4	-22.9	-23.9	-24.6	-25.3	-25.0	-25.1	-25.1	-25.1	-23.4	-20.4
4-Feb	-24.5	-24.2	-24.2	-24.7	-24.9	-25.1	-24.5	-22.8	-21.1	-20.0	-19.0	-15.5	-11.3	-10.4	-10.0	-11.2	-13.0	-13.8	-14.5	-15.7	-16.8	-18.5	-19.5	-20.2	-18.6	-10.0
5-Feb	-19.8	-19.6	-20.3	-21.8	-21.2	-21.2	-21.7	-23.4	-24.6	-24.0	-23.2	-21.9	-20.3	-19.9	-19.6	-20.0	-20.7	-21.2	-21.5	-21.8	-22.4	-22.8	-23.0	-21.5	-19.6	-19.6
6-Feb	-23.4	-23.8	-24.2	-24.4	-24.6	-24.7	-24.7	-24.9	-25.0	-25.0	-24.7	-23.8	-22.4	-21.7	-21.5	-21.4	-21.4	-21.6	-21.9	-22.1	-22.2	-22.1	-22.1	-22.1	-23.2	-21.4
7-Feb	-21.8	-21.4	-21.2	-21.2	-21.2	-21.4	-21.6	-22.0	-21.7	-21.3	-20.9	-20.5	-19.8	-19.4	-19.0	-18.7	-18.4	-18.3	-18.3	-18.3	-18.2	-18.2	-18.4	-18.5	-20.0	-18.2
8-Feb	-18.5	-18.5	-18.5	-18.9	-19.8	-21.5	-22.6	-23.8	-24.1	-24.3	-23.1	-21.1	-20.5	-20.1	-19.5	-19.2	-19.3	-20.7	-21.7	-22.8	-24.6	-25.9	-26.1	-26.9	-21.7	-18.5
9-Feb	-26.7	-26.5	-26.6	-26.3	-26.0	-25.4	-25.2	-24.9	-25.1	-24.5	-23.8	-22.5	-21.5	-20.2	-19.8	-19.3	-19.4	-19.4	-19.8	-20.4	-20.4	-20.6	-20.5	-20.4	-22.7	-19.3
10-Feb	-20.4	-20.3	-20.3	-21.0	-21.8	-22.6	-23.4	-23.5	-23.2	-22.4	-22.1	-21.5	-20.6	-20.2	-20.0	-20.0	-20.3	-21.2	-23.4	-24.5	-25.6	-26.4	-27.1	-27.9	-22.5	-20.0
11-Feb	-28.0	-29.1	-30.5	-31.4	-32.5	-33.3	-33.0	-33.6	-33.1	-31.3	-30.1	-27.2	-24.1	-22.5	-20.6	-19.1	-19.0	-18.6	-17.9	-17.2	-16.6	-16.2	-15.8	-15.3	-24.8	-15.3
12-Feb	-14.8	-14.3	-13.9	-13.5	-13.3	-12.9	-12.6	-11.7	-11.1	-10.4	-10.0	-9.4	-9.5	-9.5	-9.8	-10.2	-10.9	-11.8	-12.1	-12.6	-13.5	-14.1	-14.6	-15.4	-12.2	-9.4
13-Feb	-16.0	-16.3	-16.5	-16.8	-16.9	-17.2	-17.3	-17.2	-17.2	-16.8	-16.1	-15.4	-14.3	-13.5	-13.3	-13.1	-13.0	-13.9	-15.1	-16.0	-16.6	-17.2	-17.3	-17.1	-15.8	-13.0
14-Feb	-17.2	-17.0	-16.7	-16.4	-16.1	-15.9	-15.8	-15.4	-14.9	-14.1	-13.0	-11.6	-10.4	-8.8	-6.2	-4.6	-4.7	-4.5	-4.0	-6.5	-9.4	-10.5	-11.1	-11.3	-11.5	-4.0
15-Feb	-11.5	-11.8	-12.3	-13.0	-13.4	-14.0	-14.4	-14.8	-15.0	-14.8	-14.1	-13.3	-13.0	-13.1	-12.4	-13.0	-13.9	-15.3	-16.5	-17.0	-17.4	-17.3	-17.1	-17.3	-14.4	-11.5
16-Feb	-18.2	-19.0	-19.5	-20.0	-20.1	-20.0	-20.1	-21.2	-21.1	-19.8	-19.5	-18.6	-17.6	-16.8	-15.9	-15.7	-15.7	-17.5	-18.7	-19.4	-20.6	-21.8	-23.5	-23.6	-19.3	-15.7
17-Feb	-24.1	-24.5	-24.7	-24.0	-23.2	-24.5	-25.7	-26.0	-24.9	-24.2	-22.7	-21.3	-19.0	-16.6	-15.0	-13.8	-13.3	-14.0	-14.5	-14.0	-14.8	-15.1	-15.4	-15.6	-19.6	-13.3
18-Feb	-15.6	-15.4	-15.1	-14.7	-14.2	-14.0	-14.0	-13.8	-13.4	-13.1	-12.0	-11.4	-10.5	-9.5	-8.4	-8.2	-8.1	-8.0	-8.1	-8.2	-8.5	-8.8	-9.0	-9.0	-11.3	-8.0
19-Feb	-9.1	-9.0	-9.0	-9.0	-8.9	-8.5	-8.5	-8.1	-7.6	-7.2	-6.4	-4.8	-3.8	-3.9	-3.2	-3.4	-3.3	-3.7	-3.9	-4.6	-5.9	-7.4	-8.2	-8.9	-6.5	-3.2
20-Feb	-10.0	-11.2	-11.6	-11.9	-12.1	-12.2	-12.4	-12.8	-13.2	-13.4	-13.1	-12.6	-11.7	-11.5	-11.5	-11.3	-12.3	-14.4	-15.0	-15.8	-16.8	-18.3	-19.7	-20.9	-13.6	-10.0
21-Feb	-21.9	-21.3	-22.3	-21.8	-22.6	-22.6	-23.3	-23.7	-24.1	-23.5	-22.4	-21.2	-20.0	-19.2	-18.1	-17.2	-16.8	-17.0	-19.1	-18.7	-19.5	-19.1	-18.3	-18.5	-20.5	-16.8
22-Feb	-18.7	-19.0	-19.6	-20.0	-20.6	-21.3	-21.2	-21.8	-20.9	-19.2	-16.8	-12.7	-9.9	-6.3	-3.9	-2.2	-1.8	-1.1	-1.3	-0.3	-0.6	1.7	2.3	1.8	-10.6	2.3
23-Feb	0.3	-0.2	-0.4	-1.3	-0.7	-0.6	0.2	0.0	-0.3	0.1	0.4	0.3	-1.6	-0.8	-0.5	-1.5	-2.9	-3.5	-4.5	-5.8	-7.4	-8.9	-9.5	-9.8	-2.5	0.4
24-Feb	-9.9	-10.2	-10.7	-11.3	-11.8	-12.3	-12.5	-12.5	-12.5	-12.6	-12.4	-12.0	-11.4	-10.9	-10.1	-10.4	-11.5	-12.9	-14.5	-15.4	-17.1	-18.6	-19.6	-21.0	-13.1	-9.9
25-Feb	-22.2	-22.8	-23.4	-23.6	-24.0	-23.7	-23.5	-24.4	-24.1	-24.4	-22.1	-20.4	-19.1	-18.1	-17.2	-16.5	-16.5	-17.0	-18.7	-19.3	-20.4	-21.4	-22.1	-22.2	-21.1	-16.5
26-Feb	-22.9	-22.8	-23.3	-23.9	-24.3	-25.0	-26.4	-26.3	-25.1	-22.7	-19.6	-16.0	-14.0	-10.7	-8.7	-6.9	-7.2	-8.5	-9.1	-9.0	-9.4	-9.9	-10.5	-10.7	-16.4	-6.9
27-Feb	-11.0	-11.6	-12.6	-13.5	-14.3	-14.8	-15.4	-15.8	-15.4	-14.6	-13.9	-13.1	-11.9	-11.7	-11.5	-10.6	-9.7	-9.4	-10.9	-10.1	-10.0	-9.6	-9.9	-9.4	-12.1	-9.4
28-Feb	-9.1	-8.5	-8.1	-7.4	-7.2	-6.8	-6.5	-6.8	-6.3	-5.3	-4.3	-3.5	-2.9	-2.6	-2.0	-2.4	-3.3	-3.5	-4.3	-5.1	-5.6	-6.9	-7.5	-8.7	-5.6	-2.0
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	260	38.69	38.69
-20 - 0	403	59.97	98.66
0 - 10	9	1.34	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Summary of Hour Averages

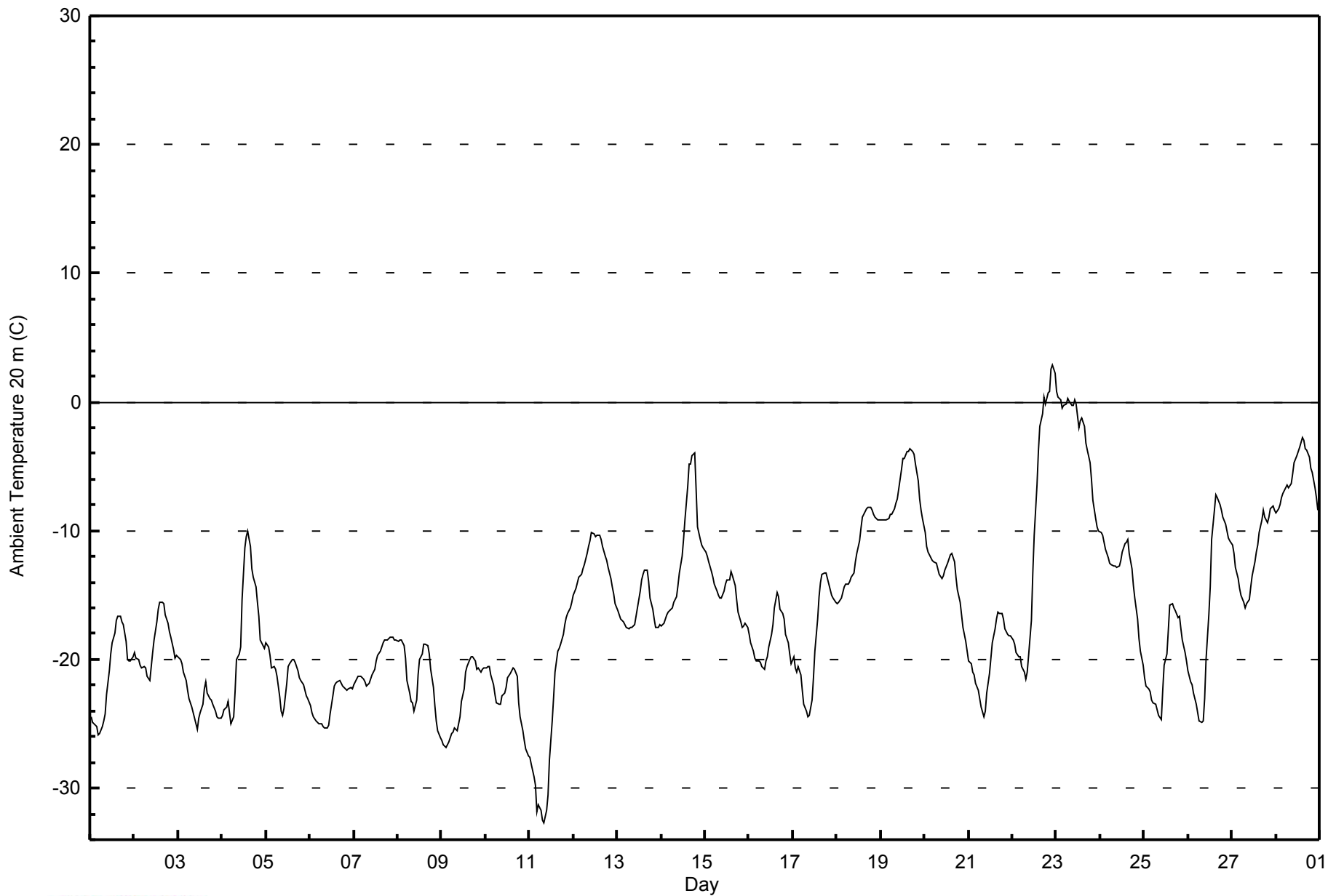
Mannix - February 2015

Maximum Value: 2.9 C on Feb 22 23:00		Maximum Daily Average: -2.5 C on Feb 23		Hours in Service: 672																						
Minimum Value: -32.7 C on Feb 11 09:00		Minimum Daily Average: -24.6 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.1 C at hour 16		Minimum Diurnal Average: -19.1 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.48 C		Percentiles: P <sub>1</sub> = -30.3 P <sub>10</sub> = -24.2 Q <sub>1</sub> = -21.4 Median = -17.5 Q <sub>3</sub> = -12.2 P <sub>90</sub> = -7.2 P <sub>99</sub> = 0.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-24.4	-24.9	-25.0	-25.3	-25.9	-25.8	-25.2	-24.7	-24.2	-22.7	-20.8	-19.6	-18.7	-18.0	-17.0	-16.6	-16.7	-17.1	-17.3	-18.6	-20.1	-20.1	-20.1	-19.8	-21.2	-16.6
2-Feb	-19.5	-19.8	-20.0	-20.4	-20.7	-20.6	-20.6	-21.3	-21.7	-20.6	-19.5	-18.5	-17.1	-16.1	-15.5	-15.6	-15.7	-16.5	-17.2	-17.8	-18.2	-19.2	-19.9	-19.7	-18.8	-15.5
3-Feb	-19.9	-20.0	-20.4	-21.0	-21.6	-22.4	-23.1	-23.7	-24.1	-24.6	-25.5	-24.6	-24.2	-23.5	-22.3	-21.7	-22.6	-23.0	-23.1	-23.5	-24.1	-24.4	-24.6	-24.6	-23.0	-19.9
4-Feb	-24.4	-23.9	-23.7	-23.3	-24.2	-25.0	-24.4	-22.5	-20.0	-19.6	-19.1	-15.3	-11.4	-10.5	-10.1	-11.3	-13.0	-13.6	-14.4	-15.5	-16.6	-18.5	-18.9	-19.1	-18.3	-10.1
5-Feb	-18.8	-19.0	-19.7	-20.6	-20.5	-20.7	-21.3	-22.9	-24.1	-24.4	-23.8	-21.9	-20.6	-20.4	-20.0	-20.0	-20.3	-20.9	-21.4	-21.7	-22.0	-22.4	-22.9	-23.1	-21.4	-18.8
6-Feb	-23.6	-24.1	-24.5	-24.7	-24.9	-25.0	-25.0	-25.2	-25.3	-25.3	-25.1	-24.2	-22.9	-22.0	-21.9	-21.7	-21.6	-21.9	-22.1	-22.3	-22.3	-22.3	-22.2	-22.3	-23.4	-21.6
7-Feb	-22.0	-21.5	-21.3	-21.3	-21.4	-21.6	-21.8	-22.0	-21.9	-21.5	-21.2	-20.8	-20.1	-19.7	-19.3	-19.0	-18.7	-18.5	-18.5	-18.4	-18.3	-18.3	-18.5	-18.5	-20.2	-18.3
8-Feb	-18.6	-18.5	-18.5	-18.9	-19.9	-21.7	-22.6	-23.2	-23.4	-24.0	-23.2	-21.2	-20.0	-19.6	-18.8	-18.9	-19.0	-19.6	-20.8	-22.1	-23.6	-24.8	-25.5	-26.1	-21.4	-18.5
9-Feb	-26.3	-26.6	-26.9	-26.7	-26.4	-25.8	-25.6	-25.3	-25.5	-25.0	-24.5	-23.2	-22.3	-21.0	-20.6	-20.0	-19.8	-19.8	-20.1	-20.8	-20.7	-20.9	-20.8	-20.7	-23.1	-19.8
10-Feb	-20.7	-20.6	-20.6	-21.2	-22.0	-22.7	-23.4	-23.5	-23.5	-22.9	-22.6	-22.1	-21.4	-21.1	-20.8	-20.6	-20.8	-21.3	-23.4	-24.4	-25.6	-26.3	-26.9	-27.5	-22.7	-20.6
11-Feb	-27.6	-28.2	-29.1	-29.8	-31.8	-31.3	-31.7	-32.5	-32.7	-31.7	-30.5	-27.8	-24.7	-22.9	-21.0	-19.3	-19.2	-18.8	-18.1	-17.3	-16.8	-16.4	-16.0	-15.5	-24.6	-15.5
12-Feb	-15.0	-14.4	-14.0	-13.6	-13.4	-13.0	-12.6	-11.8	-11.2	-10.8	-10.2	-10.2	-10.4	-10.3	-10.3	-10.6	-11.2	-12.0	-12.3	-12.8	-13.7	-14.4	-14.9	-15.7	-12.5	-10.2
13-Feb	-16.2	-16.5	-16.8	-17.1	-17.3	-17.5	-17.6	-17.6	-17.5	-17.3	-16.6	-16.0	-14.7	-13.8	-13.3	-13.0	-13.1	-14.0	-15.2	-16.1	-16.8	-17.5	-17.5	-17.3	-16.1	-13.0
14-Feb	-17.4	-17.2	-16.8	-16.6	-16.3	-16.1	-15.9	-15.5	-15.1	-14.3	-13.3	-12.0	-10.7	-9.1	-6.5	-4.9	-4.8	-4.2	-3.9	-6.8	-9.7	-10.7	-11.1	-11.4	-11.7	-3.9
15-Feb	-11.6	-12.0	-12.5	-13.1	-13.6	-14.2	-14.7	-15.1	-15.3	-15.2	-14.6	-14.1	-13.8	-13.8	-13.2	-13.5	-14.2	-15.3	-16.3	-17.1	-17.5	-17.4	-17.2	-17.5	-14.7	-11.6
16-Feb	-18.0	-18.7	-19.4	-19.9	-20.2	-20.1	-20.2	-20.6	-20.8	-20.1	-19.8	-19.1	-18.1	-17.3	-15.9	-14.8	-15.2	-16.1	-16.4	-16.8	-18.0	-18.8	-19.6	-20.3	-18.5	-14.8
17-Feb	-19.7	-20.6	-21.0	-20.5	-21.2	-22.4	-23.5	-24.0	-24.4	-24.3	-23.1	-21.4	-19.4	-16.8	-15.2	-14.0	-13.4	-13.3	-13.3	-13.7	-14.6	-15.0	-15.3	-15.5	-18.6	-13.3
18-Feb	-15.7	-15.5	-15.3	-14.8	-14.3	-14.2	-14.2	-13.9	-13.6	-13.3	-12.4	-11.7	-10.8	-9.8	-8.9	-8.5	-8.3	-8.2	-8.2	-8.4	-8.7	-8.9	-9.1	-9.2	-11.5	-8.2
19-Feb	-9.2	-9.2	-9.2	-9.2	-9.1	-8.7	-8.7	-8.3	-7.9	-7.5	-6.8	-5.2	-4.4	-4.4	-3.8	-3.9	-3.6	-3.9	-4.0	-4.8	-6.1	-7.6	-8.3	-9.0	-6.8	-3.6
20-Feb	-10.2	-11.2	-11.7	-12.1	-12.3	-12.4	-12.6	-12.9	-13.4	-13.7	-13.5	-13.0	-12.5	-12.2	-11.9	-11.8	-12.5	-13.6	-14.5	-15.6	-16.6	-17.5	-18.5	-19.4	-13.6	-10.2
21-Feb	-20.1	-20.3	-21.0	-21.2	-21.9	-22.4	-23.0	-23.7	-24.4	-24.0	-22.6	-21.1	-19.8	-18.8	-17.6	-16.9	-16.4	-16.5	-16.5	-16.9	-17.6	-18.1	-18.1	-18.2	-19.9	-16.4
22-Feb	-18.5	-18.9	-19.4	-19.8	-19.8	-20.6	-20.9	-21.5	-20.9	-19.7	-17.0	-13.3	-10.4	-6.4	-3.8	-1.9	-0.9	0.4	-0.2	0.7	0.9	2.5	2.9	2.3	-10.2	2.9
23-Feb	0.8	0.4	0.2	-0.5	-0.2	-0.2	0.3	0.1	-0.3	-0.3	0.1	-0.1	-2.0	-1.4	-1.2	-1.9	-3.2	-3.7	-4.7	-6.0	-7.6	-9.0	-9.7	-10.0	-2.5	0.8
24-Feb	-10.2	-10.4	-10.8	-11.5	-12.0	-12.5	-12.7	-12.7	-12.9	-12.7	-12.3	-11.7	-11.0	-10.9	-10.7	-11.7	-13.0	-14.3	-15.2	-16.9	-18.3	-19.3	-20.4	-20.4	-13.2	-10.2
25-Feb	-21.5	-22.0	-22.3	-22.6	-23.2	-23.3	-23.4	-23.9	-24.3	-24.7	-22.4	-20.4	-19.5	-17.8	-15.8	-15.7	-16.0	-16.2	-16.7	-16.6	-17.6	-18.4	-19.4	-20.1	-20.2	-15.7
26-Feb	-20.9	-21.8	-21.9	-22.6	-23.4	-24.2	-24.8	-24.9	-24.8	-23.0	-20.0	-16.5	-14.4	-10.6	-8.4	-7.2	-7.4	-8.0	-8.4	-8.9	-9.5	-10.0	-10.6	-10.8	-16.0	-7.2
27-Feb	-11.1	-11.8	-12.8	-13.7	-14.5	-15.0	-15.6	-16.0	-15.7	-15.3	-14.4	-13.5	-12.4	-11.7	-11.1	-10.1	-9.2	-8.4	-9.0	-9.3	-8.9	-8.3	-8.1	-8.4	-11.8	-8.1
28-Feb	-8.6	-8.3	-8.0	-7.4	-7.1	-6.7	-6.5	-6.6	-6.3	-5.6	-4.8	-4.2	-3.8	-3.5	-2.7	-3.0	-3.7	-3.7	-4.3	-5.1	-5.5	-6.7	-7.4	-8.4	-5.7	-2.7
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	241	35.86	35.86
-20 - 0	419	62.35	98.21
0 - 10	12	1.79	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Summary of Hour Averages

Mannix - February 2015

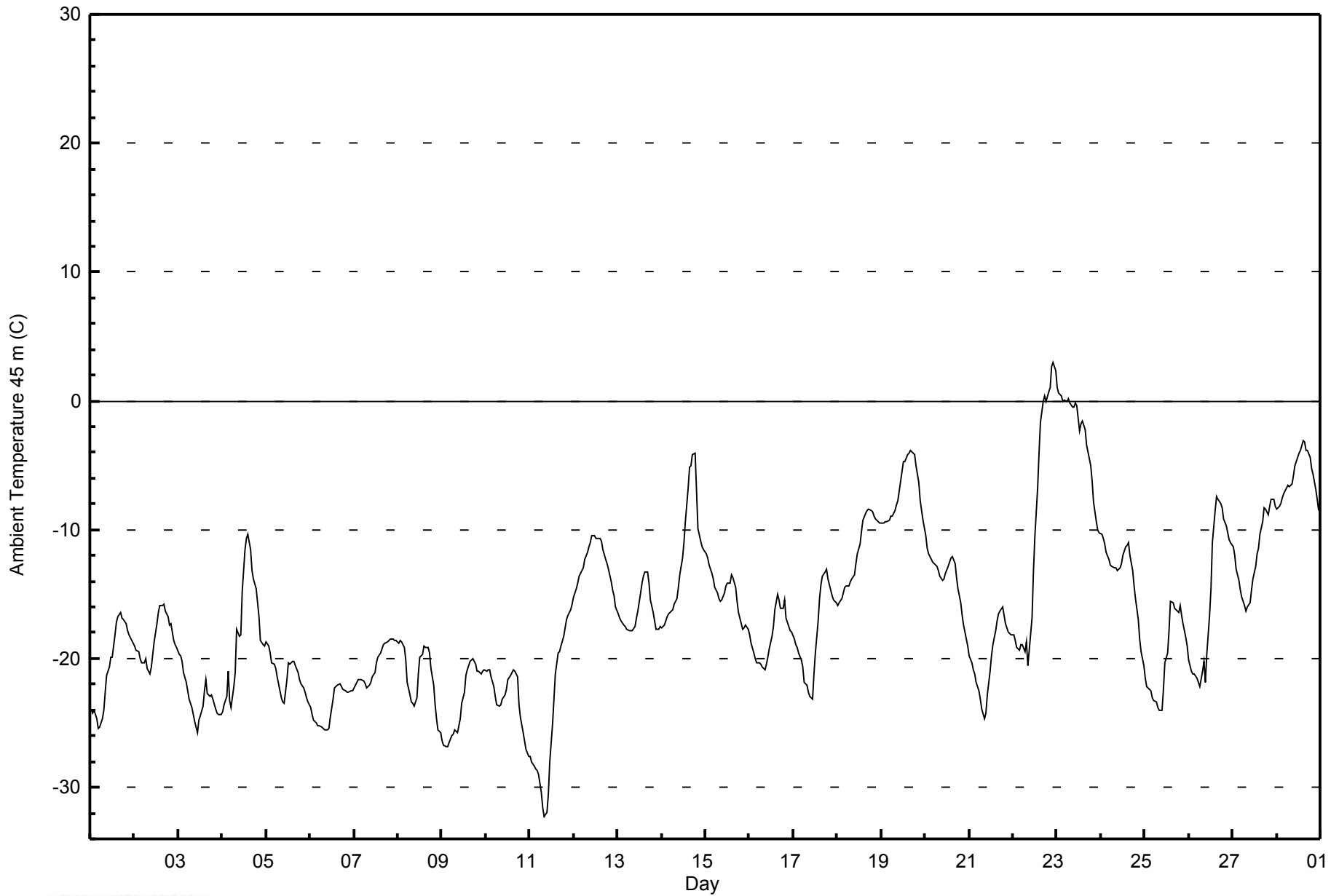
Maximum Value: 3.0 C on Feb 22 23:00		Maximum Daily Average: -2.6 C on Feb 23		Hours in Service: 672																						
Minimum Value: -32.3 C on Feb 11 09:00		Minimum Daily Average: -24.3 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.3 C at hour 16		Minimum Diurnal Average: -18.8 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.45 C		Percentiles: P <sub>1</sub> = -28.7 P <sub>10</sub> = -23.8 Q <sub>1</sub> = -21.3 Median = -17.5 Q <sub>3</sub> = -12.4 P <sub>90</sub> = -7.6 P <sub>99</sub> = 0.6		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-Feb	-24.0	-24.2	-24.0	-24.7	-25.4	-25.4	-24.7	-24.0	-22.6	-21.3	-20.6	-19.9	-19.9	-18.2	-17.2	-16.8	-16.5	-16.9	-16.9	-17.3	-17.8	-18.1	-18.4	-18.8	-20.6	-16.5
2-Feb	-19.1	-19.4	-19.5	-20.0	-20.3	-20.4	-20.0	-20.8	-21.2	-20.6	-19.7	-18.7	-17.3	-16.4	-15.9	-15.8	-15.8	-16.3	-16.8	-17.4	-17.3	-18.6	-18.9	-19.1	-18.5	-15.8
3-Feb	-19.7	-19.8	-20.2	-21.1	-21.8	-22.5	-23.1	-23.8	-24.3	-24.9	-25.7	-24.8	-24.4	-23.7	-22.5	-21.7	-22.7	-22.9	-22.8	-23.1	-23.9	-24.2	-24.4	-24.4	-23.0	-19.7
4-Feb	-24.1	-23.6	-23.0	-21.0	-23.2	-23.8	-22.2	-21.1	-17.8	-18.3	-18.1	-14.7	-11.5	-10.7	-10.3	-11.5	-13.2	-13.8	-14.5	-15.6	-16.8	-18.6	-18.9	-19.0	-17.7	-10.3
5-Feb	-18.7	-19.0	-19.6	-20.3	-20.5	-20.8	-21.4	-22.5	-23.0	-23.4	-23.4	-21.6	-20.4	-20.5	-20.2	-20.2	-20.5	-21.1	-21.6	-21.9	-22.2	-22.6	-23.1	-23.3	-21.3	-18.7
6-Feb	-23.8	-24.4	-24.7	-25.0	-25.2	-25.3	-25.3	-25.5	-25.5	-25.6	-25.4	-24.5	-23.1	-22.3	-22.2	-22.0	-21.9	-22.2	-22.4	-22.5	-22.6	-22.6	-22.5	-22.5	-23.7	-21.9
7-Feb	-22.3	-21.8	-21.6	-21.6	-21.6	-21.8	-22.0	-22.3	-22.1	-21.8	-21.5	-21.1	-20.4	-19.9	-19.6	-19.3	-18.9	-18.8	-18.7	-18.6	-18.5	-18.5	-18.6	-18.6	-20.4	-18.5
8-Feb	-18.8	-18.6	-18.7	-19.1	-20.1	-21.9	-22.8	-23.3	-23.4	-23.7	-23.0	-21.2	-19.9	-19.7	-19.0	-19.1	-19.2	-19.5	-20.8	-22.0	-23.6	-24.7	-25.5	-25.8	-21.4	-18.6
9-Feb	-26.4	-26.7	-26.9	-26.9	-26.6	-26.0	-25.8	-25.5	-25.8	-25.2	-24.7	-23.5	-22.6	-21.3	-20.9	-20.3	-20.1	-20.0	-20.4	-21.0	-20.9	-21.2	-21.0	-20.9	-23.4	-20.0
10-Feb	-20.9	-20.9	-20.8	-21.5	-22.2	-22.9	-23.6	-23.7	-23.6	-23.1	-22.8	-22.4	-21.7	-21.3	-21.1	-20.9	-21.0	-21.5	-23.6	-24.6	-25.7	-26.5	-27.1	-27.6	-23.0	-20.8
11-Feb	-27.7	-28.0	-28.3	-28.5	-28.7	-29.0	-30.4	-31.7	-32.3	-31.9	-30.5	-28.0	-25.1	-23.2	-21.2	-19.6	-19.5	-19.0	-18.3	-17.6	-17.0	-16.6	-16.2	-15.8	-24.3	-15.8
12-Feb	-15.2	-14.6	-14.1	-13.6	-13.1	-12.9	-12.3	-11.8	-11.4	-11.0	-10.4	-10.5	-10.7	-10.6	-10.6	-10.9	-11.5	-12.3	-12.6	-13.1	-14.0	-14.7	-15.2	-16.0	-12.6	-10.4
13-Feb	-16.5	-16.8	-17.1	-17.4	-17.5	-17.8	-17.9	-17.8	-17.8	-17.5	-16.9	-16.3	-14.9	-14.1	-13.6	-13.2	-13.3	-14.2	-15.5	-16.4	-17.1	-17.7	-17.8	-17.5	-16.4	-13.2
14-Feb	-17.6	-17.4	-17.1	-16.8	-16.5	-16.3	-16.2	-15.8	-15.3	-14.5	-13.6	-12.2	-11.0	-9.4	-6.8	-5.1	-5.0	-4.2	-4.0	-7.0	-9.9	-10.9	-11.3	-11.6	-11.9	-4.0
15-Feb	-11.9	-12.2	-12.7	-13.4	-13.8	-14.5	-14.9	-15.3	-15.6	-15.5	-15.0	-14.4	-14.2	-14.1	-13.5	-13.8	-14.5	-15.5	-16.4	-17.3	-17.7	-17.6	-17.4	-17.7	-15.0	-11.9
16-Feb	-18.2	-18.8	-19.6	-20.1	-20.4	-20.4	-20.4	-20.7	-20.8	-20.5	-19.9	-19.2	-18.3	-17.6	-16.3	-15.0	-15.4	-16.1	-16.1	-15.5	-16.9	-17.5	-17.8	-18.0	-18.3	-15.0
17-Feb	-18.5	-18.9	-19.2	-19.5	-20.2	-20.7	-21.8	-22.1	-22.6	-23.0	-23.1	-21.2	-19.6	-17.0	-15.4	-14.2	-13.6	-13.3	-13.1	-13.8	-14.7	-15.1	-15.4	-15.7	-18.0	-13.1
18-Feb	-15.8	-15.7	-15.4	-14.9	-14.5	-14.3	-14.3	-14.1	-13.8	-13.5	-12.6	-11.9	-11.1	-10.1	-9.3	-8.8	-8.6	-8.4	-8.5	-8.6	-8.9	-9.2	-9.4	-9.4	-11.7	-8.4
19-Feb	-9.4	-9.4	-9.4	-9.4	-9.3	-9.0	-8.9	-8.5	-8.1	-7.7	-7.0	-5.5	-4.7	-4.7	-4.1	-4.1	-3.8	-4.1	-4.2	-5.0	-6.3	-7.8	-8.6	-9.3	-7.0	-3.8
20-Feb	-10.4	-11.4	-11.9	-12.3	-12.5	-12.6	-12.8	-13.1	-13.6	-14.0	-13.8	-13.4	-12.8	-12.5	-12.2	-12.1	-12.7	-13.7	-14.6	-15.7	-16.7	-17.4	-18.5	-19.1	-13.8	-10.4
21-Feb	-19.8	-20.3	-20.9	-21.2	-21.9	-22.5	-23.2	-23.9	-24.6	-24.2	-22.8	-21.0	-19.8	-18.9	-17.8	-17.1	-16.5	-16.3	-16.0	-16.6	-17.3	-17.9	-18.1	-18.1	-19.9	-16.0
22-Feb	-18.2	-18.6	-19.1	-19.3	-19.0	-19.0	-19.4	-18.7	-20.5	-19.4	-16.9	-13.3	-10.5	-6.7	-4.1	-1.7	0.0	0.4	0.0	0.7	1.0	2.7	3.0	2.4	-9.8	3.0
23-Feb	1.0	0.6	0.4	-0.1	0.1	-0.1	0.2	-0.1	-0.4	-0.5	-0.1	-0.4	-2.4	-1.8	-1.6	-2.2	-3.4	-4.0	-5.0	-6.2	-7.9	-9.3	-10.0	-10.2	-2.6	1.0
24-Feb	-10.4	-10.7	-11.1	-11.8	-12.3	-12.8	-12.9	-13.0	-13.0	-13.1	-13.0	-12.6	-12.0	-11.3	-11.2	-11.0	-12.0	-13.2	-14.4	-15.3	-17.0	-18.5	-19.5	-20.5	-13.4	-10.4
25-Feb	-21.5	-22.1	-22.3	-22.5	-23.0	-23.3	-23.4	-23.8	-24.0	-24.0	-22.4	-20.4	-19.6	-17.8	-15.5	-15.7	-16.1	-16.2	-16.4	-15.9	-16.6	-17.3	-18.4	-19.0	-19.9	-15.5
26-Feb	-20.1	-21.0	-21.2	-21.2	-21.5	-21.9	-22.2	-21.0	-20.2	-21.9	-19.7	-16.7	-14.6	-11.0	-8.5	-7.5	-7.6	-7.9	-8.3	-9.1	-9.7	-10.2	-10.8	-11.0	-15.2	-7.5
27-Feb	-11.3	-12.0	-13.1	-13.9	-14.7	-15.3	-15.9	-16.3	-16.0	-15.7	-14.7	-13.8	-12.8	-11.9	-11.4	-10.3	-9.3	-8.3	-8.4	-8.8	-8.2	-7.6	-7.7	-8.1	-11.9	-7.6
28-Feb	-8.4	-8.2	-7.9	-7.5	-7.2	-6.7	-6.6	-6.6	-6.5	-5.8	-5.0	-4.4	-4.1	-3.8	-3.0	-3.2	-3.9	-3.9	-4.4	-5.3	-5.7	-6.8	-7.6	-8.5	-5.9	-3.0
																								Diurnal Average		
																								Diurnal Maximum		





**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	231	34.38	34.38
-20 - 0	430	63.99	98.36
0 - 10	11	1.64	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Summary of Hour Averages

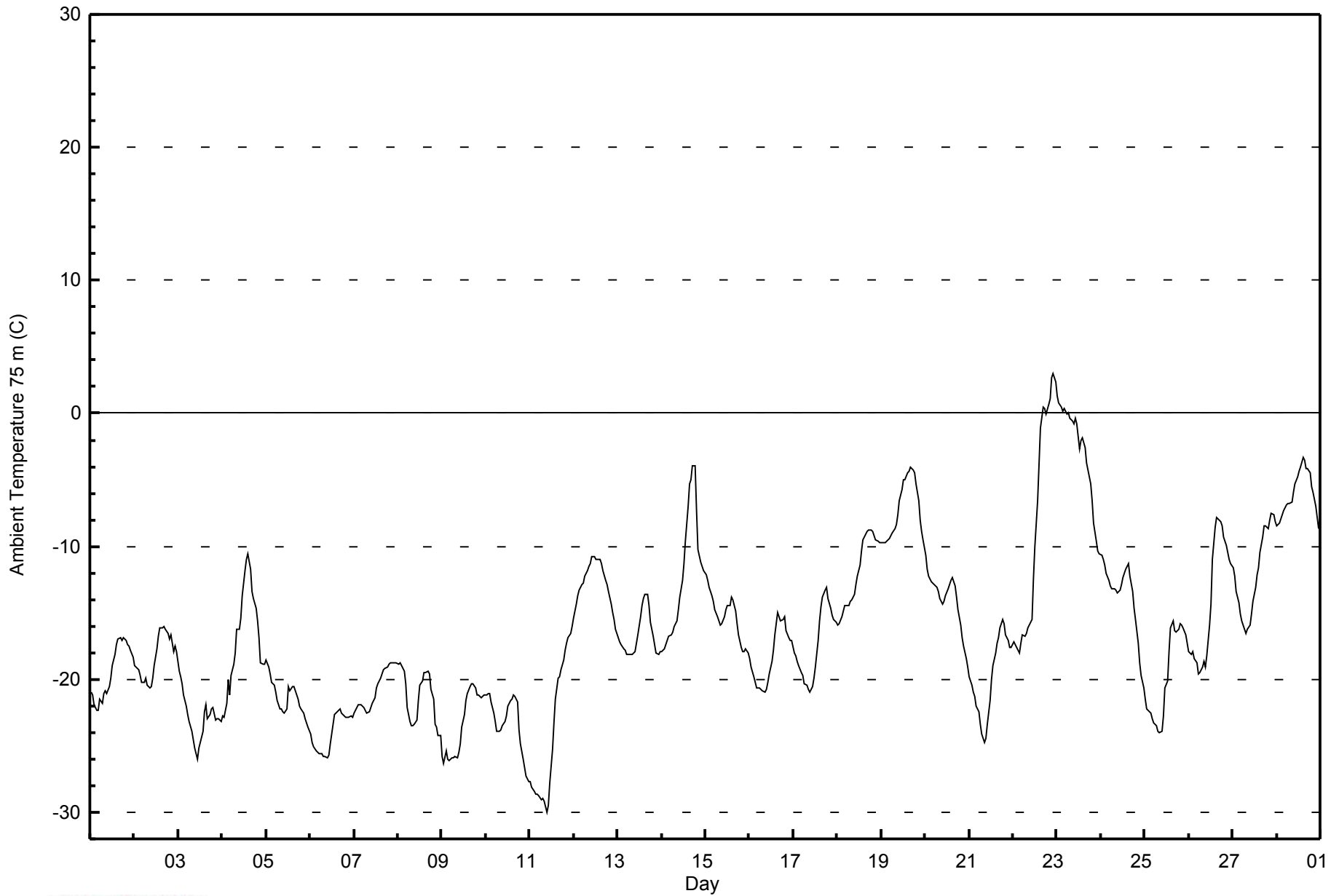
Mannix - February 2015

Maximum Value: 3.0 C on Feb 22 23:00		Maximum Daily Average: -2.8 C on Feb 23		Hours in Service: 672																						
Minimum Value: -30.1 C on Feb 11 10:00		Minimum Daily Average: -24.0 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.6 C at hour 16		Minimum Diurnal Average: -18.4 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.37 C		Percentiles: P <sub>1</sub> = -28.7 P <sub>10</sub> = -23.4 Q <sub>1</sub> = -21.1 Median = -17.3 Q <sub>3</sub> = -12.6 P <sub>90</sub> = -7.7 P <sub>99</sub> = 0.6		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-Feb	-21.0	-21.2	-21.9	-22.4	-22.3	-21.5	-21.9	-21.1	-20.9	-21.0	-20.5	-20.0	-19.0	-18.2	-17.4	-17.0	-16.9	-17.1	-16.9	-17.1	-17.4	-17.5	-17.8	-18.4	-19.4	-16.9
2-Feb	-19.0	-19.1	-19.2	-19.7	-20.3	-20.3	-19.9	-20.4	-20.7	-20.6	-19.9	-19.0	-17.7	-16.7	-16.1	-16.1	-16.1	-16.3	-16.5	-17.0	-16.6	-17.9	-17.5	-18.0	-18.4	-16.1
3-Feb	-19.4	-19.8	-20.3	-21.2	-22.1	-22.7	-23.2	-23.9	-24.5	-25.2	-26.0	-25.2	-24.7	-23.9	-22.5	-21.9	-23.0	-22.7	-22.2	-23.0	-23.0	-23.0	-23.2	-22.9	-19.4	
4-Feb	-22.8	-22.9	-21.8	-20.0	-21.1	-19.7	-18.8	-18.0	-16.2	-16.3	-15.4	-13.8	-11.8	-11.0	-10.6	-11.8	-13.4	-14.0	-14.6	-15.7	-16.9	-18.7	-18.8	-18.8	-16.8	-10.6
5-Feb	-18.6	-19.1	-19.6	-20.2	-20.5	-21.0	-21.6	-22.2	-22.2	-22.4	-22.5	-22.2	-20.6	-20.8	-20.6	-20.5	-20.9	-21.4	-22.0	-22.3	-22.6	-22.9	-23.3	-23.6	-21.4	-18.6
6-Feb	-24.2	-24.7	-25.1	-25.4	-25.5	-25.6	-25.6	-25.8	-25.8	-25.9	-25.7	-24.9	-23.4	-22.7	-22.5	-22.4	-22.3	-22.5	-22.7	-22.8	-22.9	-22.9	-22.8	-22.8	-24.0	-22.3
7-Feb	-22.5	-22.1	-21.9	-21.9	-21.9	-22.1	-22.3	-22.6	-22.4	-22.1	-21.8	-21.4	-20.7	-20.3	-19.9	-19.6	-19.3	-19.1	-19.0	-18.9	-18.8	-18.7	-18.8	-18.8	-20.7	-18.7
8-Feb	-18.9	-18.8	-19.0	-19.4	-20.4	-22.2	-23.1	-23.5	-23.5	-23.4	-23.1	-21.6	-20.5	-20.1	-19.5	-19.5	-19.4	-19.6	-20.8	-21.5	-23.4	-23.6	-24.2	-24.3	-21.4	-18.8
9-Feb	-25.8	-26.3	-25.4	-26.0	-26.1	-25.9	-25.9	-25.8	-26.0	-25.4	-24.9	-23.6	-22.7	-21.6	-21.1	-20.5	-20.4	-20.3	-20.7	-21.2	-21.1	-21.4	-21.2	-21.2	-23.4	-20.3
10-Feb	-21.2	-21.1	-21.1	-21.8	-22.5	-23.2	-23.9	-24.0	-23.9	-23.5	-23.2	-22.7	-22.0	-21.6	-21.4	-21.2	-21.3	-21.7	-23.8	-24.8	-26.0	-26.6	-27.3	-27.7	-23.2	-21.1
11-Feb	-27.7	-28.1	-28.4	-28.6	-28.6	-28.8	-29.1	-29.0	-29.1	-30.1	-29.5	-27.8	-25.2	-23.3	-21.5	-19.9	-19.8	-19.3	-18.6	-17.9	-17.3	-16.9	-16.5	-16.0	-24.0	-16.0
12-Feb	-15.4	-14.3	-13.8	-13.3	-12.9	-12.7	-12.2	-11.8	-11.5	-11.3	-10.8	-10.8	-11.0	-11.0	-11.0	-11.3	-11.8	-12.6	-12.9	-13.4	-14.3	-15.0	-15.5	-16.3	-12.8	-10.8
13-Feb	-16.8	-17.1	-17.4	-17.7	-17.8	-18.1	-18.2	-18.2	-18.1	-17.9	-17.3	-16.6	-15.3	-14.5	-14.0	-13.6	-13.6	-14.5	-15.8	-16.7	-17.4	-18.1	-18.1	-17.9	-16.7	-13.6
14-Feb	-17.9	-17.7	-17.3	-17.1	-16.8	-16.6	-16.5	-16.1	-15.6	-14.8	-13.8	-12.5	-11.3	-9.6	-7.0	-5.4	-5.0	-3.9	-3.9	-7.3	-10.2	-11.2	-11.6	-11.9	-12.1	-3.9
15-Feb	-12.2	-12.6	-13.1	-13.7	-14.2	-14.8	-15.3	-15.6	-15.9	-15.8	-15.3	-14.7	-14.5	-14.4	-13.8	-14.1	-14.8	-15.8	-16.7	-17.6	-18.0	-17.9	-17.7	-18.1	-15.3	-12.2
16-Feb	-18.5	-19.0	-19.9	-20.3	-20.6	-20.6	-20.7	-20.8	-20.9	-20.7	-20.2	-19.6	-18.6	-17.8	-16.6	-15.0	-15.3	-15.6	-15.5	-15.3	-16.4	-16.9	-17.0	-17.0	-18.3	-15.0
17-Feb	-18.1	-18.2	-18.7	-19.0	-19.4	-19.7	-20.4	-20.4	-20.7	-21.0	-20.6	-19.9	-19.1	-17.1	-15.7	-14.6	-13.9	-13.3	-13.0	-14.0	-14.7	-15.1	-15.5	-15.7	-17.4	-13.0
18-Feb	-15.9	-15.8	-15.3	-14.9	-14.4	-14.5	-14.5	-14.2	-14.0	-13.6	-12.9	-12.2	-11.4	-10.4	-9.5	-9.1	-8.8	-8.7	-8.8	-8.9	-9.2	-9.5	-9.6	-9.7	-11.9	-8.7
19-Feb	-9.7	-9.7	-9.7	-9.6	-9.4	-9.2	-8.9	-8.7	-8.4	-7.7	-6.6	-5.7	-5.0	-5.0	-4.4	-4.4	-4.0	-4.3	-4.5	-5.3	-6.6	-8.0	-8.8	-9.6	-7.2	-4.0
20-Feb	-10.7	-11.7	-12.2	-12.6	-12.8	-12.9	-13.1	-13.4	-13.9	-14.3	-14.2	-13.7	-13.2	-12.8	-12.6	-12.4	-13.0	-13.8	-14.7	-15.9	-16.8	-17.5	-18.5	-19.0	-14.0	-10.7
21-Feb	-19.8	-20.4	-21.0	-21.3	-22.0	-22.5	-23.4	-24.1	-24.8	-24.4	-23.3	-21.6	-20.0	-19.0	-18.1	-17.3	-16.9	-16.1	-15.5	-15.8	-16.7	-17.1	-17.6	-17.6	-19.8	-15.5
22-Feb	-17.2	-17.4	-17.7	-18.0	-17.3	-16.7	-16.7	-16.5	-16.1	-15.9	-15.5	-12.4	-10.0	-6.6	-3.9	-1.1	0.5	0.3	0.0	0.7	1.1	2.7	3.0	2.3	-8.7	3.0
23-Feb	1.3	0.8	0.5	0.1	0.4	-0.1	0.0	-0.3	-0.6	-0.7	-0.4	-0.7	-2.7	-2.1	-1.9	-2.6	-3.8	-4.3	-5.3	-6.5	-8.2	-9.6	-10.3	-10.6	-2.8	1.3
24-Feb	-10.7	-11.0	-11.4	-12.1	-12.6	-13.0	-13.2	-13.3	-13.5	-13.3	-12.9	-12.3	-11.7	-11.5	-11.3	-12.2	-13.4	-14.6	-15.6	-17.3	-18.7	-19.7	-20.6	-13.7	-10.7	
25-Feb	-21.5	-22.3	-22.5	-22.6	-23.0	-23.3	-23.5	-23.9	-24.1	-23.9	-22.8	-20.6	-20.1	-17.9	-16.1	-15.6	-16.3	-16.5	-16.2	-15.8	-15.9	-16.1	-16.7	-17.3	-19.8	-15.6
26-Feb	-17.9	-18.2	-17.9	-18.5	-18.8	-19.6	-19.5	-19.1	-18.7	-19.1	-18.2	-15.9	-14.4	-11.0	-8.6	-7.8	-7.9	-8.1	-8.4	-9.3	-9.9	-10.5	-11.0	-11.3	-14.1	-7.8
27-Feb	-11.6	-12.2	-13.4	-14.2	-15.1	-15.6	-16.2	-16.5	-16.2	-15.9	-15.1	-14.1	-13.1	-12.1	-11.6	-10.5	-9.3	-8.5	-8.5	-8.6	-8.1	-7.5	-7.6	-8.1	-12.1	-7.5
28-Feb	-8.5	-8.2	-8.0	-7.7	-7.4	-6.9	-6.7	-6.8	-6.6	-6.0	-5.3	-4.8	-4.4	-4.1	-3.3	-3.5	-4.2	-4.1	-4.5	-5.5	-5.9	-7.0	-7.8	-8.7	-6.1	-3.3
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	219	32.59	32.59
-20 - 0	440	65.48	98.07
0 - 10	13	1.93	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Summary of Hour Averages

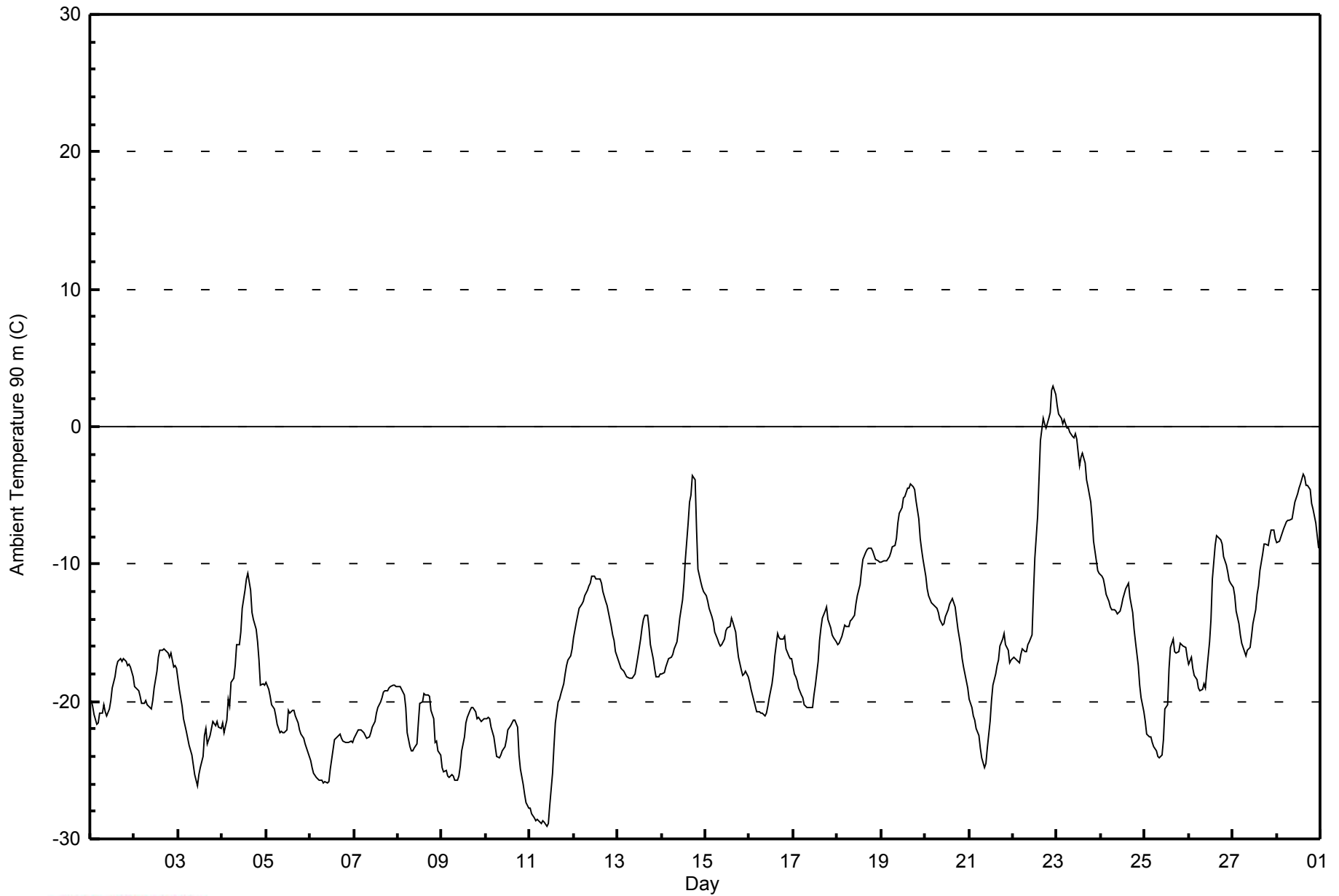
Mannix - February 2015

Maximum Value: 3.0 C on Feb 22 23:00		Maximum Daily Average: -2.9 C on Feb 23		Hours in Service: 672																						
Minimum Value: -29.1 C on Feb 11 10:00		Minimum Daily Average: -24.2 C on Feb 6		Hours of Data: 672																						
Maximum Diurnal Average: -13.7 C at hour 16		Minimum Diurnal Average: -18.4 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.35 C		Percentiles: P <sub>1</sub> = -28.7 P <sub>10</sub> = -23.4 Q <sub>1</sub> = -21.0 Median = -17.1 Q <sub>3</sub> = -12.7 P <sub>90</sub> = -7.4 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-Feb	-19.9	-20.3	-20.9	-21.7	-21.6	-20.9	-20.9	-20.3	-20.7	-21.0	-20.5	-20.0	-19.1	-18.2	-17.5	-17.1	-16.9	-17.1	-16.9	-17.1	-17.4	-17.3	-17.5	-18.2	-19.1	-16.9
2-Feb	-18.9	-19.0	-19.2	-19.6	-20.1	-20.2	-19.9	-20.3	-20.4	-20.5	-20.0	-19.0	-17.7	-16.8	-16.3	-16.2	-16.2	-16.3	-16.5	-16.8	-16.5	-17.5	-17.3	-17.6	-18.3	-16.2
3-Feb	-19.1	-19.7	-20.3	-21.3	-22.2	-22.7	-23.2	-23.9	-24.6	-25.3	-26.1	-25.3	-24.8	-24.0	-22.4	-22.0	-23.1	-22.5	-22.0	-21.5	-21.7	-21.5	-21.8	-22.0	-22.6	-19.1
4-Feb	-21.6	-22.3	-21.3	-19.8	-20.4	-18.6	-18.3	-17.4	-15.9	-15.9	-14.9	-13.3	-11.9	-11.1	-10.7	-11.9	-13.5	-14.0	-14.7	-15.7	-17.0	-18.8	-18.7	-18.8	-16.5	-10.7
5-Feb	-18.6	-19.1	-19.6	-20.3	-20.5	-21.1	-21.7	-22.3	-22.1	-22.3	-22.0	-20.6	-20.9	-20.7	-20.7	-21.0	-21.6	-22.1	-22.4	-22.7	-23.1	-23.4	-23.7	-21.4	-18.6	
6-Feb	-24.3	-24.9	-25.3	-25.5	-25.7	-25.7	-25.9	-25.9	-25.9	-25.8	-25.0	-23.5	-22.8	-22.7	-22.5	-22.4	-22.7	-22.8	-22.9	-23.0	-23.0	-22.9	-22.9	-24.2	-22.4	
7-Feb	-22.7	-22.3	-22.1	-22.1	-22.1	-22.2	-22.5	-22.7	-22.6	-22.3	-21.9	-21.5	-20.8	-20.4	-20.0	-19.7	-19.4	-19.3	-19.2	-19.0	-18.9	-18.9	-18.9	-20.8	-18.9	
8-Feb	-19.0	-18.9	-19.1	-19.5	-20.5	-22.3	-23.2	-23.6	-23.6	-23.4	-23.1	-21.5	-20.1	-20.0	-19.4	-19.6	-19.5	-19.6	-20.7	-21.2	-23.0	-22.9	-23.6	-23.9	-21.3	-18.9
9-Feb	-24.8	-25.1	-25.0	-25.4	-25.5	-25.4	-25.8	-25.7	-25.4	-24.7	-23.6	-22.6	-21.6	-21.2	-20.6	-20.4	-20.4	-20.7	-21.2	-21.2	-21.5	-21.3	-21.3	-23.2	-20.4	
10-Feb	-21.3	-21.2	-21.2	-21.9	-22.6	-23.3	-24.0	-24.1	-23.9	-23.6	-23.3	-22.8	-22.1	-21.7	-21.5	-21.3	-21.4	-21.8	-23.9	-24.9	-26.1	-26.7	-27.3	-27.7	-23.3	-21.2
11-Feb	-27.7	-28.1	-28.5	-28.6	-28.6	-28.7	-28.8	-28.7	-28.8	-29.1	-28.9	-27.6	-25.2	-23.3	-21.6	-20.0	-19.9	-19.4	-18.7	-18.0	-17.4	-17.0	-16.7	-16.2	-24.0	-16.2
12-Feb	-15.4	-14.2	-13.7	-13.3	-12.9	-12.8	-12.3	-11.9	-11.6	-11.3	-10.9	-10.9	-11.1	-11.1	-11.1	-11.4	-12.0	-12.7	-13.0	-13.5	-14.5	-15.1	-15.6	-16.4	-12.9	-10.9
13-Feb	-17.0	-17.3	-17.6	-17.8	-18.0	-18.2	-18.3	-18.3	-18.0	-17.4	-16.7	-15.4	-14.6	-14.1	-13.7	-13.8	-14.6	-15.9	-16.8	-17.6	-18.2	-18.2	-18.0	-16.8	-13.7	
14-Feb	-18.0	-17.8	-17.5	-17.2	-16.9	-16.7	-16.6	-16.2	-15.7	-14.9	-14.0	-12.6	-11.4	-9.7	-7.1	-5.5	-5.0	-3.6	-3.9	-7.4	-10.4	-11.3	-11.7	-12.0	-12.2	-3.6
15-Feb	-12.3	-12.7	-13.2	-13.9	-14.3	-15.0	-15.4	-15.8	-16.0	-15.9	-15.4	-14.9	-14.6	-14.5	-13.9	-14.2	-15.0	-16.0	-16.8	-17.7	-18.1	-18.0	-17.8	-18.2	-15.4	-12.3
16-Feb	-18.6	-19.1	-20.0	-20.3	-20.7	-20.7	-20.8	-20.9	-21.1	-20.9	-20.3	-19.7	-18.7	-17.9	-16.7	-15.1	-15.4	-15.4	-15.4	-15.2	-16.1	-16.6	-16.9	-16.9	-18.3	-15.1
17-Feb	-18.0	-18.2	-18.5	-19.0	-19.5	-19.7	-20.2	-20.4	-20.4	-20.5	-19.5	-18.8	-17.1	-15.6	-14.6	-13.9	-13.4	-13.1	-14.0	-14.7	-15.1	-15.4	-15.6	-17.3	-13.1	
18-Feb	-15.9	-15.8	-15.3	-14.8	-14.4	-14.5	-14.5	-14.2	-14.0	-13.7	-12.9	-12.3	-11.5	-10.5	-9.6	-9.2	-9.0	-8.9	-8.9	-9.1	-9.4	-9.6	-9.8	-9.8	-12.0	-8.9
19-Feb	-9.8	-9.8	-9.8	-9.7	-9.4	-9.1	-8.7	-8.7	-8.1	-7.1	-6.3	-5.9	-5.2	-5.1	-4.5	-4.4	-4.1	-4.4	-4.6	-5.4	-6.7	-8.2	-8.9	-9.7	-7.2	-4.1
20-Feb	-10.8	-11.8	-12.3	-12.8	-12.9	-13.0	-13.2	-13.6	-14.0	-14.4	-14.3	-13.8	-13.3	-12.9	-12.7	-12.5	-13.1	-13.9	-14.8	-16.0	-16.9	-17.5	-18.5	-19.0	-14.1	-10.8
21-Feb	-19.8	-20.5	-21.0	-21.4	-22.0	-22.4	-23.4	-24.1	-24.8	-24.5	-23.4	-21.5	-20.0	-18.8	-18.0	-17.4	-17.0	-16.0	-15.4	-15.0	-15.9	-16.3	-17.2	-17.0	-19.7	-15.0
22-Feb	-16.8	-16.9	-17.0	-17.2	-16.6	-16.2	-16.4	-16.4	-15.9	-15.7	-15.2	-12.2	-9.6	-6.5	-3.7	-1.0	0.6	0.2	-0.1	0.6	1.1	2.7	3.0	2.3	-8.5	3.0
23-Feb	1.5	0.9	0.6	0.2	0.5	-0.1	-0.1	-0.4	-0.7	-0.9	-0.5	-0.9	-2.8	-2.2	-2.0	-2.7	-3.9	-4.4	-5.4	-6.7	-8.4	-9.8	-10.4	-10.7	-2.9	1.5
24-Feb	-10.9	-11.1	-11.6	-12.2	-12.7	-13.1	-13.3	-13.3	-13.4	-13.6	-13.4	-13.0	-12.5	-11.8	-11.6	-11.4	-12.4	-13.5	-14.7	-15.7	-17.4	-18.8	-19.8	-20.7	-13.8	-10.9
25-Feb	-21.5	-22.3	-22.5	-22.6	-23.0	-23.3	-23.6	-24.0	-24.1	-23.9	-22.8	-20.5	-20.2	-17.6	-16.1	-15.5	-16.3	-16.5	-16.3	-15.7	-15.8	-15.9	-16.1	-16.8	-19.7	-15.5
26-Feb	-17.2	-16.7	-17.6	-18.1	-18.4	-19.0	-19.2	-19.1	-18.7	-19.0	-17.8	-15.6	-14.1	-11.0	-8.6	-7.9	-8.0	-8.2	-8.5	-9.4	-10.0	-10.6	-11.1	-11.4	-14.0	-7.9
27-Feb	-11.7	-12.3	-13.5	-14.4	-15.2	-15.7	-16.3	-16.7	-16.3	-16.0	-15.3	-14.4	-13.3	-12.2	-11.6	-10.5	-9.3	-8.6	-8.6	-8.6	-8.0	-7.6	-7.6	-8.1	-12.2	-7.6
28-Feb	-8.5	-8.3	-8.0	-7.7	-7.4	-6.9	-6.8	-6.8	-6.7	-6.1	-5.5	-4.9	-4.5	-4.2	-3.5	-3.6	-4.3	-4.2	-4.5	-5.6	-6.0	-7.1	-8.0	-8.8	-6.2	-3.5
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	219	32.59	32.59
-20 - 0	441	65.63	98.21
0 - 10	12	1.79	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



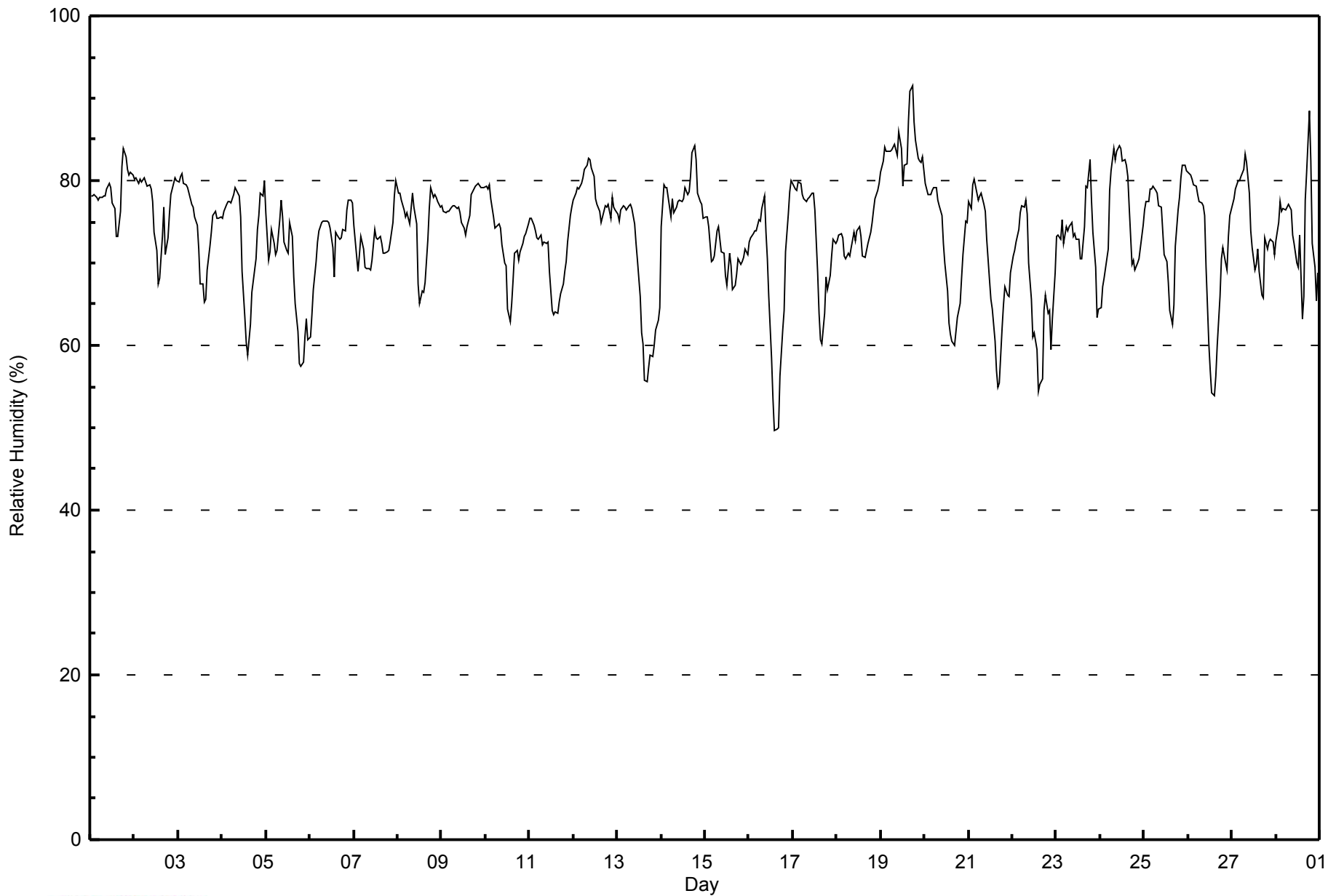


Maximum Value: 92 % on Feb 19 18:00														Maximum Daily Average: 84.1 % on Feb 19														Hours in Service: 672	
Minimum Value: 50 % on Feb 16 15:00														Minimum Daily Average: 66.9 % on Feb 22														Hours of Data: 672	
Maximum Diurnal Average: 77.2 % at hour 8														Minimum Diurnal Average: 67.4 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 73.5 %														Percentiles: P <sub>1</sub> = 55 P <sub>10</sub> = 64 Q <sub>1</sub> = 70 Median = 75 Q <sub>3</sub> = 78 P <sub>90</sub> = 80 P <sub>99</sub> = 85														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-Feb	78	78	78	78	78	78	78	78	78	79	80	79	77	77	73	73	76	82	84	83	81	81	81	81	78.7	84			
2-Feb	80	80	80	80	80	80	80	79	80	79	77	74	72	67	68	73	77	71	73	76	78	80	80	80	76.9	80			
3-Feb	80	80	81	80	79	79	78	77	77	76	75	72	67	67	65	66	69	72	74	76	76	75	76	76	74.7	81			
4-Feb	75	76	77	77	77	77	78	79	79	78	76	69	63	60	59	62	66	68	70	74	76	78	78	80	73.2	80			
5-Feb	76	70	71	74	72	71	72	75	78	76	73	72	71	75	73	68	65	62	58	58	58	61	63	61	68.8	78			
6-Feb	61	64	67	70	73	74	75	75	75	75	75	74	72	68	74	73	73	73	74	74	76	78	78	77	72.8	78			
7-Feb	75	71	69	71	73	72	69	69	69	69	70	74	73	73	72	71	71	71	72	72	75	78	80	72.3	80				
8-Feb	78	79	78	76	76	76	75	77	78	77	75	67	65	67	66	68	73	77	79	78	78	78	77	77	74.8	79			
9-Feb	77	76	76	76	76	77	77	77	77	77	76	75	74	73	74	76	78	79	79	80	80	79	79	79	77.0	80			
10-Feb	79	79	79	78	76	74	74	75	74	72	70	70	64	63	65	68	71	72	70	71	72	73	74	75	72.5	79			
11-Feb	75	75	75	74	73	73	73	72	73	72	73	69	64	64	64	64	65	66	67	69	70	73	76	77	70.7	77			
12-Feb	78	78	79	79	80	80	81	82	83	83	82	80	78	77	76	75	76	77	77	77	75	78	77	77	78.5	83			
13-Feb	76	75	76	77	77	76	77	77	77	75	72	70	66	62	60	56	56	57	59	59	60	62	63	65	67.9	77			
14-Feb	74	79	79	79	78	76	78	76	77	78	78	77	78	79	78	79	80	83	84	83	78	77	77	75	78.4	84			
15-Feb	76	76	74	70	70	71	74	74	73	71	71	69	67	71	70	67	67	69	70	70	70	71	72	71	71.0	76			
16-Feb	73	73	74	74	74	75	75	77	78	74	70	66	58	54	50	50	50	56	62	64	71	76	79	80	68.0	80			
17-Feb	79	79	79	80	80	78	78	77	78	78	78	79	76	69	64	61	60	64	68	67	68	71	73	72	73.2	80			
18-Feb	73	73	74	73	71	71	71	71	72	74	73	74	74	73	71	71	72	72	74	75	76	78	79	80	73.4	80			
19-Feb	81	82	84	84	84	84	84	84	84	83	86	84	79	82	82	87	91	92	87	85	83	82	82	83	84.1	92			
20-Feb	80	79	78	78	79	79	79	78	77	76	72	70	67	63	61	60	60	62	63	65	68	71	75	75	71.5	80			
21-Feb	77	77	80	80	79	78	78	78	77	76	73	68	66	64	60	57	55	55	62	65	67	66	66	69	69.8	80			
22-Feb	71	72	73	74	76	77	77	78	76	70	66	61	62	59	54	55	56	64	66	64	64	59	63	69	66.9	78			
23-Feb	73	73	73	75	72	74	74	74	75	73	74	73	70	71	74	79	79	83	78	74	70	63	64	73.4	83				
24-Feb	65	67	68	69	72	79	81	84	82	83	84	84	82	83	82	80	77	70	70	69	70	71	72	75	75.8	84			
25-Feb	76	77	77	79	79	79	79	79	77	77	74	71	70	68	64	63	65	72	76	78	80	82	82	81	75.2	82			
26-Feb	81	81	80	80	79	78	77	77	77	76	69	60	57	54	54	56	60	66	71	72	70	69	73	76	70.6	81			
27-Feb	77	78	79	80	80	81	81	83	82	78	74	72	69	70	72	69	66	66	73	72	72	73	72	71	74.6	83			
28-Feb	73	75	77	76	77	76	77	77	76	73	72	70	69	73	63	66	78	81	89	82	72	69	66	69	74.1	89			
75.7														75.9														Diurnal Average	
81														82														Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	28	4.17	4.17
60 - 80	567	84.38	88.54
80 - 100	77	11.46	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

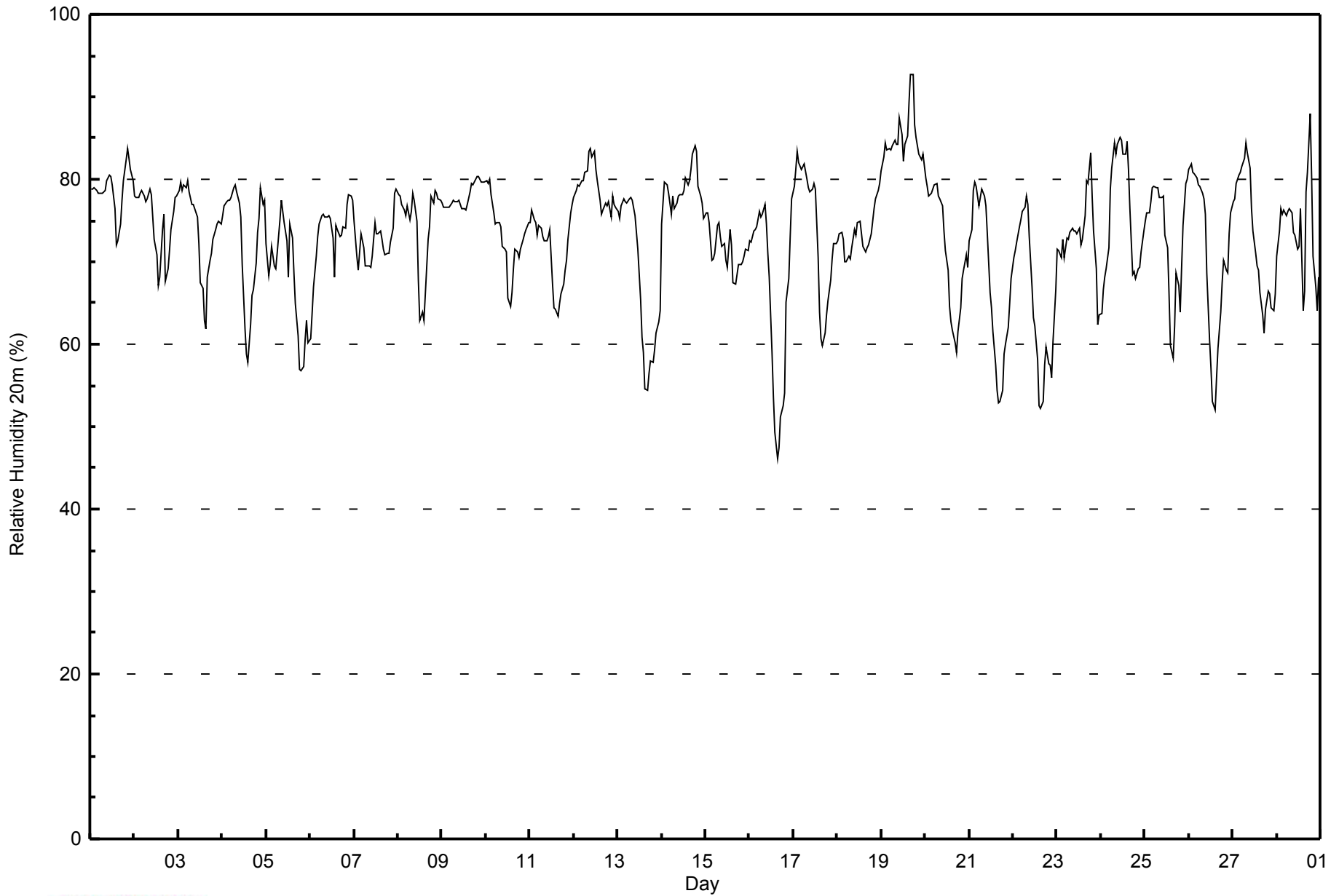


Maximum Value: 93 % on Feb 19 17:00																		Maximum Daily Average: 84.9 % on Feb 19						Hours in Service: 672																									
Minimum Value: 46 % on Feb 16 16:00																		Minimum Daily Average: 65.3 % on Feb 22						Hours of Data: 672																									
Maximum Diurnal Average: 77.3 % at hour 8																		Minimum Diurnal Average: 67.1 % at hour 16						Hours of Missing Data: 0																									
Monthly Average: 73.2 %																		Percentiles: P <sub>1</sub> = 52 P <sub>10</sub> = 63 Q <sub>1</sub> = 69 Median = 75 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 P <sub>99</sub> = 85						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-Feb	79	79	79	79	78	78	78	78	79	80	80	80	79	76	72	73	75	77	80	82	84	83	81	80	78.7	84																							
2-Feb	78	78	78	78	79	78	77	78	79	78	76	73	71	67	68	74	76	68	69	71	74	76	78	78	74.9	79																							
3-Feb	79	80	79	79	79	80	79	77	77	76	75	72	67	67	63	62	68	70	71	73	74	75	75	75	73.8	80																							
4-Feb	76	77	77	77	77	78	79	79	78	77	75	70	62	59	58	62	66	67	70	74	75	79	77	78	72.8	79																							
5-Feb	72	68	70	72	69	69	71	75	77	76	75	73	68	74	73	69	65	61	57	57	57	61	63	60	68.0	77																							
6-Feb	61	64	67	71	73	75	76	76	75	75	76	75	73	68	74	74	73	73	74	74	77	78	78	78	73.2	78																							
7-Feb	75	71	69	71	73	72	69	69	69	69	71	75	73	73	74	73	72	71	71	71	72	74	78	79	72.3	79																							
8-Feb	78	78	77	76	76	77	75	76	78	77	75	68	63	64	63	66	73	74	78	77	79	78	78	77	74.2	79																							
9-Feb	77	77	77	77	77	77	77	77	77	77	77	77	77	76	77	78	80	79	80	80	80	80	80	80	77.9	80																							
10-Feb	80	79	80	78	76	75	75	75	74	72	72	71	66	65	66	69	71	71	70	72	73	73	74	75	73.0	80																							
11-Feb	75	76	75	75	73	74	74	73	73	73	73	74	67	64	64	63	65	66	67	69	70	73	76	77	71.2	77																							
12-Feb	78	79	79	79	80	80	81	81	83	84	83	83	81	80	78	76	76	77	77	77	75	78	77	77	79.1	84																							
13-Feb	76	75	77	78	77	77	78	78	77	76	74	71	65	61	59	55	54	56	58	58	59	61	63	64	67.8	78																							
14-Feb	75	80	80	79	78	76	78	76	77	78	78	79	80	79	80	81	83	84	83	79	78	77	75	75	78.8	84																							
15-Feb	76	76	75	70	70	71	74	75	73	72	72	70	69	74	72	67	67	69	70	70	70	71	72	71	71.5	76																							
16-Feb	73	72	74	74	74	76	75	76	77	75	71	68	59	54	49	46	47	51	53	54	65	68	73	78	65.9	78																							
17-Feb	79	81	83	82	81	81	82	80	79	79	79	79	79	70	64	61	60	61	64	65	68	70	72	72	73.8	83																							
18-Feb	73	73	74	73	70	70	71	70	72	74	73	75	75	73	72	71	72	72	73	75	76	78	79	80	73.4	80																							
19-Feb	81	83	84	84	84	84	84	85	84	84	87	85	82	84	85	89	93	93	87	85	83	83	82	83	84.9	93																							
20-Feb	80	79	78	78	79	79	79	78	78	77	74	71	69	65	63	62	60	59	62	64	68	69	71	69	71.3	80																							
21-Feb	73	74	79	80	79	77	78	79	78	77	73	66	64	61	58	54	53	53	54	59	60	62	65	68	67.7	80																							
22-Feb	71	71	72	74	75	76	77	78	77	73	67	63	62	58	53	52	53	58	60	58	57	56	60	67	65.3	78																							
23-Feb	71	71	71	73	70	73	73	74	74	74	74	73	74	72	73	76	80	80	83	78	74	69	62	64	73.1	83																							
24-Feb	64	67	68	69	72	79	81	84	83	84	85	85	83	83	85	81	76	68	69	68	69	69	71	74	75.7	85																							
25-Feb	75	76	76	77	79	79	79	79	78	78	78	73	72	66	60	58	62	69	67	64	69	74	79	80	72.9	80																							
26-Feb	81	82	81	81	80	79	79	78	78	76	69	61	57	53	52	56	60	64	67	70	69	69	73	76	70.4	82																							
27-Feb	77	78	80	81	81	81	83	84	83	81	77	74	71	70	69	66	64	61	64	66	66	64	64	66	73.0	84																							
28-Feb	71	74	76	76	76	76	76	76	76	74	73	72	72	76	64	67	78	81	88	80	71	67	64	68	73.8	88																							
																								75.0	75.6	76.2	76.4	76.3	76.7	77.1	77.3	77.3	76.6	75.4	73.4	70.7	69.1	67.3	67.1	68.5	69.0	70.2	70.5	71.2	72.0	72.9	73.8	Diurnal Average	
																								81	83	84	84	84	84	84	85	84	84	87	85	83	84	85	89	93	93	88	85	84	83	82	83	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	44	6.55	6.55
60 - 80	547	81.40	87.95
80 - 100	81	12.05	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

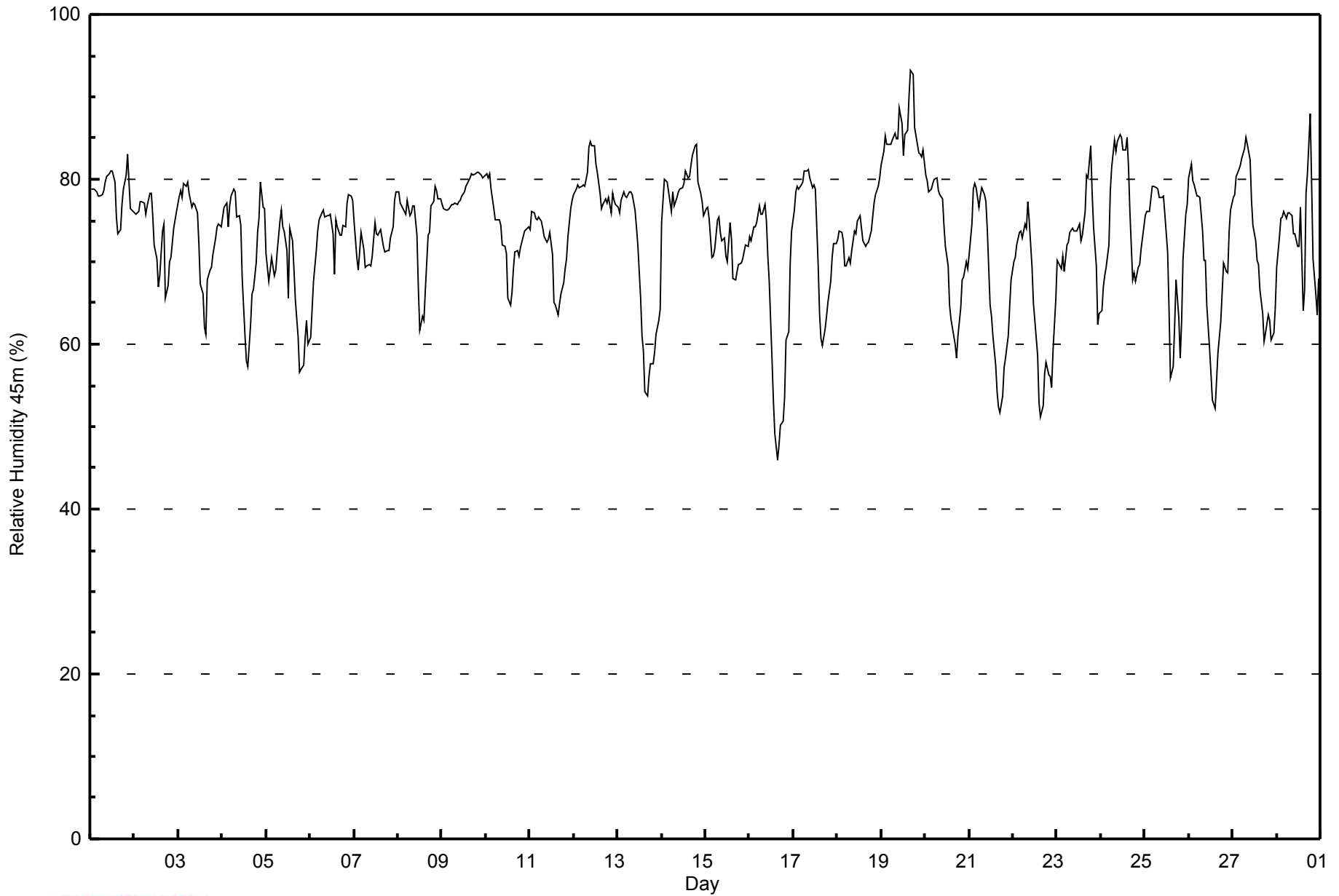


Maximum Value: 93 % on Feb 19 17:00																		Maximum Daily Average: 85.5 % on Feb 19																		Hours in Service: 672																																													
Minimum Value: 46 % on Feb 16 16:00																		Minimum Daily Average: 64.7 % on Feb 22																		Hours of Data: 672																																													
Maximum Diurnal Average: 77.2 % at hour 8																		Minimum Diurnal Average: 67.3 % at hour 16																		Hours of Missing Data: 0																																													
Monthly Average: 73.0 %																		Percentiles: P <sub>1</sub> = 52 P <sub>10</sub> = 62 Q <sub>1</sub> = 69 Median = 74 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 P <sub>99</sub> = 86																		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-Feb	79	79	79	78	78	78	78	79	80	80	81	81	81	80	75	73	74	77	79	81	83	80	77	76	78.5	83																																																							
2-Feb	76	76	76	77	77	77	76	77	78	78	76	72	70	67	68	74	75	66	67	70	70	74	75	76	73.7	78																																																							
3-Feb	78	79	78	79	79	80	78	77	77	77	76	72	67	66	62	61	68	69	69	71	73	74	75	74	73.3	80																																																							
4-Feb	76	77	77	74	77	78	79	78	75	76	74	68	61	58	57	62	66	67	70	74	75	80	77	76	72.1	80																																																							
5-Feb	71	68	69	71	68	69	71	75	76	74	74	71	66	74	73	69	65	61	57	57	57	61	63	60	67.5	76																																																							
6-Feb	61	64	68	71	74	75	76	76	75	76	76	76	73	69	75	74	73	73	74	74	77	78	78	78	73.5	78																																																							
7-Feb	75	70	69	71	74	72	69	69	70	69	71	75	73	73	74	73	72	71	71	71	73	74	77	78	72.3	78																																																							
8-Feb	78	77	77	76	76	77	76	76	77	77	73	67	62	63	63	67	73	74	77	77	79	79	78	78	74.0	79																																																							
9-Feb	77	76	76	76	76	77	77	77	77	77	77	78	78	79	80	80	81	80	81	81	81	80	80	80	78.5	81																																																							
10-Feb	81	80	81	79	76	75	75	75	74	72	72	71	66	65	66	69	71	71	71	72	73	74	74	74	73.2	81																																																							
11-Feb	74	76	76	75	75	75	75	74	73	72	73	74	71	65	65	64	65	66	67	69	70	73	76	77	71.7	77																																																							
12-Feb	78	79	79	79	79	79	79	81	84	85	84	84	82	81	78	76	77	78	77	78	76	78	77	77	79.4	85																																																							
13-Feb	77	76	78	78	78	78	78	79	78	76	74	72	66	61	59	54	54	56	58	58	59	61	63	64	68.1	79																																																							
14-Feb	75	80	80	80	79	76	79	77	78	79	79	80	81	80	80	82	83	84	84	80	78	77	76	76	79.3	84																																																							
15-Feb	76	77	75	70	71	71	75	75	74	72	73	71	70	75	73	68	68	69	70	70	70	71	72	72	72.0	77																																																							
16-Feb	73	73	74	74	75	77	76	76	77	75	71	68	58	53	49	46	48	50	51	54	60	62	70	74	65.1	77																																																							
17-Feb	76	79	79	79	79	80	81	81	81	80	79	79	79	70	64	61	60	62	63	65	68	70	72	72	73.3	81																																																							
18-Feb	73	74	74	73	69	70	70	70	71	74	73	75	76	74	73	72	72	72	74	75	77	78	79	80	73.7	80																																																							
19-Feb	82	83	85	84	84	84	85	86	85	85	89	87	83	85	86	90	93	93	86	85	83	83	83	84	85.5	93																																																							
20-Feb	81	80	79	79	79	80	80	79	78	78	74	72	70	65	63	62	60	58	61	64	68	68	70	69	71.5	81																																																							
21-Feb	71	75	79	80	79	77	78	79	78	77	74	65	63	61	57	54	52	52	54	57	58	61	65	68	67.2	80																																																							
22-Feb	70	71	72	74	74	73	74	74	77	75	69	65	63	59	53	51	52	56	58	56	56	55	59	65	64.7	77																																																							
23-Feb	70	70	69	71	69	72	72	73	74	74	74	75	73	73	76	81	80	84	78	74	69	62	64	73.0	84																																																								
24-Feb	64	67	68	69	72	79	82	85	83	85	86	85	84	84	85	82	76	68	69	68	69	70	71	74	75.9	86																																																							
25-Feb	76	76	76	78	79	79	79	79	78	78	78	76	71	64	56	57	62	68	63	58	63	70	76	77	71.5	79																																																							
26-Feb	80	82	80	79	78	78	78	74	70	70	65	60	56	53	52	56	59	63	66	70	69	69	74	76	69.0	82																																																							
27-Feb	78	78	80	81	82	82	84	85	84	82	77	74	73	70	70	67	64	60	61	64	63	60	61	64	72.7	85																																																							
28-Feb	69	73	75	75	76	75	76	76	76	73	73	72	72	77	64	67	78	81	88	79	70	66	64	68	73.5	88																																																							
74.7																		75.4																		76.0		76.1		76.2		76.6		77.0		77.2		77.1		76.7		75.5		73.6		71.0		69.4		67.6		67.3		68.6		68.7		69.6		70.0		70.6		71.3		72.3		73.3		Diurnal Average	
82																		83																		85		84		84		84		85		86		85		85		89		87		84		85		86		90		93		93		88		85		83		83		83		84		Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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







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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	50	7.44	7.44
60 - 80	532	79.17	86.61
80 - 100	90	13.39	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

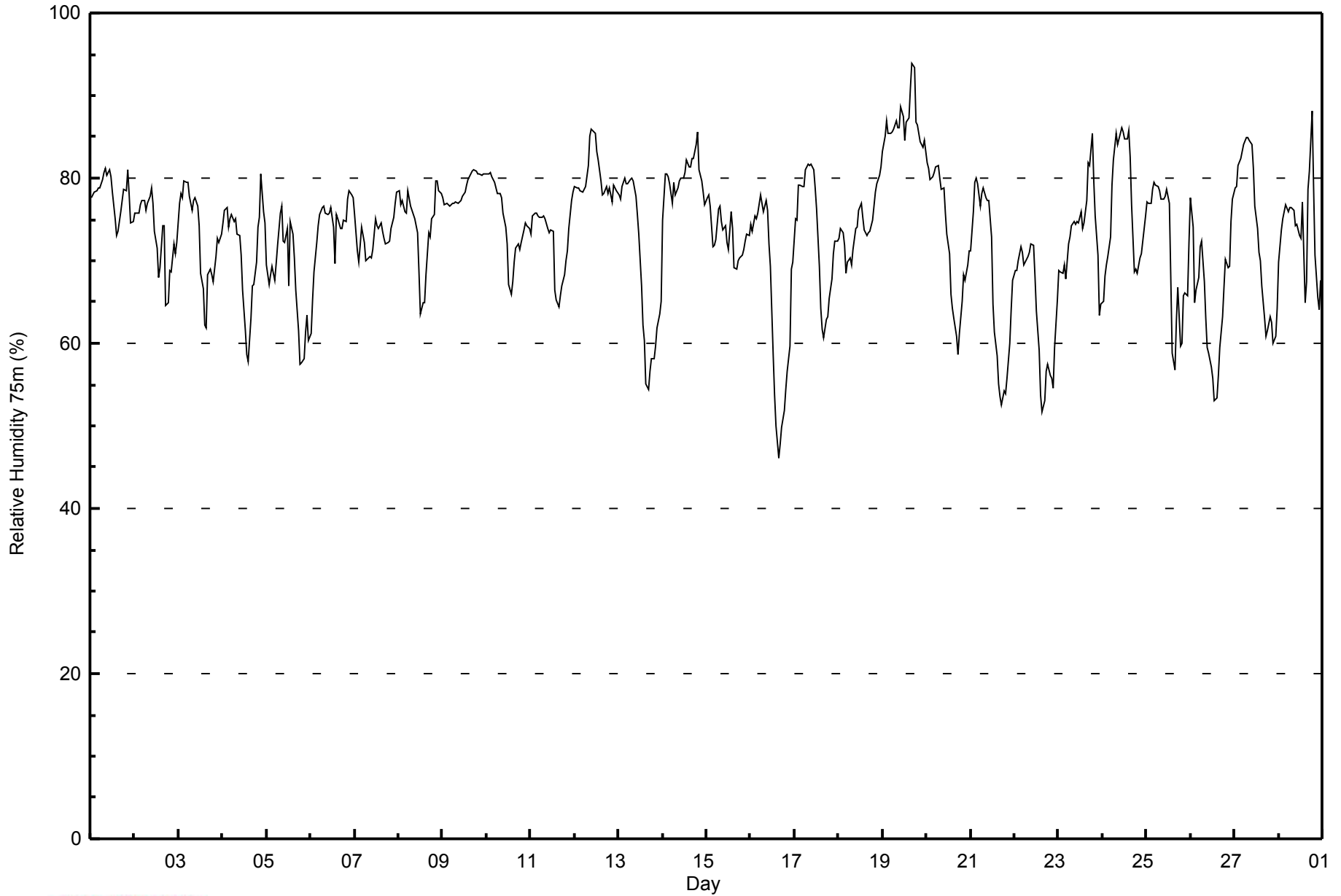


Maximum Value: 94 % on Feb 19 17:00														Maximum Daily Average: 86.6 % on Feb 19														Hours in Service: 672																					
Minimum Value: 46 % on Feb 16 16:00														Minimum Daily Average: 63.8 % on Feb 22														Hours of Data: 672																					
Maximum Diurnal Average: 77.3 % at hour 8														Minimum Diurnal Average: 68.1 % at hour 16														Hours of Missing Data: 0																					
Monthly Average: 73.3 %														Percentiles: P <sub>1</sub> = 53 P <sub>10</sub> = 62 Q <sub>1</sub> = 69 Median = 75 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 P <sub>99</sub> = 87														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-Feb	78	78	78	78	79	79	80	81	81	80	81	80	78	75	73	74	76	77	79	79	81	78	75	75	78.0	81																							
2-Feb	76	76	76	77	77	77	76	77	78	79	77	74	72	68	69	74	74	65	65	69	69	72	71	72	73.3	79																							
3-Feb	77	78	78	80	79	79	78	76	77	78	77	74	68	67	62	62	68	69	68	67	70	73	72	73	73.0	80																							
4-Feb	75	76	76	74	75	76	75	75	73	73	71	66	62	59	58	63	67	67	70	74	75	80	76	75	71.3	80																							
5-Feb	69	67	68	69	68	70	72	76	77	72	72	74	67	75	73	70	66	62	57	58	58	61	63	60	67.7	77																							
6-Feb	61	65	69	72	74	76	76	77	76	76	76	74	70	76	75	74	74	75	75	77	78	78	78	74.0	78																								
7-Feb	76	71	70	72	74	72	70	70	70	70	71	75	74	74	75	74	73	72	72	72	74	75	77	78	73.0	78																							
8-Feb	78	77	77	76	76	79	77	76	76	75	73	69	64	65	65	68	73	73	75	76	80	80	78	78	74.3	80																							
9-Feb	78	77	77	77	77	77	77	77	77	77	77	78	78	79	80	81	81	81	81	81	81	81	80	81	78.7	81																							
10-Feb	81	81	81	80	79	79	78	78	78	76	74	72	67	66	67	70	72	72	71	72	74	74	74	74	74.6	81																							
11-Feb	73	75	76	76	75	75	75	75	75	74	73	74	74	67	65	64	66	67	68	70	71	74	77	78	72.5	78																							
12-Feb	79	79	79	79	78	79	79	82	85	86	86	85	83	82	80	78	78	79	78	79	77	79	79	78	80.2	86																							
13-Feb	78	77	79	80	79	79	80	80	80	78	76	73	67	62	60	55	54	57	58	58	60	62	64	65	69.2	80																							
14-Feb	75	80	80	80	79	77	79	78	79	80	80	80	81	82	81	81	82	82	84	86	81	80	78	77	80.2	86																							
15-Feb	78	78	77	72	72	73	76	77	75	74	74	72	71	76	74	69	69	70	70	71	71	72	73	73	73.2	78																							
16-Feb	74	74	75	75	76	78	77	76	77	76	72	69	59	54	50	46	48	50	52	54	57	60	69	70	65.3	78																							
17-Feb	75	75	79	79	79	79	81	82	82	82	81	79	76	69	64	62	61	63	63	65	68	71	72	72	73.3	82																							
18-Feb	73	74	73	72	69	70	70	70	71	74	74	76	77	75	74	73	73	74	75	77	78	79	80	81	74.3	81																							
19-Feb	83	85	87	85	85	86	86	87	86	86	89	88	85	87	87	91	94	93	87	86	84	84	84	85	86.6	94																							
20-Feb	82	81	80	80	81	81	82	80	79	79	76	73	71	66	64	63	61	59	61	65	68	68	70	71	72.5	82																							
21-Feb	71	76	79	80	79	77	78	79	78	77	77	73	65	61	58	55	54	53	54	54	56	60	64	68	67.7	80																							
22-Feb	69	69	70	72	71	69	70	70	71	72	72	68	64	59	54	52	53	57	57	56	56	55	60	65	63.8	72																							
23-Feb	69	69	68	70	68	72	73	74	75	74	75	75	76	74	74	77	82	81	85	80	75	71	63	65	73.5	85																							
24-Feb	65	68	69	71	73	79	82	85	84	85	86	86	85	85	86	83	77	69	69	68	70	71	72	75	76.8	86																							
25-Feb	77	77	77	79	80	79	79	79	78	78	78	79	77	68	59	57	63	67	60	60	66	66	66	72	71.5	80																							
26-Feb	78	74	65	66	68	72	72	67	63	60	59	57	56	53	53	56	59	63	67	70	69	69	75	77	65.4	78																							
27-Feb	79	79	81	82	83	84	85	85	85	84	81	77	74	71	70	67	63	61	62	63	63	60	61	64	73.5	85																							
28-Feb	70	74	75	76	77	76	76	76	76	74	74	73	73	77	65	67	79	81	88	79	71	66	64	68	73.9	88																							
																								74.8	75.4	75.7	76.0	76.1	76.7	77.1	77.3	77.1	76.7	76.1	74.8	72.0	70.2	68.5	68.1	69.3	69.1	69.7	70.1	70.7	71.4	72.0	73.2	Diurnal Average	
																								83	85	87	85	85	86	86	87	86	86	89	88	85	87	87	91	94	93	88	86	84	84	84	85	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	52	7.74	7.74
60 - 80	518	77.08	84.82
80 - 100	102	15.18	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

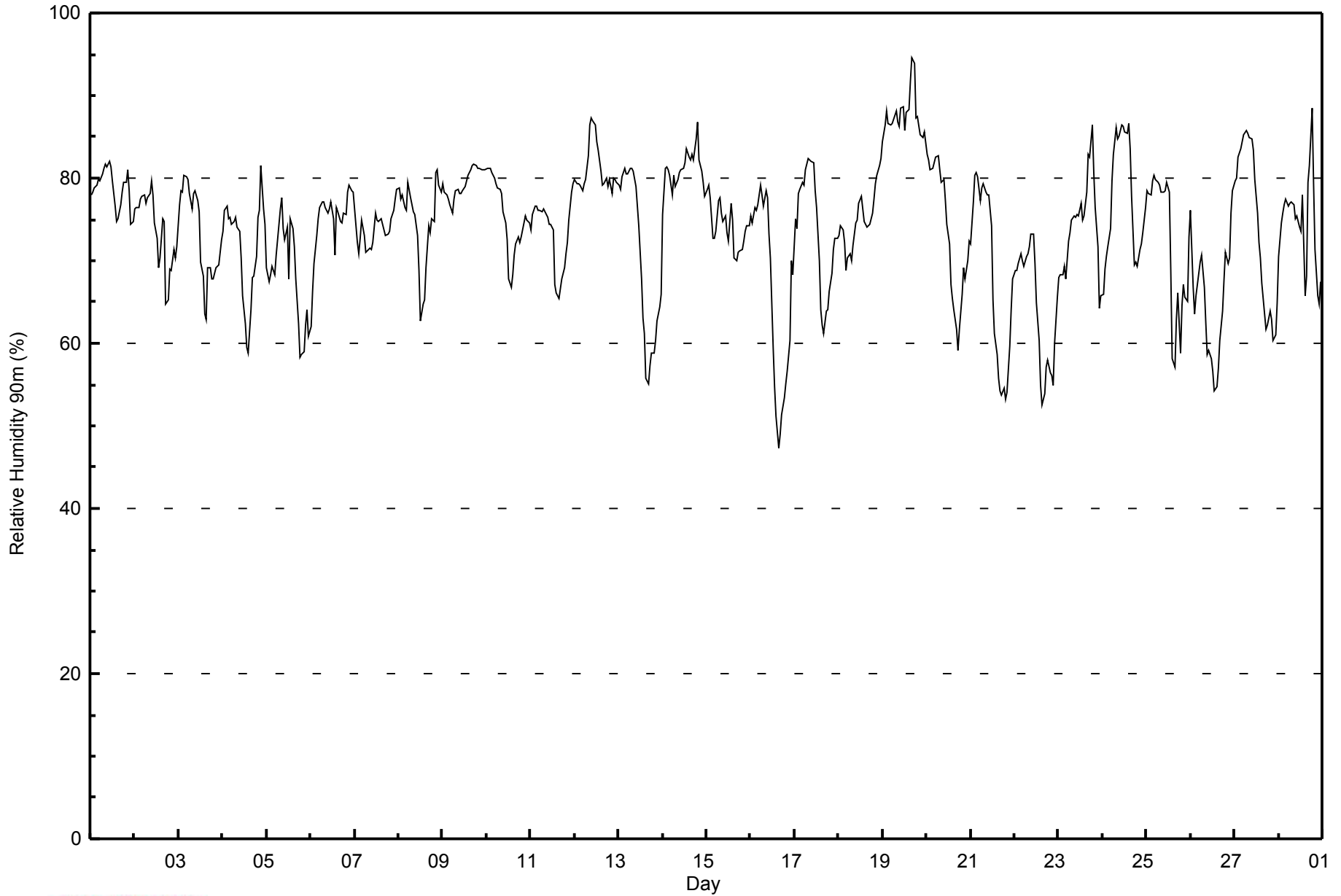


Maximum Value: 95 % on Feb 19 17:00																		Maximum Daily Average: 87.6 % on Feb 19																		Hours in Service: 672													
Minimum Value: 47 % on Feb 16 16:00																		Minimum Daily Average: 64.2 % on Feb 22																		Hours of Data: 672													
Maximum Diurnal Average: 78.0 % at hour 8																		Minimum Diurnal Average: 69.0 % at hour 16																		Hours of Missing Data: 0													
Monthly Average: 73.9 %																		Percentiles: P <sub>1</sub> = 54 P <sub>10</sub> = 63 Q <sub>1</sub> = 69 Median = 75 Q <sub>3</sub> = 79 P <sub>90</sub> = 82 P <sub>99</sub> = 88																		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-Feb	78	78	79	79	80	80	80	81	82	81	82	81	80	77	75	75	77	78	79	79	81	78	74	75	78.8	82																							
2-Feb	76	77	77	78	78	78	77	78	78	80	78	75	73	69	70	75	75	65	65	69	69	71	70	72	73.8	80																							
3-Feb	77	78	78	80	80	80	78	76	78	78	77	76	70	68	64	63	69	69	68	68	69	69	70	72	73.2	80																							
4-Feb	74	76	77	75	75	74	75	75	74	73	70	66	62	60	59	64	68	68	70	75	76	82	76	74	71.7	82																							
5-Feb	69	67	68	69	68	71	73	76	78	74	73	74	68	75	74	72	68	62	58	59	59	62	64	61	68.4	78																							
6-Feb	62	66	70	73	75	76	77	77	76	76	76	77	75	71	76	76	75	75	76	76	78	79	79	78	74.8	79																							
7-Feb	76	72	71	73	75	73	71	71	71	71	72	76	75	75	75	74	74	73	73	73	75	76	78	79	73.9	79																							
8-Feb	79	77	78	76	76	79	78	77	76	76	73	69	63	65	65	69	74	73	75	75	81	81	79	78	74.7	81																							
9-Feb	79	78	78	78	77	76	77	78	79	78	78	78	79	80	80	81	81	82	81	81	81	81	81	81	79.4	82																							
10-Feb	81	81	81	81	80	79	79	79	78	76	74	72	68	67	68	71	72	73	72	73	75	75	75	75	75.2	81																							
11-Feb	74	76	77	77	76	76	76	76	76	75	74	74	74	67	66	65	67	68	69	71	72	75	78	79	73.3	79																							
12-Feb	80	79	79	79	79	79	80	83	86	87	87	86	84	83	81	79	79	80	79	80	78	80	80	80	81.2	87																							
13-Feb	79	79	80	81	80	81	81	81	81	79	77	74	68	63	61	56	55	57	59	59	60	63	64	66	70.2	81																							
14-Feb	76	81	81	81	80	78	80	79	80	81	81	82	84	83	82	83	82	85	87	82	81	79	78	78	81.1	87																							
15-Feb	79	79	78	73	73	74	77	78	76	75	75	73	72	77	75	70	70	71	71	71	72	73	74	74	74.2	79																							
16-Feb	75	75	76	76	77	79	78	77	79	78	73	70	60	55	51	47	49	51	53	55	57	60	70	68	66.2	79																							
17-Feb	75	74	78	79	80	79	81	82	82	82	82	78	76	70	64	62	61	64	64	66	68	71	73	73	73.6	82																							
18-Feb	73	74	74	72	69	70	71	70	72	75	75	77	78	76	75	74	74	74	76	78	79	80	81	82	75.0	82																							
19-Feb	84	86	88	87	87	87	87	88	87	86	89	89	86	88	88	92	95	94	87	87	85	85	85	86	87.6	95																							
20-Feb	83	82	81	81	82	83	83	81	79	80	77	74	72	67	65	64	62	59	62	66	69	68	70	72	73.4	83																							
21-Feb	72	77	80	81	80	77	79	79	78	78	78	74	65	61	59	56	54	54	55	53	54	60	64	68	68.2	81																							
22-Feb	69	69	70	71	70	69	70	71	72	73	73	70	65	60	55	53	54	57	58	56	56	55	60	66	64.2	73																							
23-Feb	68	68	68	69	68	72	73	75	75	75	76	75	77	75	78	83	83	86	81	77	72	64	66	66	74.2	86																							
24-Feb	66	69	70	72	74	80	83	86	85	85	87	86	86	87	83	78	69	70	69	71	72	73	77	77	77.6	87																							
25-Feb	79	78	78	80	80	80	80	79	78	78	79	79	78	69	58	57	63	66	59	65	67	66	65	73	72.2	80																							
26-Feb	76	67	64	66	68	70	71	67	63	59	59	58	57	54	55	57	60	64	68	71	70	70	76	78	65.2	78																							
27-Feb	80	80	83	84	84	85	86	85	85	85	83	80	76	72	70	67	64	62	62	64	63	60	61	65	74.4	86																							
28-Feb	70	75	76	77	78	77	77	77	77	75	75	74	74	78	66	68	79	81	89	79	71	66	65	67	74.6	89																							
																								75.3	75.7	76.3	76.6	76.7	77.2	77.8	78.0	77.9	77.5	76.9	75.7	72.9	71.1	69.3	69.0	70.1	69.8	70.4	70.9	71.3	71.9	72.5	73.7	Diurnal Average	
																								84	86	88	87	87	87	87	88	87	87	89	89	86	88	88	92	95	94	89	87	85	85	85	86	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

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





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

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

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	47	6.99	6.99
60 - 80	493	73.36	80.36
80 - 100	132	19.64	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 28 km/h on Feb 23 07:00	Maximum Daily Speed Average: 12.9 km/h on Feb 14	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 25 11:00	Minimum Daily Speed Average: 0.8 km/h on Feb 25	Hours of Data: 672
Maximum Diurnal Speed Average: 4.3 km/h at hour 20	Minimum Diurnal Speed Average: 0.3 km/h at hour 13	Hours of Missing Data: 0
Monthly Average Velocity: 1.9 km/h 40.4 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 10 Q <sub>3</sub> = 13 P <sub>90</sub> = 18 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-Feb	SSE11	SSE12	SSE13	SSE13	SSE12	SSE10	SSE9	SSE7	SE5	SSE2	N3	NNW5	WNW5	W7	W6	W5	NNE2	NE4	NNE4	WSW5	WSW9	WSW12	W14	W13	SSW3.4	W14
2-Feb	WSW9	WSW9	WSW6	WSW9	WSW9	SSW3	WSW6	WSW9	WSW9	WNW3	W4	W8	NNW9	WNW8	W6	W6	WNW7	WNW10	WNW7	W7	W9	WSW11	W15	W11	W7.3	W15
3-Feb	WSW8	W5	WNW6	NW7	N8	N10	N14	N15	N9	NNE12	N11	N10	NNW9	W6	WNW2	ESE4	SE7	SE8	SSE9	SSE13	SSE14	SSE15	SSE13	SSE17	NE1.0	SSE17
4-Feb	SSE16	SSE16	SSE15	SSE13	S10	SSE12	SSE14	SE10	SSE11	SW4	SW5	WSW7	W21	WNW20	WNW17	N12	N12	NNW9	NNW12	NNW11	N11	N13	N7	NNW8	WSW1.6	W21
5-Feb	NW12	NW13	NW12	WNW13	NNW12	N12	N7	WSW6	SW6	SW5	WSW3	W1	E4	E2	ENE2	NNE4	NE10	NNE9	NNE11	NE10	NNE9	NNE9	NE7	NNE10	N4.9	NW13
6-Feb	NNE10	NNE12	NNE13	NNE13	NNE13	NNE13	NNE14	NNE14	NNE16	NNE16	NNE15	NNE11	NE9	ENE12	ENE13	ENE14	ENE15	ENE17	E16	E15	E12	E12	ESE10	ESE13	NE11.3	ENE17
7-Feb	ESE12	SE15	SE14	SE13	SE13	SE13	SE15	SE16	SE17	SE19	SE18	SE17	SE14	SE14	SE14	SE15	SE12	SE11	SE7	SE6	E4	NNW2	N6	N4	SE11.2	SE19
8-Feb	NNW5	N5	N9	NNE11	NNE14	NNE14	NNE12	NNE7	NNW4	W8	W6	SSW2	E3	ENE5	E3	E6	ENE7	NNE6	N10	N9	NW6	N6	N6	N5	N5.4	NNE14
9-Feb	NW5	N6	N7	NW5	NNW5	NNW5	NNW6	NNW7	NNW5	WNW5	WNW6	WNW7	NW7	NW7	NW8	NNW6	NW8	NNW8	NNW7	NNW7	WNW8	NW9	NW9	NW6	NW6.3	NW9
10-Feb	NW8	NNW7	NNW9	N14	N14	NNE15	NNE16	N10	WNW8	NNW12	NW10	WNW10	NW12	NW12	NW9	NNW7	NNW7	N11	NNE15	NNE13	NNE12	N11	N10	N8	N9.6	NNE16
11-Feb	N7	NW3	W5	W5	WSW7	SSE4	SSE7	SSE10	SSE10	SSE9	SE8	SSE11	SSE15	SSE12	SE14	SSE18	SE22	SE22	SE21	SE21	SE22	SSE20	SSE18	SSE16	SSE11.0	SE22
12-Feb	SSE13	SSE11	SE8	SSE7	SSE7	SSE6	S6	SW9	WSW7	WSW7	NNW2	NNW9	NNW9	N8	NE8	NNE9	NNE12	N13	NNE15	NNE13	NNE13	NNE13	NNE15	N14	NNE3.5	NNE15
13-Feb	NNE15	NNE12	N14	N14	N12	NNE14	NNE13	NNE12	NNE12	NNE12	N12	NNE10	ENE10	ESE8	ESE9	ESE10	ESE12	SE14	SE15	SE17	SE23	SE24	SE22	SE25	ENE8.0	SE25
14-Feb	SE23	SE24	SE26	SE27	SE28	SE26	SE25	SE24	SE22	SE20	SE19	SSE20	SSE19	SSE12	SSE15	SSE10	S9	N9	NNE16	NNE16	N18	N12	N12	N14	SE12.9	SE28
15-Feb	NNE9	NE8	NE9	NE10	NNE7	NNE11	NNE11	NNE13	NNE15	NNE11	NNE7	N8	NNW9	NNW7	NNW6	NNE12	NNE12	NNE12	N13	NNE15	NNE17	N12	N10	NNE10	NNE10.2	NNE17
16-Feb	N11	N11	NNE12	NNE16	NNE12	NNE10	NNW8	N4	W2	NNW2	WNW3	WNW5	WNW8	WNW10	NW4	ESE2	SSE5	SSE5	SE2	W5	NW4	WNW5	WNW5	W5	NNW4.1	NNE16
17-Feb	WNW3	WSW4	W3	WNW8	WNW8	W6	SW4	S5	SSE6	SE7	SSE6	SSE4	SE10	SE7	SE8	SE7	SE7	SSE6	SE7	SE10	SE9	SE9	SE10	SE12	SSE4.5	SE12
18-Feb	SE11	SE8	SE8	SE9	SE10	SE7	SE6	SE8	SE10	SE9	SE8	SE8	ESE7	ESE10	SSE8	SE7	SSE7	SE8	SE9	SE10	SE10	SSE12	SSE10	SSE9	SE8.4	SSE12
19-Feb	SSE8	S7	S9	S5	S8	SSE8	SSE9	SSE9	SSE9	SE4	S5	S2	NW1	NW2	NW5	WNW8	NW9	NNW7	N10	N15	N20	NNE25	N22	N18	NNE2.2	NNE25
20-Feb	NNE23	N20	N18	NNW16	NNW15	NNW13	N11	N13	N14	NNE14	NNE11	NNE8	N8	NNW11	NNW8	NNW9	N9	N9	NNE12	NNE22	N19	N10	N6	NW8	N12.3	NNE23
21-Feb	NW7	NNW9	NNW8	N11	N11	NNE12	N6	NNE8	N10	NNW5	NNE3	E3	SE3	E6	ESE7	ESE7	ESE5	SE7	SE9	SSE12	SSE12	SSE12	SSE12	SSE13	E2.5	SSE13
22-Feb	SE15	SSE14	SE14	SSE13	SSE12	SSE11	SE13	SSE14	SSE12	SSE9	SE8	SSE11	SSE18	SSE17	SSE16	SSE19	SSE9	SSW14	SSW11	SSW12	SW12	WSW13	W22	WNW23	S9.6	WNW23
23-Feb	WNW21	WNW20	WNW22	WNW18	WNW24	WNW21	WNW28	NW24	NW20	WNW12	WNW15	NNW16	NNE9	NNE9	N8	NNE13	NNE18	NNE19	NNE22	NNE23	NNE22	NE21	NE15	ENE11	NNW12.6	WNW28
24-Feb	ENE10	E11	ESE10	E14	E13	ESE14	E13	E11	ENE15	ENE14	ENE10	ENE12	ENE10	ENE5	N7	NNE16	N21	N21	N17	N18	N16	NNW17	N17	N12	NE9.8	N21
25-Feb	NNW10	NNW11	NNW10	NNW8	NW4	NW6	NNW5	NNW5	W4	WNW6	NW1	ESE1	W4	NE1	ENE1	E4	E5	SE3	SSE4	SSE6	SSE4	SSE6	SSE10	SSE10	NNW0.8	NNW11
26-Feb	SSE10	SSE10	SSE10	SSE11	SSE13	SSE13	SSE11	SSE12	SSE13	SE10	SE13	SSE11	SE10	SE8	SW1	WSW15	WSW12	WSW6	WNW8	NNW10	N9	NNE15	NNE11	N13	SSE4.3	WSW15
27-Feb	N12	N13	NNE14	NNE12	NNE13	NNE13	NNE10	NE7	W1	SSW5	WSW2	W1	S3	E5	E7	ESE5	SSE4	SW9	SSW9	S7	S6	SSW6	SW6	WSW10	NNE1.3	NNE14
28-Feb	W12	W13	WSW10	WSW13	WSW14	W22	W24	W21	W20	WNW18	WNW17	NW15	NW13	NW12	NW12	NW8	W9	NW12	N12	N20	NNW19	NNW16	N12	NNE9	WNW12.1	W24
NNE1.6 NNE1.0 NE1.4 NNE1.8 NE1.5 NE2.6 NE2.0 NE1.3 E0.7 NE0.8 NNE0.9 NNE0.9 ENE0.3 ENE0.7 ENE0.7 ENE2.0 ENE3.0 NE2.4 NE4.1 NE4.3 NE4.0 NNE3.5 NNE2.7 NNE2.1																								Diurnal Average		
NNE23 SE24 SE26 SE27 SE28 SE26 WNW28 NW24 SE22 SE20 SE19 SSE20 W21 WNW20 WNW17 SSE19 SE22 SE22 NNE22 NNE23 SE23 NNE25 SE22 SE25																								Diurnal Maximum		

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



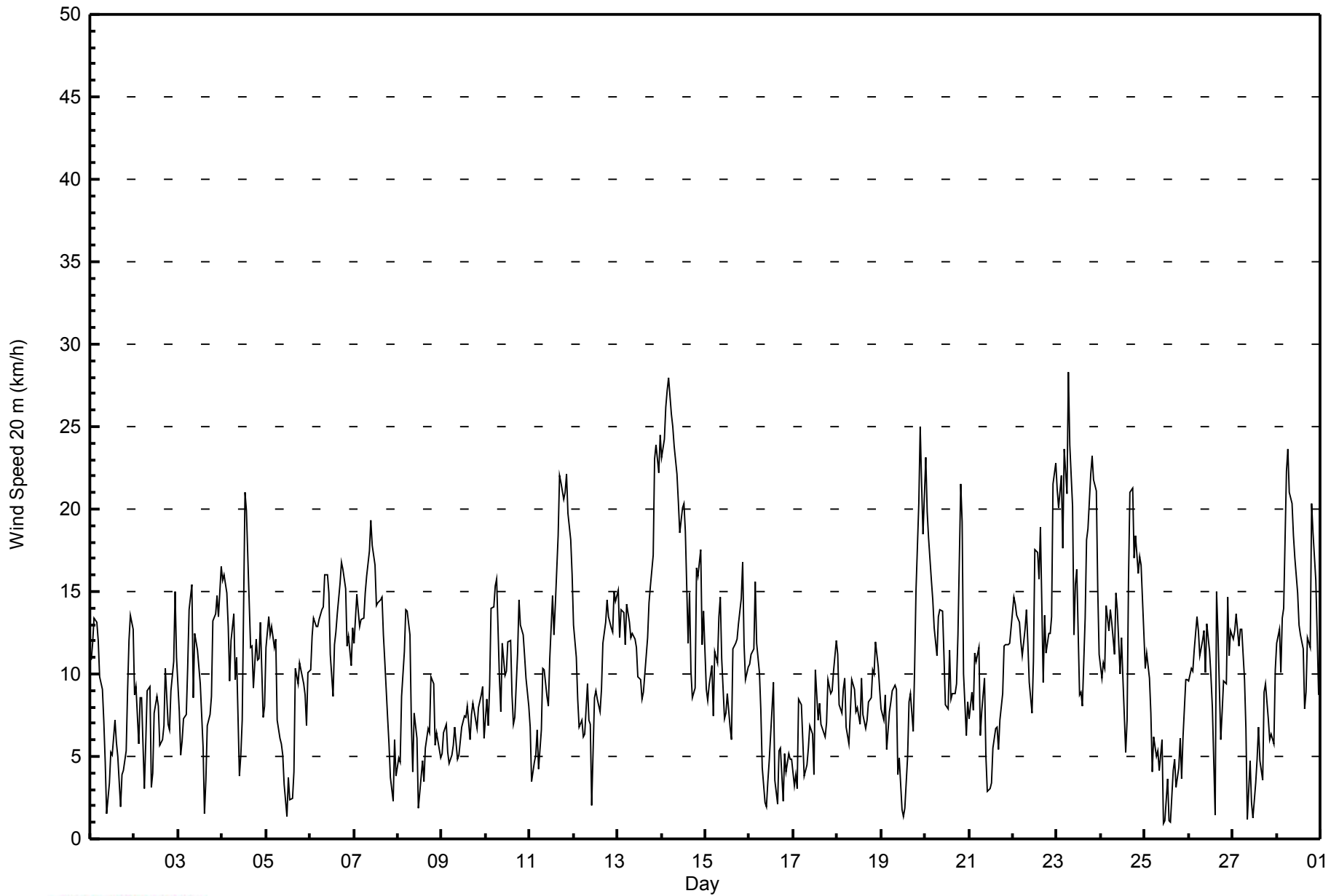


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 13 21:00 Minimum Value: 1 km/h on Feb 1 18:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 4 P <sub>90</sub> = 5 P <sub>99</sub> = 7																	Hours in Service: 672 Hours of Data: 672 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-Feb	2	3	3	3	3	3	4	3	2	1	2	2	2	1	1	2	1	1	1	3	1	2	2	2	4
2-Feb	4	3	2	2	3	2	3	2	3	2	3	3	3	3	3	1	3	2	1	1	3	2	1	1	4
3-Feb	1	2	3	2	2	2	3	3	3	5	4	3	3	3	1	3	3	2	2	3	3	3	3	4	5
4-Feb	4	4	3	2	3	3	4	4	3	2	2	4	4	5	4	4	3	3	4	3	4	3	4	3	5
5-Feb	3	3	3	2	3	4	4	1	1	2	1	1	2	2	1	3	3	2	3	2	2	2	2	3	4
6-Feb	3	3	3	3	3	3	3	3	3	3	4	3	4	3	3	3	4	3	4	4	3	3	3	4	4
7-Feb	4	6	5	4	4	5	6	6	5	5	5	5	5	5	5	4	4	3	2	2	2	1	2	2	6
8-Feb	2	2	3	3	3	3	4	3	2	1	1	1	1	1	1	2	1	2	2	3	1	2	2	3	4
9-Feb	2	3	2	2	2	2	2	2	2	2	2	1	1	2	2	2	2	2	2	3	3	4	3	3	4
10-Feb	2	3	3	5	6	5	4	4	3	3	2	2	3	3	3	2	2	5	4	4	3	3	3	2	6
11-Feb	2	1	2	1	1	1	3	2	3	3	3	4	3	3	4	4	6	6	6	6	6	5	5	4	6
12-Feb	3	2	2	2	1	2	2	2	1	3	3	2	3	3	2	2	4	3	4	4	4	3	4	5	5
13-Feb	4	4	4	3	4	3	3	3	3	3	3	3	3	3	3	4	5	6	6	6	8	8	7	7	8
14-Feb	7	7	8	8	8	7	7	7	6	6	5	6	5	5	4	4	3	3	6	5	5	4	3	3	8
15-Feb	3	2	2	3	2	3	4	4	4	3	2	3	3	3	3	3	4	3	4	4	4	4	4	3	4
16-Feb	3	3	4	4	3	3	3	3	2	1	1	1	2	3	2	2	1	2	1	2	2	2	2	3	4
17-Feb	1	2	2	1	1	3	1	2	1	2	3	2	3	3	3	3	3	1	3	2	2	3	3	4	4
18-Feb	4	3	3	3	3	2	2	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	2	4
19-Feb	2	2	2	2	3	2	3	3	2	1	1	1	2	2	2	2	2	2	4	6	7	7	6	6	7
20-Feb	7	7	6	5	5	4	4	5	4	4	3	3	3	4	3	3	2	2	3	5	7	3	2	2	7
21-Feb	3	2	3	3	3	3	2	2	3	3	2	1	2	2	2	2	2	3	2	2	2	3	3	3	3
22-Feb	3	3	3	3	3	2	3	3	3	3	3	3	4	5	4	4	2	4	3	4	3	5	4	5	5
23-Feb	4	4	3	3	4	4	6	6	5	3	4	5	4	3	3	4	4	5	6	5	5	5	4	2	6
24-Feb	2	2	4	4	3	4	4	3	3	3	2	2	2	2	3	5	5	6	6	6	5	5	5	4	6
25-Feb	2	3	3	2	1	2	2	2	2	2	1	1	1	2	1	2	2	1	1	1	1	2	3	2	3
26-Feb	2	2	2	3	3	3	2	3	3	3	3	4	3	3	5	4	3	2	2	2	3	4	3	4	5
27-Feb	4	4	3	3	3	3	3	2	1	1	1	1	2	2	2	2	2	2	2	1	1	1	2	2	4
28-Feb	2	5	2	3	3	5	3	3	3	4	4	3	3	4	3	3	3	4	3	7	5	5	3	3	7
																	Diurnal Maximum								



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	104	15.48	15.48
6 - 11	296	44.05	59.52
12 - 19	221	32.89	92.41
20 - 28	51	7.59	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

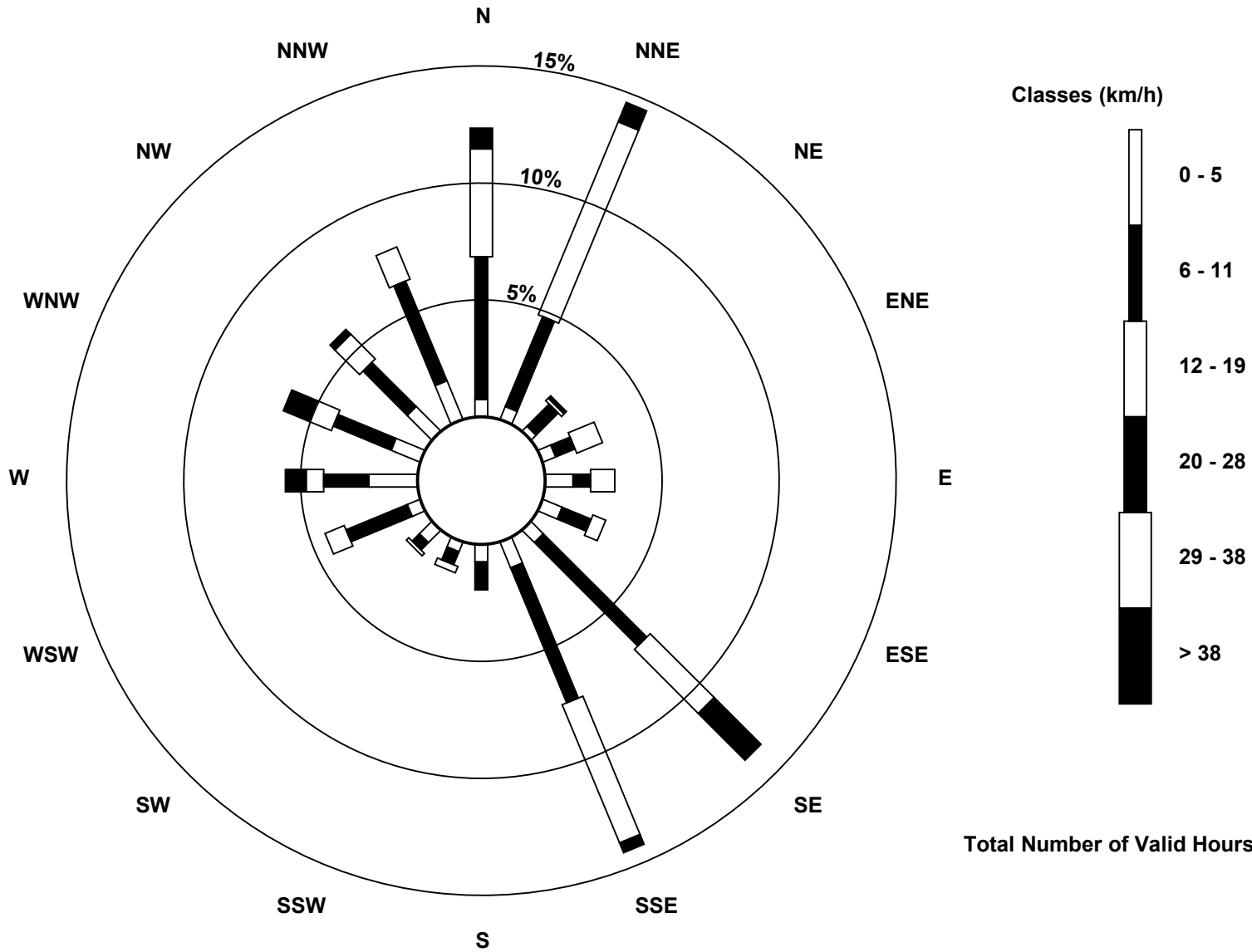
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	4	2	4	8	6	5	8	5	3	5	4	14	9	10	12	104
6 - 11	41	28	9	6	5	9	42	42	8	4	3	19	13	18	18	31	296
12 - 19	31	60	1	8	7	4	26	43	0	2	1	6	5	7	10	10	221
20 - 28	6	6	1	0	0	0	19	3	0	0	0	0	6	8	2	0	51
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>	83	98	13	18	20	19	92	96	13	9	9	29	38	42	40	53	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

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





Maximum Speed: 37 km/h on Feb 23 07:00	Maximum Daily Speed Average: 17.0 km/h on Feb 23	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 25 15:00	Minimum Daily Speed Average: 0.8 km/h on Feb 25	Hours of Data: 670
Maximum Diurnal Speed Average: 6.1 km/h at hour 20	Minimum Diurnal Speed Average: 0.7 km/h at hour 15	Hours of Missing Data: 2
Monthly Average Velocity: 2.4 km/h 44.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 14 Q <sub>3</sub> = 19 P <sub>90</sub> = 24 P <sub>99</sub> = 32	Percent Operational Time: 99.7

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	SSE20	SSE21	SSE24	SSE21	SSE20	SSE17	SSE16	SSE12	SSE8	WNW1	NNW7	AF	AF	W7	W6	WNW5	NE1	NE5	NE7	SW2	SW11	W17	W22	W20	S6.2	SSE24
2-Feb	W13	WSW15	W14	W16	WSW13	WSW6	W11	W16	WSW15	WNW7	W7	WNW10	NW10	NW9	W7	WNW8	WNW9	WNW16	NW12	W9	W15	W17	W22	W16	W11.6	W22
3-Feb	W13	W9	WNW11	NNW10	N10	NNE14	N21	NNE22	N11	NNE16	N15	N13	NW11	W5	W2	SE4	SE9	SE13	SSE16	SSE21	SSE21	SSE22	SSE22	SSE26	E1.3	SSE26
4-Feb	SSE25	SSE25	SSE24	SSE23	SSE17	SSE21	SSE24	SSE22	SSE24	S11	SW9	WSW14	W23	WNW24	WNW21	N15	NNE15	NNW13	NNW17	NNW16	N15	N18	NNW12	NNW14	SSW2.6	SSE25
5-Feb	NW18	NW19	NW18	NW19	NNW18	N18	N11	W6	W8	W6	WNW6	NW1	E3	E3	ENE3	NNE5	NE12	NNE12	NNE13	NE12	NE11	NE11	NE10	NNE13	N7.7	NW19
6-Feb	NNE13	NNE14	NNE16	NNE15	NNE14	NNE15	NNE18	NNE17	NNE20	NNE19	NNE18	NNE13	NE10	ENE13	ENE14	ENE16	ENE18	ENE19	E19	E18	E14	E14	ESE13	ESE15	NE13.5	NNE20
7-Feb	ESE14	SE19	SE17	SE16	SE18	SE18	SE20	SE20	SE22	SE24	SE23	SE20	SE17	SE18	SE18	SE15	SE14	SE9	SE7	E4	N2	N8	N5	SE14.1	SE24	
8-Feb	N7	N7	N12	NNE15	NNE19	NNE17	NNE16	NNE10	N6	WNW6	WSW6	S3	E3	ENE5	E4	ENE6	NE8	NNE10	N15	N15	NNW8	N12	N11	N10	NNE8.1	NNE19
9-Feb	NNW7	N9	N10	NNW6	NNW6	N7	N8	NW8	N6	NW5	NW6	NW7	NW8	NW8	NW9	NNW7	NW8	NNW9	NNW9	NNW8	NW9	NW10	NW11	NW7	NNW7.5	NNW11
10-Feb	NW10	NNW9	NNW13	N18	NNE19	NNE20	NNE21	N13	NW10	NNW15	NW11	NNW12	NW14	NW14	NNW11	NNW8	NNW10	N16	NNE20	NNE18	NNE16	NNE16	N14	N13	N12.8	NNE21
11-Feb	N10	N4	NW2	NW1	WSW6	S5	SE12	SSE19	SSE16	SSE13	SE12	SSE14	SSE17	SSE15	SE17	SSE22	SE28	SE28	SE26	SE26	SE28	SSE25	SSE23	SSE20	SSE14.4	SE28
12-Feb	SSE17	SSE15	SSE13	SSE10	S11	SSE9	SSW12	SW15	WSW11	WSW9	NW3	NNW10	NNW11	N10	NE9	NNE11	NNE15	NNE17	NNE19	NNE18	NNE16	NNE16	NNE19	N19	NNE3.7	N19
13-Feb	NNE19	NNE15	NNE17	N17	NNE15	NNE18	NNE16	NNE15	NNE16	NNE15	NNE14	NNE11	ENE11	ESE10	ESE11	ESE12	ESE17	ESE19	SE21	SE22	SE30	SE31	SE27	SE31	E10.5	SE31
14-Feb	SE31	SE31	SE35	SE35	SE32	SE32	SE30	SE28	SE26	SE23	SSE25	SSE25	SSE25	SSE16	S19	SSE15	S17	N11	NNE22	NNE22	N23	N17	NNE18	SE16.6	SE35	
15-Feb	NNE12	NE10	NE12	NE13	NNE9	NNE14	NNE16	NNE18	NNE13	NNE9	N9	NNW11	N8	NNW7	NNE15	NNE15	NNE15	NNE15	NNE18	NNE19	NNE22	N16	N13	NNE13	NNE12.9	NNE22
16-Feb	N15	N16	NNE16	NNE20	NNE16	NNE13	NNW11	N7	NNW3	N4	NW3	WNW5	WNW9	NW11	NW4	ESE2	SE6	SSE9	SSE4	NW9	NNW9	NW8	WNW11	NNW13	NNW6.4	NNE20
17-Feb	WNW9	W10	WNW9	WNW11	WNW10	WNW7	WSW8	WSW5	SSE6	SE11	SSE9	SSE9	SSE14	SE9	SE10	SE8	SE9	SE8	SE12	SE14	SE13	SE13	SE15	SE18	SSE5.4	SE18
18-Feb	SE16	SE12	SE11	SE13	SE14	SE10	SE8	SE11	SE14	SE12	SE10	SE9	ESE8	ESE12	SSE9	SE8	SE8	SE11	SE11	SE13	SE13	SSE15	SSE14	SSE12	SE11.2	SE16
19-Feb	SSE11	S10	S12	S9	S12	SSE11	SSE13	SSE13	SSE11	SE5	S5	SSE2	NW2	NNW3	NW6	WNW10	NNW11	NNW9	NNE15	N21	N27	NNE33	N28	N25	NNE3.1	NNE33
20-Feb	NNE30	N27	N24	N21	N19	N17	N15	N18	N19	NNE17	NNE13	NNE9	N9	NNW14	NNW11	NNW11	N11	N14	NNE18	NNE29	N26	N16	N11	NNW13	N16.8	NNE30
21-Feb	NNW12	NNW13	N13	N17	N16	NNE17	NNE8	NNE10	N12	NNW7	N4	E3	SE3	ESE5	ESE6	ESE6	SE7	SE12	SSE16	SSE19	SSE19	SSE20	SSE19	SSE21	E3.6	SSE21
22-Feb	SSE23	SSE23	SSE22	SSE22	SSE22	SSE23	SSE24	SE25	SSE19	SSE16	SSE14	SSE16	SSE23	SSE23	SSE21	SSE25	S16	SSW22	SSW20	SSW20	SW20	WSW19	WNW28	WNW32	S15.9	WNW32
23-Feb	WNW30	WNW29	WNW29	WNW26	WNW34	WNW29	NW37	NW32	NW26	NW16	WNW19	NNW20	NNE11	NNE11	N10	NNE17	NNE23	NNE25	NNE29	NNE30	NNE27	NE26	NE18	ENE13	NNW17.0	NW37
24-Feb	ENE11	E12	ESE14	ESE17	ESE14	ESE17	ESE15	E13	E17	ENE16	ENE11	ENE14	ENE10	ENE6	N9	NNE20	NNE27	N29	N24	N27	N22	N23	N23	N18	NE12.6	N29
25-Feb	NNW14	NNW16	NNW13	NNW12	NNW7	NNW10	NNW8	N10	NW4	NW6	WNW1	SE1	NNW4	NE1	SSE0	E4	ESE5	SE4	SE8	SSE9	SSE10	SSE14	SSE18	SSE18	N0.8	SSE18
26-Feb	SSE19	SSE20	SSE21	SSE23	SSE26	SSE24	SSE24	SSE25	SSE25	SSE19	SSE19	SSE15	SSE12	SSE11	SW4	WSW19	WSW16	WSW10	NNW12	NNW14	N13	NNE20	NNE15	N16	SSE8.9	SSE26
27-Feb	N16	N17	NNE17	NNE15	NNE16	NNE12	NE8	WNW1	SW5	W3	W1	SSW4	E5	ESE7	ESE5	S6	SW14	SSW17	SSW14	SW9	SW10	WSW11	W16	NW1.8	N17	
28-Feb	W17	W18	W16	W19	W19	W27	W28	W26	WNW25	WNW23	WNW21	NW17	NW15	NW14	NW14	NW10	WNW10	NW16	N17	N28	N26	NNW23	N17	NNE12	NW15.5	W28
NNE2.1 NNE1.2 NE1.4 NE2.1 NE1.9 NE3.1 NE2.5 ENE1.4 ESE1.5 ENE1.4 NE0.9 NE0.8 E0.7 E1.0 E0.7 ENE2.4 ENE3.6 NE3.0 NE5.3 NE6.1 NE5.2 NNE4.9 NNE3.8 NNE3.1																								Diurnal Average		
SE31 SE31 SE35 SE35 SE35 SE32 NW37 NW32 SE28 SE26 SE23 SSE25 SSE25 SSE25 SSE21 SSE25 SE28 N29 NNE29 NNE30 SE30 NNE33 N28 WNW32																								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: 672
Maximum Value: 8 km/h on Feb 13 22:00	Hours of Data: 670
Minimum Value: 1 km/h on Feb 11 04:00	Hours of Missing Data: 2
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> = 5 P <sub>99</sub> = 7	Hours of Calibration: 0
	Percent Operational Time: 99.7

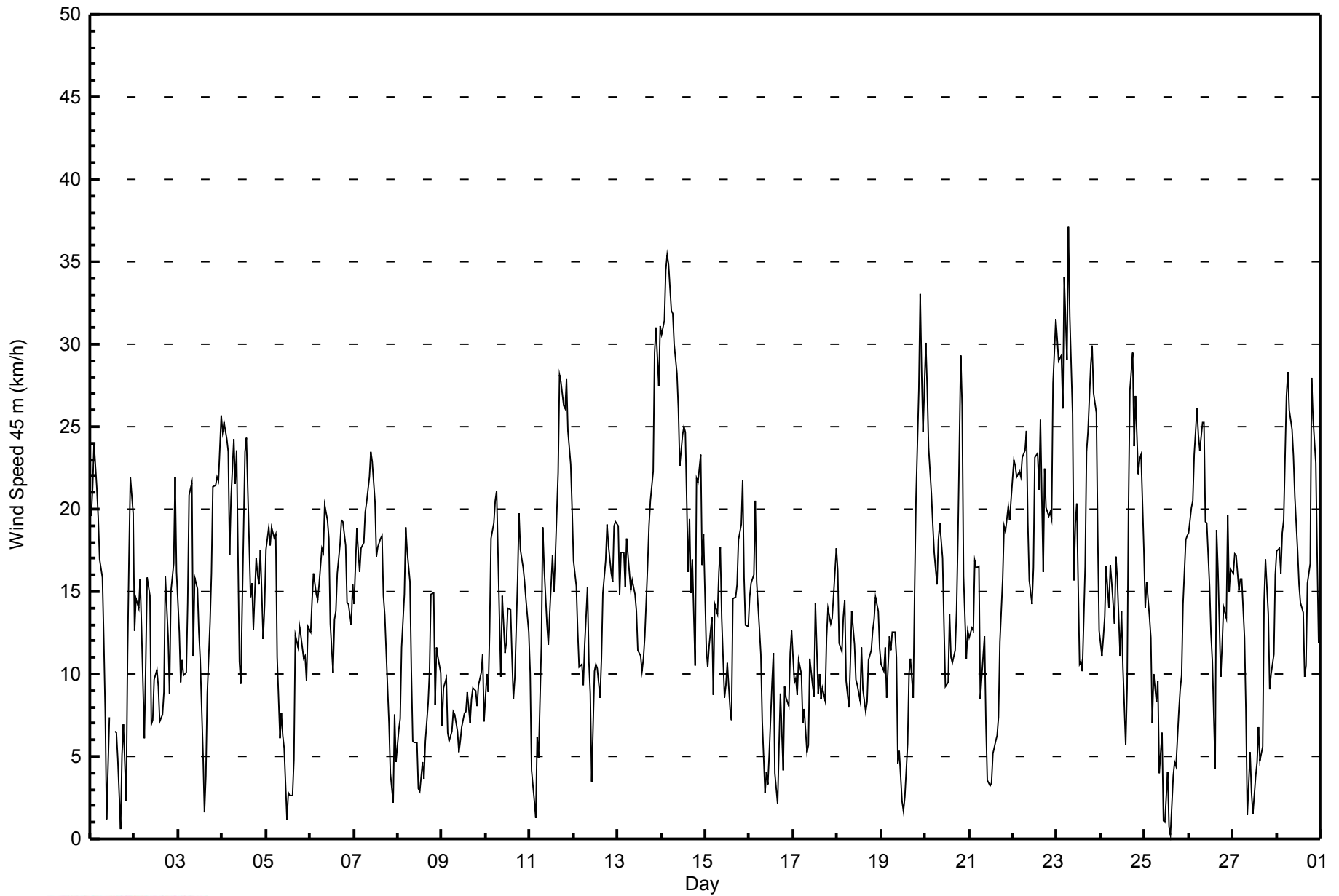
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2	3	2	4	3	3	7	5	2	3	2	AF	AF	1	1	2	1	2	1	3	1	3	2	2	7	
2-Feb	5	3	2	2	2	3	4	1	3	3	4	3	2	3	3	1	3	2	2	1	3	2	2	2	5	
3-Feb	1	3	3	3	3	2	3	3	5	5	4	3	3	3	1	3	3	2	2	2	3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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

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







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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	60	8.96	8.96
6 - 11	189	28.21	37.16
12 - 19	278	41.49	78.66
20 - 28	118	17.61	96.27
29 - 38	25	3.73	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

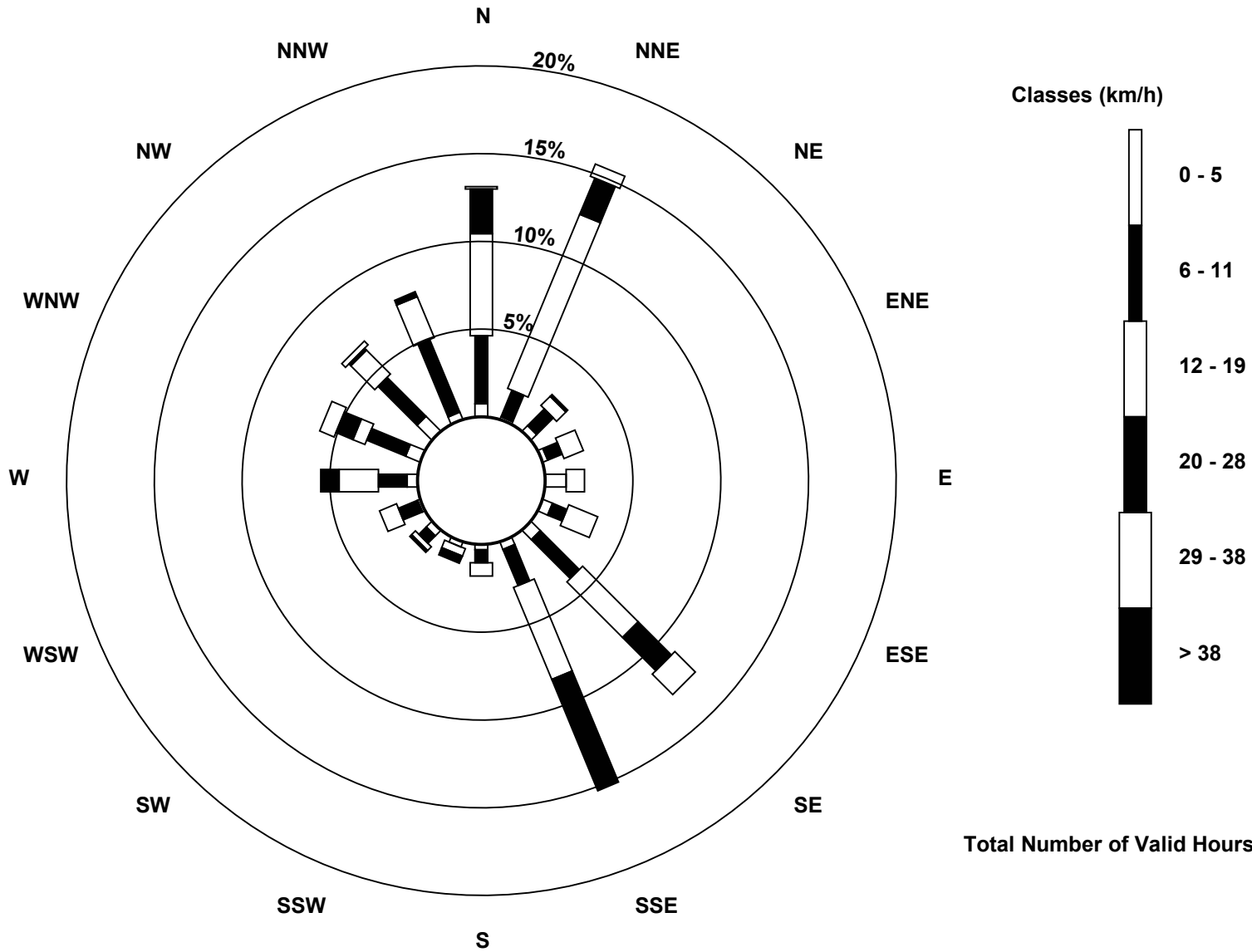
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	1	3	2	8	4	5	3	2	2	3	1	4	6	8	3	60
6 - 11	26	11	9	6	0	6	21	15	5	0	4	8	11	16	21	30	189
12 - 19	39	72	5	8	7	12	30	38	5	3	2	7	15	5	13	17	278
20 - 28	17	15	1	0	0	0	18	46	0	3	1	0	7	7	1	2	118
29 - 38	1	5	0	0	0	0	11	0	0	0	0	0	0	6	2	0	25
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	88	104	18	16	15	22	85	102	12	8	10	16	37	40	45	52	670

Total Number of Valid Hours: 670

Total Number of Hours: 672

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

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





Maximum Speed: 41 km/h on Feb 23 07:00	Maximum Daily Speed Average: 22.2 km/h on Feb 22	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 25 14:00	Minimum Daily Speed Average: 0.9 km/h on Feb 25	Hours of Data: 620
Maximum Diurnal Speed Average: 8.0 km/h at hour 20	Minimum Diurnal Speed Average: 1.2 km/h at hour 15	Hours of Missing Data: 52
Monthly Average Velocity: 3.2 km/h 52.3 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 11 Median = 16 Q <sub>3</sub> = 23 P <sub>90</sub> = 30 P <sub>99</sub> = 36	Percent Operational Time: 92.3

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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
3-Feb	AF	AF	AF	AF	NNE12	NNE18	NNE25	NNE27	N14	NNE18	NNE17	N14	NW11	WNW4	W1	SE3	SE7	SSE17	SSE23	SSE30	SSE30	S29	S30	S32	ESE4.3	S32
4-Feb	SSE35	SSE36	SSE33	SSE28	SE25	SSE29	SSE35	SSE38	SSE28	S18WSW17	WSW23	W24WNW25	WNW22	N15	NNE17	NNW16	NNW21	N19	N19	N19	N19	N18	NNW20	S5.0	SSE38	
5-Feb	NNW23	NW24	NW22	NW21	NNW23	N23	N14	WNW7	W6	WNW6	NW4	NW2	ESE2	ENE3	ENE3	NNE5	NE14	NNE14	NNE14	NE14	NE12	NE13	NE13	NNE17	N9.8	NW24
6-Feb	NNE15	NNE16	NNE18	NNE17	NNE16	NNE17	NNE19	NNE19	NNE21	NNE21	NNE21	NE14	ENE11	ENE14	ENE15	ENE18	ENE20	ENE21	E21	E18	E13	E13	ESE11	ESE12	NE14.5	NNE21
7-Feb	ESE11	SE15	SE16	SE14	SE19	SE16	SE17	SE18	SE22	SE23	SE23	SE20	SE14	SE16	SE18	SE20	SE16	SE15	SE10	SE7	E4	N2	N7	N5	SE13.3	SE23
8-Feb	N8	N9	NNE14	NNE18	NNE23	NNE20	NNE18	NNE14	NNE8	WNW2	SW5	S4	E3	ENE4	E3	ENE6	NE10	NE13	NNE16	NNE16	N11	N13	NNE14	NNE14	NNE9.9	NNE23
9-Feb	N9	N11	NNE7	N7	N9	N10	N10	NNW7	N9	NW5	NNW5	NNW6	NNW7	NW7	NNW9	NNW8	NNW8	NNW9	NNW11	NNW9	NW9	NW10	NNW12	NNW7	NNW7.9	NNW12
10-Feb	NW10	NNW10	NNW14	N20	NNE23	NNE24	NNE25	N16	NW12	NNW16	NW11	NW12	NW14	NW14	NNW11	N9	NNW11	N18	NNE25	NNE23	NNE20	NNE20	NNE18	NNE17	N15.0	NNE25
11-Feb	NNE14	NNE7	NNE3	ENE2	SSW5	S5	SSE9	SSE17	SSE23	SSE21	SE18	SSE18	SSE20	SSE18	SE19	SSE25	SE31	SE31	SE30	SE30	SE32	SSE29	SSE26	SSE23	SSE17.0	SE32
12-Feb	SSE21	SSE20	S16	S13	S12	S9	SW13	SW20	WSW13	WSW11	NNW5	NNW10	NNW10	N11	NE9	NNE12	NNE16	NNE19	NNE22	NNE20	NNE19	NNE18	NNE20	NNE21	NNE3.2	NNE22
13-Feb	NNE21	NNE16	NNE18	NNE18	NNE16	NNE21	NNE17	NNE16	NNE17	NNE16	NNE15	NNE12	ENE12	ESE8	ESE9	ESE9	ESE13	SE16	SE17	SE19	SE25	SE28	SE26	SE32	ENE10.1	SE32
14-Feb	SE33	SE33	SE36	SE38	SE35	SE35	SE33	SE32	SE29	SE26	SSE28	SSE29	SSE19	S22	SSE20	SSW23	NNW12	NNE25	NNE25	NNE25	NNE19	NNE20	SE18.4	SE38		
15-Feb	NNE13	NE12	NE13	NE16	NE10	NNE16	NNE16	NNE18	NNE20	NNE15	NNE9	N9	NNW11	N8	NNW7	NNE16	NNE16	NNE18	NNE18	NNE24	NNE25	N19	N15	NNE15	NNE14.7	NNE25
16-Feb	N17	N19	NNE19	NNE24	NNE19	NNE14	NNW14	NNW10	NNW5	N5	NNW3	WNW6	NW10	NW11	NW4	SE2	SSE5	S6	SW3	NNW13	NNW12	NNW11	NW18	NW15	NNW8.6	NNE24
17-Feb	NW10	NW8	NW7	NW5	NNW4	N5	WNW3	WSW4	WSW6	SE5	SSE16	SSE16	SSE19	SSE11	SE11	SE8	SE11	SE9	SE13	SE15	SE15	SE17	SE17	SE18	SSE6.4	SSE19
18-Feb	SE18	SE15	SE14	SE17	SE18	SE12	SE8	SE13	SE13	SE11	SE9	SE7	ESE7	ESE9	SSE9	SE8	SE9	SE11	SE13	SE14	SE15	SSE17	SSE16	SSE14	SE12.1	SE18
19-Feb	SSE13	SSE12	S13	S11	S16	S15	SSE17	SSE16	SSE14	SSE6	SSE5	S2	NW2	NNW3	NW5	NW10	NNW12	N11	NNE19	N24	N32	NNE37	N32	N29	NNE3.5	NNE37
20-Feb	NNE33	N31	N27	N24	N22	N20	N18	N21	NNE23	NNE20	NE14	NNE10	N10	N14	N12	NNW11	N13	NNE18	NNE24	NNE34	N31	N21	N15	N15	N19.6	NNE34
21-Feb	NNW16	N16	N16	N20	N20	NNE22	NNE11	NNE13	NNE15	NNW8	N4	ESE3	SE3	SE4	SE4	SE5	SE7	SE16	SSE20	SSE27	SSE28	SSE30	SSE28	SSE30	ESE4.2	SSE30
22-Feb	SSE31	SSE32	SSE33	SSE31	S28	S31	SSE30	SSE32	SSE31	SSE29	SSE24	SSE27	SSE30	SSE27	SSE26	S28	SSW21	SSW27	SSW24	SW24	SW25	WSW25	WNW32	WNW37	S22.2	WNW37
23-Feb	NW37	WNW36	WNW34	WNW32	WNW41	WNW34	NW41	NW35	NW29	NW17	WNW20	NNW23	NNE12	NNE12	N11	NNE19	NNE28	NNE28	NNE32	NNE33	NNE31	NE29	NE20	ENE14	NNW19.5	NW41
24-Feb	ENE12	E10	ESE10	ESE12	ESE11	ESE14	E13	E12	E18	ENE18	ENE12	ENE15	ENE11	ENE6	N10	NNE23	NNE29	N33	N29	N32	N26	N28	N28	N21	NE13.9	N33
25-Feb	N17	NNW18	NNW16	N14	N11	N11	N10	NNW11	NNW6	NW6	W2	SSE1	WNW5	N0	SSW1	ESE2	SE3	SE4	SE9	SSE10	SSE15	SSE18	SSE24	SSE25	NNE0.9	SSE25
26-Feb	SSE23	SSE30	S31	S28	SSE30	SSE30	SSE31	S30	SSE28	SSE29	SSE27	SSE21	SSE17	SSE14	SW9	WSW21	WSW18	WSW12	WNW14	NNW18	N16	NNE23	NNE18	N18	S12.3	S31
27-Feb	N18	N20	NNE19	NNE17	NNE18	NNE18	NNE14	NE9	NW2	SW4	W3	W2	SSW4	SE4	ESE5	SSE4	SSW8	SW16	SW19	SW17	WSW12	WSW14	WSW16	W20	WNW3.1	W20
28-Feb	W21	W20	W20	W22	W23	W31	W31	W29	WNW28	WNW26	NW22	NW18	NW16	NNW15	NW14	NNW11	WNW11	NW17	N20	N33	N29	N28	N19	NNE15	NW17.4	N33
NNE3.7 NNE2.4 NE2.2 NE3.1 NE3.4 NE4.2 NE3.6 ENE2.1 E1.8 E2.0 ESE1.6 ESE1.2 ESE1.5 ESE1.6 ESE1.2 E2.8 ENE4.0 ENE3.8 NE6.3 NE8.0 NE7.3 NE6.5 NNE5.1 NE4.6																								Diurnal Average		
NW37 SSE36 SE36 SE38 WNW41 SE35 NW41 SSE38 SE32 SE29 SSE27 SSE28 SSE30 SSE29 SSE26 S28 SE31 N33 NNE32 NNE34 SE32 NNE37 N32 WNW37																								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: 672
Maximum Value: 10 km/h on Feb 14 03:00	Hours of Data: 620
Minimum Value: 1 km/h on Feb 11 06:00	Hours of Missing Data: 52
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> = 9	Hours of Calibration: 0
	Percent Operational Time: 92.3

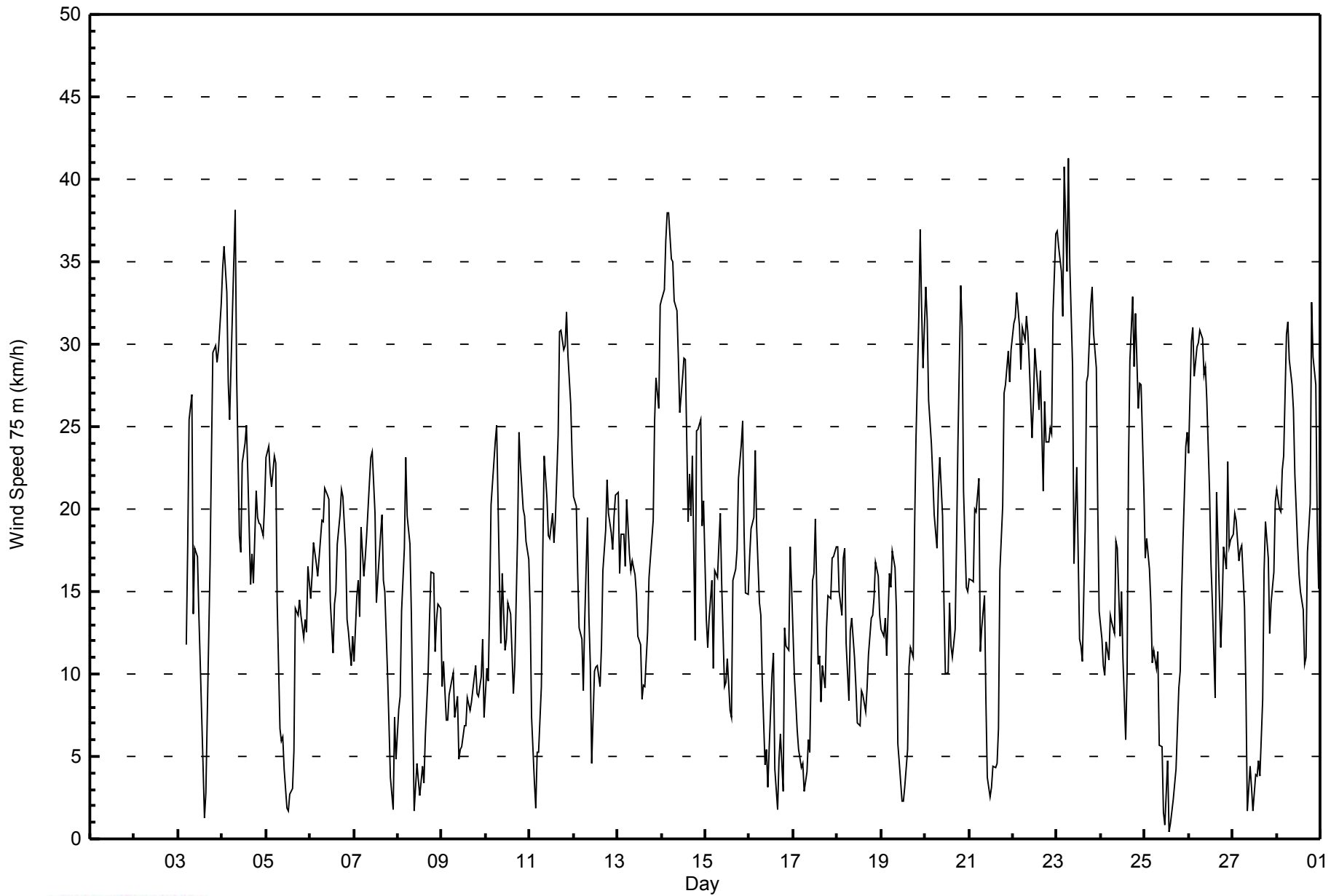
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
3-Feb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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	65	10.48	10.48
6 - 11	116	18.71	29.19
12 - 19	227	36.61	65.81
20 - 28	131	21.13	86.94
29 - 38	79	12.74	99.68
> 38	2	0.32	100.00

Total Number of Valid Hours: 620

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed 75 m (WS75m) - km/h**  
**Mannix - February 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	2	0	4	3	4	10	4	3	3	3	1	4	4	7	7	65
6 - 11	22	6	4	4	1	9	16	5	3	1	1	2	1	4	13	24	116
12 - 19	29	70	10	9	6	4	35	21	6	0	4	7	0	1	11	14	227
20 - 28	17	38	1	2	1	0	10	27	4	4	3	3	7	5	4	5	131
29 - 38	10	7	1	0	0	0	16	27	6	0	0	0	3	6	3	0	79
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
<b>Totals</b>	84	123	16	19	11	17	87	84	22	8	11	13	15	21	39	50	620

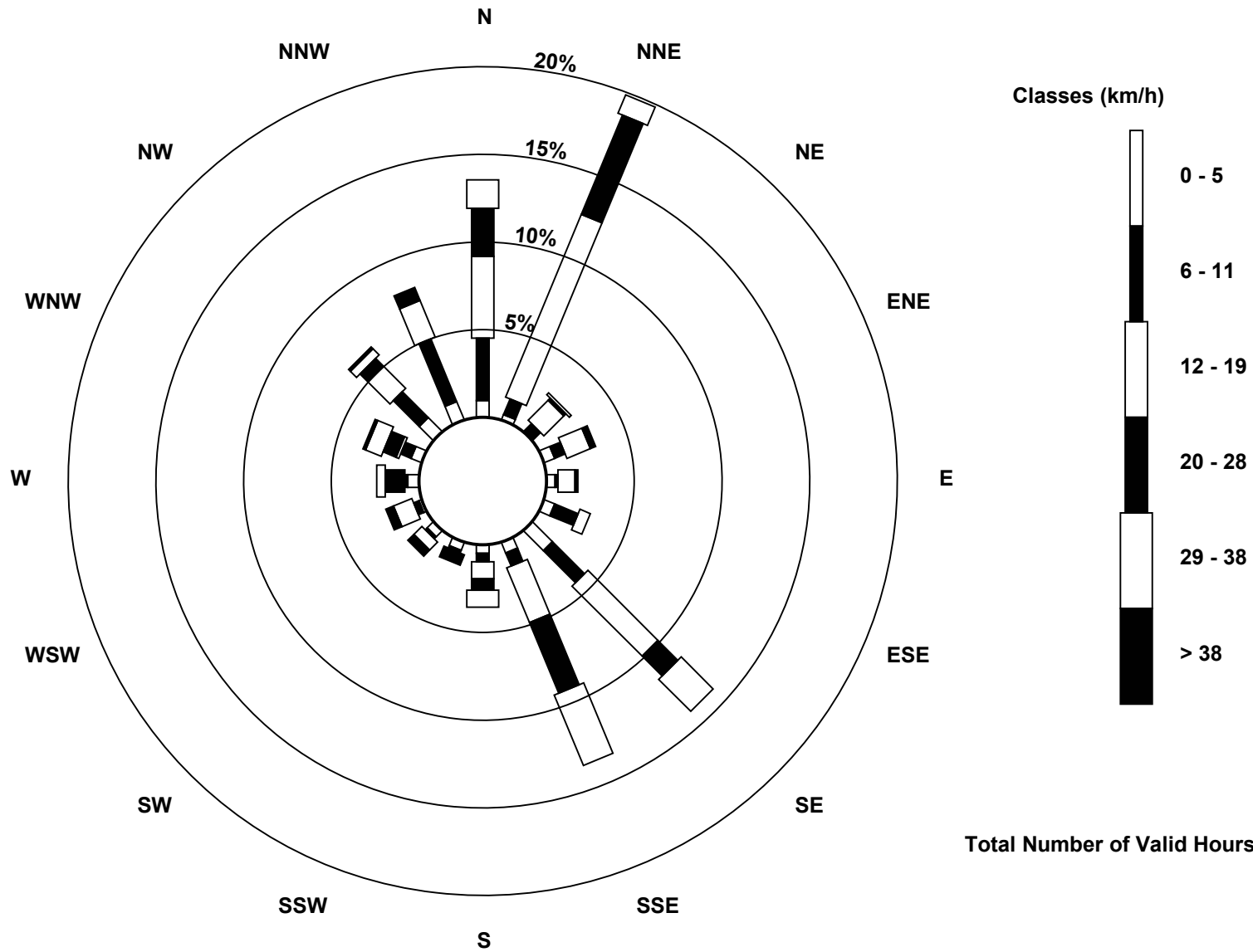
Total Number of Valid Hours: 620

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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





Maximum Speed: 42 km/h on Feb 23 07:00	Maximum Daily Speed Average: 24.1 km/h on Feb 22	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 25 14:00	Minimum Daily Speed Average: 1.0 km/h on Feb 25	Hours of Data: 638
Maximum Diurnal Speed Average: 7.8 km/h at hour 20	Minimum Diurnal Speed Average: 1.1 km/h at hour 12	Hours of Missing Data: 34
Monthly Average Velocity: 3.1 km/h 43.0 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 6 Q <sub>1</sub> = 11 Median = 18 Q <sub>3</sub> = 24 P <sub>90</sub> = 32 P <sub>99</sub> = 39	Percent Operational Time: 94.9

Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---	
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	W12WNW11	NW11	NW9	W8	W8WNW11WNW21	NW17WNW14WNW22	W26WNW26WNW20								---	WNW26
3-Feb	W20	W15WNW16NNW11	N13	NNE20	N27	N29	N15	N19	N18	N14	NW11	WNW5	WSW1	ESE3	ESE9	SSE18	SSE25	SSE31	SSE33	S32	S32	S32			SSE1.3	SSE33	
4-Feb	S36	SSE39	SSE35	SSE28	SE29	SSE33	SSE39	SSE41	SSE26	S18WSW21WSW26	W24WNW25WNW22	NNW16	N18	NNW17	NNW23	NNW20	N20	N20	NNW21	NNW22					SSW5.8	SSE41	
5-Feb	NW25	NW26	NW25	NW22	NNW25	N25	N16	WNW6	W5	W4	NW2	WNW2	ESE2	ENE3	NE3	NNE6	NE15	NNE15	NNE15	NE14	NNE13	NNE14	NNE14	NNE18	N10.7	NW26	
6-Feb	NNE15	NNE16	NNE19	NNE18	NNE17	NNE18	NNE20	NNE20	NNE21	NNE21	NNE16	NE12	ENE15	NE16	ENE19	ENE21	ENE22	ENE23	E21	E18	E17	E17	E20		NE15.7	ENE23	
7-Feb	ESE18	ESE22	ESE20	ESE17	SE21	ESE20	ESE22	ESE23	SE24	SE26	SE25	SE22	ESE17	SE18	SE20	SE21	SE17	SE16	SE11	SE8	E4	N2	NNW7	NNW5	ESE15.9	SE26	
8-Feb	N9	N9	N15	NNE19	NNE25	N20	NNE19	NNE15	NNE9	NNW1	SW4	S4	E2	ENE4	ENE3	NE6	NE11	NNE14	NNE17	NNE15	N11	NNE12	NNE13	NNE14	NNE10.2	NNE25	
9-Feb	N11	NNE10	NE7	NNE7	NNE10	NNE12	N12	NNW8	N10	NNW5	NNW6	NNW6	NNW6	NW7	NNW9	NNW8	NNW9	NNW9	NNW11	NNW9	NW8	NW10	NW12	NW7	NNW8.0	NW12	
10-Feb	NW10	NW10	NNW15	N21	N24	N25	N27	N17	NW13	NNW17	NW12	NNW12	NW15	NW14	NW11	NNW9	NNW11	N20	NNE27	NNE25	NNE22	N22	N20	NNE19	N16.0	NNE27	
11-Feb	NNE16	NNE9	NNE5	E3	S6	S7	SSE10	SSE17	SSE23	SSE22	SE22	SSE22	SSE22	SE20	SE22	SE26	SE33	SE34	SE33	SE33	SE35	SE32	SE29	SSE25	SE18.6	SE35	
12-Feb	SSE23	SSE21	S17	S14	SSW12	SSW9	SW14	SW21	WSW15	WSW12	NW5	NW10	NNW10	N11	NNE9	NNE12	N17	N19	N23	N20	NNE20	NNE18	N20	N21	N3.4	SSE23	
13-Feb	NNE22	NNE17	N19	N19	N17	NNE21	N18	N17	N17	NNE17	N15	NNE13	ENE13	ESE12	ESE13	ESE16	ESE23	ESE23	ESE24	ESE25	ESE32	ESE32	SE31	SE35	ENE12.3	SE35	
14-Feb	SE37	SE37	SE40	SE41	SE41	SE38	SE38	SE36	SE35	SE32	SE29	SE30	SSE31	SSE31	SSE20	S24	SSE22	SSW25	NNW14	N26	N26	N26	N20	N21	SE20.0	SE41	
15-Feb	NNE14	NNE12	NE14	NE16	NNE11	NNE18	NNE17	NNE19	NNE21	N17	NNE9	N10	NNW11	NNW8	NNW8	N16	N17	NNE18	N24	NNE27	N27	N20	N16	NNE16	NNE15.6	N27	
16-Feb	N18	N21	NNE21	N25	N21	N15	NNW15	NNW11	NNW6	N6	NNW3	WNW6	WNW10	NNW11	NW4	SSE2	SSE4	SSW6	W3	NW14	NNW14	NW14	WNW18	NW16	NNW9.6	N25	
17-Feb	NW10	NW9	NNW6	NNW4	NNW4	N6	NNW3	WSW3	SW5	SE6	SSE15	SSE17	SSE20	SSE12	SE13	SE10	SE12	SE11	SE13	SE16	SE16	SE20	SE18	SE19	SE7.3	SSE20	
18-Feb	SE20	SE18	SE16	SE19	SE20	SE14	ESE11	SE16	ESE15	ESE13	SE10	ESE9	ESE9	ESE12	SE9	SE8	SE10	SE12	SE15	SE15	SE16	SE18	SSE17	SSE15	SE13.9	SE20	
19-Feb	SSE14	SSE14	SSE14	SSE13	SSE18	SSE18	SSE21	SSE19	SSE14	SE5	SSE3	SSW2	NW3	NW4	NW6	NW11	NNW12	N12	N20	N26	N33	N38	N34	N30	NNE3.4	N38	
20-Feb	N35	N33	N28	NNW25	NNW23	NNW21	N19	N23	N24	NNE21	NNE15	NNE11	N10	NNW15	NNW12	NNW11	N13	NNE20	NNE26	N35	N33	N23	N17	N16	N20.8	N35	
21-Feb	NNW18	NNW17	N17	N21	N21	N24	NNE13	NNE15	N16	NNW9	NNW3	ESE3	SE3	SE5	ESE6	ESE6	ESE9	SE19	SSE22	SSE30	SSE33	SSE33	SSE31	SSE32	ESE4.4	SSE33	
22-Feb	SSE32	SSE35	SSE36	SSE33	S32	S30	SSE29	SSE33	SSE33	SSE31	SSE27	SSE30	SSE32	SSE29	SSE29	S30	SSW23	SSW28	SSW26	SSW26	SW27	WSW27	W33	WNW38	S24.1	WNW38	
23-Feb	WNW38	WNW38	WNW36	WNW33	WNW42	WNW36	WNW42	NW36	NW30	NW17	WNW20	NNW23	NNE13	N12	N11	N20	NNE29	NNE29	NNE33	NNE35	NNE32	NE30	NE21	ENE14	NNW20.5	WNW42	
24-Feb	ENE13	E14	ESE18	E19	E17	E21	E19	E14	ENE19	ENE19	ENE13	NE16	NE12	ENE6	N10	NNE23	N30	N34	N30	N33	N28	N29	N29	N23	NE15.2	N34	
25-Feb	N18	NNW19	NNW18	NNW15	N12	N11	NNW11	NNW12	NNW7	NW6	WNW2	S1	WNW5	WNW1	SW1	ESE2	ESE5	ESE6	SE9	SSE11	SSE15	SSE20	SSE26	SSE25	NNE1.0	SSE26	
26-Feb	SSE24	SSE32	SSE31	S29	SSE31	SSE30	SSE31	S30	SSE28	SSE28	SSE26	SSE22	SSE19	SSE16	SW10	SW21	SW18	WSW12	WNW15	NNW19	N18	N24	N19	N19	S12.6	SSE32	
27-Feb	N19	N21	N20	N18	NNE18	N18	NNE15	NE10	NW2	WSW4	W4	WSW2	SSW4	SE4	ESE6	SSE5	SW10	SW17	SW20	SW19	WSW14	WSW16	WSW18	W22	WNW4.1	W22	
28-Feb	W22	W21	W21	WSW23	WSW24	W32	W32	W30	W28	WNW27	WNW23	NW18	NW16	NW16	NW14	NW11	W11	NW18	N22	N34	N31	NNW29	N20	NNE16	WNW18.2	N34	
NNE3.5 NNE2.0 NE2.1 NE3.4 NE3.6 NE4.4 NE3.9 ENE2.3 E1.7 E2.0 ESE1.2 ESE1.1 ESE1.4 ESE1.5 ESE1.2 ENE2.6 ENE3.9 NE3.4 NNE6.5 NNE7.8 NNE7.0 NNE5.9 NNE5.0 NNE4.5																								Diurnal Average			
WNW38 SSE39 SE40 SE41 WNW42 SE38 WNW42 SSE41 SE35 SE32 SE29 SE30 SSE32 SSE31 SSE29 S30 SE33 SE34 NNE33 N35 SE35 N38 N34 WNW38																								Diurnal Maximum			

AF - Analyzer Failure

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

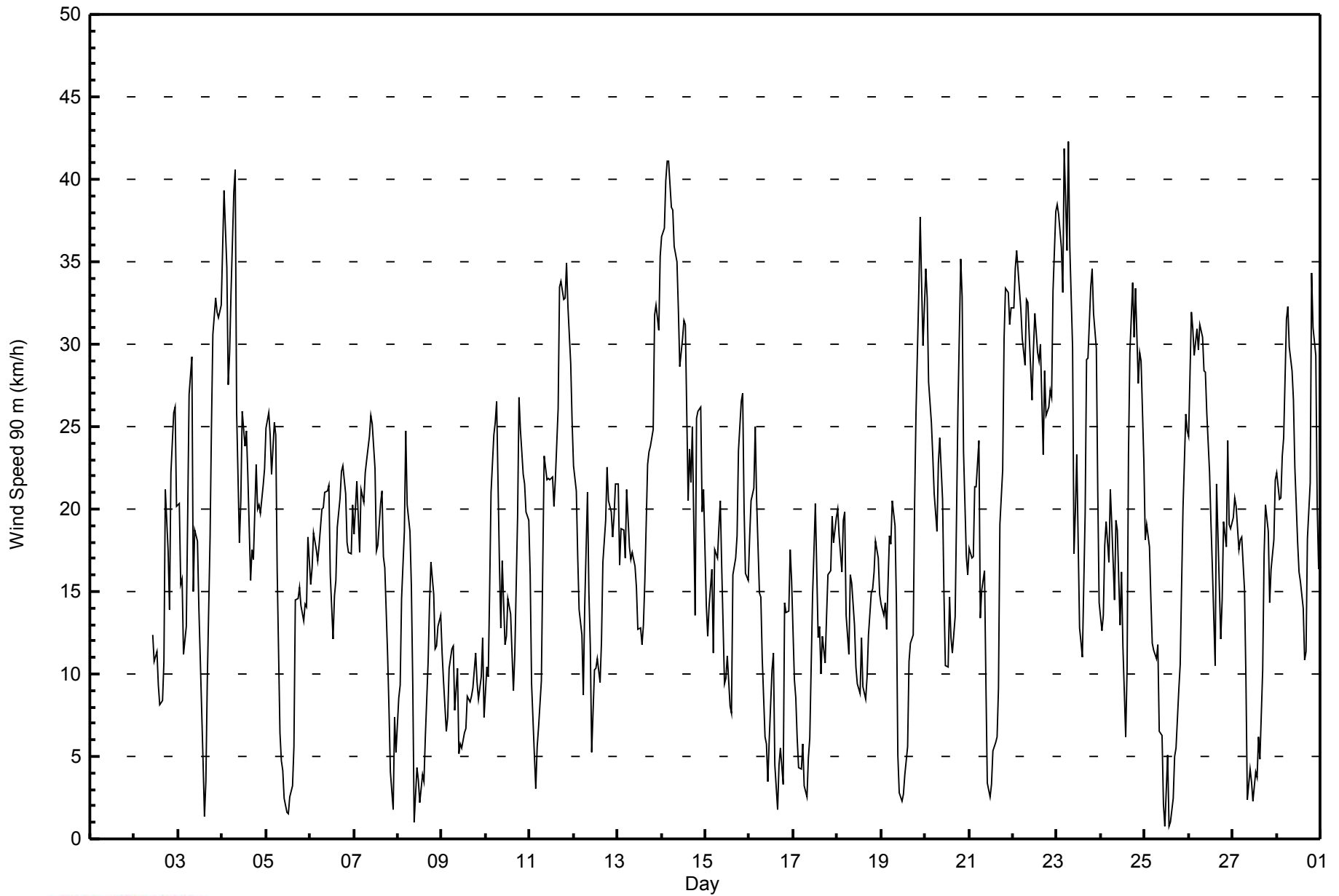


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0											Hours in Service: 672															
Maximum Value: 9 km/h on Feb 14 03:00											Hours of Data: 638															
Minimum Value: 1 km/h on Feb 3 22:00											Hours of Missing Data: 34															
Percentiles: P <sub>1</sub> = 1 P <sub>10</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 of Calibration: 0															
											Percent Operational Time: 94.9															
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	4	4	2	3	3	2	2	3	3	2	2	2	3	1	4	
3-Feb	1	3	3	2	3	2	3	2	6	5	3	3	3	3	1	2	3	2	1	2	1	1	1	2	6	
4-Feb	4	2	3	2	4	3	3	4	4	4	7	2	3	4	3	4	3	5	4	2	4	3	4	2	7	
5-Feb	3	3	3	1	4	4	7	2	2	1	1	1	1	2	1	3	4	3	3	2	2	2	2	3	7	
6-Feb	3	3	3	3	2	2	2	2	1	1	2	3	4	2	3	3	4	3	4	4	4	3	3	3	4	
7-Feb	4	5	5	4	4	5	4	5	6	6	5	5	4	4	5	4	3	3	2	2	2	2	2	2	6	
8-Feb	2	2	3	3	3	3	3	4	3	1	2	2	1	2	1	2	2	1	1	2	1	2	1	1	4	
9-Feb	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	2	2	2	3	3	3	3	2	3	
10-Feb	2	4	2	5	6	5	4	5	2	3	2	2	3	3	3	2	1	5	3	3	3	4	4	2	6	
11-Feb	3	2	3	1	2	1	2	2	2	1	2	3	3	3	4	4	6	5	6	6	6	6	5	4	6	
12-Feb	2	1	3	1	2	1	3	1	2	3	2	2	2	2	2	2	4	2	3	2	4	3	3	5	5	
13-Feb	4	4	3	2	4	2	2	2	2	3	2	2	3	4	3	4	6	5	5	5	6	7	7	7	7	
14-Feb	7	7	9	7	7	6	6	7	5	5	5	7	5	5	4	2	3	3	4	3	5	3	3	2	9	
15-Feb	3	2	2	3	2	3	4	4	4	4	3	3	3	3	3	3	3	6	4	4	5	4	4	6		
16-Feb	3	4	4	3	3	5	4	4	3	3	2	1	2	3	2	1	1	1	3	1	4	1	2	1	5	
17-Feb	1	1	1	1	1	1	2	2	1	1	2	2	3	2	2	2	2	3	3	3	4	3	4	4	4	
18-Feb	3	5	3	4	3	3	3	4	3	3	2	2	3	3	3	2	2	2	3	3	3	2	2	2	5	
19-Feb	2	2	1	2	3	3	2	3	3	2	1	1	2	2	1	2	2	4	4	7	7	7	6	5	7	
20-Feb	7	6	6	5	5	4	4	6	4	4	3	3	3	3	3	3	3	2	3	4	7	4	3	2	7	
21-Feb	2	2	4	2	2	3	4	2	4	3	2	1	2	2	2	1	3	2	2	2	2	2	2	2	4	
22-Feb	1	1	1	1	1	2	1	1	1	2	2	2	4	3	2	2	4	4	2	4	3	6	5	3	6	
23-Feb	2	3	5	3	3	4	4	6	5	5	4	4	5	2	3	4	4	4	6	4	5	5	4	2	6	
24-Feb	2	2	3	2	3	3	4	3	2	2	2	3	2	2	5	3	3	6	6	6	5	5	6	4	6	
25-Feb	3	3	3	2	2	2	2	2	2	1	1	1	2	2	1	2	1	2	1	1	1	2	1	1	3	
26-Feb	2	1	1	2	1	1	1	1	1	1	2	2	2	3	6	3	2	2	2	2	4	4	4	4	6	
27-Feb	4	4	3	3	3	3	3	3	2	1	1	2	2	2	2	2	3	1	1	2	2	2	3	2	4	
28-Feb	2	3	1	3	3	5	2	2	2	4	5	2	4	3	3	4	3	4	3	6	4	4	3	3	6	
											Diurnal Maximum															
AF - Analyzer Failure																										



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	56	8.78	8.78
6 - 11	106	16.61	25.39
12 - 19	211	33.07	58.46
20 - 28	163	25.55	84.01
29 - 38	94	14.73	98.75
> 38	8	1.25	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

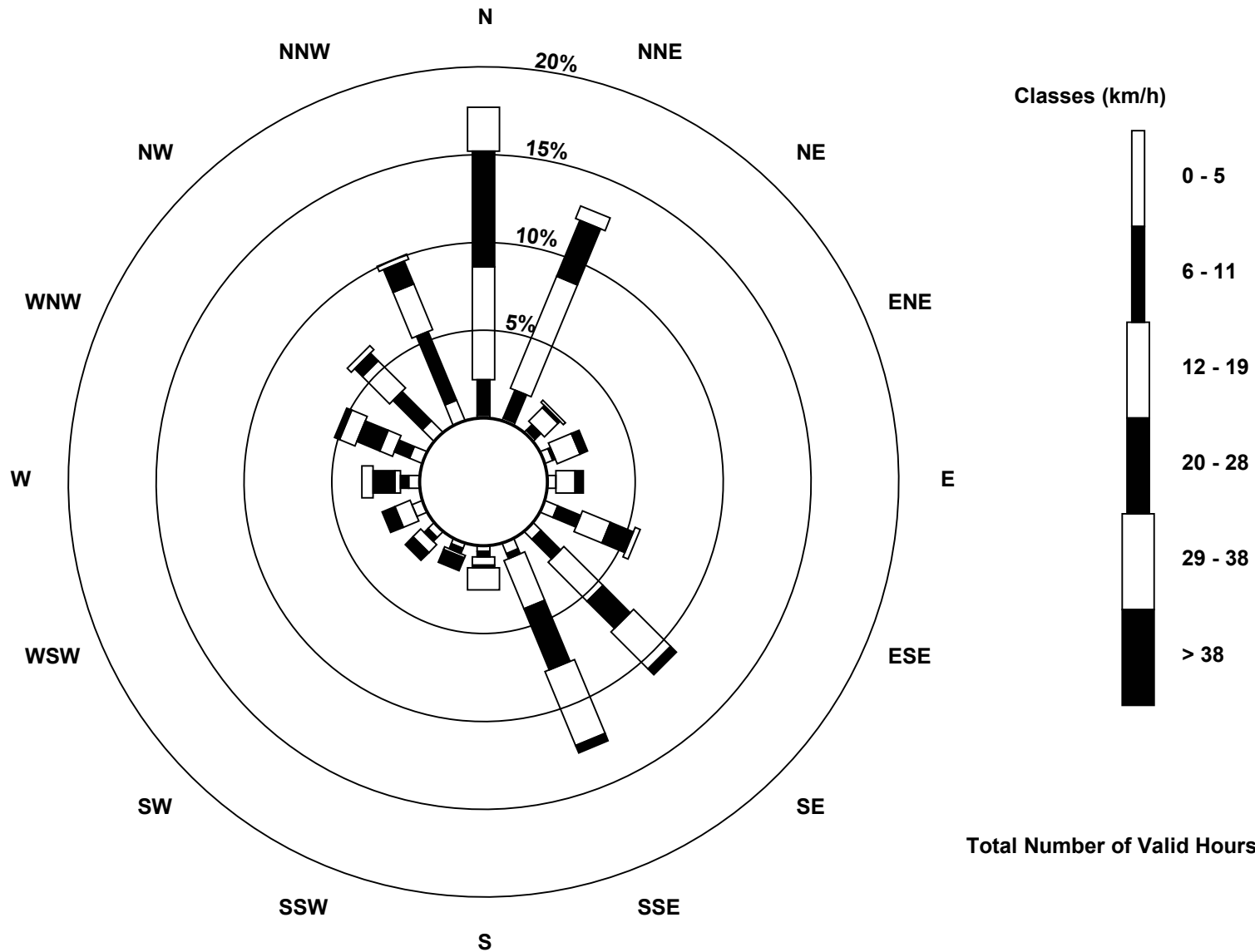
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	1	1	1	3	3	5	4	4	2	2	3	4	4	5	6	8	56
6 - 11	13	11	3	1	0	9	10	2	2	2	2	0	3	6	15	27	106
12 - 19	41	44	7	9	7	11	20	19	3	1	4	6	2	5	14	18	211
20 - 28	42	22	1	3	3	9	14	24	1	5	4	5	8	9	4	9	163
29 - 38	16	5	1	0	0	2	19	29	8	0	0	0	4	6	2	2	94
> 38	0	0	0	0	0	0	3	3	0	0	0	0	0	2	0	0	8
<b>Totals</b>	113	83	13	16	13	36	70	81	16	10	13	15	21	33	41	64	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

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

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



**Total Number of Valid Hours: 638**



Direction of Maximum Speed: 302 deg on Feb 23 07:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 133.4 deg on Feb 14	Hours of Data: 672
Direction of Minimum Speed: 315 deg on Feb 25 11:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 25	Percent Operational Time: 100.0
Monthly Average Direction: 300.5 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-Feb	152	152	154	154	154	148	156	161	143	148	357	340	297	266	267	270	33	48	33	237	240	252	272	263	198.4
2-Feb	250	243	254	256	242	200	244	251	237	303	267	278	314	302	274	278	287	288	297	260	263	256	272	269	266.7
3-Feb	251	264	301	324	3	11	10	11	357	13	9	358	311	269	287	123	130	138	148	160	160	160	157	159	51.5
4-Feb	153	158	160	150	169	159	159	141	153	219	236	249	267	290	290	349	11	338	339	338	355	9	349	337	254.7
5-Feb	315	310	305	298	330	354	358	246	235	231	248	263	95	92	62	14	44	22	25	39	32	32	36	31	352.1
6-Feb	29	27	28	30	19	15	15	14	13	14	23	24	45	72	60	61	69	72	82	89	96	94	105	102	48.8
7-Feb	106	126	131	132	136	131	128	131	136	138	136	137	131	133	137	139	142	140	140	144	96	346	2	352	131.1
8-Feb	348	351	7	19	20	12	24	20	336	269	269	196	85	67	99	81	62	19	5	3	316	351	355	354	9.6
9-Feb	320	357	5	321	337	342	348	327	345	295	303	297	304	305	317	328	317	327	331	327	299	313	325	316	322.5
10-Feb	314	330	339	7	11	17	15	3	295	328	310	298	316	315	325	344	343	1	24	20	12	11	8	4	350.6
11-Feb	0	307	269	260	241	156	150	160	154	152	143	157	166	157	145	150	141	141	140	143	143	147	151	155	151.5
12-Feb	156	152	145	150	157	157	186	227	237	245	341	329	341	5	36	20	12	11	14	16	26	28	15	8	23.5
13-Feb	20	26	11	6	11	19	13	12	13	17	11	12	72	116	118	120	111	124	128	129	130	131	135	138	77.9
14-Feb	136	136	136	138	140	141	140	140	141	140	144	151	152	156	159	167	154	187	3	15	13	10	5	11	133.4
15-Feb	24	39	45	48	29	32	25	22	20	16	16	357	340	343	333	13	15	19	11	18	14	359	359	18	16.2
16-Feb	360	6	15	16	19	15	337	358	272	341	301	291	298	303	309	102	150	156	131	279	320	291	292	272	342.4
17-Feb	289	248	277	285	282	270	224	178	155	145	162	149	146	142	134	134	133	153	138	138	137	139	140	135	156.7
18-Feb	133	135	140	140	139	142	130	134	133	134	134	132	118	108	156	141	149	138	143	138	139	153	158	163	139.2
19-Feb	160	170	170	174	175	165	156	164	165	144	172	169	318	326	305	297	322	336	9	4	9	14	3	7	16.0
20-Feb	12	351	354	346	347	347	353	1	11	25	33	32	2	343	344	336	356	358	24	14	8	358	355	320	0.9
21-Feb	320	332	337	358	354	15	4	18	4	329	19	86	130	99	102	104	123	132	143	147	157	151	151	153	79.7
22-Feb	145	147	146	147	152	147	143	148	147	147	142	154	151	159	156	162	165	201	193	208	214	253	281	298	171.7
23-Feb	299	300	283	293	294	296	302	306	305	303	299	329	25	14	352	12	23	24	20	20	33	51	56	65	337.2
24-Feb	60	92	109	101	100	102	100	91	78	69	62	63	67	78	360	30	11	4	355	1	354	347	2	351	42.6
25-Feb	329	331	345	337	316	325	327	342	274	286	315	116	271	47	73	88	101	126	148	163	147	147	154	158	330.8
26-Feb	147	147	150	155	147	147	154	150	151	142	143	147	142	142	221	240	242	248	303	339	5	13	14	11	149.4
27-Feb	357	349	13	16	26	21	27	42	267	208	250	271	188	88	96	107	164	214	200	177	183	195	221	255	16.6
28-Feb	271	261	254	257	256	274	278	277	280	290	302	311	321	321	314	317	278	310	354	354	348	341	6	20	301.8
	24.2	31.3	43.3	33.5	37.3	41.4	39.7	53.7	98.6	38.2	28.5	17.2	61.7	66.2	70.3	77.2	62.6	47.6	40.5	37.3	36.1	31.4	17.6	19.4	
	Diurnal Average																								

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



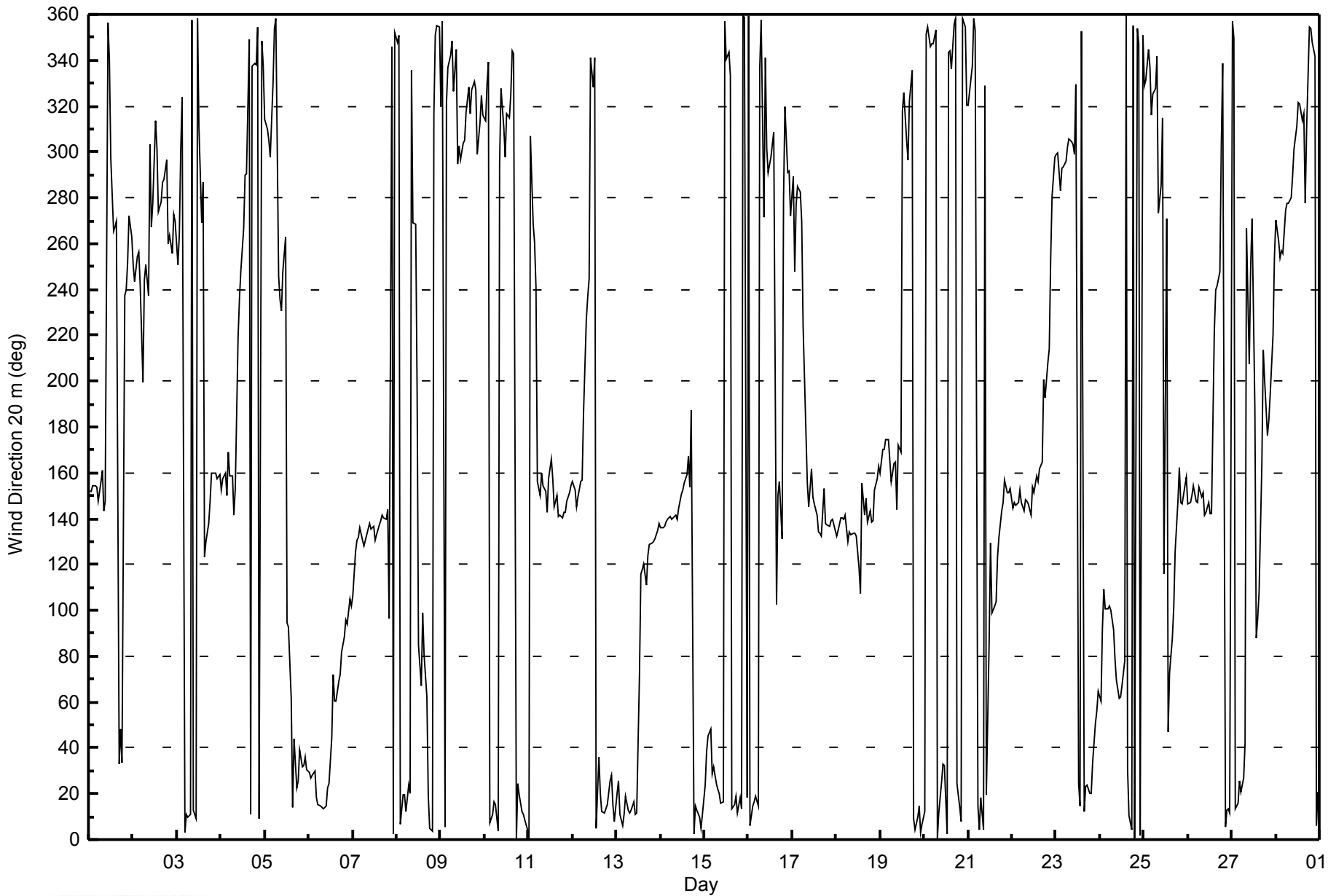


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Feb 26 15:00 Minimum Value: 3 deg on Feb 2 23:00 Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 9 Q <sub>1</sub> = 10 Median = 13 Q <sub>3</sub> = 18 P <sub>90</sub> = 28 P <sub>99</sub> = 76																		Hours in Service: 672 Hours of Data: 672 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-Feb	9	9	8	9	10	11	30	23	18	69	29	21	45	7	11	27	54	12	11	39	7	8	5	10	69
2-Feb	7	10	15	8	8	53	43	10	12	67	71	17	18	16	54	10	10	7	13	11	14	8	3	9	71
3-Feb	12	18	26	26	16	9	9	10	16	15	14	19	21	24	65	39	14	10	11	7	8	8	9	8	65
4-Feb	9	8	8	10	28	11	10	16	12	36	16	19	9	11	13	32	10	21	21	12	29	11	16	17	36
5-Feb	11	11	13	11	20	13	36	15	14	15	23	80	21	70	37	37	12	11	14	14	10	12	13	12	80
6-Feb	15	11	11	13	10	9	10	9	8	8	11	12	28	13	13	11	11	10	12	11	13	11	13	12	28
7-Feb	13	14	13	12	11	12	13	12	11	10	10	11	12	11	10	10	12	11	12	14	27	42	16	23	42
8-Feb	15	21	19	10	12	12	12	15	37	5	8	53	40	21	14	15	13	19	8	11	14	15	15	20	53
9-Feb	14	22	14	29	22	23	22	17	20	22	11	10	11	14	19	16	14	9	14	14	11	12	16	30	30
10-Feb	14	18	14	14	15	13	12	16	32	14	19	13	19	13	25	22	12	20	11	11	11	13	13	11	32
11-Feb	11	40	21	15	10	26	16	8	10	12	16	12	9	10	11	11	10	10	11	9	10	11	11	10	40
12-Feb	8	9	13	12	9	10	18	12	10	41	70	18	18	17	18	15	11	11	11	11	12	13	11	15	70
13-Feb	13	14	12	11	17	11	11	12	11	12	12	15	26	20	21	17	15	15	13	12	12	11	11	10	26
14-Feb	11	10	10	10	9	10	10	10	10	11	10	11	10	10	16	10	12	16	76	12	13	10	13	9	76
15-Feb	13	13	13	12	14	12	15	14	11	13	17	21	19	24	28	15	12	11	14	12	12	18	22	14	28
16-Feb	18	17	13	10	12	13	20	37	62	46	30	16	20	17	32	71	16	12	45	20	33	11	19	23	71
17-Feb	36	51	38	7	9	45	32	23	17	14	16	27	12	14	11	12	12	10	13	9	10	13	11	10	51
18-Feb	12	12	12	11	12	15	19	13	12	11	12	15	21	19	22	16	12	13	12	10	10	11	10	10	22
19-Feb	11	12	11	13	12	13	11	9	10	17	15	66	62	58	20	13	14	19	20	17	15	10	16	19	66
20-Feb	13	14	13	15	14	14	16	18	15	13	17	20	22	22	23	18	19	13	12	11	12	14	15	18	23
21-Feb	21	15	21	13	12	10	20	13	18	41	60	32	61	18	12	15	16	12	7	7	7	10	10	10	61
22-Feb	9	9	9	9	9	8	8	8	8	10	16	10	11	10	10	6	20	13	13	13	13	20	8	9	20
23-Feb	8	8	10	7	8	8	9	8	8	10	10	29	17	15	23	22	11	11	12	10	12	11	9	13	29
24-Feb	14	9	14	10	10	11	11	10	10	9	12	13	13	20	25	16	9	13	13	14	13	12	16	12	25
25-Feb	11	10	11	15	22	18	29	23	41	25	75	77	26	78	74	18	17	14	13	6	22	10	6	10	78
26-Feb	9	9	10	9	8	8	7	7	9	11	9	11	11	13	97	13	11	20	11	14	16	12	14	12	97
27-Feb	14	13	10	13	12	10	14	19	89	17	54	83	44	27	15	25	35	9	9	10	10	15	22	8	89
28-Feb	6	10	9	9	10	7	6	6	6	11	9	11	18	16	14	26	23	30	12	18	12	13	12	15	30
	36	51	38	29	28	53	43	37	89	69	75	83	62	78	97	71	54	30	76	39	33	42	22	30	
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

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





Direction of Maximum Speed: 304 deg on Feb 23 07:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 336.0 deg on Feb 23	Hours of Data: 670
Direction of Minimum Speed: 164 deg on Feb 25 15:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 25	Percent Operational Time: 99.7
Monthly Average Direction: 305.7 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-Feb	157	156	157	158	158	154	158	162	153	289	327	AF	AF	273	272	284	46	42	38	228	234	267	276	269	189.4
2-Feb	266	256	260	261	254	258	269	265	258	293	274	286	314	307	275	282	294	294	311	278	280	273	273	271	275.5
3-Feb	266	272	295	336	8	13	10	13	359	15	11	359	316	278	278	126	129	142	153	161	161	163	159	160	84.5
4-Feb	157	159	161	150	154	160	153	155	151	172	231	255	268	291	291	351	14	342	343	344	359	9	347	342	196.5
5-Feb	321	317	314	310	337	356	3	269	259	269	288	321	98	87	63	15	42	25	28	40	34	35	36	30	352.4
6-Feb	28	26	28	30	24	18	17	17	15	17	23	27	53	69	59	61	69	73	81	90	98	97	107	104	49.7
7-Feb	109	124	129	129	135	129	127	128	134	136	135	134	129	131	136	138	141	140	139	137	99	356	3	352	129.7
8-Feb	354	359	10	20	21	15	24	25	6	285	258	185	83	67	93	73	56	28	9	6	338	360	2	3	14.0
9-Feb	335	358	2	329	343	349	353	326	350	308	318	311	314	311	324	336	322	329	335	333	305	316	326	322	329.8
10-Feb	318	332	341	9	12	17	17	6	312	332	317	302	320	318	329	347	344	2	25	21	16	13	10	11	355.1
11-Feb	8	1	324	319	237	191	144	163	160	155	143	158	167	156	144	148	141	141	140	142	144	148	150	154	148.8
12-Feb	157	155	151	155	169	164	204	231	241	246	326	332	343	7	34	22	15	12	15	15	25	26	16	10	21.8
13-Feb	21	25	12	9	12	20	15	14	15	19	13	14	72	113	118	118	112	123	126	128	128	129	131	136	78.8
14-Feb	135	135	135	138	139	140	139	139	141	139	143	150	152	157	164	170	157	187	357	14	13	11	9	14	133.3
15-Feb	26	39	43	46	33	31	24	21	22	19	20	0	343	351	335	15	17	19	13	20	15	2	359	19	17.6
16-Feb	0	7	18	15	17	13	341	351	334	358	318	295	302	304	320	120	146	159	160	313	334	324	302	297	345.2
17-Feb	298	279	289	291	294	285	258	253	167	143	163	161	148	145	135	132	133	138	131	135	133	137	136	134	158.4
18-Feb	131	134	135	136	136	138	131	131	131	130	133	127	118	110	152	139	145	136	140	137	139	153	158	162	137.0
19-Feb	159	170	172	175	175	167	159	165	164	144	173	167	324	332	308	302	329	347	12	6	10	13	4	8	21.3
20-Feb	12	354	356	350	351	351	354	2	11	23	33	29	4	347	347	338	1	11	23	13	9	4	2	341	3.2
21-Feb	343	344	352	1	359	13	12	21	9	338	5	98	126	111	111	111	126	135	153	151	156	154	155	157	88.8
22-Feb	150	152	153	155	161	161	150	143	149	149	148	154	153	160	159	165	183	201	196	212	218	252	283	299	174.2
23-Feb	302	301	287	294	296	297	304	308	308	307	299	331	23	15	355	13	23	23	20	19	32	49	55	65	336.0
24-Feb	62	94	110	103	104	103	102	90	79	68	60	60	65	74	2	29	12	6	359	5	357	351	4	356	39.7
25-Feb	340	335	341	344	348	341	346	349	320	304	285	130	291	49	164	95	111	128	141	155	157	155	161	164	7.6
26-Feb	156	155	158	161	152	149	159	161	153	148	148	149	147	150	214	238	241	246	299	341	9	14	15	11	157.7
27-Feb	357	351	14	17	26	20	29	42	290	217	259	264	196	100	103	116	186	219	212	197	225	232	240	259	318.4
28-Feb	276	268	260	260	259	277	280	279	282	293	303	315	323	324	316	324	282	314	356	356	351	346	7	25	305.3
	22.5	28.8	50.8	46.9	54.6	49.3	54.6	76.1	106.3	60.3	36.5	43.8	86.9	81.2	79.6	76.1	64.6	55.5	42.9	36.5	35.5	28.1	12.9	15.4	
	Diurnal Average																								

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

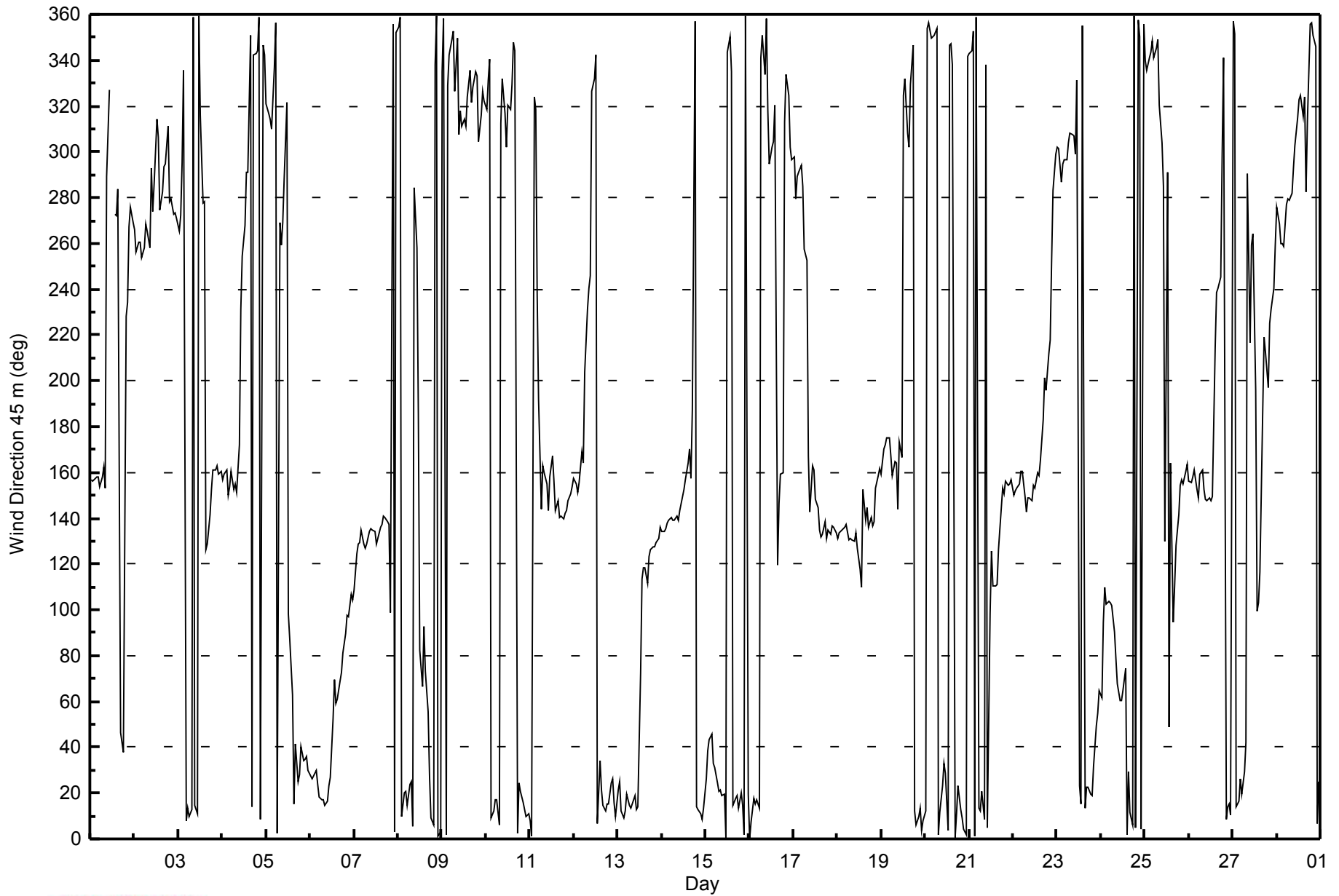


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 111 deg on Feb 25 15:00 Minimum Value: 2 deg on Feb 26 08:00 Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 5 Q <sub>1</sub> = 7 Median = 9 Q <sub>3</sub> = 14 P <sub>90</sub> = 23 P <sub>99</sub> = 78																	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	5	4	3	5	6	8	13	16	9	98	10	AF	AF	18	8	31	89	9	8	79	10	7	3	8	98
2-Feb	6	5	4	4	6	41	15	3	5	40	33	14	16	14	40	8	8	6	7	15	10	5	3	5	41
3-Feb	6	10	16	24	12	6	5	6	15	13	9	16	19	35	59	38	9	6	6	3	4	5	5	5	59
4-Feb	6	5	4	11	19	7	8	7	4	17	20	9	8	10	10	30	5	18	17	8	23	8	10	12	30
5-Feb	8	9	8	8	14	10	20	22	13	15	23	73	35	48	34	29	9	8	11	12	9	9	9	10	73
6-Feb	11	9	8	10	8	7	6	6	4	5	8	9	24	11	10	9	10	9	9	10	10	9	9	8	24
7-Feb	9	10	9	8	8	9	8	8	7	8	7	8	9	8	8	7	9	8	10	10	26	53	13	27	53
8-Feb	12	10	16	7	8	9	8	8	20	15	19	34	45	21	14	12	10	14	4	6	10	5	6	10	45
9-Feb	12	15	12	25	22	22	15	14	15	21	14	11	10	16	16	14	10	8	11	15	9	11	13	28	28
10-Feb	13	14	10	11	11	9	8	11	21	10	18	12	16	12	19	17	8	17	8	8	8	9	9	6	21
11-Feb	9	26	44	48	7	29	10	4	7	8	12	9	8	8	10	10	8	8	8	8	8	9	9	8	48
12-Feb	5	6	9	8	7	6	16	6	6	29	45	14	15	12	13	11	8	6	6	7	9	10	7	11	45
13-Feb	9	10	8	8	13	8	8	8	8	8	9	13	24	16	17	12	11	11	9	9	8	8	9	8	24
14-Feb	7	7	7	8	7	7	7	8	8	8	8	9	8	8	12	7	10	8	72	8	9	7	8	6	72
15-Feb	11	10	9	9	12	10	11	10	8	11	12	16	16	22	20	12	9	9	10	9	9	16	18	11	22
16-Feb	15	16	10	7	9	11	16	29	60	36	31	15	16	15	36	53	13	7	39	12	17	19	6	3	60
17-Feb	11	6	5	8	9	24	9	29	17	7	15	18	8	13	9	11	9	7	5	5	5	8	6	6	29
18-Feb	7	7	9	7	8	11	12	11	7	7	10	11	16	16	19	16	11	9	8	7	7	9	7	8	19
19-Feb	8	6	7	7	5	11	7	7	7	16	16	46	67	48	18	10	15	18	14	13	12	7	13	15	67
20-Feb	10	10	11	12	11	11	13	15	13	9	13	17	16	18	18	14	17	9	8	7	9	9	8	8	18
21-Feb	9	9	12	7	6	6	14	12	15	25	60	28	62	16	12	14	11	10	3	4	4	5	6	6	62
22-Feb	6	5	6	5	5	5	5	3	4	7	8	7	8	6	7	6	15	8	7	9	10	17	7	6	17
23-Feb	5	6	8	5	4	5	7	7	6	10	8	29	12	13	18	19	8	8	9	8	9	9	7	11	29
24-Feb	11	7	9	6	8	7	8	9	9	7	10	10	11	17	20	12	5	8	9	9	10	10	13	10	20
25-Feb	10	8	8	7	15	8	12	11	27	15	72	74	22	80	111	20	11	9	6	6	6	5	4	4	111
26-Feb	7	5	5	3	4	4	4	2	4	7	6	8	10	12	75	12	9	12	13	11	12	8	11	10	75
27-Feb	11	9	8	11	9	8	11	14	82	16	44	84	45	31	16	21	34	5	3	6	11	9	7	7	84
28-Feb	3	8	4	6	8	6	5	4	5	9	7	9	15	15	12	24	22	29	8	14	9	9	8	10	29
Diurnal Maximum																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

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





Direction of Maximum Speed: 306 deg on Feb 23 07:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 179.4 deg on Feb 22	Hours of Data: 620
Direction of Minimum Speed: 354 deg on Feb 25 14:00	Hours of Missing Data: 52
Direction of Minimum Daily Speed Average: 0.9 deg on Feb 25	Percent Operational Time: 92.3
Monthly Average Direction: 317.9 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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
3-Feb	AF	AF	AF	AF	15	19	14	17	1	16	13	1	323	292	261	130	133	149	157	165	165	171	170	170	118.1
4-Feb	167	163	165	160	146	150	151	163	164	169	246	256	268	292	292	352	15	347	345	352	3	7	350	344	187.9
5-Feb	327	322	321	319	345	358	6	295	271	284	315	325	109	72	61	24	42	28	31	42	38	38	38	29	357.6
6-Feb	27	27	30	32	28	23	20	20	17	19	26	34	60	71	61	65	71	74	82	90	97	99	106	105	50.0
7-Feb	111	127	131	130	137	131	129	131	135	136	137	135	131	133	138	139	142	140	139	135	98	3	357	353	131.9
8-Feb	1	360	14	23	23	17	25	31	30	302	233	183	84	66	84	66	52	37	19	19	359	11	16	21	22.8
9-Feb	358	7	28	6	9	6	3	332	358	325	341	335	333	320	331	343	331	332	341	346	315	321	329	330	343.7
10-Feb	326	333	341	11	13	17	18	8	324	335	323	307	324	322	332	349	345	5	26	23	19	15	14	20	359.6
11-Feb	19	19	32	76	201	181	149	161	166	165	141	158	165	152	143	147	141	141	141	143	145	147	151	154	147.5
12-Feb	160	167	169	180	188	190	218	234	243	249	327	334	343	10	35	23	18	15	18	17	24	27	18	12	11.6
13-Feb	22	26	14	12	14	22	17	16	17	22	16	20	72	113	122	119	112	125	129	130	131	132	134	137	73.0
14-Feb	136	137	137	140	141	142	141	141	142	141	144	149	152	158	168	173	166	193	348	15	15	13	13	16	136.0
15-Feb	28	40	45	48	39	32	27	23	23	19	21	4	347	355	340	16	18	20	16	22	16	3	1	20	19.8
16-Feb	2	9	19	15	17	14	346	344	339	7	334	298	305	304	319	142	156	175	224	330	341	329	305	310	346.1
17-Feb	304	310	315	323	334	1	299	253	247	142	158	166	152	151	139	135	137	136	134	135	135	137	136	135	147.1
18-Feb	134	136	135	136	138	138	132	134	132	132	138	126	122	113	151	141	143	136	140	137	140	153	158	160	138.7
19-Feb	157	168	170	172	172	169	160	165	167	148	158	177	326	335	311	309	338	356	15	8	10	14	5	9	32.7
20-Feb	13	357	359	352	353	352	357	3	13	24	34	29	6	350	349	339	7	19	22	14	10	8	6	354	5.9
21-Feb	348	352	356	3	1	13	18	23	12	345	357	118	133	131	124	124	129	144	156	154	158	158	159	162	102.5
22-Feb	158	160	162	165	172	172	165	155	160	159	154	153	157	165	164	172	195	203	200	214	221	252	283	301	179.4
23-Feb	305	302	290	295	296	296	306	310	312	311	299	333	23	16	358	14	22	23	20	20	32	50	56	67	336.5
24-Feb	65	95	110	103	104	102	100	90	82	71	63	63	63	69	8	31	13	8	3	6	0	355	7	1	35.9
25-Feb	351	341	343	350	5	354	349	347	344	319	279	156	300	354	210	115	125	132	138	153	158	164	162	166	31.1
26-Feb	163	165	171	173	167	166	168	170	166	162	157	156	155	158	223	237	239	247	293	342	11	16	15	10	171.4
27-Feb	358	355	15	18	27	19	30	42	313	233	268	262	201	126	117	147	213	221	219	215	247	243	245	262	303.4
28-Feb	280	277	264	261	262	277	281	280	283	295	305	316	325	327	317	327	285	317	358	359	354	350	9	28	307.8
	28.0	33.1	54.3	47.2	47.8	41.7	47.7	75.2	100.7	95.0	101.7	109.4	118.5	107.7	103.7	80.0	66.8	63.9	45.2	38.7	41.1	39.1	32.2	35.3	
	Diurnal Average																								

AF - Analyzer Failure

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



Summary of Hour Standard Deviations

Mannix - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 89 deg on Feb 27 09:00			Hours of Data:	620
Minimum Value: 1 deg on Feb 3 20:00			Hours of Missing Data:	52
			Hours of Calibration:	0
			Percent Operational Time:	92.3
Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 21 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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
3-Feb	AF	AF	AF	AF	12	5	2	4	16	13	7	15	19	48	81	28	12	4	3	1	3	2	3	3	81
4-Feb	3	4	2	10	6	3	7	2	3	16	19	4	8	10	9	29	5	14	14	5	17	8	6	9	29
5-Feb	6	7	6	7	11	8	11	24	14	14	28	52	51	37	29	23	8	7	9	10	8	7	8	8	52
6-Feb	8	7	6	8	7	6	5	5	3	3	7	7	22	10	9	8	8	8	8	10	11	11	12	11	22
7-Feb	13	10	9	8	7	9	8	8	7	7	6	8	9	8	7	5	8	6	8	9	24	75	12	26	75
8-Feb	11	8	15	6	6	7	8	6	9	51	16	27	45	19	17	10	9	10	6	7	5	4	5	8	51
9-Feb	12	9	25	21	21	12	11	15	11	24	14	12	13	21	14	12	12	9	10	16	14	13	12	27	27
10-Feb	11	12	8	10	8	7	7	11	15	9	15	12	14	13	16	15	6	15	5	6	7	6	6	4	16
11-Feb	6	10	51	37	19	11	8	4	2	9	6	7	8	7	8	7	7	6	6	6	6	7	8	6	51
12-Feb	4	4	6	6	4	6	12	4	5	22	31	12	15	11	10	8	7	5	5	6	8	8	6	9	31
13-Feb	8	9	7	6	10	6	6	7	8	7	7	12	22	16	17	13	12	11	9	9	7	7	8	6	22
14-Feb	6	5	6	6	6	6	6	7	6	6	7	7	7	6	9	6	8	8	65	6	6	5	6	5	65
15-Feb	9	9	8	7	10	8	9	8	7	9	11	16	14	22	21	11	8	8	9	7	7	14	17	9	22
16-Feb	13	14	9	6	7	9	12	23	65	33	53	16	14	15	32	59	18	20	55	6	9	18	2	4	65
17-Feb	5	7	15	18	19	19	46	32	30	20	9	5	5	10	8	9	8	8	5	5	5	4	5	5	46
18-Feb	5	5	6	4	6	7	11	9	6	7	10	12	16	17	17	14	9	7	6	6	5	7	5	7	17
19-Feb	7	5	5	5	3	8	4	5	5	14	18	51	62	45	21	9	16	17	12	12	10	6	11	14	62
20-Feb	8	9	10	10	10	10	12	14	12	7	11	14	15	17	16	13	17	7	5	6	7	7	5	8	17
21-Feb	8	8	10	5	5	4	10	9	12	16	47	27	41	15	14	15	10	8	2	2	3	2	4	4	47
22-Feb	4	3	3	3	3	2	5	2	4	3	4	4	6	6	6	6	11	6	7	7	9	15	8	5	15
23-Feb	4	5	7	6	3	4	6	6	5	11	8	29	10	11	15	19	6	6	7	6	7	7	6	10	29
24-Feb	9	10	12	9	11	10	10	10	8	6	8	8	8	17	18	11	4	6	7	7	9	8	11	8	18
25-Feb	11	8	8	6	10	8	13	9	13	8	64	76	17	84	80	29	14	11	6	6	4	2	3	3	84
26-Feb	5	5	2	3	3	3	2	3	4	4	3	4	7	9	49	11	7	10	15	10	10	7	9	9	49
27-Feb	9	8	7	10	6	6	9	11	89	21	43	88	46	40	18	31	25	5	4	7	9	6	5	7	89
28-Feb	3	9	4	5	7	5	4	4	4	8	7	8	13	14	10	22	21	29	5	12	7	7	7	10	29
	13	14	51	37	21	19	46	32	89	51	64	88	62	84	81	59	25	29	65	16	24	75	17	27	

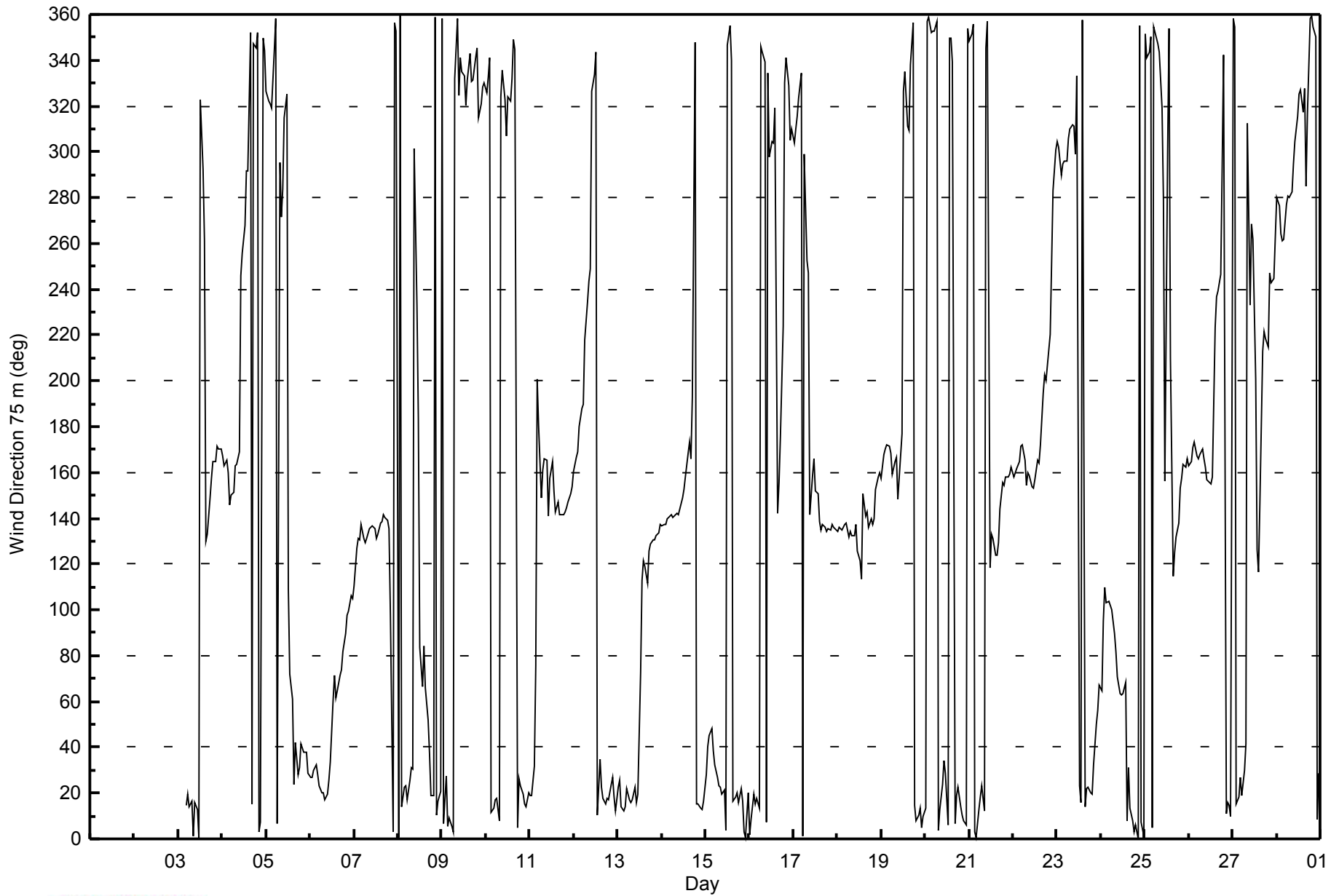
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

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







Summary of Hour Standard Deviations

Mannix - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 96 deg on Feb 25 14:00			Hours of Data:	638
Minimum Value: 2 deg on Feb 26 03:00			Hours of Missing Data:	34
			Hours of Calibration:	0
			Percent Operational Time:	94.9
Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 5 Median = 7 Q <sub>3</sub> = 11 P <sub>90</sub> = 21 P <sub>99</sub> = 72				

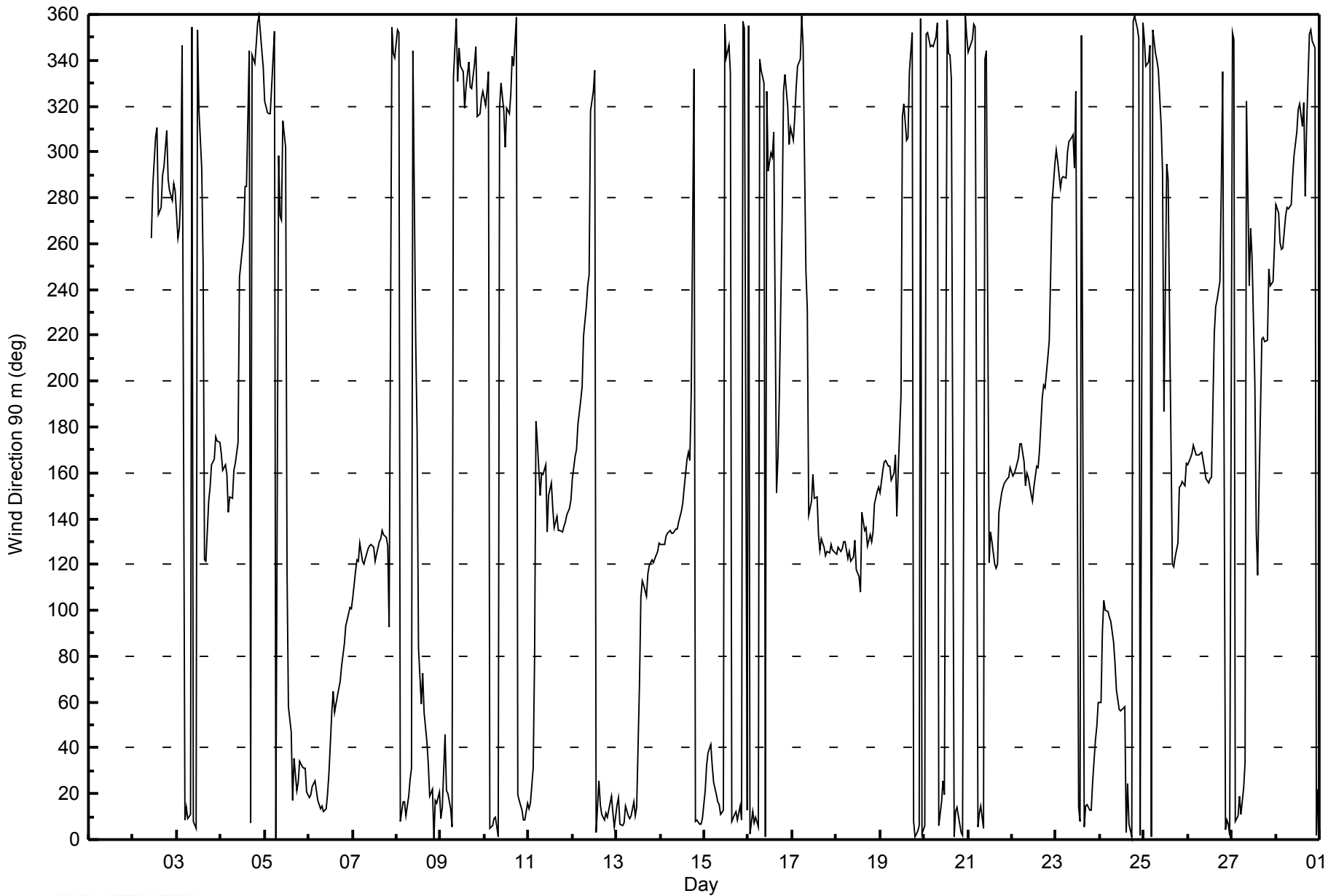
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	10	15	12	16	37	9	8	5	6	12	7	3	5	8	37	
3-Feb	4	5	11	24	11	4	2	3	17	13	6	14	17	45	72	39	9	4	4	2	4	3	3	6	72	
4-Feb	4	5	3	10	3	3	6	3	4	19	11	4	8	9	9	27	4	12	13	5	15	8	5	7	27	
5-Feb	5	6	5	6	10	8	10	25	21	11	39	44	72	42	29	24	7	6	9	10	7	7	7	7	72	
6-Feb	7	7	5	7	6	5	4	4	3	3	7	7	21	9	9	7	8	8	8	9	10	9	8	7	21	
7-Feb	9	7	7	6	6	7	5	7	6	6	6	7	8	6	6	5	7	6	8	9	26	70	11	22	70	
8-Feb	11	9	14	5	5	6	8	6	8	74	15	32	53	23	17	10	9	9	7	8	7	5	4	5	74	
9-Feb	10	11	26	17	18	12	12	15	9	20	14	10	14	21	13	12	11	10	9	15	18	11	13	27	27	
10-Feb	9	13	8	9	7	6	6	11	14	8	14	11	13	13	15	15	6	14	4	5	5	6	6	4	15	
11-Feb	5	8	43	25	24	8	7	4	4	11	6	6	7	6	7	7	7	6	7	6	6	7	7	5	43	
12-Feb	5	3	4	5	6	7	10	4	4	15	26	12	15	10	9	7	6	5	5	5	7	7	5	8	26	
13-Feb	7	9	6	6	9	5	6	6	7	7	6	12	23	16	15	10	9	8	6	6	5	6	7	6	23	
14-Feb	6	6	6	7	6	6	6	7	6	6	6	7	6	6	8	5	6	11	59	5	5	4	5	5	59	
15-Feb	9	9	8	7	9	7	8	8	7	9	11	15	13	21	19	11	7	8	8	6	6	12	17	8	21	
16-Feb	11	14	8	5	6	8	10	21	34	35	43	15	12	16	32	76	25	26	45	6	8	14	3	5	76	
17-Feb	5	7	14	23	22	18	39	41	20	24	10	4	4	8	6	8	8	7	3	4	3	4	4	4	41	
18-Feb	3	4	4	3	6	7	7	6	3	4	11	12	18	13	17	15	9	6	5	5	5	7	5	6	18	
19-Feb	6	5	5	5	3	5	3	4	5	17	27	44	52	39	21	9	15	15	10	10	8	5	10	13	52	
20-Feb	8	9	10	10	9	10	11	13	11	7	10	13	15	16	16	14	17	5	5	5	6	6	5	7	17	
21-Feb	7	8	10	5	5	3	9	7	10	14	54	32	43	16	15	11	8	7	2	2	2	3	3	4	54	
22-Feb	4	3	2	3	3	3	4	3	3	3	4	3	5	6	5	6	10	6	7	7	9	13	8	5	13	
23-Feb	4	5	6	6	2	4	6	6	5	11	7	28	9	10	15	18	5	6	6	5	7	7	6	10	28	
24-Feb	8	8	7	5	7	7	8	10	8	6	8	8	8	8	19	17	10	3	5	7	6	8	7	10	7	19
25-Feb	10	8	7	5	8	8	14	8	13	7	61	90	15	96	76	39	11	6	5	5	3	2	2	4	96	
26-Feb	6	5	2	3	3	3	3	3	4	4	3	4	7	8	37	10	8	8	15	10	9	6	8	9	37	
27-Feb	9	7	6	9	6	6	8	10	74	22	43	80	42	51	17	40	18	5	4	8	8	6	5	7	80	
28-Feb	3	8	3	4	6	5	3	3	3	7	7	8	13	13	10	20	19	28	5	11	7	7	7	10	28	
	11	14	43	25	24	18	39	41	74	74	61	90	72	96	76	76	25	28	59	15	26	70	17	27		
Diurnal Maximum																										

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

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





Summary of Hour Averages

Mannix - February 2015

Maximum Value: 0.8 km/h on Feb 11 22:00      Maximum Daily Average: 0.3 km/h on Feb 22																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -0.7 km/h on Feb 28 20:00      Minimum Daily Average: -0.3 km/h on Feb 28 Maximum Diurnal Average: 0.1 km/h at hour 16      Minimum Diurnal Average: -0.1 km/h at hour 22 Monthly Average: 0.00 km/h      Percentiles: $P_1 = -0.6$ $P_{10} = -0.4$ $Q_1 = -0.2$ Median = -0.1 $Q_3 = 0.2$ $P_{90} = 0.4$ $P_{99} = 0.6$																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0.4	0.3	0.5	0.5	0.4	0.3	0.1	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.3	-0.3	-0.1	0.0	0.0	0.0	-0.1	0.1	-0.2	-0.2	-0.3	0.0	0.5
2-Feb	-0.2	-0.3	-0.1	-0.2	-0.2	-0.1	-0.2	-0.5	-0.4	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	-0.1	-0.1	-0.2	-0.2	-0.1	-0.2	-0.3	0.0	-0.2	-0.2	0.0
3-Feb	-0.3	-0.1	-0.1	-0.1	-0.3	-0.3	-0.5	-0.6	-0.4	-0.1	-0.3	-0.3	-0.3	-0.2	0.0	0.3	0.4	0.3	0.4	0.6	0.6	0.6	0.7	0.7	0.0	0.7
4-Feb	0.6	0.5	0.5	0.5	0.2	0.4	0.5	0.5	0.4	0.0	-0.1	-0.2	-0.3	-0.3	-0.2	-0.4	-0.3	-0.4	-0.5	-0.4	-0.3	-0.3	-0.2	-0.3	0.0	0.6
5-Feb	-0.3	-0.4	-0.3	-0.3	-0.3	-0.3	-0.4	-0.1	-0.4	-0.2	-0.2	-0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.1	0.1	0.2	0.0	-0.1	0.2
6-Feb	0.0	-0.1	0.2	0.0	-0.1	-0.3	-0.1	-0.3	-0.5	-0.6	-0.2	0.2	0.2	0.6	0.3	0.6	0.5	0.3	0.5	0.4	0.3	0.3	0.2	0.3	0.1	0.6
7-Feb	0.4	0.2	0.3	0.1	0.4	0.2	0.2	0.2	0.4	0.3	0.4	0.1	0.0	0.0	0.2	0.3	0.2	0.4	0.2	0.2	0.0	-0.2	-0.1	0.2	0.4	
8-Feb	-0.2	-0.2	-0.2	-0.2	-0.2	-0.4	-0.1	-0.1	-0.2	0.0	-0.1	0.3	0.1	0.1	0.0	0.2	0.3	-0.1	-0.4	-0.3	-0.2	-0.3	-0.2	-0.2	-0.1	0.3
9-Feb	-0.2	-0.2	-0.1	-0.1	-0.2	-0.2	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	0.1	-0.1	-0.3	-0.2	-0.3	-0.1	-0.1	-0.2	-0.1	-0.1	0.1
10-Feb	-0.1	-0.1	-0.2	-0.4	-0.2	-0.2	-0.2	-0.2	-0.2	-0.5	-0.2	-0.2	-0.1	-0.1	0.0	-0.1	-0.3	-0.1	-0.1	-0.1	-0.4	-0.2	-0.2	-0.4	-0.2	0.0
11-Feb	-0.3	-0.2	-0.1	-0.2	-0.3	0.1	0.1	0.5	0.4	0.2	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.5	0.4	0.3	0.8	0.5	0.4	0.2	0.8
12-Feb	0.3	0.3	0.3	0.3	0.2	0.3	-0.1	-0.3	-0.2	-0.2	0.1	-0.2	-0.2	-0.2	0.2	0.1	-0.3	-0.3	-0.3	-0.3	-0.1	-0.1	-0.3	-0.5	-0.1	0.3
13-Feb	-0.1	0.1	-0.4	-0.5	-0.2	0.0	-0.4	-0.2	-0.3	-0.3	-0.3	-0.2	0.4	0.3	0.2	0.4	0.3	0.4	0.2	0.2	0.1	0.5	0.6	0.0	0.6	
14-Feb	0.5	0.3	0.6	0.4	0.4	0.3	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.6	0.3	0.2	0.5	-0.1	-0.4	-0.4	-0.4	-0.2	-0.2	0.2	0.6	
15-Feb	-0.1	0.2	0.2	0.2	0.1	0.1	0.3	-0.2	-0.3	-0.2	0.0	-0.1	0.0	0.0	0.1	-0.2	-0.2	-0.2	-0.3	-0.2	-0.4	-0.3	-0.2	-0.1	-0.1	0.3
16-Feb	-0.2	-0.2	-0.2	-0.3	-0.1	-0.2	-0.2	0.0	-0.2	0.0	-0.1	-0.1	-0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.1	-0.1	-0.1	0.1
17-Feb	-0.1	-0.1	0.0	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.1	0.1	0.2	0.3	0.2	0.4	0.4	0.2	0.3	0.3	0.1	0.4
18-Feb	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.0	0.0	0.2	0.2	0.2	0.1	0.2	-0.1	0.1	0.3	0.3	0.3	0.2	0.4	0.3	0.2	0.4
19-Feb	0.2	0.2	0.1	0.1	0.1	0.3	0.3	0.3	0.2	0.2	-0.2	0.1	0.1	0.0	0.0	-0.1	-0.2	-0.3	-0.1	-0.4	-0.4	-0.6	-0.5	-0.3	0.0	0.3
20-Feb	-0.4	-0.4	-0.6	-0.3	-0.3	-0.3	-0.2	-0.1	-0.2	0.0	0.2	0.2	0.0	-0.1	0.3	-0.1	-0.3	-0.3	0.1	-0.3	-0.4	-0.3	-0.2	-0.1	-0.2	0.3
21-Feb	-0.2	-0.4	-0.2	-0.6	-0.5	-0.4	-0.2	-0.3	-0.4	-0.1	-0.1	0.2	0.5	0.4	0.3	0.3	0.6	0.3	0.4	0.5	0.5	0.5	0.5	0.6	0.1	0.6
22-Feb	0.5	0.5	0.6	0.6	0.6	0.4	0.5	0.5	0.4	0.2	0.2	0.3	0.5	0.6	0.5	0.7	0.3	-0.1	-0.1	-0.2	-0.2	-0.1	-0.4	-0.5	0.3	0.7
23-Feb	-0.6	-0.5	-0.3	-0.5	-0.7	-0.5	-0.6	-0.7	-0.6	-0.3	-0.2	-0.3	0.2	-0.1	0.0	-0.2	-0.1	-0.1	-0.3	-0.5	0.0	0.1	0.2	0.3	-0.3	0.3
24-Feb	0.5	0.2	0.3	0.3	0.2	0.4	0.4	0.2	0.5	0.6	0.3	0.6	0.6	0.4	0.0	0.1	-0.7	-0.5	-0.4	-0.4	-0.5	-0.6	-0.4	-0.5	0.1	0.6
25-Feb	-0.4	-0.5	-0.4	-0.1	-0.1	-0.2	-0.2	-0.1	-0.1	0.0	0.0	0.2	-0.4	0.0	0.1	0.1	0.2	0.3	0.1	0.1	0.1	0.2	0.4	0.3	0.0	0.4
26-Feb	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.6	0.5	0.3	0.4	0.3	0.3	0.3	0.1	-0.3	-0.3	-0.1	-0.2	-0.3	-0.1	-0.4	0.1	-0.2	0.2	0.6
27-Feb	-0.4	-0.4	-0.3	0.0	-0.1	-0.1	0.1	0.0	-0.1	-0.2	-0.2	0.0	0.2	0.3	0.5	0.4	0.3	-0.2	-0.2	0.0	-0.1	-0.3	-0.2	-0.3	-0.1	0.5
28-Feb	-0.1	-0.1	-0.3	-0.3	-0.3	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.3	-0.4	-0.3	0.0	0.0	-0.3	-0.4	-0.7	-0.4	-0.4	-0.4	-0.1	-0.3	0.0
																								Diurnal Average		
																								Diurnal Maximum		



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 km/h on Feb 13 21:00 Minimum Value: 0.1 km/h on Feb 1 17:00 Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.6 Q <sub>1</sub> = 0.8 Median = 1.3 Q <sub>3</sub> = 1.7 P <sub>90</sub> = 2.2 P <sub>99</sub> = 3.3																								Hours in Service: 672 Hours of Data: 672 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-Feb	1.2	1.2	1.3	1.2	1.2	1.3	1.1	0.7	0.7	0.4	0.6	1.0	0.8	0.6	0.5	0.3	0.1	0.2	0.2	0.3	0.4	0.4	0.4	0.6	1.3
2-Feb	0.6	0.6	0.7	0.6	0.3	0.4	0.7	0.7	0.7	0.9	0.6	0.9	1.2	1.1	0.9	0.7	0.6	0.7	0.5	0.3	0.4	0.6	0.3	0.3	1.2
3-Feb	0.4	0.3	0.8	0.7	1.0	1.1	1.7	1.8	1.2	1.9	1.7	1.7	1.3	0.9	0.9	0.9	1.2	0.8	1.0	1.1	1.4	1.5	1.4	1.7	1.9
4-Feb	1.8	1.6	1.4	1.0	1.0	1.2	1.3	1.3	1.1	0.5	0.6	1.0	1.7	2.0	1.7	1.6	1.2	1.1	1.6	1.3	1.5	1.4	1.1	1.1	2.0
5-Feb	1.3	1.4	1.3	0.9	1.6	1.8	1.2	0.6	0.5	0.6	0.5	0.6	0.7	0.8	0.7	1.0	1.5	1.2	1.5	1.4	1.2	1.1	1.0	1.5	1.8
6-Feb	1.5	1.5	1.8	1.7	1.5	1.4	1.6	1.5	1.6	1.6	1.8	1.6	1.4	1.6	1.6	1.8	1.9	1.9	1.9	1.7	1.7	1.5	1.7	1.9	1.9
7-Feb	1.8	2.8	2.5	2.0	2.1	2.3	2.7	2.6	2.4	2.4	2.4	2.3	2.2	2.2	1.9	1.9	1.7	1.5	1.1	0.8	0.6	0.3	0.5	0.5	2.8
8-Feb	0.5	0.6	1.0	1.2	1.9	1.8	1.5	0.7	0.4	0.3	0.3	1.0	0.9	1.0	0.7	0.7	0.8	0.7	1.0	1.0	0.5	0.7	0.8	0.6	1.9
9-Feb	0.4	0.9	1.0	0.7	0.7	0.9	1.1	0.9	1.0	0.7	0.7	0.8	0.8	0.9	0.9	1.0	0.8	0.8	1.0	0.9	0.7	0.9	1.1	0.7	1.1
10-Feb	0.9	0.9	1.3	1.9	2.2	2.0	2.1	1.5	1.0	1.6	1.2	1.2	1.6	1.4	1.4	1.2	1.0	1.6	1.9	1.8	1.6	1.6	1.4	1.0	2.2
11-Feb	0.7	0.4	0.3	0.4	0.4	0.3	0.5	0.9	1.1	1.2	1.2	1.3	1.4	1.4	1.9	2.2	2.9	2.8	2.7	2.7	2.7	2.8	2.3	1.9	2.9
12-Feb	1.3	1.2	1.1	0.8	0.6	0.6	0.7	1.0	0.7	0.7	0.7	1.1	1.3	1.4	1.3	1.3	1.5	1.6	2.0	1.8	1.8	1.6	1.8	1.9	2.0
13-Feb	1.9	1.6	1.6	1.7	1.6	1.8	1.5	1.5	1.5	1.5	1.5	1.3	1.6	1.6	1.6	1.9	2.3	2.8	2.8	3.0	3.7	3.6	3.2	3.3	3.7
14-Feb	3.3	3.3	3.5	3.5	3.4	3.1	3.3	3.1	2.8	2.6	2.3	2.5	2.5	2.1	1.6	1.5	1.2	1.4	1.7	2.3	2.2	2.1	1.6	1.6	3.5
15-Feb	1.1	1.1	1.2	1.5	1.0	1.6	1.6	1.7	1.7	1.6	1.3	1.4	1.4	1.2	1.3	1.6	1.6	1.6	1.9	2.0	2.3	1.8	1.7	1.5	2.3
16-Feb	1.6	1.7	1.8	1.9	1.5	1.4	1.2	0.8	0.6	0.6	0.7	0.8	1.2	1.3	1.0	0.7	0.6	0.4	0.2	0.3	0.3	0.2	0.2	0.3	1.9
17-Feb	0.2	0.2	0.1	0.2	0.3	0.4	0.3	0.2	0.4	0.8	0.8	0.8	1.4	1.3	1.3	1.2	1.1	0.5	0.8	1.2	1.2	1.2	1.3	1.6	1.6
18-Feb	1.8	1.3	1.1	1.3	1.4	1.1	1.1	1.3	1.6	1.4	1.2	1.4	1.3	1.5	1.2	1.1	0.9	1.3	1.3	1.3	1.3	1.3	1.2	0.9	1.8
19-Feb	0.9	0.8	0.9	0.7	1.1	0.9	1.0	0.9	0.8	0.7	0.8	0.8	0.8	0.9	0.7	0.8	0.9	1.0	1.7	2.5	2.9	3.2	2.8	2.7	3.2
20-Feb	3.0	3.0	2.7	2.2	2.2	2.0	2.1	2.1	2.1	1.8	1.8	1.5	1.5	1.8	1.7	1.3	1.1	1.2	1.7	2.7	2.7	1.6	0.8	0.8	3.0
21-Feb	0.9	1.0	1.0	1.5	1.3	1.4	0.8	1.0	1.2	0.8	0.9	1.0	1.1	1.1	1.0	1.1	1.2	1.1	0.7	1.0	0.9	1.4	1.5	1.6	1.6
22-Feb	1.6	1.5	1.6	1.5	1.3	1.1	1.3	1.3	1.3	1.2	1.2	1.4	2.1	1.9	1.8	1.5	1.0	1.8	1.4	1.8	1.6	1.9	1.7	2.1	2.1
23-Feb	1.9	1.7	1.7	1.3	2.2	2.0	2.8	2.4	1.9	1.2	1.5	2.0	1.5	1.5	1.4	2.0	2.5	2.3	2.7	2.8	2.5	2.4	1.7	1.3	2.8
24-Feb	1.3	1.2	1.9	1.6	1.5	1.7	1.6	1.1	1.6	1.6	1.3	1.6	1.4	1.0	1.3	2.1	2.3	2.9	2.6	2.9	2.4	2.4	2.4	1.8	2.9
25-Feb	1.2	1.3	1.0	1.0	0.6	0.7	0.6	0.7	0.6	0.5	0.7	0.8	0.8	0.9	0.7	0.7	0.7	0.5	0.2	0.2	0.2	0.5	0.6	0.8	1.3
26-Feb	1.0	1.2	1.2	1.0	1.3	1.2	0.8	0.8	1.2	1.2	1.4	1.5	1.4	1.2	1.3	1.8	1.3	0.7	0.7	1.3	1.6	2.1	1.7	1.8	2.1
27-Feb	1.8	1.8	1.7	1.6	1.5	1.5	1.4	1.1	0.7	0.8	0.9	1.0	1.2	1.0	1.2	0.9	0.8	0.9	0.8	0.7	0.5	0.5	0.4	0.9	1.8
28-Feb	0.7	0.9	1.2	1.7	1.6	1.7	1.6	1.4	1.4	1.9	1.7	1.4	1.5	1.5	1.3	1.1	1.0	1.5	1.6	2.8	2.7	2.1	1.7	1.1	2.8
Diurnal Maximum																									



Summary of Hour Averages

Mannix - February 2015

Maximum Value: 1.5 km/h on Feb 26 05:00																				Maximum Daily Average: 0.6 km/h on Feb 22					Hours in Service: 672	
Minimum Value: -1.0 km/h on Feb 28 20:00																				Minimum Daily Average: -0.3 km/h on Feb 28					Hours of Data: 670	
Maximum Diurnal Average: 0.3 km/h at hour 14																				Minimum Diurnal Average: 0.1 km/h at hour 20					Hours of Missing Data: 2	
Monthly Average: 0.18 km/h																				Percentiles: P <sub>1</sub> = -0.7 P <sub>10</sub> = -0.4 Q <sub>1</sub> = -0.2 Median = 0.1 Q <sub>3</sub> = 0.5 P <sub>90</sub> = 0.8 P <sub>99</sub> = 1.2					Hours of Calibration: 0	
																									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-Feb	0.9	1.0	1.1	0.8	0.8	0.8	0.4	0.1	0.2	-0.1	-0.7	AF	AF	-0.3	-0.2	-0.1	0.1	0.2	0.2	0.1	0.2	-0.3	-0.6	-0.6	0.2	1.1
2-Feb	-0.3	-0.3	-0.2	-0.4	-0.3	-0.1	-0.3	-0.7	-0.5	-0.1	0.1	-0.1	-0.1	-0.1	0.1	-0.1	-0.2	-0.3	-0.4	-0.1	-0.4	-0.4	-0.4	-0.4	-0.3	0.1
3-Feb	-0.4	-0.2	-0.1	0.0	-0.3	-0.3	-0.4	-0.5	-0.5	0.3	-0.4	-0.2	0.0	-0.1	0.3	0.8	0.7	0.7	0.9	0.9	1.0	0.8	1.0	1.1	0.2	1.1
4-Feb	1.1	0.9	0.8	1.0	0.6	0.7	1.3	0.9	1.0	0.2	-0.3	-0.4	-0.4	-0.2	-0.1	-0.3	-0.2	-0.3	-0.4	-0.4	-0.3	-0.3	0.0	-0.3	0.2	1.3
5-Feb	-0.6	-0.5	-0.4	-0.7	-0.4	-0.2	-0.1	0.1	-0.3	-0.1	-0.1	0.0	0.1	0.2	0.1	0.0	0.4	0.4	0.3	0.1	0.4	0.3	0.2	0.2	0.0	0.4
6-Feb	0.2	0.2	0.7	0.4	0.4	0.0	0.1	0.0	-0.3	-0.4	0.1	0.7	0.6	1.0	0.9	0.8	0.8	0.7	0.9	0.8	0.6	0.5	0.4	0.7	0.4	1.0
7-Feb	0.7	0.7	0.6	0.5	0.6	0.5	0.6	0.4	0.5	0.6	0.4	0.4	0.5	0.3	0.4	0.4	0.6	0.7	0.6	0.4	0.3	0.1	-0.1	-0.1	0.4	0.7
8-Feb	-0.1	-0.1	0.0	0.0	0.1	-0.4	-0.1	0.0	0.0	0.2	0.1	0.5	0.2	0.4	0.0	0.4	0.3	0.1	-0.2	-0.1	-0.2	-0.1	-0.2	-0.1	0.0	0.5
9-Feb	-0.1	-0.2	-0.1	0.0	0.0	-0.1	-0.1	0.0	0.1	0.1	0.0	0.0	-0.2	0.2	-0.2	0.2	0.0	-0.2	0.0	-0.2	0.0	-0.1	-0.3	0.0	-0.1	0.2
10-Feb	0.1	-0.1	-0.4	-0.2	0.2	0.3	0.0	-0.1	-0.1	-0.6	-0.3	-0.2	0.3	0.4	0.2	-0.1	-0.3	0.0	0.2	0.1	-0.1	0.1	-0.3	-0.3	-0.1	0.4
11-Feb	-0.3	0.1	0.1	0.1	-0.1	0.1	0.4	0.7	0.7	0.5	0.6	0.4	0.3	0.4	0.8	0.5	1.0	1.0	0.9	0.8	0.9	1.1	0.7	0.7	0.5	1.1
12-Feb	0.6	0.6	0.7	0.5	0.3	0.3	-0.1	-0.4	-0.3	-0.1	0.2	-0.1	-0.2	-0.1	0.5	0.2	-0.1	-0.2	-0.2	-0.1	0.1	0.0	-0.2	-0.2	0.1	0.7
13-Feb	0.2	0.1	-0.3	-0.3	-0.2	0.0	-0.2	0.0	-0.2	0.1	-0.1	0.1	0.6	0.6	0.6	0.7	0.7	1.0	0.7	0.5	0.7	0.7	0.8	0.8	0.3	1.0
14-Feb	0.7	0.7	0.8	0.6	0.8	1.0	0.9	1.0	1.0	0.9	0.8	0.9	0.9	0.8	0.8	0.6	0.8	0.3	-0.2	-0.3	-0.4	-0.3	0.2	-0.2	0.5	1.0
15-Feb	0.0	0.3	0.2	0.2	0.3	0.3	0.5	-0.1	-0.2	0.1	0.4	0.0	0.3	0.4	0.3	0.0	0.1	0.1	-0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.5
16-Feb	-0.1	0.1	0.1	-0.4	-0.2	-0.1	-0.2	0.2	-0.1	0.2	-0.1	-0.2	0.1	0.3	0.0	0.3	0.3	0.3	0.1	0.0	-0.1	-0.1	-0.1	-0.1	0.0	0.3
17-Feb	-0.2	-0.1	-0.1	0.0	0.0	0.0	-0.1	0.0	0.2	0.3	0.3	0.4	0.5	0.4	0.3	0.2	0.3	0.4	0.6	0.7	0.7	0.5	0.6	0.6	0.3	0.7
18-Feb	0.7	0.6	0.5	0.6	0.4	0.4	0.6	0.5	0.5	0.2	0.1	0.4	0.6	0.4	0.1	0.2	0.0	0.3	0.5	0.4	0.5	0.5	0.6	0.4	0.4	0.7
19-Feb	0.4	0.3	0.2	0.3	0.3	0.5	0.6	0.5	0.4	0.3	0.1	0.4	0.2	0.0	0.1	0.0	-0.1	0.0	0.2	0.1	0.1	-0.6	-0.2	0.0	0.2	0.6
20-Feb	-0.3	-0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.5	0.5	0.2	0.3	0.5	0.3	-0.2	0.2	0.3	-0.3	-0.3	-0.1	0.0	0.0	0.1	0.5
21-Feb	-0.5	-0.5	-0.2	-0.5	-0.4	-0.2	-0.2	-0.4	-0.3	0.0	-0.1	0.2	1.0	0.7	0.6	0.8	0.8	0.6	0.8	0.9	0.9	0.9	1.0	1.2	0.3	1.2
22-Feb	1.1	1.1	1.2	1.2	1.0	1.0	1.2	1.3	1.1	0.5	0.6	0.6	0.7	0.9	0.8	0.7	0.3	-0.1	0.0	-0.3	-0.4	0.0	-0.7	-0.5	0.6	1.3
23-Feb	-0.7	-0.7	-0.6	-0.8	-0.9	-0.7	-0.9	-0.9	-0.7	-0.2	-0.1	-0.2	0.5	0.0	0.3	0.1	0.2	0.1	-0.1	-0.4	0.2	0.3	0.4	0.5	-0.2	0.5
24-Feb	0.8	0.2	0.6	0.5	0.3	0.5	0.5	0.4	0.6	0.8	0.8	1.0	0.9	0.6	0.1	0.2	-0.6	-0.5	-0.3	0.1	0.0	-0.4	-0.5	-0.3	0.3	1.0
25-Feb	-0.4	-0.6	-0.5	-0.2	0.1	-0.3	-0.2	-0.1	0.2	0.2	0.1	0.5	-0.4	0.3	0.3	0.3	0.4	0.5	0.4	0.4	0.4	0.7	0.7	0.6	0.1	0.7
26-Feb	0.7	0.9	0.9	1.0	1.5	1.4	0.8	1.0	1.5	1.0	0.8	0.6	0.7	0.5	0.3	-0.2	-0.3	-0.1	-0.2	-0.5	0.1	-0.2	0.3	-0.1	0.5	1.5
27-Feb	-0.1	-0.3	-0.2	0.2	0.1	0.0	0.4	0.3	0.2	0.0	0.0	0.0	0.4	0.6	0.8	0.5	0.3	-0.2	-0.2	-0.1	-0.2	-0.4	-0.3	-0.4	0.1	0.8
28-Feb	-0.2	-0.4	-0.3	-0.4	-0.3	-0.3	-0.5	-0.3	-0.6	-0.4	-0.2	-0.4	-0.4	-0.4	-0.4	0.1	0.0	-0.3	-0.3	-1.0	-0.5	-0.5	-0.1	0.2	-0.3	0.2
																								Diurnal Average		
																								Diurnal Maximum		
0.1 0.1 0.2 0.1 0.2 0.2 0.2 0.1 0.2 0.2 0.1 0.2 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1																										
1.1 1.1 1.2 1.2 1.5 1.4 1.3 1.3 1.5 1.0 0.8 1.0 1.0 1.0 0.9 0.8 1.0 1.0 0.9 0.9 1.0 1.1 1.0 1.2 0.1 0.1 0.1																										
AF - Analyzer Failure																										



Summary of Hour Standard Deviations

Mannix - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 3.7 km/h on Feb 14 04:00		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																								
Minimum Value: 0.2 km/h on Feb 1 20:00																										
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.9 Median = 1.3 Q <sub>3</sub> = 1.8 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.5																										
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-Feb	1.1	1.1	1.1	1.1	1.1	1.2	0.9	0.8	0.9	0.7	0.8	AF	AF	0.7	0.4	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.6	1.2	
2-Feb	0.4	0.4	0.5	0.6	0.3	0.6	0.7	0.5	0.6	0.9	0.7	0.9	1.5	1.4	0.9	0.6	0.7	0.7	0.7	0.3	0.4	0.5	0.4	0.3	1.5	
3-Feb	0.3	0.4	0.9	0.9	1.0	1.0	1.4	1.5	1.2	2.2	1.6	1.9	1.7	1.0	1.0	0.9	1.2	0.8	0.9	0.7	1.2	1.1	1.4	1.5	2.2	
4-Feb	1.8	1.7	1.0	0.8	1.1	0.9	1.1	1.4	0.9	0.7	0.9	1.1	1.7	2.1	1.9	1.6	1.0	1.1	1.6	1.3	1.6	1.2	1.4	1.3	2.1	
5-Feb	1.6	1.6	1.4	0.8	1.9	2.1	1.3	0.4	0.3	0.2	0.3	0.5	0.7	0.8	1.0	1.2	1.5	1.4	1.7	1.5	1.3	1.2	1.2	1.7	2.1	
6-Feb	1.6	1.8	2.1	1.9	1.6	1.4	1.5	1.5	1.1	1.4	1.7	1.8	1.6	1.9	1.8	1.8	2.0	2.1	2.2	1.9	1.7	1.8	1.8	2.0	2.2	
7-Feb	1.9	2.7	2.3	1.9	2.0	2.2	2.5	2.4	2.4	2.4	2.3	2.4	2.2	1.9	1.9	1.9	1.9	1.6	1.3	1.0	0.7	0.3	0.5	0.4	2.7	
8-Feb	0.7	0.7	1.1	1.2	1.9	1.8	1.6	0.9	0.5	0.2	0.4	1.3	1.0	1.1	0.7	0.9	0.8	0.7	0.6	0.7	0.5	0.6	0.7	0.5	1.9	
9-Feb	0.4	0.7	0.8	0.7	0.7	0.9	1.1	1.0	1.1	0.8	0.7	0.8	0.8	1.1	1.0	1.1	0.9	0.8	1.1	0.8	0.7	1.0	1.3	0.8	1.3	
10-Feb	1.2	1.1	1.5	1.8	2.4	2.1	2.2	1.5	1.3	1.9	1.5	1.4	2.1	1.9	1.7	1.5	1.0	1.6	2.0	1.8	1.7	1.8	1.4	0.9	2.4	
11-Feb	0.7	0.6	0.3	0.2	0.2	0.3	0.5	0.6	0.8	1.2	1.2	1.4	1.4	1.6	2.2	2.4	3.1	3.1	3.1	2.8	3.2	3.4	2.7	2.1	3.4	
12-Feb	1.3	1.1	1.0	0.8	0.4	0.5	0.5	0.7	0.5	0.7	0.8	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.6	1.6	2.0	1.6	1.5	1.8	2.0	
13-Feb	1.9	1.8	1.4	1.7	1.6	1.7	1.4	1.6	1.5	1.5	1.5	1.5	1.9	1.8	1.9	2.0	2.3	2.8	2.7	2.7	3.5	3.3	3.1	3.5	3.5	
14-Feb	3.3	3.2	3.6	3.7	3.6	3.4	3.5	3.1	2.9	2.7	2.7	3.0	2.9	2.5	1.8	1.5	1.4	1.2	1.6	2.1	2.3	1.7	1.6	1.3	3.7	
15-Feb	1.3	1.1	1.2	1.2	1.2	1.8	1.7	1.8	1.8	1.8	1.6	1.6	1.9	1.5	1.5	1.6	1.7	1.5	2.1	2.2	2.4	2.2	2.1	1.7	2.4	
16-Feb	1.9	1.9	2.0	1.8	1.7	1.5	1.4	1.0	1.0	1.0	0.7	0.9	1.6	1.7	1.1	0.8	0.6	0.3	0.3	0.4	0.4	0.2	0.2	0.3	2.0	
17-Feb	0.3	0.2	0.2	0.4	0.3	0.4	0.2	0.2	0.4	0.7	0.9	0.8	1.5	1.2	1.3	1.3	1.0	0.7	0.7	1.0	1.0	1.1	1.2	1.3	1.5	
18-Feb	1.6	1.2	1.2	1.3	1.2	1.0	1.1	1.3	1.6	1.1	1.1	1.5	1.6	1.6	1.3	1.3	1.1	1.2	1.4	1.3	1.3	1.4	1.2	1.0	1.6	
19-Feb	0.9	0.7	0.8	0.6	0.8	0.9	1.0	0.9	0.9	0.7	0.6	0.9	1.0	0.9	0.9	0.9	1.1	1.4	1.9	2.7	3.0	2.8	3.1	3.1	3.1	
20-Feb	3.0	3.5	3.2	2.8	2.6	2.5	2.5	2.4	2.0	2.1	1.9	1.8	1.9	2.4	2.2	1.6	1.3	1.3	1.9	2.5	2.7	1.9	1.1	0.9	3.5	
21-Feb	1.1	1.1	1.0	1.3	1.1	1.3	1.0	1.3	1.2	1.0	0.9	1.0	1.5	1.2	1.3	1.3	1.3	0.9	0.4	0.9	1.0	1.4	1.6	1.7	1.7	
22-Feb	1.5	1.5	1.6	1.4	1.1	0.8	1.0	1.0	1.1	1.2	1.2	1.7	2.1	2.0	1.8	1.0	1.1	1.8	1.2	2.0	1.7	2.2	1.9	2.1	2.2	
23-Feb	1.6	1.7	1.6	1.1	1.6	2.0	2.9	2.8	2.0	1.5	1.6	2.4	1.6	1.7	1.7	2.1	2.5	2.4	2.8	2.6	2.5	2.1	1.7	1.5	2.9	
24-Feb	1.5	1.1	1.8	1.4	1.5	1.7	1.5	1.2	1.6	1.7	1.5	1.8	1.7	1.2	1.2	1.9	1.8	2.4	2.8	3.3	2.7	2.7	2.5	2.0	3.3	
25-Feb	1.3	1.3	1.3	0.9	0.8	0.6	0.6	0.6	0.6	0.4	0.6	0.9	0.6	1.1	1.0	0.7	0.8	0.6	0.4	0.2	0.3	0.4	0.5	0.5	1.3	
26-Feb	0.8	1.0	1.2	0.7	0.8	0.6	0.5	0.4	0.8	1.1	1.4	1.6	1.5	1.5	1.3	1.7	1.2	0.4	0.6	1.4	1.7	2.1	2.0	1.8	2.1	
27-Feb	2.0	2.0	1.7	1.7	1.6	1.7	1.7	1.3	0.9	0.7	0.9	1.1	1.5	1.1	1.4	1.1	0.9	0.6	0.3	0.6	0.7	0.8	0.6	0.7	2.0	
28-Feb	0.6	0.6	0.7	1.4	1.6	1.7	1.5	1.2	1.3	1.9	1.8	1.8	1.9	2.0	1.6	1.4	1.0	1.7	1.5	3.1	2.9	2.4	1.7	1.2	3.1	
	3.3	3.5	3.6	3.7	3.6	3.4	3.5	3.1	2.9	2.7	2.7	3.0	2.9	2.5	2.2	2.4	3.1	3.1	3.1	3.3	3.5	3.4	3.1	3.5		
	Diurnal Maximum																									
AF - Analyzer Failure																										



Summary of Hour Averages

Mannix - February 2015

Maximum Value: 1.9 km/h on Feb 4 08:00		Maximum Daily Average: 0.5 km/h on Feb 20		Hours in Service: 672																						
Minimum Value: -0.8 km/h on Feb 14 01:00		Minimum Daily Average: -0.2 km/h on Feb 7		Hours of Data: 620																						
Maximum Diurnal Average: 0.3 km/h at hour 14		Minimum Diurnal Average: 0.1 km/h at hour 18		Hours of Missing Data: 52																						
Monthly Average: 0.19 km/h		Percentiles: P <sub>1</sub> = -0.5 P <sub>10</sub> = -0.3 Q <sub>1</sub> = -0.1 Median = 0.1 Q <sub>3</sub> = 0.4 P <sub>90</sub> = 0.7 P <sub>99</sub> = 1.3		Hours of Calibration: 0																						
				Percent Operational Time: 92.3																						
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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
3-Feb	AF	AF	AF	AF	-0.2	-0.2	0.0	0.0	-0.4	0.7	-0.2	0.1	0.1	-0.3	0.3	0.6	0.2	0.4	1.2	1.5	1.5	0.8	1.2	1.2	0.4	1.5
4-Feb	1.3	1.4	1.3	0.8	0.4	0.6	1.0	1.9	1.3	0.6	-0.3	-0.4	-0.1	0.4	0.3	0.1	0.0	0.0	-0.2	0.0	0.1	-0.1	0.3	0.0	0.4	1.9
5-Feb	-0.3	-0.2	-0.1	-0.4	0.2	0.2	0.0	0.2	-0.1	0.0	0.1	-0.1	0.0	0.2	0.0	-0.1	0.4	0.3	0.4	0.1	0.4	0.3	0.3	0.3	0.1	0.4
6-Feb	0.1	0.3	0.6	0.5	0.5	0.2	0.3	0.2	0.0	-0.1	0.2	0.9	0.9	1.0	1.0	0.8	0.8	0.7	0.7	0.3	0.2	0.1	0.0	0.1	0.4	1.0
7-Feb	0.4	-0.1	-0.3	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.5	-0.8	-0.5	-0.3	-0.5	-0.3	-0.5	0.2	0.1	0.2	-0.1	0.1	0.1	-0.1	-0.1	-0.2	0.4
8-Feb	0.0	-0.1	0.1	0.1	0.4	-0.2	-0.2	0.0	0.1	0.2	0.0	0.4	0.1	0.1	-0.3	0.3	0.2	0.2	0.1	0.3	0.0	0.3	0.3	0.2	0.1	0.4
9-Feb	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	-0.1	0.2	0.0	0.3	0.1	-0.1	0.0	-0.1	0.0	0.1	-0.2	0.1	0.1	0.3
10-Feb	0.1	0.1	-0.3	0.0	0.7	0.5	0.4	0.2	0.2	-0.7	-0.2	0.0	0.6	1.1	0.7	0.0	-0.2	0.4	0.3	0.2	0.2	0.3	-0.3	-0.1	0.2	1.1
11-Feb	0.0	0.1	0.0	0.1	-0.1	0.1	0.2	0.7	0.7	0.3	0.2	0.2	0.1	0.3	0.2	-0.2	-0.2	-0.2	-0.1	0.0	-0.1	0.4	0.3	0.4	0.1	0.7
12-Feb	0.4	0.3	0.3	0.2	0.0	0.0	-0.3	-0.4	-0.4	-0.2	0.2	-0.1	-0.1	0.0	0.6	0.2	0.1	0.0	0.2	0.4	0.1	0.2	0.1	0.0	0.1	0.6
13-Feb	0.3	0.1	-0.1	-0.1	0.1	0.2	0.0	0.3	0.0	0.2	0.1	0.2	0.6	0.2	0.1	0.5	0.5	0.2	-0.3	-0.3	-0.5	-0.4	-0.2	-0.5	0.1	0.6
14-Feb	-0.8	-0.4	-0.8	-0.6	-0.6	-0.1	-0.1	-0.1	0.1	0.0	0.0	0.3	0.4	0.5	0.6	0.5	0.5	0.0	0.1	0.2	0.1	0.1	0.5	0.0	0.0	0.6
15-Feb	0.1	0.4	0.3	0.2	0.3	0.4	0.5	0.0	-0.3	0.2	0.5	0.1	0.4	0.7	0.4	0.3	0.3	0.1	0.3	0.7	0.3	0.4	0.5	0.0	0.3	0.7
16-Feb	0.4	0.7	0.7	-0.2	-0.1	0.0	0.1	0.6	-0.3	0.2	-0.3	-0.3	0.3	0.6	-0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.2	0.2	0.1	0.7
17-Feb	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.5	0.4	0.3	0.3	-0.1	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.3	0.0	0.5
18-Feb	-0.2	0.0	-0.1	0.0	-0.1	0.0	0.2	-0.1	-0.3	-0.3	-0.3	0.3	0.4	0.1	-0.2	-0.2	-0.3	-0.2	-0.2	-0.2	0.0	0.3	0.5	0.3	0.0	0.5
19-Feb	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.3	0.1	0.1	0.1	0.4	0.2	-0.1	0.2	0.2	0.0	0.3	0.6	0.6	0.8	-0.2	0.3	0.5	0.3	0.8
20-Feb	0.5	0.5	0.8	0.5	0.9	0.8	1.0	0.9	0.7	0.6	0.4	0.7	0.1	0.6	0.7	0.5	0.1	0.6	0.7	0.3	0.2	0.3	0.3	0.2	0.5	1.0
21-Feb	-0.3	-0.2	0.0	-0.3	-0.2	0.1	-0.3	-0.5	-0.1	0.1	-0.1	0.3	0.9	0.8	0.5	0.6	0.1	0.1	0.6	0.5	0.7	1.0	1.1	1.3	0.3	1.3
22-Feb	1.0	0.9	1.2	1.0	0.8	0.6	1.0	0.9	1.3	0.6	0.5	0.2	0.5	0.6	0.5	0.5	-0.1	-0.5	-0.2	-0.4	-0.5	0.2	-0.4	0.3	0.4	1.3
23-Feb	0.1	0.0	-0.1	-0.3	-0.1	0.0	0.1	0.2	0.1	0.3	0.4	0.3	0.6	0.2	0.7	0.4	0.5	0.3	0.3	-0.1	0.6	0.8	0.6	0.6	0.3	0.8
24-Feb	0.9	-0.3	0.2	-0.1	-0.5	0.0	-0.1	0.1	0.5	0.7	0.7	0.9	0.9	0.5	0.2	0.5	-0.3	-0.1	0.5	0.9	0.7	0.3	0.1	0.0	0.3	0.9
25-Feb	0.0	-0.2	-0.3	0.1	0.4	0.0	-0.1	-0.1	0.2	0.1	0.0	0.3	-0.4	0.2	0.2	0.3	0.2	0.1	0.0	0.2	0.5	0.6	0.9	0.6	0.2	0.9
26-Feb	0.7	0.8	0.9	0.7	1.2	1.2	0.5	0.6	1.0	1.0	0.6	0.6	0.7	0.4	0.2	-0.3	-0.3	0.0	0.1	-0.3	0.5	0.2	0.4	0.4	0.5	1.2
27-Feb	0.3	0.2	0.0	0.2	0.2	0.2	0.6	0.3	0.1	0.0	0.0	-0.1	0.3	0.5	0.7	0.1	0.3	-0.3	-0.4	-0.4	-0.3	-0.5	-0.4	-0.3	0.1	0.7
28-Feb	0.1	-0.2	-0.2	-0.3	-0.2	0.0	-0.1	0.0	-0.1	0.1	0.2	-0.1	0.0	-0.2	-0.2	0.2	0.0	-0.1	0.0	-0.5	0.0	-0.2	0.3	0.4	0.0	0.4
																								Diurnal Average		
																								Diurnal Maximum		
0.2 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.2 0.3 0.3 0.3 0.2 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2																										
1.3 1.4 1.3 1.0 1.2 1.2 1.0 1.9 1.3 1.0 0.7 0.9 0.9 1.1 1.0 0.8 0.8 0.7 1.2 1.5 1.5 1.0 1.2 1.3																										
AF - Analyzer Failure																										



Summary of Hour Standard Deviations

Mannix - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 3.7 km/h on Feb 14 04:00	Hours of Data: 620
Minimum Value: 0.2 km/h on Feb 11 06:00	Hours of Missing Data: 52
Percentiles: P <sub>1</sub> = 0.2 P <sub>10</sub> = 0.5 Q <sub>1</sub> = 0.8 Median = 1.3 Q <sub>3</sub> = 1.8 P <sub>90</sub> = 2.4 P <sub>99</sub> = 3.2	Hours of Calibration: 0
	Percent Operational Time: 92.3

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

Diurnal Maximum

AF - Analyzer Failure





Summary of Hour Averages

Mannix - February 2015

Maximum Value: 4.7 km/h on Feb 23 07:00		Maximum Daily Average: 1.9 km/h on Feb 23		Hours in Service: 672																							
Minimum Value: -1.7 km/h on Feb 13 21:00		Minimum Daily Average: -0.6 km/h on Feb 7		Hours of Data: 638																							
Maximum Diurnal Average: 0.9 km/h at hour 2		Minimum Diurnal Average: 0.2 km/h at hour 17		Hours of Missing Data: 34																							
Monthly Average: 0.60 km/h		Percentiles: $P_1 = -1.1$ $P_{10} = -0.4$ $Q_1 = 0.0$ Median = 0.4 $Q_3 = 1.0$ $P_{90} = 2.0$ $P_{99} = 3.5$		Hours of Calibration: 0																							
				Percent Operational Time: 94.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--	
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.3	1.5	1.3	0.8	0.7	0.6	0.8	1.9	1.8	1.3	2.0	2.7	2.7	2.0	--	2.7	
3-Feb	1.8	1.4	2.0	0.7	-0.2	-0.2	-0.1	0.0	-0.1	0.8	-0.1	0.5	0.9	0.0	0.2	0.2	-0.1	0.7	1.6	2.3	2.6	2.3	2.5	2.5	0.9	2.6	
4-Feb	2.4	2.4	2.2	1.4	0.9	1.4	1.7	2.8	1.5	0.8	1.6	2.3	2.6	3.2	2.7	0.7	0.0	0.8	1.0	0.9	0.6	0.2	1.4	1.3	1.5	3.2	
5-Feb	1.8	2.1	2.0	1.5	1.7	1.1	0.2	0.8	0.4	0.4	0.3	0.1	-0.2	0.0	-0.3	-0.2	-0.1	0.0	0.0	-0.2	-0.2	-0.1	0.0	0.1	0.5	2.1	
6-Feb	-0.2	0.0	0.2	0.0	0.2	0.0	0.2	0.1	-0.1	-0.2	-0.2	0.4	0.4	0.3	0.4	0.1	-0.1	-0.1	-0.1	-0.4	-0.5	-0.6	-0.9	-0.9	-0.1	0.4	
7-Feb	-0.5	-0.9	-0.9	-0.7	-0.4	-1.0	-1.2	-1.1	-0.8	-0.8	-1.1	-0.8	-1.0	-1.0	-0.5	-0.7	0.2	0.0	0.0	-0.4	-0.2	0.1	0.2	0.1	-0.6	0.2	
8-Feb	0.1	0.1	0.2	-0.1	0.3	-0.4	-0.5	-0.3	-0.2	0.1	0.1	0.3	-0.1	-0.2	-0.4	0.1	-0.1	-0.1	-0.1	0.1	0.3	0.2	0.2	0.0	0.0	0.3	
9-Feb	0.2	0.0	0.0	0.2	0.2	0.3	0.2	0.5	0.3	0.3	0.3	0.2	0.3	0.7	0.5	0.6	0.7	0.5	0.5	0.3	0.7	0.8	0.8	0.7	0.4	0.8	
10-Feb	0.8	0.8	0.5	0.2	1.0	0.5	0.3	0.4	1.1	0.4	0.7	1.1	1.8	2.4	1.6	0.3	0.2	0.8	0.0	0.0	0.2	0.4	-0.2	-0.3	0.6	2.4	
11-Feb	-0.1	0.1	-0.1	0.0	0.1	0.3	0.3	1.0	1.4	0.9	0.3	0.7	0.8	0.6	0.3	0.1	0.1	-0.1	0.1	0.3	0.4	0.8	0.7	0.8	0.4	1.4	
12-Feb	1.0	0.9	0.7	0.7	0.5	0.2	0.4	0.9	0.6	0.7	0.5	0.6	0.5	0.1	0.4	0.0	0.0	-0.1	0.2	0.4	-0.1	-0.1	0.0	0.1	0.4	1.0	
13-Feb	0.1	-0.2	-0.1	0.0	0.1	0.1	0.0	0.2	0.0	0.0	0.1	0.0	-0.1	-0.5	-0.4	-0.2	-0.6	-0.8	-1.2	-1.1	-1.7	-1.7	-0.9	-0.8	-0.4	0.2	
14-Feb	-1.1	-0.9	-0.9	-0.5	-0.3	0.2	0.2	0.1	0.5	0.3	0.5	0.8	1.1	1.3	1.2	1.1	1.2	1.1	0.9	0.3	0.1	0.3	0.7	-0.1	0.3	1.3	
15-Feb	-0.1	0.1	-0.1	-0.1	0.0	0.1	0.2	-0.3	-0.7	0.1	0.3	0.3	0.9	1.0	0.8	0.4	0.1	-0.1	0.4	0.7	0.3	0.9	1.2	-0.2	0.3	1.2	
16-Feb	1.0	1.1	0.7	-0.3	-0.2	0.1	0.7	1.4	-0.1	0.2	-0.3	0.1	1.1	1.6	0.2	0.0	0.0	0.2	0.2	1.0	0.9	1.3	2.3	1.7	0.6	2.3	
17-Feb	1.1	0.8	0.4	0.3	0.2	0.1	0.1	0.3	0.3	0.0	0.6	1.0	0.8	0.6	0.0	-0.6	-0.2	-0.5	-0.8	-0.5	-0.7	-0.4	-0.6	-1.0	0.1	1.1	
18-Feb	-1.0	-0.3	-0.5	-0.5	-0.3	-0.2	-0.1	-0.4	-1.1	-0.9	-0.5	-0.3	-0.1	-0.5	-0.3	-0.4	-0.3	-0.5	-0.2	-0.3	0.1	0.6	0.9	0.6	-0.3	0.9	
19-Feb	0.6	0.7	0.6	0.5	1.0	0.9	1.0	0.8	0.4	0.1	0.1	0.6	0.2	0.0	0.7	1.3	0.6	0.7	0.8	1.3	1.4	0.1	1.2	1.1	0.7	1.4	
20-Feb	0.8	2.0	2.2	1.9	2.0	1.9	2.0	1.7	1.1	0.3	0.1	0.5	0.2	1.4	1.2	1.1	0.4	0.8	0.6	0.5	0.5	0.6	0.6	0.9	1.0	2.2	
21-Feb	0.4	0.5	0.6	0.2	0.3	0.2	-0.3	-0.7	0.0	0.6	0.1	0.1	0.6	0.7	0.1	0.1	-0.3	0.5	1.1	1.6	1.8	2.0	2.1	2.6	0.6	2.6	
22-Feb	2.0	2.0	2.5	2.1	1.9	1.7	1.9	2.0	2.4	1.7	1.4	0.9	1.5	1.6	1.5	1.6	0.9	0.9	1.0	0.7	0.8	2.8	3.2	4.5	1.8	4.5	
23-Feb	4.6	4.3	3.8	3.5	4.5	3.8	4.7	3.9	3.1	1.9	2.6	2.1	0.4	0.2	1.2	0.6	0.3	0.0	0.2	-0.4	0.0	0.0	-0.3	0.0	1.9	4.7	
24-Feb	0.2	-0.7	-0.7	-0.9	-1.1	-0.9	-0.9	-0.4	-0.2	-0.2	0.0	0.1	0.3	0.3	0.3	0.1	-0.2	0.5	1.5	1.8	1.8	1.6	0.6	0.6	0.1	1.8	
25-Feb	0.9	0.9	0.5	0.8	0.7	0.5	0.3	0.5	0.5	0.7	0.1	0.2	0.0	0.3	0.3	0.1	-0.1	-0.2	-0.2	0.5	0.8	1.2	1.5	1.4	0.5	1.5	
26-Feb	1.5	2.0	2.0	1.7	2.1	2.0	1.6	1.7	1.9	1.9	1.4	1.3	1.4	0.8	0.9	1.3	1.1	0.9	1.7	0.9	0.7	0.3	0.5	0.7	1.3	2.1	
27-Feb	1.2	1.2	0.0	0.2	-0.1	0.0	0.3	-0.1	0.2	0.3	0.3	0.0	0.4	0.2	0.2	-0.1	1.0	0.5	0.5	0.5	1.0	0.8	1.1	1.9	0.5	1.9	
28-Feb	2.6	2.0	2.0	2.1	2.3	3.3	3.3	3.2	3.0	3.0	2.5	1.6	1.3	1.0	0.9	1.0	1.1	1.5	0.8	0.5	1.3	1.2	0.7	0.2	1.8	3.3	
		0.9	0.9	0.8	0.6	0.7	0.6	0.6	0.7	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.3	0.2	0.4	0.5	0.5	0.6	0.7	0.8	0.8	Diurnal Average	
		4.6	4.3	3.8	3.5	4.5	3.8	4.7	3.9	3.1	3.0	2.6	2.3	2.6	3.2	2.7	1.6	1.2	1.9	1.8	2.3	2.6	2.8	3.2	4.5	Diurnal Maximum	
AF - Analyzer Failure																											



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 3.5 km/h on Feb 14 04:00	Hours of Data: 638
Minimum Value: 0.2 km/h on Feb 11 06:00	Hours of Missing Data: 34
Percentiles: $P_1 = 0.2$ $P_{10} = 0.5$ $Q_1 = 0.8$ Median = 1.2 $Q_3 = 1.8$ $P_{90} = 2.3$ $P_{99} = 3.2$	Hours of Calibration: 0
	Percent Operational Time: 94.9

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

Diurnal Maximum

AF - Analyzer Failure



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 19, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	16:08
Barometric Pressure	730 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	26-Sep-17
Gas Cert Reference	S960161A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range		DACS channel #	N/A

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-634	-634
Analyzer Range (mv)	1000	1000	Lamp voltage	879	877
Calculated slope	1.002447	0.995077	Chamber temp.	44.9	44.9
Calculated intercept	0.009385	0.038451	Pressure (mmHg)	693.1	690.0
Analyzer Background	6.9	7.4	Flow (lpm)	0.470	0.465
Analyzer Coefficient	0.976	1.022	Intensity	90	90

Analyzer make TEI 43i Analyzer serial # 1008841399

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	NA
as found span	5000	60.0	600.0	601.5	0.997
calibrator zero	5000	0.0	0.0	0.0	0.000
high point	5000	60.0	600.0	602.4	0.996
second point	5000	30.0	300.0	303.2	0.989
third point	5000	15.0	150.0	149.4	1.004
calibrator zero					
as left zero	5000	0.0	0.0	0.2	0.000
as left span	5000	58.8	588.0	602.5	0.976
Average Correction Factor					0.996

Corrected As found 601.4 Previous response 598.5 % change -0.5%

#### Notes:

Cal gas changed after As Finds. Zero and span adjusted. Filter changed after third point. THC pump change causing long zero after As Finds

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

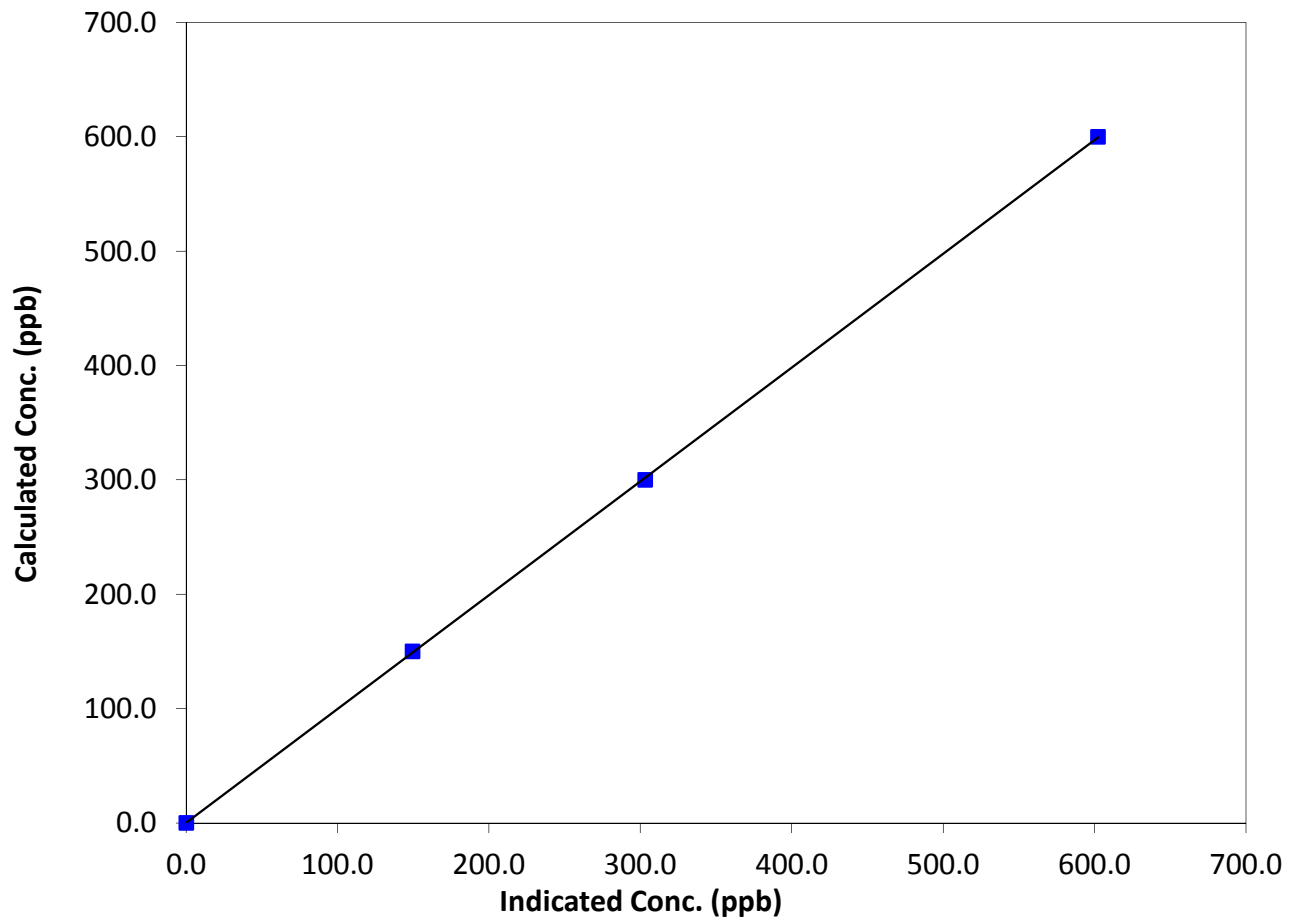
### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 19, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:00	End Time (MST)	16:08
Analyzer make	TEI 43i	Analyzer serial #	1008841399

### Calibration Data

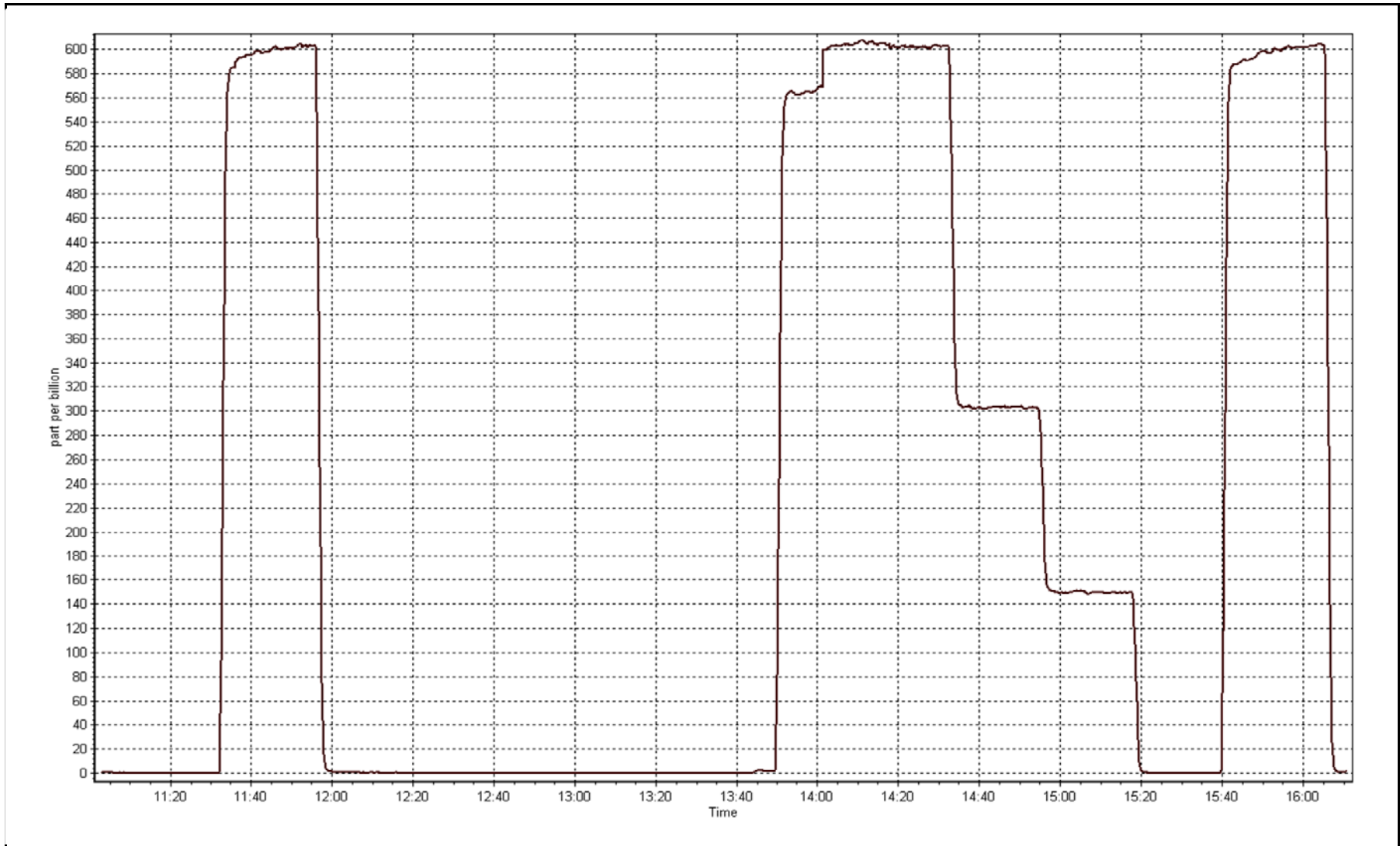
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999975
600.0	602.4	0.9961		
300.0	303.2	0.9894	Slope	0.995077
150.0	149.4	1.0037		
			Intercept	0.038451

### SO<sub>2</sub> Calibration Curve



SO2 Calibration Plot

Date: February 4, 2015





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 16, 2015
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	14:40
Barometric Pressure	725 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11061107
Cal Gas Concentration	5.04 ppm H2S	Cal Gas Expiry Date	9-Sep-17
Gas Cert Reference	CC62844	SO2 gas conc.	50.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	28

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-624	-624
Analyzer Range (ppb)	100	100	Lamp voltage	893	886
Calculated slope	0.996100	1.009352	Chamber temp.	45	45
Calculated intercept	-0.003816	-0.304998	Pressure	498.9	515.0
Analyzer Background	14.6	16.7	Flow	1.039	1.063
Analyzer Coefficient	1.144	1.29	Intensity (%)	115	115
			Converter temp.	323	323

Analyzer make/model	TEI 450i	Analyzer serial #	815129108
Converter make/model	N/A	Converter serial #	N/A

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.11	NA
as found span	5000	36.8	75.0	78.8	0.952
SO2 scrubber check	5000	30.0	300.0	5.0	NA
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	74.4	75.0	74.5	1.007
second point	5000	41.7	42.0	42.1	1.000
third point	5000	24.8	25.0	25.2	0.992
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	36.8	75.0	74.6	1.006
Average Correction Factor					0.999

Corrected As found	78.7	Previous response	75.3	% change	-4.3%
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#### Notes:

Very dry air led to unstable scrubber check and elevated baseline (performed after initial zero); time given to stabilize baseline. Cal gas change after As Finds. Filter changed after third point.

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## H2S Calibration Summary

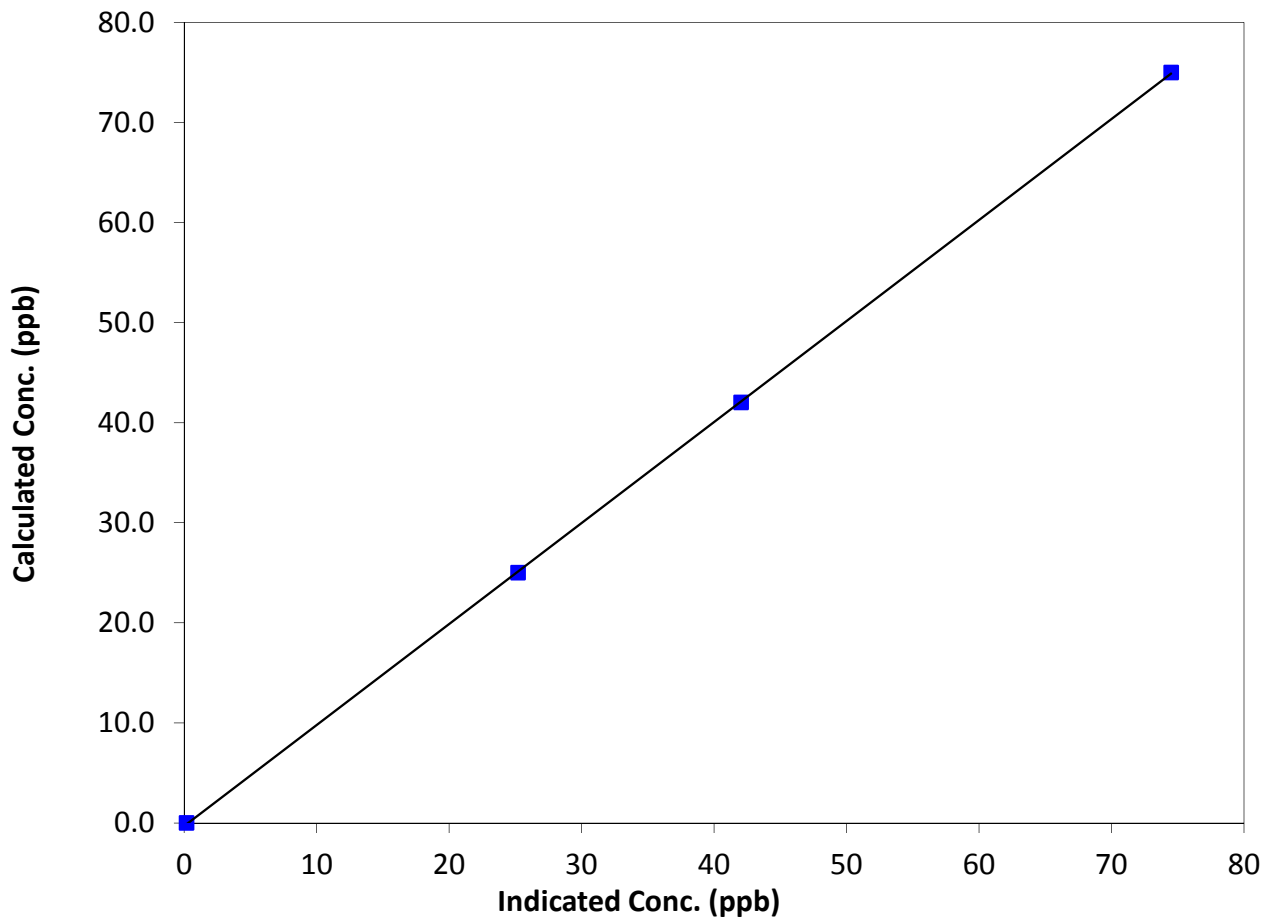
### Station Information

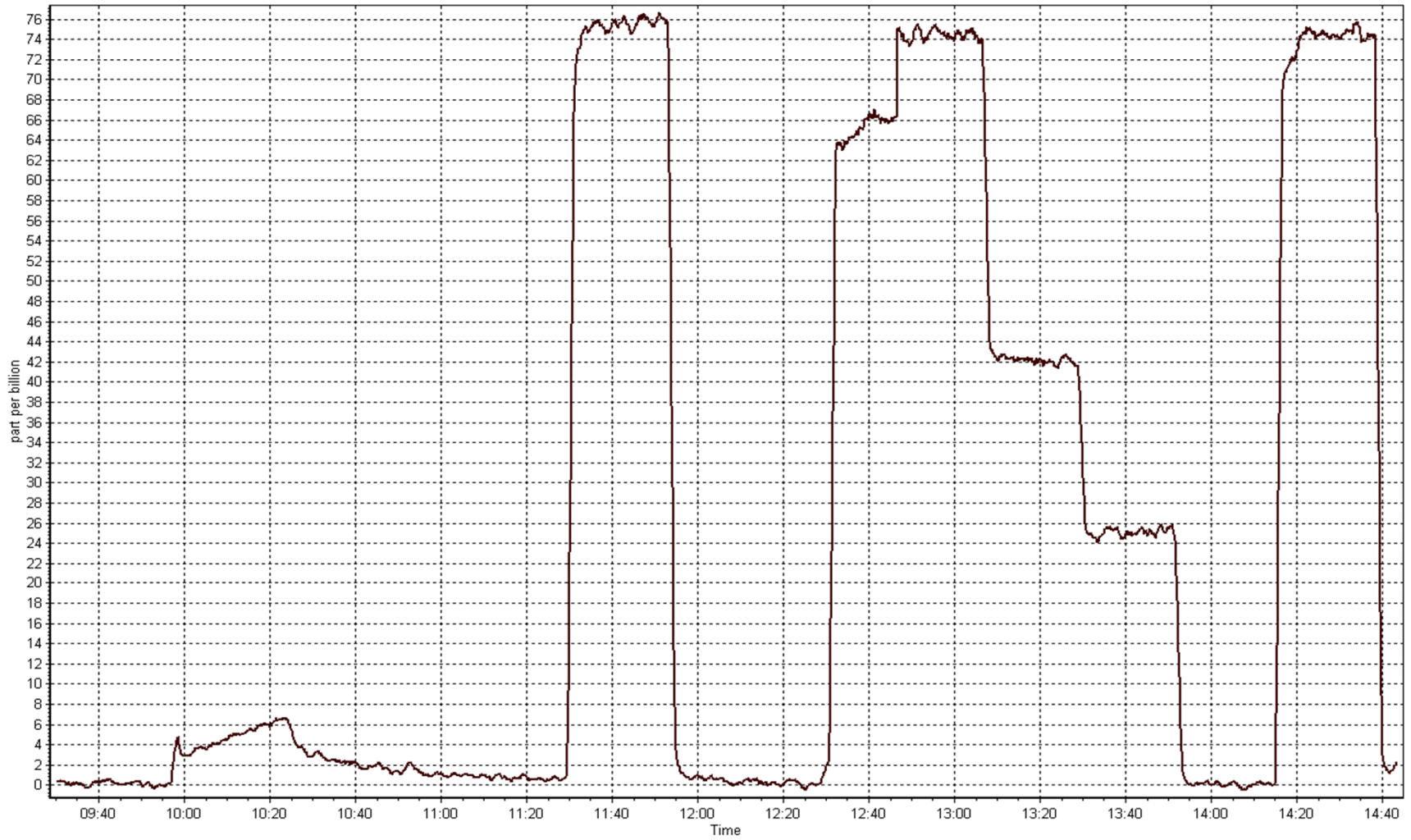
Calibration Date	February 6, 2015	Previous Calibration	January 16, 2015
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	9:25	End Time (MST)	14:40
Analyzer make	TEI 450i	Analyzer serial #	815129108

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999981
75.0	74.5	1.0066		
42.0	42.1	0.9996	Slope	1.009352
25.0	25.2	0.9920		
			Intercept	-0.304998

### H2S Calibration Curve









# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Wednesday, February 05, 2014	Previous Calibration	Tuesday, February 04, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Other: <input type="checkbox"/> repair		
Start Time (MST)	10:25	End Time (MST)	14:28
Barometric Pressure	740 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	S960161A	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.5	9.4
Analyzer Range (ppm)	25	25	Air	42.3	42.3
Calculated slope	1.002973	1.009054	Fuel Pressure	20.2	20.2
Calculated intercept	-0.041775	-0.072550	Detector Temp	125.1	124.9
Bkg	2.46	3.49	Flame Temp	161.8	158.7
Slope	2.354	3.722			

Analyzer make TEI 51i-LT Analyzer serial # 1317958295

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	-0.02	N/A
as found span	5000	60.0	12.46	14.98	0.832
calibrator zero	5000	0.0	0.00	0.05	N/A
high point	5000	60.0	12.46	12.40	1.005
2nd point	5000	30.0	6.23	6.27	0.993
3rd point	5000	15.0	3.11	3.17	0.982
calibrator zero					
as left zero	5000	0.0	0.00	0.14	N/A
as left span	5000	58.8	12.21	12.36	0.988
Average Correction Factor					0.993

Corrected As found 15.00 Previous response 12.46 % change -16.9%

#### Notes:

Calibration to address the rising span since yesterdays calibration. Sample flow adjusted from 11.5 to 9.4 psi. Also replaced coaxial cable to input board of oven

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

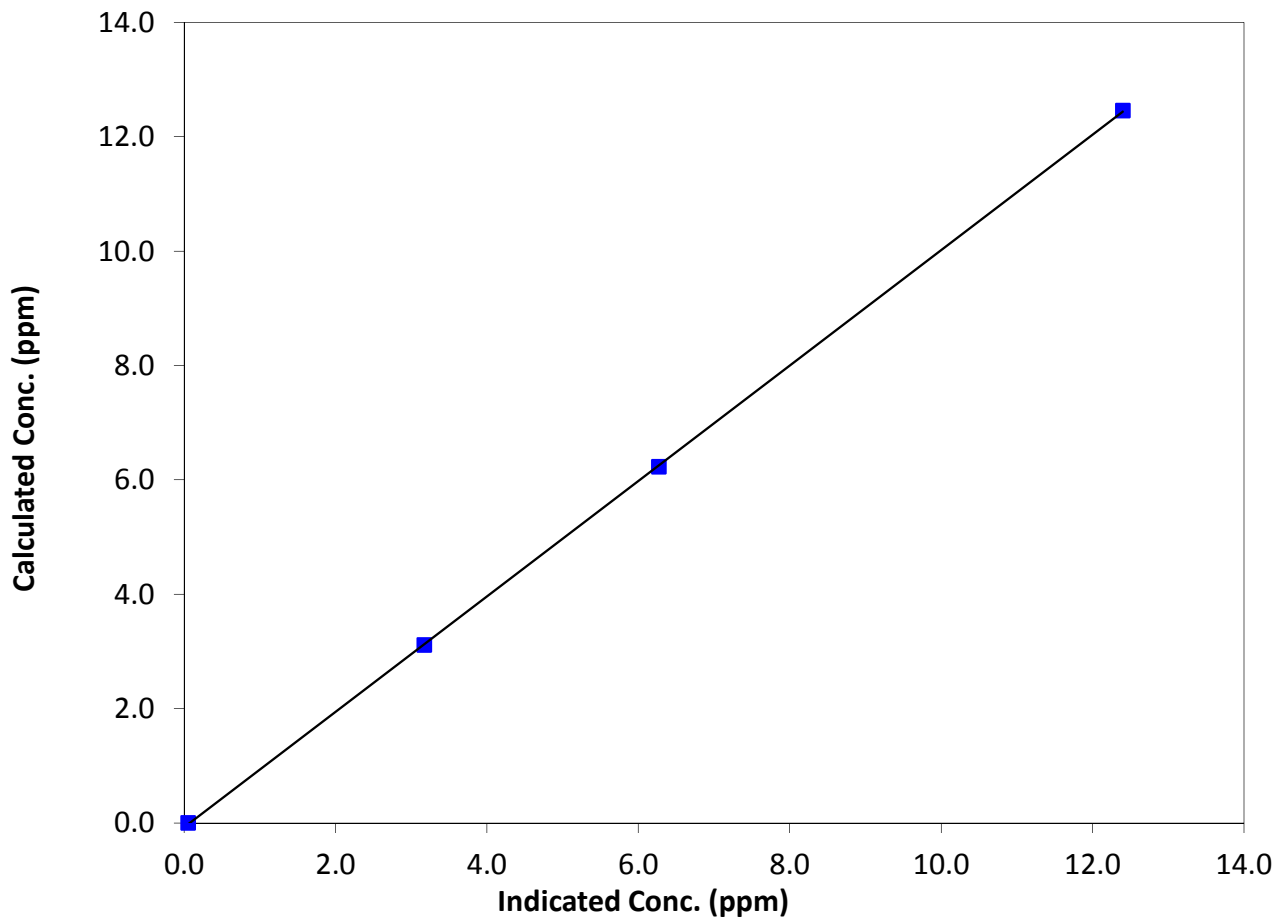
### Station Information

Calibration Date	February 5, 2014	Previous Calibration	February 4, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	10:25	End Time (MST)	14:28
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

### Calibration Data

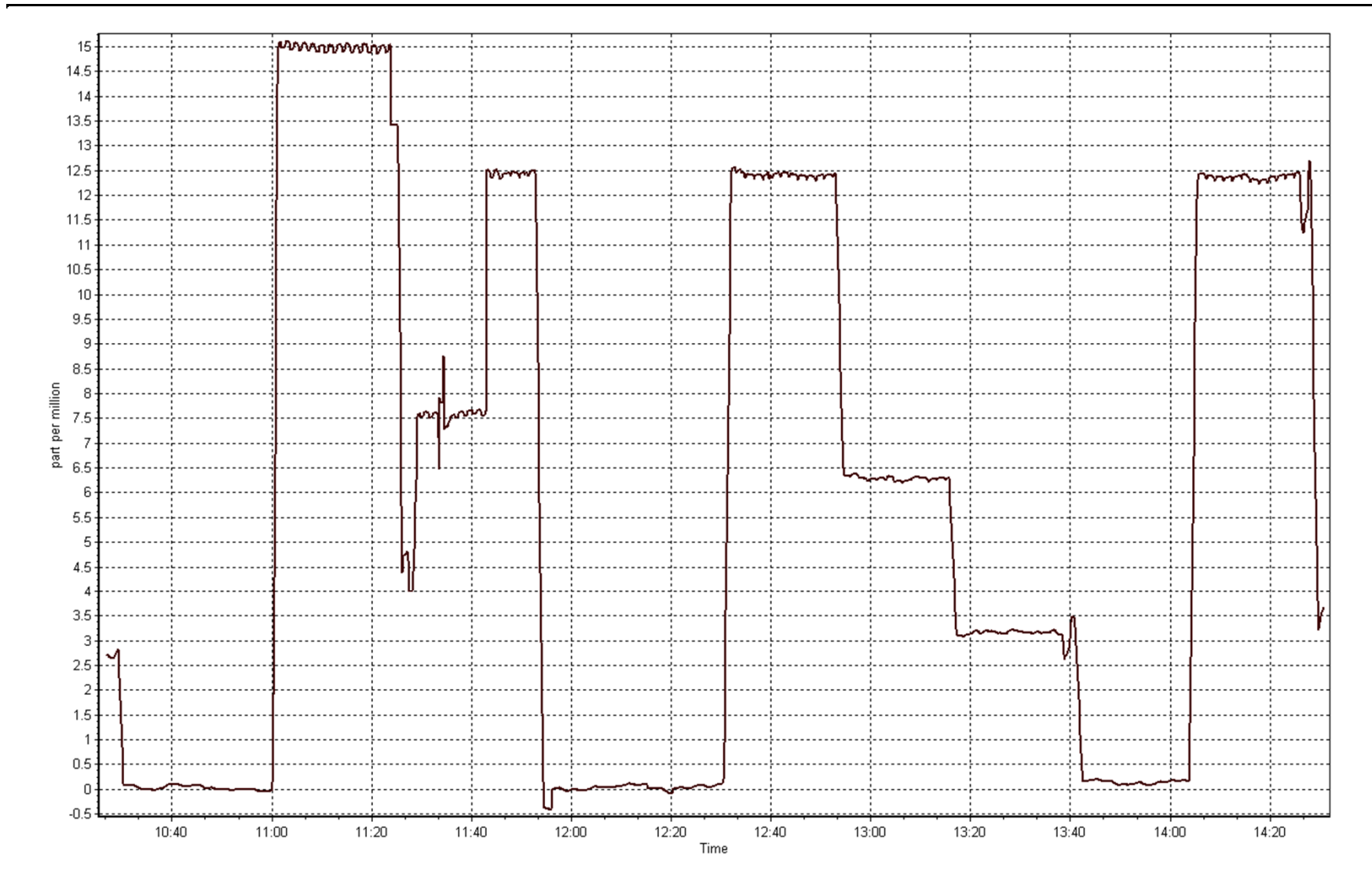
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	N/A	Correlation Coefficient	0.999981
12.46	12.40	1.0045		
6.23	6.27	0.9933	Slope	1.009054
3.11	3.17	0.9823		
			Intercept	-0.072550

### THC Calibration Curve



THC Calibration Plot

Date: February 5, 2014





# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Tuesday, February 04, 2014	Previous Calibration	Sunday, January 19, 2014
Station Name	Mannix	Station Number	AMS 5
Reason:	Routine		
Start Time (MST)	11:00	End Time (MST)	16:05
Barometric Pressure	740 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11061107
Gas Cert Reference	S960161A	Cal Gas Expiry Date	26-Sep-17
CH4 Cal Gas Conc.	499 ppm	CH4 Equiv Conc.	1038.0 ppm
C3H8 Cal Gas Conc.	196 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2633
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.6	11.5
Analyzer Range (ppm)	25	25	Air	42.3	42.3
Calculated slope	1.004916	1.002973	Fuel Pressure	20.2	20.2
Calculated intercept	-0.038088	-0.041775	Detector Temp	125.1	125.1
Bkg	1.91	2.46	Flame Temp	164.3	161.8
Slope	1.810	2.354			

Analyzer make TEI 51i-LT Analyzer serial # 1317958295

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.07	N/A
as found span	5000	58.8	12.72	12.55	1.014
calibrator zero	5000	0.0	0.00	0.01	N/A
high point	5000	60.0	12.46	12.43	1.002
2nd point	5000	30.0	6.23	6.31	0.987
3rd point	5000	15.0	3.11	3.15	0.989
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	58.8	12.21	12.99	0.940
Average Correction Factor					0.993

Corrected As found 12.48 Previous response 12.70 % change 1.7%

#### Notes:

Internal pump and cal gas changed after As Finds. Filter changed after third point

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

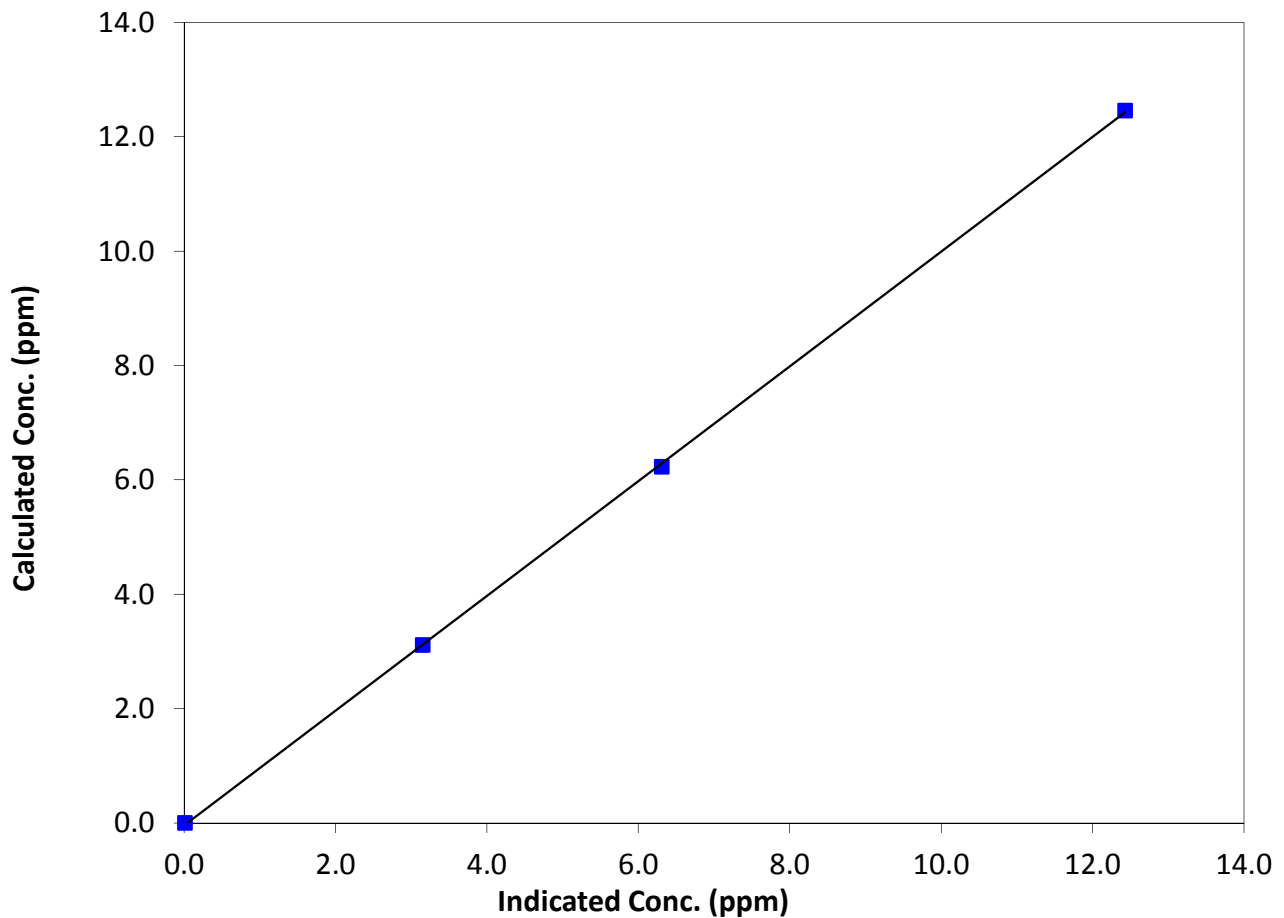
### Station Information

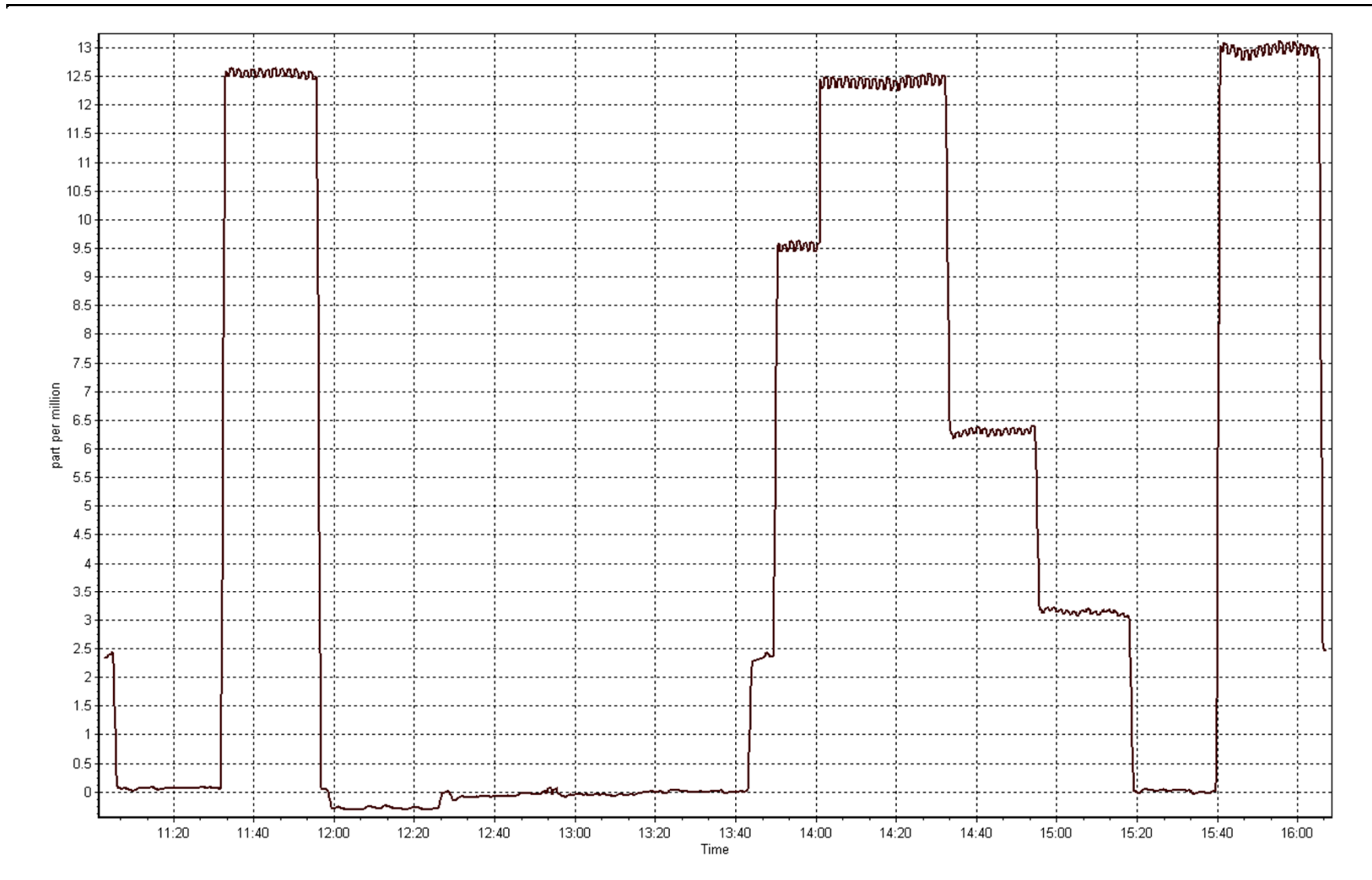
Calibration Date	February 4, 2014	Previous Calibration	January 19, 2014
Station Name	Mannix	Station Number	AMS 5
Start Time (MST)	11:00	End Time (MST)	16:05
Analyzer make	TEI 51i-LT	Analyzer serial #	1317958295

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	N/A	Correlation Coefficient	0.999936
12.46	12.43	1.0021		
6.23	6.31	0.9870	Slope	1.002973
3.11	3.15	0.9886		
			Intercept	-0.041775

THC Calibration Curve





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 6**  
**PATRICIA MCINNES**  
**FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
FEBRUARY 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	639	33	33	100.00	17	0	4	0
TRS (ppb) Average	611	34	61	95.98	1	0	1	0
THC (ppm) Average	638	33	34	99.85	2.4	-	2.2	-
NMHC(ppm) Average	638	33	34	99.85	0.078	-	0.004	-
CH4(ppm) Average	638	33	34	99.85	2.4	-	2.2	-
O3 (ppb) Average	637	32	35	99.55	42	0	37	-
NO2 (ppb) Average	639	33	33	100.00	36	0	24	-
NO (ppb) Average	639	33	33	100.00	32	-	9	-
NOX (ppb) Average	639	33	33	100.00	62	-	31	-
NH3 (ppb) Average	625	41	47	99.11	0	0	0	-
PM2.5 (ug/m3) Average	669	0	3	99.55	39	-	10.6	0
Temperature 2 m (C) Average	672	0	0	100.00	2.2	-	-1.7	-
Relative Humidity (%) Average	672	0	0	100.00	92	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	23	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
 FEBRUARY 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	639	1.4	2	-	0	0	0	1	1	4	17
TRS (ppb) Average	611	0.6	0	-	0	0	0	1	1	1	1
THC (ppm) Average	638	2	0.1	-	1.9	1.9	2	2	2	2.1	2.4
NMHC(ppm) Average	638	0.001	0.005	-	0	0	0	0	0	0	0.078
CH4(ppm) Average	638	2	0.1	-	1.9	1.9	2	2	2	2.1	2.4
O3 (ppb) Average	637	23.5	10	-	1	7	18	26	31	34	42
NO2 (ppb) Average	639	9.7	8	-	0	2	4	7	14	23	36
NO (ppb) Average	639	3.7	5	-	0	0	0	2	5	11	32
NOX (ppb) Average	639	13.3	12	-	0	2	5	9	19	32	62
NH3 (ppb) Average	625	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	669	4.84	3.6	-	0.6	1.7	2.5	3.8	6.1	9.1	39
Temperature 2 m (C) Average	672	-16.72	7.6	-	-37.5	-25.5	-22.2	-17	-11.8	-6.5	2.2
Relative Humidity (%) Average	672	73	8	-	43	60	70	75	78	81	92
Wind Speed 10 m (km/h) Average	672	10	5	-	1	4	6	10	13	17	23
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

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

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	07 Feb 2015 04:00	08 Feb 2015 04:00	25	Analyzer failure - Daily QA check failure
TRS	09 Feb 2015 13:00	09 Feb 2015 14:00	2	Maintenance on daily zero and span system - verify response
NMHC, CH4, THC	01 Feb 2015 01:00	01 Feb 2015 01:00	1	Unstable operation
O3	09 Feb 2015 13:00	09 Feb 2015 15:00	3	Maintenance on daily zero and span system - verify response
NH3	06 Feb 2015 06:00	06 Feb 2015 06:00	1	Stabilization after daily span
NH3	06 Feb 2015 16:00	06 Feb 2015 19:00	4	Stabilization after monthly calibration
NH3	07 Feb 2015 07:00	07 Feb 2015 07:00	1	Stabilization after daily span
PM2.5	03 Feb 2015 14:00	03 Feb 2015 16:00	3	Maintenance - Flow and zero check, sample head cleaning

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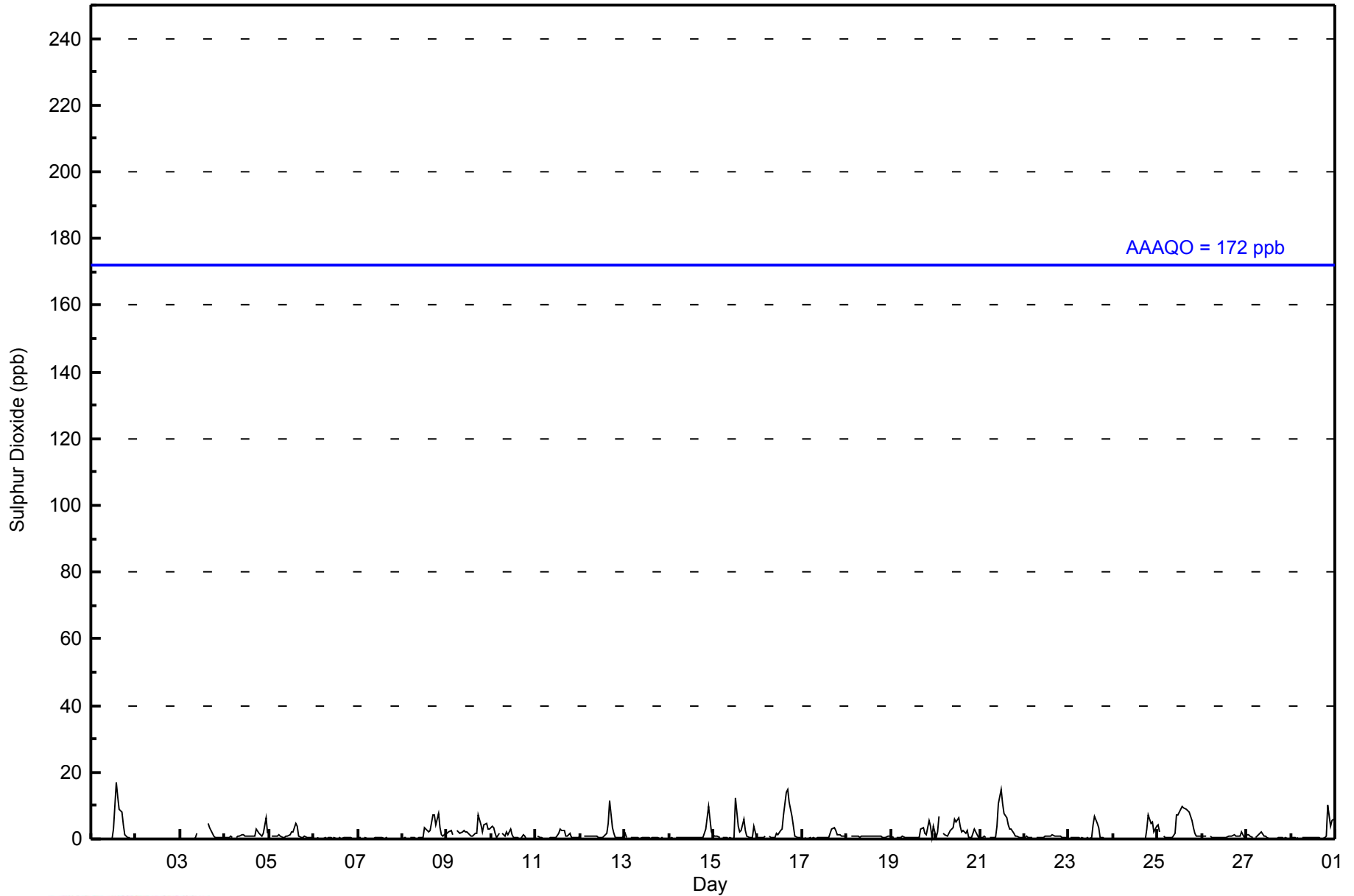


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 17 ppb on Feb 1 14:00										Maximum Daily Average: 4.0 ppb on Feb 25										Hours of Data: 639						
Minimum Value: 0 ppb on Feb 2 05:00										Minimum Daily Average: 0.0 ppb on Feb 2										Hours of Missing Data: 33						
Maximum Diurnal Average: 2.9 ppb at hour 17										Minimum Diurnal Average: 0.5 ppb at hour 4										Hours of Calibration: 33						
Monthly Average: 1.4 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> =4 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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	3	17	13	9	8	4	1	0	0	0	0	0	2.5	17
2-Feb	0	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	2	C	C	C	C	C	5	3	2	1	1	0	1	1	1	0.9	5
4-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	2	6	2	1.3	6
5-Feb	Z	1	1	1	1	1	1	1	1	1	1	2	2	5	4	1	0	1	1	1	1	0	0	0	1.1	5
6-Feb	0	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-Feb	0	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-Feb	0	0	0	Z	1	1	0	0	0	0	0	0	3	2	2	3	7	7	4	8	4	1	1	2	2.1	8
9-Feb	2	2	2	1	Z	2	2	2	2	3	2	2	1	1	1	2	2	7	4	2	4	5	3	3	2.5	7
10-Feb	4	4	2	1	2	Z	2	1	2	1	3	1	0	0	0	0	0	1	1	0	0	0	0	0	1.1	4
11-Feb	Z	1	0	0	0	0	0	0	0	0	0	2	3	3	2	1	1	2	1	1	0	0	1	0.8	3	
12-Feb	1	Z	1	1	1	1	1	1	1	1	1	0	1	2	5	11	3	2	1	0	0	0	0	0	1.5	11
13-Feb	2	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2
14-Feb	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	2	3	10	6	2	1.3	10	
15-Feb	1	1	1	0	Z	0	0	0	0	0	1	12	4	2	3	6	3	1	0	0	0	4	1	1.8	12	
16-Feb	0	0	1	0	1	Z	1	0	0	0	2	1	2	3	7	14	15	11	7	4	1	0	0	0	3.1	15
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	3	3	1	1	1	1	1	0.8	3
18-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
19-Feb	1	1	Z	1	1	1	1	1	1	0	1	1	1	1	1	3	3	2	1	5	4	0	4	1.3	5	
20-Feb	1	2	7	Z	2	1	1	2	3	3	6	5	6	4	2	2	2	3	0	0	2	3	1	0	2.5	7
21-Feb	0	0	1	1	Z	0	0	0	1	4	11	15	11	8	6	4	3	3	2	1	1	1	1	1	3.2	15
22-Feb	1	1	1	1	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0.6	1
23-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	4	7	5	4	1	0	0	0	0	0	0	1.0	7
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	5	2	4	1.2	7	
25-Feb	4	2	Z	1	1	0	0	0	0	2	7	7	9	10	10	9	9	8	5	3	2	1	1	1	4.0	10
26-Feb	1	1	1	Z	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	1	1	0.8	2
27-Feb	1	1	1	0	Z	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10	4	5	6	1.3	10
																								Diurnal Average		
																								Diurnal Maximum		
0.9 0.8 0.9 0.5 0.5 0.5 0.5 0.5 0.6 0.8 1.5 1.5 2.2 2.3 2.4 2.6 2.9 2.4 1.5 1.4 1.6 1.5 1.3 1.1																										
4 4 7 1 2 2 2 2 3 4 11 15 12 17 13 14 15 11 7 8 10 10 6 6																										
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  
Patricia McInnes - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	629	98.44	98.44
11 - 20	10	1.56	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Patricia McInnes - February 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	96	39	15	33	15	69	46	27	31	20	31	32	21	35	38	81	629
11 - 20	3	1	1	3	0	0	1	0	0	1	0	0	0	0	0	0	10
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>	99	40	16	36	15	69	47	27	31	21	31	32	21	35	38	81	639

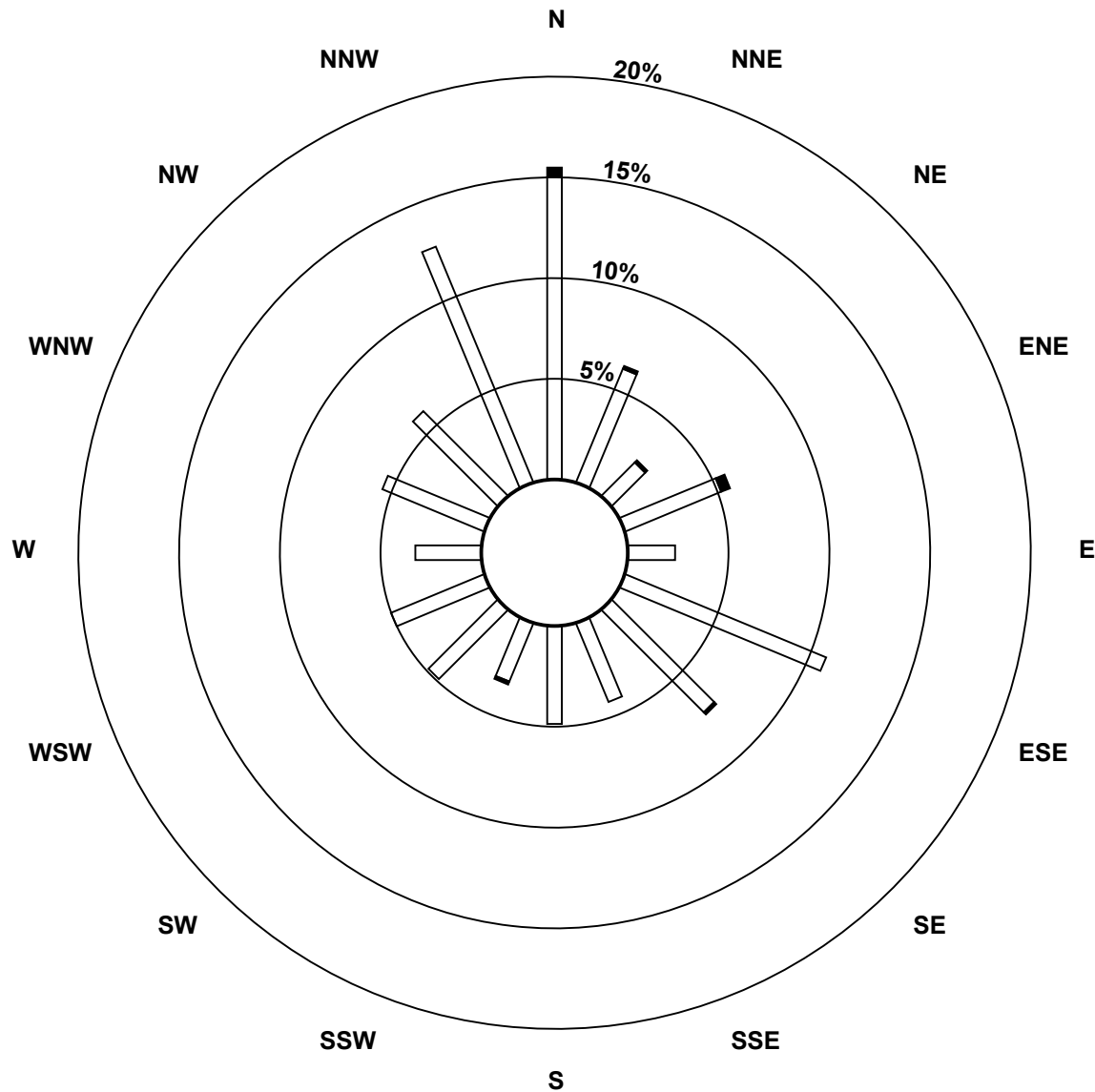
Total Number of Valid Hours: 639

Total Number of Hours: 672

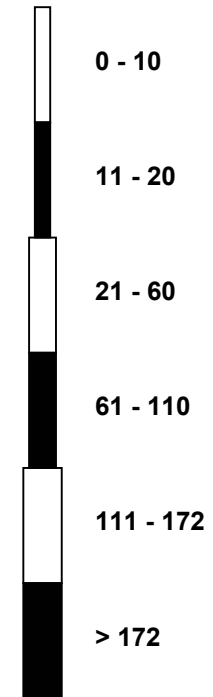


Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)



Classes (ppb)

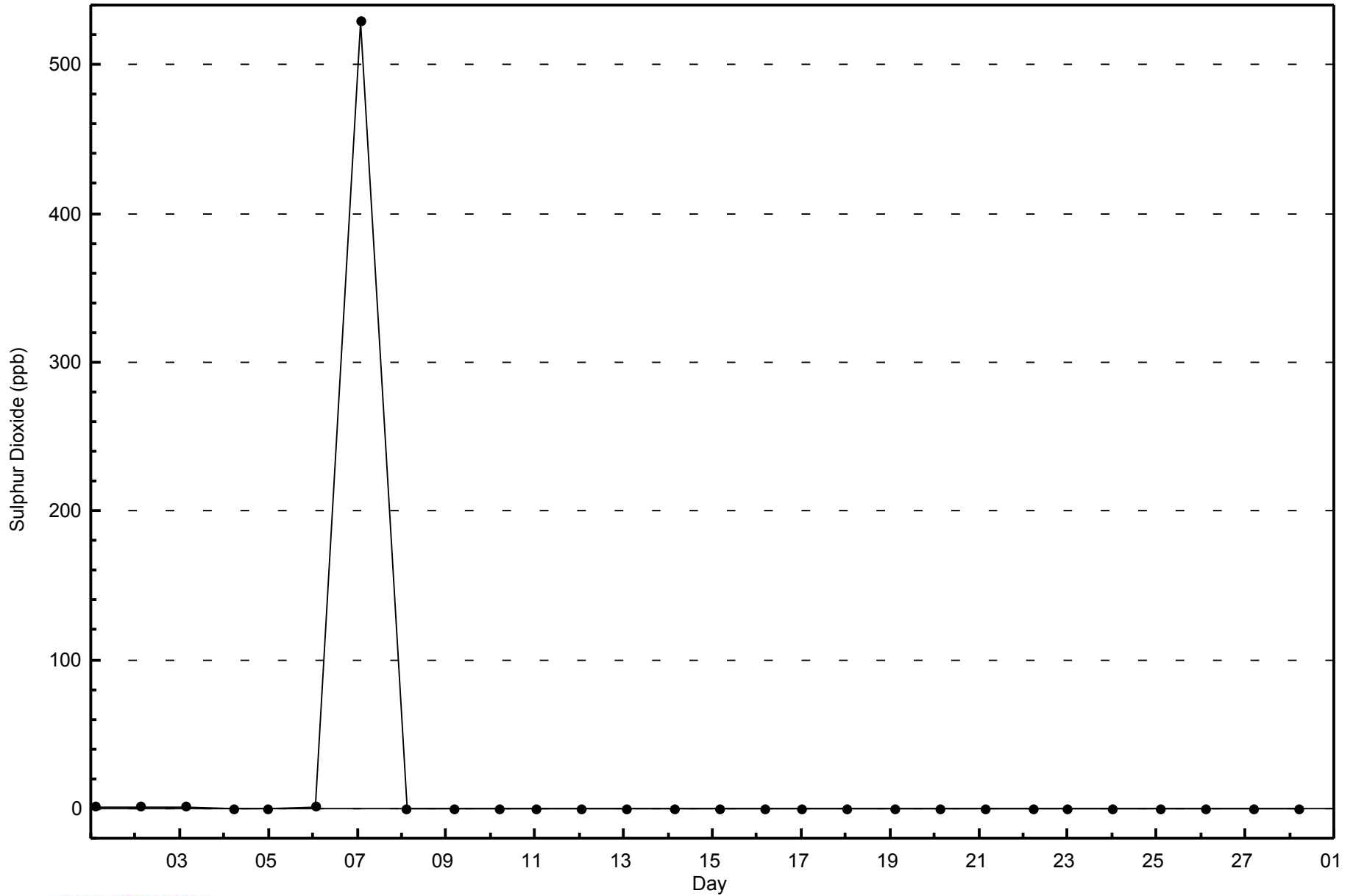


Total Number of Valid Hours: 639



WBEA  
Zero Responses

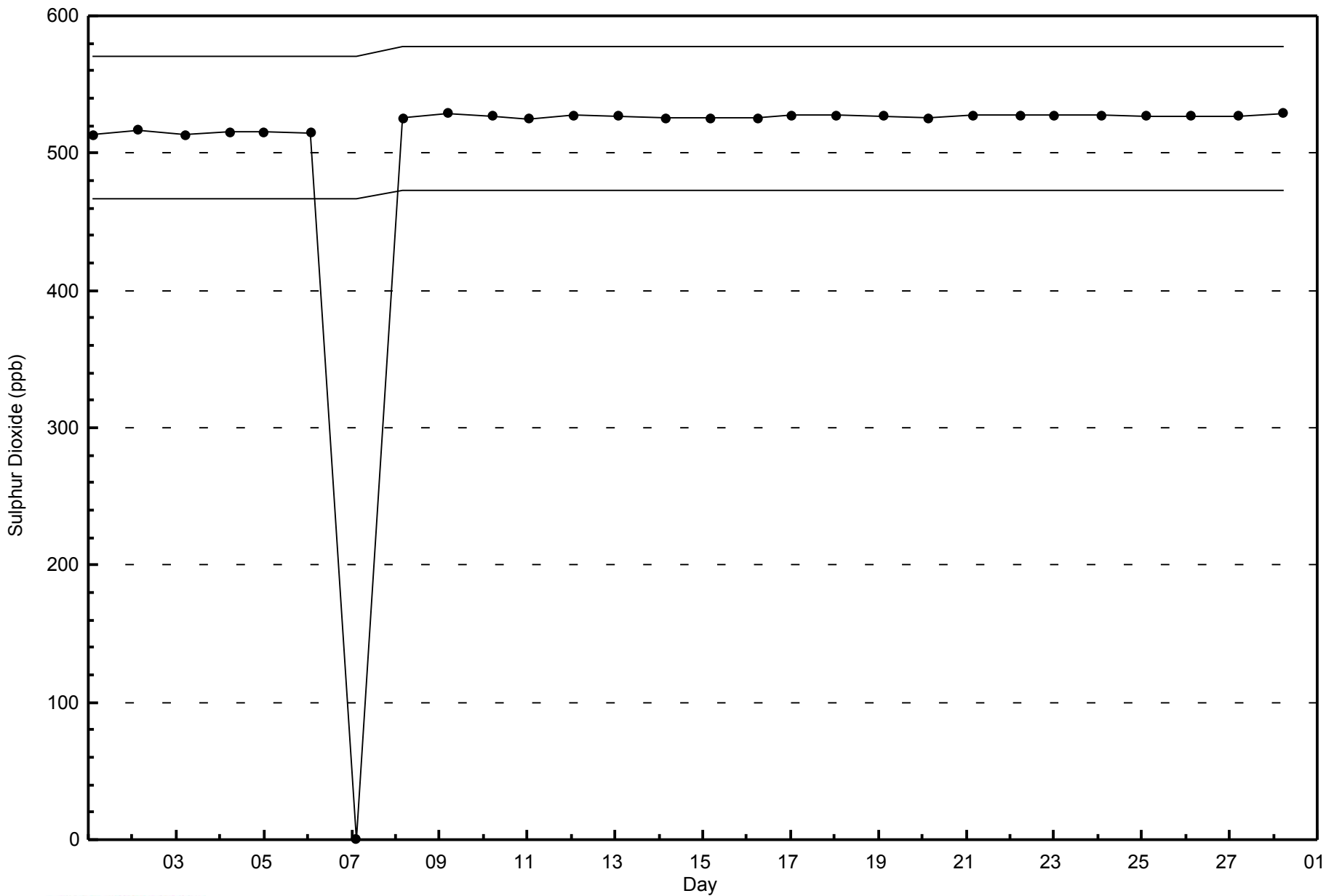
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Patricia McInnes - February 2015



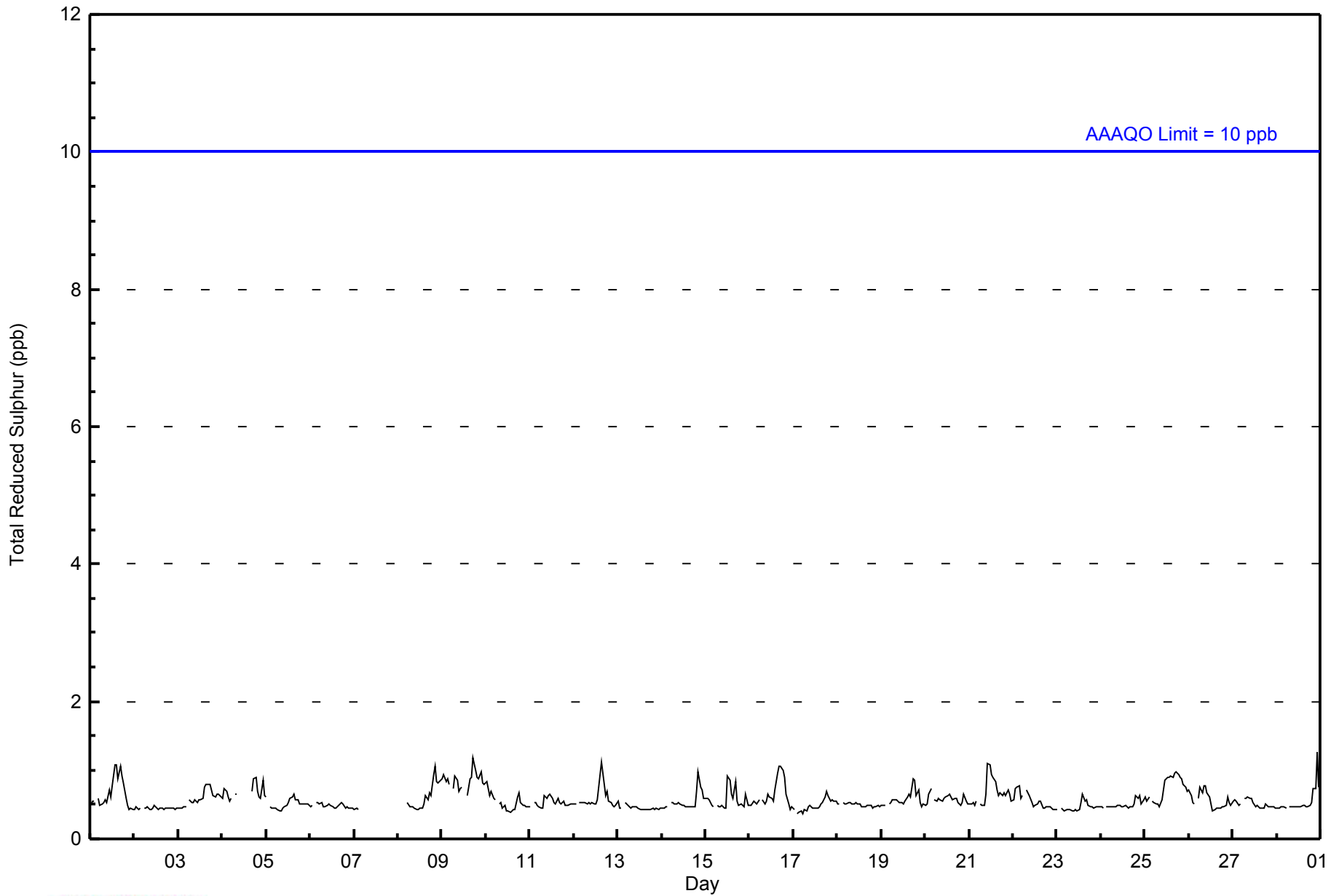


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 1 ppb on Feb 28 23:00										Maximum Daily Average: 0.9 ppb on Feb 9										Hours of Data: 611						
Minimum Value: 0 ppb on Feb 17 06:00										Minimum Daily Average: 0.4 ppb on Feb 2										Hours of Missing Data: 61						
Maximum Diurnal Average: 0.6 ppb at hour 18										Minimum Diurnal Average: 0.5 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=1 Q <sub>3</sub> =1 P <sub>90</sub> =1 P <sub>99</sub> =1										Percent Operational Time: 96.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	1	1	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.7	1
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0
3-Feb	0	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1
4-Feb	1	1	1	1	1	1	Z	1	1	1	C	C	C	C	C	C	1	1	1	1	1	1	1	1	--	1
5-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	C	C	C	1	1	1	1	1	1	1	1	1	0.5	1
6-Feb	0	0	Z	1	1	1	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0.5	1
7-Feb	0	0	0	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	0
8-Feb	AF	AF	AF	AF	Z	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.6	1
9-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	M	M	1	1	1	1	1	1	1	1	1	1	0.9	1
10-Feb	1	1	1	1	1	1	Z	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0.5	1
11-Feb	0	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0.5	1
12-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	0.6	1
13-Feb	1	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Feb	0	0	0	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1
15-Feb	1	1	1	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	1	0	0.6	1
16-Feb	0	0	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0.6	1
17-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.5	1
18-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.5	1
19-Feb	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.6	1
20-Feb	0	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.6	1
21-Feb	1	1	1	0	1	Z	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
22-Feb	1	1	1	1	1	1	Z	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	0	0	0.6	1
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0.5	1
24-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1
25-Feb	1	1	1	Z	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
26-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0.6	1
27-Feb	1	1	1	0	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0.5	1
28-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0.5	1
0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5																								Diurnal Average		
1 1																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance AF - Analyzer Failure																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	611	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: 611

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - February 2015**

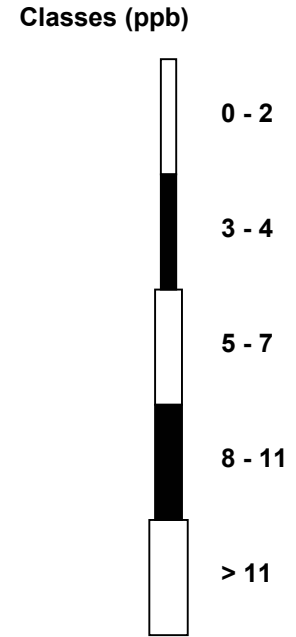
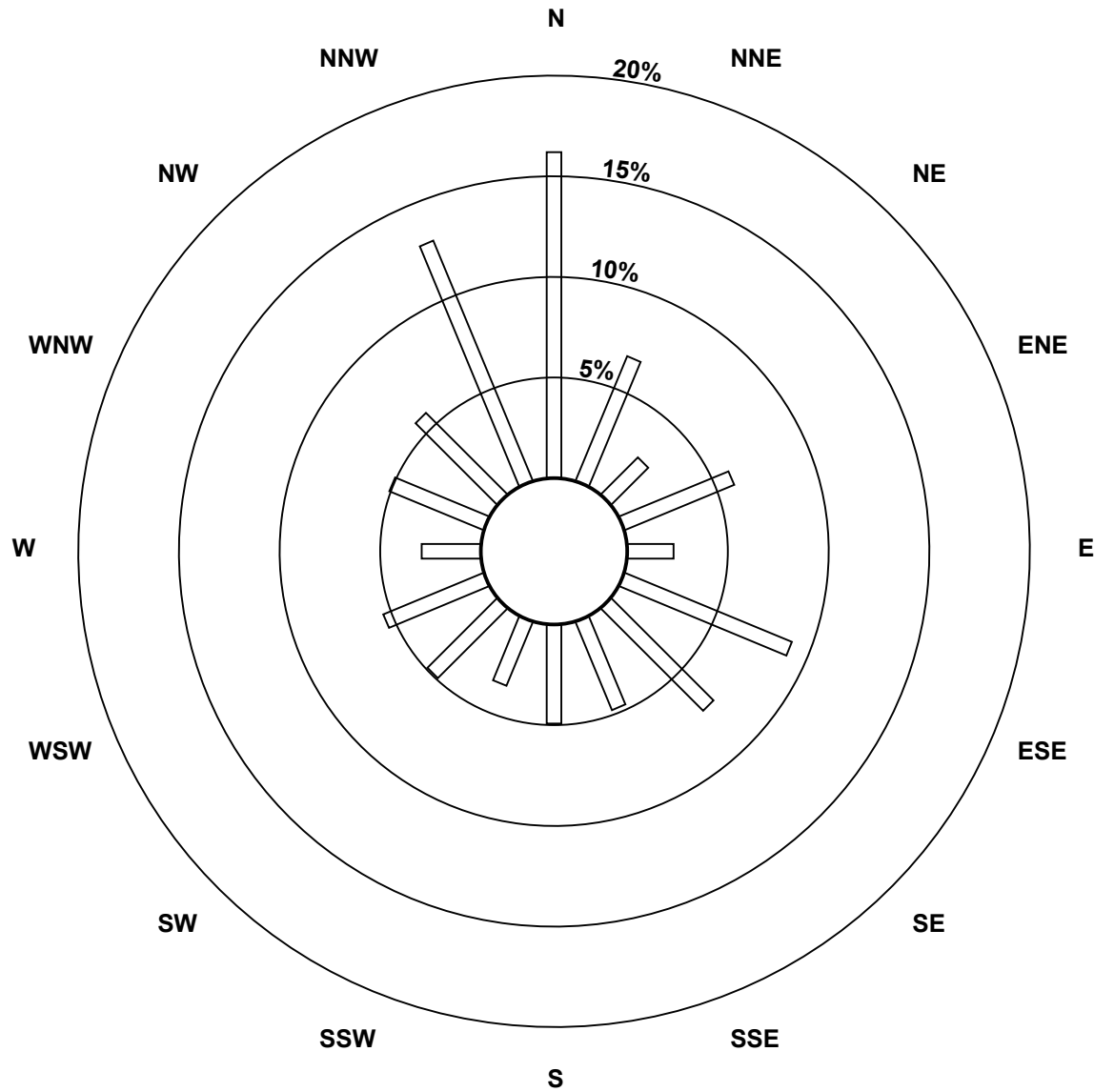
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	99	41	16	36	14	55	44	29	30	21	30	33	18	31	35	79	611
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	99	41	16	36	14	55	44	29	30	21	30	33	18	31	35	79	611

Total Number of Valid Hours: 611

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

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



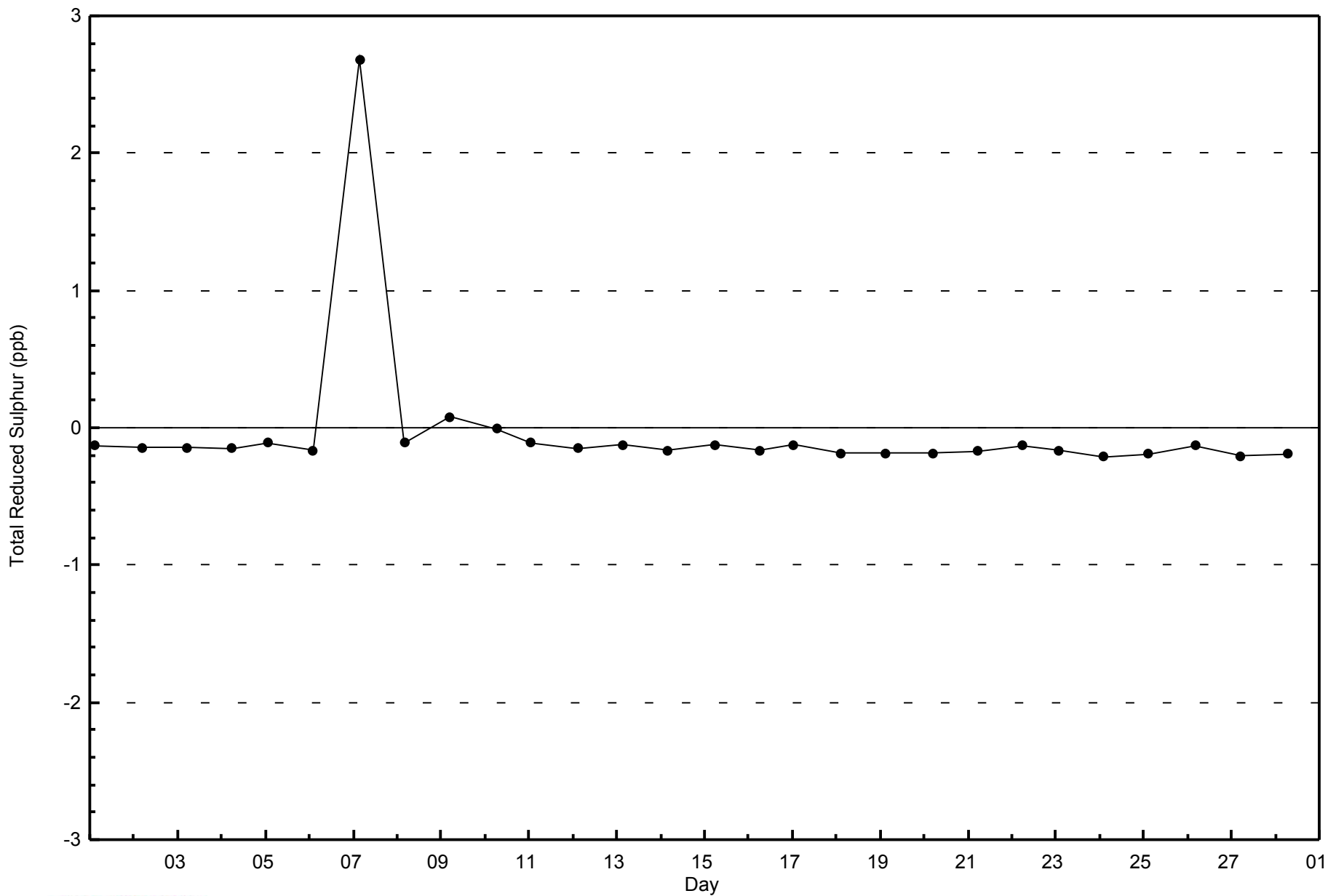
Total Number of Valid Hours: 611





WBEA  
Zero Responses

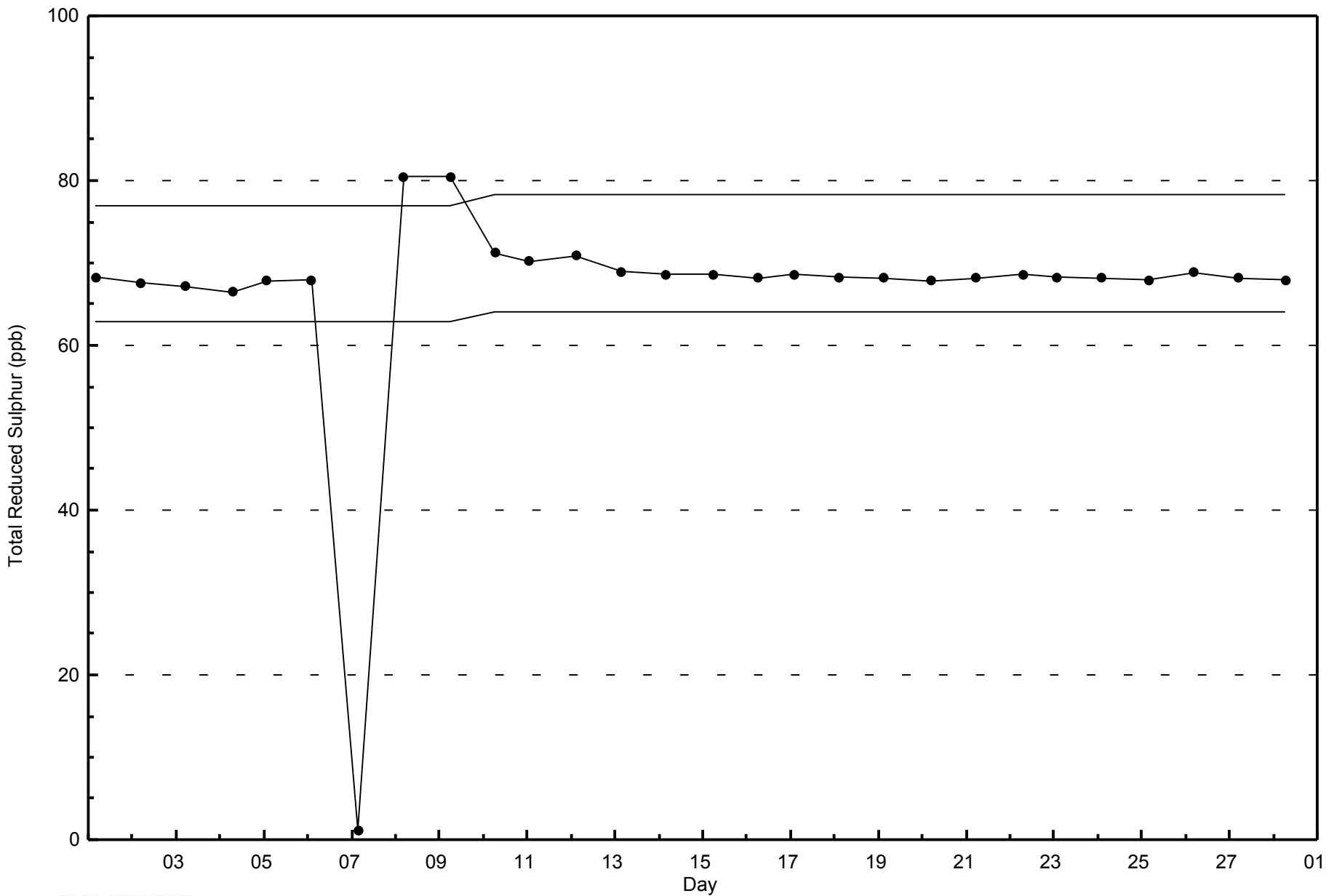
Total Reduced Sulphur (TRS) - ppb  
Patricia McInnes - February 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Patricia McInnes - February 2015**



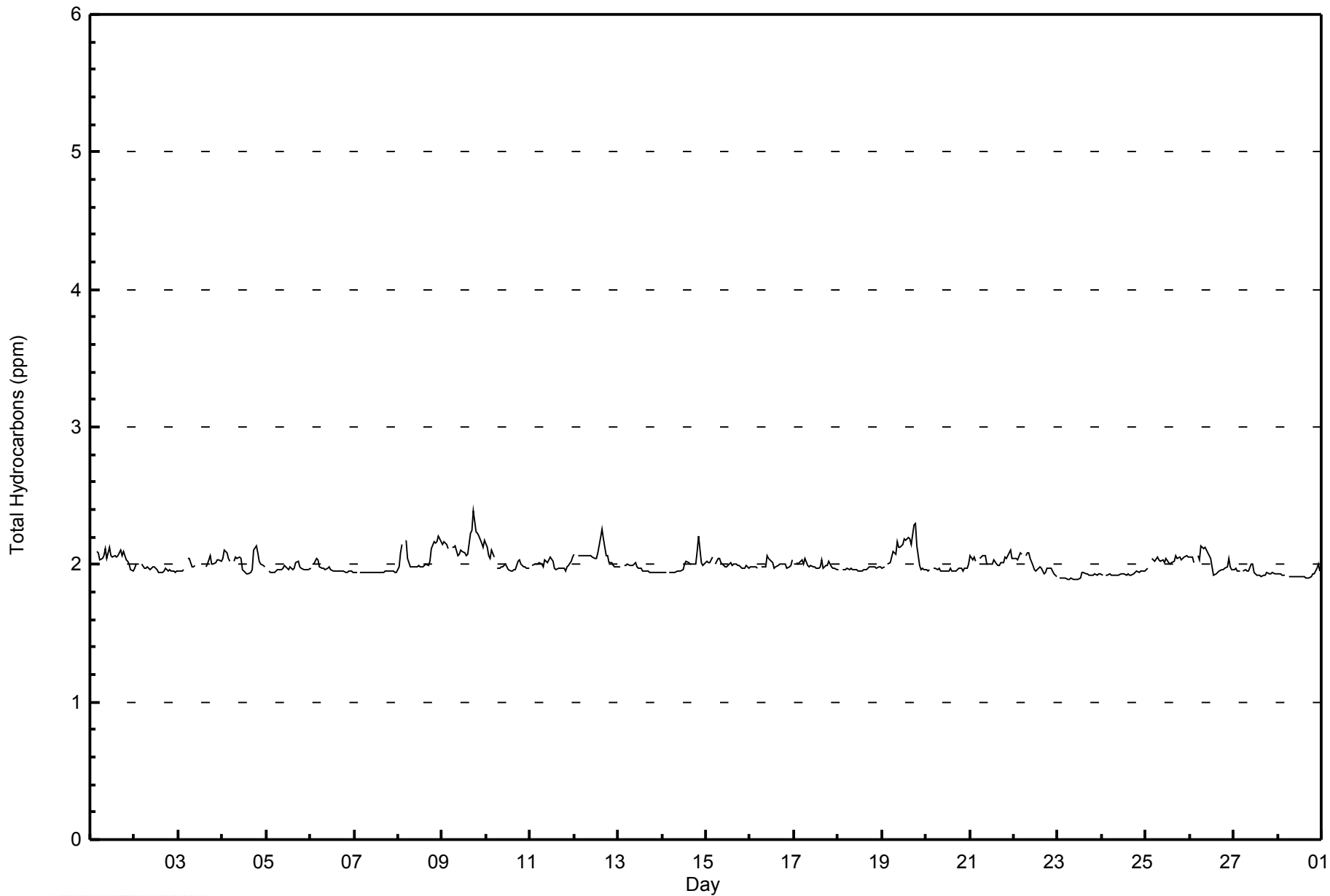


Maximum Value: 2.4 ppm on Feb 9 18:00		Maximum Daily Average: 2.2 ppm on Feb 9		Hours in Service: 672																							
Minimum Value: 1.9 ppm on Feb 23 11:00		Minimum Daily Average: 1.9 ppm on Feb 23		Hours of Data: 638																							
Maximum Diurnal Average: 2.0 ppm at hour 18		Minimum Diurnal Average: 2.0 ppm at hour 14		Hours of Missing Data: 34																							
Monthly Average: 2.00 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 2.0 Median = 2.0 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.2		Hours of Calibration: 33																							
				Percent Operational Time: 99.9																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	UO	2.1	Z	2.1	2.1	2.0	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
2-Feb	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	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	
3-Feb	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
4-Feb	2.0	2.1	2.1	2.0	2.0	Z	2.0	2.1	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1		
5-Feb	Z	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
6-Feb	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	1.9	2.0	1.9	1.9	2.0	2.0	
7-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	
8-Feb	2.0	2.1	2.1	Z	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	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	
9-Feb	2.1	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.4	
10-Feb	2.1	2.1	2.0	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
11-Feb	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1		
12-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.3		
13-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0		
14-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.2		
15-Feb	2.0	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
16-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
17-Feb	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		
18-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
19-Feb	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.1	2.0	2.0	2.0	2.1	2.3		
20-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
21-Feb	2.1	2.0	2.1	2.0	Z	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.1		
22-Feb	2.0	2.0	2.0	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	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.1		
23-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
24-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	1.9	2.0		
25-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.0	2.1	2.1	2.1	2.0	2.1		
26-Feb	2.1	2.1	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
27-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
28-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0		
																								Diurnal Average			
																								Diurnal Maximum			
2.0 2.1 2.2 2.1 2.1 2.2 2.1 2.1 2.1 2.2 2.1 2.1 2.1 2.2 2.2 2.2 2.3 2.2 2.4 2.3 2.2 2.2 2.2 2.2 2.2																											
Z - zerospan				C - Calibration				UO - Unstable Operation																			



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	516	80.88	80.88
2.1 - 3.0	122	19.12	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Patricia McInnes - February 2015**

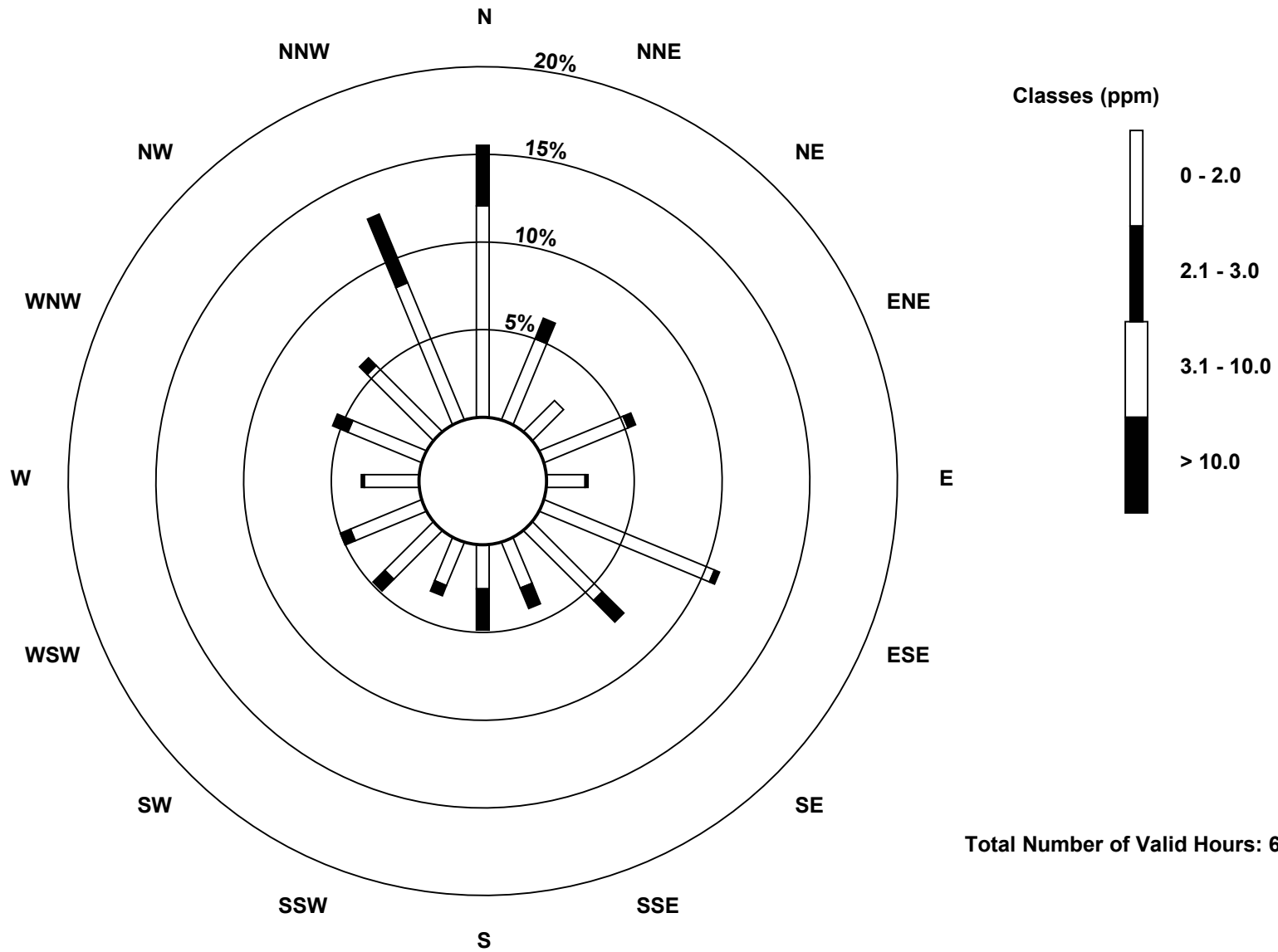
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	77	32	16	33	14	67	36	18	16	17	25	28	20	29	34	54	516
2.1 - 3.0	22	8	0	3	1	2	11	8	15	4	6	4	1	6	4	27	122
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	99	40	16	36	15	69	47	26	31	21	31	32	21	35	38	81	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

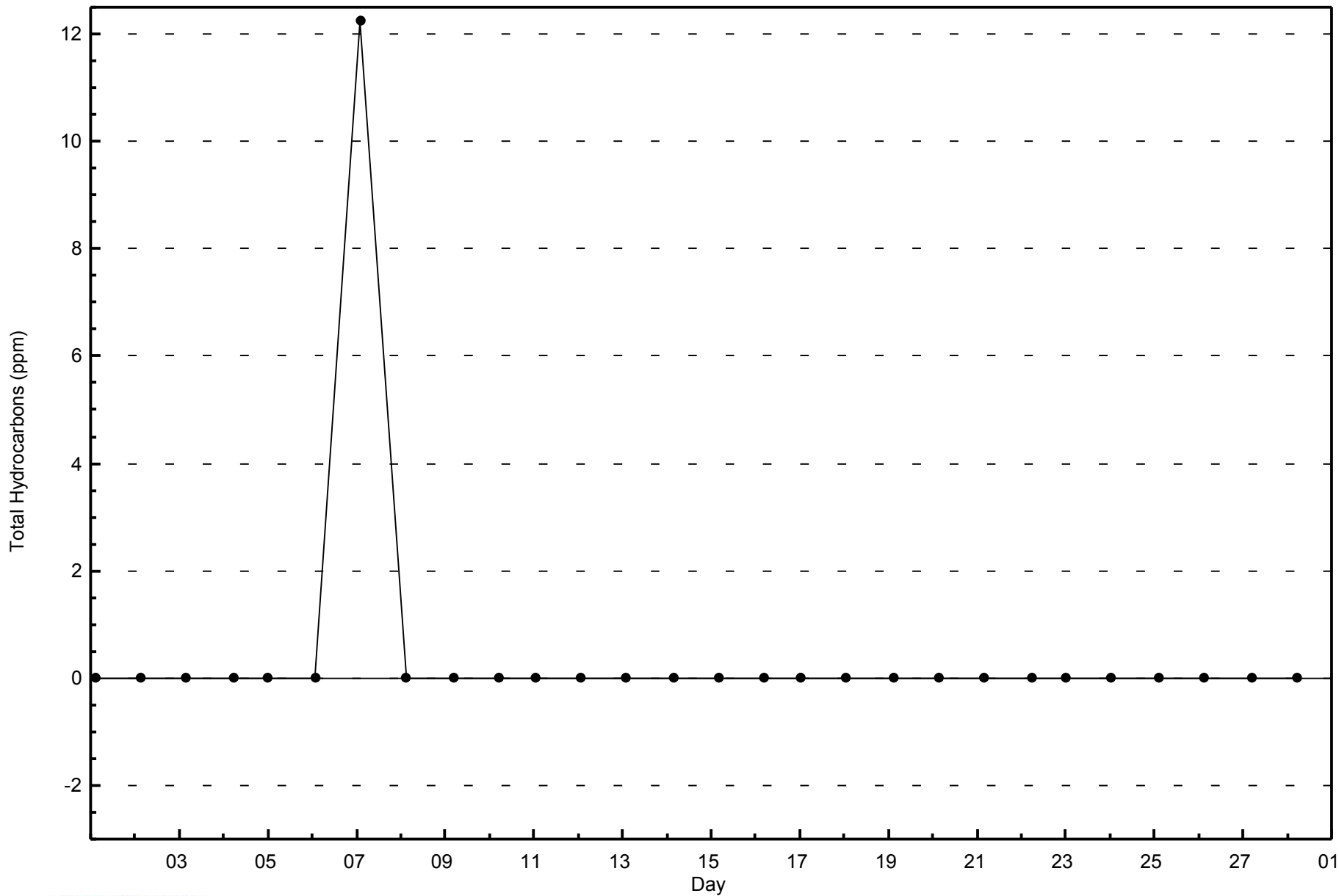
Total Hydrocarbons (THC) - ppm  
Patricia McInnes (AMS 6)





WBEA  
Zero Responses

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

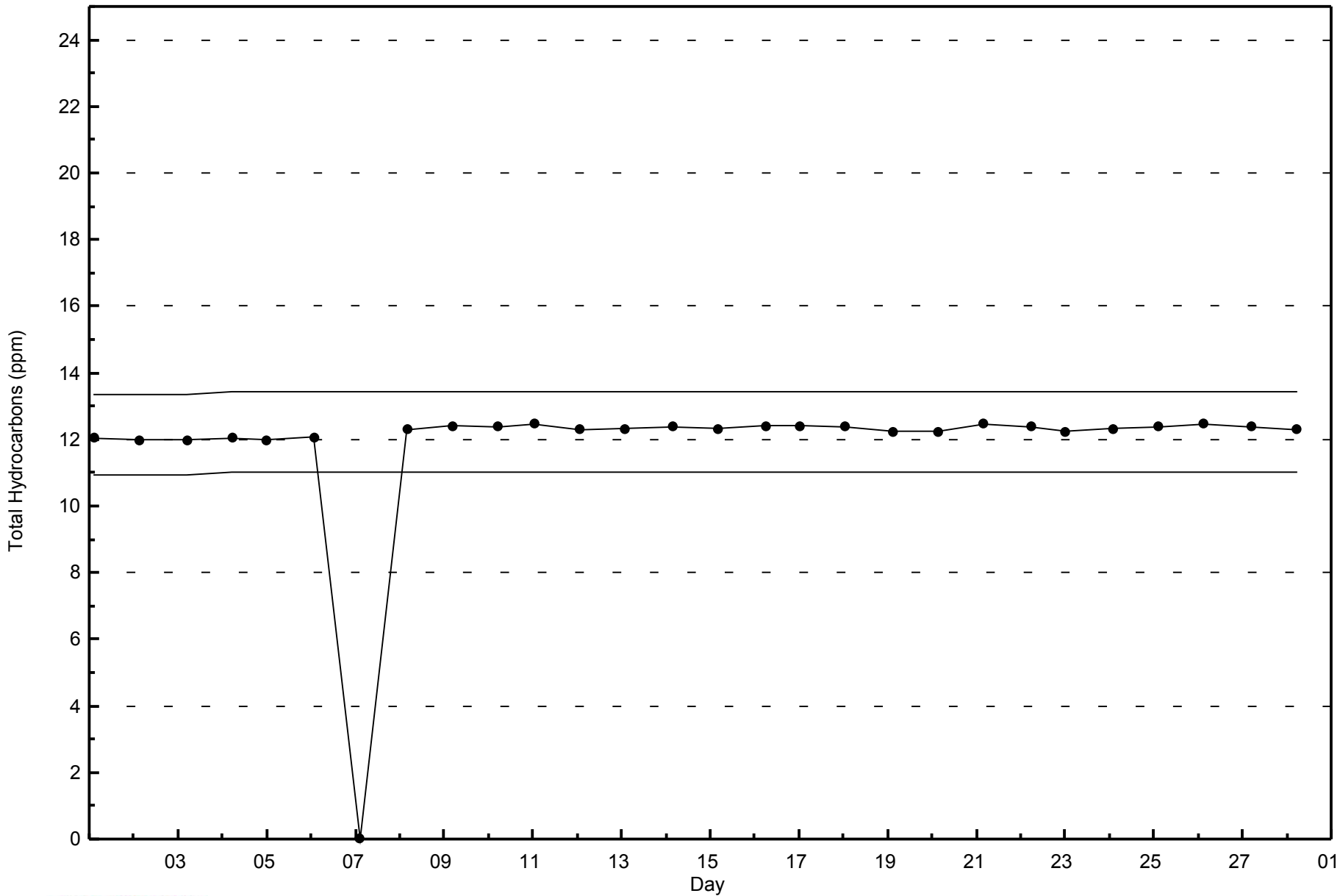






WBEA  
Span Responses

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





Summary of Hour Averages

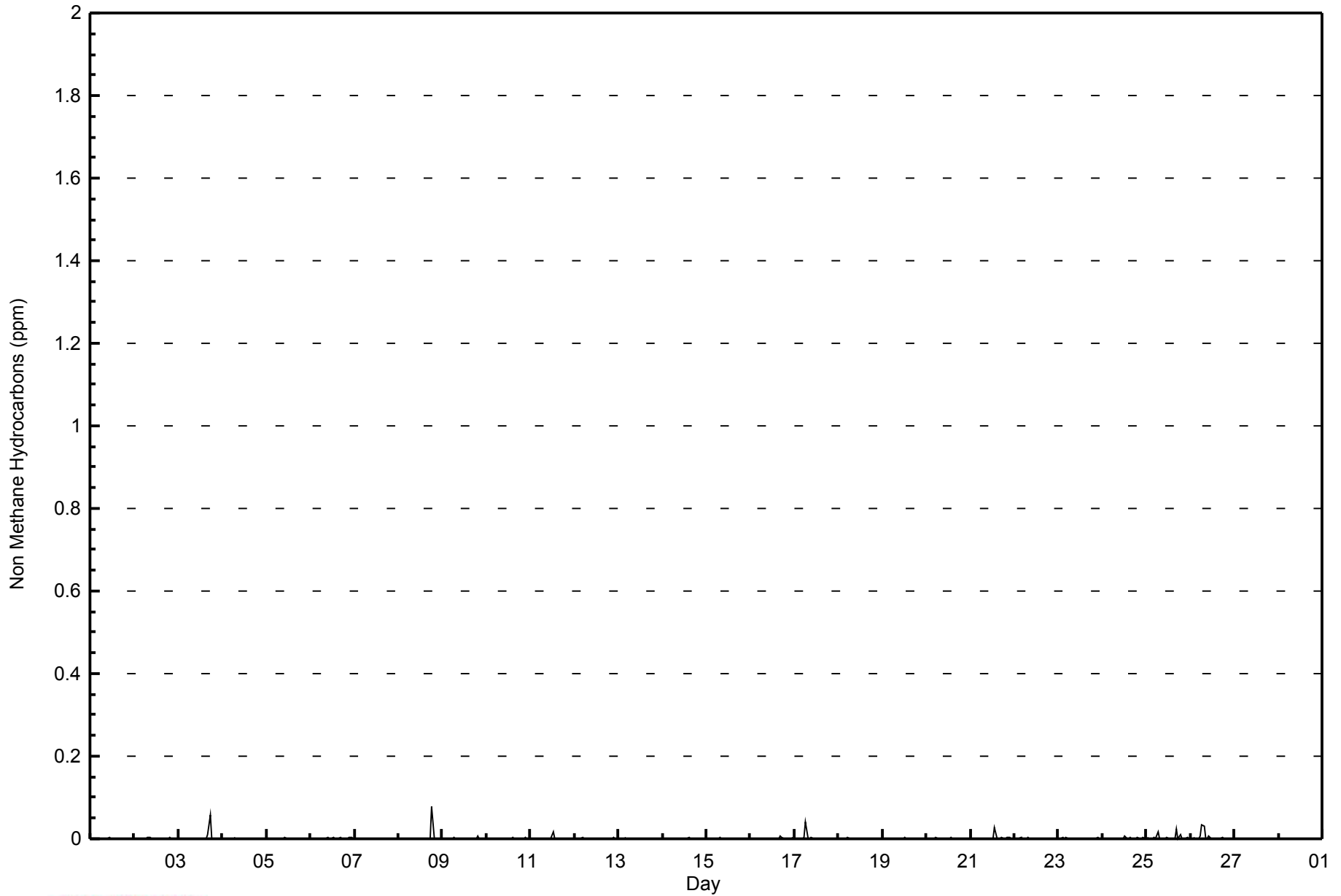
Patricia McInnes - February 2015

Maximum Value: 0.078 ppm on Feb 8 19:00																				Maximum Daily Average: 0.004 ppm on Feb 3					Hours in Service: 672									
Minimum Value: 0.000 ppm on Feb 1 04:00																				Minimum Daily Average: 0.000 ppm on Feb 7					Hours of Data: 638									
Maximum Diurnal Average: 0.004 ppm at hour 7																				Minimum Diurnal Average: 0.000 ppm at hour 1					Hours of Missing Data: 34									
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: 33									
																									Percent Operational Time: 99.9									
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
1-Feb	UO	0.001	Z	0.000	0.000	0.000	0.000	0.001	0.000	0.001	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	0.003
2-Feb	0.000	0.000	0.000	Z	0.000	0.002	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	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005		
3-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	C	C	C	C	C	0.001	0.011	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.057			
4-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
5-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.002	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			
6-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
7-Feb	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			
8-Feb	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	0.078	0.002	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.004	0.078				
9-Feb	0.001	0.000	0.000	0.000	Z	0.000	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.006					
10-Feb	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	0.002	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				
11-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.016					
12-Feb	0.000	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
13-Feb	0.000	0.000	Z	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	0.000	0.000				
14-Feb	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	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
15-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
16-Feb	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	0.005	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				
17-Feb	Z	0.000	0.000	0.000	0.000	0.003	0.042	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				
18-Feb	0.000	Z	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				
19-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
20-Feb	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	0.003	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				
21-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.029	0.000	0.000	0.000	0.002	0.000	0.001	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.002	0.029					
22-Feb	0.000	0.000	0.000	0.003	0.002	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	0.000				
23-Feb	Z	0.000	0.002	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	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
24-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.003	0.000	0.000	0.000	0.003	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.001	0.005				
25-Feb	0.000	0.003	Z	0.000	0.002	0.000	0.018	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.023	0.000	0.011	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.003	0.023					
26-Feb	0.000	0.000	0.003	Z	0.000	0.007	0.033	0.031	0.000	0.000	0.008	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	0.004	0.033					
27-Feb	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				
28-Feb	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				
																								Diurnal Average										
																								Diurnal Maximum										
Z - zerospan                      C - Calibration                      UO - Unstable Operation																																		



**WBEA**  
**Hourly Averages**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - February 2015**





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	624	97.81	97.81
0.006 - 0.05	12	1.88	99.69
0.06 - 0.1	2	0.31	100.00
> 0.1	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



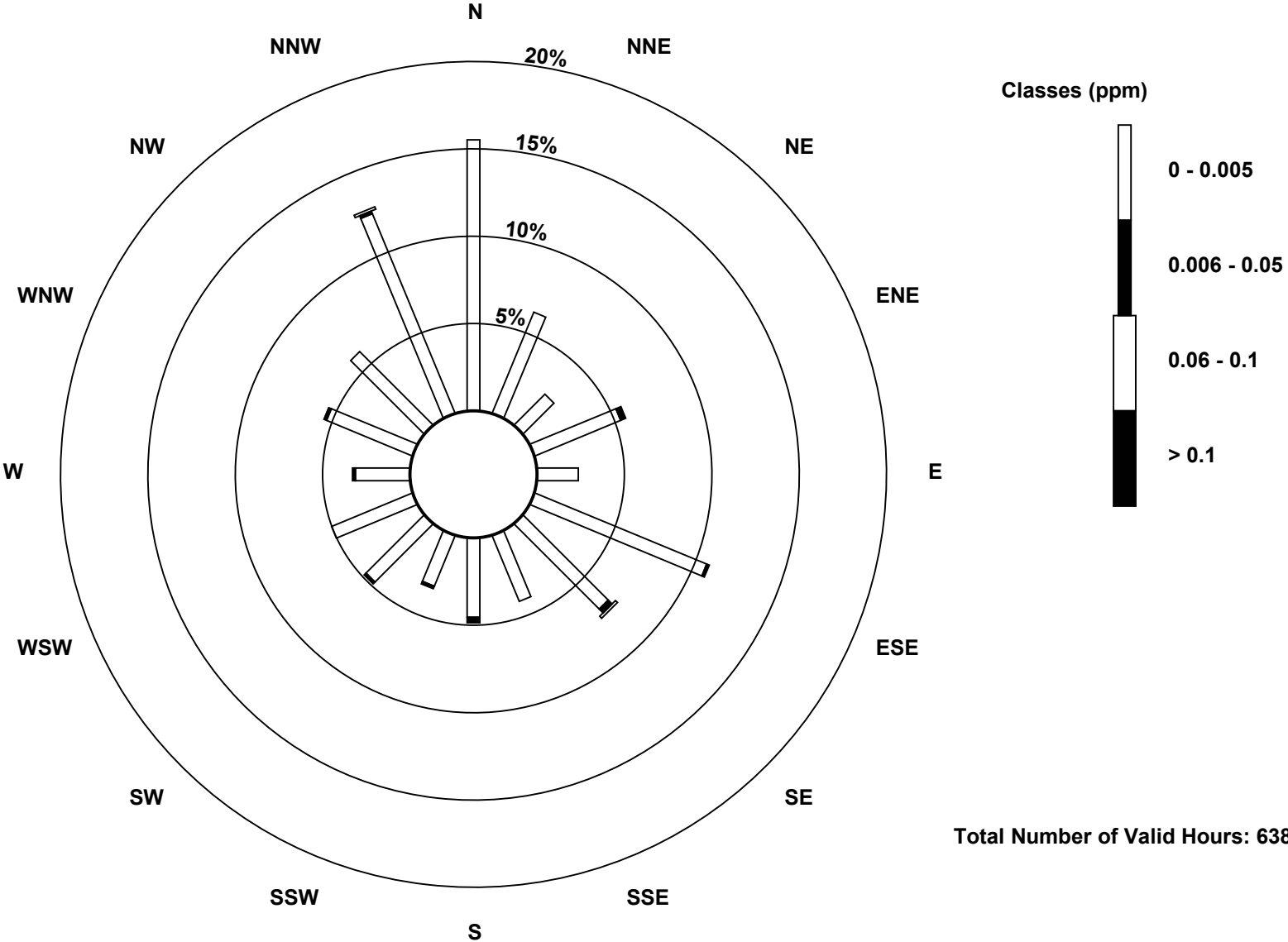
**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Patricia McInnes - February 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	99	40	16	34	15	68	44	26	29	20	30	32	20	34	38	79	624
0.006 - 0.05	0	0	0	2	0	1	2	0	2	1	1	0	1	1	0	1	12
0.06 - 0.1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2
> 0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	99	40	16	36	15	69	47	26	31	21	31	32	21	35	38	81	638

Total Number of Valid Hours: 638

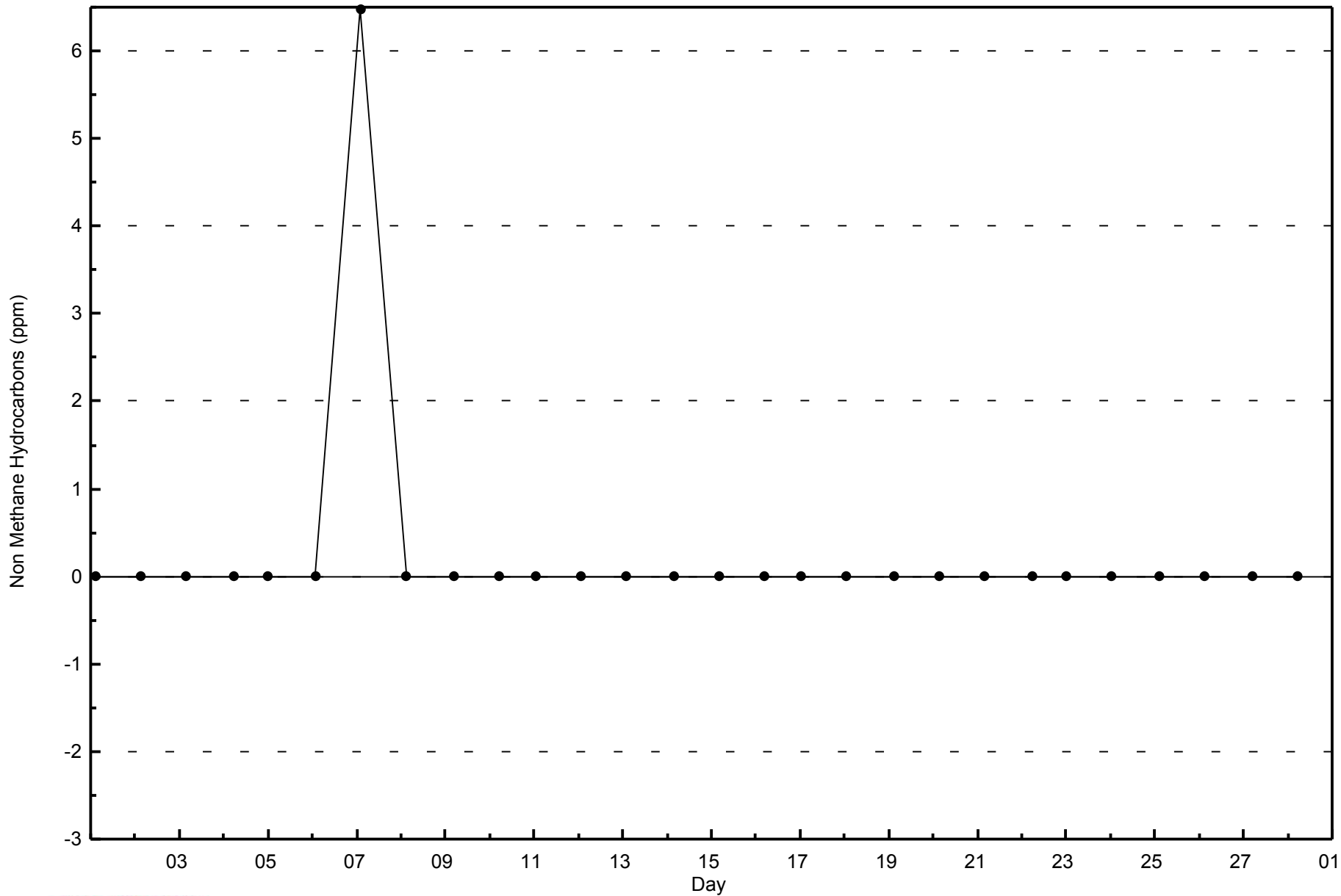
Total Number of Hours: 672





WBEA  
Zero Responses

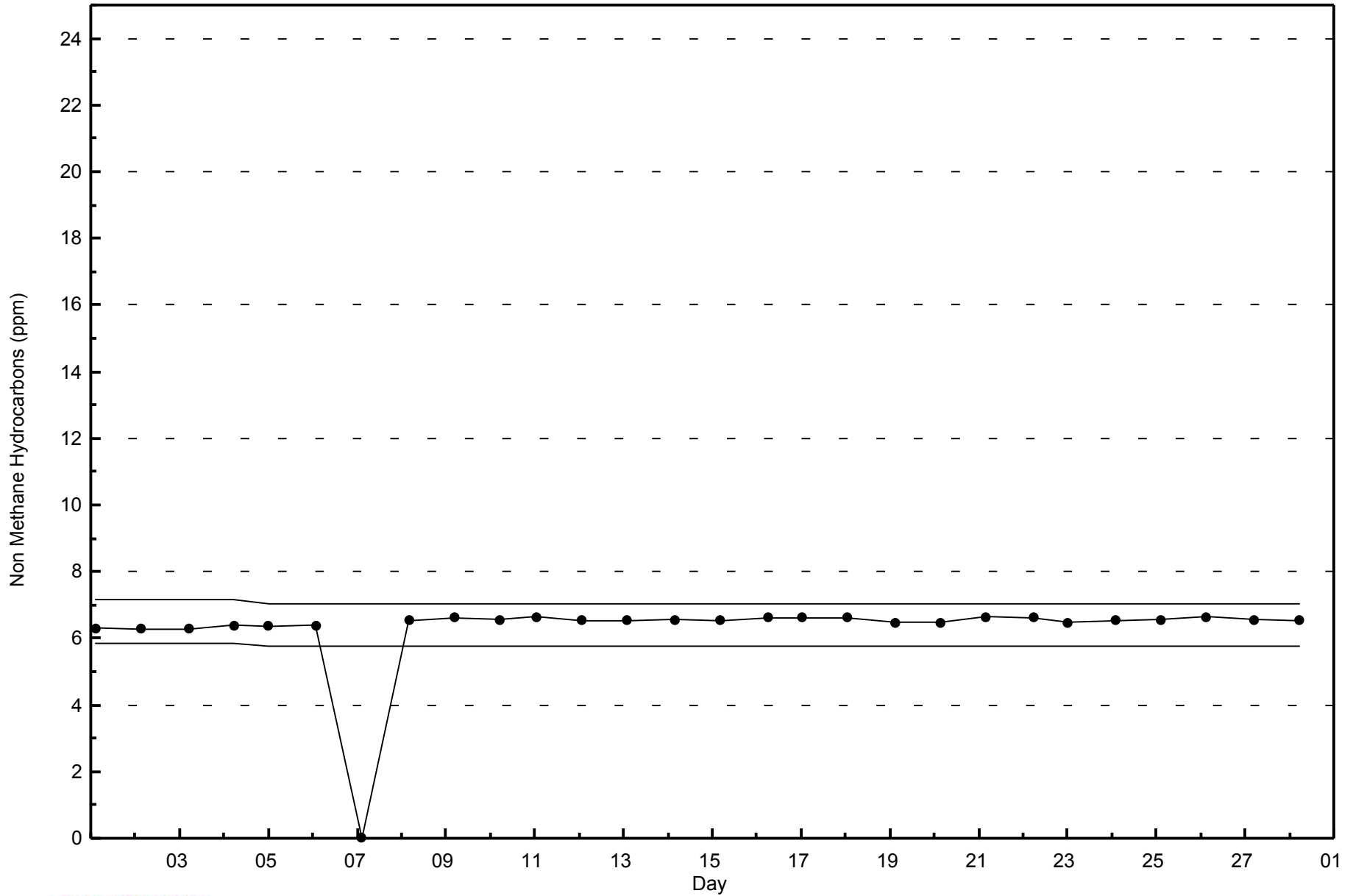
Non Methane Hydrocarbons (NMHC) - ppm  
Patricia McInnes - February 2015





WBEA  
Span Responses

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





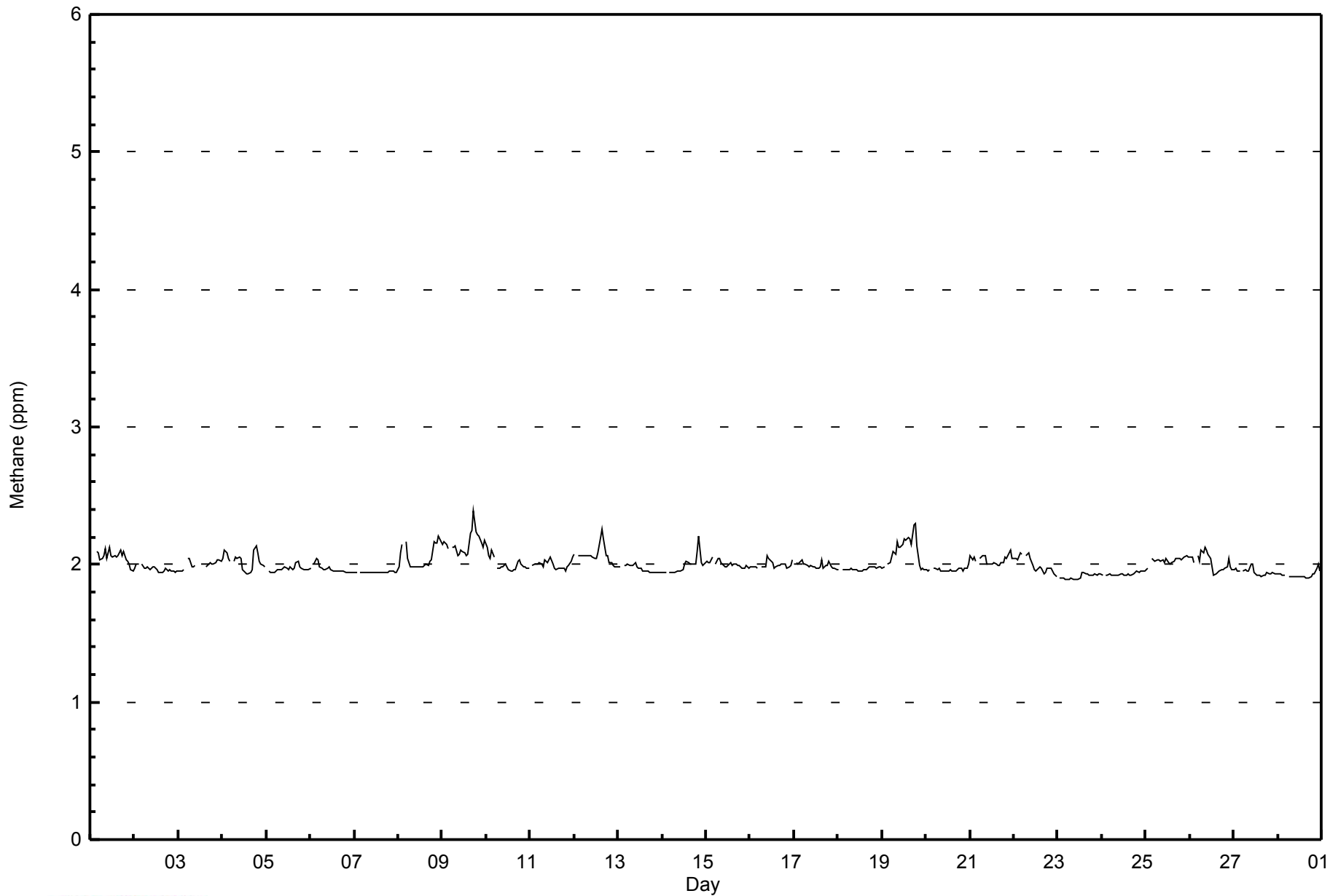


Number of Exceedences (AAAQO):		1-hr: 0		24-hr: 0		Hours in Service: 672																		Daily Average		Daily Maximum	
Maximum Value: 2.4 ppm on Feb 9 18:00		Maximum Daily Average: 2.2 ppm on Feb 9		Hours of Data: 638																							
Minimum Value: 1.9 ppm on Feb 23 11:00		Minimum Daily Average: 1.9 ppm on Feb 23		Hours of Missing Data: 34																							
Maximum Diurnal Average: 2.0 ppm at hour 18		Minimum Diurnal Average: 2.0 ppm at hour 14		Hours of Calibration: 33																							
Monthly Average: 2.00 ppm		Percentiles: P <sub>1</sub> = 1.9 P <sub>10</sub> = 1.9 Q <sub>1</sub> = 2.0 Median = 2.0 Q <sub>3</sub> = 2.0 P <sub>90</sub> = 2.1 P <sub>99</sub> = 2.2		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-Feb	UO	2.1	Z	2.1	2.1	2.0	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	
2-Feb	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	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	2.0	
3-Feb	1.9	1.9	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	C	C	C	C	C	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
4-Feb	2.0	2.1	2.1	2.0	2.0	Z	2.0	2.1	2.0	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1		
5-Feb	Z	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
6-Feb	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	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0		
7-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0	
8-Feb	2.0	2.1	2.1	Z	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	2.2	2.2	2.2	2.2	2.2	2.1	2.2	
9-Feb	2.1	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.4	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.4	
10-Feb	2.1	2.1	2.0	2.1	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
11-Feb	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1		
12-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.2	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.3		
13-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0		
14-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.2		
15-Feb	2.0	2.0	2.0	2.1	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
16-Feb	2.0	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
17-Feb	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		
18-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
19-Feb	2.0	2.0	Z	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.3	2.3	2.1	2.0	2.0	2.0	2.1	2.3		
20-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
21-Feb	2.1	2.0	2.1	2.0	Z	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.1		
22-Feb	2.0	2.0	2.0	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	1.9	1.9	2.0	2.0	2.0	1.9	1.9	2.0	2.1		
23-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		
24-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	1.9	2.0		
25-Feb	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1		
26-Feb	2.1	2.1	2.0	Z	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1		
27-Feb	2.0	2.0	2.0	2.0	Z	2.0	2.0	2.0	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0		
28-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0		
																								Diurnal Average		Diurnal Maximum	
																								2.0		2.0	
																								2.1		2.2	
Z - zerospan			C - Calibration					UO - Unstable Operation																			



WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - February 2015





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

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	521	81.66	81.66
2.1 - 3.0	117	18.34	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Patricia McInnes - February 2015**

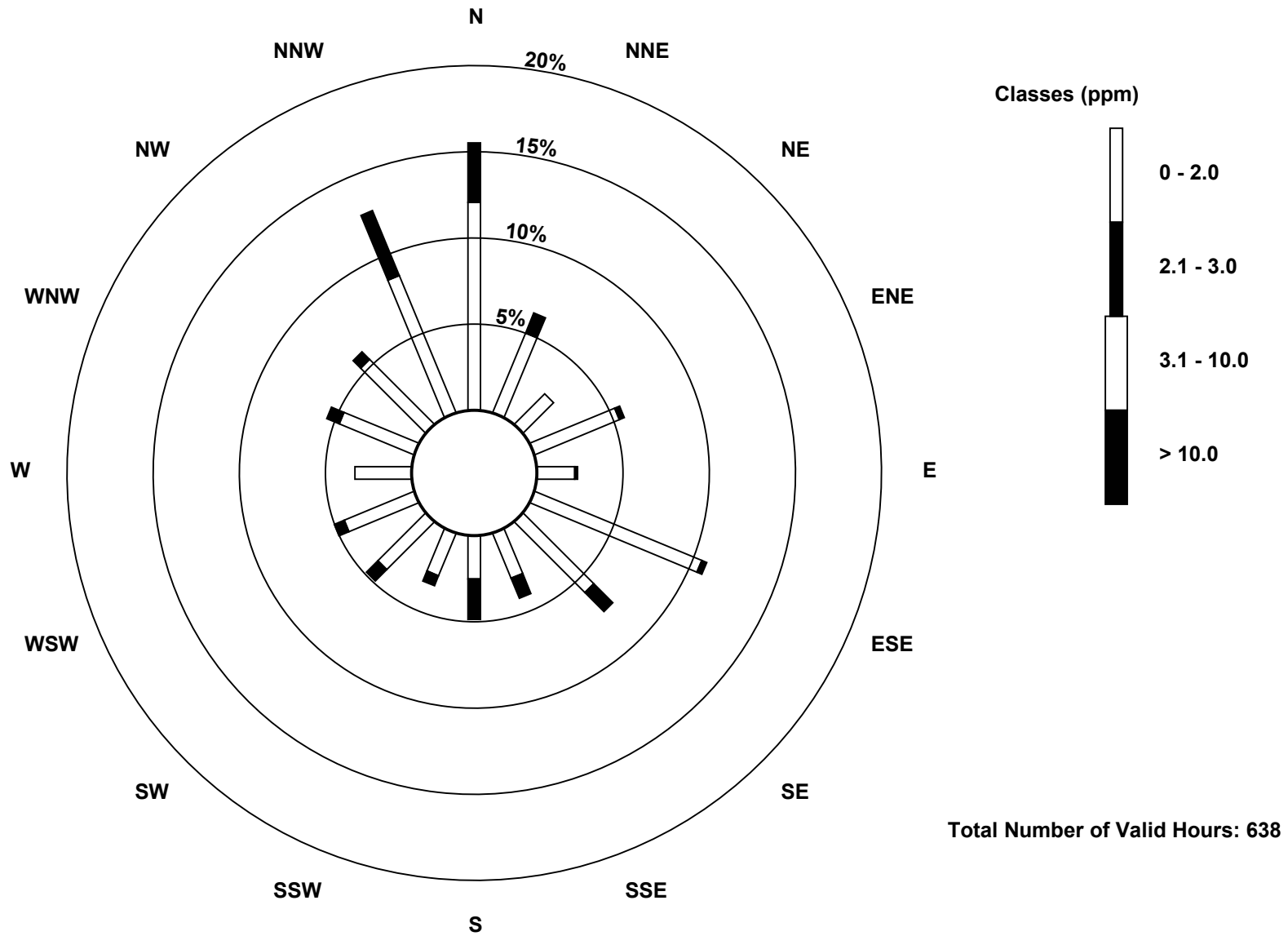
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	77	32	16	34	14	67	37	18	16	17	25	28	21	30	34	55	521
2.1 - 3.0	22	8	0	2	1	2	10	8	15	4	6	4	0	5	4	26	117
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	99	40	16	36	15	69	47	26	31	21	31	32	21	35	38	81	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

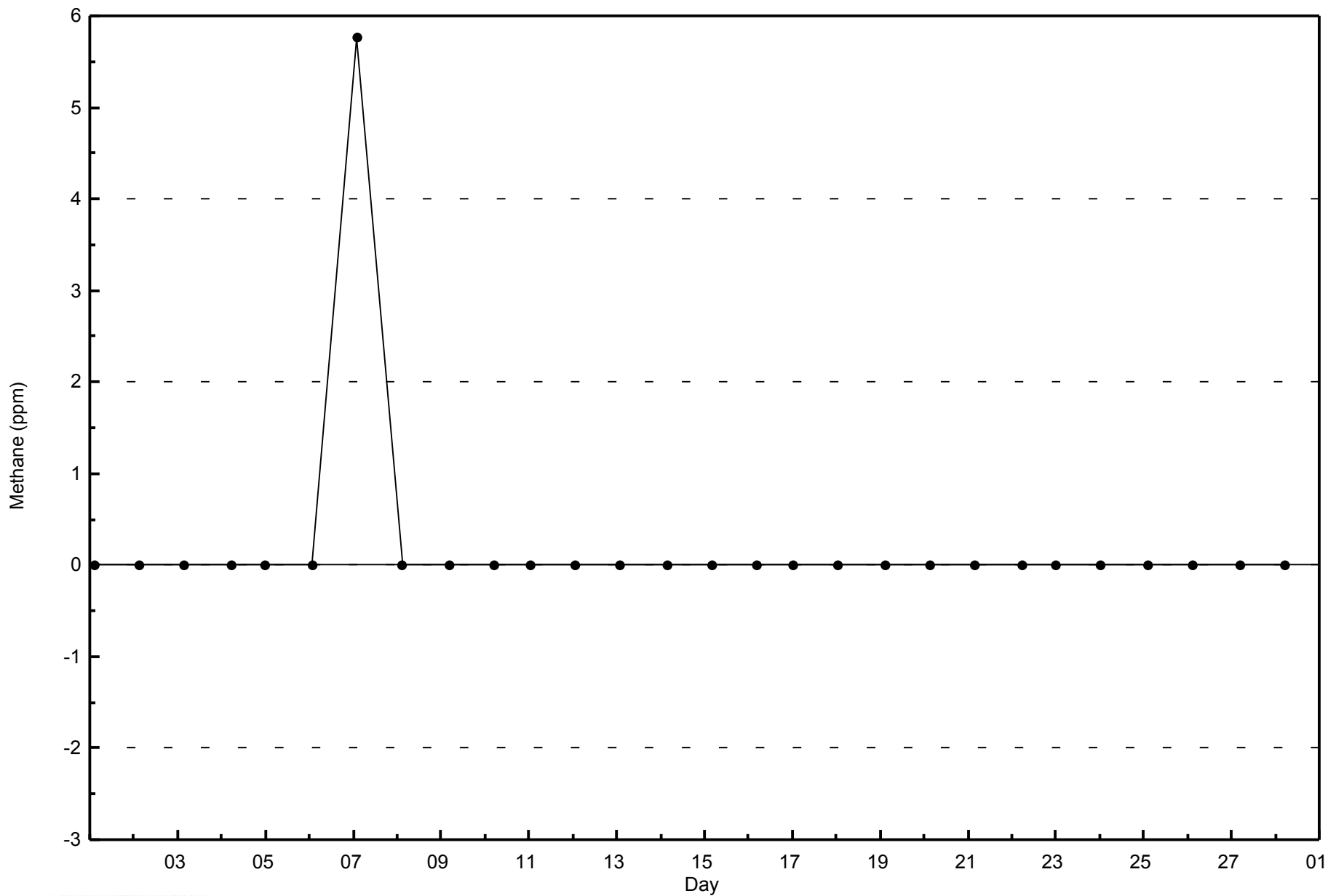
Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes (AMS 6)

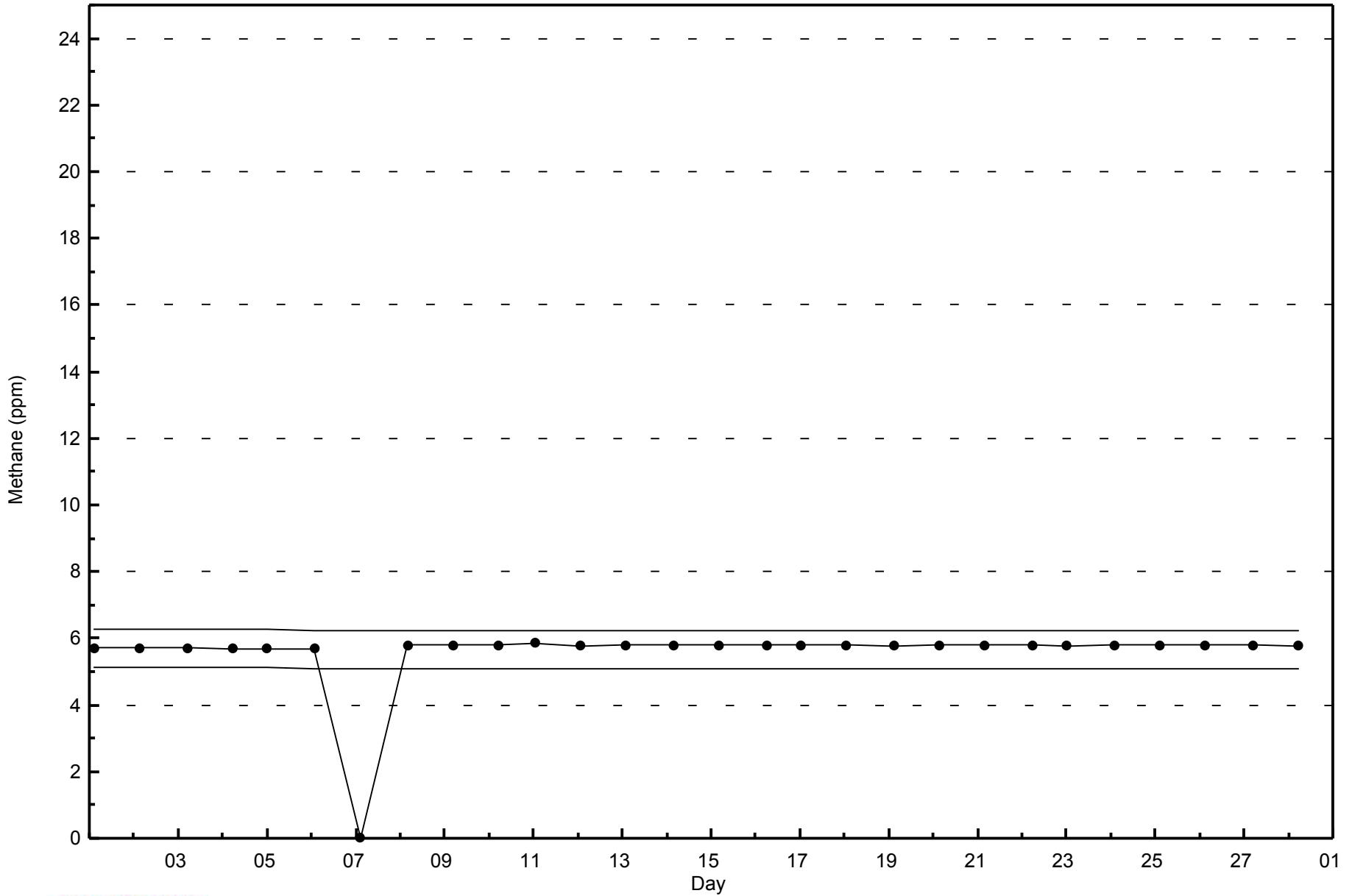




WBEA  
Zero Responses

Methane (CH<sub>4</sub>) - ppm  
Patricia McInnes - February 2015







Summary of Hour Averages

Patricia McInnes - February 2015

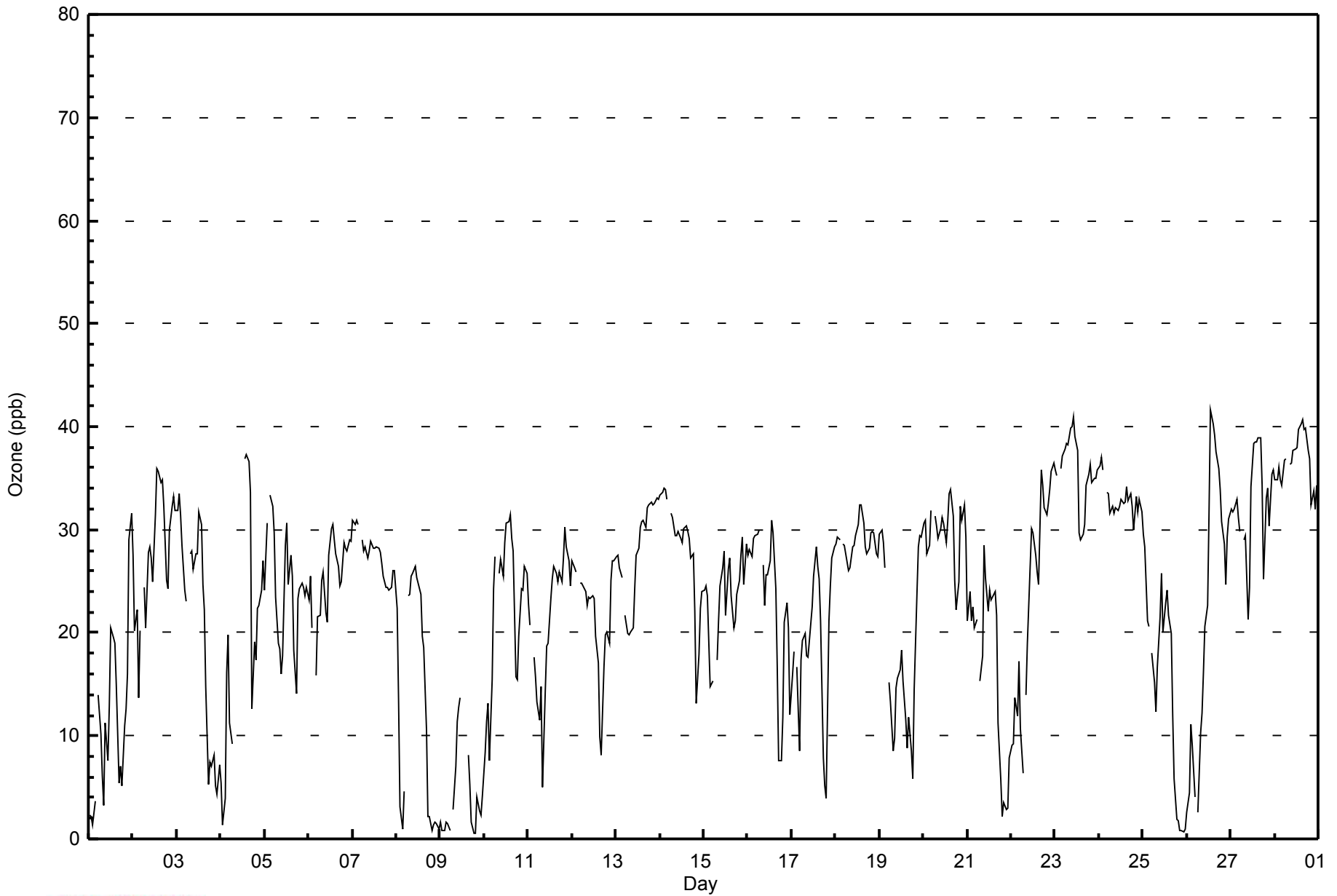
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 42 ppb on Feb 26 14:00										Maximum Daily Average: 36.6 ppb on Feb 28										Hours of Data: 637						
Minimum Value: 1 ppb on Feb 9 19:00										Minimum Daily Average: 4.2 ppb on Feb 9										Hours of Missing Data: 35						
Maximum Diurnal Average: 29.1 ppb at hour 14										Minimum Diurnal Average: 19.6 ppb at hour 19										Hours of Calibration: 32						
Monthly Average: 23.5 ppb										Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 7 Q <sub>1</sub> = 18 Median = 26 Q <sub>3</sub> = 31 P <sub>90</sub> = 34 P <sub>99</sub> = 40										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-Feb	2	2	1	4	Z	14	10	6	3	11	8	13	21	19	19	15	5	7	5	11	13	16	29	32	11.6	32
2-Feb	27	20	22	14	20	Z	24	20	28	28	27	25	31	36	36	35	35	32	25	24	30	32	33	32	27.8	36
3-Feb	32	33	31	29	24	23	Z	28	28	26	28	28	32	30	25	22	15	5	7	7	8	5	4	7	20.8	33
4-Feb	5	1	4	16	20	11	9	Z	7	C	C	C	C	37	37	37	34	13	19	17	22	23	24	27	19.2	37
5-Feb	24	31	Z	33	32	30	24	19	18	16	18	28	31	25	27	25	18	14	23	24	25	24	24	24	24.3	33
6-Feb	23	26	21	Z	16	22	22	25	26	22	21	28	30	30	29	28	26	25	25	29	28	28	29	29	25.5	30
7-Feb	31	30	31	31	Z	29	28	28	27	28	29	28	28	28	28	28	27	25	24	24	24	24	26	26	27.6	31
8-Feb	22	14	3	1	5	Z	24	24	26	26	26	25	25	24	20	19	11	2	2	1	1	2	1	1	13.2	26
9-Feb	2	1	1	2	1	1	Z	3	7	11	13	14	M	M	M	8	5	2	1	1	4	3	2	4	4.2	14
10-Feb	8	11	13	8	15	24	27	Z	26	27	25	29	31	31	31	29	28	16	15	20	24	24	26	26	22.4	31
11-Feb	23	21	Z	18	16	13	11	15	5	14	19	19	23	25	27	26	25	26	25	27	30	28	27	25	21.2	30
12-Feb	27	26	26	Z	25	25	25	24	23	23	23	24	23	20	17	10	8	17	20	20	19	25	27	27	21.9	27
13-Feb	27	27	26	25	Z	22	20	20	20	20	24	28	28	30	31	31	30	32	32	33	32	33	33	33	27.8	33
14-Feb	33	34	34	34	33	Z	32	31	29	30	29	30	30	30	30	29	27	28	22	13	18	22	24	24	28.3	34
15-Feb	24	25	24	15	15	15	Z	17	21	25	26	28	22	26	27	24	21	21	24	25	27	29	25	29	23.2	29
16-Feb	28	28	27	29	29	30	30	Z	27	23	26	26	27	31	30	24	17	8	8	12	21	23	20	12	23.2	31
17-Feb	16	18	Z	17	9	17	19	20	18	18	21	23	26	28	26	25	21	8	5	4	21	24	27	28	19.1	28
18-Feb	29	29	29	Z	29	29	27	26	26	28	28	29	31	32	32	31	28	28	28	30	30	30	28	27	28.9	32
19-Feb	30	30	29	26	Z	15	13	9	10	15	16	16	18	15	12	9	12	9	6	15	24	28	29	29	18.0	30
20-Feb	31	31	28	28	32	Z	31	30	29	30	31	31	29	31	34	34	31	25	22	25	32	31	32	29	29.9	34
21-Feb	21	24	21	22	21	21	Z	15	18	29	25	22	24	23	24	24	22	11	6	2	4	3	3	8	17.1	29
22-Feb	9	9	14	12	17	11	6	Z	14	19	26	30	30	28	26	25	36	34	32	31	33	34	36	36	23.8	36
23-Feb	36	35	Z	36	37	38	38	38	40	40	41	39	38	30	29	30	31	34	35	36	35	35	36	36	35.7	41
24-Feb	36	37	36	Z	34	34	32	32	32	32	32	32	33	33	34	33	33	32	30	33	32	33	32	32	33.0	37
25-Feb	29	28	21	21	Z	18	15	12	17	22	26	20	23	24	22	20	12	6	2	2	1	1	1	1	14.9	29
26-Feb	3	4	11	9	4	Z	3	10	12	16	21	23	32	42	40	39	38	36	34	31	29	25	29	31	22.6	42
27-Feb	32	32	32	33	31	30	Z	29	29	21	24	34	38	38	39	39	39	34	25	33	34	30	35	36	32.6	39
28-Feb	35	35	36	35	34	37	Z	36	36	38	38	38	40	40	41	40	40	38	37	32	34	32	34	34	36.6	41
23.1 23.0 21.7 20.7 21.7 22.1 22.0 21.0 21.5 23.6 24.9 26.2 28.4 29.1 28.5 26.4 24.1 20.4 19.6 20.5 22.5 23.0 24.1 24.5																								Diurnal Average		
36 37 36 36 37 38 38 38 40 40 41 39 38 42 40 41 40 40 40 38 37 35 35 36 36																								Diurnal Maximum		
Z - zerospan C - Calibration M - Maintenance																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb																										





**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - February 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	193	30.30	30.30
21 - 50	444	69.70	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Patricia McInnes - February 2015**

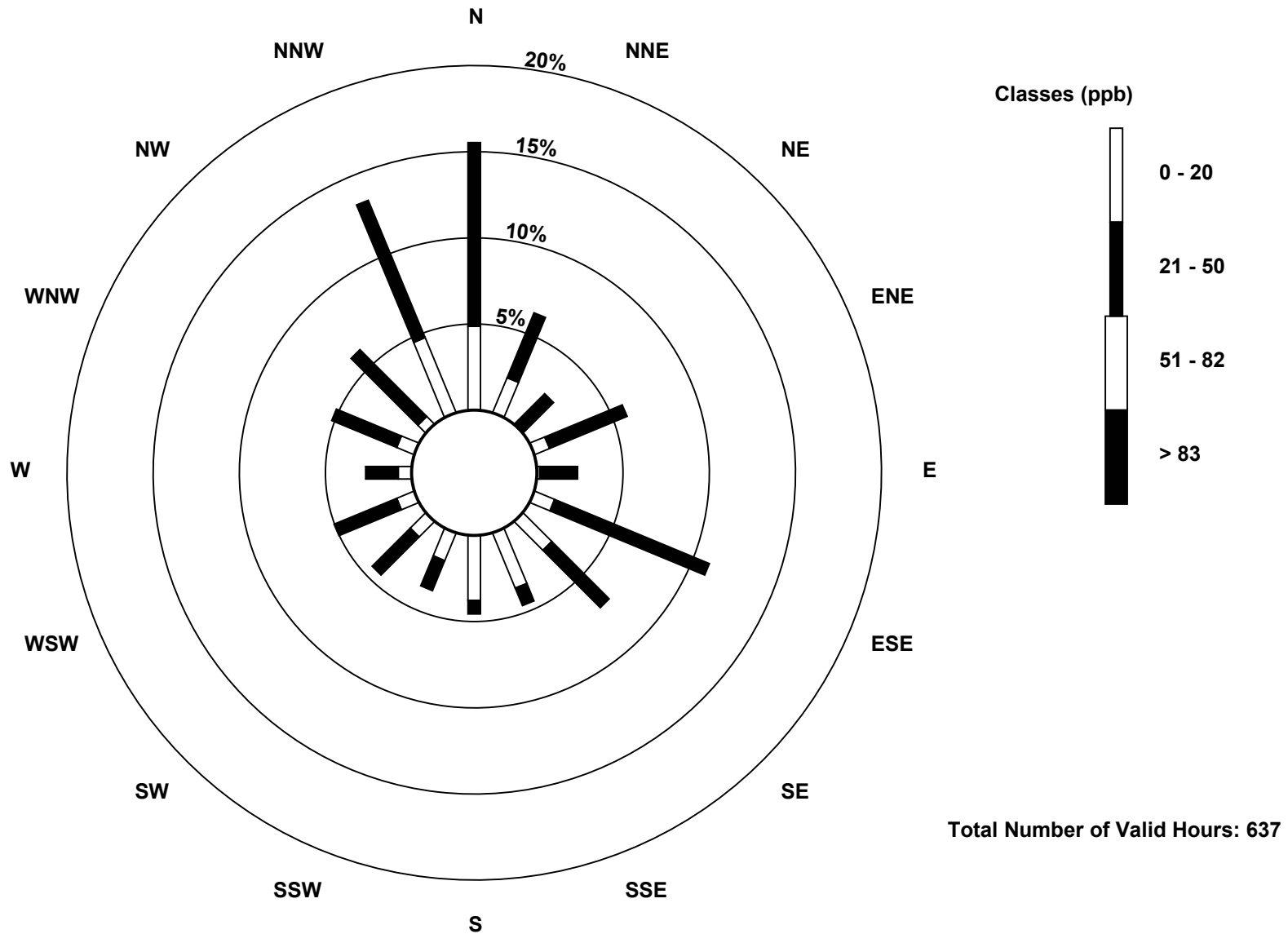
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	14	0	6	1	8	15	22	24	11	8	7	5	7	4	30	193
21 - 50	68	26	16	31	14	62	30	7	5	12	20	25	12	26	35	55	444
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	99	40	16	37	15	70	45	29	29	23	28	32	17	33	39	85	637

Total Number of Valid Hours: 637

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

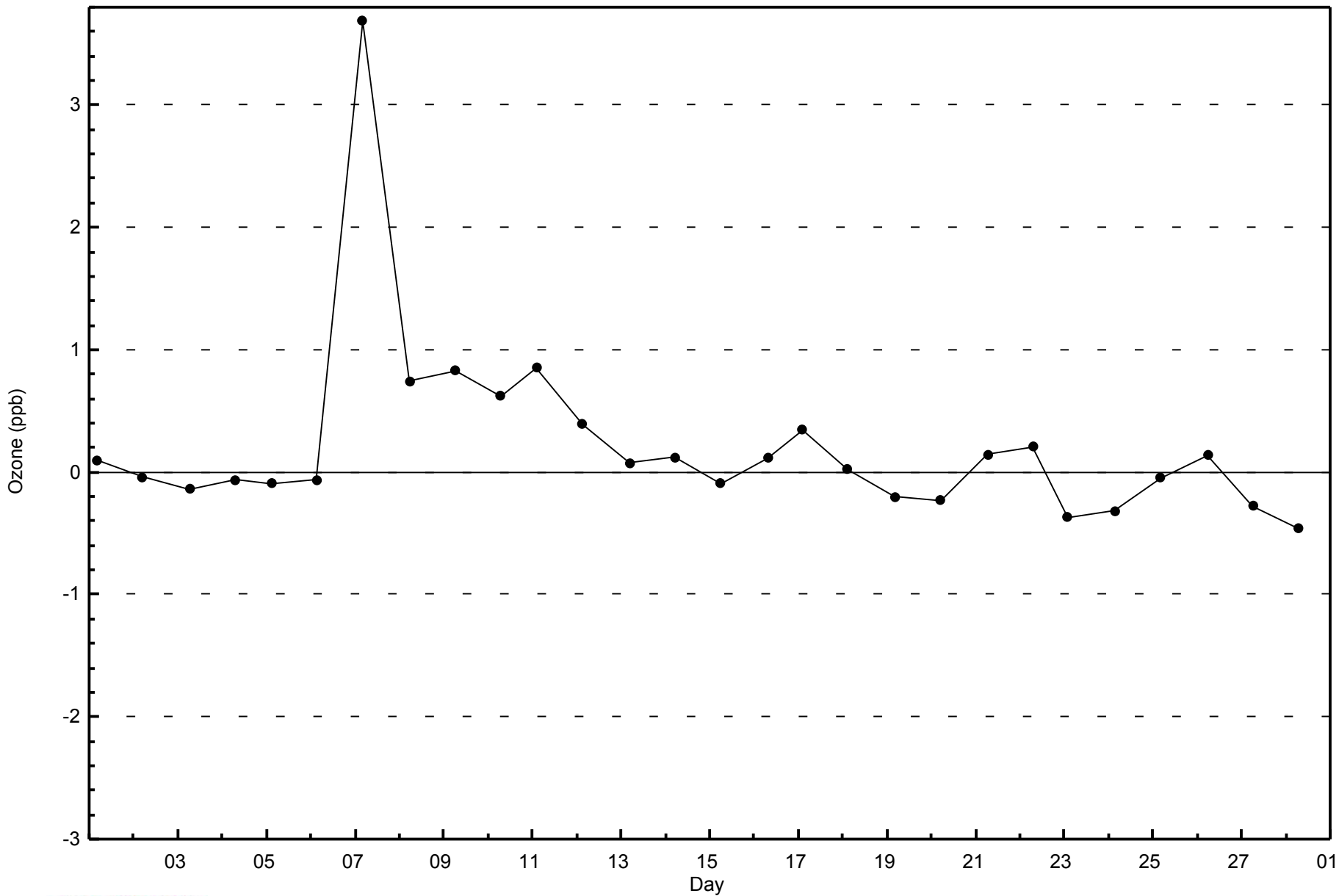
Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes (AMS 6)





WBEA  
Zero Responses

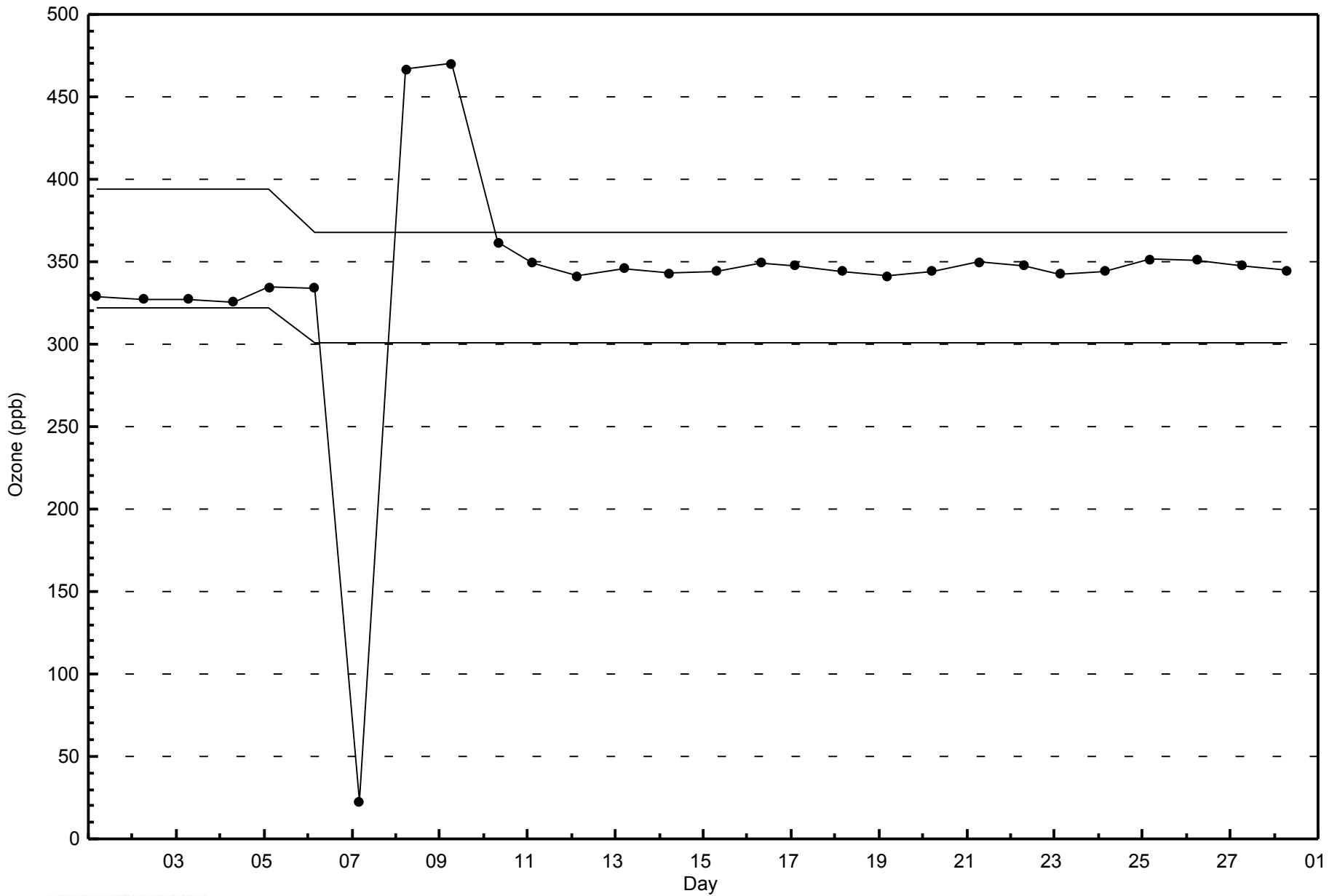
Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes - February 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Patricia McInnes - February 2015



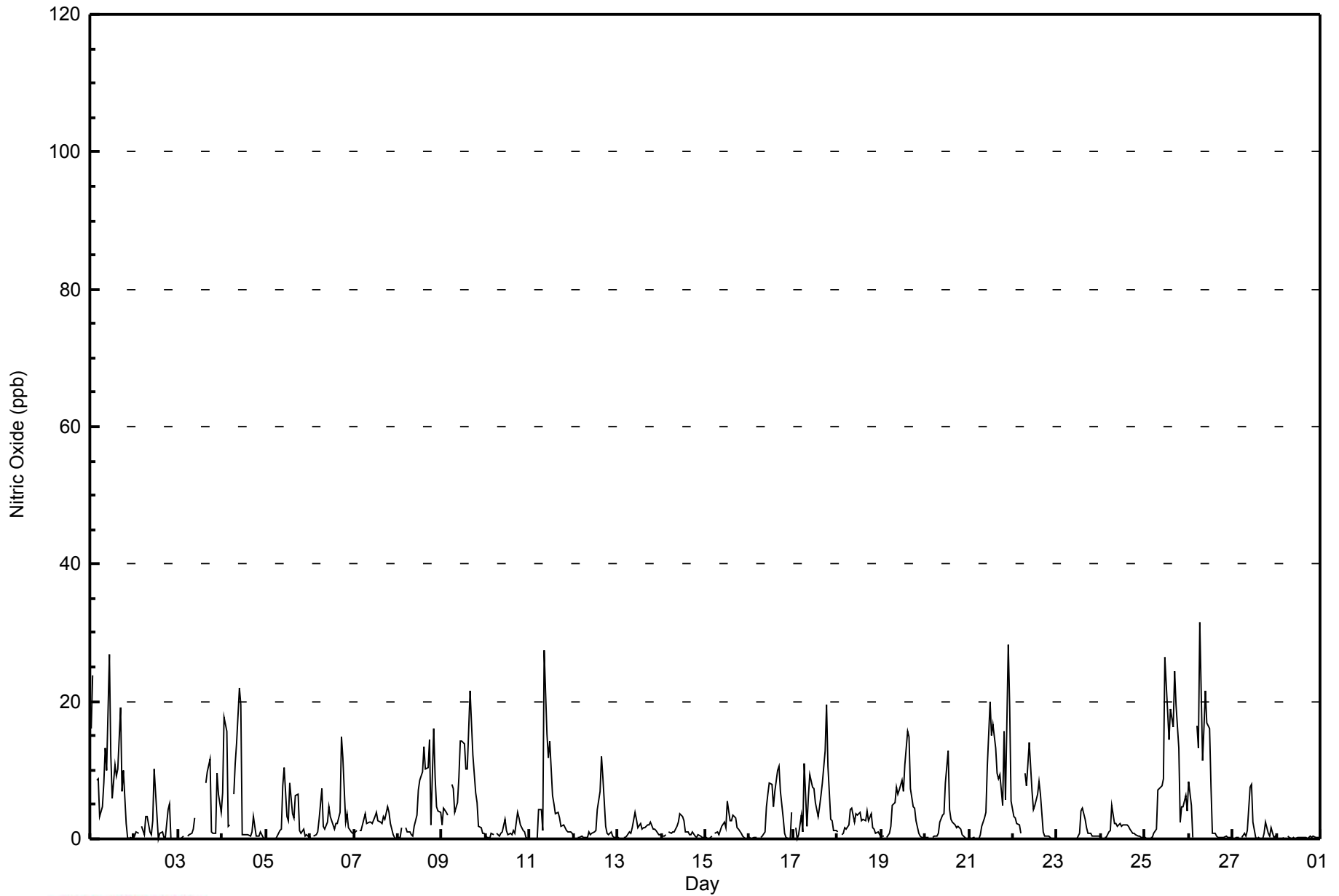


Maximum Value: 32 ppb on Feb 26 07:00																		Maximum Daily Average: 9.1 ppb on Feb 1						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 2 00:00																		Minimum Daily Average: 0.2 ppb on Feb 28						Hours of Data: 639		
Maximum Diurnal Average: 7.0 ppb at hour 11																		Minimum Diurnal Average: 1.0 ppb at hour 4						Hours of Missing Data: 33		
Monthly Average: 3.7 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 5 P <sub>90</sub> = 11 P <sub>99</sub> = 23						Hours of Calibration: 33		
																								Percent Operational Time: 100.0		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	16	24	Z	9	9	3	5	8	13	10	27	12	6	11	9	10	19	7	10	2	0	0	0	0	9.1	27
2-Feb	0	1	1	Z	2	1	3	3	1	1	3	10	3	0	1	1	0	0	4	5	0	0	0	0	1.8	10
3-Feb	0	0	0	0	Z	0	1	1	1	3	C	C	C	C	C	8	10	12	1	1	1	10	7	4	3.3	12
4-Feb	7	18	16	2	2	Z	7	11	14	22	20	1	1	1	1	0	1	3	0	0	0	1	0	0	5.5	22
5-Feb	Z	0	0	0	0	0	0	1	1	8	10	3	1	8	4	3	6	6	1	1	1	0	1	0	2.6	10
6-Feb	0	Z	0	1	1	3	7	2	1	2	5	3	2	1	2	2	4	15	12	2	4	2	1	1	3.2	15
7-Feb	1	1	Z	1	1	3	4	2	2	2	2	3	4	3	2	2	3	3	5	4	2	1	0	0	2.3	5
8-Feb	0	0	2	Z	2	1	1	1	0	2	3	7	8	10	13	10	10	15	2	16	9	5	4	4	5.4	16
9-Feb	2	5	4	4	Z	8	7	4	5	9	14	14	14	10	10	22	17	12	7	5	2	2	1	1	7.7	22
10-Feb	0	0	0	1	1	Z	1	0	1	1	3	1	1	1	1	1	1	4	3	2	1	1	0	0	1.1	4
11-Feb	Z	0	0	0	0	4	4	1	27	15	12	14	6	5	4	4	3	2	2	2	1	1	1	1	4.8	27
12-Feb	0	Z	0	0	0	0	0	0	1	1	1	1	1	4	7	12	9	2	1	1	1	0	0	0	1.9	12
13-Feb	0	0	Z	0	0	0	1	1	2	4	3	2	2	1	2	2	2	2	2	1	1	1	1	1	1.4	4
14-Feb	0	0	1	Z	1	1	1	1	2	2	4	3	3	1	1	1	1	1	0	0	1	0	0	0	1.1	4
15-Feb	0	0	0	0	Z	1	1	1	1	2	2	2	6	3	3	4	3	2	1	1	0	0	0	0	1.4	6
16-Feb	0	0	0	0	0	Z	0	0	1	5	6	8	8	5	7	10	11	7	3	1	0	0	0	4	3.3	11
17-Feb	Z	2	0	1	4	1	11	2	6	9	8	7	5	3	5	6	8	13	19	11	3	3	1	1	5.6	19
18-Feb	1	Z	1	1	2	1	2	4	5	2	4	3	4	3	3	3	4	3	4	2	1	1	1	1	2.3	5
19-Feb	0	0	Z	0	1	2	5	5	8	6	7	8	7	11	16	15	7	5	5	3	1	0	0	0	4.9	16
20-Feb	0	0	0	Z	0	0	0	1	2	4	4	8	13	4	3	2	2	2	2	2	1	0	0	0	2.2	13
21-Feb	0	0	0	0	Z	0	1	2	3	4	11	20	15	17	13	9	9	9	5	16	6	28	19	5	8.4	28
22-Feb	3	3	2	2	1	Z	10	8	11	14	7	4	5	7	8	6	1	0	0	0	0	0	0	0	4.0	14
23-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	4	4	3	2	1	1	0	0	0	0	0	0.8	4
24-Feb	0	Z	0	0	1	1	5	2	2	2	2	2	2	2	2	2	2	1	1	1	0	0	0	0	1.4	5
25-Feb	0	0	Z	0	0	1	1	7	7	8	9	26	19	14	19	16	24	20	13	2	5	5	6	4	9.0	26
26-Feb	8	5	0	Z	16	13	32	11	16	21	17	16	8	1	1	0	0	0	0	0	1	0	0	0	7.3	32
27-Feb	0	0	0	0	Z	0	1	0	1	7	8	2	0	0	0	0	0	1	2	1	0	2	0	0	1.2	8
28-Feb	0	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
1.7 2.5 1.2 1.0 1.9 2.0 4.0 2.9 4.9 6.0 7.0 6.8 5.4 4.8 5.2 5.6 5.7 5.2 3.9 2.9 1.6 2.3 1.6 1.0																		Diurnal Average								
16 24 16 9 16 13 32 11 27 22 27 26 19 17 19 22 24 20 19 16 9 28 19 5																		Diurnal Maximum								
Z - zerospan C - Calibration																										



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - February 2015**







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

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	629	98.44	98.44
21 - 40	10	1.56	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - February 2015**

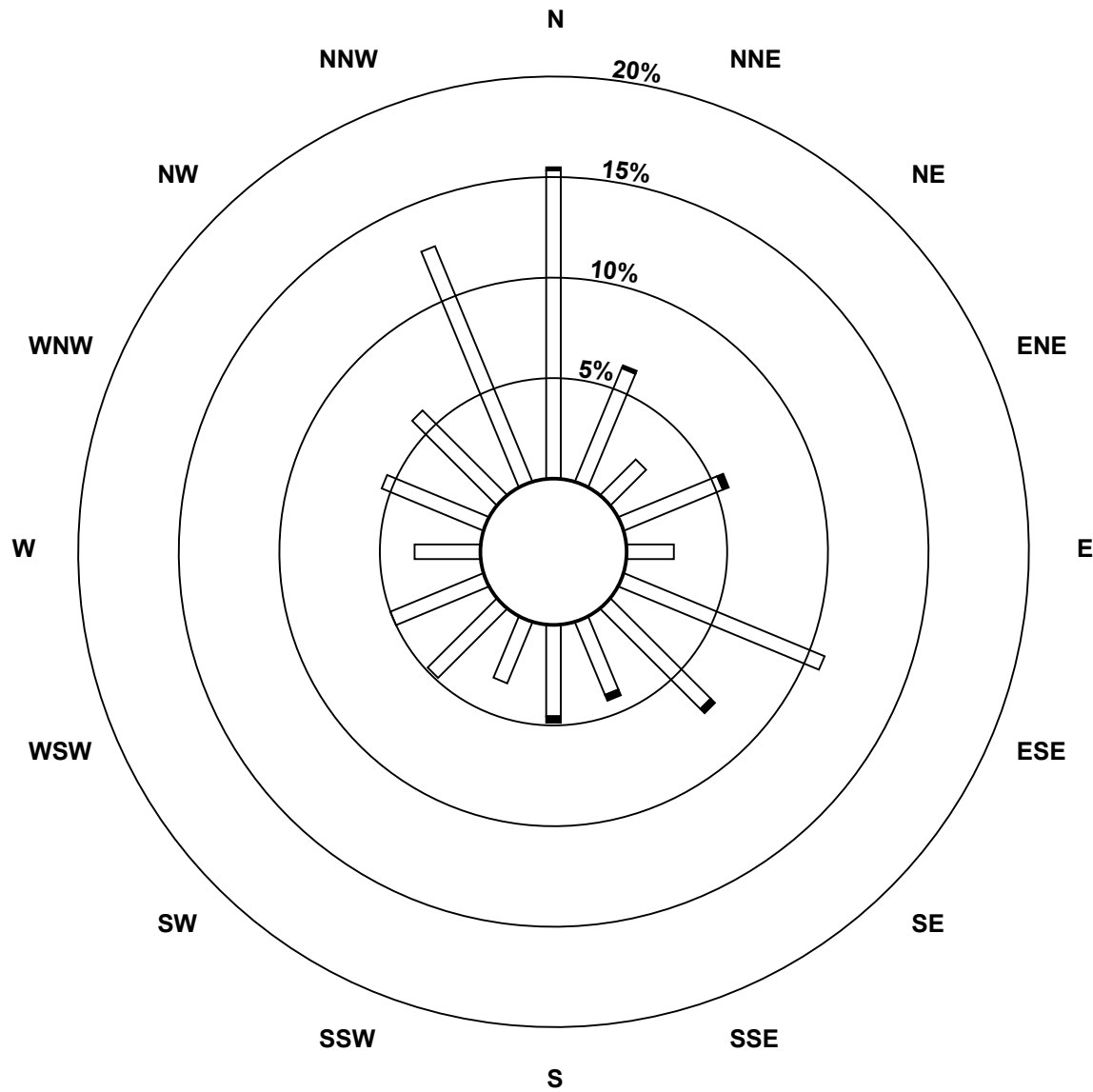
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	98	39	16	34	15	69	45	25	29	21	31	32	21	35	38	81	629
21 - 40	1	1	0	2	0	0	2	2	2	0	0	0	0	0	0	0	10
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	99	40	16	36	15	69	47	27	31	21	31	32	21	35	38	81	639

Total Number of Valid Hours: 639

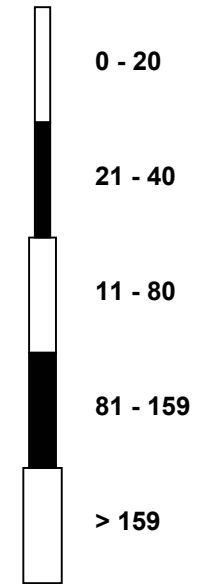
Total Number of Hours: 672

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

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



Classes (ppb)

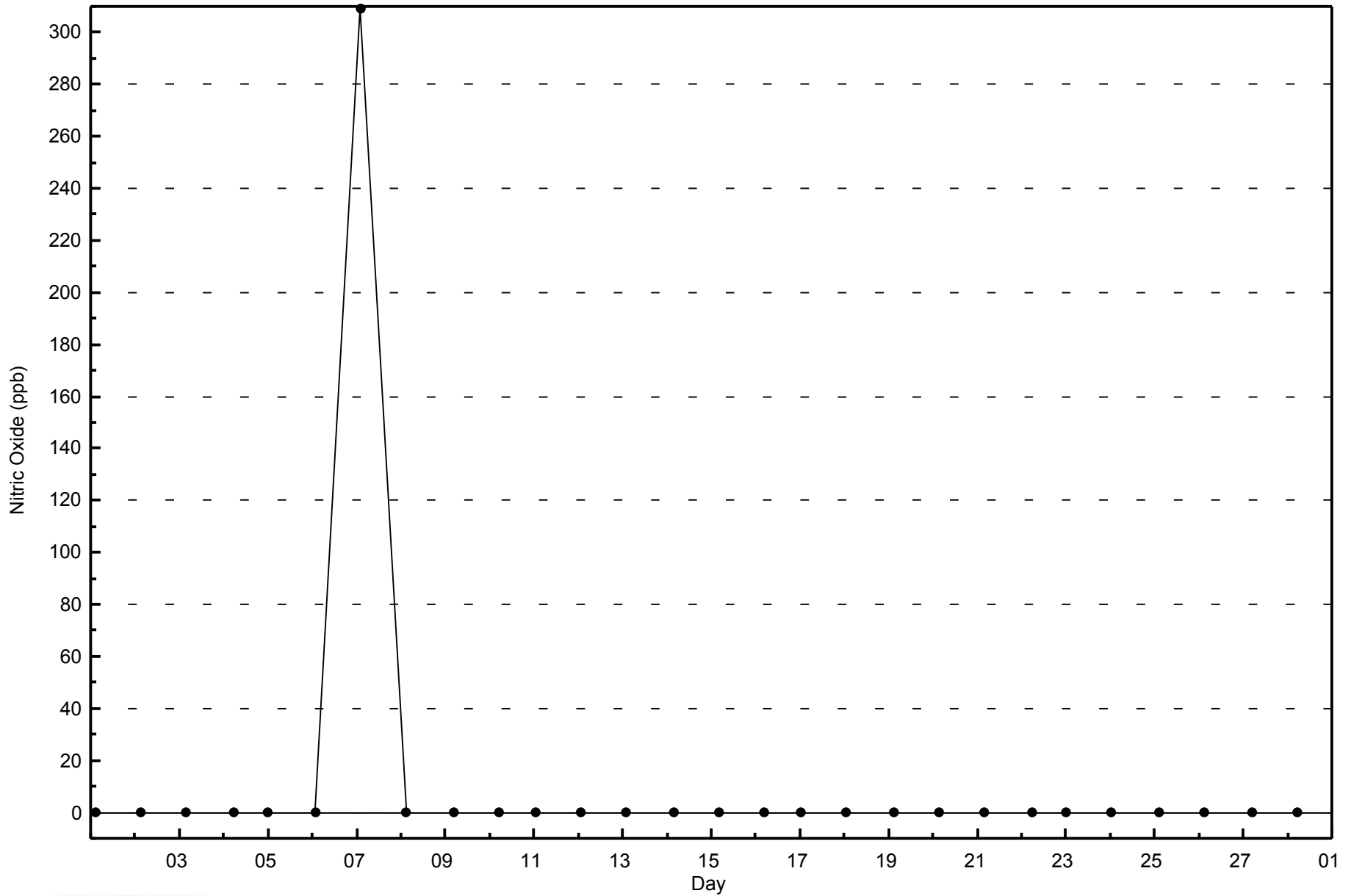


**Total Number of Valid Hours: 639**



**WBEA**  
**Zero Responses**

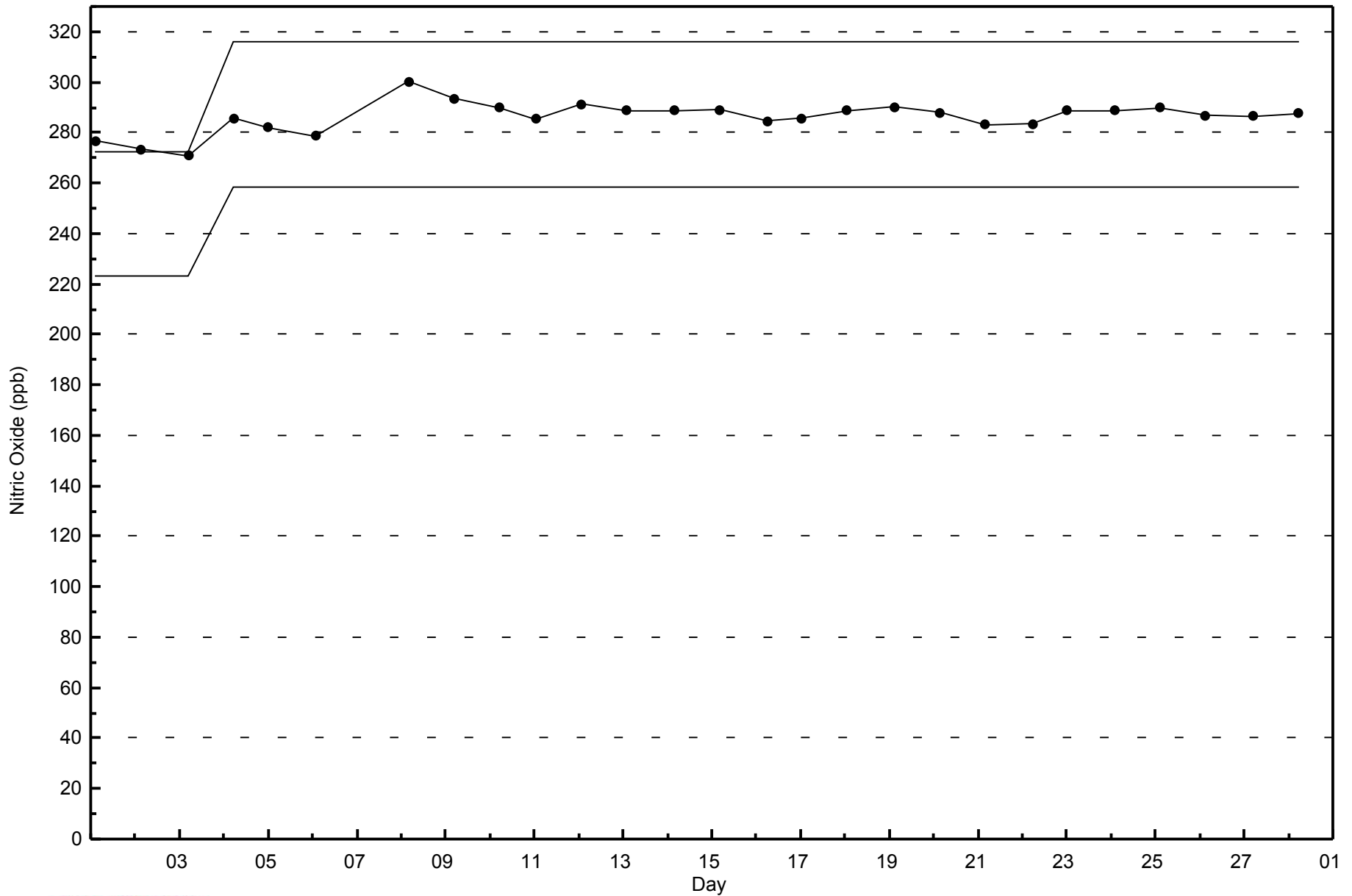
**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - February 2015**





**WBEA**  
**Span Responses**

**Nitric Oxide (NO) - ppb**  
**Patricia McInnes - February 2015**





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 36 ppb on Feb 17 19:00	Maximum Daily Average: 23.5 ppb on Feb 9		Hours of Data:	639
Minimum Value: 0 ppb on Feb 2 00:00	Minimum Daily Average: 2.1 ppb on Feb 28		Hours of Missing Data:	33
Maximum Diurnal Average: 15.4 ppb at hour 18	Minimum Diurnal Average: 6.0 ppb at hour 14		Hours of Calibration:	33
Monthly Average: 9.7 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 7 Q <sub>3</sub> = 14 P <sub>90</sub> = 23 P <sub>99</sub> = 34		Percent Operational Time:	100.0

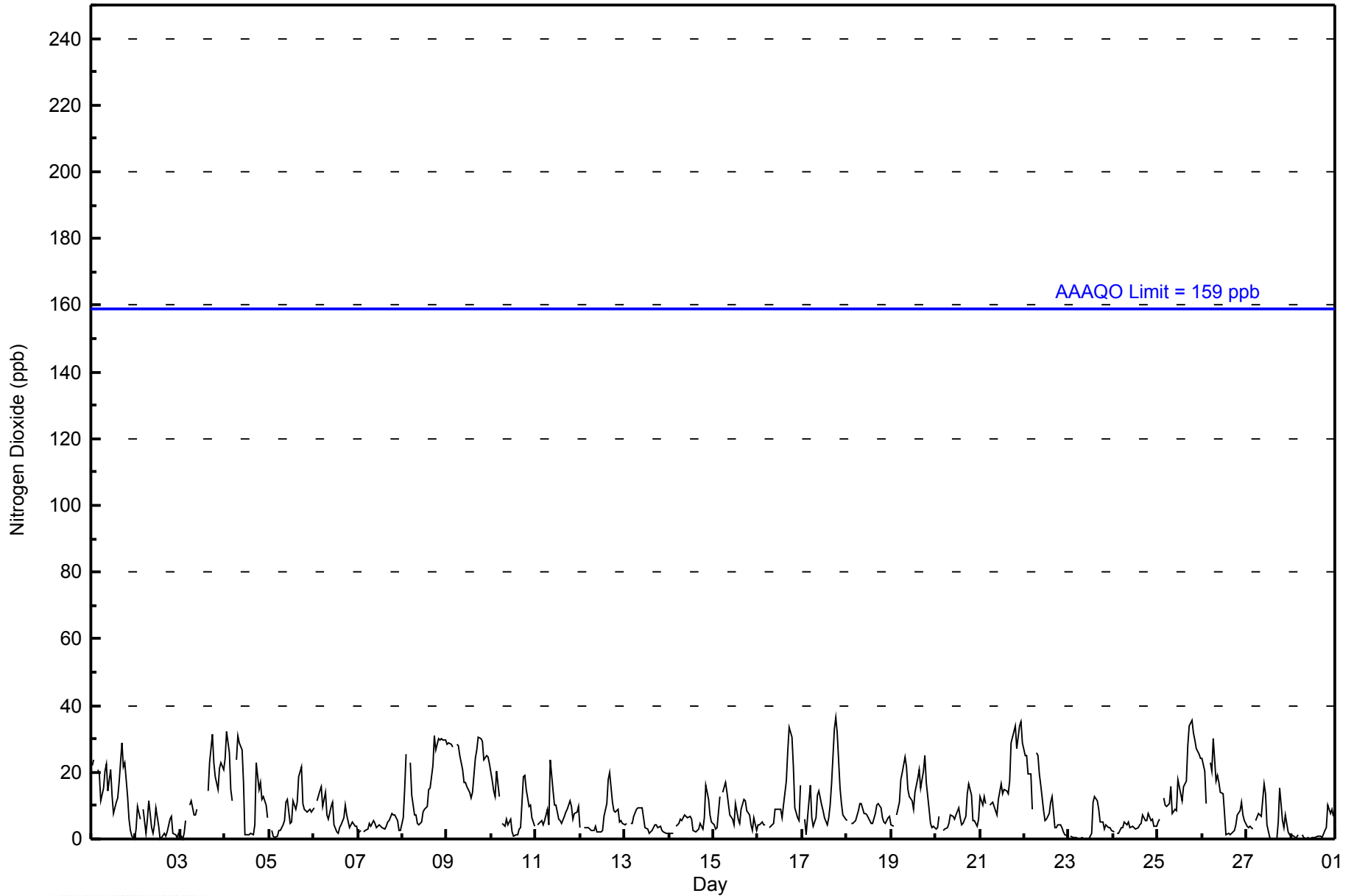
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	22	24	Z	21	19	11	15	20	22	14	21	13	8	11	12	17	29	22	23	13	6	2	1	0	15.1	29
2-Feb	3	10	6	Z	9	2	6	11	3	2	4	9	4	0	1	2	1	2	6	7	2	1	1	2	4.0	11
3-Feb	1	0	2	6	Z	10	12	7	7	9	C	C	C	C	C	15	23	31	23	19	15	21	23	21	13.5	31
4-Feb	24	32	26	15	11	Z	24	31	29	27	17	1	1	1	2	1	4	23	15	17	12	13	10	6	14.9	32
5-Feb	Z	3	1	1	1	3	3	4	6	11	12	5	5	11	9	11	19	22	11	9	8	8	9	8	7.7	22
6-Feb	9	Z	12	14	16	10	14	7	6	10	11	4	2	2	3	4	6	10	7	4	4	5	4	4	7.3	16
7-Feb	2	2	Z	2	3	3	5	4	6	5	3	4	4	4	3	4	5	5	8	7	7	5	3	2	4.1	8
8-Feb	6	15	26	Z	23	13	7	7	5	4	5	8	9	10	15	15	22	31	27	30	30	30	30	30	17.2	31
9-Feb	28	29	29	28	Z	28	28	25	21	17	17	16	14	12	14	24	27	30	30	29	24	25	25	23	23.5	30
10-Feb	17	15	13	20	13	Z	5	4	6	4	6	2	1	1	1	3	4	19	19	15	10	10	6	4	8.6	20
11-Feb	Z	4	5	5	4	5	9	4	24	15	10	10	6	6	5	7	8	9	11	10	6	8	8	10	8.2	24
12-Feb	4	Z	3	4	4	3	3	3	4	2	2	2	3	7	10	18	20	11	9	8	9	5	5	5	6.1	20
13-Feb	4	5	Z	5	5	7	9	9	9	9	6	3	3	2	2	3	4	4	3	4	3	2	2	2	4.5	9
14-Feb	2	2	2	Z	4	5	6	5	7	7	6	7	6	2	2	3	3	5	3	7	16	12	7	5	5.3	16
15-Feb	4	3	3	13	Z	14	17	14	10	7	6	4	11	6	5	9	12	12	9	7	4	2	6	3	7.9	17
16-Feb	4	4	5	4	4	Z	3	4	5	9	9	9	9	6	10	17	26	34	30	22	9	6	5	16	11.0	34
17-Feb	Z	6	1	6	16	6	4	7	13	14	10	8	6	4	6	10	17	33	36	32	15	11	7	6	12.0	36
18-Feb	5	Z	5	5	5	6	9	11	11	8	8	7	6	5	5	8	10	11	9	6	5	5	7	7	6.9	11
19-Feb	4	4	Z	7	11	18	20	24	22	15	13	12	9	14	18	21	15	20	25	17	9	5	3	4	13.4	25
20-Feb	3	3	7	Z	3	3	3	5	7	7	6	7	10	7	4	5	7	13	17	13	6	6	4	6	6.5	17
21-Feb	13	10	13	11	Z	10	11	11	9	7	12	17	14	15	14	14	18	29	32	34	27	34	35	29	18.1	35
22-Feb	25	25	19	19	9	Z	26	25	20	16	8	6	6	8	11	13	4	3	4	4	4	2	1	1	11.2	26
23-Feb	Z	1	1	0	0	0	0	0	0	0	0	0	2	11	13	11	9	5	5	3	4	4	3	3	3.3	13
24-Feb	2	Z	2	2	4	4	5	4	5	4	3	3	4	4	5	7	5	5	8	6	6	6	4	4	4.2	8
25-Feb	5	6	Z	12	10	10	11	16	8	9	8	18	14	12	16	17	28	34	35	32	30	27	26	24	17.7	35
26-Feb	24	20	11	Z	23	20	30	17	19	17	14	13	8	1	2	1	2	3	4	7	9	11	7	5	11.7	30
27-Feb	4	4	4	3	Z	6	8	7	7	17	14	4	1	0	0	0	0	5	15	5	4	7	2	1	5.1	17
28-Feb	1	1	0	1	1	Z	1	1	0	0	0	0	0	0	1	1	1	0	3	3	10	8	9	7	2.1	10
	9.1	9.4	8.4	8.8	8.5	8.5	10.4	10.3	10.3	9.5	8.6	7.2	6.0	6.0	6.9	9.2	11.7	15.4	15.1	13.2	10.4	10.0	9.0	8.4	Diurnal Average	
	28	32	29	28	23	28	30	31	29	27	21	18	14	15	18	24	29	34	36	34	30	34	35	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**  
**Patricia McInnes - February 2015**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	555	86.85	86.85
21 - 40	84	13.15	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: 639

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Patricia McInnes - February 2015**

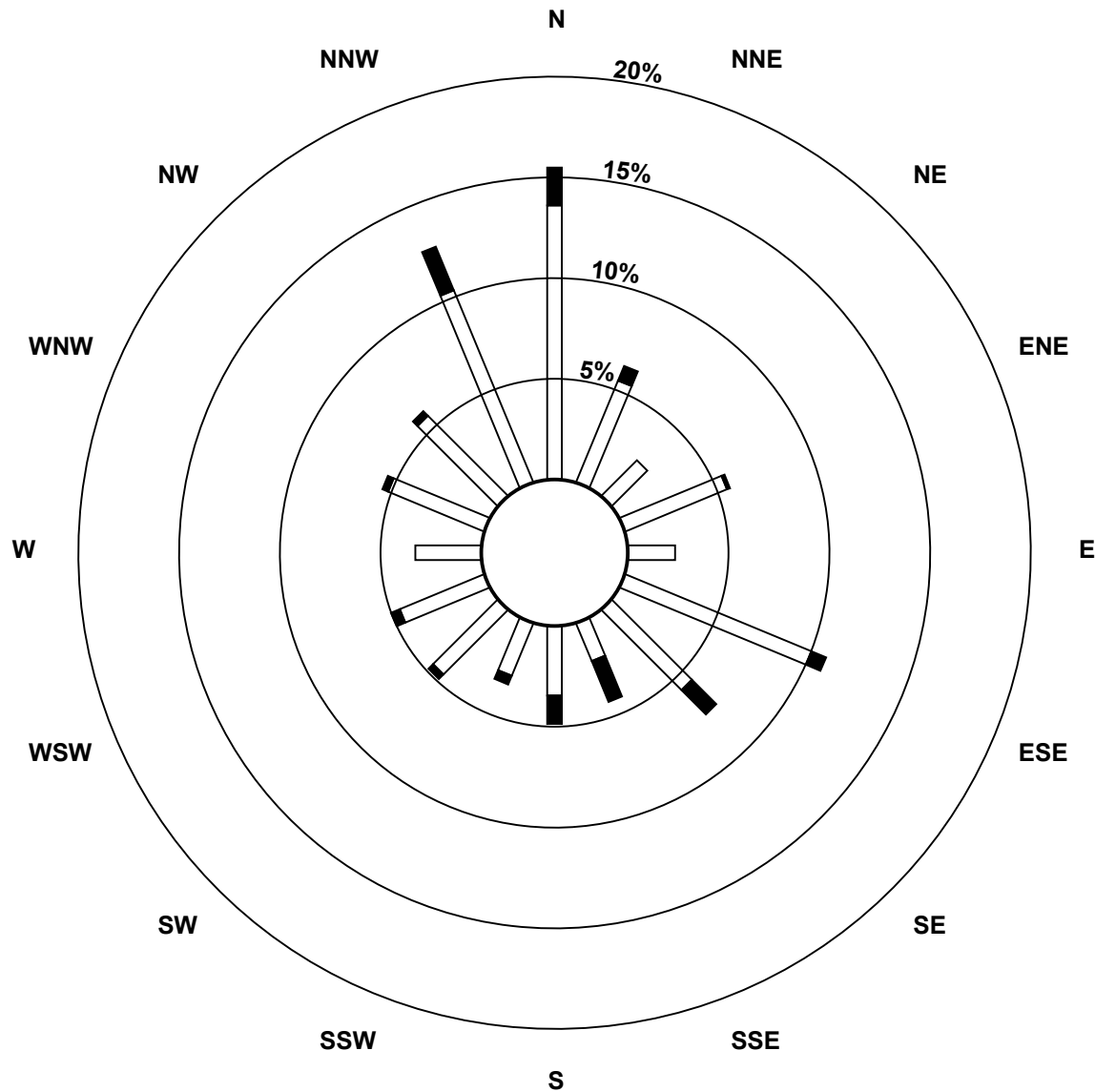
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	87	35	16	35	15	64	36	13	22	18	29	29	21	33	36	66	555
21 - 40	12	5	0	1	0	5	11	14	9	3	2	3	0	2	2	15	84
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	99	40	16	36	15	69	47	27	31	21	31	32	21	35	38	81	639

Total Number of Valid Hours: 639

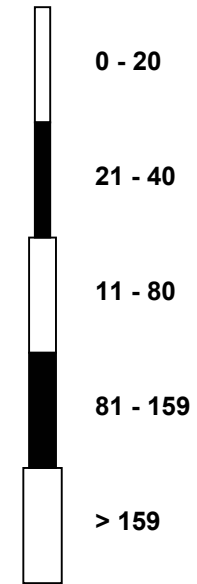
Total Number of Hours: 672

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes (AMS 6)**



Classes (ppb)

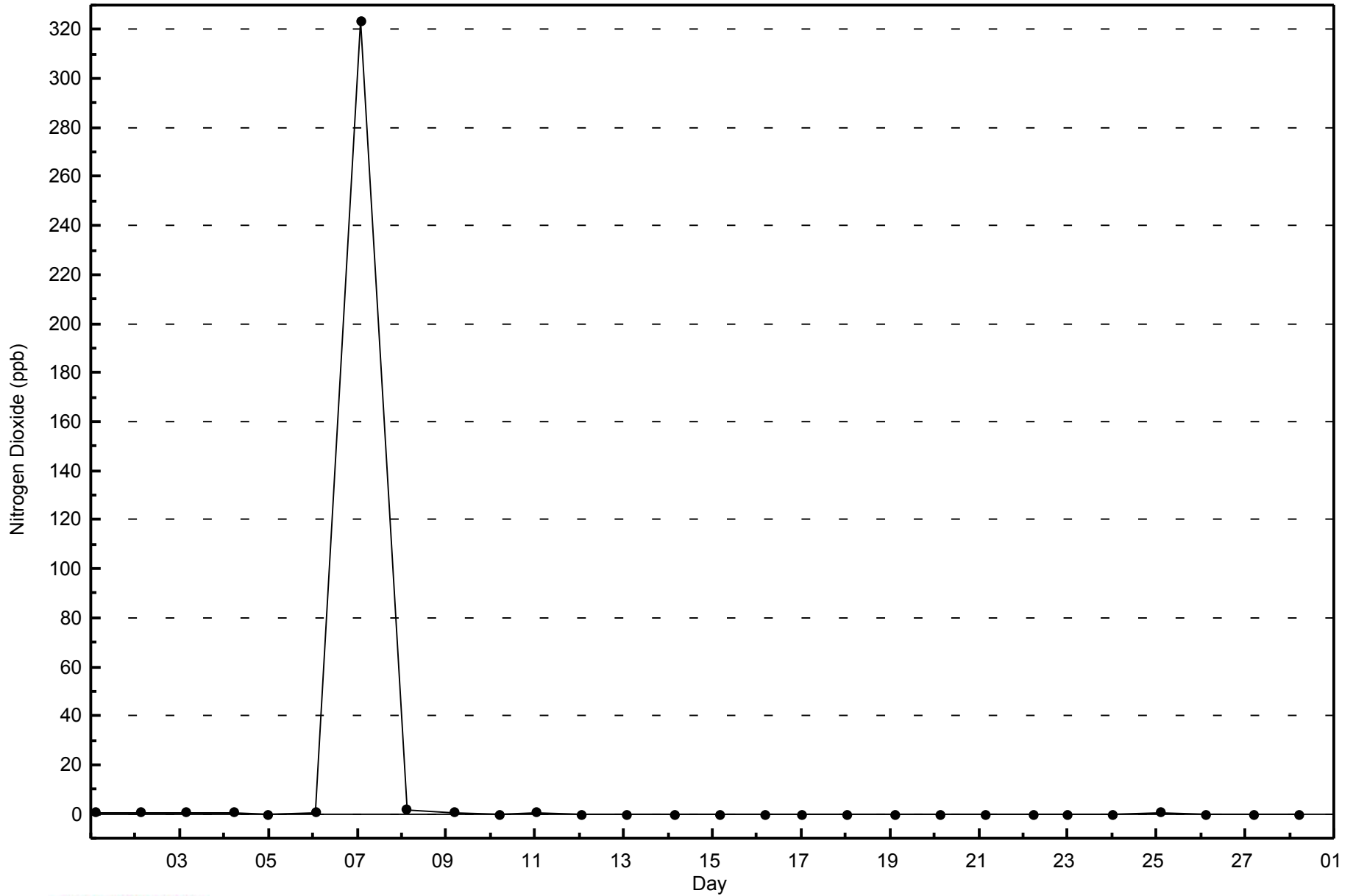


**Total Number of Valid Hours: 639**



WBEA  
Zero Responses

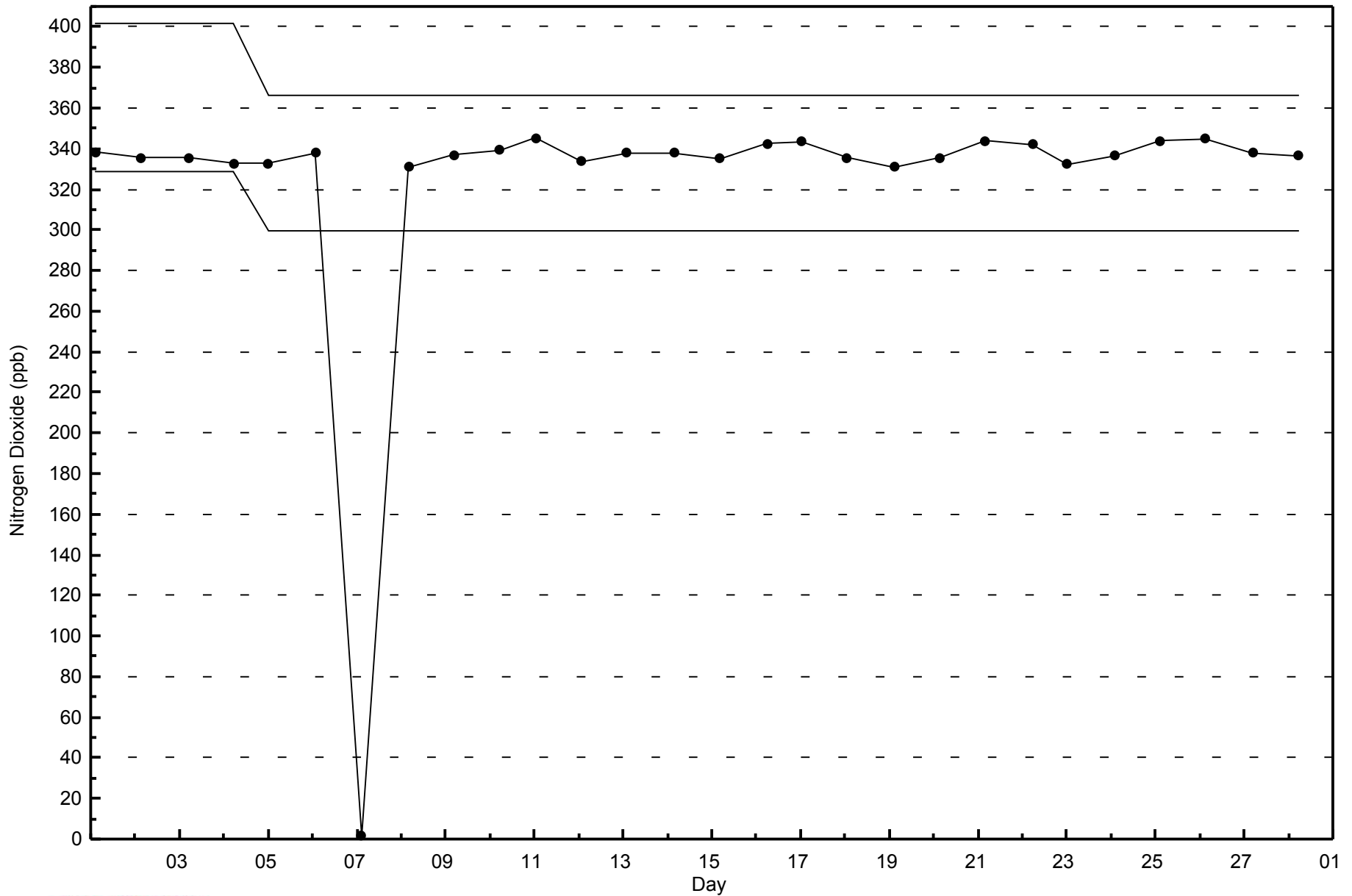
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Patricia McInnes - February 2015



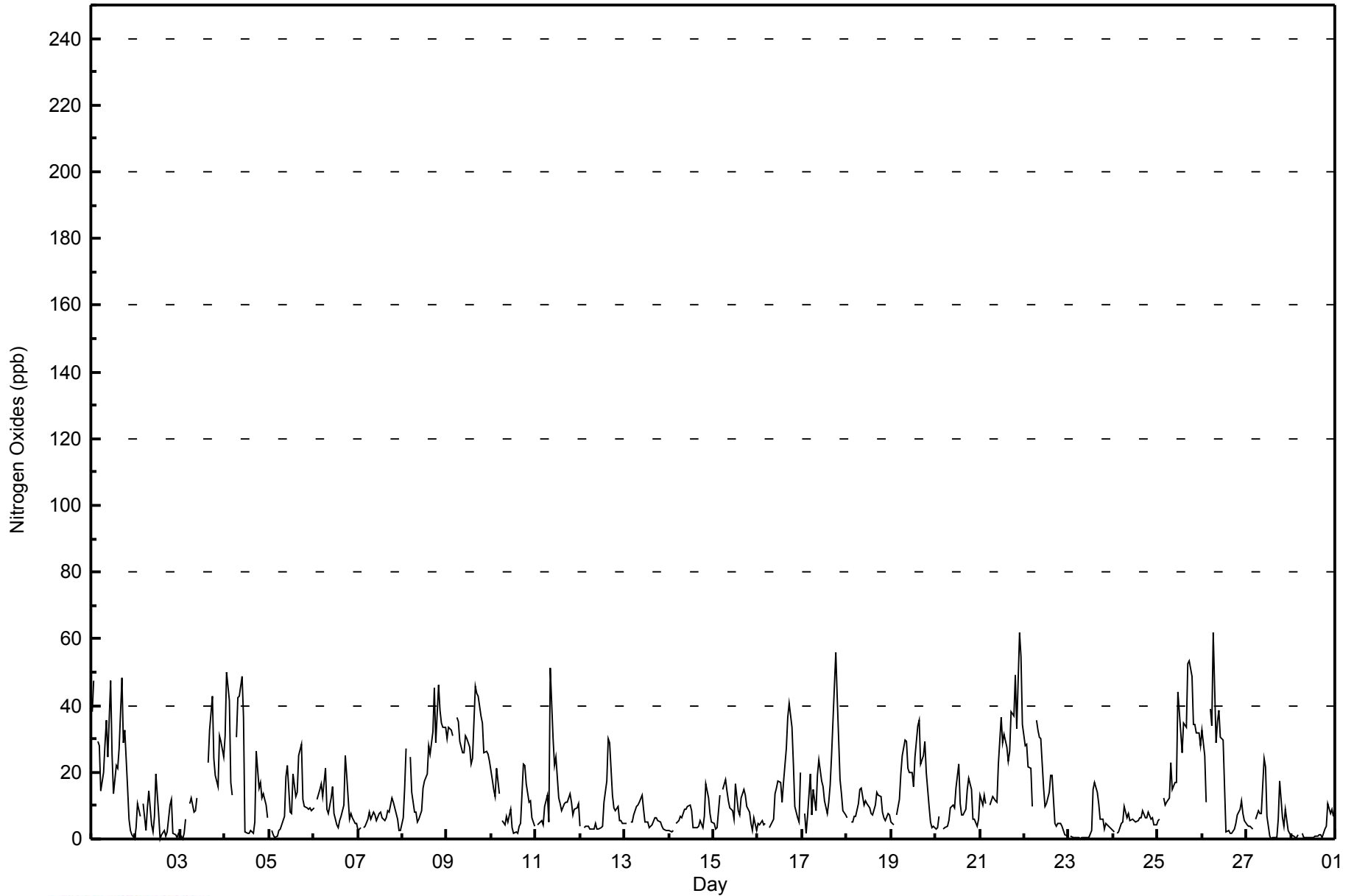


Maximum Value: 62 ppb on Feb 21 22:00																		Maximum Daily Average: 31.3 ppb on Feb 9						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 2 00:00																		Minimum Daily Average: 2.3 ppb on Feb 28						Hours of Data: 639		
Maximum Diurnal Average: 20.6 ppb at hour 18																		Minimum Diurnal Average: 9.4 ppb at hour 24						Hours of Missing Data: 33		
Monthly Average: 13.3 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 5 Median = 9 Q <sub>3</sub> = 19 P <sub>90</sub> = 32 P <sub>99</sub> = 51						Hours of Calibration: 33		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	38	47	Z	29	28	14	20	28	35	25	47	25	14	22	21	27	48	29	33	15	6	2	1	0	24.2	48
2-Feb	3	11	7	Z	11	3	9	15	4	2	7	19	7	0	1	3	1	2	10	12	2	1	1	2	5.7	19
3-Feb	1	0	2	6	Z	10	12	8	9	12	C	C	C	C	C	23	33	43	24	19	16	31	29	25	16.8	43
4-Feb	31	50	42	17	13	Z	30	42	43	49	37	2	2	2	2	2	5	26	15	17	12	13	10	6	20.4	50
5-Feb	Z	3	1	1	1	3	3	6	7	19	22	8	8	20	13	14	25	28	12	10	9	9	9	9	10.3	28
6-Feb	9	Z	12	15	17	13	21	9	8	12	16	8	4	3	6	7	10	25	19	6	8	7	5	5	10.5	25
7-Feb	3	3	Z	3	4	6	8	6	8	7	6	8	8	6	6	6	8	8	12	11	9	6	3	3	6.4	12
8-Feb	6	15	27	Z	24	14	8	8	5	6	8	15	17	20	28	25	32	46	29	46	39	35	34	33	22.6	46
9-Feb	30	33	33	31	Z	36	35	29	26	26	31	30	28	22	24	46	43	43	37	35	26	26	25	23	31.3	46
10-Feb	18	15	13	21	13	Z	5	4	7	5	9	3	2	2	2	4	4	22	22	17	11	11	6	4	9.6	22
11-Feb	Z	4	5	5	4	10	13	5	51	30	22	24	12	11	8	11	11	11	13	11	7	9	9	11	13.0	51
12-Feb	4	Z	4	4	4	3	3	3	5	3	3	3	4	11	17	30	29	13	9	9	10	5	6	5	8.0	30
13-Feb	5	5	Z	5	5	7	10	10	11	13	9	5	5	3	4	4	6	6	6	5	4	3	2	2	5.9	13
14-Feb	2	2	3	Z	5	5	7	6	9	9	10	10	8	3	3	3	4	6	3	7	17	12	7	5	6.4	17
15-Feb	5	3	3	13	Z	15	18	14	11	9	8	6	16	8	7	12	15	13	10	8	5	3	6	2	9.3	18
16-Feb	5	4	5	4	4	Z	3	4	6	14	15	17	17	11	17	27	37	41	33	22	10	6	5	20	14.3	41
17-Feb	Z	8	1	7	20	7	15	8	19	24	18	16	12	7	11	16	25	46	56	42	18	14	8	7	17.6	56
18-Feb	6	Z	5	5	7	7	10	15	15	10	12	11	10	8	7	10	14	13	13	8	7	6	7	7	9.2	15
19-Feb	5	4	Z	7	12	20	25	30	29	21	20	20	15	25	34	35	22	25	29	20	10	5	3	4	18.3	35
20-Feb	3	3	7	Z	3	3	4	5	9	10	9	15	22	11	7	7	9	15	18	15	6	6	4	6	8.7	22
21-Feb	13	10	13	11	Z	10	11	13	12	11	22	37	29	32	27	23	26	38	37	49	33	62	55	34	26.4	62
22-Feb	28	28	22	21	10	Z	36	33	30	30	15	10	11	14	19	19	4	4	5	5	4	2	1	1	15.3	36
23-Feb	Z	1	0	0	0	0	0	0	0	0	0	0	3	15	17	14	11	6	6	3	5	4	4	3	4.0	17
24-Feb	2	Z	2	2	5	5	10	6	7	5	6	5	5	6	6	6	9	6	6	8	6	6	4	4	5.6	10
25-Feb	5	6	Z	12	10	11	12	23	15	17	17	44	32	26	35	34	52	54	49	34	34	32	32	28	26.7	54
26-Feb	32	25	11	Z	39	34	62	29	35	39	31	30	16	2	3	2	2	3	4	7	9	11	7	5	19.0	62
27-Feb	4	4	4	3	Z	6	8	8	8	24	22	7	1	0	0	0	0	6	18	6	4	9	2	2	6.3	24
28-Feb	1	1	0	0	1	Z	2	1	0	1	0	0	0	1	1	1	1	0	3	4	10	8	9	7	2.3	10
10.9 11.9 9.6 9.7 10.4 10.5 14.3 13.2 15.2 15.5 15.7 14.0 11.4 10.7 12.2 14.7 17.4 20.6 19.0 16.1 12.0 12.3 10.6 9.4																		Diurnal Average								
38 50 42 31 39 36 62 42 51 49 47 44 32 32 35 46 52 54 56 49 39 62 55 34																		Diurnal Maximum								
Z - zerospan C - Calibration																										



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - February 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	490	76.68	76.68
21 - 40	122	19.09	95.77
41 - 80	27	4.23	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Patricia McInnes - February 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	78	27	11	22	12	60	31	9	14	17	29	28	20	33	36	63	490
21 - 40	17	11	5	12	3	6	10	13	16	2	2	4	1	1	1	18	122
11 - 80	4	2	0	2	0	3	6	5	1	2	0	0	0	1	1	0	27
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>	99	40	16	36	15	69	47	27	31	21	31	32	21	35	38	81	639

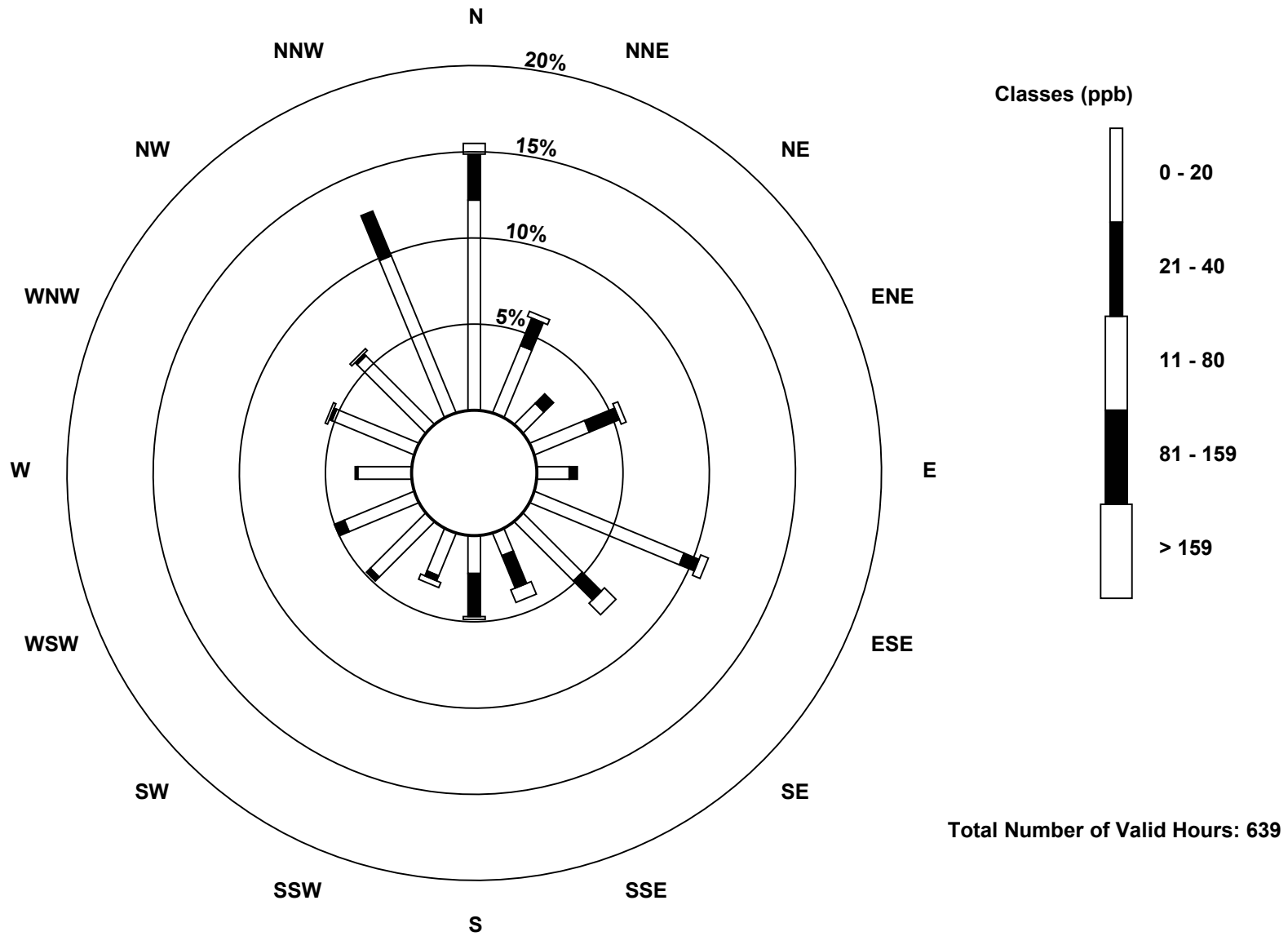
Total Number of Valid Hours: 639

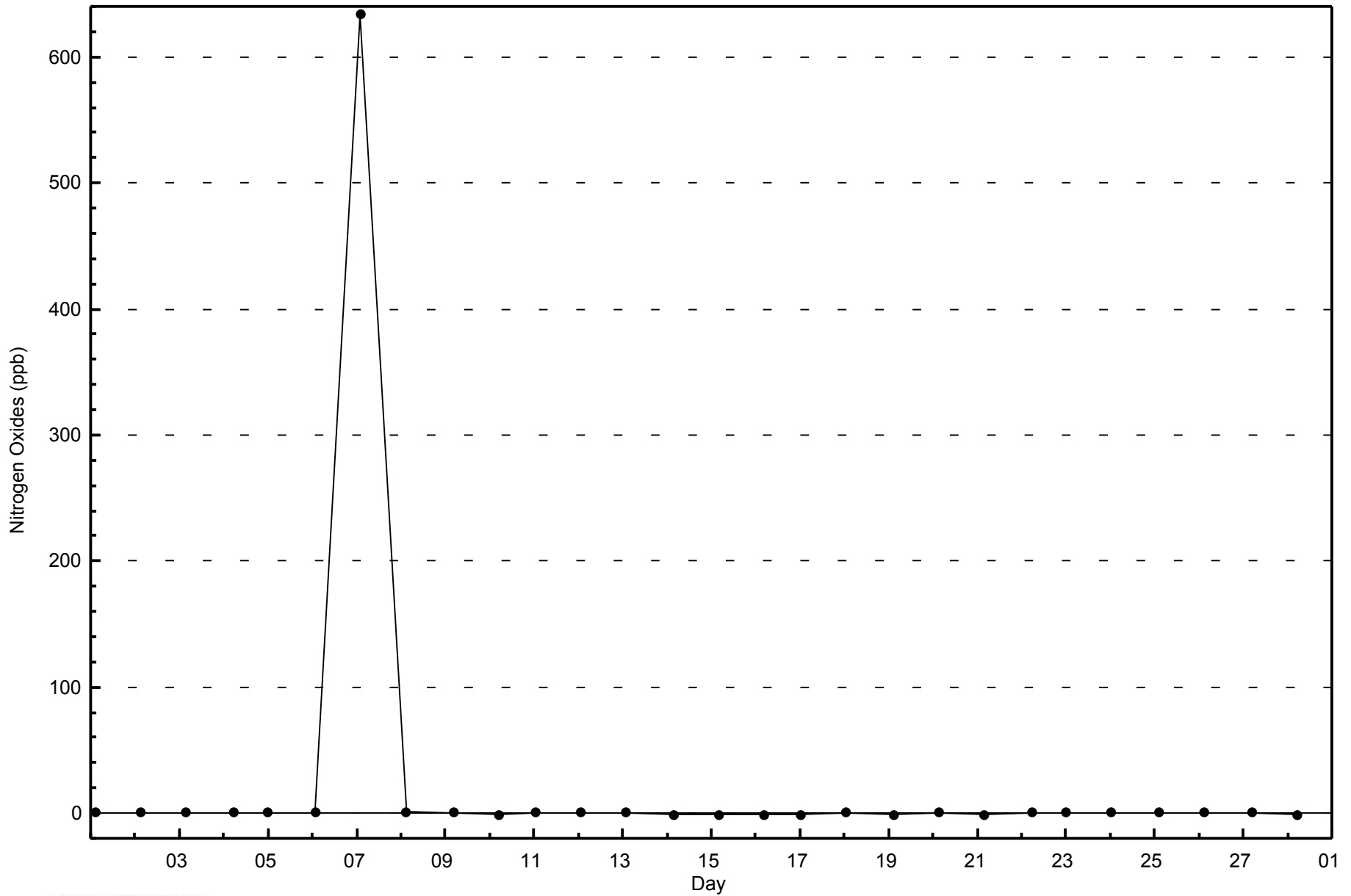
Total Number of Hours: 672



Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 Patricia McInnes (AMS 6)

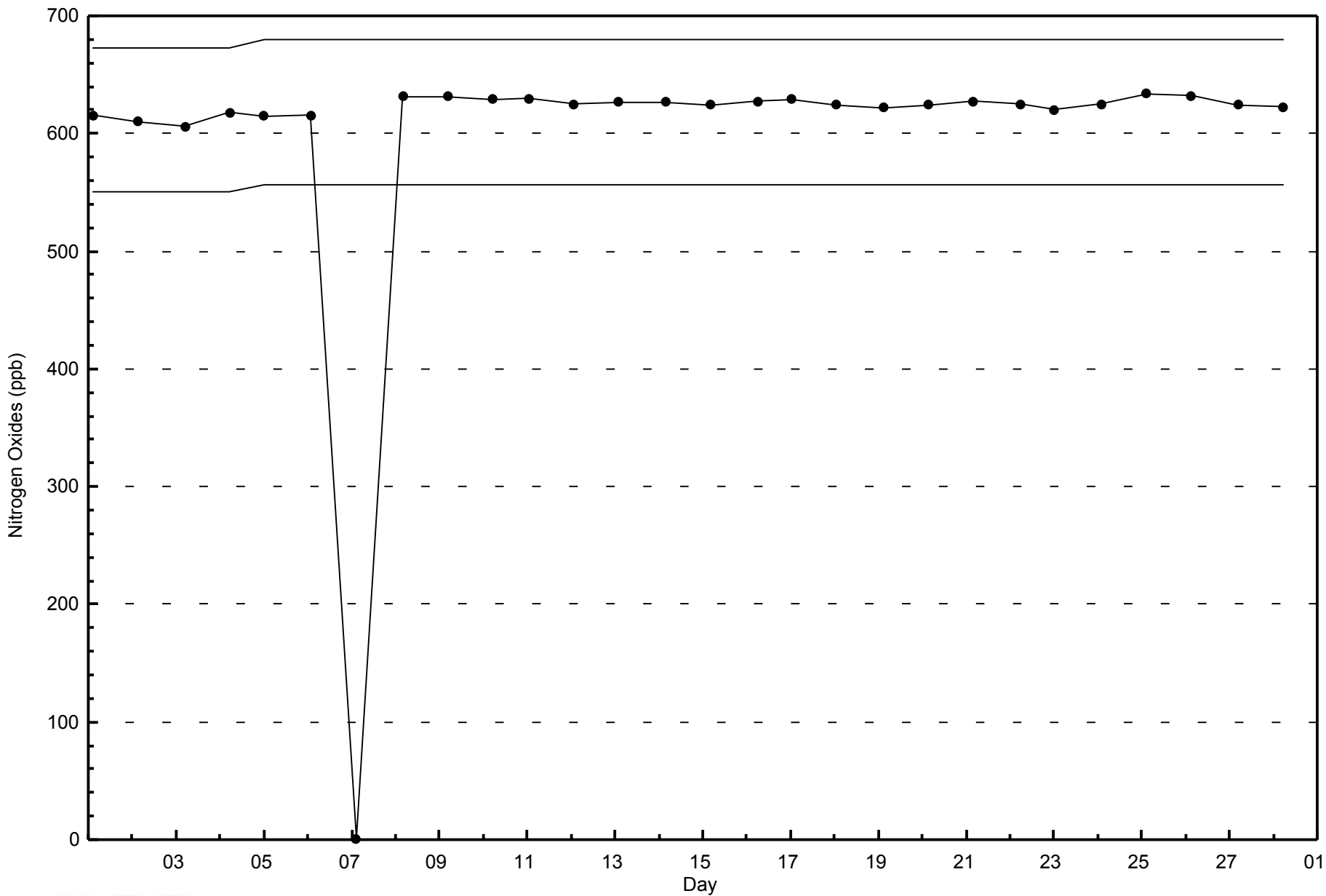






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Patricia McInnes - February 2015



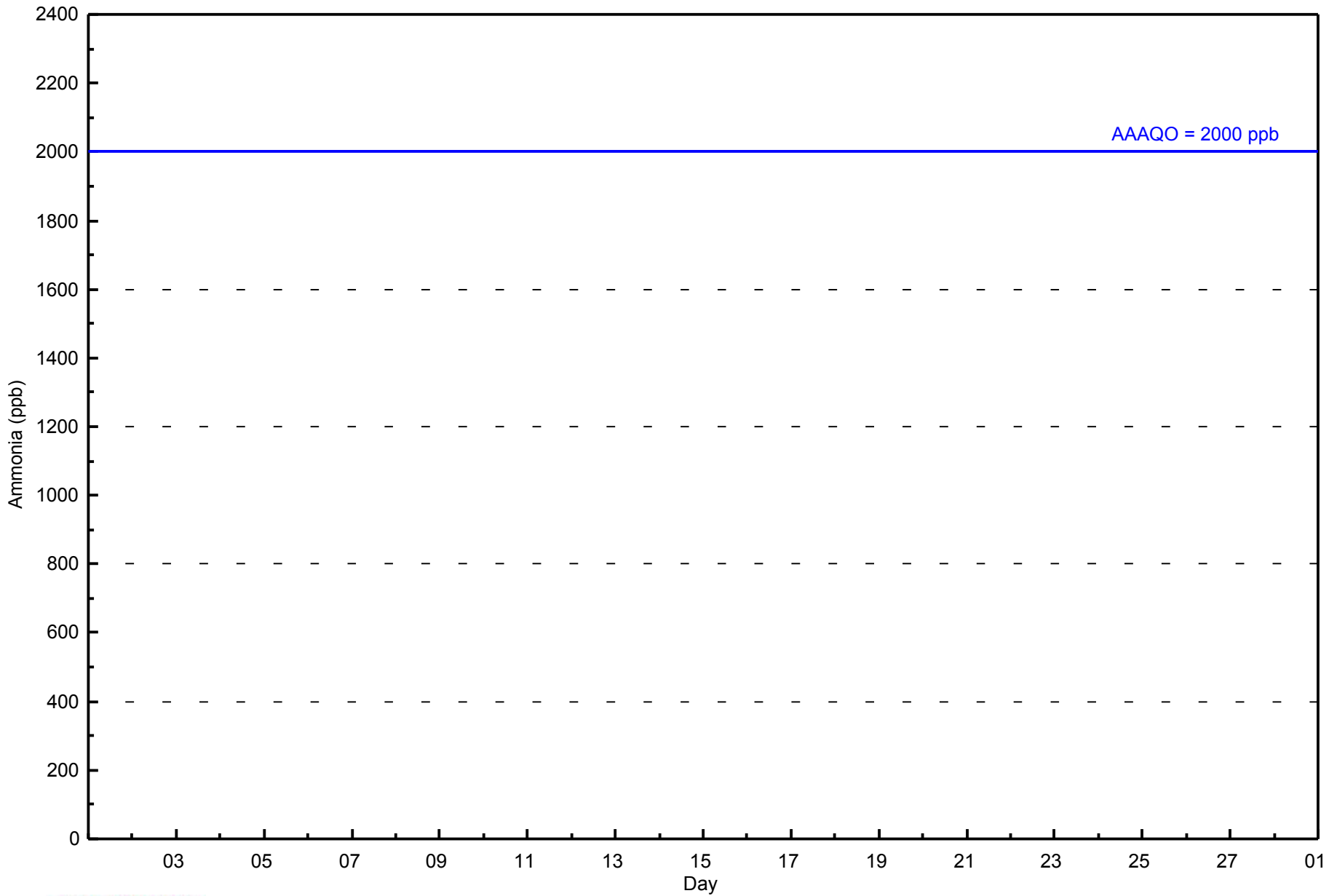


Number of Exceedences (AAAQO): 1-hr: 0										Hours in Service: 672										Daily Average	Daily Maximum						
Maximum Value: 0 ppb on Feb 1 01:00										Maximum Daily Average: 0.0 ppb on Feb 1																	
Minimum Value: 0 ppb on Feb 1 01:00										Minimum Daily Average: 0.0 ppb on Feb 1										Hours of Data: 625							
Maximum Diurnal Average: 0.0 ppb at hour 1										Minimum Diurnal Average: 0.0 ppb at hour 1										Hours of Missing Data: 47							
Monthly Average: 0.0 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> = 0 P <sub>99</sub> = 0										Hours of Calibration: 41							
										Percent Operational Time: 99.1																	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	0	0	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-Feb	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
3-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
4-Feb	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	0.0	0
5-Feb	0	0	0	Z	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-Feb	0	0	0	0	Z	RE	0	0	0	0	C	C	C	C	C	RE	RE	RE	RE	0	0	0	0	0	0	--	0
7-Feb	0	0	0	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
8-Feb	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
9-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
10-Feb	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	0.0	0
11-Feb	0	0	0	Z	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
13-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
14-Feb	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
15-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
16-Feb	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	0.0	0
17-Feb	0	0	0	Z	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
19-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
20-Feb	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
21-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
22-Feb	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	0.0	0
23-Feb	0	0	0	Z	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-Feb	0	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
25-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
26-Feb	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
27-Feb	0	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Feb	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	0.0	0
																								Diurnal Average			
																								Diurnal Maximum			
0.0 0.0																											
0 0																											
Z - zerospan C - Calibration RE - Recovery																											
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 2000 ppb																											



**WBEA**  
**Hourly Averages**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - February 2015**





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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	625	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: 625

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - February 2015**

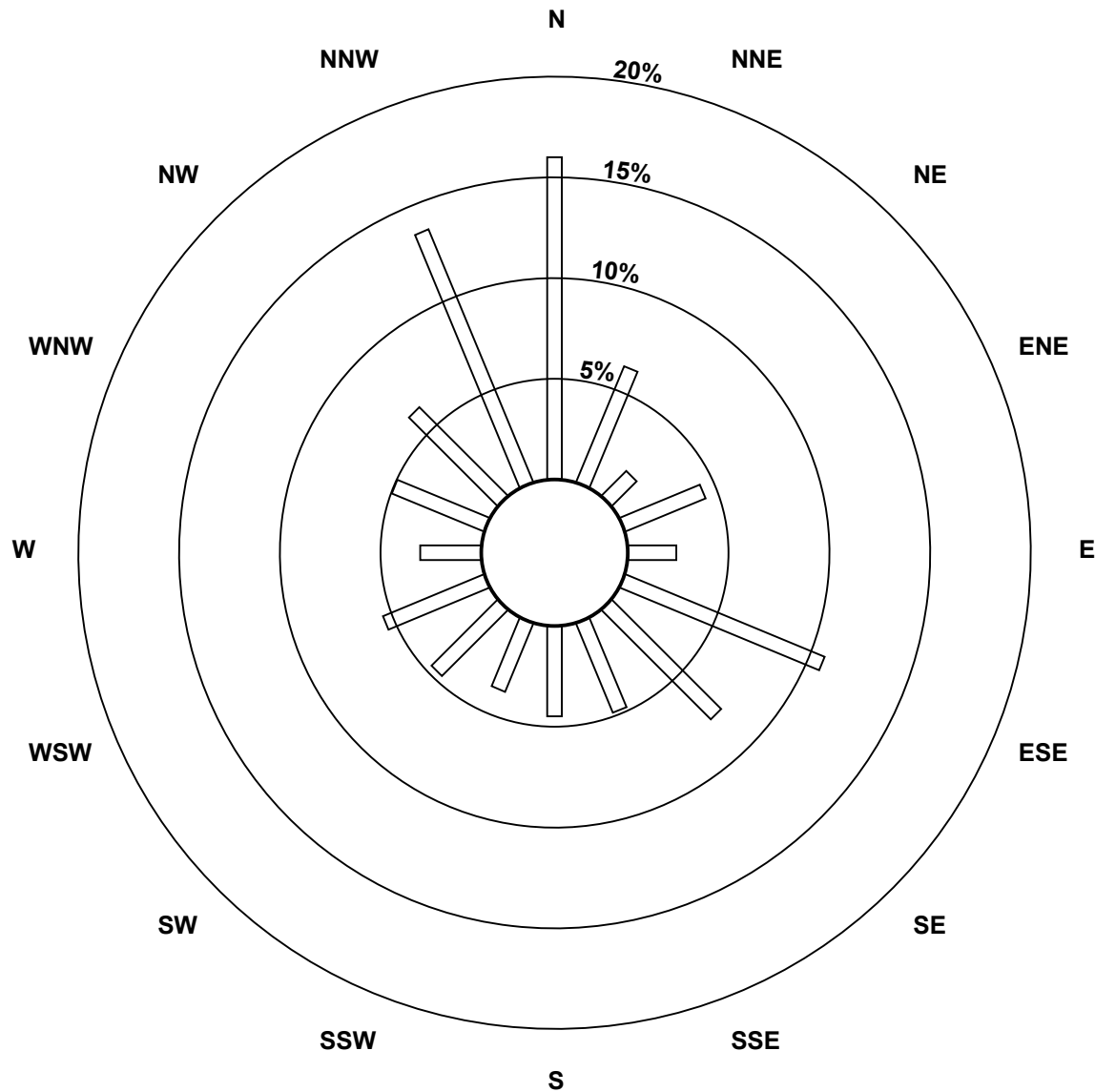
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	100	39	11	27	15	67	48	30	28	23	29	34	19	31	39	85	625
6 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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>	100	39	11	27	15	67	48	30	28	23	29	34	19	31	39	85	625

Total Number of Valid Hours: 625

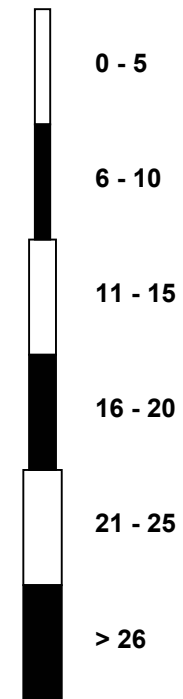
Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Ammonia (NH<sub>3</sub>) - ppb  
 Patricia McInnes (AMS 6)



Classes (ppb)



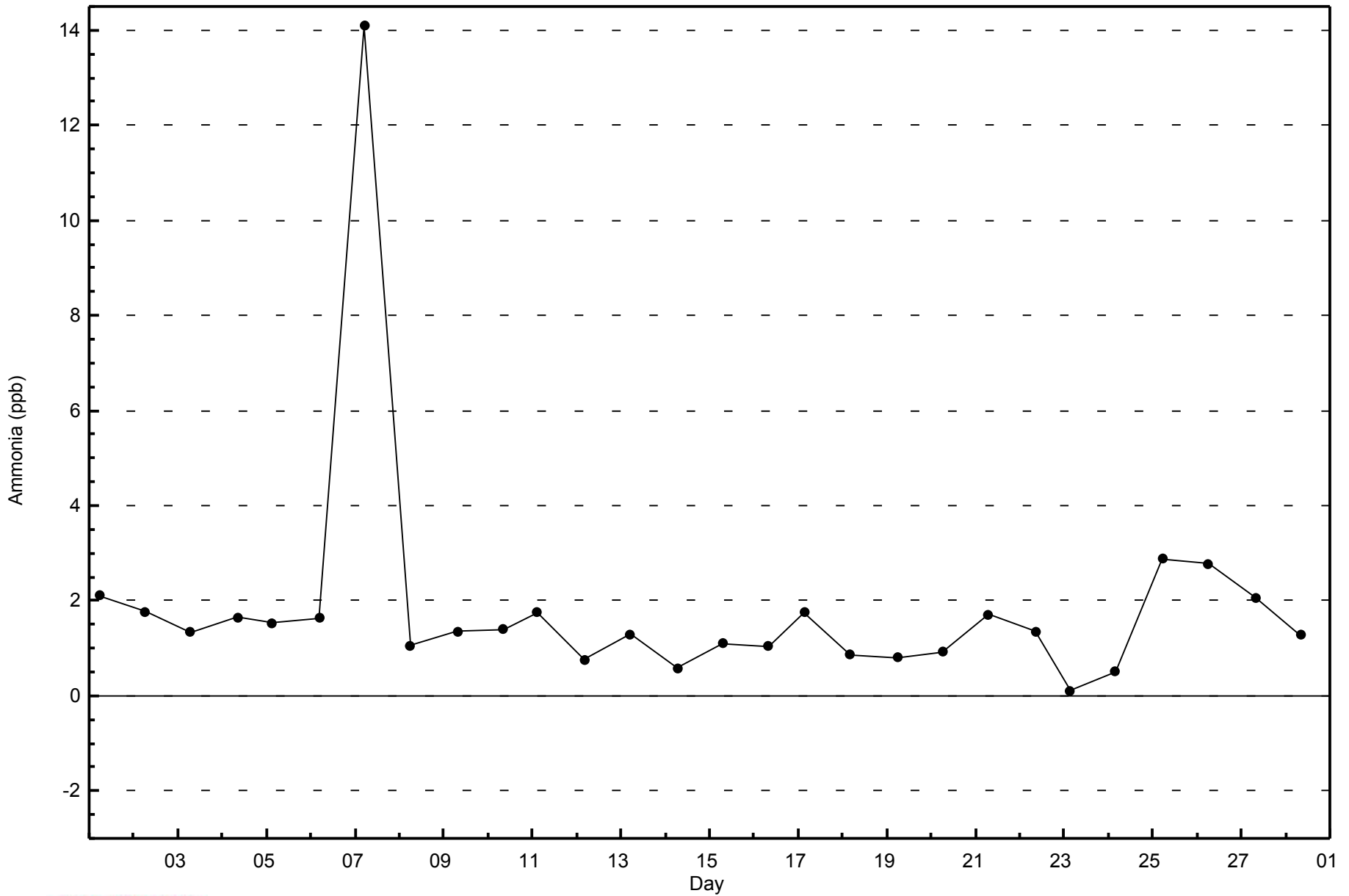
Total Number of Valid Hours: 625





WBEA  
Zero Responses

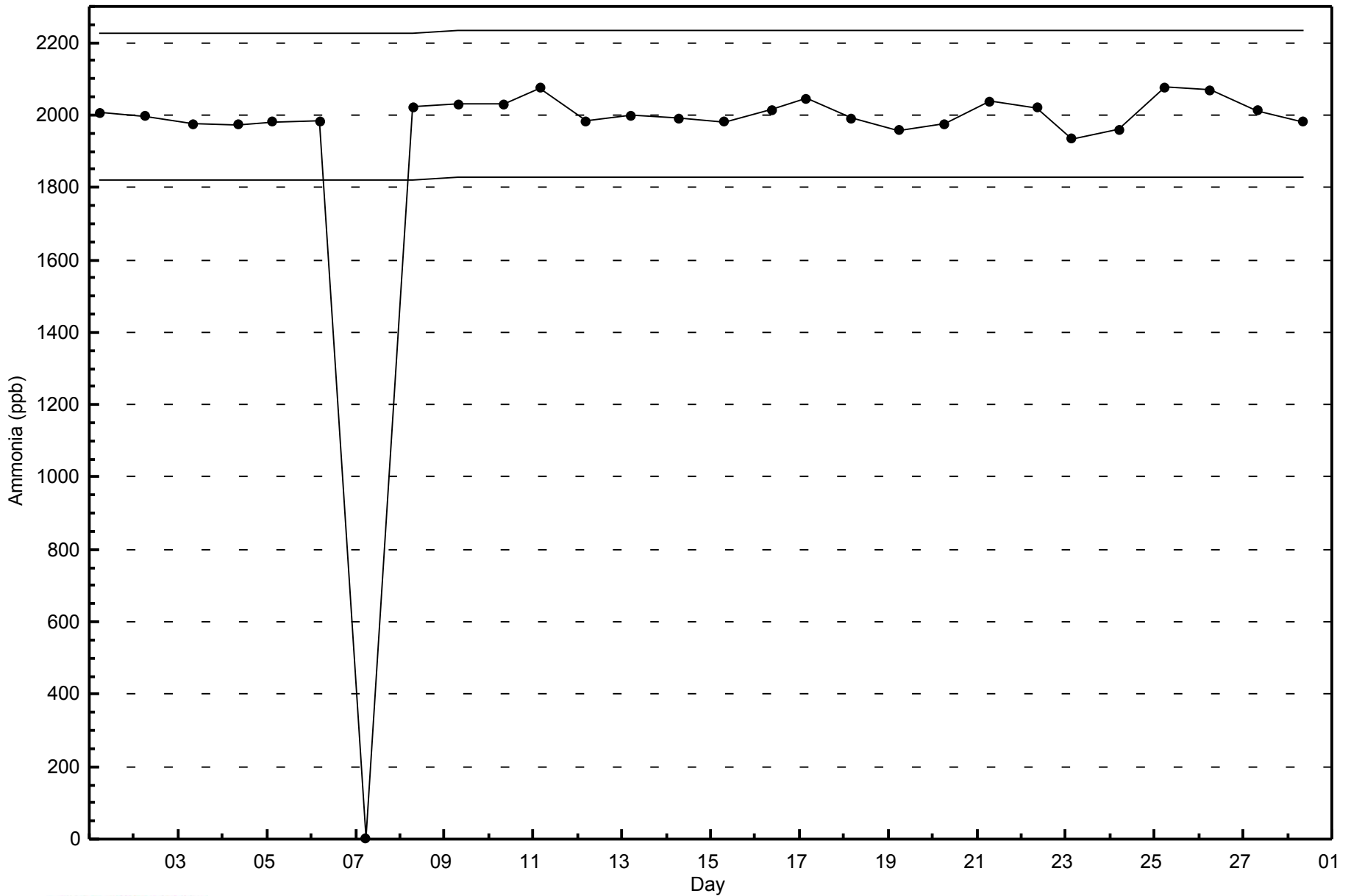
Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - February 2015





WBEA  
Span Responses

Ammonia (NH<sub>3</sub>) - ppb  
Patricia McInnes - February 2015





Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																								
Maximum Value: 39.0 µg/m <sup>3</sup> on Feb 21 22:00		Maximum Daily Average: 10.6 µg/m <sup>3</sup> on Feb 21																								
Minimum Value: 0.6 µg/m <sup>3</sup> on Feb 26 14:00		Hours of Data: 669																								
Maximum Diurnal Average: 7.3 µg/m <sup>3</sup> at hour 19		Hours of Missing Data: 3																								
Monthly Average: 4.84 µg/m <sup>3</sup>		Hours of Calibration: 0																								
Minimum Daily Average: 1.7 µg/m <sup>3</sup> on Feb 23		Percent Operational Time: 99.6																								
Minimum Diurnal Average: 3.5 µg/m <sup>3</sup> at hour 14		Percentiles: P <sub>1</sub> = 0.9 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.5 Median = 3.8 Q <sub>3</sub> = 6.1 P <sub>90</sub> = 9.1 P <sub>99</sub> = 17.6																								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	4.6	5.9	5.9	2.7	2.3	2.1	1.8	2.0	3.1	2.7	5.4	3.7	2.8	3.7	3.6	11.0	15.5	9.1	19.1	10.7	5.5	2.4	2.1	1.9	5.4	19.1
2-Feb	1.8	1.9	1.5	2.7	1.5	1.4	1.8	2.9	1.6	1.7	2.1	2.0	1.3	0.9	1.0	0.9	1.2	1.4	2.0	2.4	2.0	1.9	1.9	1.9	1.7	2.9
3-Feb	2.0	1.9	1.9	2.1	2.1	4.3	5.6	6.0	5.5	7.7	4.8	4.9	5.7	M	M	M	10.4	14.1	11.7	9.6	8.0	12.1	13.4	7.0	6.7	14.1
4-Feb	9.6	7.2	7.1	4.0	3.5	6.0	4.4	4.3	4.2	6.6	4.5	2.7	2.1	2.0	2.2	2.0	3.5	9.5	11.3	5.9	3.9	5.7	6.2	5.1	5.1	11.3
5-Feb	5.0	3.2	2.7	2.5	2.6	3.4	3.0	2.8	3.7	3.5	3.8	2.6	2.1	2.9	3.3	4.8	5.0	6.2	5.0	4.7	4.4	4.8	4.8	4.9	3.8	6.2
6-Feb	4.2	3.4	3.9	4.7	4.6	4.4	3.6	3.9	3.5	3.6	3.9	3.2	2.6	2.5	2.5	2.7	3.0	3.2	3.2	3.1	3.0	2.8	2.8	2.9	3.4	4.7
7-Feb	2.2	1.8	1.8	1.9	2.0	2.0	2.1	2.3	2.7	2.8	2.5	2.4	2.5	2.5	2.8	3.0	3.0	2.9	3.2	3.4	3.5	3.0	2.9	2.9	2.6	3.5
8-Feb	3.3	4.2	5.0	5.8	7.0	5.2	4.0	3.7	3.7	3.8	2.9	2.3	2.5	2.7	4.5	5.7	7.2	12.4	10.4	17.0	11.7	9.8	11.4	8.7	6.5	17.0
9-Feb	7.1	6.5	6.0	6.1	6.2	5.7	6.2	6.8	5.5	6.2	6.1	6.4	6.0	4.3	4.4	7.6	10.3	11.9	7.7	6.7	6.4	6.4	6.4	7.6	6.7	11.9
10-Feb	6.5	7.8	5.2	5.3	3.6	3.1	3.1	3.1	3.3	3.3	3.6	2.7	2.5	2.2	2.2	2.5	3.3	5.0	14.0	4.6	6.4	10.8	5.4	4.2	4.7	14.0
11-Feb	4.2	6.0	5.4	10.2	5.8	4.6	14.7	5.1	9.6	7.3	6.3	7.5	7.5	7.2	7.7	6.6	5.1	4.0	2.8	2.6	2.0	2.3	2.5	2.9	5.8	14.7
12-Feb	5.5	6.0	6.2	6.0	5.8	5.9	6.0	5.8	5.9	6.5	7.2	7.6	7.1	8.7	11.5	11.4	10.0	7.8	8.4	8.5	9.0	6.3	5.0	3.6	7.1	11.5
13-Feb	3.7	4.7	4.1	4.6	5.9	6.6	7.3	7.2	6.9	6.8	6.0	4.7	4.4	3.9	3.4	3.1	3.1	3.0	3.3	3.6	3.3	3.1	3.2	3.1	4.6	7.3
14-Feb	2.6	2.6	2.7	2.6	2.6	2.6	2.5	2.7	2.9	3.2	3.1	3.2	3.7	4.2	4.0	3.8	4.3	5.0	4.8	6.5	7.7	9.8	7.8	6.8	4.2	9.8
15-Feb	6.3	5.4	5.5	6.4	8.1	7.8	5.8	6.4	5.7	4.8	4.2	4.0	4.6	4.2	4.6	5.3	10.0	4.1	3.6	4.0	3.9	3.7	4.0	3.7	5.3	10.0
16-Feb	3.9	4.0	4.1	4.1	3.9	3.9	3.8	3.8	4.0	4.1	3.0	2.4	2.6	3.2	6.4	9.9	11.3	14.9	18.3	13.7	6.6	9.1	9.3	10.7	6.7	18.3
17-Feb	14.9	11.2	4.2	5.5	3.4	2.5	2.6	2.3	2.2	2.5	2.3	1.9	1.9	1.2	1.4	1.9	2.9	5.1	8.8	9.1	6.5	4.5	3.6	3.6	4.4	14.9
18-Feb	3.2	2.8	2.8	2.7	2.5	2.8	2.6	2.7	3.0	2.6	2.4	2.2	2.2	2.0	1.8	1.9	2.6	3.1	3.2	3.3	3.6	3.9	4.2	4.1	2.8	4.2
19-Feb	4.6	5.0	5.1	5.1	5.8	6.4	6.8	8.1	8.8	7.5	8.1	8.6	10.0	10.3	12.4	12.7	12.4	13.5	10.2	6.7	3.5	3.1	4.6	4.2	7.6	13.5
20-Feb	3.7	3.5	4.9	5.6	5.1	4.5	4.4	5.2	4.7	3.8	3.3	3.7	3.6	3.8	3.0	4.0	4.4	8.1	5.7	8.3	4.7	3.4	3.4	3.6	4.5	8.3
21-Feb	4.5	5.4	6.1	5.4	6.2	5.8	7.3	7.0	8.5	8.6	8.2	6.7	6.6	8.8	8.4	7.0	6.7	11.8	16.0	21.0	20.5	39.0	24.1	5.4	10.6	39.0
22-Feb	17.7	8.2	3.5	11.4	4.2	3.8	2.8	3.4	2.9	3.0	2.3	1.5	1.4	1.4	1.7	2.0	1.2	2.0	3.2	2.9	2.3	1.7	1.4	1.2	3.6	17.7
23-Feb	0.9	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	1.0	1.2	2.3	3.1	3.2	3.0	2.9	2.8	2.2	2.2	2.4	2.3	2.4	1.7	3.2
24-Feb	1.6	1.4	1.4	1.6	1.7	1.7	1.8	1.8	2.0	2.0	2.1	2.2	2.8	2.1	1.9	2.1	2.0	2.3	3.0	3.4	3.7	4.6	4.6	5.5	2.5	5.5
25-Feb	4.4	6.2	9.2	7.2	6.4	6.5	7.3	7.9	5.2	5.9	2.8	4.5	5.7	5.2	6.3	8.0	10.1	15.7	15.0	14.1	14.4	13.1	12.0	9.4	8.4	15.7
26-Feb	14.0	8.8	5.3	4.8	5.3	5.7	14.8	8.4	4.3	3.4	2.6	2.2	1.4	0.6	0.7	1.5	2.2	3.1	3.3	5.6	6.0	5.3	3.2	4.4	4.9	14.8
27-Feb	2.7	1.8	1.8	1.7	2.0	2.2	2.3	2.4	2.8	2.9	2.7	1.5	1.1	1.2	1.0	1.1	1.5	1.3	4.2	2.4	1.9	2.2	1.4	1.3	2.0	4.2
28-Feb	1.8	1.6	1.5	1.7	2.3	1.9	1.7	1.6	1.6	1.6	1.6	1.6	1.5	1.3	1.2	1.3	1.1	1.0	1.3	2.6	5.3	4.9	3.9	5.7	2.1	5.7
																								Diurnal Average	Diurnal Maximum	
																								5.2	17.7	
																								4.6	11.2	
																								4.1	9.2	
																								4.5	11.4	
																								4.0	8.1	
																								4.1	7.8	
																								4.7	14.8	
																								4.3	8.4	
																								4.2	9.6	
																								4.3	8.6	
																								3.9	8.2	
																								3.6	8.6	
																								3.6	10.0	
																								3.5	10.3	
																								4.0	12.4	
																								4.7	12.7	
																								5.6	15.5	
																								6.6	15.7	
																								7.3	19.1	
																								6.7	21.0	
																								5.8	20.5	
																								6.5	39.0	
																								5.6	24.1	
																								4.6	10.7	

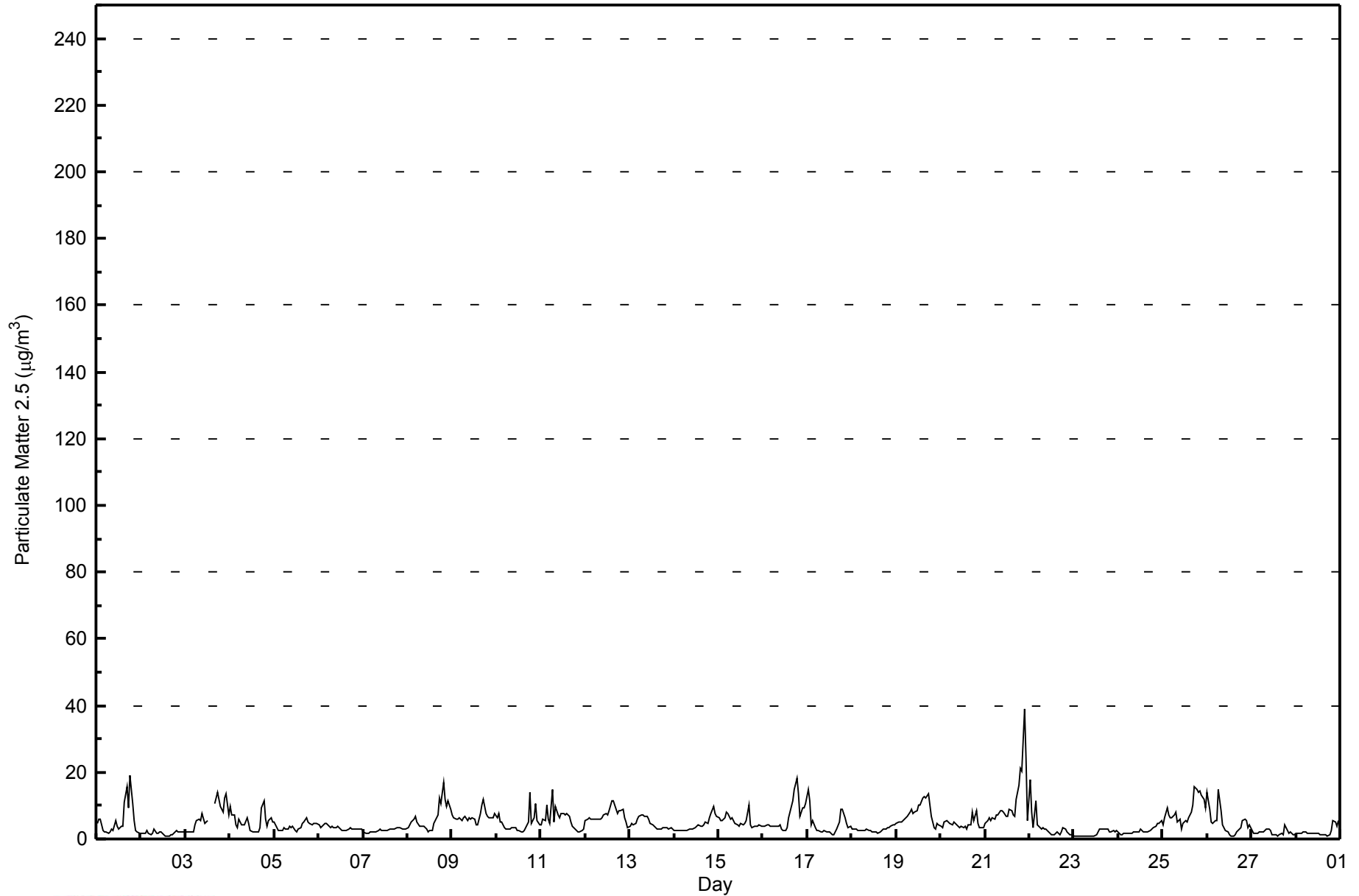
M - Maintenance

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 - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Patricia McInnes - February 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	447	66.82	66.82
6 - 15	198	29.60	96.41
16 - 25	9	1.35	97.76
26 - 80	1	0.15	97.91
> 81.0	0	0.00	97.91

Total Number of Valid Hours: 669

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Patricia McInnes - February 2015**

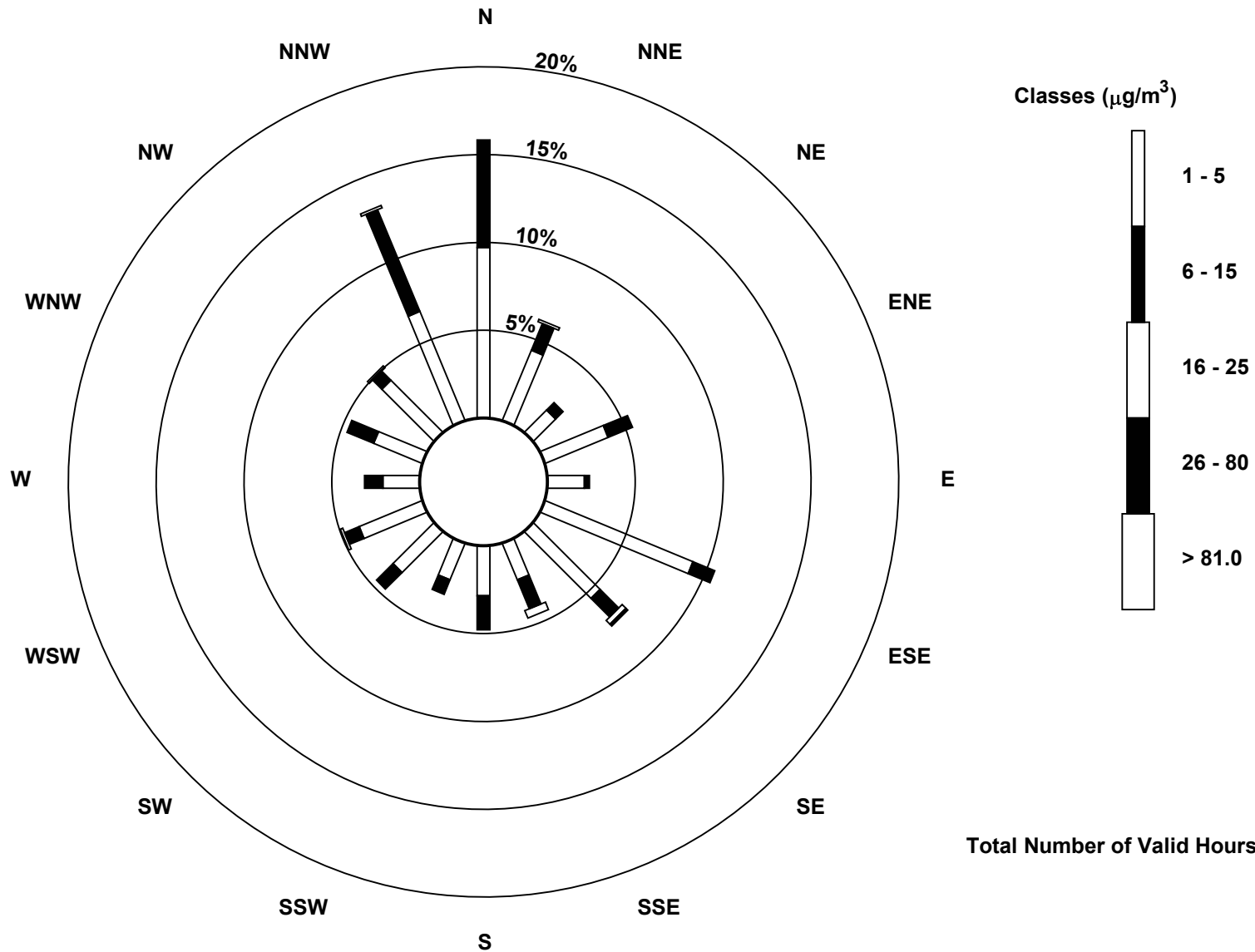
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	65	29	12	26	14	61	36	15	19	15	22	26	14	20	28	45	447
6 - 15	41	11	4	10	2	9	10	12	13	6	9	6	7	11	5	42	198
16 - 25	0	1	0	0	0	0	2	3	0	0	0	1	0	0	1	1	9
26 - 80	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	106	41	16	36	16	70	49	30	32	21	31	33	21	31	34	88	655

Total Number of Valid Hours: 669

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Patricia McInnes (AMS 6)



Total Number of Valid Hours: 669



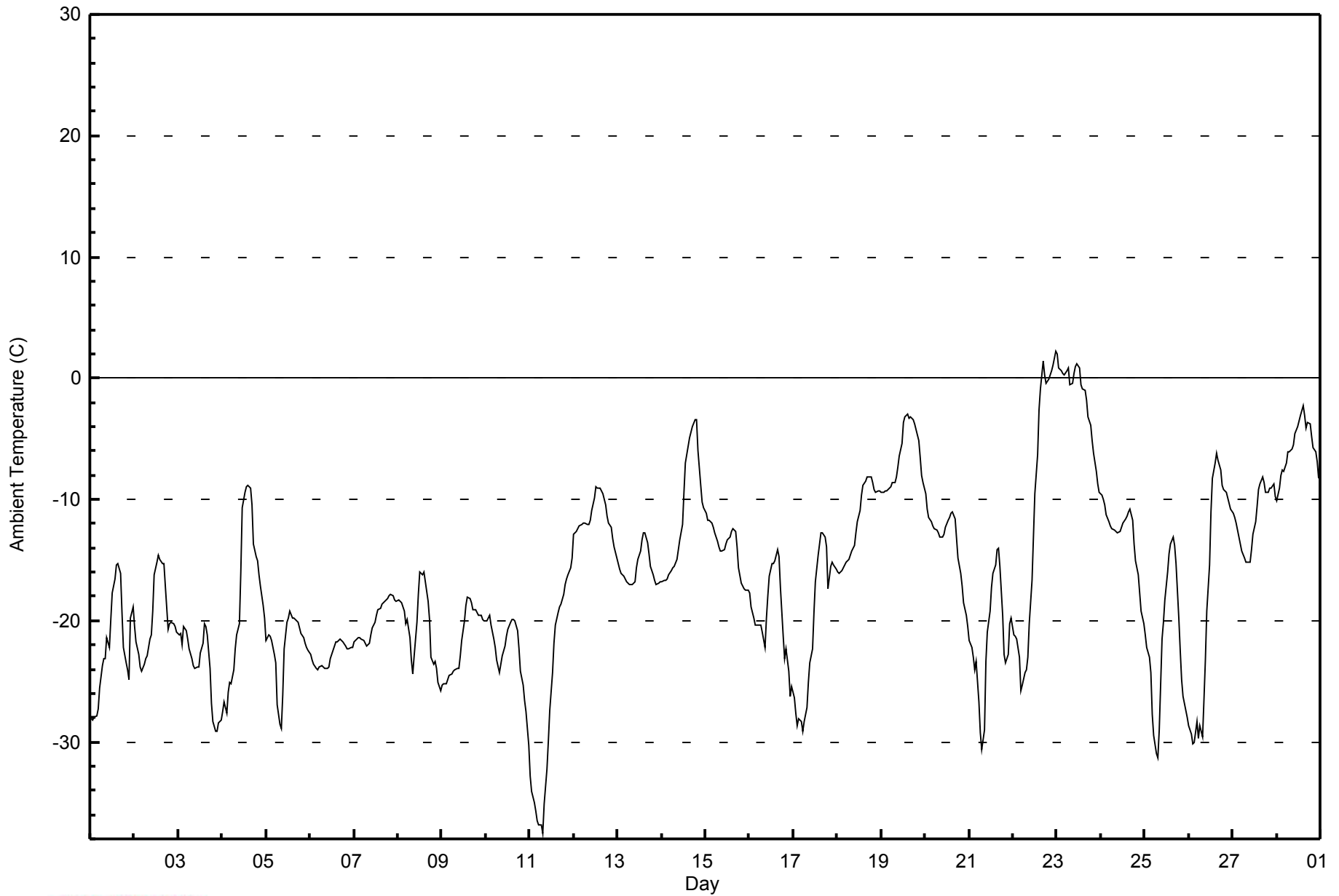
Maximum Value: 2.2 C on Feb 23 00:00		Maximum Daily Average: -1.7 C on Feb 23		Hours in Service: 672																						
Minimum Value: -37.5 C on Feb 11 08:00		Minimum Daily Average: -26.3 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.2 C at hour 16		Minimum Diurnal Average: -20.3 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.72 C		Percentiles: P <sub>1</sub> = -35.0 P <sub>10</sub> = -25.5 Q <sub>1</sub> = -22.2 Median = -17.0 Q <sub>3</sub> = -11.8 P <sub>90</sub> = -6.5 P <sub>99</sub> = 0.9		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-Feb	-28.1	-28.2	-28.0	-27.8	-27.3	-25.5	-23.7	-23.1	-23.1	-21.4	-22.2	-19.9	-17.7	-16.6	-15.4	-15.3	-16.1	-19.3	-22.2	-23.5	-24.0	-24.9	-19.8	-18.9	-22.2	-15.3
2-Feb	-20.5	-21.8	-22.8	-23.8	-24.1	-23.6	-23.2	-22.8	-21.5	-21.2	-19.2	-16.2	-15.1	-14.6	-15.0	-15.3	-15.3	-17.2	-20.7	-20.3	-20.2	-20.3	-20.5	-20.9	-19.8	-14.6
3-Feb	-21.2	-21.0	-22.0	-20.4	-20.8	-21.5	-22.3	-23.1	-23.7	-23.9	-23.8	-23.8	-22.6	-21.9	-20.2	-20.5	-21.2	-23.9	-26.8	-28.3	-29.1	-29.1	-28.4	-28.2	-23.7	-20.2
4-Feb	-27.5	-26.7	-27.6	-25.8	-25.0	-25.2	-24.0	-22.3	-21.2	-20.2	-16.0	-10.7	-9.4	-8.9	-8.8	-9.0	-10.5	-13.7	-14.7	-15.0	-16.3	-17.2	-18.7	-19.8	-18.1	-8.8
5-Feb	-21.7	-21.2	-21.3	-21.7	-22.8	-23.5	-27.0	-28.6	-28.9	-26.2	-22.3	-20.2	-19.7	-19.2	-19.8	-19.8	-19.9	-20.1	-20.6	-21.1	-21.4	-21.8	-22.2	-22.5	-22.2	-19.2
6-Feb	-22.8	-23.2	-23.6	-24.0	-24.0	-23.8	-23.7	-23.9	-23.9	-24.0	-23.9	-23.1	-22.5	-22.1	-21.8	-21.8	-21.6	-21.6	-21.8	-22.1	-22.3	-22.3	-22.2	-22.2	-22.8	-21.6
7-Feb	-21.7	-21.5	-21.4	-21.4	-21.6	-21.7	-21.9	-22.1	-21.8	-21.1	-20.6	-20.1	-19.5	-19.1	-19.0	-18.7	-18.6	-18.4	-18.2	-18.0	-17.8	-17.9	-18.3	-18.4	-19.9	-17.8
8-Feb	-18.3	-18.4	-18.6	-19.3	-20.2	-20.0	-21.4	-23.3	-24.4	-22.9	-20.1	-17.9	-16.0	-16.2	-16.0	-16.8	-18.4	-19.9	-23.0	-23.6	-23.4	-24.0	-25.1	-25.8	-20.5	-16.0
9-Feb	-25.4	-25.2	-25.2	-24.8	-24.5	-24.5	-24.2	-24.1	-24.0	-23.9	-22.9	-21.6	-20.0	-18.8	-18.1	-18.2	-18.5	-19.1	-19.1	-19.4	-19.5	-19.6	-19.9	-20.1	-21.7	-18.1
10-Feb	-20.0	-19.7	-19.5	-20.3	-21.5	-22.2	-23.3	-24.3	-23.5	-22.9	-22.0	-21.3	-20.8	-20.1	-19.9	-19.9	-20.0	-20.9	-22.3	-24.2	-25.4	-26.5	-27.5	-30.3	-22.4	-19.5
11-Feb	-32.8	-34.1	-35.0	-35.7	-36.6	-36.9	-36.8	-37.5	-35.2	-32.2	-29.9	-27.4	-24.3	-21.8	-20.3	-19.3	-18.8	-18.6	-17.8	-17.1	-16.6	-16.3	-15.6	-14.8	-26.3	-14.8
12-Feb	-12.9	-12.6	-12.4	-12.2	-12.1	-12.0	-11.9	-12.1	-12.1	-11.8	-10.9	-9.9	-8.9	-9.1	-9.1	-9.3	-9.6	-10.5	-11.4	-12.0	-12.4	-13.2	-13.9	-14.4	-11.5	-8.9
13-Feb	-15.2	-15.8	-16.1	-16.3	-16.6	-16.8	-17.0	-17.0	-16.8	-15.6	-14.9	-14.3	-13.3	-12.8	-12.7	-13.6	-14.4	-15.5	-16.2	-16.7	-17.0	-16.9	-16.8	-15.6	-12.7	-16.8
14-Feb	-16.8	-16.7	-16.7	-16.6	-16.2	-15.9	-15.7	-15.5	-15.0	-14.2	-13.4	-12.1	-9.4	-7.0	-5.6	-4.9	-4.5	-4.0	-3.5	-3.5	-6.0	-8.9	-10.2	-10.7	-11.0	-3.5
15-Feb	-11.2	-11.7	-11.8	-12.0	-12.3	-12.8	-13.4	-13.9	-14.2	-14.3	-14.1	-13.7	-13.3	-13.1	-12.6	-12.4	-12.7	-13.9	-15.7	-16.9	-17.1	-17.4	-17.4	-17.4	-14.0	-11.2
16-Feb	-17.8	-18.9	-19.8	-20.4	-20.4	-20.3	-20.4	-20.9	-22.2	-19.8	-17.9	-16.4	-15.3	-15.3	-15.1	-14.1	-14.8	-17.3	-21.3	-23.1	-22.4	-24.2	-26.3	-25.5	-19.6	-14.1
17-Feb	-26.4	-27.6	-28.6	-28.0	-28.3	-29.1	-28.3	-27.2	-25.1	-23.4	-22.3	-19.3	-16.7	-14.6	-13.7	-12.8	-12.7	-13.2	-14.0	-17.4	-15.5	-15.2	-15.4	-15.8	-20.4	-12.7
18-Feb	-15.9	-16.1	-15.9	-15.6	-15.4	-15.2	-14.9	-14.6	-14.3	-13.8	-12.7	-11.9	-10.9	-9.7	-8.8	-8.6	-8.2	-8.1	-8.2	-8.6	-9.1	-9.4	-9.3	-9.3	-11.9	-8.1
19-Feb	-9.4	-9.4	-9.4	-9.3	-9.1	-8.9	-8.6	-8.6	-8.2	-7.4	-6.4	-5.3	-3.7	-3.2	-3.0	-3.3	-3.2	-3.4	-3.8	-4.3	-5.2	-6.6	-8.1	-8.6	-6.5	-3.0
20-Feb	-9.5	-10.7	-11.5	-11.9	-12.2	-12.4	-12.5	-12.7	-13.1	-13.2	-12.8	-12.3	-11.8	-11.5	-11.1	-11.1	-11.6	-13.3	-14.8	-16.1	-17.1	-18.5	-19.5	-20.5	-13.4	-9.5
21-Feb	-21.7	-22.2	-23.0	-24.0	-23.3	-26.7	-29.3	-30.6	-29.0	-23.3	-21.0	-19.3	-17.2	-16.1	-15.4	-14.1	-14.1	-15.5	-19.5	-22.8	-23.5	-22.8	-20.3	-19.8	-21.4	-14.1
22-Feb	-21.1	-21.3	-21.6	-23.0	-25.8	-25.4	-24.2	-24.0	-23.1	-20.2	-16.7	-13.1	-9.5	-6.3	-2.7	-0.9	1.5	0.3	-0.4	0.0	0.3	0.6	1.1	2.2	-11.4	2.2
23-Feb	2.0	0.8	0.6	0.4	0.3	0.6	0.9	-0.5	-0.4	0.4	0.9	1.2	0.9	-0.5	-0.9	-1.0	-1.9	-3.1	-3.8	-5.1	-6.2	-7.7	-8.8	-9.4	-1.7	2.0
24-Feb	-9.7	-10.0	-10.5	-11.2	-11.8	-12.2	-12.4	-12.5	-12.6	-12.7	-12.6	-12.3	-12.0	-11.6	-11.3	-11.0	-10.8	-11.8	-13.7	-15.0	-16.2	-17.7	-19.2	-20.2	-13.0	-9.7
25-Feb	-21.1	-22.2	-23.0	-24.3	-27.8	-29.4	-31.0	-31.3	-29.0	-21.5	-20.1	-18.2	-16.0	-14.4	-13.7	-13.1	-13.8	-15.3	-19.8	-22.4	-24.9	-26.3	-27.4	-28.0	-22.2	-13.1
26-Feb	-28.7	-29.4	-30.1	-30.0	-28.3	-29.7	-28.6	-29.5	-26.4	-23.3	-19.2	-15.4	-11.0	-8.2	-6.9	-6.2	-6.8	-7.6	-8.8	-9.2	-9.4	-9.9	-10.4	-10.8	-17.7	-6.2
27-Feb	-11.1	-11.4	-11.9	-13.1	-13.7	-14.2	-14.8	-15.2	-15.2	-14.2	-12.9	-11.9	-10.6	-9.2	-8.7	-8.2	-8.2	-8.7	-9.4	-9.4	-9.1	-9.1	-8.7	-9.8	-11.5	-8.2
28-Feb	-10.1	-9.1	-8.0	-7.6	-7.6	-7.0	-6.0	-6.1	-5.9	-5.5	-4.5	-4.0	-3.6	-3.1	-2.3	-3.1	-4.1	-3.6	-3.8	-4.9	-5.7	-6.1	-6.9	-8.3	-5.7	-2.3
																								Diurnal Average		
																								Diurnal Maximum		





**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Patricia McInnes - February 2015**





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

**Ambient Temperature (AT) - C**  
**Patricia McInnes - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	256	38.10	38.10
-20 - 0	399	59.38	97.47
0 - 10	17	2.53	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

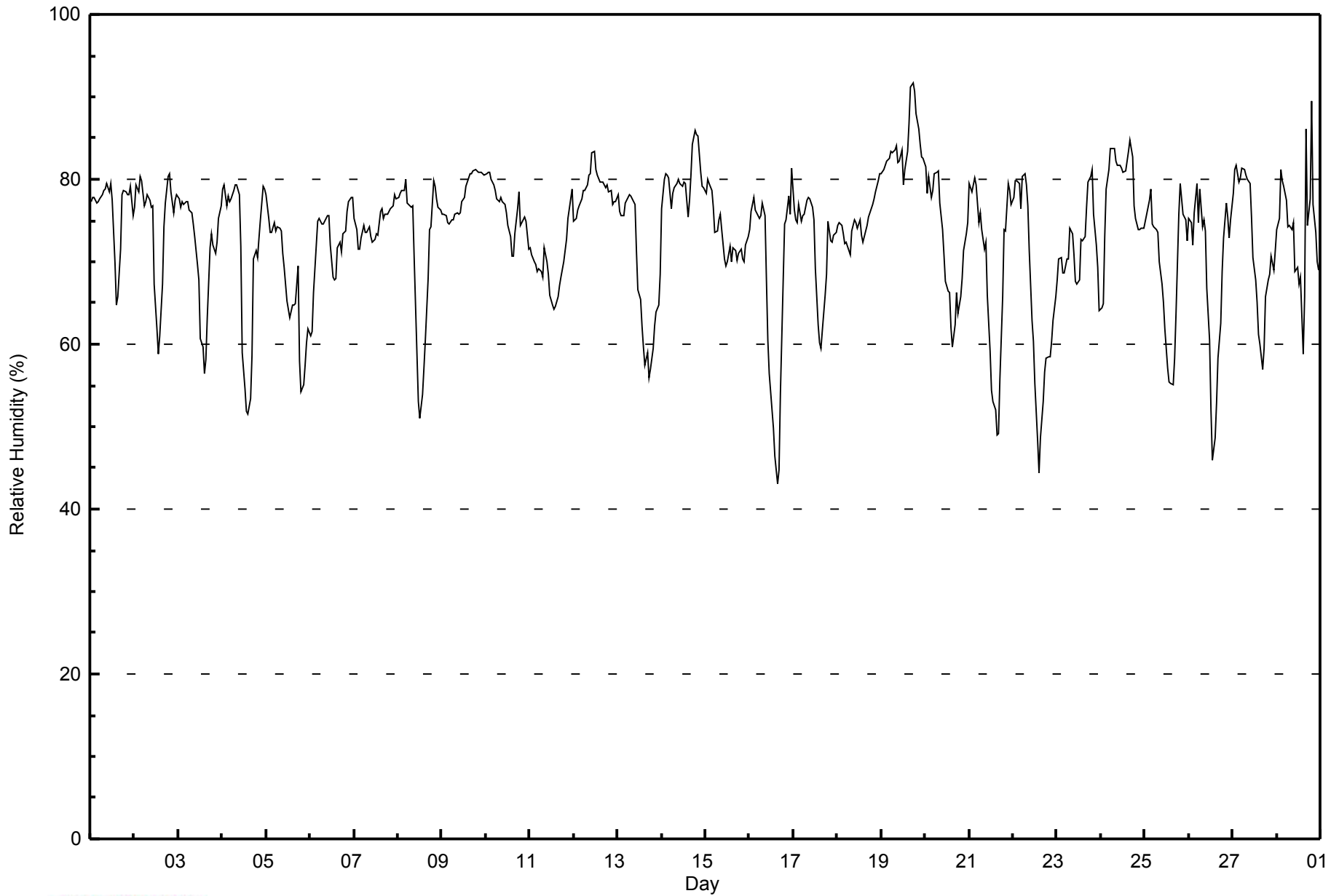


Maximum Value: 92 % on Feb 19 18:00														Maximum Daily Average: 84.1 % on Feb 19														Hours in Service: 672	
Minimum Value: 43 % on Feb 16 16:00														Minimum Daily Average: 65.6 % on Feb 22														Hours of Data: 672	
Maximum Diurnal Average: 76.9 % at hour 5														Minimum Diurnal Average: 64.2 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 73.0 %														Percentiles: P <sub>1</sub> = 48 P <sub>10</sub> = 60 Q <sub>1</sub> = 70 Median = 75 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 P <sub>99</sub> = 86														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-Feb	77	78	78	77	77	78	78	79	79	80	78	79	78	70	65	66	72	78	79	79	78	78	79	76	76.4	80			
2-Feb	77	79	78	80	80	77	77	78	78	77	77	67	62	59	61	67	74	77	80	81	78	76	77	78	74.8	81			
3-Feb	78	77	77	77	77	77	76	76	74	73	70	68	61	60	56	58	63	72	73	72	71	72	75	77	71.3	78			
4-Feb	79	79	77	78	77	78	79	79	79	78	72	59	55	52	52	53	59	70	71	71	73	75	79	79	70.9	79			
5-Feb	78	75	74	73	75	74	74	74	74	71	69	65	64	63	65	65	65	69	58	54	55	57	60	62	67.3	78			
6-Feb	61	61	66	72	75	75	75	75	75	76	76	72	68	68	68	72	72	71	73	74	76	77	78	78	72.2	78			
7-Feb	75	74	72	72	73	74	74	74	74	73	72	73	73	76	76	75	76	76	76	76	76	77	78	78	74.6	78			
8-Feb	78	78	79	79	80	77	77	77	77	71	59	53	51	54	57	61	68	74	74	80	79	78	77	76	71.3	80			
9-Feb	76	76	76	75	75	75	75	76	76	76	76	77	78	79	80	81	81	81	81	81	81	81	81	80	78.0	81			
10-Feb	81	81	81	80	79	79	78	77	78	77	77	76	74	73	71	71	73	76	78	74	75	75	75	71	76.3	81			
11-Feb	72	71	70	70	69	69	69	68	72	70	69	66	65	64	65	66	67	68	70	71	73	75	78	79	69.7	79			
12-Feb	75	75	76	77	78	79	79	79	81	81	83	83	81	80	80	80	80	79	79	78	79	77	77	77	78.9	83			
13-Feb	78	76	76	76	77	77	78	78	78	77	71	67	65	62	60	57	59	56	57	59	62	64	65	69	68.5	78			
14-Feb	76	80	81	81	80	76	78	79	79	80	79	79	80	79	76	77	81	84	86	85	85	81	79	79	80.1	86			
15-Feb	78	80	80	79	77	74	74	75	76	74	70	69	70	72	70	72	71	70	71	72	70	70	72	73	73.2	80			
16-Feb	74	76	78	76	76	75	76	77	76	68	61	57	52	50	46	43	45	54	68	75	75	78	76	81	67.1	81			
17-Feb	76	75	75	77	75	76	76	78	78	78	77	75	69	62	60	60	62	66	68	75	73	72	73	74	72.0	78			
18-Feb	74	75	74	73	72	72	71	71	74	75	75	74	75	73	72	74	74	75	76	77	78	78	80	81	74.8	81			
19-Feb	81	81	82	82	83	83	83	84	84	82	82	84	79	81	83	87	91	92	91	88	86	84	83	82	84.1	92			
20-Feb	82	78	80	78	79	81	81	81	77	74	71	68	66	66	62	60	62	66	64	66	68	71	73	75	72.1	82			
21-Feb	79	78	79	80	79	75	76	74	71	72	66	59	54	53	52	49	49	56	66	74	74	80	79	77	68.8	80			
22-Feb	78	80	80	79	77	80	81	79	77	71	63	60	55	48	44	49	53	57	58	59	58	60	63	66	65.6	81			
23-Feb	68	70	70	69	69	70	70	74	73	71	68	67	68	73	73	73	77	80	80	81	76	72	69	64	71.9	81			
24-Feb	64	65	73	79	81	84	84	84	82	82	81	81	81	81	82	83	85	83	77	75	74	74	74	74	78.5	85			
25-Feb	75	76	78	79	75	74	74	74	70	67	65	62	57	56	55	55	58	64	76	79	78	76	75	73	69.5	79			
26-Feb	75	75	72	76	80	75	79	74	75	74	67	61	52	46	49	53	58	63	69	73	77	75	73	75	68.5	80			
27-Feb	78	81	82	80	80	81	81	80	80	80	75	70	68	65	61	60	57	59	66	68	69	71	69	71	72.2	82			
28-Feb	74	75	81	80	79	77	74	74	74	75	69	69	67	68	59	66	86	74	78	89	77	73	70	69	74.1	89			
75.6 76.0 76.5 76.9 76.9 76.5 76.6 76.7 76.4 75.0 72.1 69.4 66.8 65.4 64.2 65.4 68.5 71.1 73.0 74.5 74.1 74.3 74.5 74.8																								Diurnal Average					
82 81 82 82 83 84 84 84 84 82 83 84 81 81 83 87 91 92 91 89 86 84 83 82																								Diurnal Maximum					



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Patricia McInnes - February 2015**





Maximum Speed: 23 km/h on Feb 14 04:00		Maximum Daily Speed Average: 13.3 km/h on Feb 20		Hours in Service: 672																						
Minimum Speed Value: 1 km/h on Feb 17 05:00		Minimum Daily Speed Average: 1.2 km/h on Feb 1		Hours of Data: 672																						
Maximum Diurnal Speed Average: 4.9 km/h at hour 22		Minimum Diurnal Speed Average: 1.6 km/h at hour 3		Hours of Missing Data: 0																						
Monthly Average Velocity: 2.6 km/h 5.6 deg		Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 13 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-Feb	SSE4	SSE4	SSE4	SSE6	S6	S8	SSE6	SE4	SE4	ESE4	N5	N5	NNW10	N8	N4	NNE3	SSW3	WSW5	NNW2	W2	SW3	WSW7	W12	W12	SW1.2	W12
2-Feb	SW8	SSW5	SSW5	SSE4	SSW8	SW11	SW7	S6	SW10	SW10	SW8	NNE2	NNW9	NW12	NW12	WNW6	WNW4	W5	W6	WSW6	WSW10	WSW11	W10	WSW9	WSW5.9	NNW12
3-Feb	WSW11	WSW12	SW10	NNW3	NNW6	NNW13	NNW13	NNW13	NNW13	NNW9	N12	NNE10	N11	NNE7	ENE6	ESE5	ESE5	SE3	SSE2	S3	S3	S4	SSE5	S5	NNW2.9	NNW13
4-Feb	SSE5	SE5	SE4	SE7	SE8	SSE7	SE8	SSE7	ESE5	SE2	WSW8	W16	W15	NNW21	NNW17	NW16	NNW14	N10	NNW10	NNW11	NW8	N10	NNW9	NW6	NNW4.0	NNW21
5-Feb	WNW7	WNW8	W11	WNW9	NW7	NW7	WSW4	WSW4	W4	SSW2	S3	S5	SSE5	ENE6	NNE9	NNE9	NNE8	NNE11	NNE14	NNE13	NNE12	NNE10	NNE9	NNE9	N4.2	NNE14
6-Feb	NNE9	N13	NNE14	NNE13	NNE13	NE11	NE11	NE13	NE12	NNE11	NE10	ENE11	ENE15	ENE17	ENE15	ENE15	ENE15	ENE15	ENE15	ENE17	ENE14	E12	ENE11	ENE11	NE11.9	ENE17
7-Feb	E15	ESE15	ESE18	ESE16	SE16	ESE15	ESE16	ESE16	ESE14	SE15	ESE17	ESE15	ESE15	ESE13	ESE14	ESE14	ESE12	ESE10	ESE9	E7	ENE6	N6	NNW9	NNW7	ESE11.2	ESE18
8-Feb	NNW6	NNW6	NW7	NNW5	NNW8	N14	N14	NNW10	NW7	WNW5	W2	NW1	NE1	E4	ENE5	ENE7	NNE8	N5	NNW5	NW6	NNW7	NNW10	NNW9	NNW9	NNW5.8	N14
9-Feb	NNW8	N9	N10	N9	N10	N10	N10	N9	N10	N10	N8	N7	N6	N5	NNE7	NNE9	N9	N9	NNW11	NNW12	NNW9	NNW8	NNW10	NNW9	N8.8	NNW12
10-Feb	NNW8	NNW7	NNW6	NNW14	NNW13	NNW14	NNW16	NNW11	NNW8	NW8	NW9	NW13	NW13	N11	NNW13	N10	NNW8	NNE8	N10	N10	N12	NNW9	NNW6	NW5	NNW9.8	NNW16
11-Feb	WSW5	W4	WSW3	W3	WSW3	SSW1	S3	S3	SSE4	SSE4	SE8	SE7	SE9	ESE13	ESE17	SE16	SE18	SE17	SE16	SE18	SE19	SE14	SE11	SE7	SE7.9	SE19
12-Feb	S12	SSW11	SSW11	SW7	SW10	SW11	WSW13	WSW14	SW11	WSW13	SW12	SW13	W7	NNE11	NNE10	N9	NNE11	N13	NNW13	NNW14	N14	N15	N15	N18	WNW4.5	N18
13-Feb	N15	N14	N16	N15	N14	N14	N15	N14	N14	N12	NNE10	NE10	NE11	E12	ESE14	ESE17	ESE16	ESE20	ESE20	ESE22	ESE22	ESE21	ESE20	SE21	ENE9.0	ESE22
14-Feb	ESE21	ESE20	SE21	SE23	SE21	SE21	SE20	SE21	SE17	SE16	ESE14	ESE11	SSE14	S19	SSW17	S13	SSW11	SSW11	SW13	NW12	NNW16	NNW19	NNW18	N11	SE8.5	SE23
15-Feb	NNW9	NW6	NNW6	N9	N9	N10	N11	N12	N13	N12	N10	N12	N10	NNW10	N9	NNE10	N12	N13	N11	NNW10	N14	NNW14	NW8	NW7	N9.9	N14
16-Feb	N9	NNW8	NNW7	N11	NNW9	NNW8	NW8	NW6	W5	WNW5	N5	ENE4	ENE4	NNE8	NE8	ENE5	SE4	SSW2	WSW3	WNW7	WNW9	WNW8	WNW6	WNW3	NNW4.2	NNW11
17-Feb	NW2	SW2	SW4	NW3	SSW1	SW5	SW5	SW6	SW5	SSE4	SSE5	SSE5	SE6	SE6	ESE8	E5	E5	SE4	ESE5	ESE4	ESE9	SE7	SE9	ESE10	SE3.4	ESE10
18-Feb	ESE10	ESE12	SE11	ESE9	SE11	SE11	ESE10	ESE9	ESE10	ESE10	ESE7	ESE9	ESE9	ESE9	ESE7	ESE9	ESE9	ESE9	ESE10	ESE11	ESE10	ESE8	SE7	ESE6	ESE9.3	ESE12
19-Feb	ESE7	SE7	SE6	ESE4	SE3	S5	ESE4	SE5	SSE5	E5	SSE1	S2	ESE3	ENE4	ENE4	NNE4	NNW8	NNW10	NNW13	N16	N18	N23	N23	N19	NNE4.3	N23
20-Feb	N21	N20	N17	N18	NNW16	NNW14	NNW14	N16	N17	N14	N15	N11	NNE10	N11	N12	N12	N11	NNW9	N10	N11	NNW14	NNW12	NNW12	NW10	N13.3	N21
21-Feb	WNW10	NW10	NW10	NW8	NNW9	NW5	WNW7	WNW6	WNW3	N8	NE3	ENE5	ENE6	ENE6	ENE7	ENE6	E6	ESE5	SE5	SSE4	SSE4	SE5	SE6	SSE6	N1.5	NW10
22-Feb	SSE5	S7	S6	S5	S3	S5	S5	S5	S4	SSE6	SE7	SE10	SE10	SSE7	ESE6	SSE7	SSW15	SW23	SW23	SW23	SW22	SW21	WSW14	WNW15	SSW8.3	SW23
23-Feb	NW18	NNW12	W15	NNW15	NNW18	NNW19	NW23	NW17	NW17	NNW15	NW14	NW17	NNW17	NNE12	NNE11	NNE11	N15	N16	N17	N20	NNE20	NNE17	NE12	ENE13	NNW12.1	NW23
24-Feb	ENE11	E12	E11	E12	E13	E14	E13	E13	ENE15	ENE17	ENE13	NE11	ENE10	NE9	NE10	NNE11	NNE12	N18	N20	N19	N20	NNW20	NNW21	NNW18	NE10.8	NNW21
25-Feb	NNW17	NNW14	NNW11	NW5	WNW5	WNW5	W5	W4	WSW5	W3	NNE7	ENE5	NE3	ENE4	NE4	NE4	ENE4	NNE3	WNW2	WSW3	SW3	SW2	SSW3	S4	NNW2.6	NNW17
26-Feb	S4	SSE5	SSW3	SSW5	S6	S4	S5	SSW4	S6	S6	SE6	SE8	SSE8	SSW16	SSW13	SW15	WSW14	WSW11	WSW8	NNW7	NNW11	NNW12	N14	N11	SW3.3	SSW16
27-Feb	NNW11	NNW9	N11	N13	N11	N10	N10	N8	N8	NE6	ESE4	WSW2	WSW9	NNW10	WSW9	WSW13	WSW13	SW8	S6	SSW9	SSW9	SSW6	SW10	WSW12	WNW3.9	N13
28-Feb	WSW10	W8	W10	WSW12	SW11	WSW11	NNW19	NNW17	NNW18	NNW17	NW16	NW14	NNW12	NW15	NNW13	NW15	NW10	WNW9	NNW10	N13	NNW17	N13	N12	NNW10	WNW10.9	WNW19
NNW2.4 NNW1.7 NNW1.6 N2.2 N1.9 NNW2.1 NNW2.6 N2.0 NNW1.9 N1.7 NNE2.1 NE1.9 NE2.3 NE3.2 NE3.7 NE3.3 NNE2.5 NNE2.2 N2.7 N3.9 N4.4 N4.9 NNW4.6 N3.9 N21 ESE20 SE21 SE23 SE21 SE21 NW23 SE21 NNW18 NNW17 ESE17 NNW17 NNW17 NNW21 NNW17 ESE17 SE18 SW23 SW23 SW23 ESE22 N23 N23 ESE21																								Diurnal Average	Diurnal Maximum	
All monthly, daily, and diurnal averages have been calculated using vector methods																										

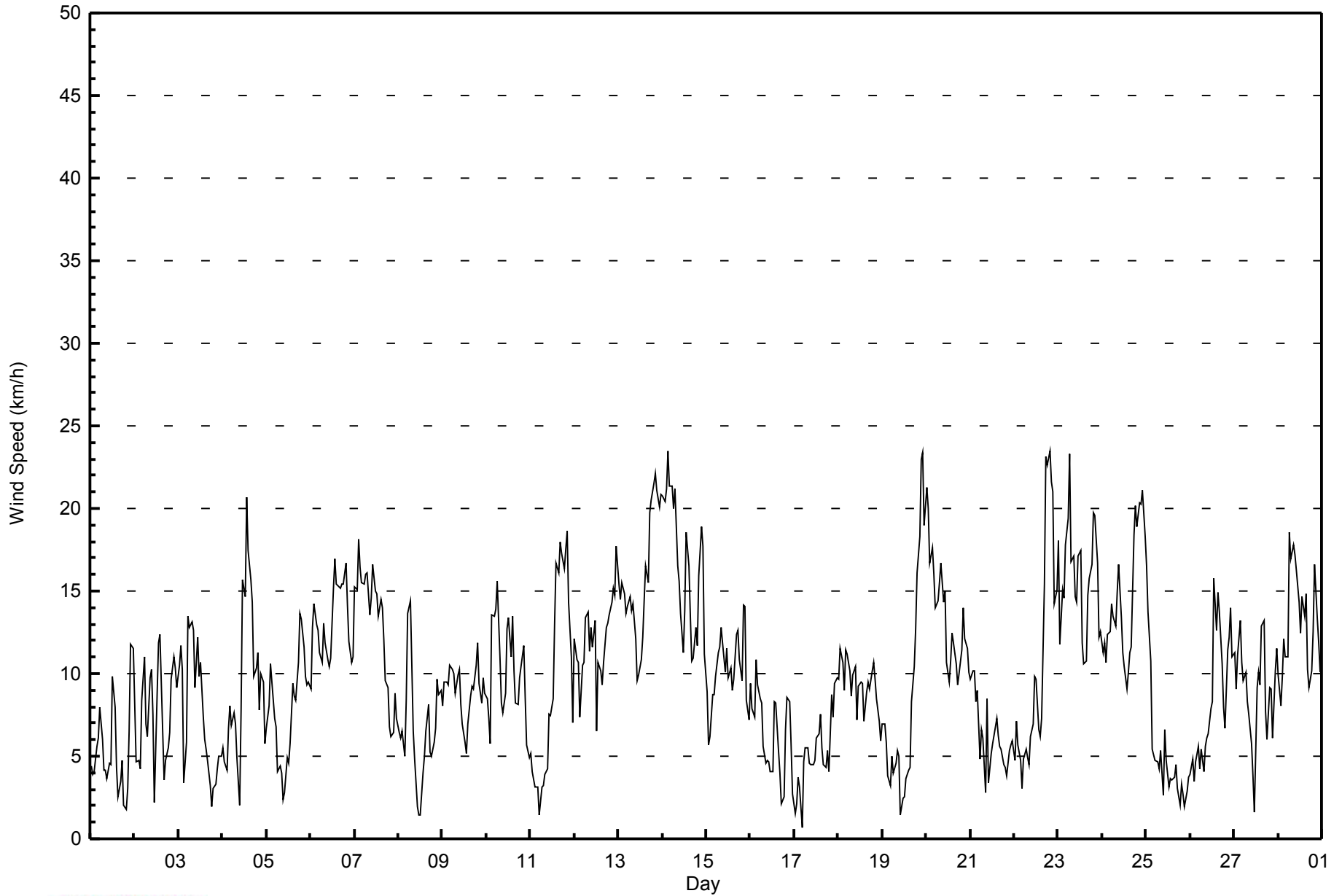


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 672											
Maximum Value: 9 km/h on Feb 28 20:00														Hours of Data: 672											
Minimum Value: 1 km/h on Feb 26 00:00														Hours of Missing Data: 0											
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 5														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-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	2	2	1	1	2	2	1	2	2
2-Feb	2	1	2	1	3	2	3	2	3	2	1	2	4	3	3	2	2	1	1	1	2	1	1	1	4
3-Feb	2	2	2	2	2	3	2	2	2	2	2	2	3	2	1	1	1	1	1	1	1	1	1	1	3
4-Feb	1	1	1	2	2	1	2	2	2	2	7	3	4	4	3	3	3	1	2	3	2	3	2	1	7
5-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	3	2	2	1	2	2	3	2	2	2	2	3
6-Feb	2	2	3	3	2	2	2	2	2	2	2	2	3	4	3	3	4	3	3	4	3	2	2	3	4
7-Feb	4	4	5	4	4	3	4	4	3	3	4	4	3	3	3	3	3	2	2	1	2	3	1	1	5
8-Feb	1	1	1	1	1	3	3	2	1	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2	3
9-Feb	2	2	2	2	2	2	2	2	2	2	1	1	1	1	2	1	2	2	2	2	1	2	2	2	2
10-Feb	2	2	2	3	3	3	3	3	2	1	2	3	3	2	3	3	2	2	3	2	2	1	1	1	3
11-Feb	1	1	1	1	1	1	1	1	1	1	2	2	2	4	4	4	4	4	4	4	5	3	3	3	5
12-Feb	3	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3	2	3	3	3	3	4	4
13-Feb	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3	4	5	5	5	6	5	5	5	6
14-Feb	6	5	6	5	5	5	5	5	4	4	3	3	5	4	5	3	2	3	2	2	3	3	3	2	6
15-Feb	2	1	2	2	2	2	2	2	2	2	2	3	2	2	2	2	2	3	2	2	4	3	2	1	4
16-Feb	2	2	1	2	1	2	2	1	1	1	2	1	3	2	2	2	1	1	1	3	1	2	2	2	3
17-Feb	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	3	2	3	2	3
18-Feb	2	3	3	2	3	2	2	2	2	3	2	2	2	2	2	2	2	2	2	3	3	2	2	1	3
19-Feb	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	4	4	5	5	4	5
20-Feb	4	4	4	4	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	3	2	1	1	4
21-Feb	1	1	1	1	2	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2
22-Feb	1	1	1	1	1	1	1	2	1	1	2	2	2	1	2	1	5	5	4	4	4	3	4	3	5
23-Feb	4	2	3	3	4	4	5	4	3	4	3	4	5	2	2	2	4	3	3	4	5	4	3	2	5
24-Feb	2	2	3	2	3	3	3	3	3	3	3	2	2	2	2	2	4	4	4	4	4	4	3	3	4
25-Feb	3	2	3	1	1	1	1	1	1	1	1	1	1	1	2	2	1	2	1	1	1	1	1	1	3
26-Feb	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	3	2	1	2	3	2	3	2	4
27-Feb	2	2	3	3	2	2	2	2	1	2	2	2	3	3	4	3	3	2	1	1	2	1	2	1	4
28-Feb	1	1	2	2	2	3	4	4	3	3	3	3	3	3	3	3	4	4	2	9	4	3	2	2	9
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

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





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

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

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	148	22.02	22.02
6 - 11	293	43.60	65.63
12 - 19	199	29.61	95.24
20 - 28	32	4.76	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

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

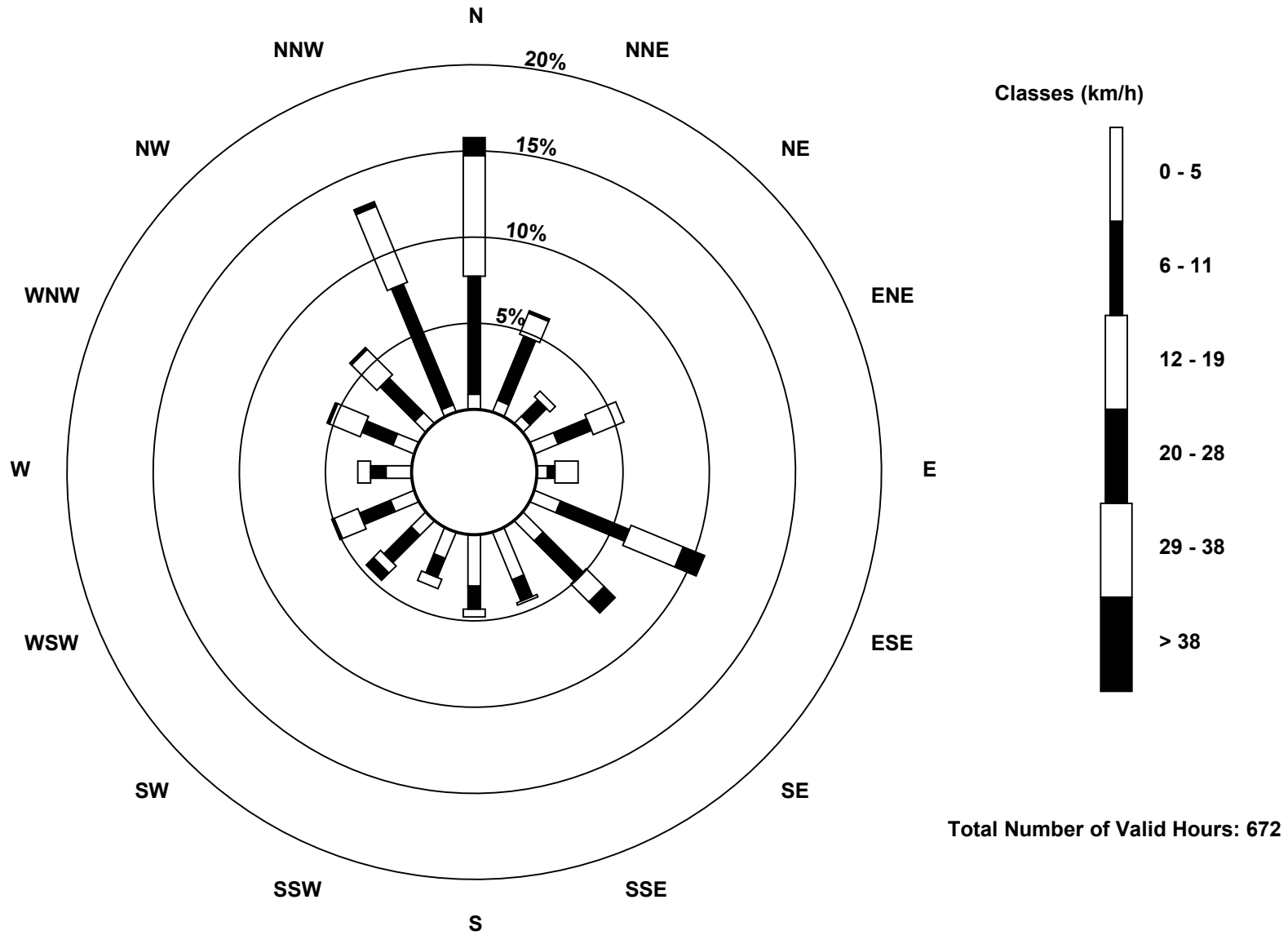
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	6	5	4	10	4	11	11	20	20	11	8	10	10	9	6	3	148
6 - 11	46	27	9	14	3	29	22	9	9	8	15	13	6	13	19	51	293
12 - 19	47	9	3	13	9	22	10	1	3	4	4	10	5	13	14	32	199
20 - 28	7	1	0	0	0	9	6	0	0	0	4	1	0	1	1	2	32
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>	106	42	16	37	16	71	49	30	32	23	31	34	21	36	40	88	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

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





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

**Wind Direction (WD) - deg**  
**Patricia McInnes - February 2015**

Direction of Maximum Speed: 129 deg on Feb 14 04:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 351.1 deg on Feb 20	Hours of Data: 672
Direction of Minimum Speed: 212 deg on Feb 17 05:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.2 deg on Feb 1	Percent Operational Time: 100.0
Monthly Average Direction: 318.6 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-Feb	153	150	153	168	175	171	157	137	131	116	11	358	340	350	354	13	196	238	337	278	228	252	276	271	233.5
2-Feb	228	207	211	168	203	223	221	189	226	228	223	13	339	310	304	296	288	261	261	251	245	251	260	251	248.6
3-Feb	253	254	235	291	341	341	337	340	343	344	7	23	355	32	74	105	122	126	152	181	179	171	167	172	338.4
4-Feb	159	146	136	134	135	162	144	148	121	135	243	261	279	295	299	318	332	350	327	327	325	354	333	305	300.7
5-Feb	300	283	281	286	305	324	250	242	268	209	178	170	149	63	27	17	22	15	18	23	29	23	23	28	355.5
6-Feb	22	2	15	17	15	34	44	39	36	31	36	72	75	78	63	67	64	67	72	78	78	80	76	78	53.8
7-Feb	101	110	121	120	127	114	113	112	116	124	122	119	110	103	104	103	111	106	103	88	78	351	340	327	108.4
8-Feb	345	331	316	327	334	356	354	341	309	298	280	305	52	83	74	58	14	360	336	325	334	345	342	340	346.0
9-Feb	337	0	352	352	359	3	0	352	351	353	358	360	9	5	23	15	356	353	346	348	344	344	338	348	354.4
10-Feb	329	340	329	340	337	347	342	338	328	310	322	325	326	351	335	352	343	13	355	352	352	348	337	309	339.2
11-Feb	249	262	257	262	239	202	178	185	157	161	135	132	134	122	112	124	127	130	130	133	136	134	133	133	136.7
12-Feb	185	193	207	216	221	233	240	239	231	237	232	229	272	18	20	11	12	354	341	347	356	354	355	359	293.9
13-Feb	356	357	353	350	352	360	1	357	359	3	16	40	56	83	104	104	111	114	117	115	111	113	122	124	65.7
14-Feb	123	123	126	129	129	129	128	129	128	126	121	123	160	183	196	191	193	212	234	309	336	340	340	352	139.7
15-Feb	342	306	327	358	11	8	356	0	352	0	356	8	2	347	6	17	350	6	1	348	355	345	323	325	354.1
16-Feb	352	342	348	349	336	327	325	311	268	286	11	76	65	23	43	69	127	199	248	298	297	297	291	300	336.9
17-Feb	323	233	229	322	212	227	229	223	216	157	151	155	134	129	103	94	97	124	111	115	121	125	124	118	140.0
18-Feb	123	119	125	120	124	124	117	117	116	110	105	105	113	106	120	114	105	111	112	111	117	121	131	116	116.0
19-Feb	117	133	132	114	126	174	119	126	147	97	162	191	120	72	69	20	333	336	336	354	351	356	359	1	16.2
20-Feb	6	357	352	349	343	343	343	350	357	3	4	5	15	354	355	353	350	347	353	354	343	327	330	316	351.1
21-Feb	301	314	313	305	336	317	295	286	287	350	40	74	76	65	67	69	95	121	129	152	160	140	142	150	8.1
22-Feb	165	179	175	171	180	190	189	178	185	159	137	145	144	157	119	157	209	216	217	223	230	236	246	291	204.4
23-Feb	304	286	277	283	297	297	312	311	306	303	307	309	330	17	17	14	8	9	10	4	17	29	47	59	334.1
24-Feb	75	87	80	84	85	85	89	83	74	71	68	47	66	50	38	29	18	6	354	352	350	344	345	344	37.4
25-Feb	341	334	335	311	294	292	276	264	241	276	22	77	51	66	44	33	63	25	286	255	227	223	212	179	329.0
26-Feb	180	160	198	201	180	191	186	195	183	169	141	135	153	200	201	229	253	248	253	337	343	343	356	350	222.7
27-Feb	346	347	0	3	359	359	5	0	352	40	109	255	253	282	243	248	255	233	190	213	207	194	230	241	292.4
28-Feb	243	261	263	253	234	258	284	286	291	293	304	308	295	321	329	315	309	289	331	356	347	349	351	347	302.7
	347.6	344.8	330.3	351.8	350.3	347.4	344.1	348.9	341.4	7.9	28.7	42.0	35.5	35.3	42.1	41.6	26.4	20.5	6.3	1.6	1.4	354.1	348.0	349.5	
	Diurnal Average																								

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

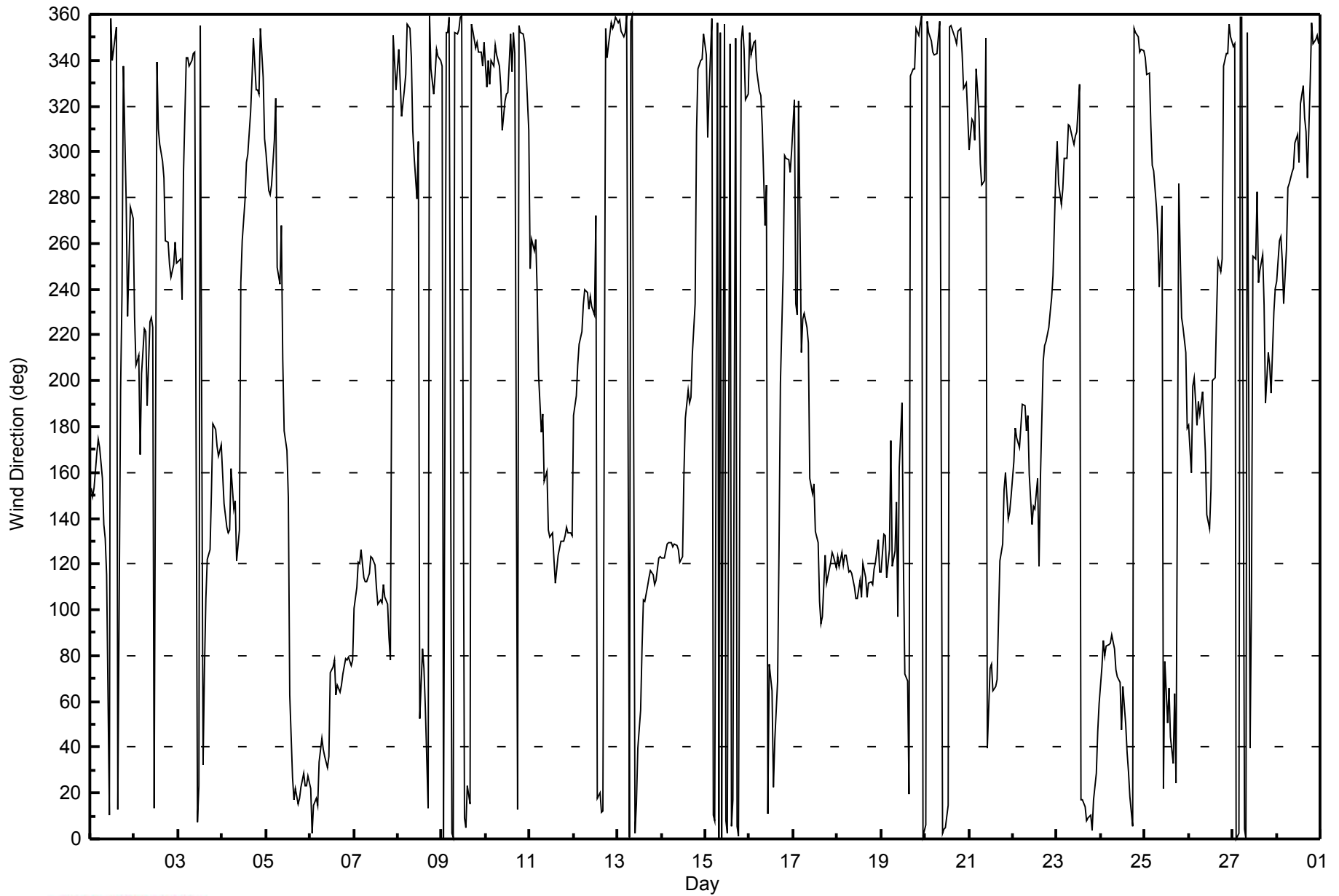


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Feb 27 12:00		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																								
Minimum Value: 4 deg on Feb 21 22:00																										
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 12 Median = 14 Q <sub>3</sub> = 17 P <sub>90</sub> = 25 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-Feb	18	14	13	14	17	9	13	26	17	46	18	22	12	16	23	40	43	44	49	70	25	19	7	7	70	
2-Feb	13	17	37	22	15	9	34	23	11	14	13	75	52	19	15	15	28	16	11	8	7	7	8	7	75	
3-Feb	7	11	8	62	16	9	8	8	10	11	14	15	16	17	15	21	14	19	33	12	14	7	9	10	62	
4-Feb	17	13	15	16	12	13	16	14	29	78	45	11	16	16	12	11	14	13	11	12	8	15	20	13	78	
5-Feb	13	12	6	12	12	15	20	21	36	40	25	19	23	30	11	15	14	13	11	11	11	14	18	40		
6-Feb	19	13	12	11	12	13	14	10	12	11	11	14	12	12	14	12	13	13	13	13	11	12	12	13	19	
7-Feb	14	15	15	15	15	13	13	12	14	15	14	17	14	15	12	12	15	16	14	14	13	27	9	11	27	
8-Feb	15	13	9	13	9	13	13	12	11	18	36	52	71	37	15	18	15	16	11	17	15	12	12	10	71	
9-Feb	12	13	15	13	14	15	13	14	14	15	13	15	20	17	14	14	14	14	12	12	13	14	12	19	20	
10-Feb	9	13	18	9	11	13	10	11	12	18	16	17	15	16	15	21	17	16	13	13	11	11	12	23	23	
11-Feb	13	26	18	24	17	43	23	12	17	28	14	16	18	15	14	15	14	14	13	12	12	12	13	20	43	
12-Feb	14	14	13	16	12	14	9	9	10	10	11	11	48	12	12	12	12	14	11	12	13	14	13	14	48	
13-Feb	14	14	13	13	16	13	13	14	13	13	26	15	18	19	17	14	13	14	14	13	13	13	14	14	26	
14-Feb	14	14	14	12	13	13	12	12	12	13	12	15	22	13	15	13	14	16	13	38	10	10	11	13	38	
15-Feb	11	14	12	13	16	12	14	14	13	14	18	14	16	13	18	19	17	14	13	12	14	13	11	10	19	
16-Feb	15	11	12	14	12	10	14	21	19	20	29	32	48	18	27	23	20	42	11	14	6	6	23	52	52	
17-Feb	62	43	21	49	91	12	9	12	18	21	22	18	19	21	16	17	16	13	13	14	16	13	14	14	91	
18-Feb	13	12	13	16	15	16	15	15	14	14	16	13	15	16	19	16	12	12	12	12	14	14	15	16	19	
19-Feb	15	14	14	23	23	18	23	17	18	26	62	27	41	20	21	33	14	10	10	14	15	14	15	14	62	
20-Feb	15	14	14	12	13	10	10	13	15	14	16	19	26	20	16	14	13	11	12	12	10	9	7	9	26	
21-Feb	5	7	10	8	9	9	10	14	51	11	54	19	18	13	12	11	24	11	7	12	18	4	9	12	54	
22-Feb	13	9	10	11	32	12	14	13	18	15	18	10	12	21	14	14	10	10	9	10	10	13	17	32		
23-Feb	12	14	11	13	10	10	12	11	11	13	15	13	27	9	12	12	14	14	15	14	13	12	15	14	27	
24-Feb	13	11	12	11	12	11	12	13	10	10	13	16	18	19	19	14	13	16	14	13	13	10	11	10	19	
25-Feb	9	8	11	23	13	7	18	28	11	25	21	36	44	34	34	27	25	17	49	13	24	38	26	20	49	
26-Feb	27	13	13	14	14	13	10	14	15	13	14	13	34	14	18	17	14	13	20	21	12	10	14	13	34	
27-Feb	12	18	13	13	14	13	12	13	14	20	43	98	28	19	39	15	13	19	14	13	11	12	16	8	98	
28-Feb	6	14	15	11	11	20	11	10	10	11	11	14	20	19	20	19	11	16	22	24	13	13	14	12	24	
		62	43	37	62	91	43	34	28	51	78	62	98	71	37	39	40	43	44	49	70	25	38	26	52	
		Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Patricia McInnes - February 2015**



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:35
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
Cal Gas Concentration	47.0 ppm	Cal Gas Expiry Date	12/12/2016
Gas Cert Reference	SA130110A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	0-5000mV	DACS channel #	SE 1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-677	-677
Analyzer Range (mv)	1000	1000	Lamp voltage	773	773
Calculated slope	1.003623	0.997039	Chamber temp.	45.0	45.0
Calculated intercept	0.394339	0.599486	Pressure (mmHg)	696.7	700.0
Analyzer Background	5.5	5.5	Flow (lpm)	0.443	0.447
Analyzer Coefficient	1.031	1.031	Intensity	91	91

Analyzer make Thermo 43i Analyzer serial # 1008841397

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	NA
as found span	5000	55.3	519.8	521.0	0.998
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	55.3	519.8	521.0	0.998
second point	5000	27.7	260.4	260.3	1.000
third point	5000	13.9	130.7	130.0	1.005
calibrator zero					
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	55.3	519.8	521.8	0.996
Average Correction Factor					1.001

Corrected As found 521.1 Previous response 517.5 % change -0.7%

#### Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

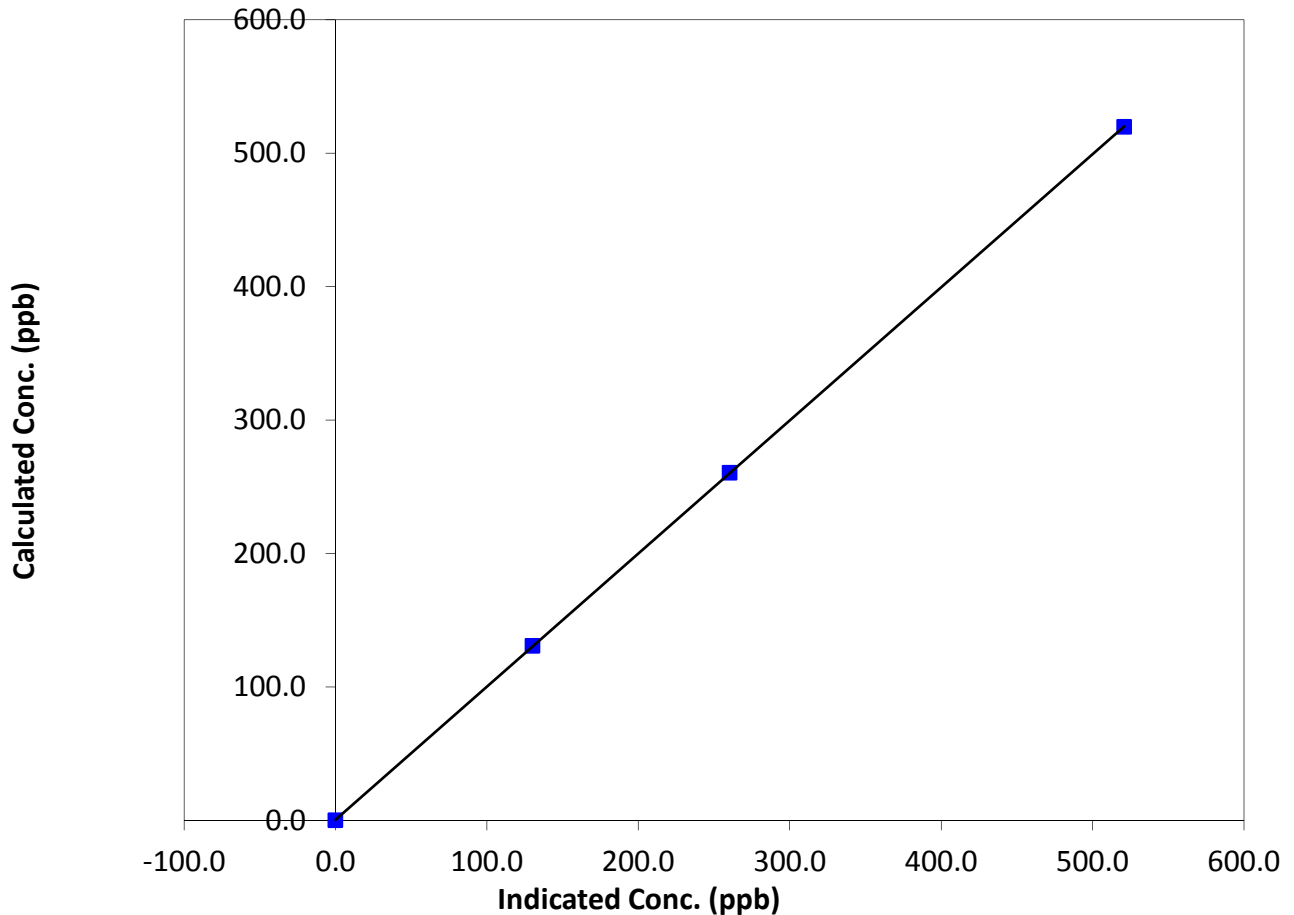
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:35
Analyzer make	Thermo 43i	Analyzer serial #	1008841397

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
519.8	521.0	0.9977		
260.4	260.3	1.0003	Slope	0.997039
130.7	130.0	1.0051		
			Intercept	0.599486

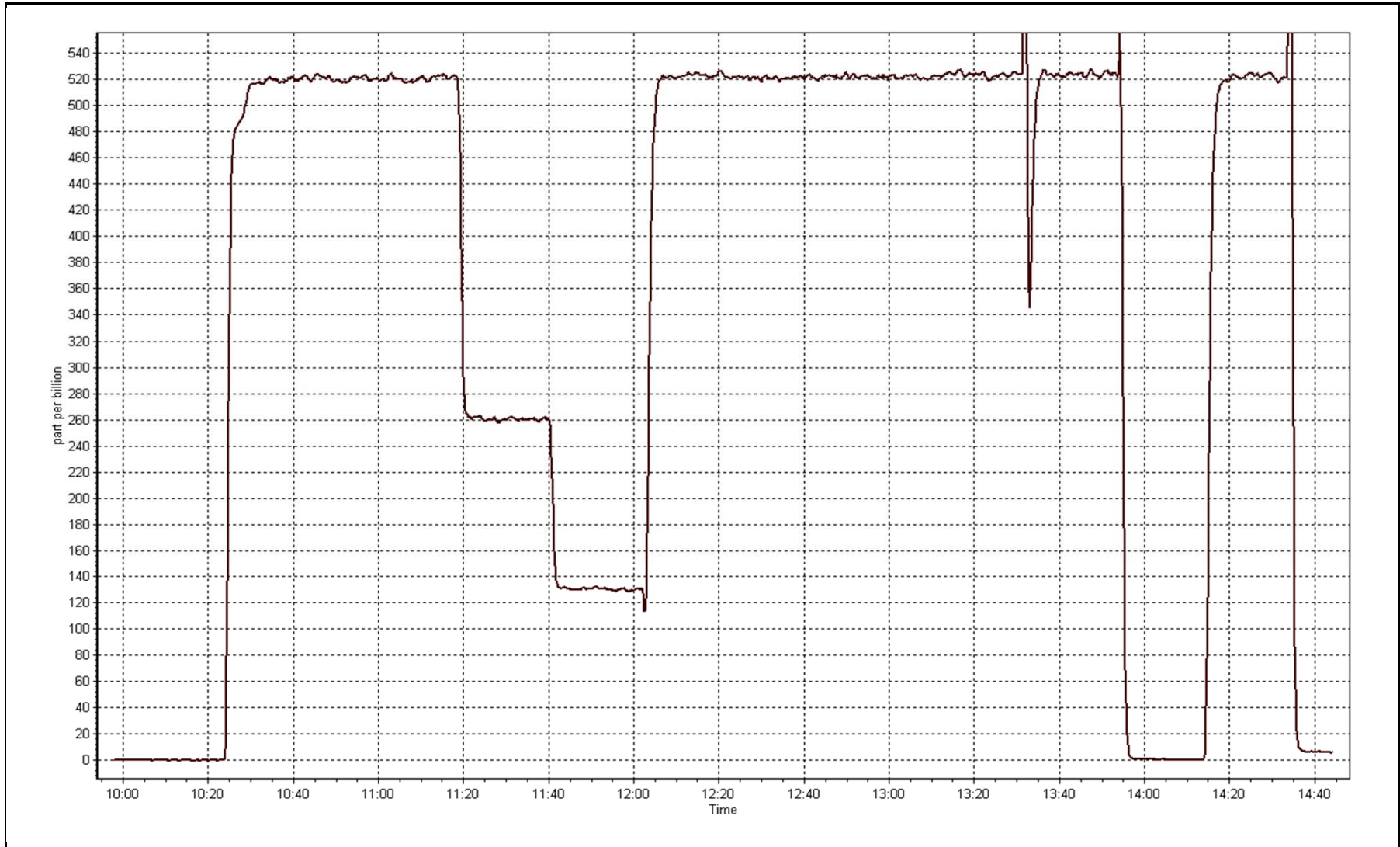
**SO<sub>2</sub> Calibration Curve**





SO2 Calibration Plot

Date: February 3, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	12:15	End Time (MST)	14:55
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	1220
Cal Gas Concentration	4.84 ppm H2S	Cal Gas Expiry Date	June 10 2014
Gas Cert Reference	ALM009562	SO2 gas conc.	47.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582
DACS voltage range	Ethernet connection	DACS channel #	192.168.1.44

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-720	-720
Analyzer Range (input)	100	100	Lamp voltage	1002	1002
Calculated slope	0.995119	1.006712	Chamber temp.	45	45
Calculated intercept	-0.159029	0.116984	Pressure	722.5	694.2
Analyzer Background	2.48	2.55	Flow	0.454	0.439
Analyzer Coefficient	1.206	1.206	Intensity	91	91
			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	-0.2	NA
as found span	5000	72.3	70.0	69.4	1.009
SO2 scrubber check	5000	21.3	200.2	1.0	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	72.3	70.0	69.4	1.009
second point	5000	36.3	35.1	34.8	1.010
third point	5000	18.7	18.1	18.0	1.007
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	72.3	70.0	70.3	0.995
Average Correction Factor					1.009

Corrected As found	69.6	Previous response	70.5	% change	1.3%
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#### Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## TRS Calibration Summary

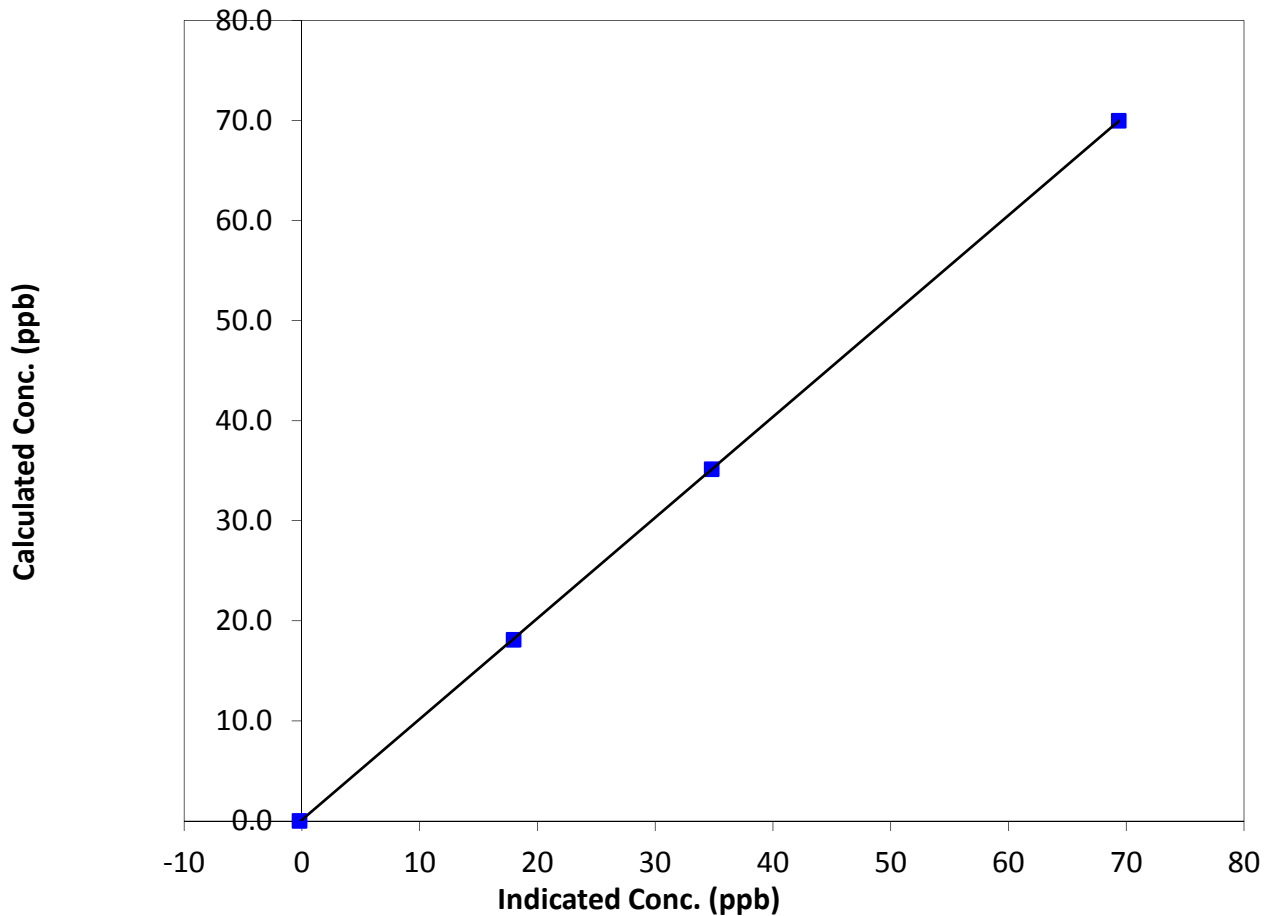
### Station Information

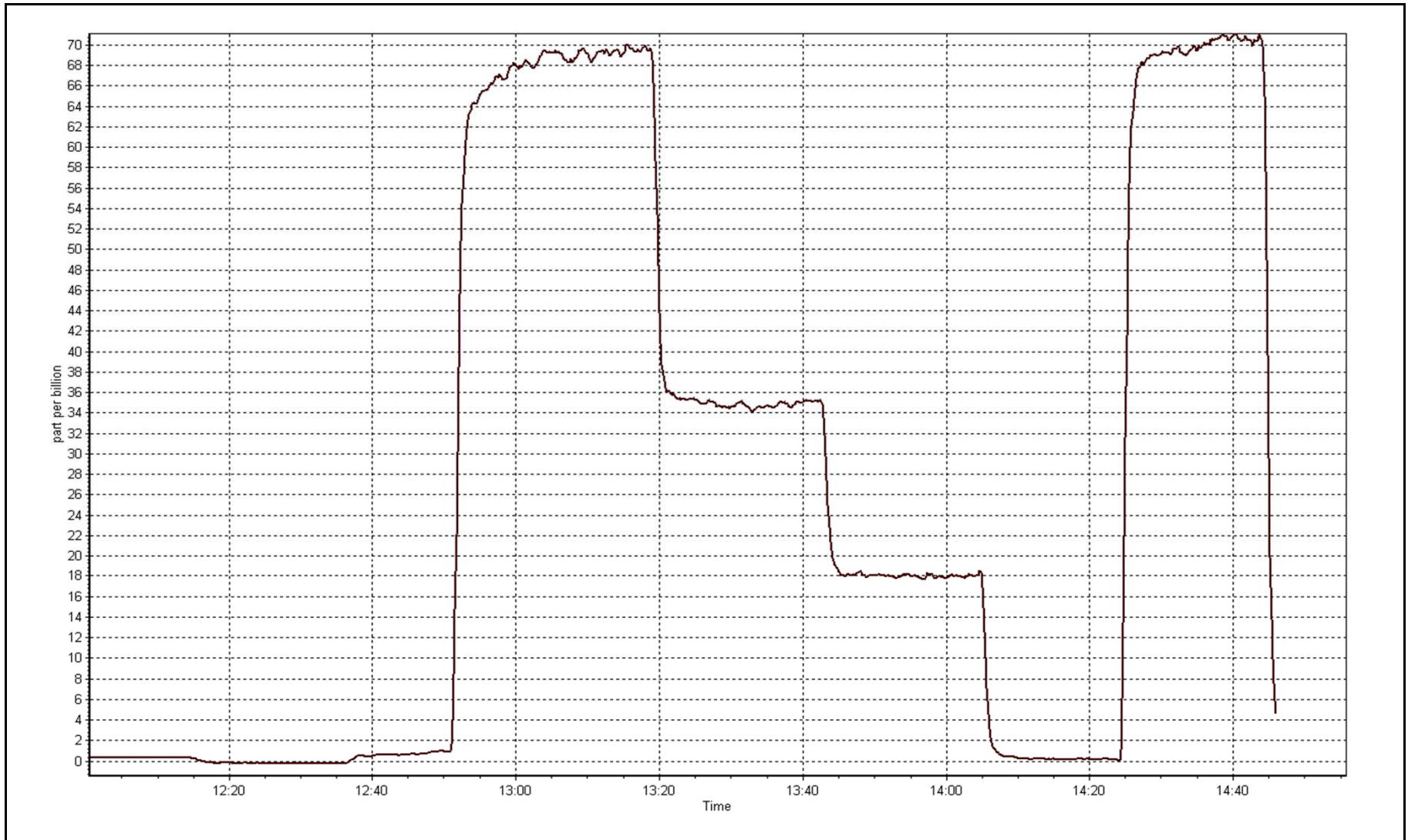
Calibration Date	February 4, 2015	Previous Calibration	January 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	12:15	End Time (MST)	14:55
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1218153358

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999993
70.0	69.4	1.0089		
35.1	34.8	1.0097	Slope	1.006712
18.1	18.0	1.0073		
			Intercept	0.116984

TRS Calibration Curve







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Tuesday, February 03, 2015	Prev Calibration	Wednesday, January 07, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:45
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	API T700	Serial Number	1220
Gas Cert Reference	SA130110A	Cal Gas Expiry Date	Monday, December 12, 2016
CH4 Cal Gas Conc.	512.0 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

### Analyzer Information

	Before	After		Before	After
CH4 Range (ppm)	50	50	Internal Temp	38.9	37.6
CH4 Range (input)	50	50	Flame Temp	402.4	400.5
NMHC Range (ppm)	50	50	Carrier Pressure	34.5	34.5
NMHC Range (input)	50	50	Fuel Pressure	42.3	42.3
THC Calc slope	0.993689	0.997818	Air Pressure	32.4	32.4
THC Calc intercept	-0.019808	0.018013	Detector Temp	175.0	175.0
NMHC Calc slope	0.995286	0.995339	Filter Temp	175.0	175.0
NMHC Calc intercept	-0.025667	0.013997			

Analyzer make Thermo 55i Analyzer serial # 1331259521

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	55.3	12.08	11.98	1.008
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	12.08	12.10	0.998
second point	5000	27.7	6.05	6.03	1.003
third point	5000	13.8	3.01	2.99	1.008
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	12.08	12.14	0.995
Average Correction Factor					1.003

Corrected As found 11.98 Previous response 12.18 % change 1.6%

**Notes:**

adjusted span.

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	5000	0	0.00	0.00	N/A
as found span	5000	55.3	6.42	6.27	1.024
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	6.42	6.44	0.997
second point	5000	27.7	3.21	3.21	1.001
third point	5000	13.8	1.60	1.58	1.014
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	6.42	6.49	0.989
Average Correction Factor					1.004

Corrected As found      6.27      Previous response      6.47      % change      3.2%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	55.3	5.66	5.71	0.992
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	55.3	5.66	5.65	1.002
second point	5000	27.7	2.84	2.81	1.009
third point	5000	13.8	1.41	1.41	1.002
calibrator zero					
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	55.3	5.66	5.65	1.002
Average Correction Factor					

Corrected As found      5.71      Previous response      5.70      % change      -0.1%



# Wood Buffalo Environmental Association

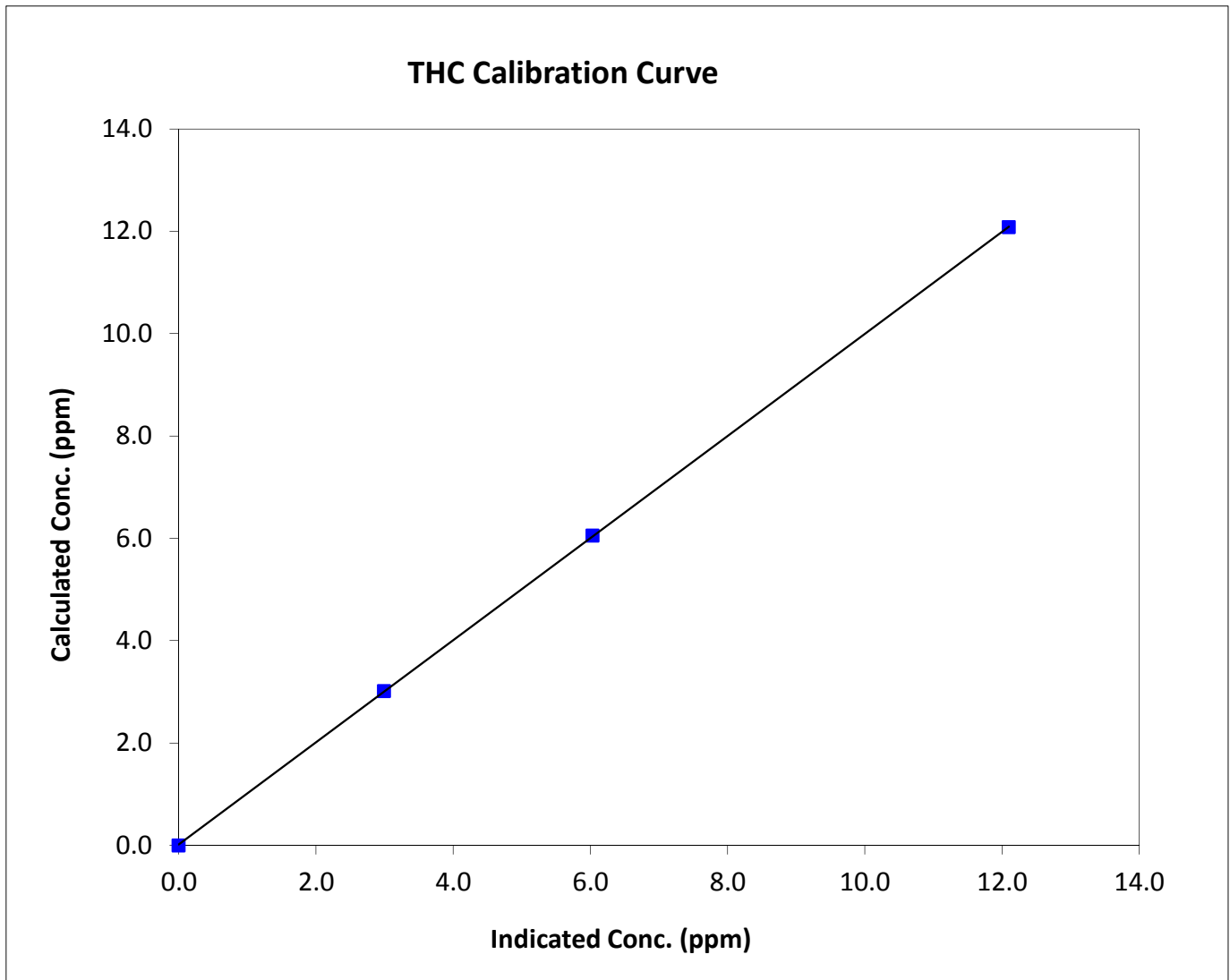
## THC Calibration Summary

### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999989
12.08	12.10	0.9984		
6.05	6.03	1.0035	Slope	0.997818
3.01	2.99	1.0082		
			Intercept	0.018013





# Wood Buffalo Environmental Association

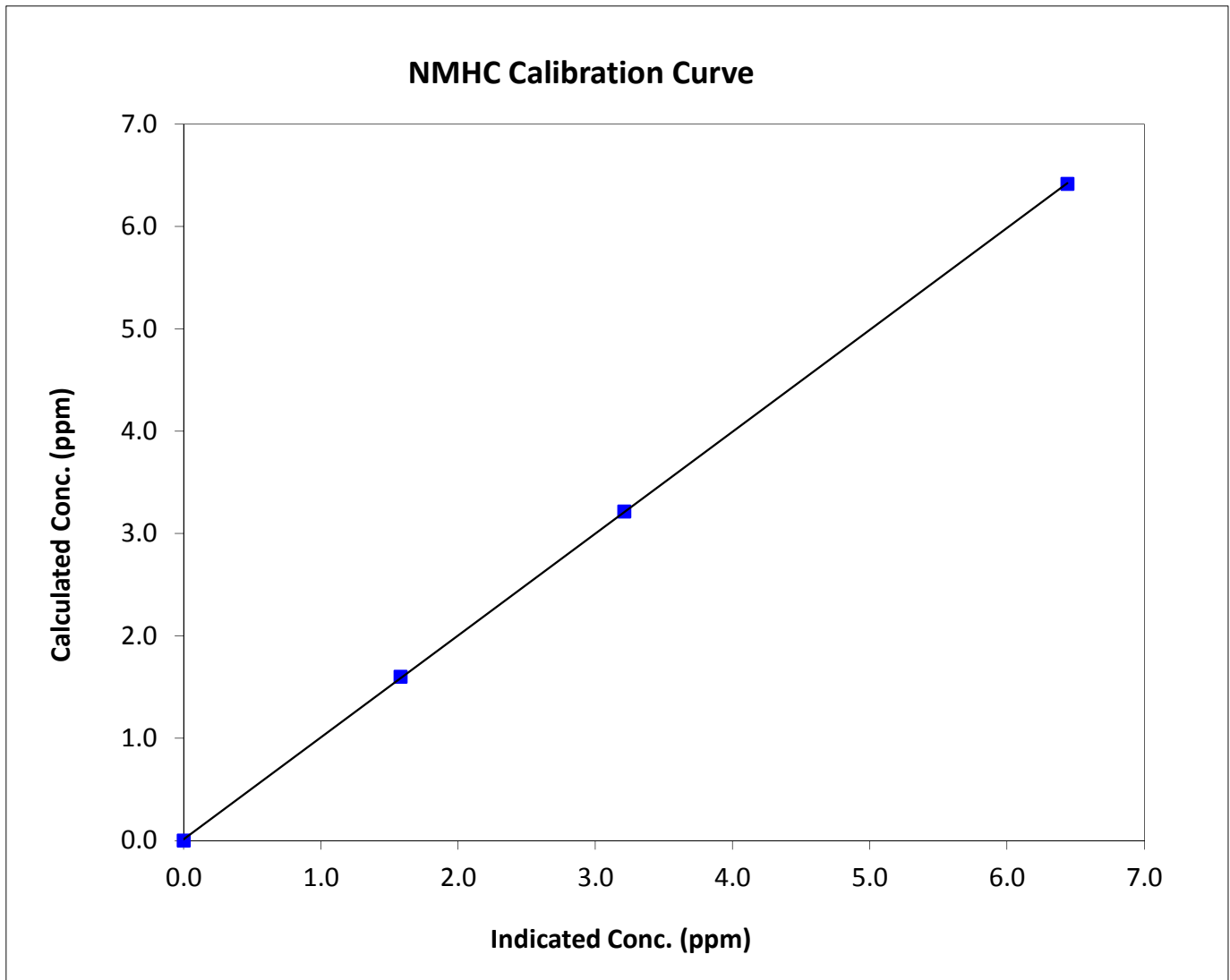
## NMHC Calibration Summary

### Station Information

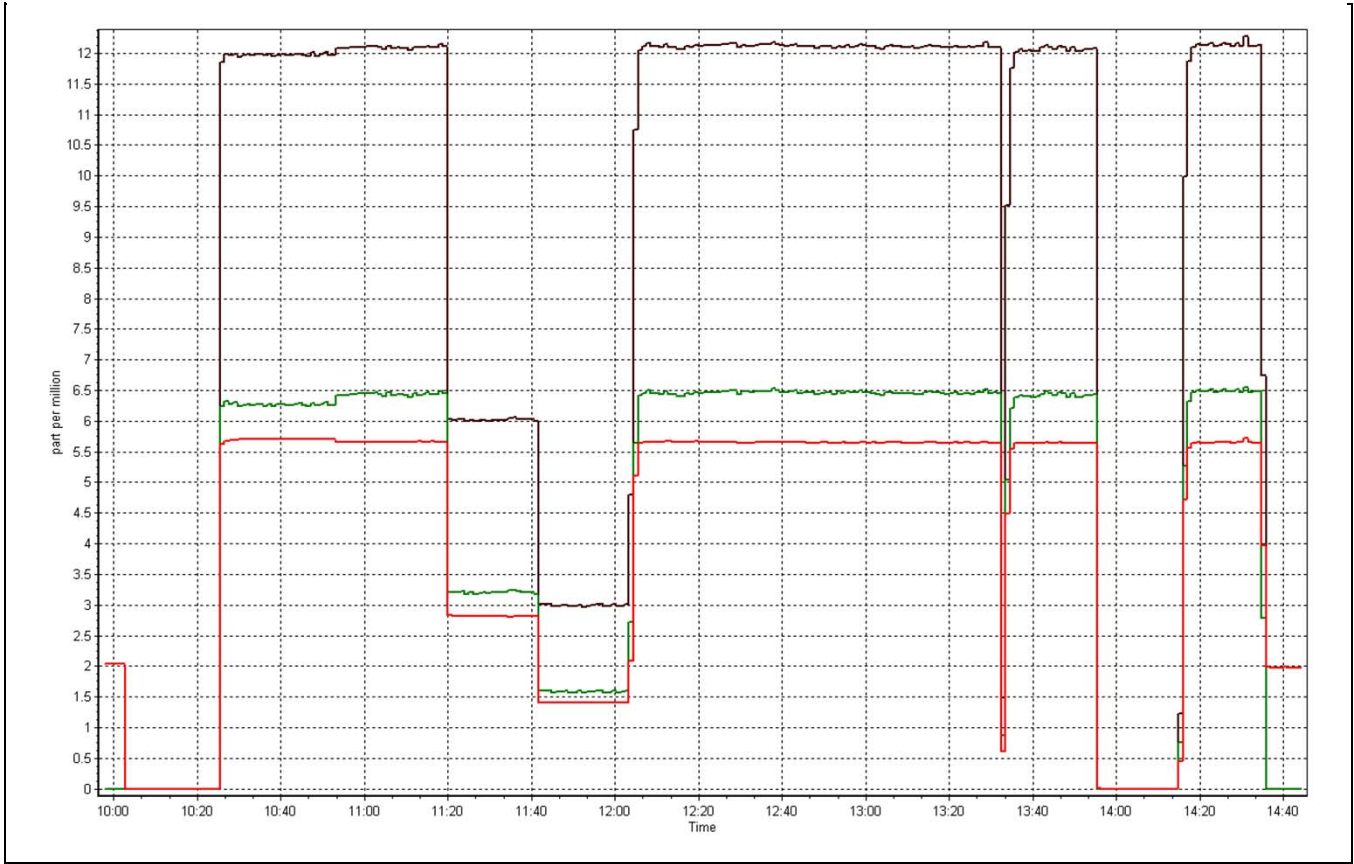
Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo 55i	Analyzer serial #	1331259521

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999978
6.42	6.44	0.9965		
3.21	3.21	1.0014	Slope	0.995339
1.60	1.58	1.0136		
			Intercept	0.013997









# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 8, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	12:15
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	1220
NO2 calibration used	Wednesday, January 07, 2015	Transfer Standard	SA130110A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2582

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	29.7	27.8
Analyzer Range (input)	500	500	Lamp temp.	53.5	53.5
Calculated slope	0.992785	1.003550	Pressure	681.6	659.0
Calculated intercept	-2.177731	-0.725692	Flow cell A	0.712	0.697
Analyzer Background	-0.4	-0.4	Flow cell B	0.737	0.723
Analyzer Coefficient	0.982	1.004	Cell A Intensity	85200	84500
			Cell B Intensity	79800	79100

Analyzer make Thermo 49i Analyzer serial # 1300156234

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Gen Drive Vs. Ref (mv)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.000	0.0	0.2	N/A
as found span	5000	1053 / 621	333.1	325.0	1.025
calibrator zero	5000	0.000	0.0	0.2	N/A
high point	5000	1053 / 621	333.1	332.5	1.002
second point	5000	958 / 430	226.6	226.3	1.001
third point	5000	834 / 220	113.9	115.2	0.989
calibrator zero					
as left zero	5000	0.000	0.0	0.4	N/A
as left span	5000	1060 / 615	333.1	333.5	0.999
Average Correction Factor					0.997

Corrected As found 324.8 Previous response 337.7 % change 4.0%

#### Notes:

adjusted span.

Calibration Performed By:

Michael Martineau



## Wood Buffalo Environmental Association

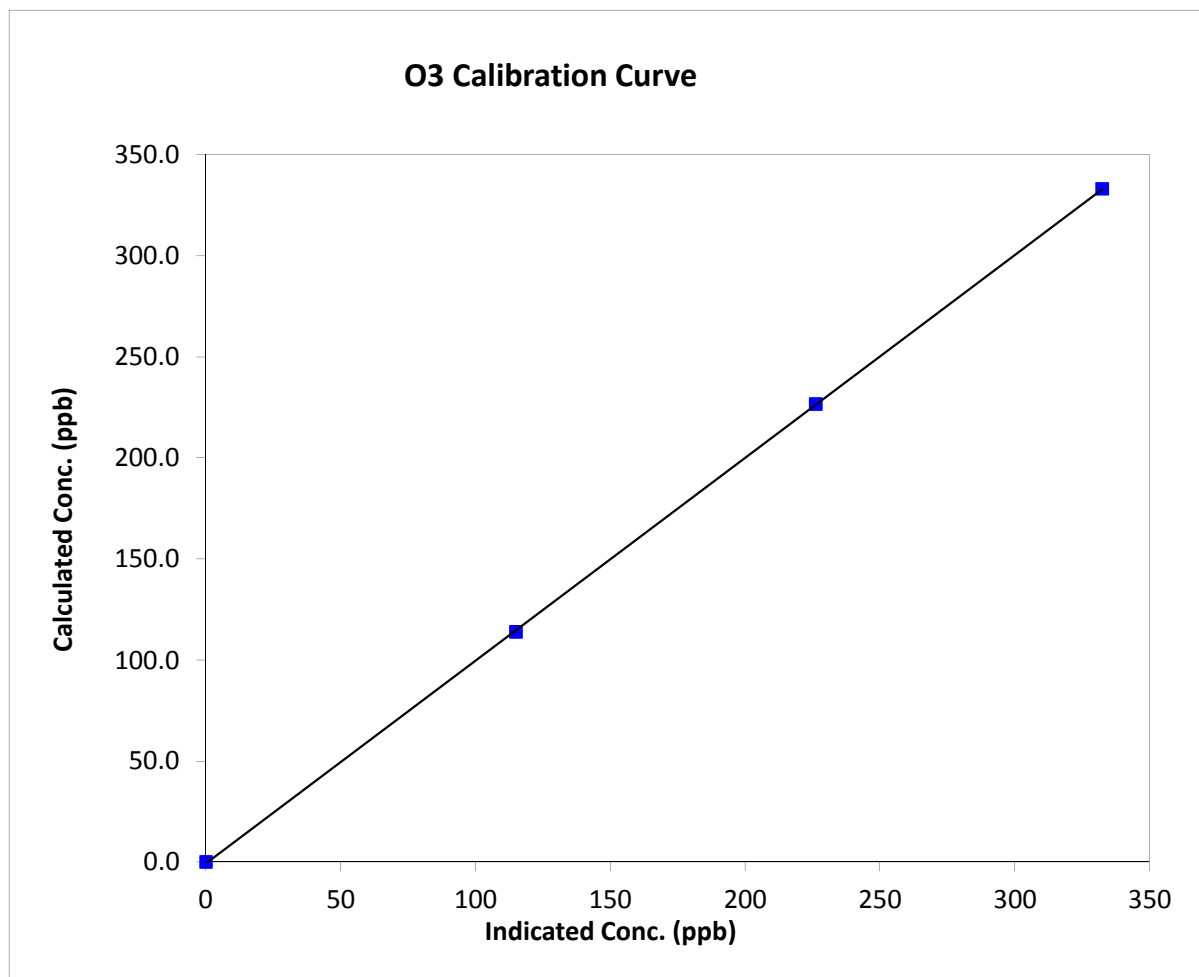
### O<sub>3</sub> Calibration Summary

#### Station Information

Calibration Date	Wednesday, February 04, 2015	Previous Calibration	January 8, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	9:45	End Time (MST)	12:15
Analyzer make	Thermo 49i	Analyzer serial #	1300156234

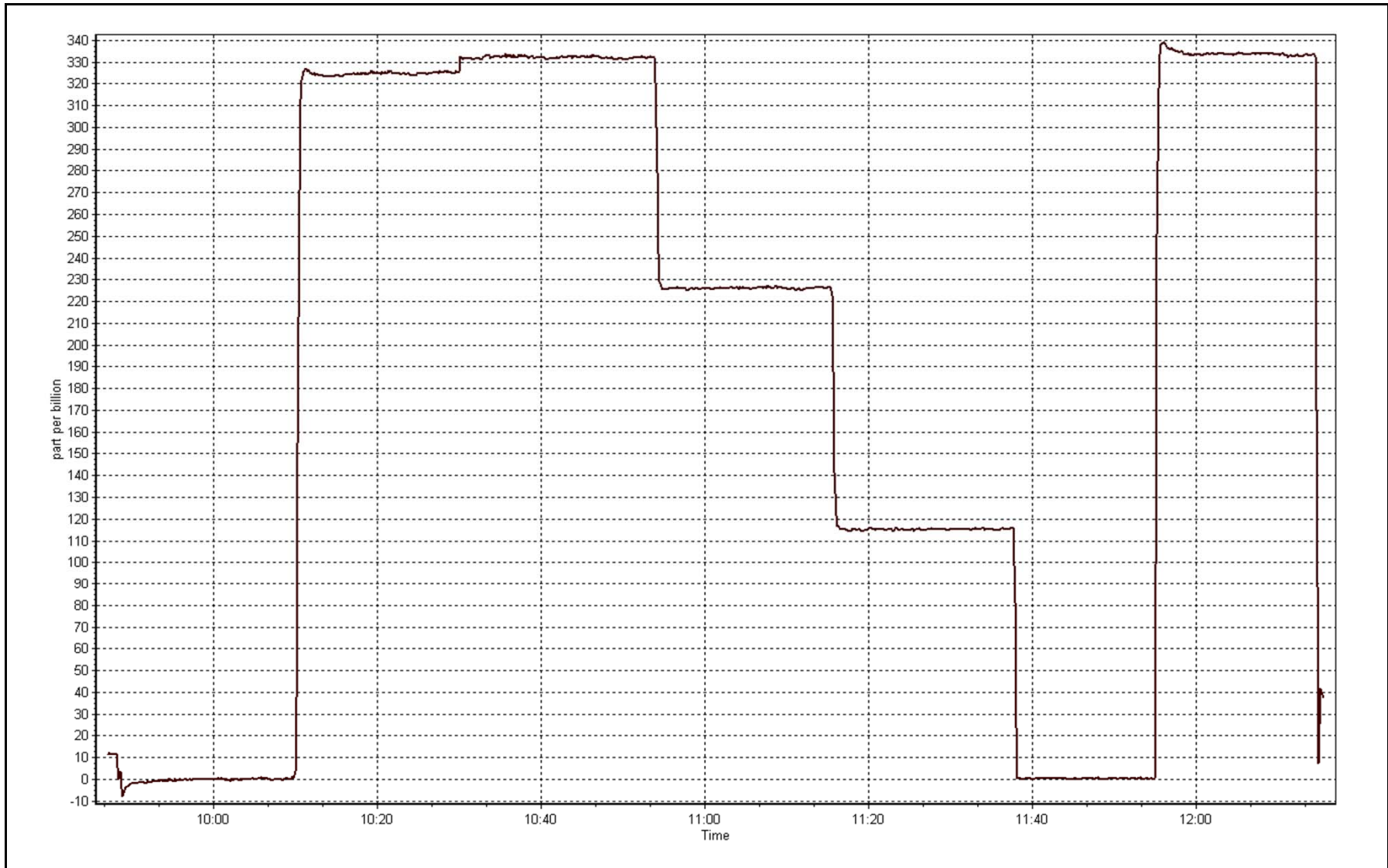
#### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999979
333.1	332.5	1.0020		
226.6	226.3	1.0012	Slope	1.003550
113.9	115.2	0.9889		
			Intercept	-0.725692



O3 Calibration Plot

Date: February 4, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:45
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	1220
NO Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	SA130110A

### DACS Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.995893	0.993777	0.998558
	Data Offset	-0.520403	0.249298	-1.679439
After	Data Slope	0.990121	0.989387	1.011243
	Data Offset	-0.034388	0.524573	-0.629259
IP address:		192.168.1.42		
Voltage Range		N/A		

### Analyzer Information

Analyzer make/model Thermo Scientific 42i      Analyzer serial # 1218153460

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.991		0.991	
NOX coefficient	0.997		0.997	
NO2 coefficient	1.000		1.000	
NO bkgnd	2.7		2.7	
NOX bkgnd	3.3		3.3	
Chamber Temp	50.6	Deg C	50.7	Deg C
Moly Temp	327	Deg C	322	Deg C
PMT voltage	-761	V	-761	V
PMT Temp	-3	Deg C	-3	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press NO	167.3	mmHg	166.7	mmHg
R Cell Press Nox	167	mmHg	166.4	mmHg
NO sample flow	0.868	ccm	0.872	ccm
Nox sample Flow	0.865	ccm	0.868	ccm

**Notes:**

Used 2nd NO-high-GPT point as reference for GPT calibration. No adjustments required.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date: February 3, 2015 Station Number: AMS 6

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	N/A	N/A
as found span	5000	55.3	601.7	601.7	0.0	606.0	605.7	0.4	0.9928	0.9934
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	N/A	N/A
high point	5000	55.3	601.7	601.7	0.0	607.3	607.7	-0.3	0.9907	0.9901
second point	5000	27.7	301.4	301.4	0.0	305.1	304.3	0.8	0.9877	0.9904
third point	5000	13.9	151.2	151.2	0.0	152.9	151.6	1.3	0.9893	0.9974
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as left span	5000	55.3	601.7	286.8	314.9	620.2	290.6	329.6	0.9702	0.9871
Average Correction Factor									0.9892	0.9926

Corrected As found NO<sub>x</sub>= 606.4 NO= 605.8 Percent Change NO<sub>x</sub>= -0.3% NO= -0.1%  
 Previous Response NO<sub>x</sub>= 604.7 NO= 605.2

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 55.30 ccm

O3 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			-0.3			N/A	
1st NO <sub>2</sub> (300)	N/A	286.8	333.1	616.2	286.8	329.4	0.9658	1.0000	1.0112	98.9%
2nd NO <sub>2</sub> (200)	N/A	393.2	226.6	618.2	393.2	225.0	0.9625	1.0000	1.0072	99.3%
3rd NO <sub>2</sub> (100)	N/A	506.0	113.9	620.5	506.0	114.5	0.9591	1.0000	0.9948	100.5%
4th NO <sub>2</sub> (0)	619.9	N/A	1.0	620.9	619.9	1.0	0.9585	1.0000	N/A	N/A
Average Correction Factor							0.9615	1.0000	1.0044	99.6%

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

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

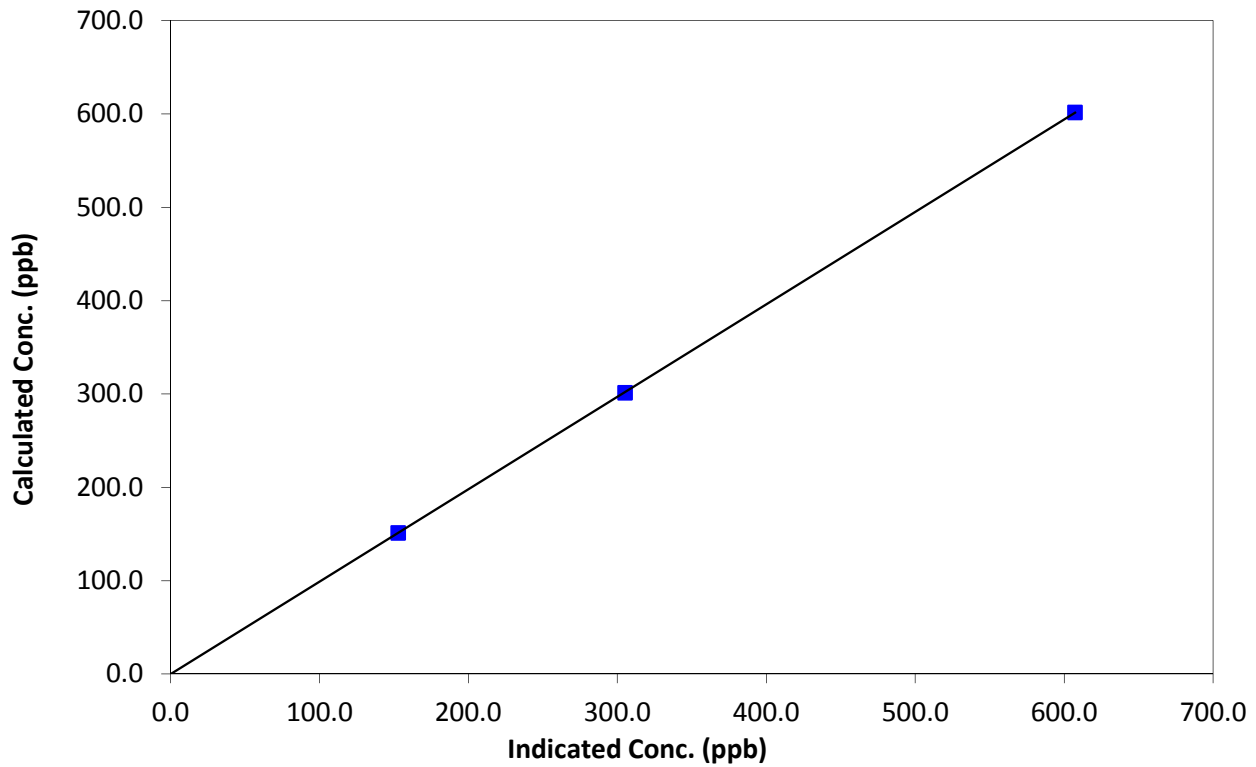
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999996
601.7	607.3	0.9907		
301.4	305.1	0.9877	Slope	0.990121
151.2	152.9	0.9893		
			Intercept	-0.034388

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

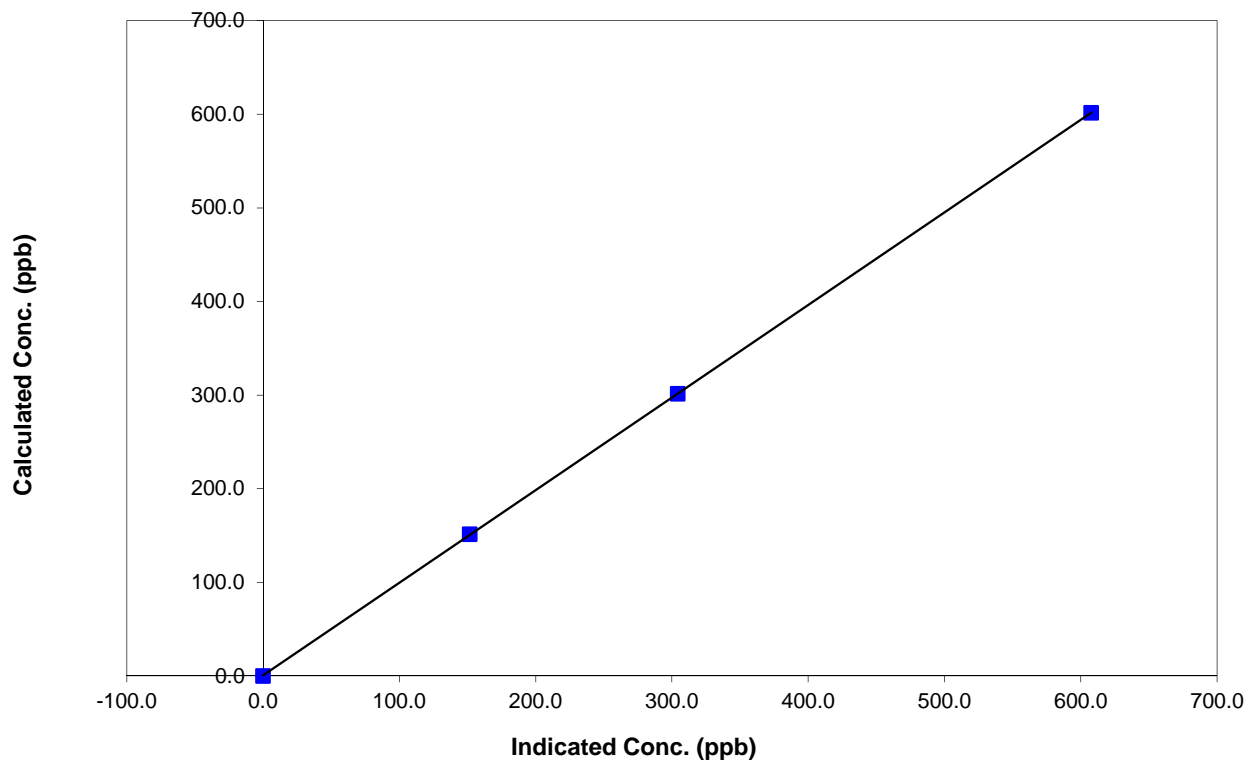
### Station Information

Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999997
601.7	607.7	0.9901		
301.4	304.3	0.9904	Slope	0.989387
151.2	151.6	0.9974		
			Intercept	0.524573

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

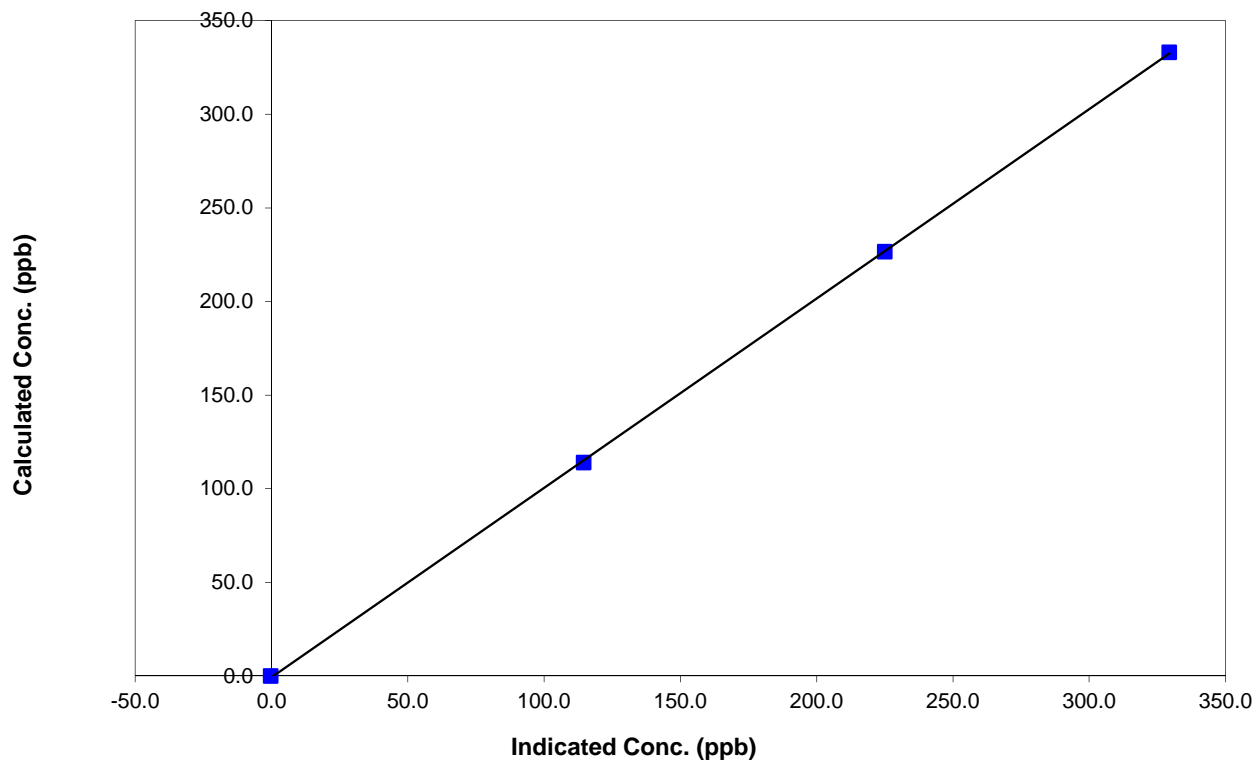
### Station Information

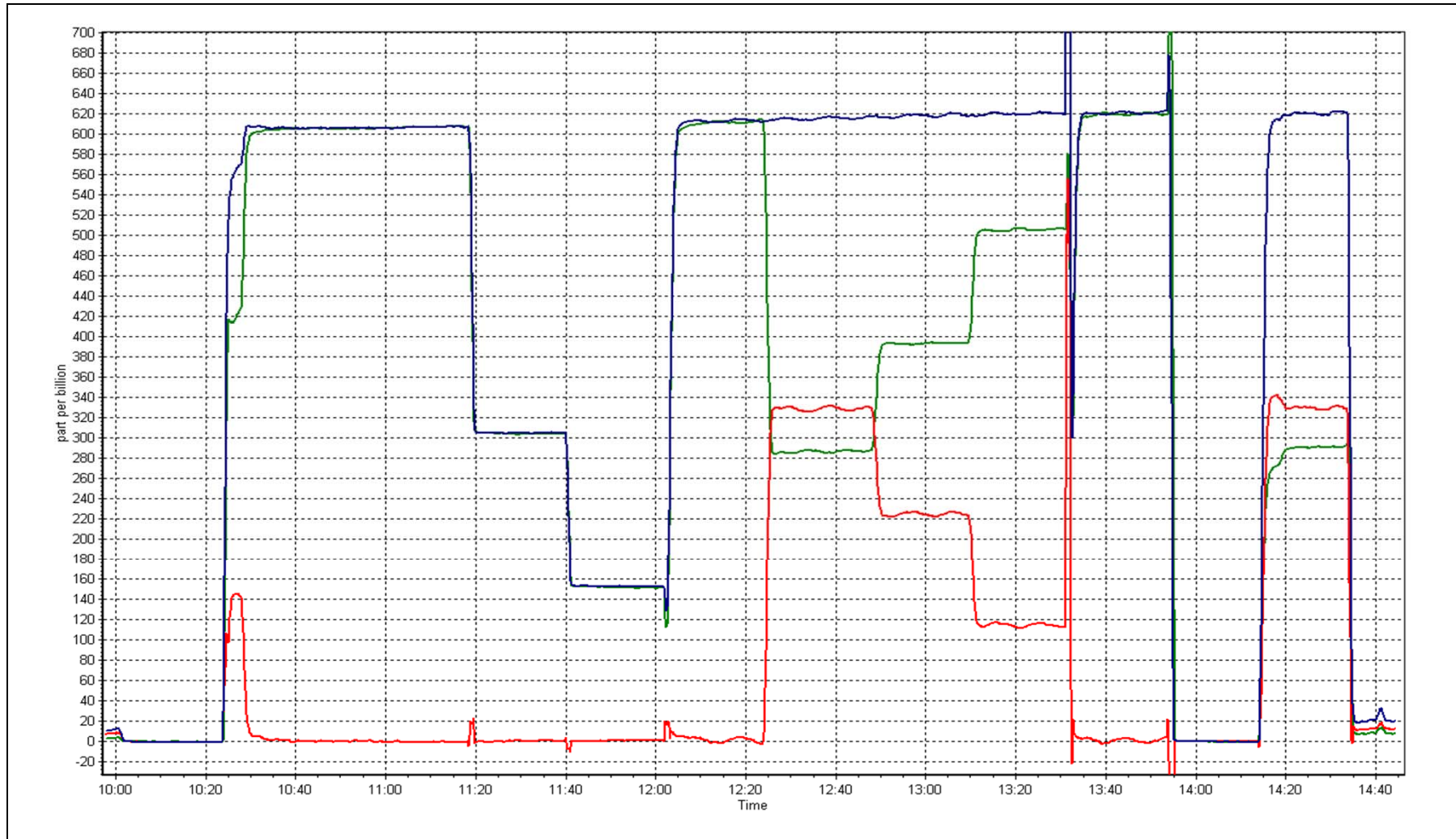
Calibration Date	February 3, 2015	Previous Calibration	January 7, 2015
Station Number	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:45
Analyzer make	Thermo Scientific 42i	Analyzer serial #	1218153460

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999954
333.1	329.4	1.0112		
226.6	225.0	1.0072	Slope	1.011243
113.9	114.5	0.9948		
			Intercept	-0.629259

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







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	14:25
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	1220
NH3 Cal Gas Conc	190 ppm	Cal Gas Expiry Date	April 3, 2012
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	LL86349

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2582
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Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	2500	1000	2500
Before	Data Slope	0.980690	0.998059	0.981266
	Data Offset	11.147256	0.409227	10.488799
After	Data Slope	0.986231	1.000412	0.986731
	Data Offset	18.598157	1.039306	17.515685
IP address			192.168.1.17	

### Analyzer Information

Analyzer make/model	Thermo 17i	Analyzer serial #	1426262596
		Converter serial #	1426262596

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
NO BKG	11.1	ppb	11.0	ppb
NOx BKG	10.2	ppb	10.1	ppb
Nt BKG	13.9		13.7	
NO coefficient	1.197		1.177	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	0.926		0.925	
NH3 coefficient	0.870		0.870	
Nt coefficient	0.981		0.984	
NH3 conv temp	757	DegC	758	Deg C
Chamber Temp	50.7	Deg C	50.6	Deg C
Moly Temp	325.0	Deg C	323.0	Deg C
PMT Temp	-9.0	Deg C	-9.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	101.4	mmHg	100.8	mmHg
PMT Voltage	-838.0	v	-837.7	v
Sample Flow 1 NO	546.0	ccm	548.0	ccm
Sample Flow 2 Nox	525.0	ccm	528.0	ccm
Sample Flow 3 Nt	494.0	ccm	497.0	ccm

Notes:

Adjusted NO, Nox, Nt span.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

February 6, 2015

Station Number:

AMS 6

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-2.3	-1.1	-1.2	NA	NA
as found NO	5000	73.6	800.8	800.8	NA	786.1	789.3	-3.2	1.019	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	-1.1	-1.0	-0.1	NA	NA
high NO point	5000	73.6	800.8	800.8	NA	801.4	801.3	0.1	0.999	NA
NO/O <sub>3</sub> point	5000	73.6	800.8	800.8	NA	801.4	797.5	3.9	0.999	NA
as found NH <sub>3</sub>	5000	52.6	1998.8	NA	1998.8	2018.5	-0.1	2018.6	0.990	0.990
first NH <sub>3</sub>	5000	52.6	1998.8	NA	1998.8	2018.5	-0.1	2018.6	0.990	0.990
second NH <sub>3</sub>	5000	26.3	999.4	NA	999.4	978.7	-0.6	979.3	1.021	1.021
third NH <sub>3</sub>	5000	13.2	501.6	NA	501.6	477.1	-0.9	478.0	1.051	1.049
as left zero						0.0				
as left span						0.0				
Average Correction Factor									0.9992	1.0200

Corrected As found

Nt = 788.4 ppb

NH<sub>3</sub> = 2019.7 ppb

Previous response

Nt = 805.4 ppb

NH<sub>3</sub> = 2026.5 ppb

Nt percent change 2.2%

NH<sub>3</sub> percent change 0.3%

Converter efficiency 87.0%

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

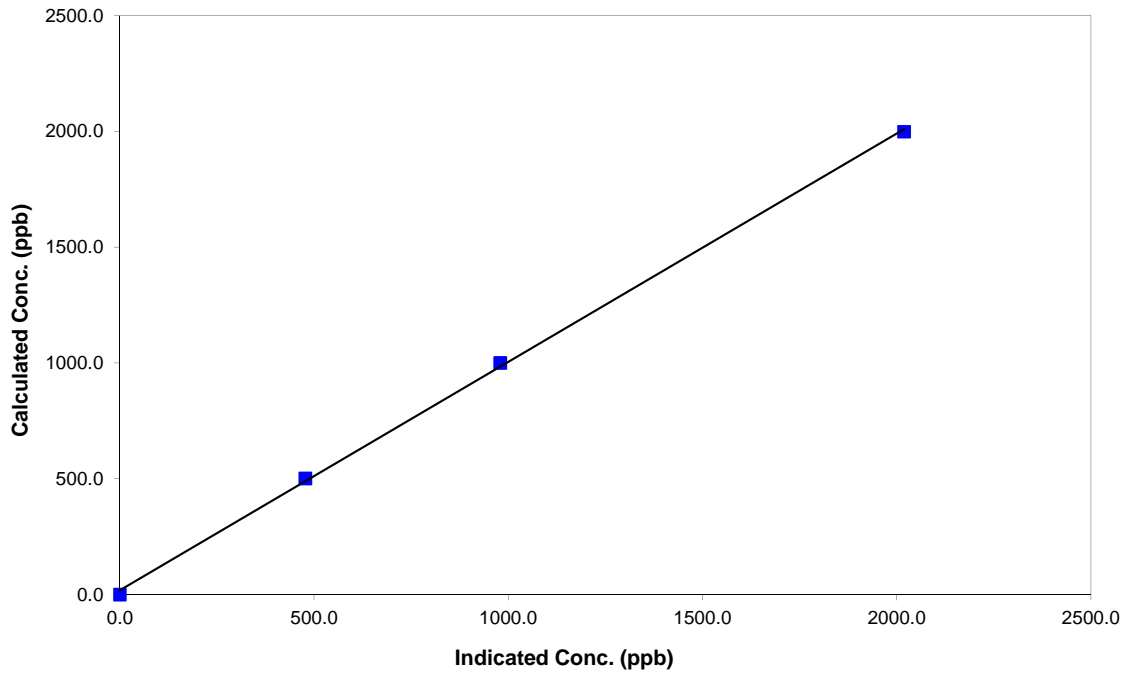
### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:25
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999627
1998.8	2018.6	0.9902		
999.4	979.3	1.0205	Slope	0.986731
501.6	478.0	1.0494		
			Intercept	17.515685

### NH3 Calibration Curve





# Wood Buffalo Environmental Association

## Nt Calibration Summary

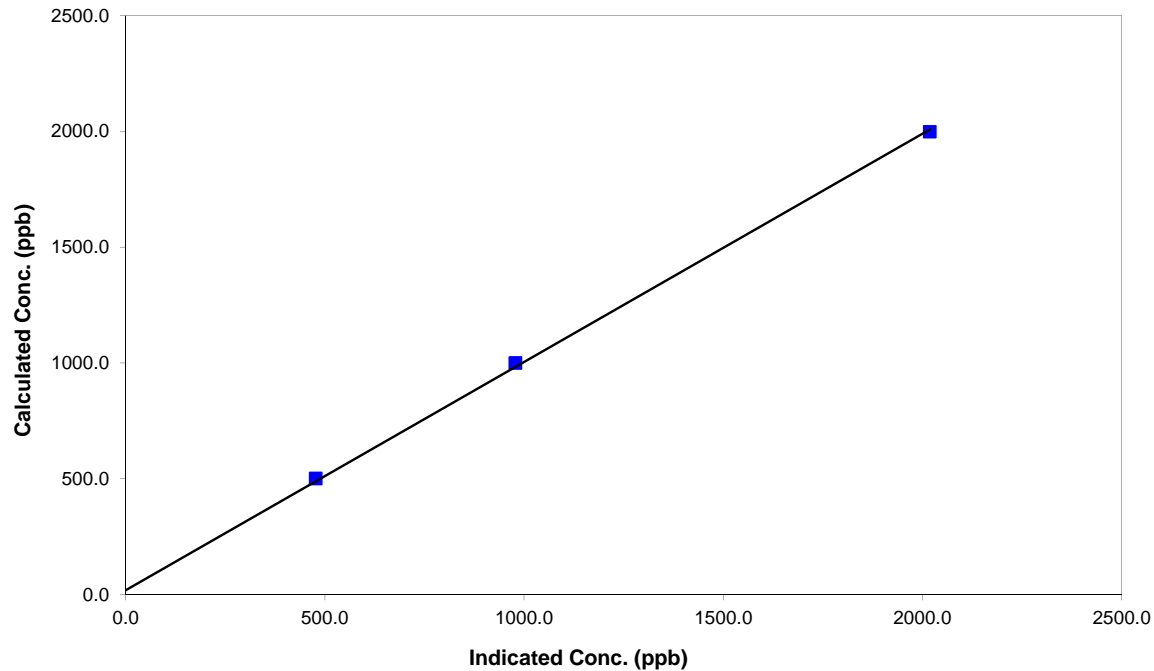
### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:25
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.1	N/A	Correlation Coefficient	0.999627
1998.8	2018.5	0.9902		
999.4	978.7	1.0212	Slope	0.986231
501.6	477.1	1.0513		
	0.0		Intercept	18.598157

### Nt Calibration Curve





## Wood Buffalo Environmental Association

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

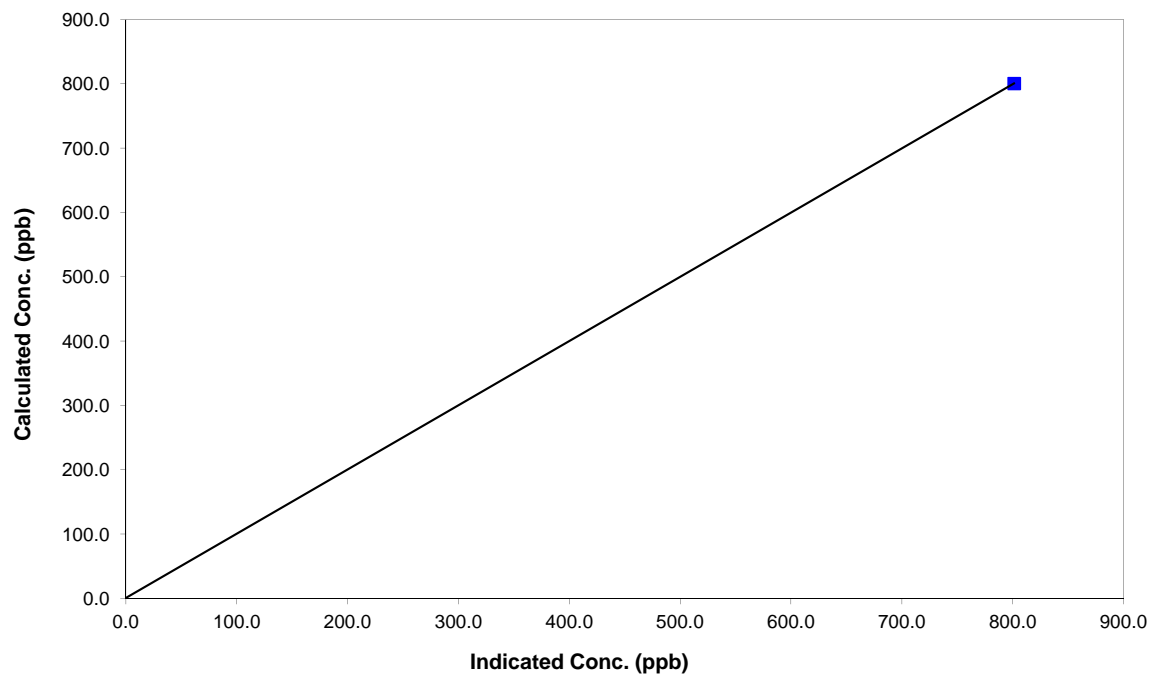
#### Station Information

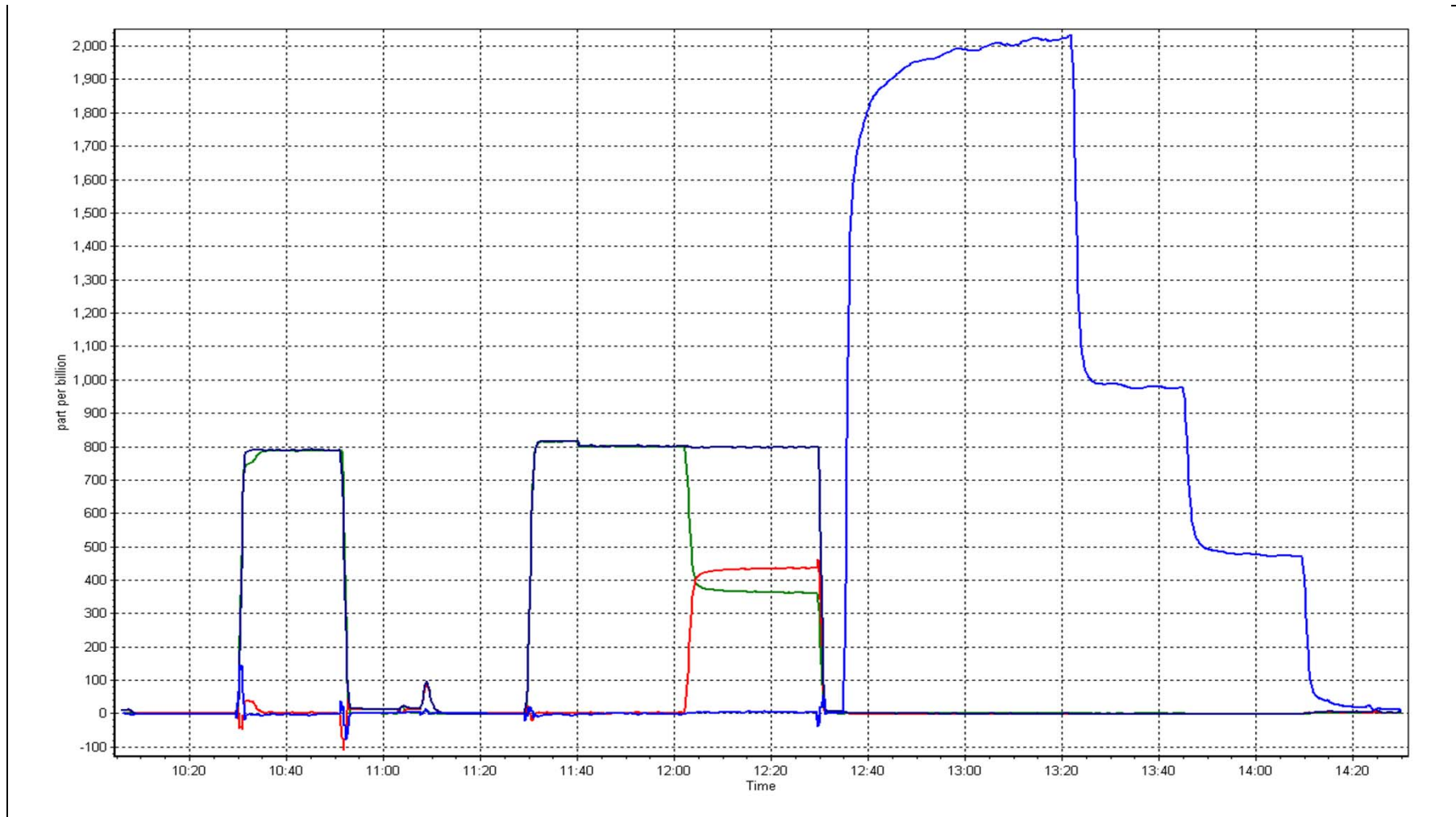
Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:00	End Time (MST)	14:25
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-1.0	N/A	Correlation Coefficient	0.999983
800.8	801.3	0.9994		
800.8	797.5	1.0041	Slope	1.000412
			Intercept	1.039306

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









# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Reason:	<input type="checkbox"/> Other: <input type="checkbox"/> repair		
Start Time (MST)	10:10	End Time (MST)	16:40
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	1220
NO Cal Gas Conc	54.4 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	SA130110A

### DACS Information

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

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope			
	Data Offset			
After	Data Slope	0.998045	0.996899	1.003278
	Data Offset	3.282934	2.609667	0.411344
IP address:		192.168.1.17		
Voltage Range		N/A		

### Analyzer Information

Analyzer make/model Thermo Scientific 17i      Analyzer serial # 1426262596

Test Point	before		after	
Concentration range		ppb	0-1000	ppb
NO coefficient	1.177		1.207	
NOx coefficient	0.925		0.927	
NO2 coefficient	1.000		1.000	
NO bkgnd	11.0		10.6	
NOx bkgnd	10.1		11.6	
Chamber Temp	50.6	Deg C	50.4	Deg C
Moly Temp	323	Deg C	322	Deg C
PMT voltage	-837.7	V	-837.7	V
PMT Temp	-9	Deg C	-8.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell press	100.8	mmHg	102.3	mmHg
Nt sample flow	497	ccm	497	ccm
NO sample flow	548	ccm	545	ccm
Nox sample Flow	528	ccm	525	ccm

**Notes:**

Replaced capillary o-rings, replaced solenoid fittings on two solenoids. Checked fittings for tightness. Replaced inlet filter. Adjusted zero, NO/NOx/Nt spans.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 24, 2015

Station Number:

AMS 6

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.9	-0.9	0.1	N/A	N/A
as found span	5000	55.3	601.7	601.7	0.0	579.1	575.8	3.2	1.0390	1.0449
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.7	-0.3	-0.4	N/A	N/A
high point	5000	55.3	601.7	601.7	0.0	601.1	602.3	-1.2	1.0010	0.9989
second point	5000	27.7	301.4	301.4	0.0	296.6	297.8	-1.2	1.0162	1.0121
third point	5000	13.9	151.2	151.2	0.0	146.3	147.3	-1.1	1.0341	1.0265
calibrator zero										
as left zero										
as left span										
Average Correction Factor									1.0171	1.0125

Corrected As found  
Previous Response

NO<sub>x</sub>= 579.9  
NO<sub>x</sub>= NA

NO= 576.7  
NO= NA

Percent Change

NO<sub>x</sub>= N/A

NO= N/A

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

55.30

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			-0.4			N/A	
1st NO <sub>2</sub> (300)	N/A	277.9	324.4	600.8	277.9	323.0	0.9905	1.0000	1.0046	99.5%
2nd NO <sub>2</sub> (200)										
3rd NO <sub>2</sub> (100)										
4th NO <sub>2</sub> (0)	602.3	N/A	-1.2	601.1	602.3	-1.2	0.9900	1.0000	N/A	N/A
Average Correction Factor							0.9902	1.0000	1.0046	99.5%

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

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

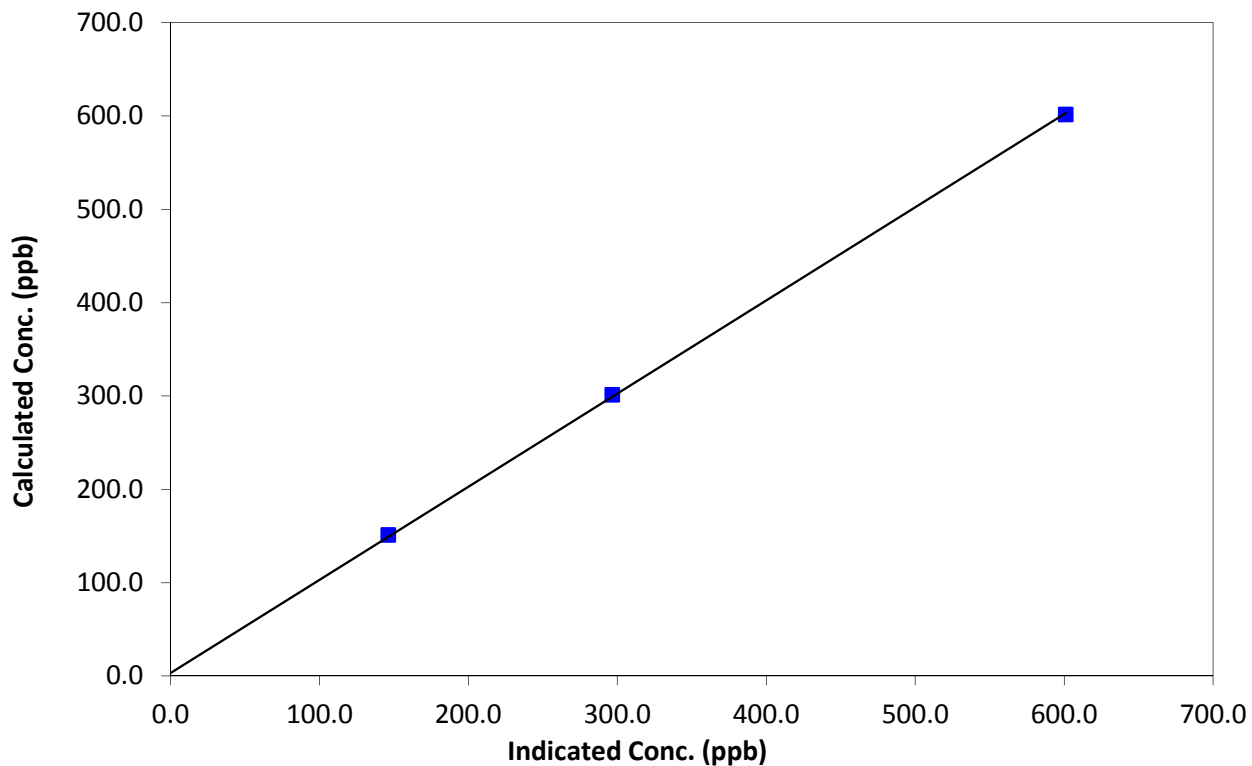
### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	16:40
Analyzer make	Thermo Scientific 17i	Analyzer serial #	1426262596

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	0.999913
601.7	601.1	1.0010		
301.4	296.6	1.0162	Slope	0.998045
151.2	146.3	1.0341		
			Intercept	3.282934

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

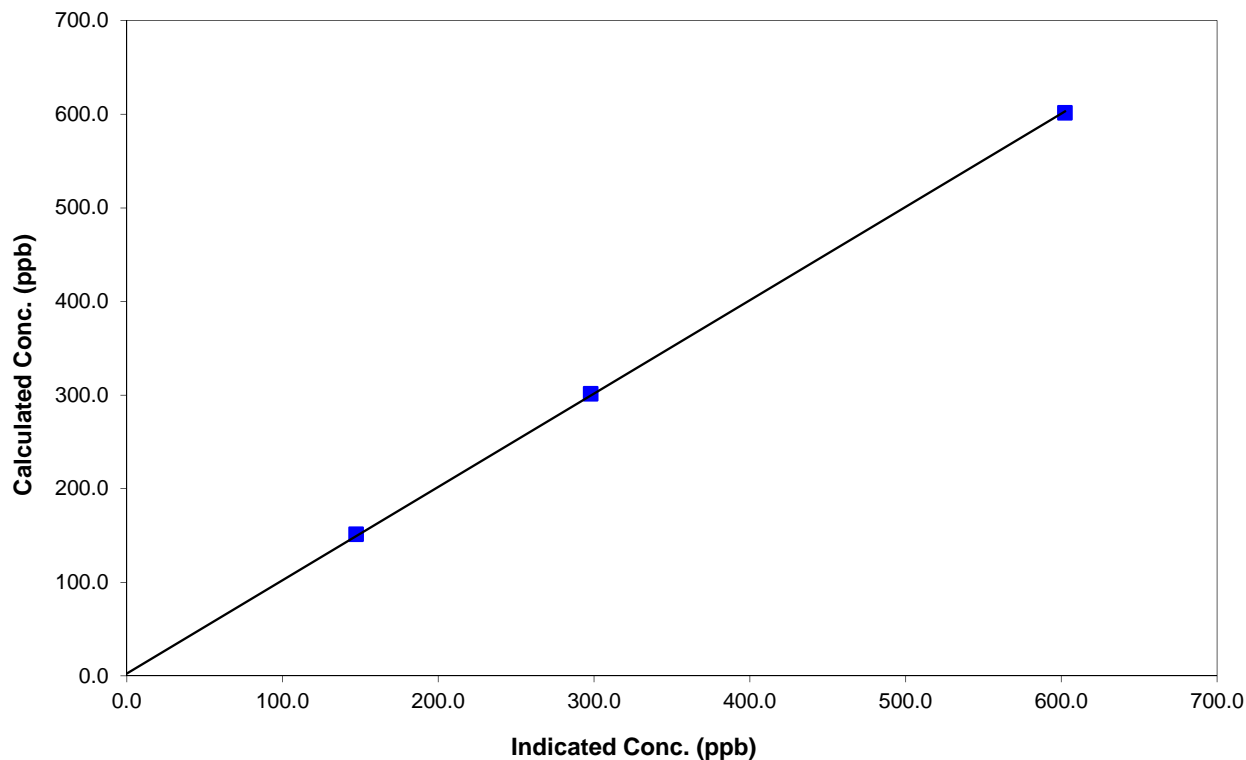
### Station Information

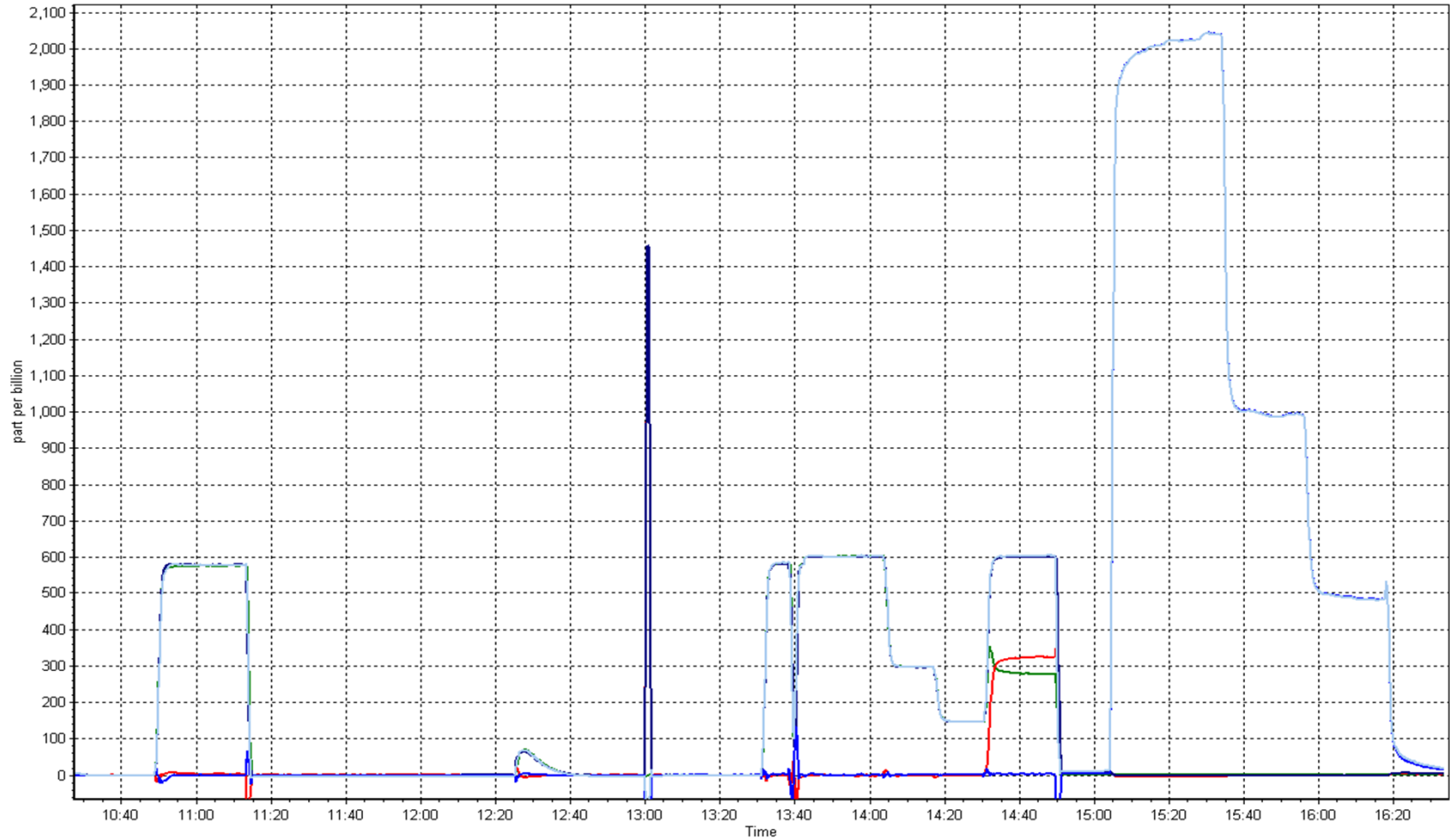
Calibration Date	February 6, 2015	Previous Calibration	February 6, 2015
Station Name	Patricia McInnes	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	16:40
Analyzer make	Thermo Scientific 17i	Analyzer serial #	1426262596

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999930
601.7	602.3	0.9989		
301.4	297.8	1.0121	Slope	0.996899
151.2	147.3	1.0265		
			Intercept	2.609667

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 6, 2015
Station Name	Patricia McInnis	Station Number	AMS 6
Reason:	Other: <input type="text" value="repair"/>		
Start Time (MST)	10:10	End Time (MST)	16:40
Barometric Pressure	n/a mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	1220
NH3 Cal Gas Conc	190 ppm	Cal Gas Expiry Date	April 3, 2012
NOx Cal Gas Conc	54.4 ppm	Cal Gas Serial #	LL86349

### DACs Information

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

Parameter		Nt	NOx	NH3
MV conversion	Analyzer Range (ppb)	2500	1000	2500
	Analyzer Range (mv)	2500	1000	2500
Before	Data Slope	0.986231	1.000412	0.986731
	Data Offset	18.598157	1.039306	17.515685
After	Data Slope	0.981012	1.000023	0.980991
	Data Offset	15.760196	0.700091	14.745846
IP address		192.168.1.17		

### Analyzer Information

Analyzer make/model	Thermo 17i	Analyzer serial #	1426262596
		Converter serial #	1426262596

Test Point	before		after	
Concentration range	0-2500	ppb	0-2500	ppb
NO BKG	11.0	ppb	10.6	ppb
NOx BKG	10.1	ppb	11.6	ppb
Nt BKG	13.7		14.5	
NO coefficient	1.177		1.207	
NO2 coefficient	1.000	ppb	1.000	ppb
NOx coefficient	0.925		0.927	
NH3 coefficient	0.870		0.870	
Nt coefficient	0.984		0.981	
NH3 conv temp	758	DegC	750	Deg C
Chamber Temp	50.6	Deg C	50.4	Deg C
Moly Temp	323.0	Deg C	322.0	Deg C
PMT Temp	-9.0	Deg C	-8.7	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	100.8	mmHg	102.3	mmHg
PMT Voltage	-837.7	v	-837.7	v
Sample Flow 1 NO	548.0	ccm	545.0	ccm
Sample Flow 2 Nox	528.0	ccm	525.0	ccm
Sample Flow 3 Nt	497.0	ccm	497.0	ccm

**Notes:**

Replaced capillary o-rings, replaced solenoid fittings on two solenoids. Checked fittings for tightness. Replaced inlet filter. Adjusted zero, NO/NOx/Nt spans.



# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date:

February 24, 2015

Station Number:

AMS 6

### Calibration Data

Set Point	Total flow rate (ccm)	Source gas flow rate (ccm)	Calculated Nt conc (ppb)	Calculated NO <sub>x</sub> conc (ppb)	Calculated NH <sub>3</sub> conc (ppb)	Indicated Nt conc (ppb)	Indicated NO <sub>x</sub> conc (ppb)	Indicated NH <sub>3</sub> conc (ppb)	Nt Correction factor	NH <sub>3</sub> Correction factor
as found zero	5000	0.0	0.0	0.0	0.0	-1.2	-0.9	-0.4	NA	NA
as found NO	5000	55.3	601.7	601.7	NA	578.4	579.1	-0.7	1.040	NA
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.5	-0.7	0.2	NA	NA
high NO point	5000	55.3	601.7	601.7	NA	601.2	601.1	0.1	1.001	NA
NO/O <sub>3</sub> point	5000	55.3	601.7	601.7	NA	603.8	600.8	3.0	0.996	NA
as found NH <sub>3</sub>	5000	52.6	1998.8	NA	1998.8	2030.5	-0.8	2031.3	0.984	0.984
first NH <sub>3</sub>	5000	52.6	1998.8	NA	1998.8	2030.5	-0.8	2031.3	0.984	0.984
second NH <sub>3</sub>	5000	26.3	999.4	NA	999.4	989.9	-1.3	991.2	1.010	1.008
third NH <sub>3</sub>	5000	13.2	501.6	NA	501.6	483.4	-1.6	485.0	1.038	1.034
as left zero						0.0				
as left span						0.0				
Average Correction Factor									0.9986	1.0088

Corrected As found

Nt = 579.6 ppb  
NH<sub>3</sub> = 2031.7 ppb

Previous response

Nt = 591.5 ppb  
NH<sub>3</sub> = 2008.2 ppb

Nt percent change 2.1%  
NH<sub>3</sub> percent change -1.2%

Converter efficiency 87.0%

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## NH3 Calibration Summary

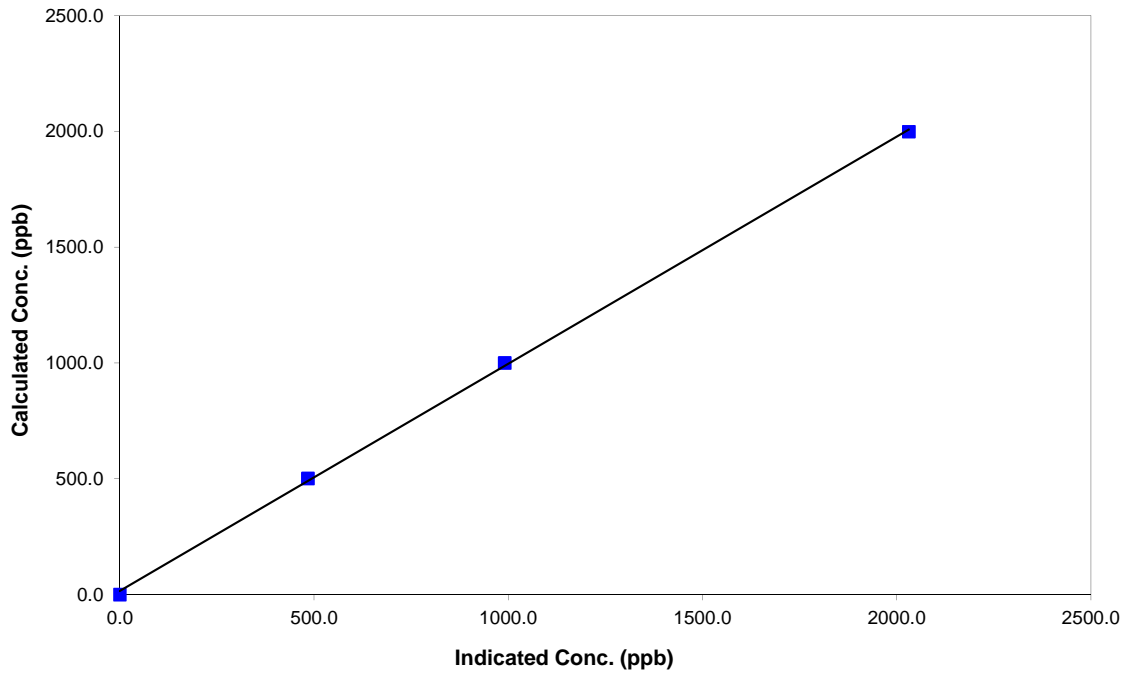
### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 6, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

### NH3 Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999740
1998.8	2031.3	0.9840		
999.4	991.2	1.0083	Slope	0.980991
501.6	485.0	1.0342		
			Intercept	14.745846

### NH3 Calibration Curve







# Wood Buffalo Environmental Association

## Nt Calibration Summary

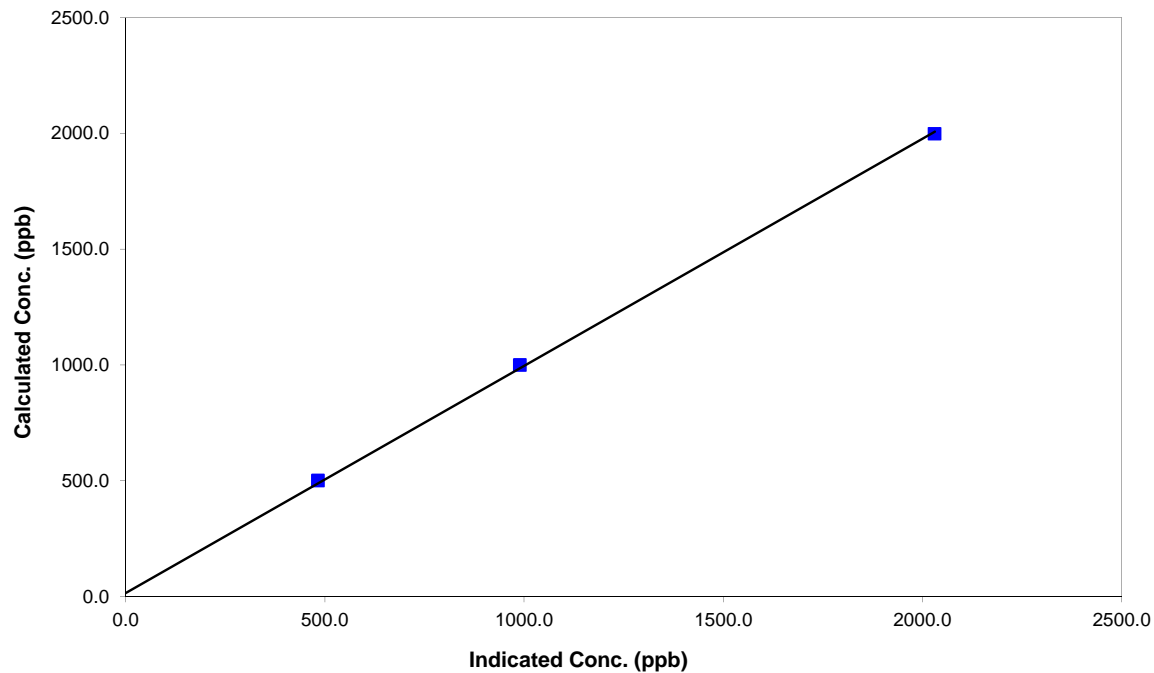
### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 6, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.5	N/A	Correlation Coefficient	0.999722
1998.8	2030.5	0.9844		
999.4	989.9	1.0096	Slope	0.981012
501.6	483.4	1.0376		
	0.0		Intercept	15.760196

### Nt Calibration Curve





## Wood Buffalo Environmental Association

### NOx Calibration Summary

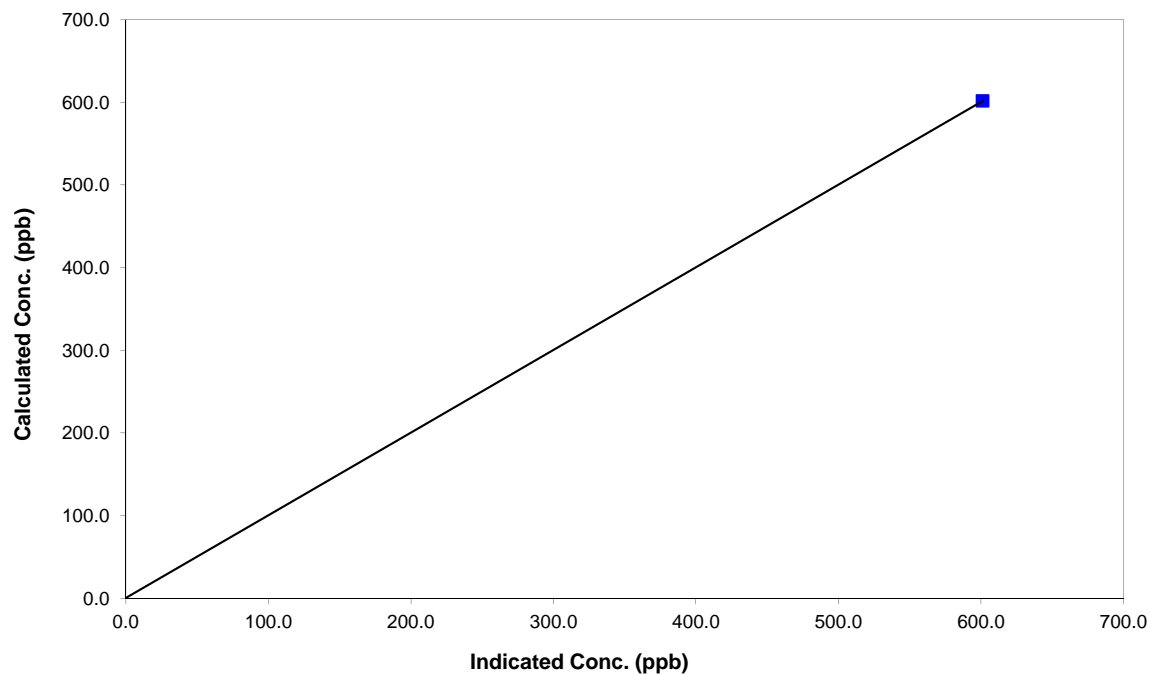
#### Station Information

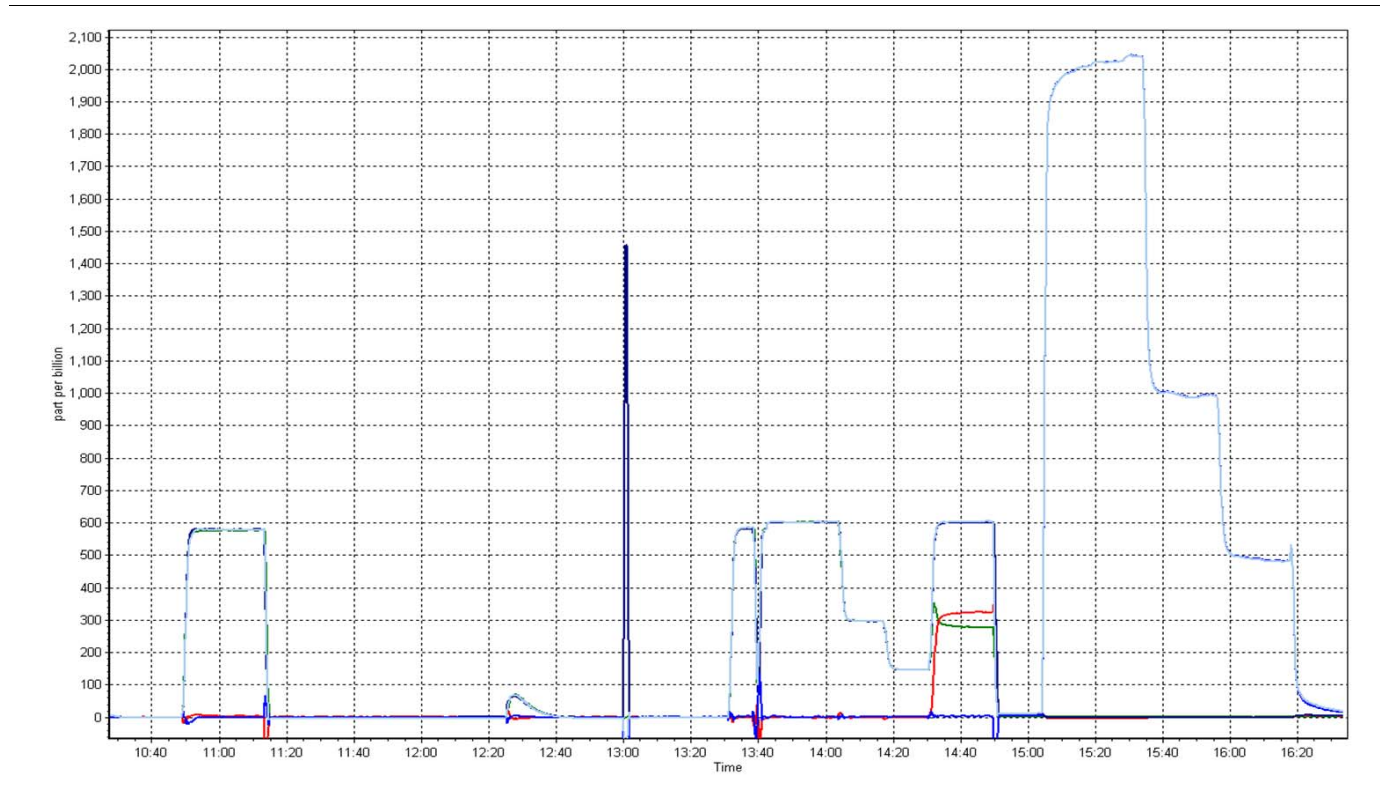
Calibration Date	February 24, 2015	Previous Calibration	February 6, 2015
Station Number	Patricia McInnis	Station Number	AMS 6
Start Time (MST)	10:10	End Time (MST)	16:40
Analyzer make	Thermo 17i	Analyzer serial #	1426262596

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

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	1.000000
601.7	601.1	1.0009		
601.7	600.8	1.0014		
			Slope	1.000023
			Intercept	0.700091

#### NOx Calibration Curve





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# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 7**  
**ATHABASCA VALLEY**  
**FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
 FEBRUARY 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	637	35	35	100.00	19	0	4	0
TRS (ppb) Average	639	33	33	100.00	1	0	1	0
THC (ppm) Average	617	35	55	97.02	2.6	-	2.3	-
NMHC (ppm) Average	617	35	55	97.02	0.311	-	0.15	-
CH4(ppm) Average	617	35	55	97.02	2.3	-	2.1	-
O3 (ppb) Average	639	33	33	100.00	38	0	33	-
NO2 (ppb) Average	638	34	34	100.00	44	0	25	-
NO (ppb) Average	638	34	34	100.00	81	-	16	-
NOX (ppb) Average	638	34	34	100.00	118	-	37	-
PM2.5 (ug/m3) Average	645	0	27	95.98	21.9	-	9.9	0
CO(ppm) Average	640	32	32	100.00	0.6	0	0.2	-
Temperature 2 m (C) Average	672	0	0	100.00	2.3	-	-1.2	-
Barometric Pressure (inHg) Average	672	0	0	100.00	29.9	-	-	-
Relative Humidity (%) Average	672	0	0	100.00	94	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	30	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
 FEBRUARY 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	637	1.5	2	-	0	0	1	1	1	3	19
TRS (ppb) Average	639	0.4	0	-	0	0	0	0	0	1	1
THC (ppm) Average	617	1.93	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.6
NMHC (ppm) Average	617	0.013	0.039	-	0	0	0	0	0	0	0.311
CH4(ppm) Average	617	1.91	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.3
O3 (ppb) Average	639	19.9	10	-	0	5	13	21	28	31	38
NO2 (ppb) Average	638	12	9	-	0	3	6	10	16	25	44
NO (ppb) Average	638	5.5	9	-	0	0	1	2	7	15	81
NOX (ppb) Average	638	17.5	15	-	0	3	7	12	24	38	118
PM2.5 (ug/m3) Average	645	5.97	3.1	-	0.6	2.3	4	5.4	7.7	9.6	21.9
CO(ppm) Average	640	0.1	0.1	-	0	0.1	0.1	0.1	0.1	0.2	0.6
Temperature 2 m (C) Average	672	-16.85	7.8	-	-35.7	-26.8	-22.6	-17.4	-11.3	-6.5	2.3
Barometric Pressure (inHg) Average	672	29.27	0.3	-	28.7	28.9	29.1	29.3	29.4	29.7	29.9
Relative Humidity (%) Average	672	71.9	8	-	42	61	68	74	77	79	94
Wind Speed 10 m (km/h) Average	672	8.5	5	-	0	2	4	8	11	16	30
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ATHABASCA VALLEY (AMS 7)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NMHC, CH4, THC	12 Feb 2015 16:00	13 Feb 2015 10:00	19	Analyzer unstable operation and follow up calibration
NMHC, CH4, THC	18 Feb 2015 16:00	18 Feb 2015 16:00	1	Power spike
PM2.5	05 Feb 2015 13:00	05 Feb 2015 13:00	1	Power spike
PM2.5	05 Feb 2015 14:00	06 Feb 2015 04:00	15	Intermittent unstable operation
PM2.5	18 Feb 2015 16:00	18 Feb 2015 16:00	1	Power spike
PM2.5	18 Feb 2015 17:00	19 Feb 2015 00:00	8	Intermittent unstable operation
PM2.5	20 Feb 2015 10:00	20 Feb 2015 11:00	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:	672
Maximum Value: 19 ppb on Feb 16 17:00	Maximum Daily Average: 4.0 ppb on Feb 25		Hours of Data:	637
Minimum Value: 0 ppb on Feb 3 10:00	Minimum Daily Average: 0.5 ppb on Feb 7		Hours of Missing Data:	35
Maximum Diurnal Average: 3.7 ppb at hour 16	Minimum Diurnal Average: 0.7 ppb at hour 9		Hours of Calibration:	35
Monthly Average: 1.5 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 1 Q <sub>3</sub> = 1 P <sub>90</sub> = 3 P <sub>99</sub> = 13		Percent Operational Time:	100.0

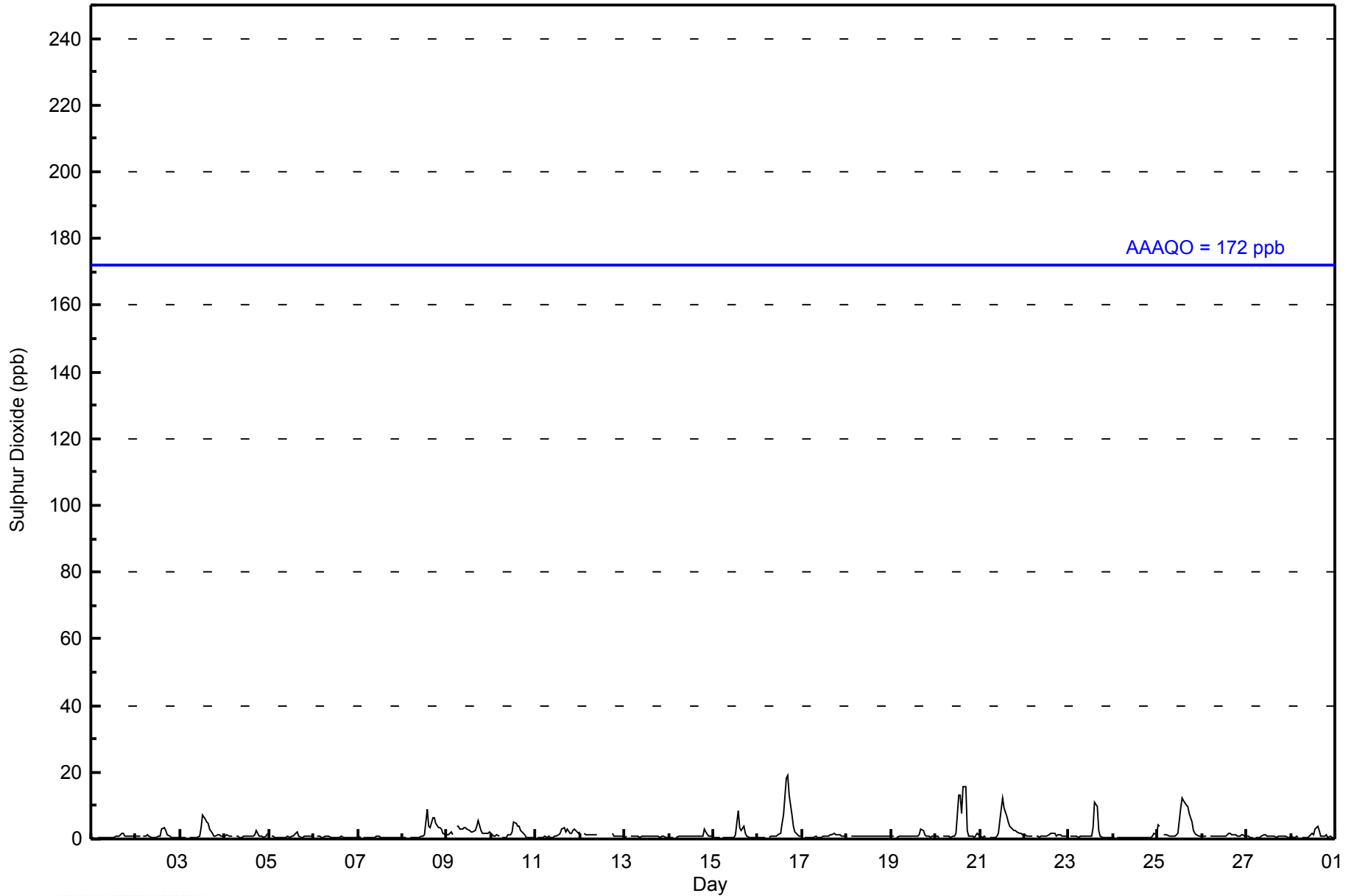
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	1	1	1	1	1	1	0.7	2
2-Feb	1	1	1	Z	1	1	1	1	1	0	0	1	1	1	3	4	2	1	1	0	0	0	0	0	1.0	4
3-Feb	0	0	0	0	Z	0	0	0	0	0	1	3	7	6	5	5	3	2	1	1	1	1	1	1	1.8	7
4-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	0.9	2
5-Feb	Z	1	1	1	0	0	0	1	0	0	1	1	1	1	2	2	1	0	1	1	1	1	1	1	0.8	2
6-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.6	1
7-Feb	1	1	Z	1	1	1	0	0	0	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0.5	1
8-Feb	0	0	1	Z	1	1	1	0	0	0	1	1	1	9	4	3	7	6	5	4	3	3	2	1	2.3	9
9-Feb	1	1	2	1	Z	4	4	3	3	4	3	3	3	2	2	3	4	5	3	2	2	2	2	2	2.6	5
10-Feb	1	1	1	1	1	Z	0	0	1	1	1	2	5	5	4	4	2	2	1	0	0	0	0	0	1.6	5
11-Feb	Z	0	0	1	1	1	1	1	1	0	1	1	1	2	3	3	2	3	1	2	3	3	2	2	1.4	3
12-Feb	2	Z	2	1	1	1	1	1	1	1	C	C	C	C	C	C	C	2	1	1	1	1	1	1	--	2
13-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
14-Feb	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	2	1	1	1	0.9	3
15-Feb	1	1	1	0	Z	1	1	1	0	1	1	1	1	9	3	3	4	2	1	1	1	1	0	1	1.4	9
16-Feb	0	1	0	0	0	Z	1	1	1	1	1	2	5	7	18	19	13	7	4	2	1	1	1	3.8	19	
17-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
18-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1
19-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	3	3	1	1	1	1	1	1	1	1.0	3
20-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	13	13	8	16	16	3	1	1	1	1	1	1	3.6	16
21-Feb	1	1	1	1	Z	1	0	1	1	1	2	9	12	9	7	5	4	3	3	2	2	2	2	1	3.0	12
22-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1.0	2
23-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	4	11	10	2	1	1	0	1	1	1	0	1	1.7	11
24-Feb	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	1	0.6	2
25-Feb	4	4	Z	1	1	1	1	1	1	1	2	9	12	12	10	10	8	5	3	2	1	1	1	1	4.0	12
26-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1.0	2
27-Feb	1	1	1	1	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
28-Feb	1	0	0	1	1	Z	1	1	1	1	2	1	3	4	2	1	1	1	1	1	1	1	1	1	1.1	4
	0.9	0.8	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.8	0.9	1.4	2.6	3.4	3.2	3.7	3.4	2.4	1.5	1.2	1.1	1.0	0.9	0.9	Diurnal Average	
	4	4	2	1	1	4	4	3	3	4	3	9	13	13	12	18	19	13	7	4	3	3	2	2	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	626	98.27	98.27
11 - 20	11	1.73	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: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Athabasca Valley - February 2015**

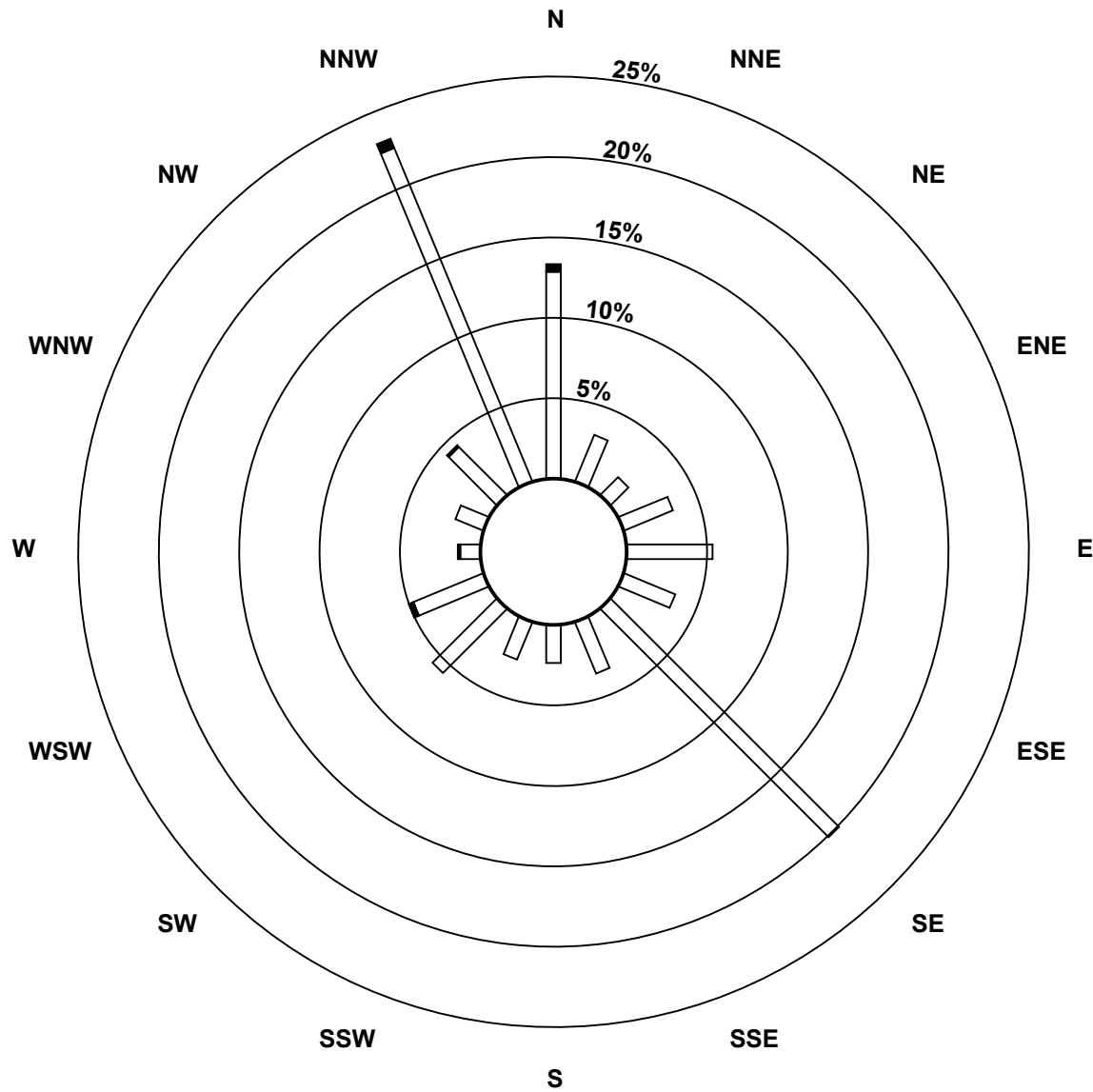
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	82	20	10	21	34	22	128	22	15	16	36	30	8	12	27	143	626
11 - 20	3	0	0	0	0	0	0	0	0	0	0	2	1	0	1	4	11
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	85	20	10	21	34	22	128	22	15	16	36	32	9	12	28	147	637

Total Number of Valid Hours: 637

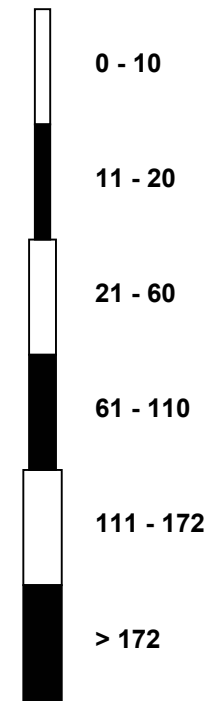
Total Number of Hours: 672

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)**



Classes (ppb)

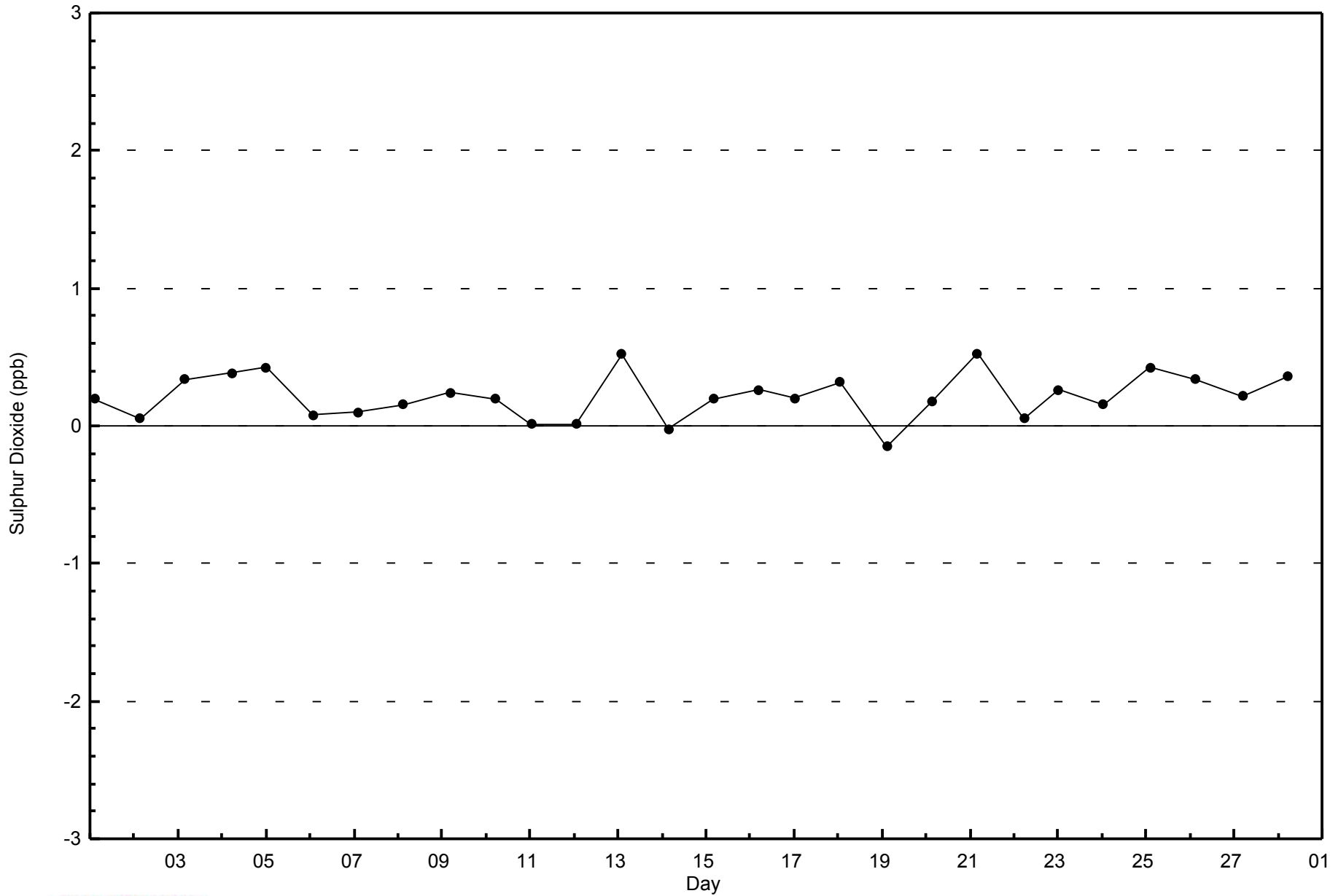


**Total Number of Valid Hours: 637**



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - February 2015

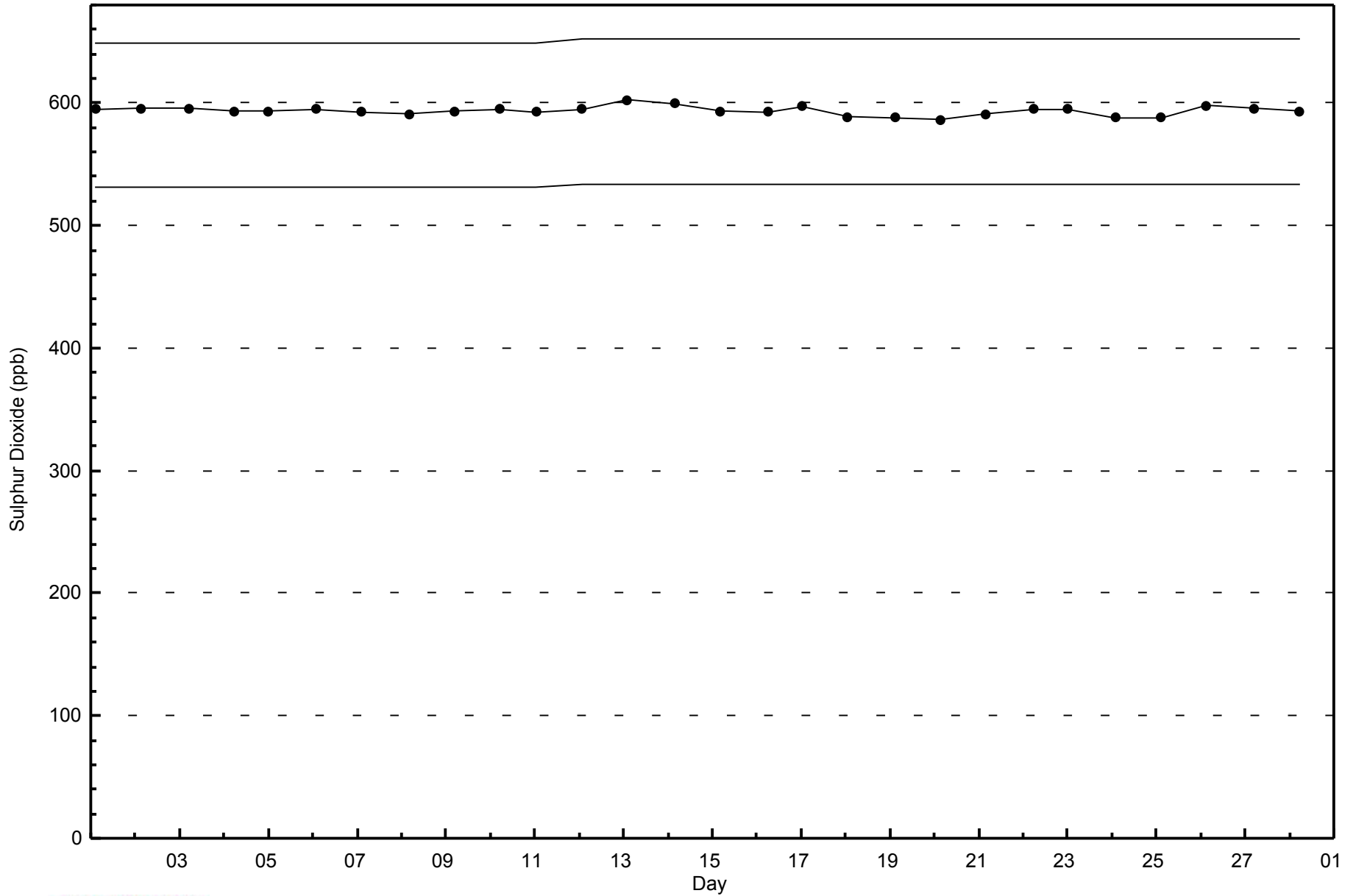






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Athabasca Valley - February 2015



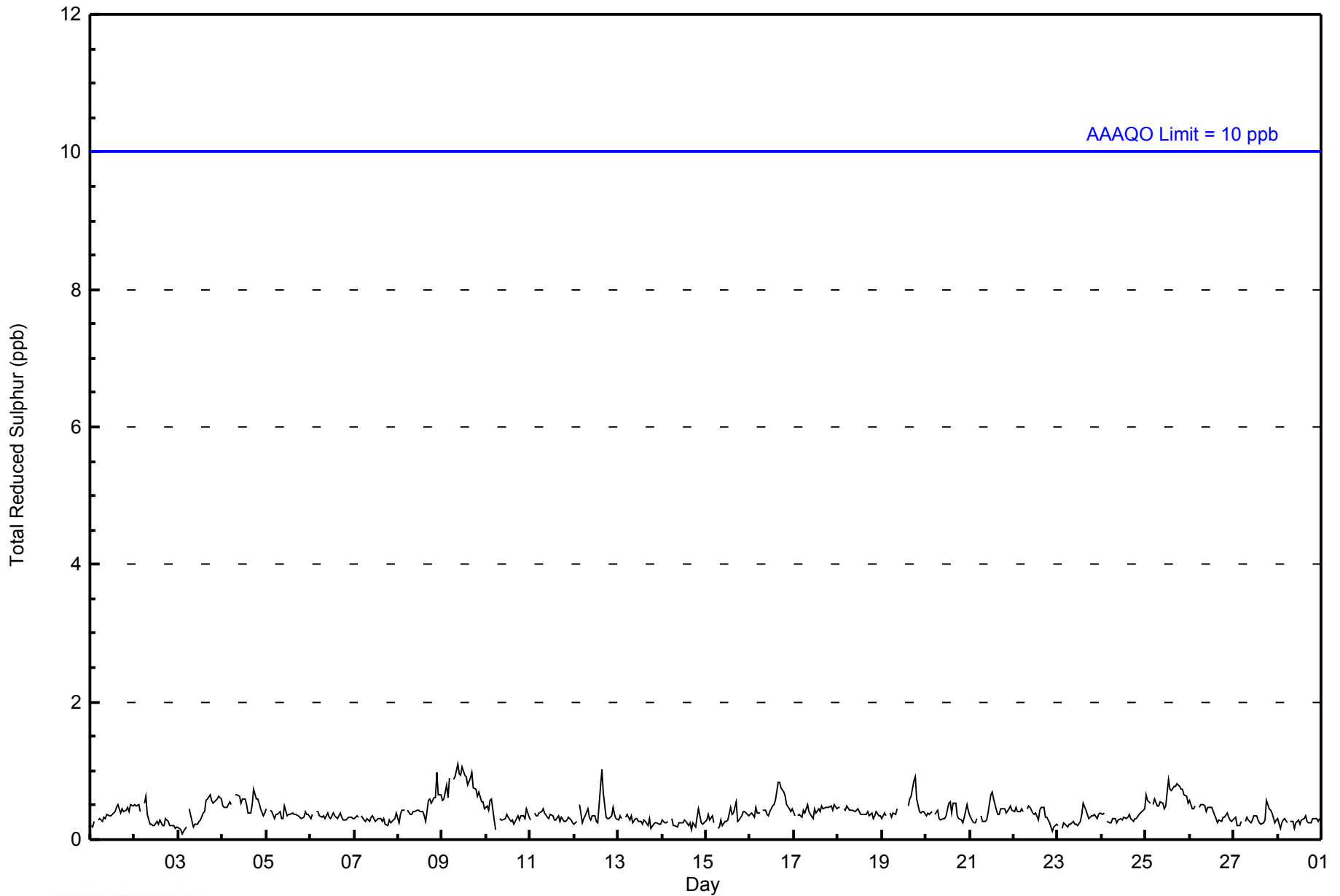


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672										Daily Average	Daily Maximum																												
Maximum Value: 1 ppb on Feb 9 09:00										Maximum Daily Average: 0.8 ppb on Feb 9												Hours of Data: 639																											
Minimum Value: 0 ppb on Feb 3 03:00										Minimum Daily Average: 0.2 ppb on Feb 14										Hours of Missing Data: 33																													
Maximum Diurnal Average: 0.4 ppb at hour 17										Minimum Diurnal Average: 0.4 ppb at hour 10										Hours of Calibration: 33																													
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> = 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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0.4	1																							
2-Feb	1	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
3-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0.4	1																							
4-Feb	0	0	0	1	1	1	Z	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0.5	1																							
5-Feb	0	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																							
6-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.5	1																							
9-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	1																							
10-Feb	0	0	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
11-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
12-Feb	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0.4	1																							
13-Feb	0	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																							
14-Feb	0	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																							
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1																							
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1																							
17-Feb	0	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.4	1																							
18-Feb	0	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																							
19-Feb	0	0	0	Z	0	0	0	0	0	C	C	C	C	C	0	1	1	1	1	1	0	0	0	0	0.5	1																							
20-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	1	0	0.4	1																							
21-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																							
22-Feb	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																							
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.3	1																							
24-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																							
25-Feb	1	1	1	Z	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1																							
26-Feb	1	0	0	0	Z	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
27-Feb	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																							
28-Feb	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																							
0.4																								0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average		
1																								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	Diurnal Maximum	
Z - zerospan C - Calibration																																																	
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																																																	



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	639	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - February 2015**

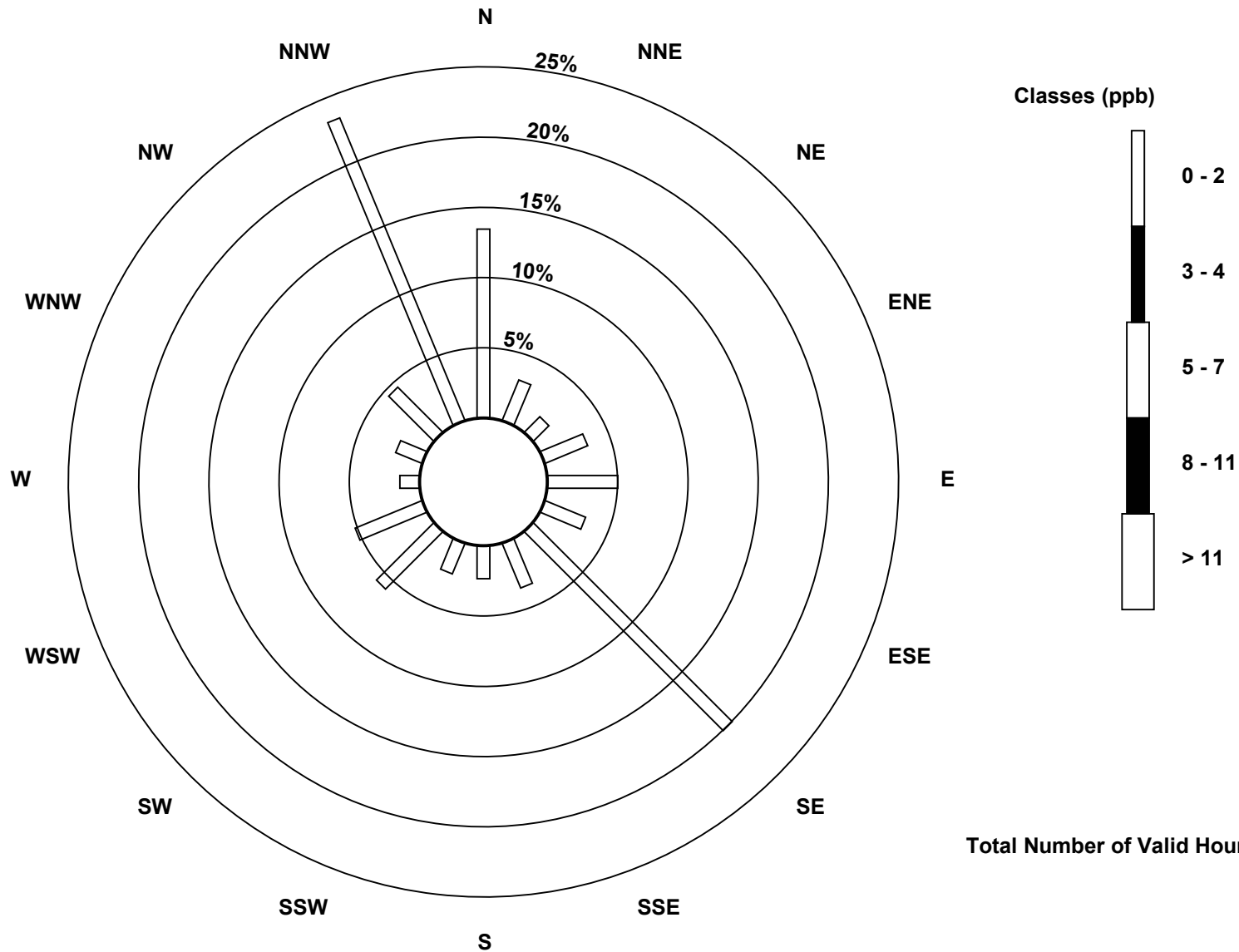
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	86	20	10	21	32	20	128	22	15	15	37	33	9	13	29	149	639
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	86	20	10	21	32	20	128	22	15	15	37	33	9	13	29	149	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

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

**Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley (AMS 7)**

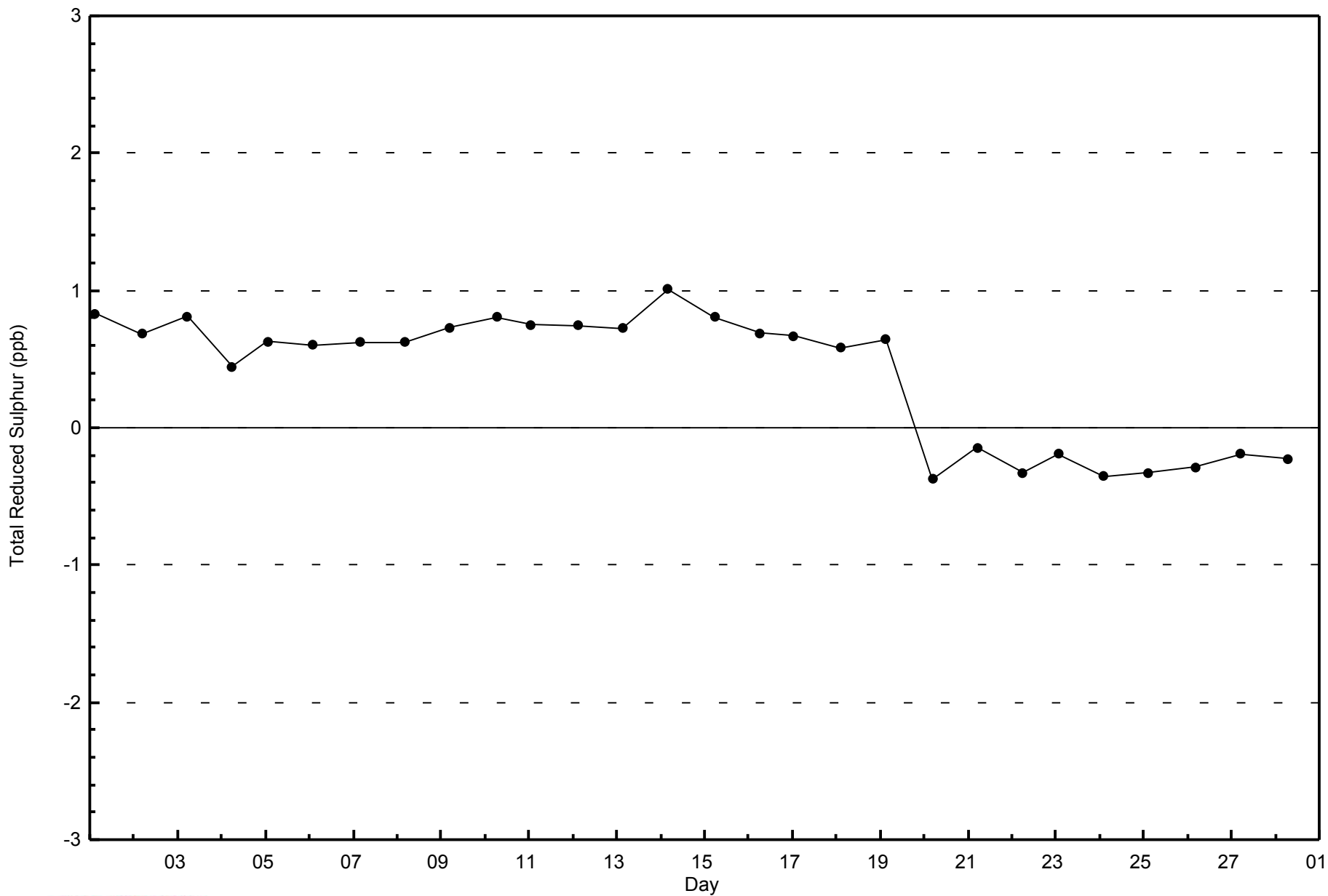


**Total Number of Valid Hours: 639**



WBEA  
Zero Responses

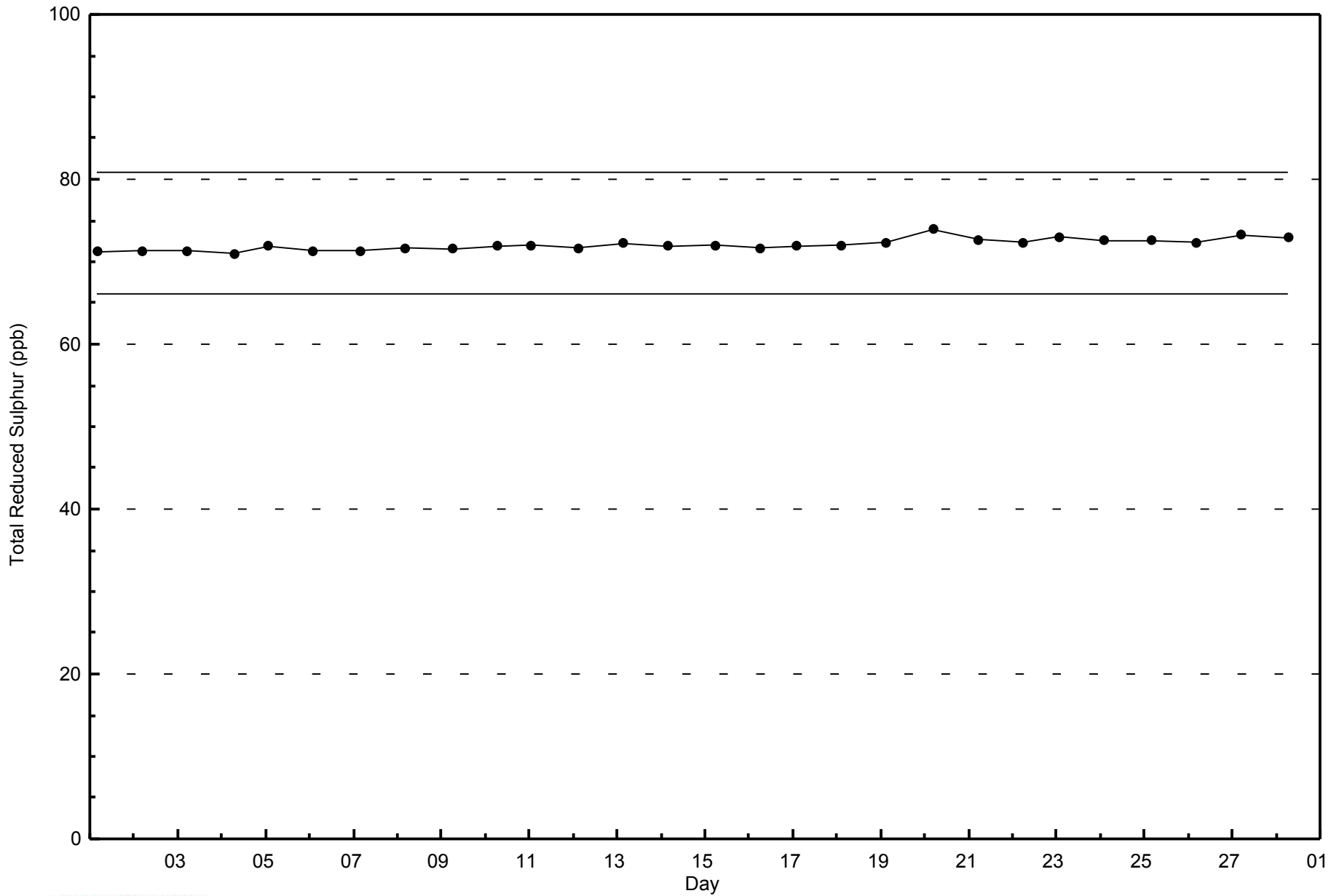
Total Reduced Sulphur (TRS) - ppb  
Athabasca Valley - February 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Athabasca Valley - February 2015**





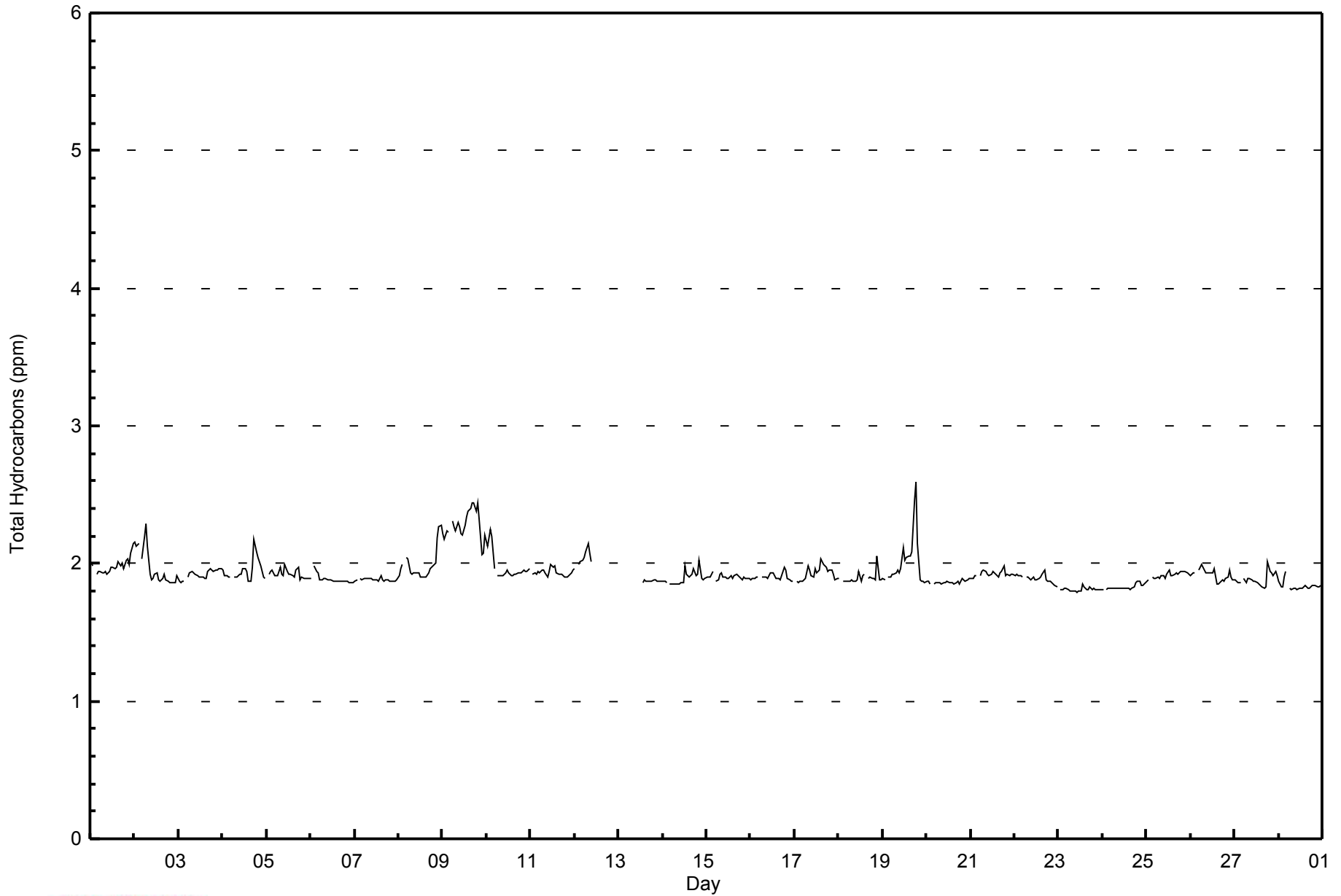


Maximum Value: 2.6 ppm on Feb 19 19:00		Maximum Daily Average: 2.3 ppm on Feb 9		Hours in Service: 672																						
Minimum Value: 1.8 ppm on Feb 23 11:00		Minimum Daily Average: 1.8 ppm on Feb 23		Hours of Data: 617																						
Maximum Diurnal Average: 2.0 ppm at hour 19		Minimum Diurnal Average: 1.9 ppm at hour 10		Hours of Missing Data: 55																						
Monthly Average: 1.93 ppm		Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.4		Hours of Calibration: 35																						
				Percent Operational Time: 97.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	
2-Feb	2.2	2.1	2.1	Z	2.0	2.2	2.3	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	2.0	2.3	
3-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	2.0	1.9	2.0	1.9	2.0	
4-Feb	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.2	2.1	2.0	2.0	1.9	1.9	1.9	2.2	
5-Feb	Z	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
6-Feb	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
7-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
8-Feb	1.9	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.2	2.3	2.3	2.3	
9-Feb	2.2	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.1	2.1	2.2	2.4	
10-Feb	2.1	2.2	2.2	2.2	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.2	
11-Feb	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
12-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.1	
13-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
14-Feb	1.9	1.9	1.9	Z	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.0	
15-Feb	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	
16-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	2.0	
17-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	2.0	1.9	1.9	2.0	
18-Feb	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	PF	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	
19-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.1	2.0	2.0	2.1	2.1	2.1	2.5	2.6	2.1	1.9	1.9	1.9	1.9	2.6	
20-Feb	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	
21-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.0	
22-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	
23-Feb	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	
24-Feb	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.9	1.9	
25-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
26-Feb	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	
27-Feb	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	1.8	1.8	1.8	1.8	1.8	1.8	2.0	1.9	1.9	1.9	1.9	2.0	
28-Feb	1.9	1.8	1.8	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      AF - Analyzer Failure      PF - Power Failure																										



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	567	91.90	91.90
2.1 - 3.0	50	8.10	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 617

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Athabasca Valley - February 2015**

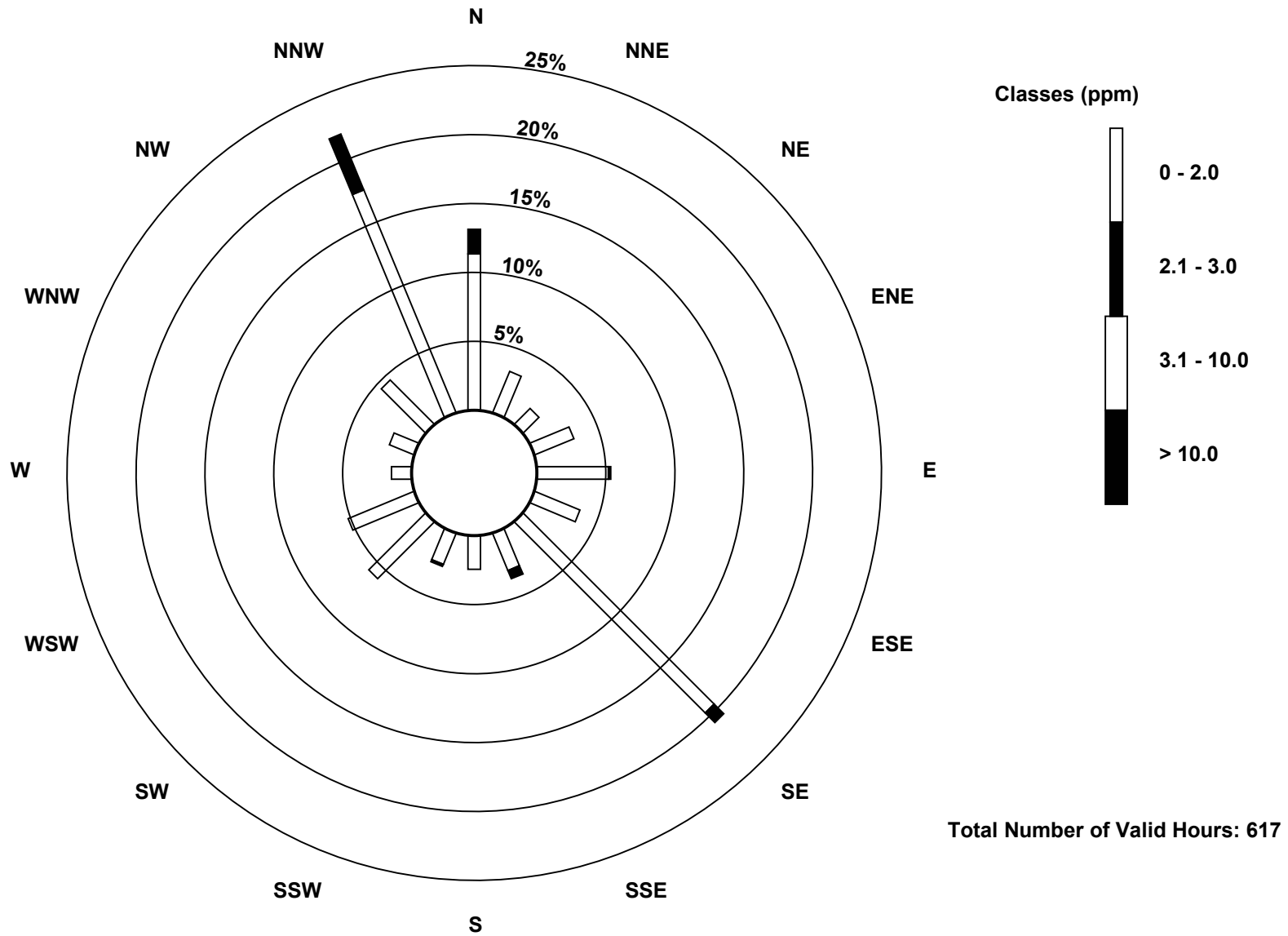
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	70	20	10	19	32	22	121	18	15	15	36	32	9	12	28	108	567
2.1 - 3.0	11	0	0	0	1	0	6	4	0	1	0	0	0	0	0	27	50
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	20	10	19	33	22	127	22	15	16	36	32	9	12	28	135	617

Total Number of Valid Hours: 617

Total Number of Hours: 672

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

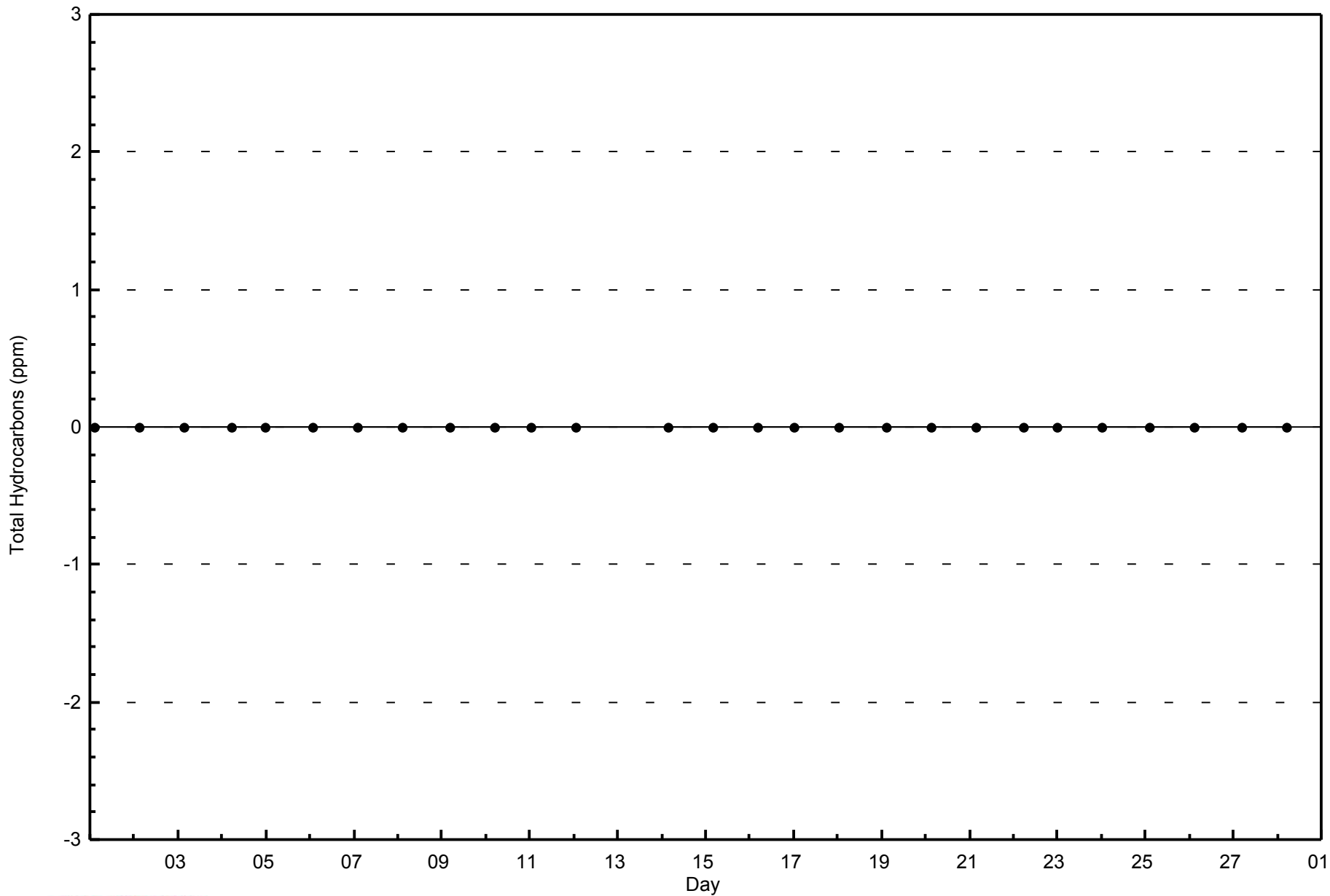
**Total Hydrocarbons (THC) - ppm  
Athabasca Valley (AMS 7)**





WBEA  
Zero Responses

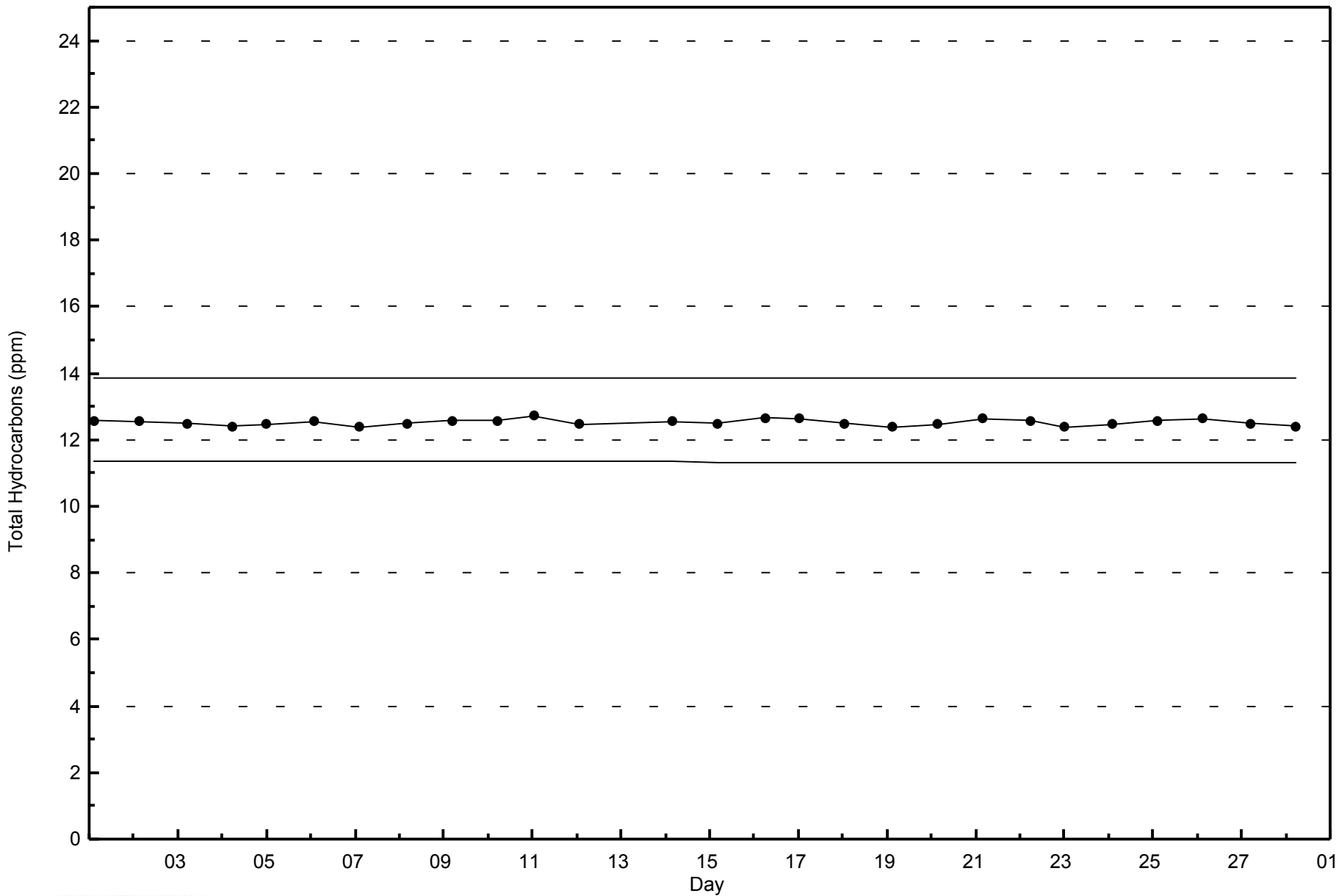
Total Hydrocarbons (THC) - ppm  
Athabasca Valley - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Athabasca Valley - February 2015





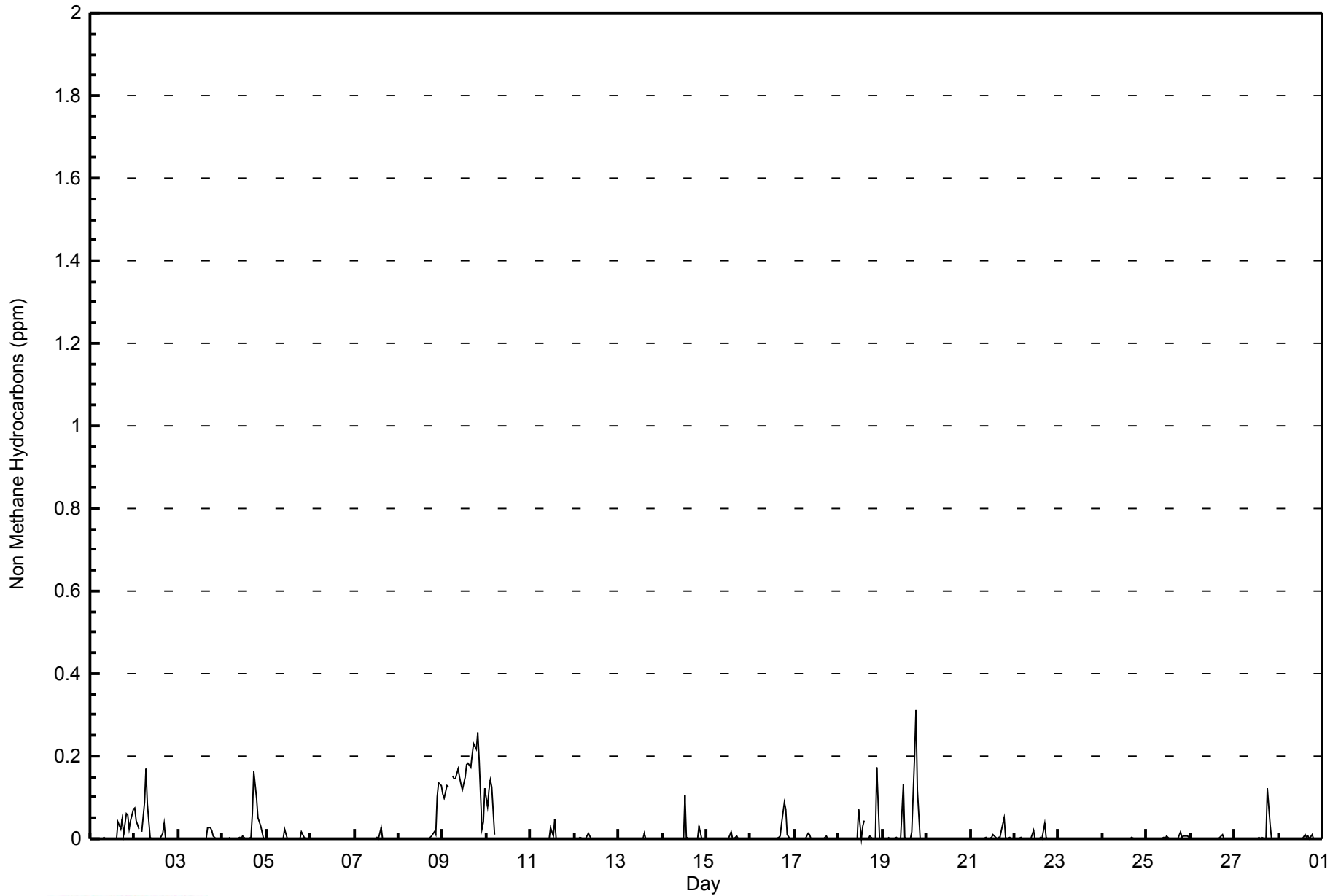
Maximum Value: 0.311 ppm on Feb 19 19:00		Maximum Daily Average: 0.150 ppm on Feb 9		Hours in Service:	672																						
Minimum Value: 0.000 ppm on Feb 1 04:00		Minimum Daily Average: 0.000 ppm on Feb 6		Hours of Data:	617																						
Maximum Diurnal Average: 0.035 ppm at hour 19		Minimum Diurnal Average: 0.001 ppm at hour 5		Hours of Missing Data:	55																						
Monthly Average: 0.013 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> = 0.2		Hours of Calibration:	35																						
				Percent Operational Time:	97.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0.000	0.001	Z	0.000	0.000	0.001	0.000	0.003	0.001	0.000	0.000	0.000	0.000	0.001	0.042	0.024	0.047	0.009	0.060	0.059	0.022	0.043	0.071	0.017	0.071		
2-Feb	0.075	0.044	0.023	Z	0.016	0.088	0.168	0.085	0.002	0.001	0.001	0.000	0.000	0.001	0.014	0.038	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.024	0.168		
3-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.002	0.026	0.027	0.020	0.008	0.001	0.000	0.000	0.001	0.004	0.027		
4-Feb	0.000	0.000	0.000	0.000	0.003	Z	0.000	0.001	0.000	0.002	0.000	0.006	0.000	0.000	0.003	0.061	0.162	0.100	0.050	0.042	0.031	0.001	0.000	0.020	0.162		
5-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.023	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.016	0.003	0.000	0.002	0.023		
6-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
7-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.004	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.027		
8-Feb	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	0.004	0.008	0.018	0.012	0.103	0.135	0.018	0.135		
9-Feb	0.109	0.100	0.129	0.125	Z	0.153	0.145	0.146	0.168	0.148	0.132	0.119	0.151	0.179	0.183	0.174	0.204	0.232	0.217	0.258	0.190	0.023	0.039	0.150	0.258		
10-Feb	0.078	0.118	0.142	0.124	0.009	Z	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.021	0.142		
11-Feb	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.027	0.008	0.048	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.048		
12-Feb	0.000	Z	0.000	0.004	0.000	0.000	0.000	0.013	0.007	0.000	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	--	0.013		
13-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	--	0.014		
14-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.106	0.002	0.000	0.000	0.000	0.000	0.000	0.029	0.000	0.000	0.000	0.006	0.106		
15-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.017	0.000	0.001	0.008	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.017		
16-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.005	0.037	0.089	0.072	0.009	0.001	0.000	0.000	0.009	0.089		
17-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.009	0.002	0.000	0.001	0.000	0.000	0.002	0.000	0.008	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.012		
18-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072	0.000	0.031	0.045	PF	0.000	0.006	0.000	0.000	0.001	0.172	0.000	0.015	0.172		
19-Feb	0.000	0.000	Z	0.002	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.133	0.004	0.000	0.000	0.000	0.017	0.201	0.311	0.120	0.000	0.000	0.000	0.034	0.311		
20-Feb	0.000	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
21-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.001	0.002	0.000	0.001	0.003	0.012	0.005	0.001	0.002	0.005	0.021	0.050	0.002	0.000	0.003	0.000	0.005	0.050		
22-Feb	0.000	0.000	0.000	0.002	0.000	Z	0.000	0.000	0.000	0.000	0.020	0.001	0.000	0.000	0.002	0.000	0.036	0.004	0.000	0.001	0.000	0.000	0.000	0.003	0.036		
23-Feb	Z	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	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.002		
24-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003		
25-Feb	0.000	0.001	Z	0.000	0.000	0.000	0.001	0.000	0.000	0.003	0.000	0.007	0.000	0.000	0.001	0.002	0.000	0.018	0.004	0.008	0.008	0.006	0.002	0.003	0.018		
26-Feb	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.011		
27-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.002	0.000	0.002	0.000	0.001	0.122	0.033	0.002	0.000	0.000	0.007	0.122		
28-Feb	0.000	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.001	0.009	0.003	0.005	0.000	0.011	0.000	0.000	0.000	0.000	0.001	0.011		
		0.011	0.012	0.013	0.012	0.001	0.011	0.012	0.010	0.007	0.006	0.007	0.014	0.011	0.011	0.010	0.016	0.028	0.035	0.024	0.013	0.014	0.008	0.012	Diurnal Average		
		0.109	0.118	0.142	0.125	0.016	0.153	0.168	0.146	0.168	0.148	0.132	0.133	0.151	0.179	0.183	0.174	0.204	0.232	0.311	0.258	0.190	0.172	0.135	0.129	Diurnal Maximum	
Z - zerospan		C - Calibration				AF - Analyzer Failure				PF - Power Failure																	





WBEA  
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - February 2015





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	509	82.50	82.50
0.006 - 0.05	60	9.72	92.22
0.06 - 0.1	32	5.19	97.41
> 0.1	16	2.59	100.00

Total Number of Valid Hours: 617

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Athabasca Valley - February 2015**

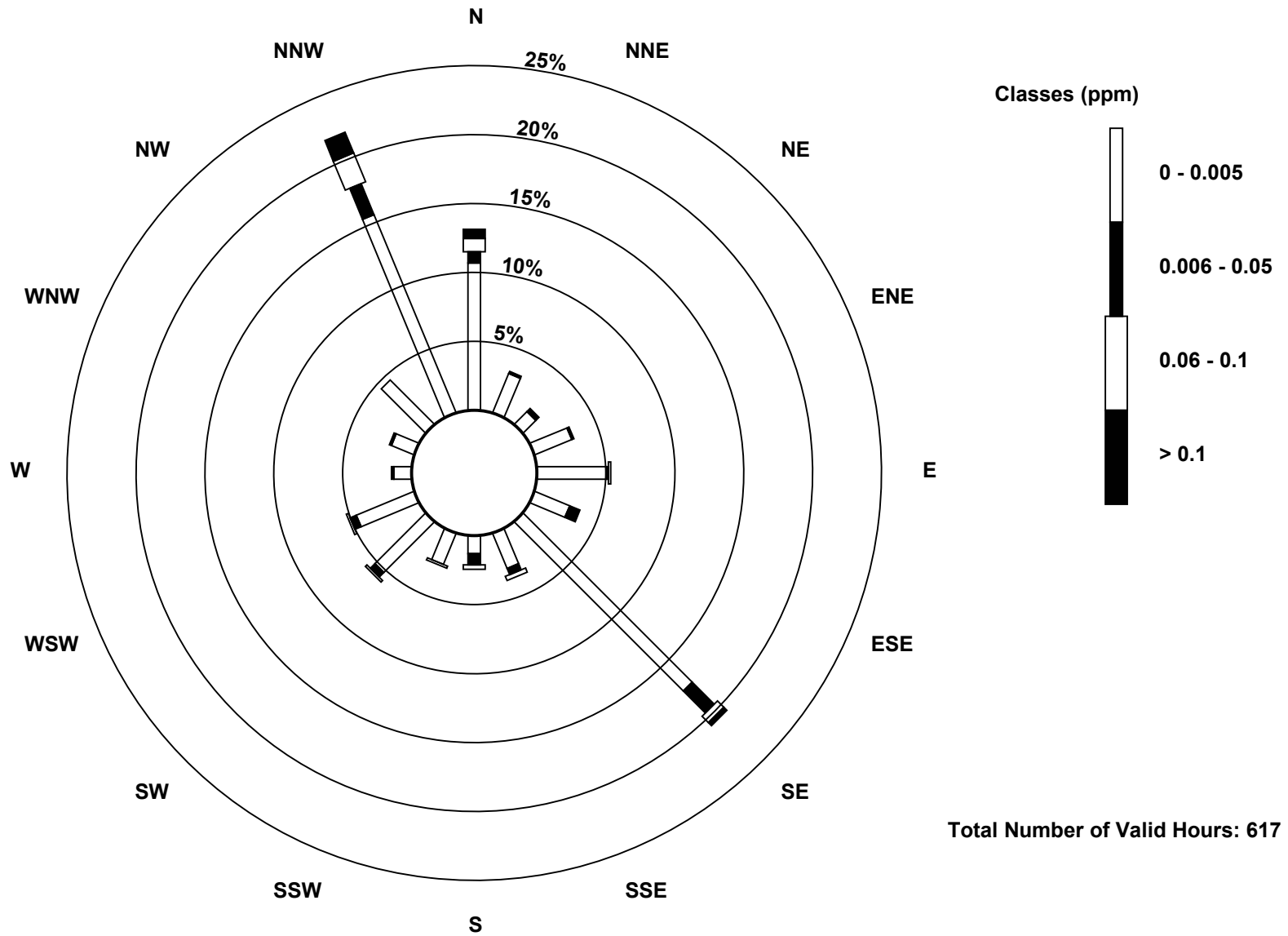
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	66	19	8	18	31	17	107	17	8	15	32	28	8	11	28	96	509
0.006 - 0.05	5	1	2	1	1	5	14	3	5	0	3	3	1	1	0	15	60
0.06 - 0.1	6	0	0	0	1	0	4	2	2	1	1	1	0	0	0	14	32
> 0.1	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	10	16
<b>Totals</b>	81	20	10	19	33	22	127	22	15	16	36	32	9	12	28	135	617

Total Number of Valid Hours: 617

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

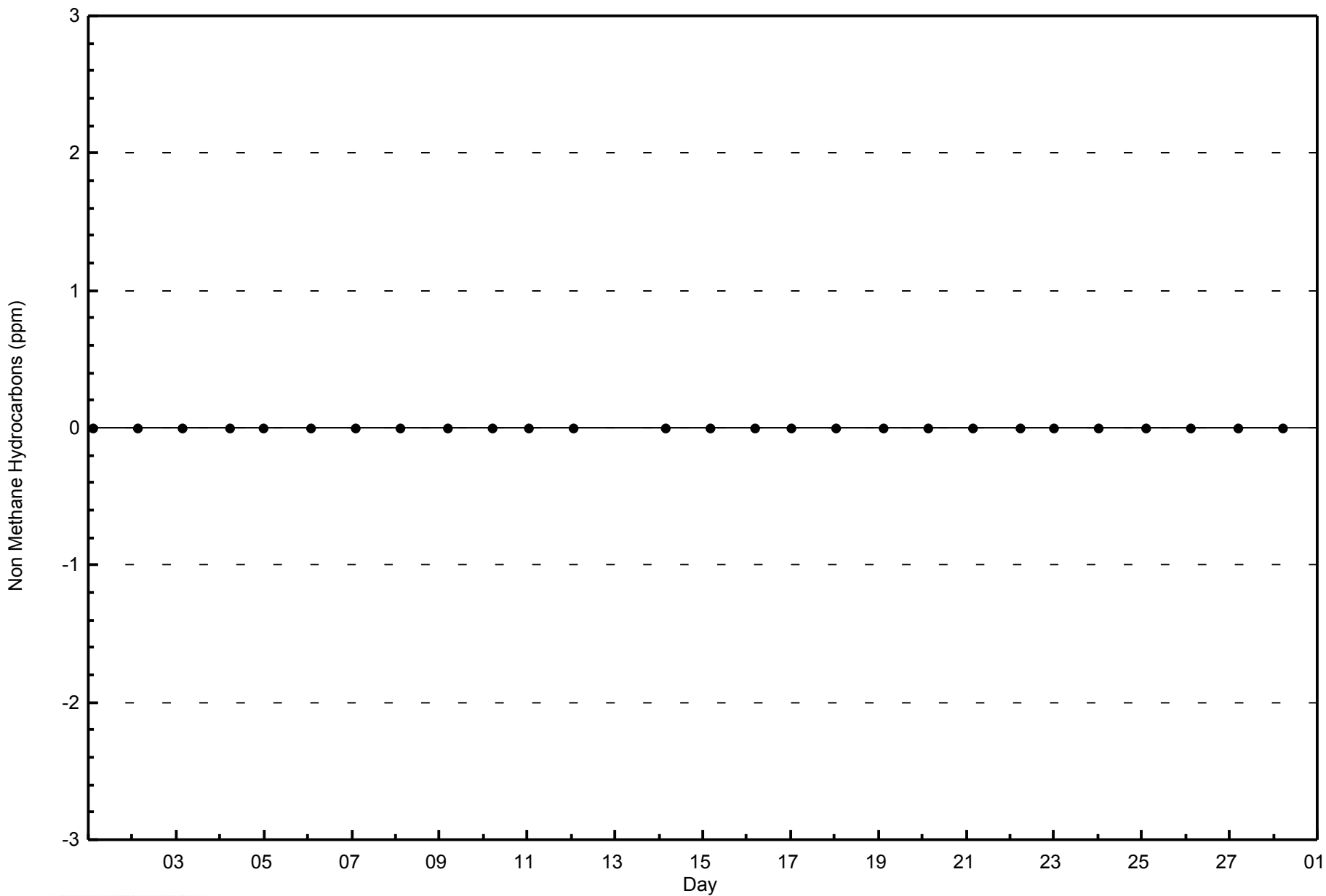
Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley (AMS 7)





WBEA  
Zero Responses

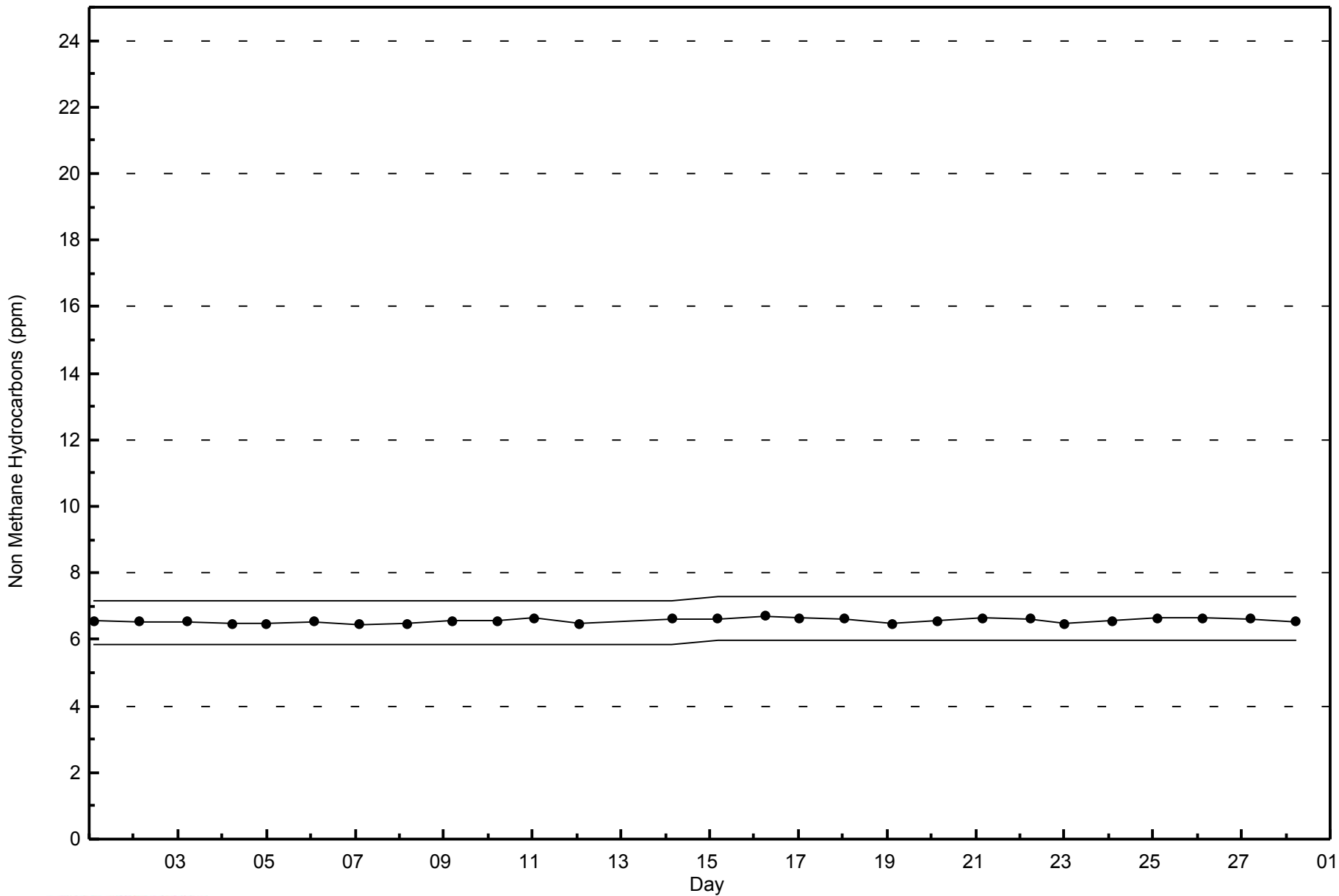
Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - February 2015





WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Athabasca Valley - February 2015



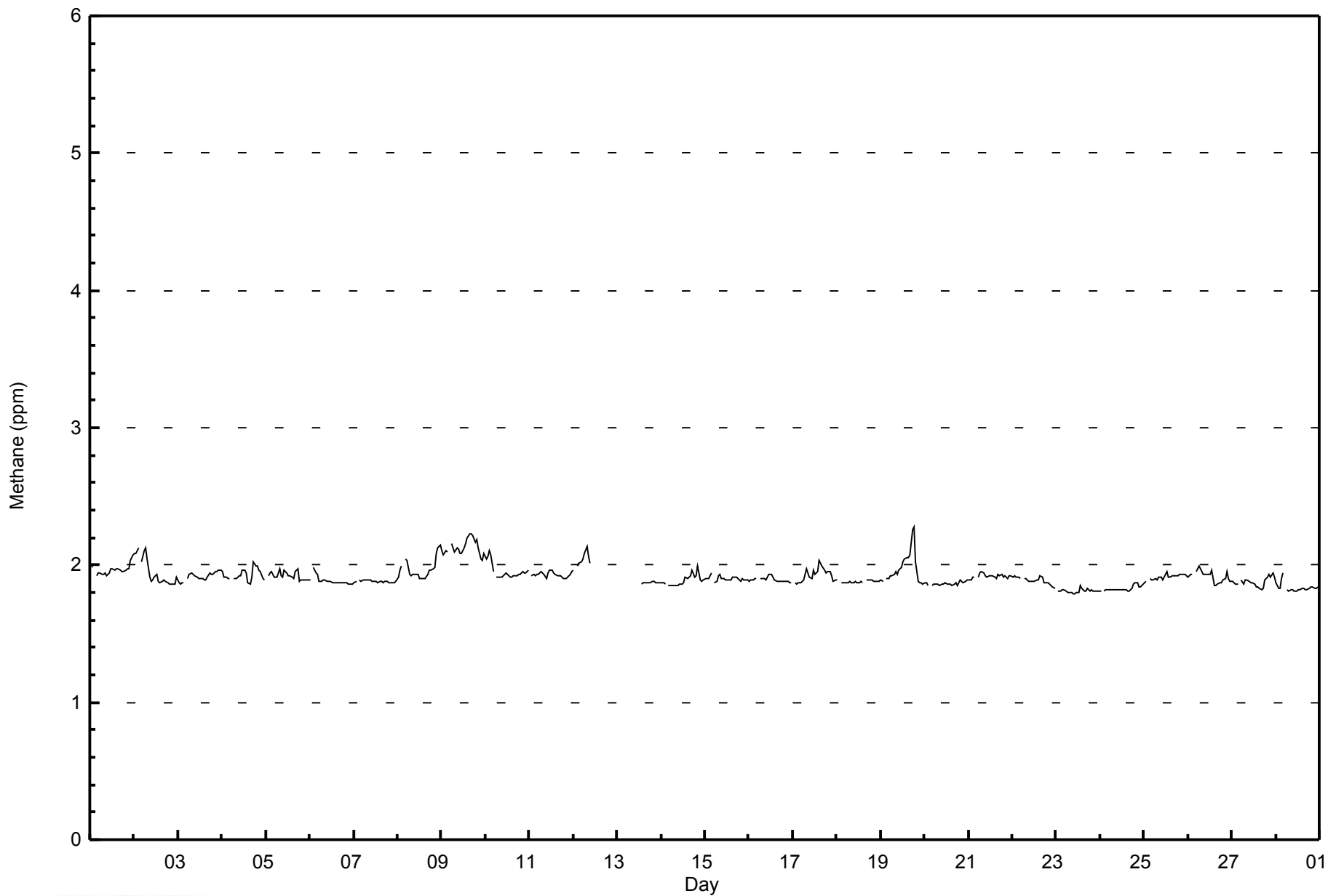


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 2.3 ppm on Feb 19 19:00										Maximum Daily Average: 2.1 ppm on Feb 9										Hours of Data: 617						
Minimum Value: 1.8 ppm on Feb 23 10:00										Minimum Daily Average: 1.8 ppm on Feb 23										Hours of Missing Data: 55						
Maximum Diurnal Average: 1.9 ppm at hour 18										Minimum Diurnal Average: 1.9 ppm at hour 11										Hours of Calibration: 35						
Monthly Average: 1.91 ppm										Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.2										Percent Operational Time: 97.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.0	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	
2-Feb	2.1	2.1	2.1	Z	2.0	2.1	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
3-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	1.9	2.0	
4-Feb	2.0	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	1.9	1.9	1.9	2.0	
5-Feb	Z	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	
6-Feb	1.9	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
7-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
8-Feb	1.9	2.0	2.0	Z	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	
9-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.0	2.0	2.1	
10-Feb	2.0	2.1	2.1	2.1	2.0	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	2.1	
11-Feb	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
12-Feb	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	C	C	C	C	C	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.1	
13-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
14-Feb	1.9	1.9	1.9	Z	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0	1.9	1.9	1.9	2.0	
15-Feb	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	
16-Feb	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	
17-Feb	Z	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	2.0	
18-Feb	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	PF	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	
19-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.3	2.3	2.0	1.9	1.9	1.9	1.9	2.3	
20-Feb	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	
21-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
22-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.9	
23-Feb	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	
24-Feb	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.9	1.8	
25-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
26-Feb	1.9	1.9	1.9	Z	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	
27-Feb	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	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	
28-Feb	1.9	1.8	1.8	1.9	1.9	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	
																								Diurnal Average		
																								Diurnal Maximum		
Z - zerospan      C - Calibration      AF - Analyzer Failure      PF - Power Failure																										



WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - February 2015







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

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	576	93.35	93.35
2.1 - 3.0	41	6.65	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 617

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Athabasca Valley - February 2015**

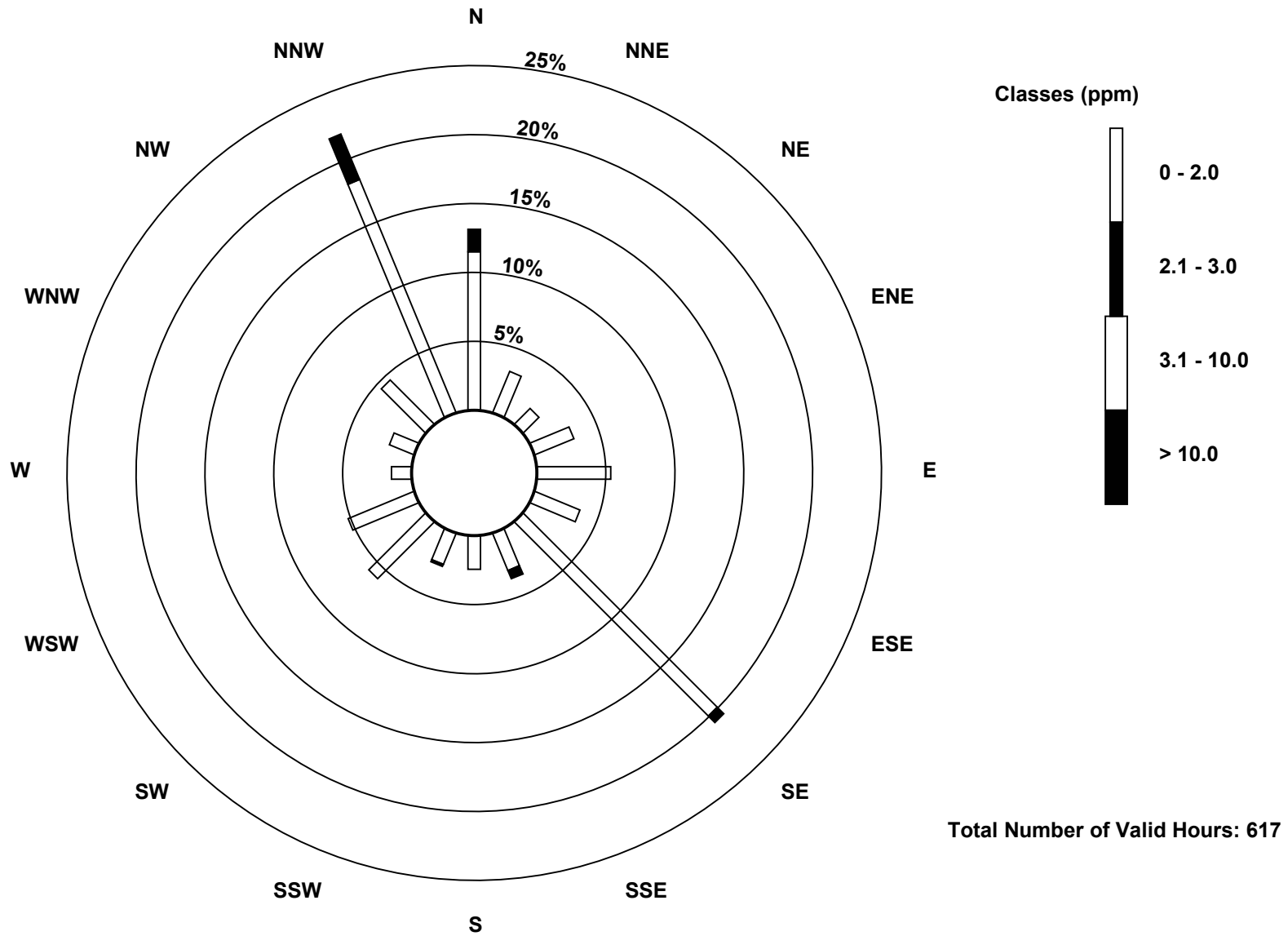
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	71	20	10	19	33	22	123	18	15	15	36	32	9	12	28	113	576
2.1 - 3.0	10	0	0	0	0	0	4	4	0	1	0	0	0	0	0	22	41
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	81	20	10	19	33	22	127	22	15	16	36	32	9	12	28	135	617

Total Number of Valid Hours: 617

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

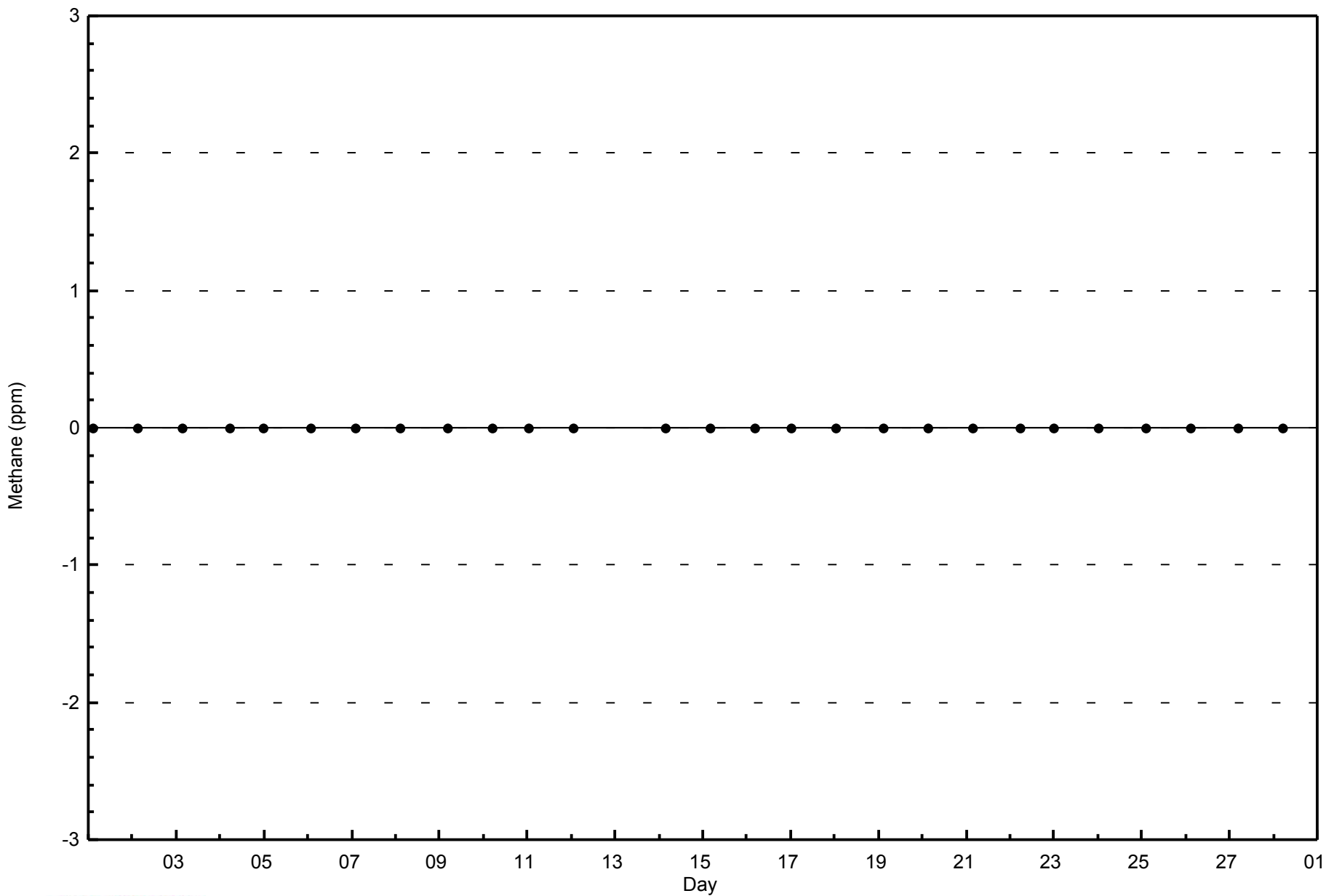
Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley (AMS 7)





WBEA  
Zero Responses

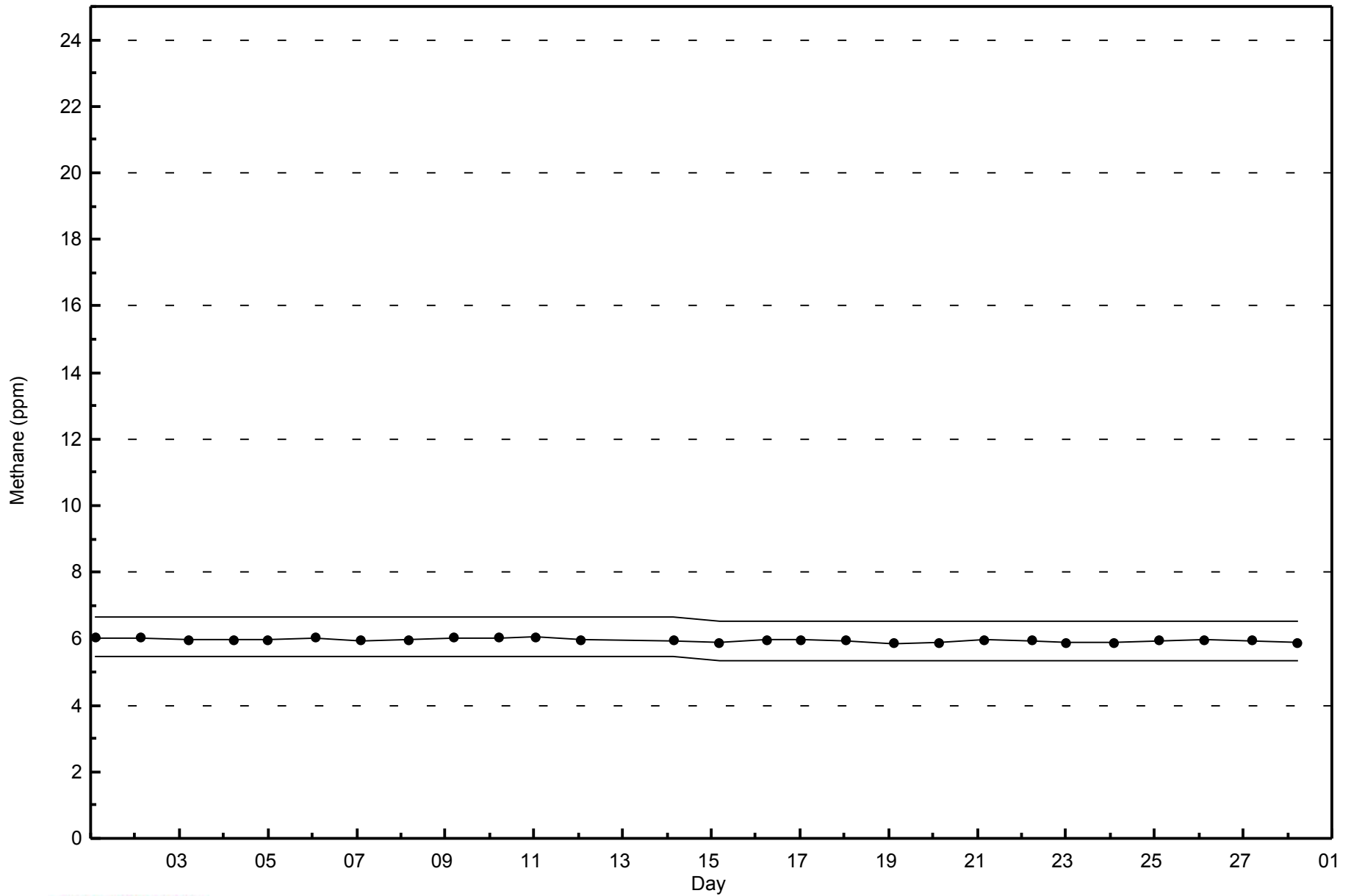
Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - February 2015





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Athabasca Valley - February 2015



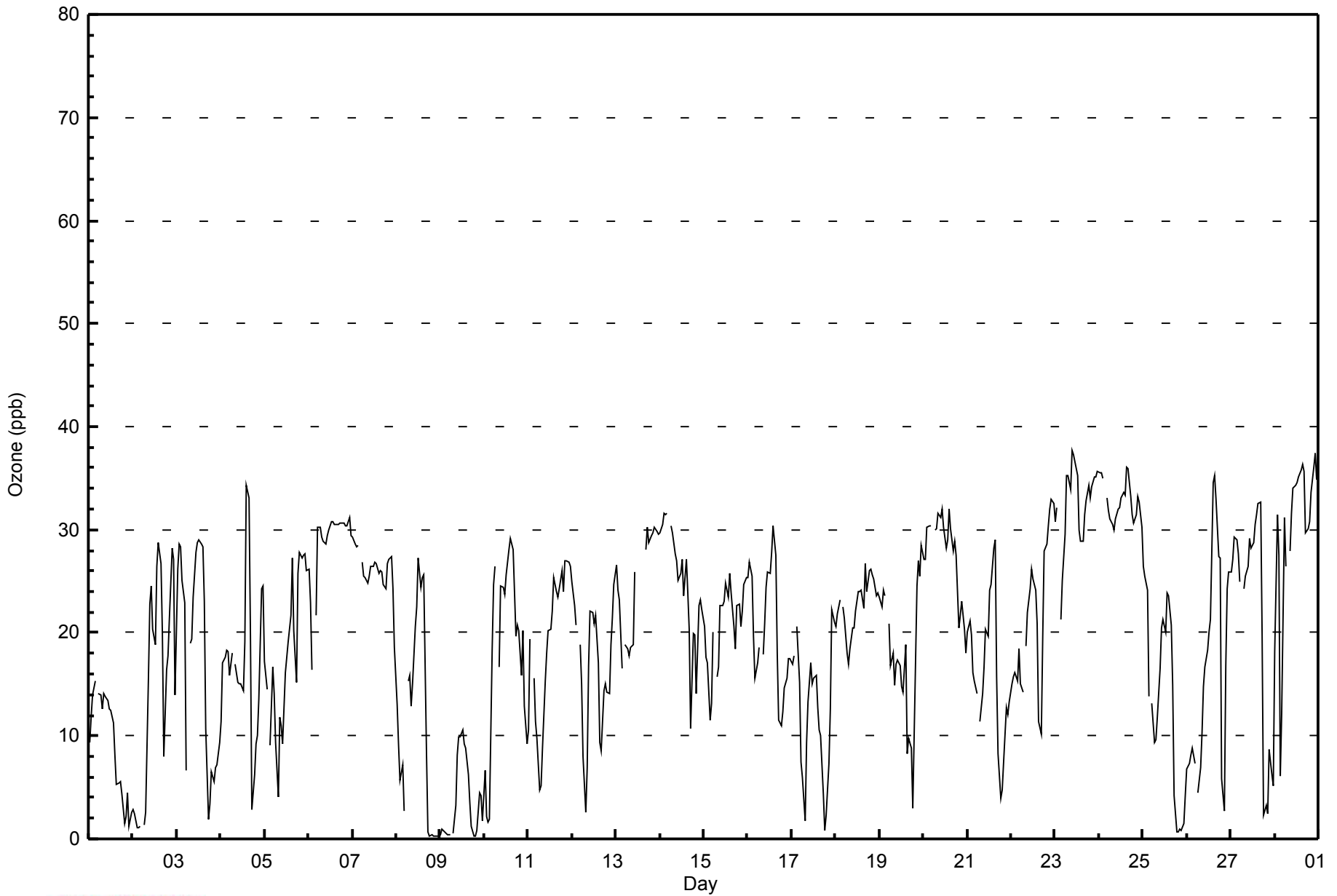


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 38 ppb on Feb 23 10:00										Maximum Daily Average: 32.7 ppb on Feb 24										Hours of Data: 639						
Minimum Value: 0 ppb on Feb 9 20:00										Minimum Daily Average: 3.8 ppb on Feb 9										Hours of Missing Data: 33						
Maximum Diurnal Average: 25.6 ppb at hour 15										Minimum Diurnal Average: 15.9 ppb at hour 8										Hours of Calibration: 33						
Monthly Average: 19.9 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 5 Q <sub>1</sub> = 13 Median = 21 Q <sub>3</sub> = 28 P <sub>90</sub> = 31 P <sub>99</sub> = 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-Feb	9	12	14	15	Z	14	14	13	14	14	13	13	13	11	8	5	5	6	4	1	2	4	1	3	9.1	15
2-Feb	3	2	1	1	1	Z	1	3	16	23	25	20	19	26	29	27	20	8	16	18	21	28	27	14	15.2	29
3-Feb	26	29	28	25	23	7	Z	19	19	23	28	29	29	29	28	23	11	2	3	7	6	7	7	9	18.1	29
4-Feb	11	17	18	18	18	16	18	Z	17	15	15	15	14	19	34	33	20	3	6	9	10	14	24	25	17.0	34
5-Feb	17	15	Z	9	17	14	9	4	12	11	9	16	18	19	22	27	20	15	26	28	27	28	28	26	18.1	28
6-Feb	26	23	16	Z	22	30	30	29	29	29	29	30	31	31	31	31	31	31	31	31	30	30	31	29	28.7	31
7-Feb	29	29	28	28	Z	27	25	25	25	26	26	26	27	27	26	26	26	25	24	27	27	27	24	19	26.1	29
8-Feb	13	9	6	7	3	Z	15	16	13	15	21	22	27	24	25	26	8	1	0	0	0	0	0	0	11.0	27
9-Feb	0	1	1	1	0	0	Z	1	3	8	10	10	11	9	9	6	4	1	0	0	1	4	4	2	3.8	11
10-Feb	7	2	2	2	18	25	26	Z	17	25	24	24	26	28	29	29	28	20	21	20	16	20	13	9	18.7	29
11-Feb	11	19	Z	16	11	10	5	5	9	15	18	20	20	22	25	24	23	24	26	24	27	27	27	26	19.0	27
12-Feb	25	23	21	Z	19	15	8	3	7	17	22	22	21	22	17	9	9	14	15	14	14	19	21	25	16.5	25
13-Feb	27	24	23	17	Z	19	18	18	19	19	26	C	C	C	C	C	28	30	29	29	30	30	30	30	24.7	30
14-Feb	30	30	32	31	32	Z	30	30	28	27	25	26	27	24	27	24	20	11	20	20	14	23	23	22	25.0	32
15-Feb	21	18	17	12	13	20	Z	16	17	23	23	23	25	23	26	24	21	18	23	23	21	22	25	25	20.7	26
16-Feb	25	27	26	20	16	17	19	Z	18	21	24	26	26	28	30	28	18	12	11	12	15	16	17	18	20.3	30
17-Feb	17	18	Z	21	15	7	6	2	9	13	17	15	16	16	13	11	10	4	1	2	7	13	22	21	12.0	22
18-Feb	21	22	23	Z	23	21	18	17	18	20	20	22	24	24	24	22	27	24	26	26	26	25	24	24	22.7	27
19-Feb	23	23	24	24	Z	21	17	18	15	17	17	17	15	14	19	8	10	9	3	10	25	27	26	28	17.8	28
20-Feb	27	27	30	30	30	Z	30	30	32	31	32	30	28	29	32	30	28	29	27	20	22	23	20	18	27.7	32
21-Feb	20	21	20	16	15	14	Z	11	14	17	20	20	24	25	28	29	16	8	4	5	7	13	12	13	16.2	29
22-Feb	15	16	16	15	18	15	14	Z	19	22	24	26	25	24	21	11	10	20	28	29	30	32	33	33	21.6	33
23-Feb	31	32	Z	21	25	30	35	35	34	38	37	37	35	30	29	29	32	33	34	33	34	35	35	36	32.6	38
24-Feb	36	36	35	Z	33	32	31	31	30	31	32	32	33	34	33	36	36	33	32	31	31	33	33	30	32.7	36
25-Feb	26	25	24	14	Z	13	9	10	12	17	21	21	20	24	24	21	15	4	1	1	1	1	1	4	13.4	26
26-Feb	7	7	8	9	7	Z	4	7	10	15	17	18	20	21	35	35	33	27	27	6	3	17	24	26	16.7	35
27-Feb	26	27	29	29	28	25	Z	24	25	26	29	28	29	31	31	33	33	20	2	3	2	9	6	5	21.8	33
28-Feb	18	31	28	6	12	31	26	Z	28	32	34	34	35	35	36	36	36	30	30	31	34	36	37	35	30.1	37
19.6 20.2 19.6 16.1 17.4 18.4 17.9 15.9 18.1 21.0 22.9 23.1 23.6 24.0 25.6 23.8 20.5 16.5 16.8 16.4 17.3 20.1 20.6 19.8																								Diurnal Average		
36 36 35 31 33 32 35 35 34 38 37 37 35 35 36 36 36 33 34 33 34 36 37 36																								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 - February 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	306	47.89	47.89
21 - 50	333	52.11	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - February 2015**

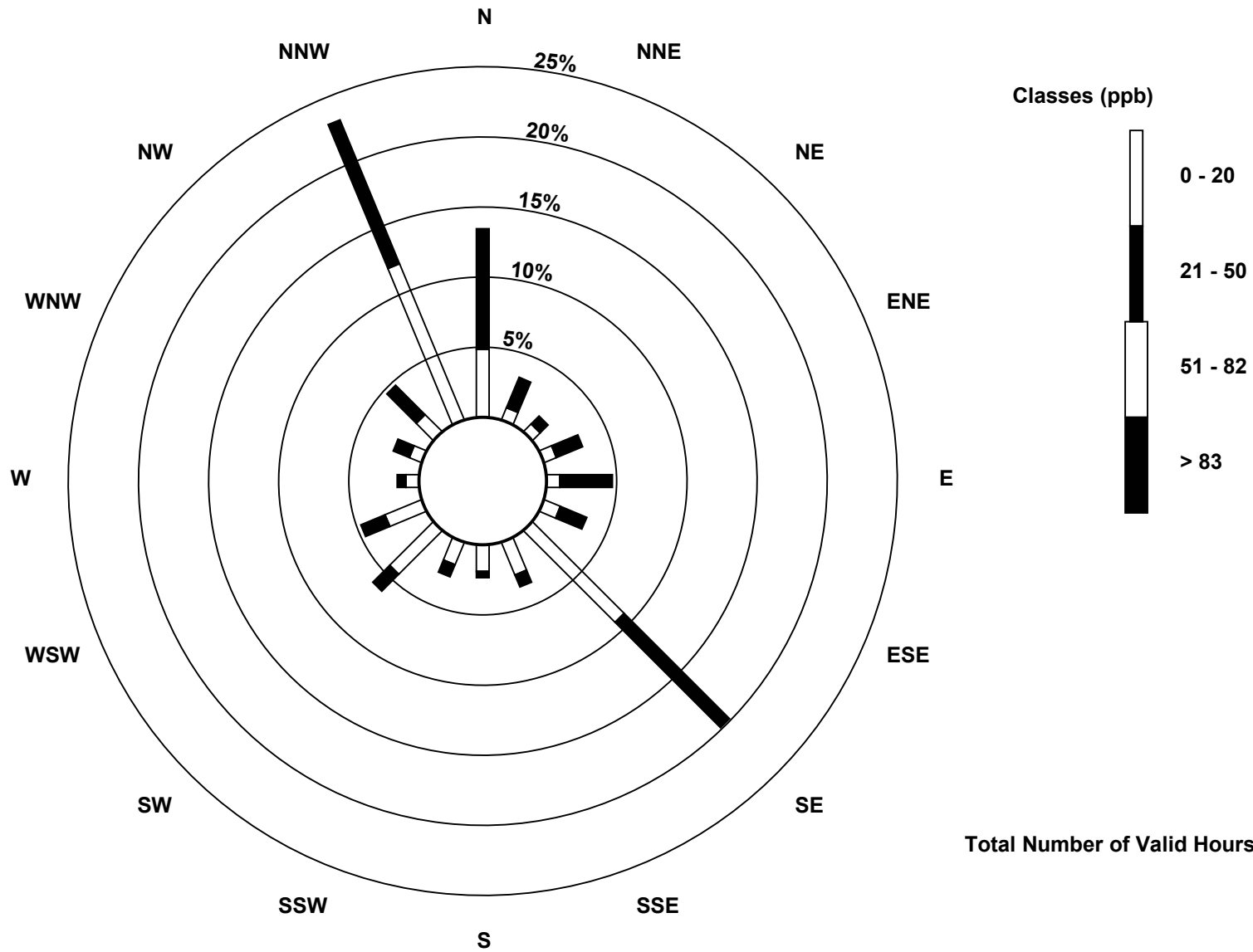
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	31	6	5	6	6	8	59	16	12	11	28	18	6	6	11	77	306
21 - 50	55	15	5	13	24	13	68	6	3	6	11	12	4	8	19	71	333
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	86	21	10	19	30	21	127	22	15	17	39	30	10	14	30	148	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Ozone (O<sub>3</sub>) - ppb  
 Athabasca Valley (AMS 7)

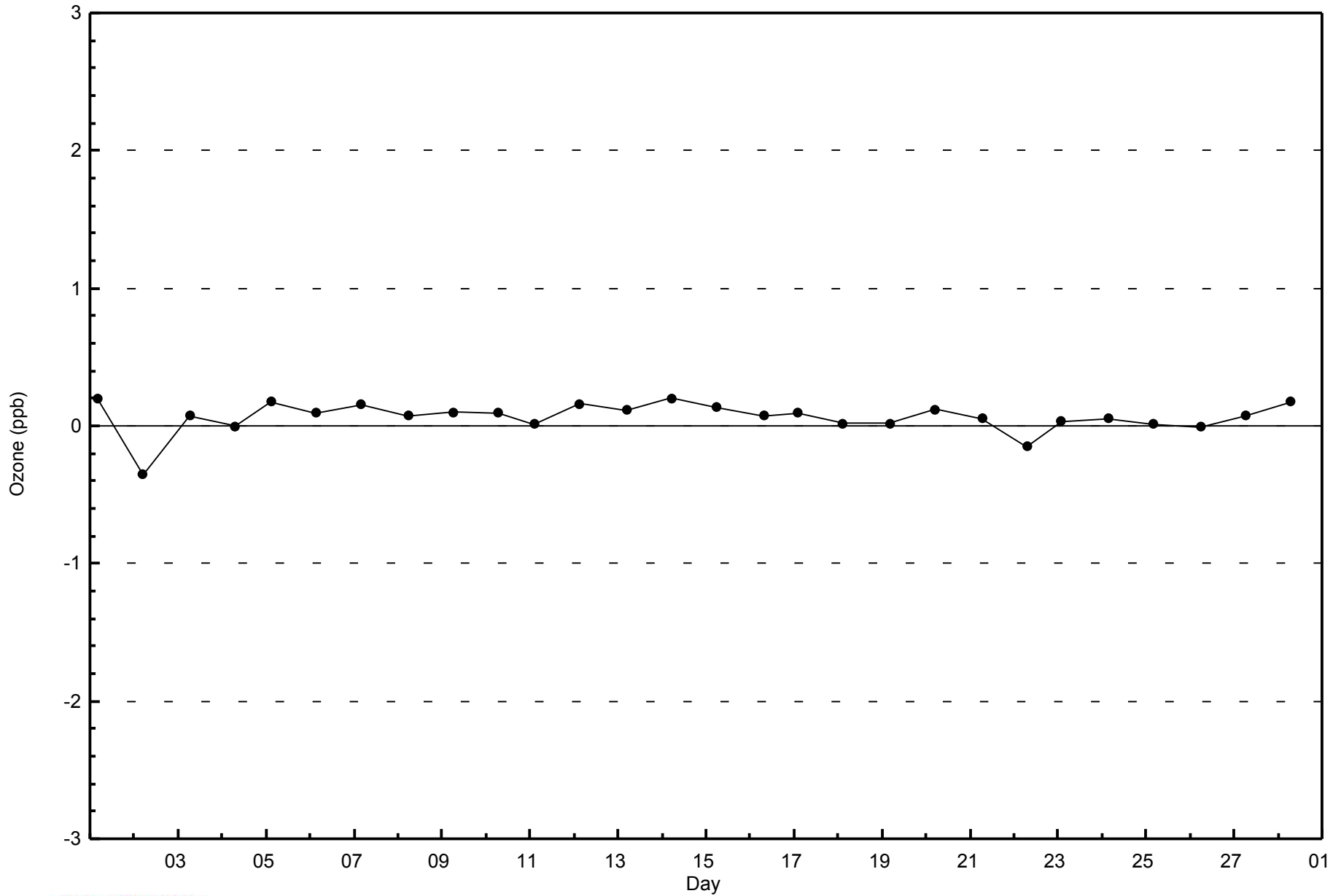


Total Number of Valid Hours: 639



WBEA  
Zero Responses

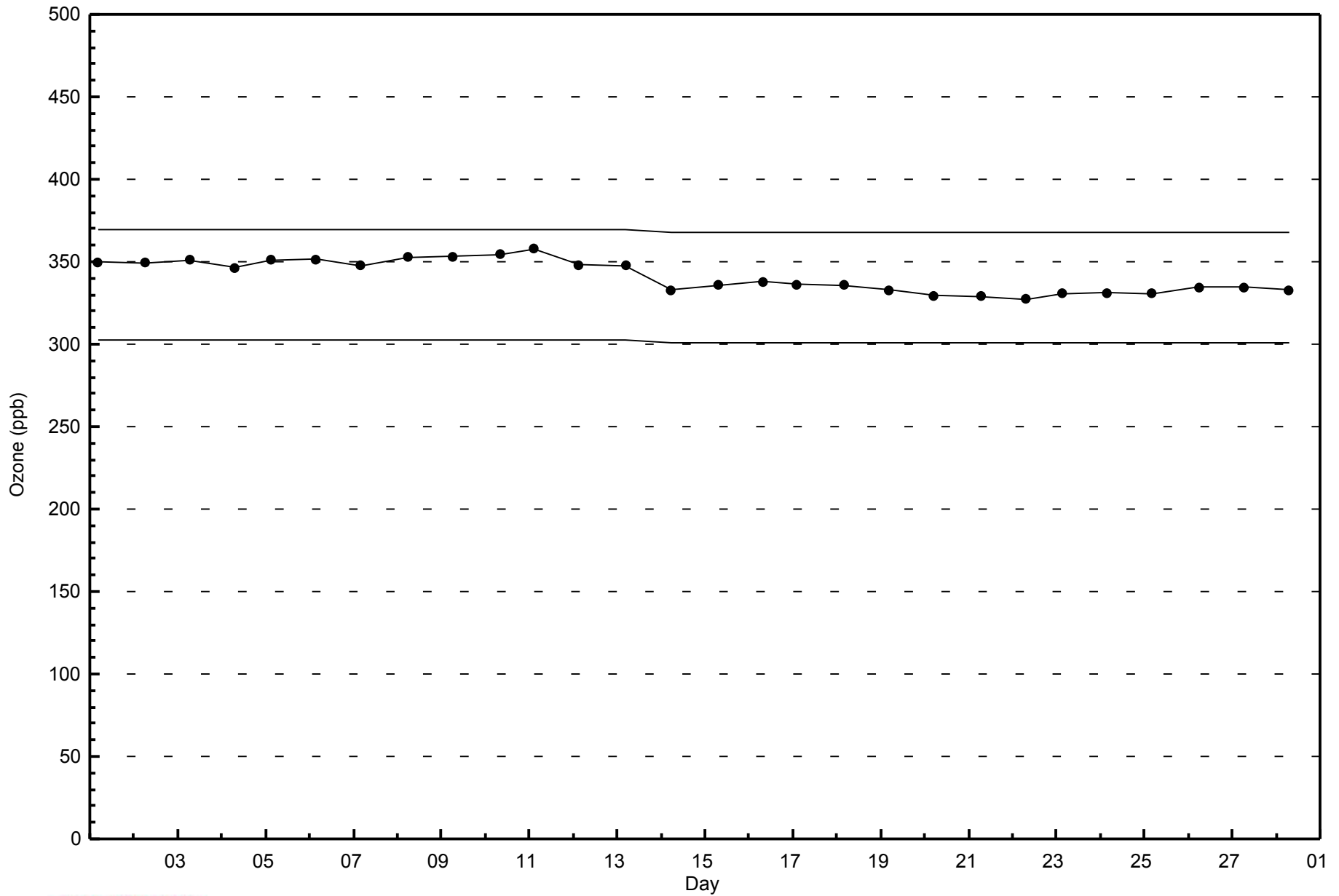
Ozone (O<sub>3</sub>) - ppb  
Athabasca Valley - February 2015





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Athabasca Valley - February 2015**



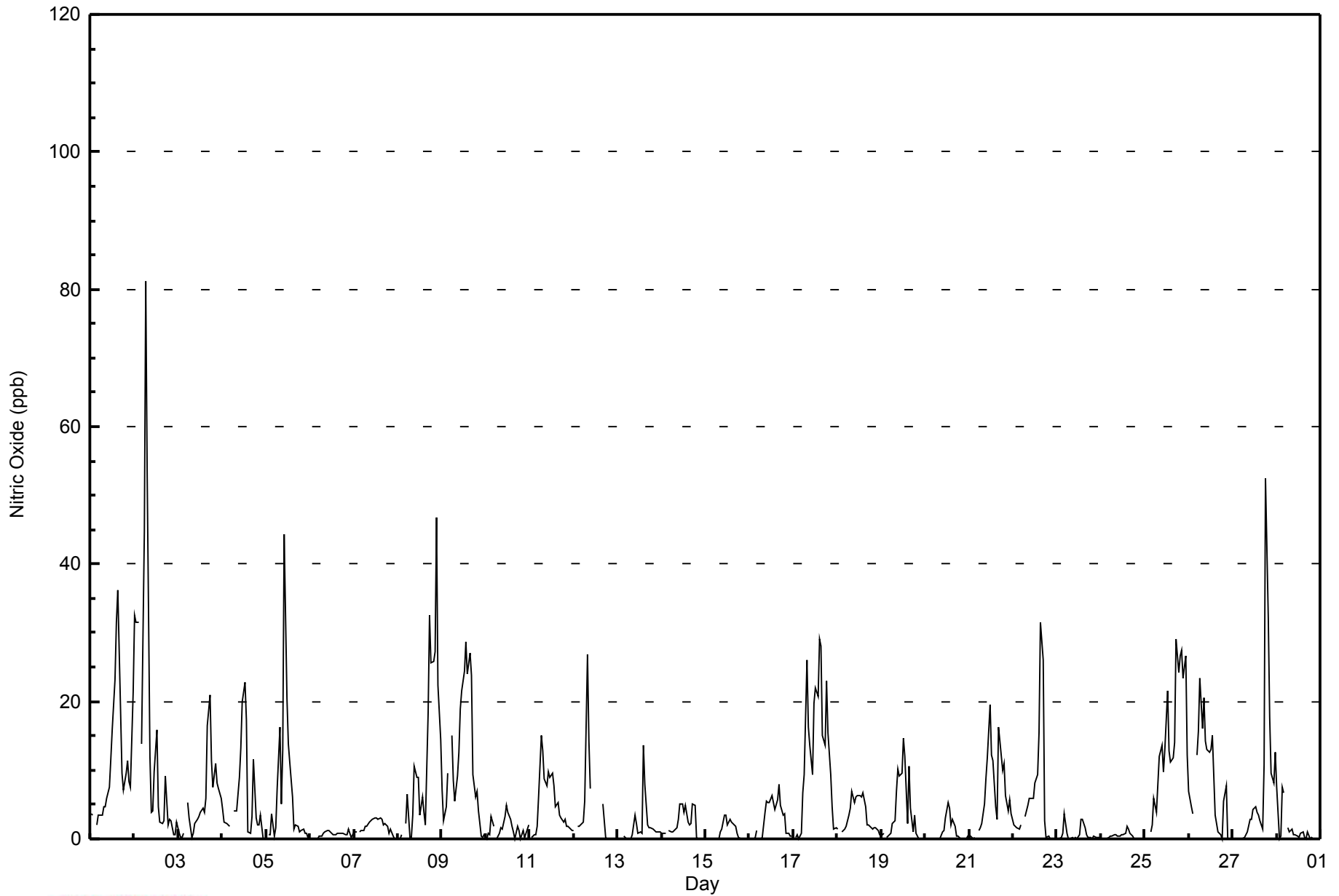


Maximum Value: 81 ppb on Feb 2 07:00														Maximum Daily Average: 16.0 ppb on Feb 2														Hours in Service: 672	
Minimum Value: 0 ppb on Feb 12 20:00														Minimum Daily Average: 0.4 ppb on Feb 24														Hours of Data: 638	
Maximum Diurnal Average: 8.9 ppb at hour 13														Minimum Diurnal Average: 1.6 ppb at hour 4														Hours of Missing Data: 34	
Monthly Average: 5.5 ppb														Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 7 P <sub>90</sub> = 15 P <sub>99</sub> = 44														Hours of Calibration: 34	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	4	3	Z	2	3	3	4	5	5	6	7	12	16	23	32	36	18	9	7	10	11	8	7	21	11.0	36			
2-Feb	33	32	32	Z	14	45	81	54	12	4	4	10	16	5	2	2	3	9	2	3	3	1	1	2	16.0	81			
3-Feb	1	0	0	1	Z	5	3	0	1	2	3	3	4	4	4	6	17	21	11	7	11	8	7	6	5.5	21			
4-Feb	4	2	2	2	2	Z	4	4	4	9	13	20	23	17	1	1	3	12	3	2	2	3	0	0	5.8	23			
5-Feb	Z	1	1	4	0	2	7	16	5	13	44	21	14	11	6	1	2	2	1	1	1	1	0	0	6.7	44			
6-Feb	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0.6	1			
7-Feb	1	1	Z	1	1	1	2	2	2	3	3	3	3	3	3	3	2	2	2	1	1	0	0	0	1.8	3			
8-Feb	0	0	1	Z	2	7	0	0	3	11	9	9	3	6	4	2	18	32	26	26	27	47	22	14	11.8	47			
9-Feb	7	3	5	10	Z	15	8	6	9	13	19	22	24	29	24	27	24	9	6	7	4	0	0	1	11.8	29			
10-Feb	0	1	1	3	2	Z	0	1	2	1	3	5	4	3	2	1	0	2	1	0	1	0	1	2	1.5	5			
11-Feb	Z	0	1	1	2	6	15	13	9	8	10	9	10	8	5	5	3	3	2	3	2	2	1	1	5.1	15			
12-Feb	1	Z	2	2	2	3	6	27	14	7	C	C	C	C	C	C	5	0	0	0	0	0	0	0	--	27			
13-Feb	0	0	Z	0	0	0	0	0	1	3	2	1	1	1	14	8	2	2	2	1	1	1	1	1	1.8	14			
14-Feb	1	1	1	Z	1	1	1	1	2	3	5	4	5	3	3	2	2	5	5	0	0	0	0	0	2.1	5			
15-Feb	0	0	0	0	Z	0	0	0	1	1	3	3	2	3	3	2	2	1	0	0	0	0	0	0	1.0	3			
16-Feb	0	0	0	0	1	Z	0	0	4	5	5	5	6	5	4	6	8	5	3	4	1	1	0	1	2.8	8			
17-Feb	Z	0	1	0	1	7	9	26	16	14	9	20	22	21	29	28	15	14	23	15	9	5	1	2	12.4	29			
18-Feb	1	Z	1	1	1	2	3	5	7	5	6	6	6	6	7	5	2	2	2	1	2	2	1	1	3.3	7			
19-Feb	0	1	Z	0	1	1	2	3	7	10	9	10	15	12	2	10	5	1	4	1	0	0	0	0	4.0	15			
20-Feb	0	0	0	Z	0	0	0	0	0	1	1	3	5	4	2	3	2	1	0	0	0	0	0	0	1.0	5			
21-Feb	1	0	0	0	Z	1	2	2	5	9	12	20	12	11	5	3	16	14	10	11	6	4	6	4	6.7	20			
22-Feb	2	2	2	1	2	Z	3	4	5	6	6	6	8	9	16	31	26	3	0	0	0	0	0	0	5.8	31			
23-Feb	Z	0	0	1	4	1	0	0	0	0	0	0	1	3	3	2	1	0	0	0	0	0	0	0	0.7	4			
24-Feb	0	Z	0	0	0	0	0	1	1	0	0	1	1	1	2	1	1	0	0	0	0	0	0	0	0.4	2			
25-Feb	0	0	Z	1	2	6	4	8	12	14	10	13	22	13	11	12	14	29	24	27	27	23	27	12	13.5	29			
26-Feb	7	5	4	Z	12	16	23	16	21	14	13	13	13	15	3	2	1	1	0	5	8	0	0	0	8.3	23			
27-Feb	0	0	0	0	Z	0	0	1	1	3	3	4	5	4	3	3	1	11	52	32	18	10	8	13	7.5	52			
28-Feb	7	0	0	7	7	Z	2	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	1.4	7			
2.9														2.1														Diurnal Average	
33														32														Diurnal Maximum	
2.2														1.6															
2.7														5.3															
6.5														7.0															
5.4														6.0															
7.5														8.3															
8.3														8.9															
7.0														7.5															
6.9														6.8															
6.7														6.7															
5.7														4.9															
4.2														3.1															
2.9														2.9															
Z - zerospan														C - Calibration															



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - February 2015**





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

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	592	92.79	92.79
21 - 40	40	6.27	99.06
41 - 80	5	0.78	99.84
81 - 159	0	0.00	99.84
> 159	0	0.00	99.84

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - February 2015**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	82	19	8	19	34	20	125	17	11	15	33	30	9	10	26	134	592
21 - 40	3	1	2	1	0	2	1	4	3	1	3	2	0	2	2	13	40
11 - 80	0	0	0	1	0	0	1	1	1	0	0	0	0	0	0	1	5
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	20	10	21	34	22	127	22	15	16	36	32	9	12	28	148	637

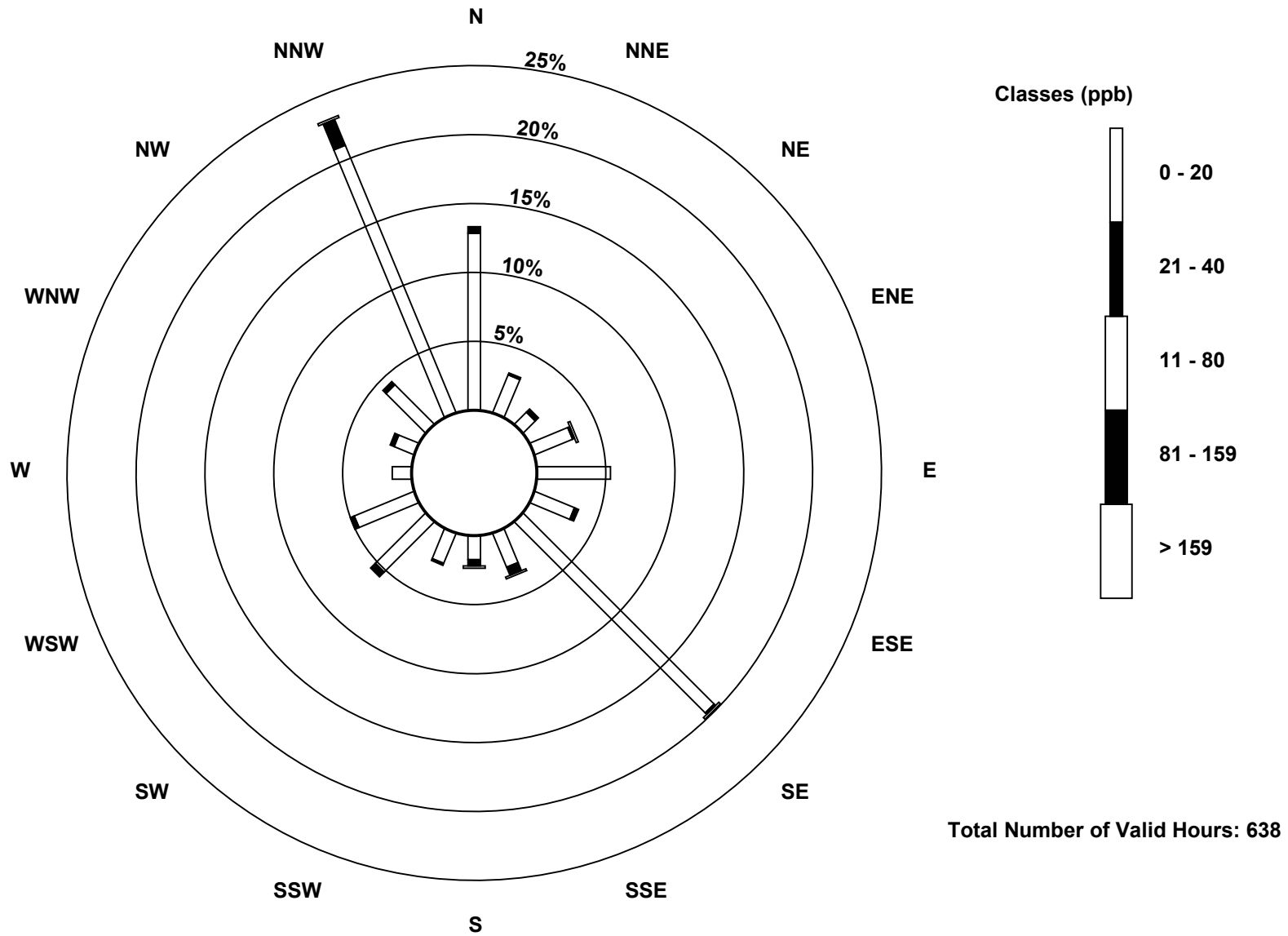
Total Number of Valid Hours: 638

Total Number of Hours: 672



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

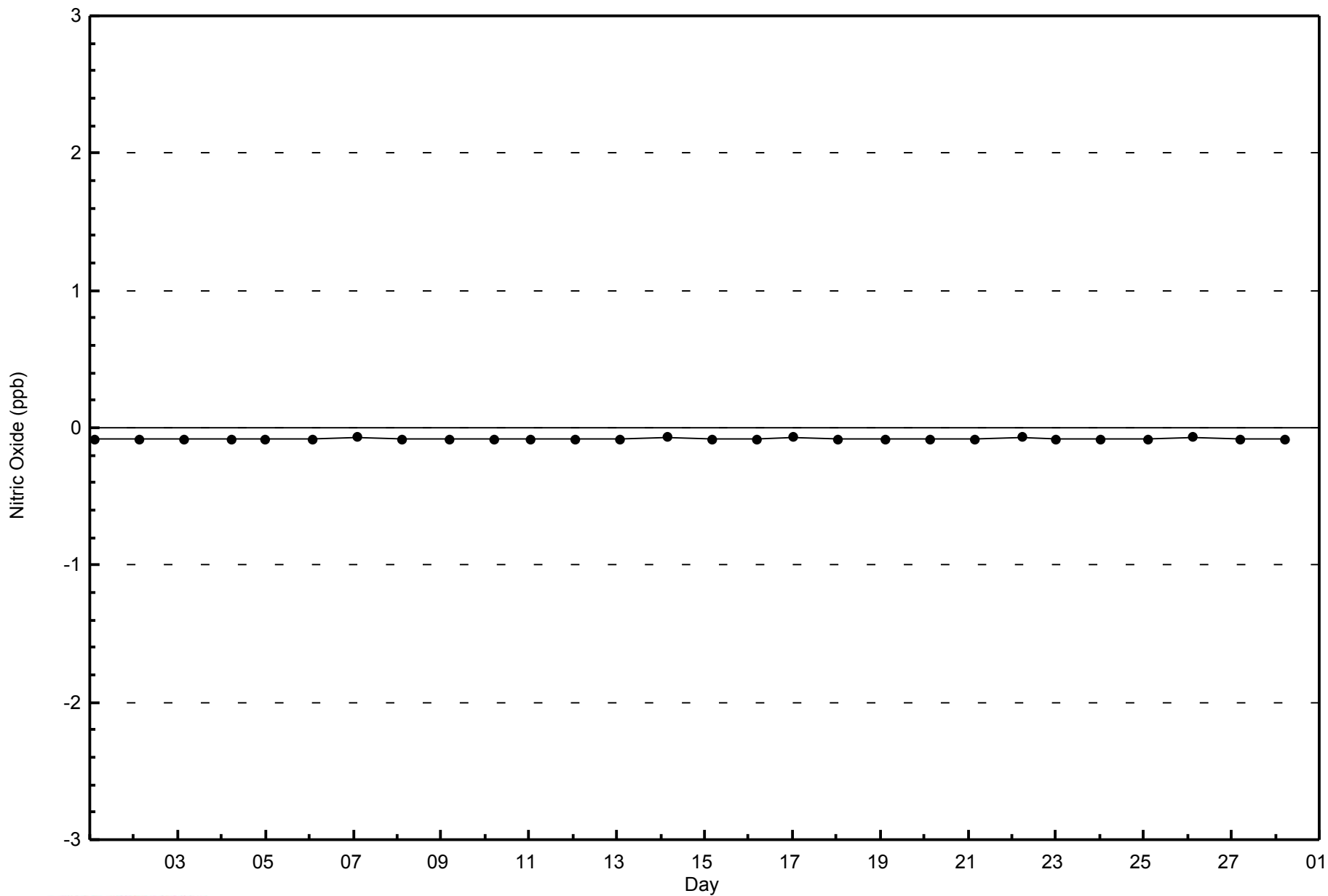
**Nitric Oxide (NO) - ppb  
Athabasca Valley (AMS 7)**





WBEA  
Zero Responses

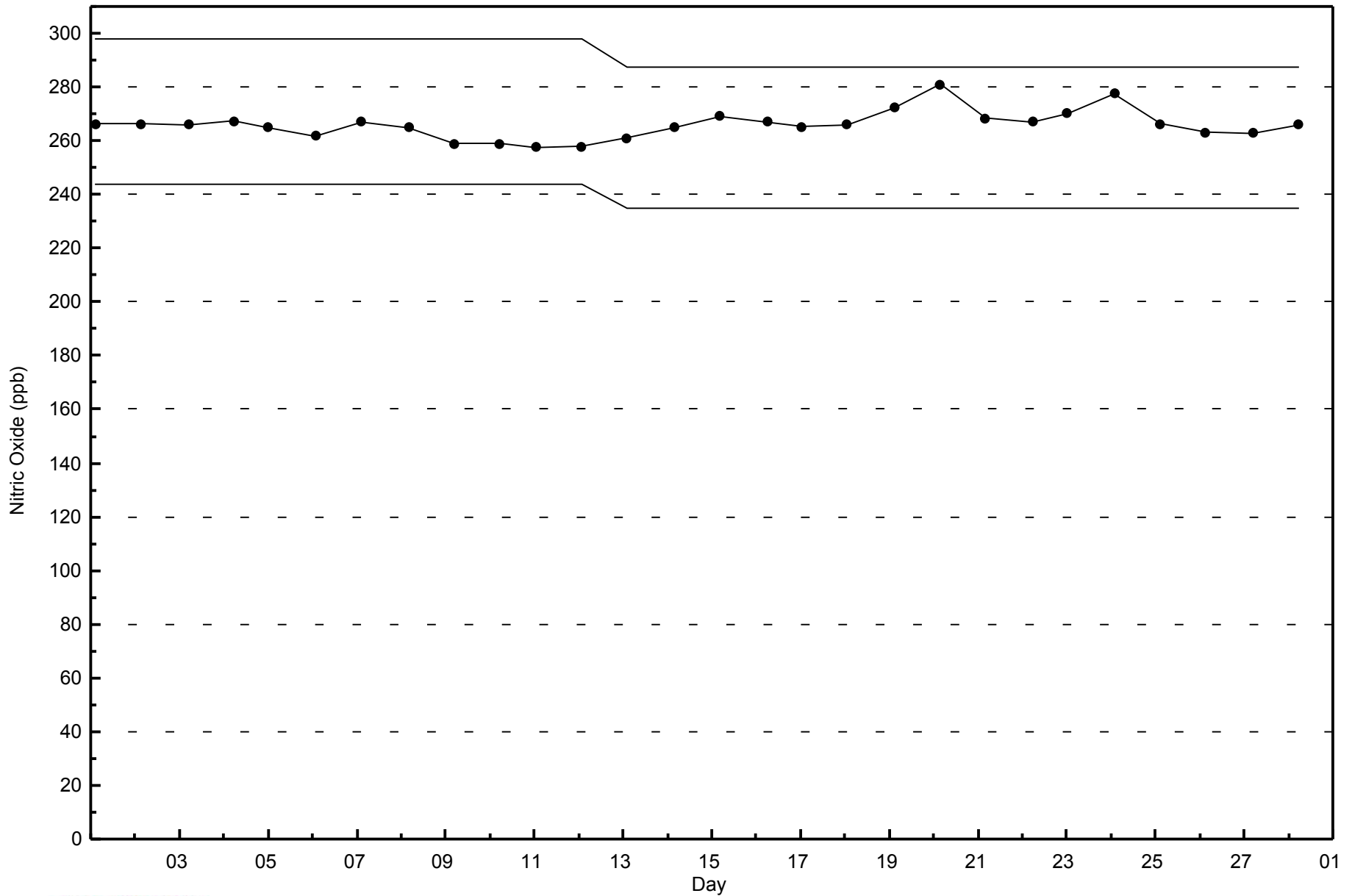
Nitric Oxide (NO) - ppb  
Athabasca Valley - February 2015





**WBEA**  
**Span Responses**

**Nitric Oxide (NO) - ppb**  
**Athabasca Valley - February 2015**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 44 ppb on Feb 27 19:00	Maximum Daily Average: 25.0 ppb on Feb 9
Minimum Value: 0 ppb on Feb 6 18:00	Hours of Data: 638
Maximum Diurnal Average: 18.0 ppb at hour 18	Hours of Missing Data: 34
Monthly Average: 12.0 ppb	Hours of Calibration: 34
Minimum Daily Average: 2.5 ppb on Feb 6	Percent Operational Time: 100.0
Minimum Diurnal Average: 8.4 ppb at hour 11	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 16 P <sub>90</sub> = 25 P <sub>99</sub> = 36	

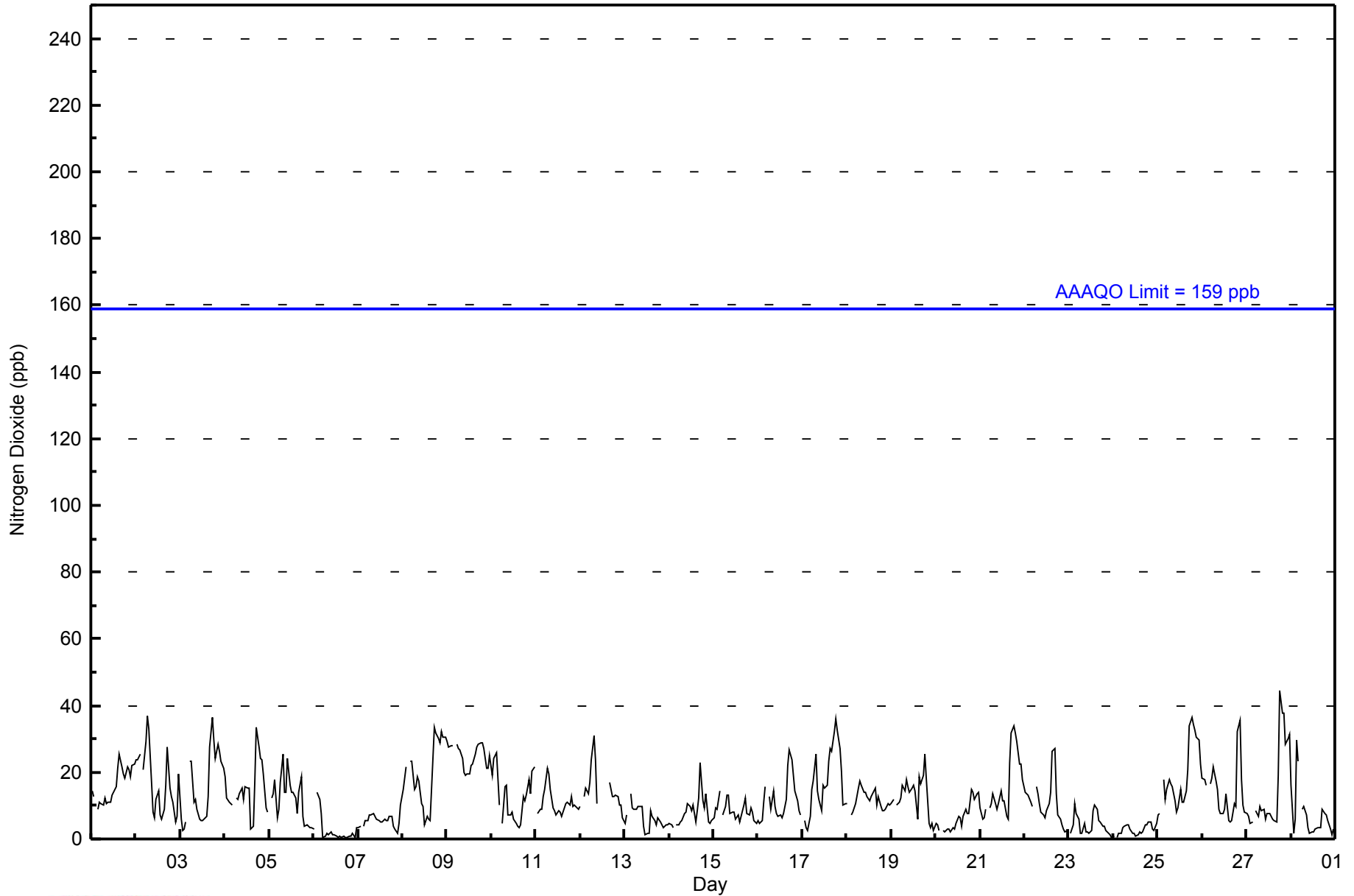
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	14	13	Z	9	11	10	10	12	11	11	11	13	14	16	21	25	22	19	18	21	21	19	22	22	15.9	25
2-Feb	24	24	25	Z	21	29	37	33	17	8	6	12	15	7	6	9	16	28	15	13	11	5	7	20	16.8	37
3-Feb	6	3	3	5	Z	23	23	11	12	9	6	5	6	6	7	13	28	36	30	24	28	26	23	21	15.4	36
4-Feb	19	12	11	10	10	Z	12	12	14	15	12	16	15	15	3	4	17	33	28	24	24	20	9	8	14.9	33
5-Feb	Z	12	13	18	6	9	17	25	14	14	24	16	14	14	12	8	14	19	7	4	4	4	3	4	12.0	25
6-Feb	3	Z	14	12	8	1	1	2	1	2	1	1	1	1	1	1	1	0	0	1	1	2	1	3	2.5	14
7-Feb	3	4	Z	4	5	6	7	7	8	7	6	6	5	5	6	6	6	7	7	4	3	2	5	10	5.5	10
8-Feb	15	18	21	Z	23	23	15	16	19	17	11	10	4	7	6	5	24	33	32	30	29	32	31	31	19.6	33
9-Feb	29	28	28	28	Z	29	27	27	24	20	19	20	20	22	23	26	28	28	29	29	27	21	21	25	25.0	29
10-Feb	19	24	25	26	10	Z	5	16	16	7	7	8	6	5	4	4	4	13	11	13	18	13	20	22	12.9	26
11-Feb	Z	8	9	9	13	15	21	20	15	9	9	7	8	8	7	9	11	11	10	13	10	10	10	9	10.9	21
12-Feb	10	Z	13	15	13	17	24	31	24	11	C	C	C	C	C	C	17	13	13	13	13	10	10	6	--	31
13-Feb	5	7	Z	13	9	9	9	10	10	10	4	1	2	2	8	7	6	4	6	5	4	4	4	4	6.2	13
14-Feb	5	4	3	Z	4	4	5	6	8	8	10	10	9	10	5	8	12	23	11	9	13	5	5	5	8.0	23
15-Feb	7	9	9	15	Z	7	10	13	13	8	8	8	6	7	5	7	10	12	8	7	9	8	6	5	8.5	15
16-Feb	6	5	5	11	16	Z	13	9	14	10	8	7	7	6	8	12	22	27	24	19	14	11	8	7	11.6	27
17-Feb	Z	6	3	3	7	15	17	26	15	12	9	16	15	16	23	27	26	32	36	33	27	21	10	11	17.6	36
18-Feb	11	Z	7	8	10	11	15	18	16	14	14	13	12	13	14	15	10	13	10	8	9	9	11	10	11.6	18
19-Feb	11	12	Z	10	11	12	16	15	18	16	14	15	16	15	6	19	17	19	25	18	5	3	5	3	13.0	25
20-Feb	5	4	3	Z	2	2	3	3	2	4	3	5	7	6	4	7	9	8	8	15	14	12	13	14	6.6	15
21-Feb	9	6	6	9	Z	9	10	14	11	9	11	14	11	11	7	6	23	32	34	32	29	23	23	18	15.5	34
22-Feb	14	14	13	11	10	Z	16	14	11	8	7	7	9	11	14	26	27	13	7	6	4	3	2	2	10.8	27
23-Feb	Z	2	4	11	8	6	2	2	5	2	2	2	2	9	10	9	6	5	4	4	3	2	1	0	4.3	11
24-Feb	1	Z	0	2	2	3	4	4	4	3	2	2	1	1	2	2	2	4	4	5	5	3	3	5	2.8	5
25-Feb	7	8	Z	18	12	15	18	17	16	11	8	9	15	11	11	14	21	34	37	34	33	30	30	23	18.7	37
26-Feb	18	18	16	Z	17	18	21	18	15	9	8	8	9	14	6	5	6	11	10	32	35	18	10	8	14.3	35
27-Feb	8	7	5	5	Z	8	7	10	9	9	6	8	8	7	6	5	5	19	44	38	38	29	30	32	14.8	44
28-Feb	16	2	6	30	Z	9	10	7	4	2	2	2	3	3	4	4	9	8	7	6	3	1	3	7.1	30	
10.9 10.3 10.6 12.2 10.9 12.2 13.4 14.1 12.3 9.5 8.4 8.8 8.8 9.2 8.4 10.4 14.0 18.0 16.9 16.5 15.6 12.4 11.5 11.8																								Diurnal Average		
29 28 28 30 24 29 37 33 24 20 24 20 20 22 23 27 28 36 44 38 38 32 31 32																								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 - February 2015**





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	527	82.60	82.60
21 - 40	110	17.24	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Athabasca Valley - February 2015**

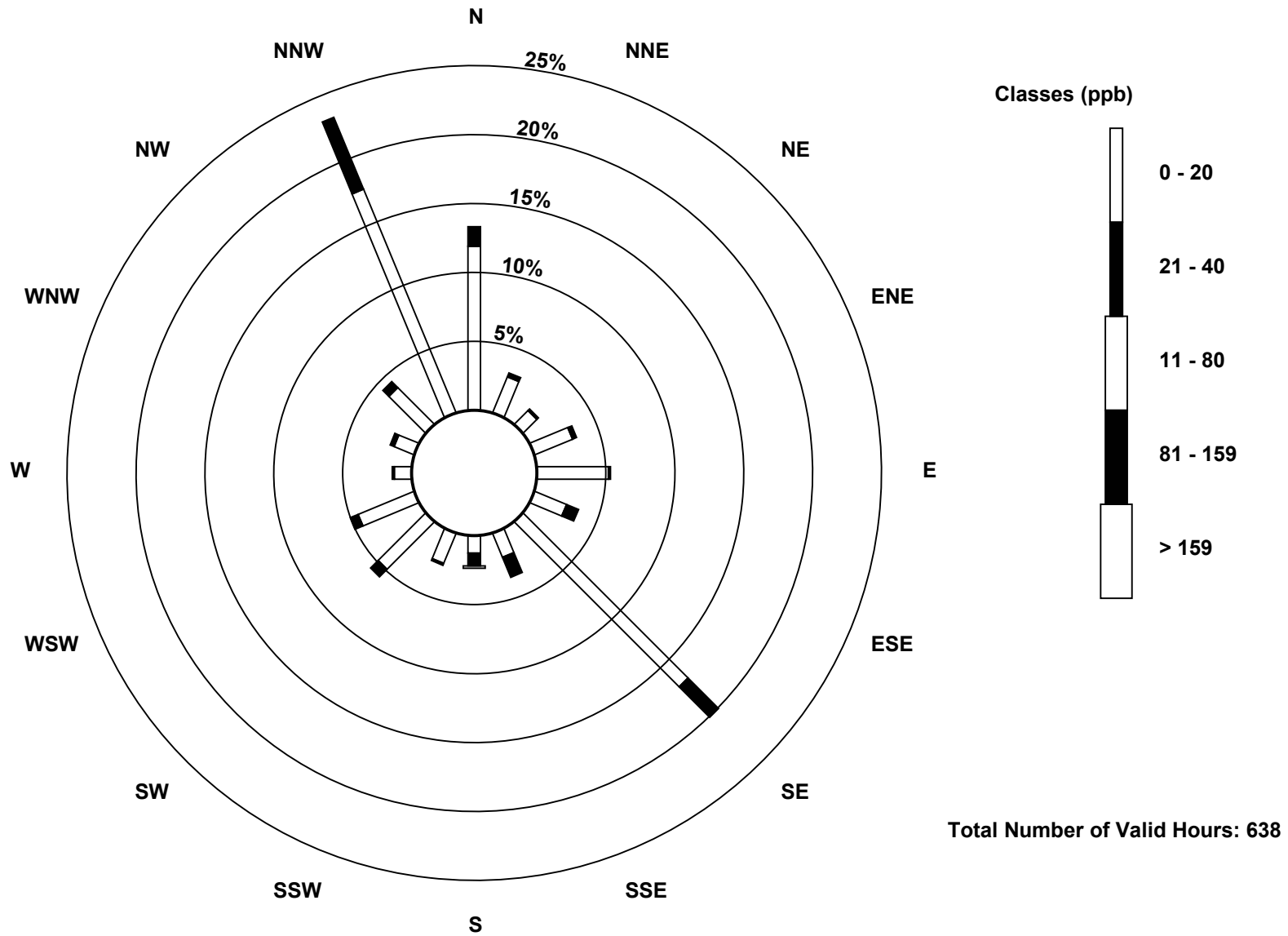
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	76	18	9	19	33	16	108	12	8	15	31	28	8	10	24	112	527
21 - 40	9	2	1	2	1	6	20	10	6	1	5	4	1	2	4	36	110
11 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	20	10	21	34	22	128	22	15	16	36	32	9	12	28	148	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley (AMS 7)**

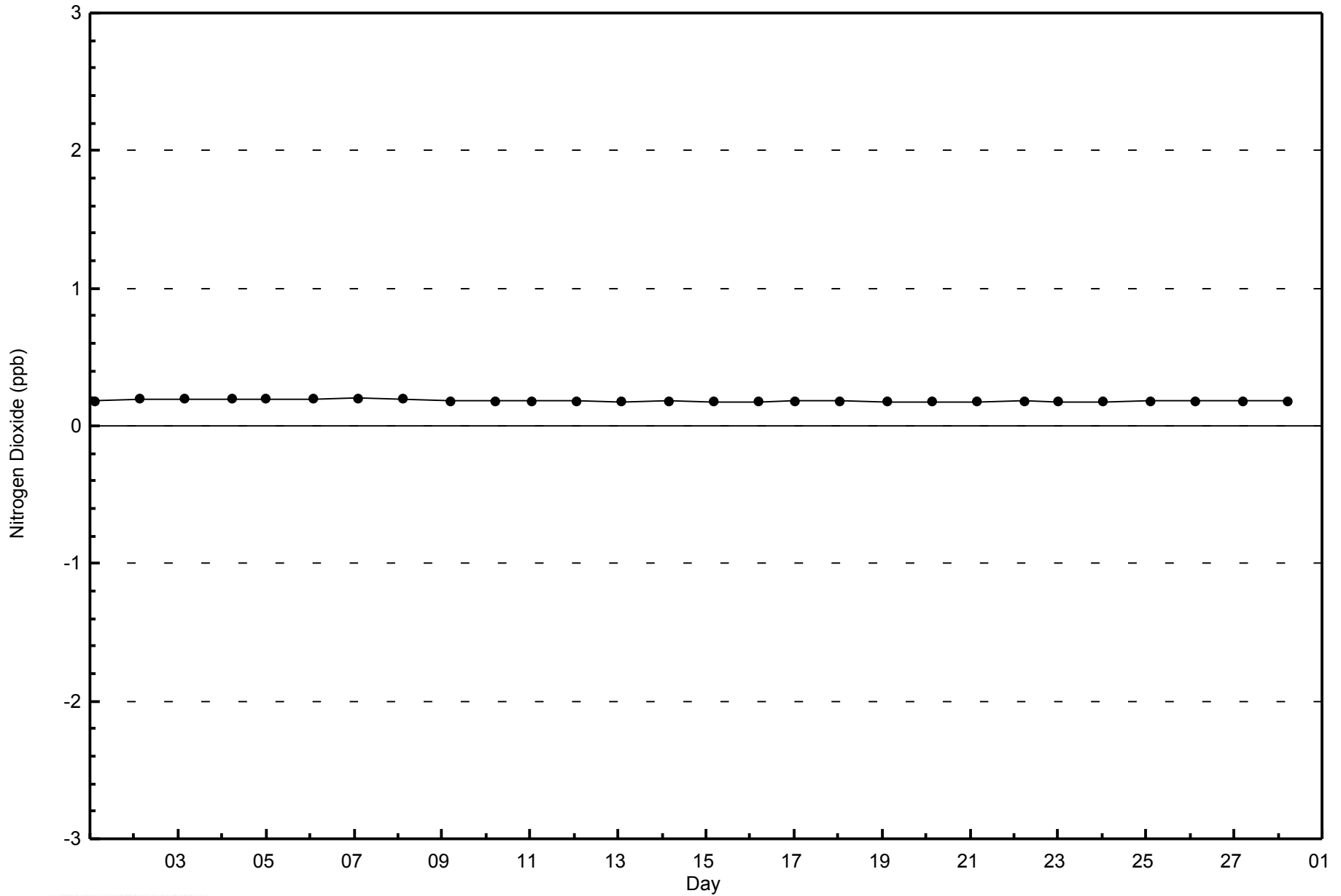






WBEA  
Zero Responses

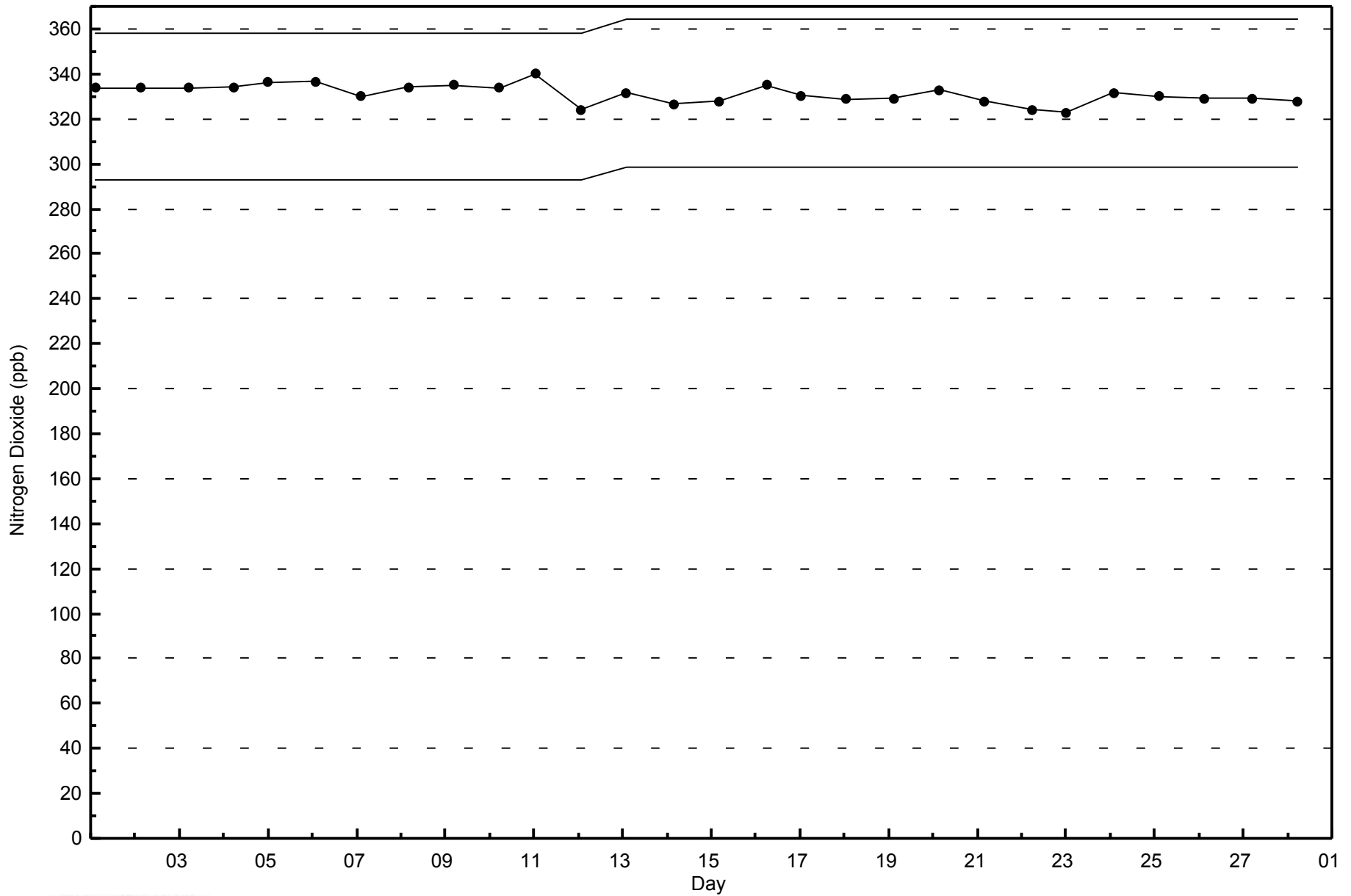
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Athabasca Valley - February 2015



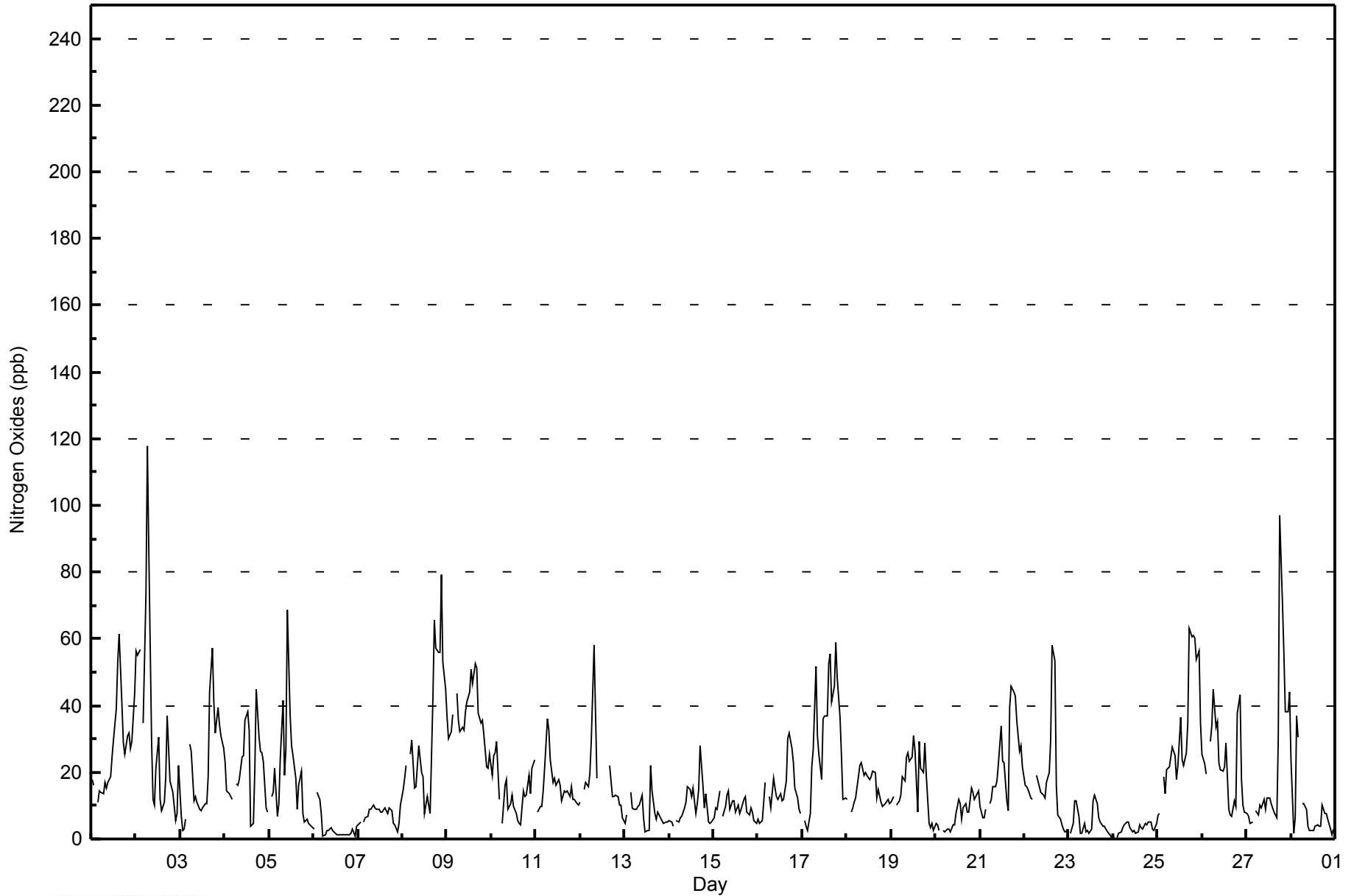


Maximum Value: 118 ppb on Feb 2 07:00																		Maximum Daily Average: 36.8 ppb on Feb 9																		Hours in Service: 672			
Minimum Value: 0 ppb on Feb 24 03:00																		Minimum Daily Average: 3.1 ppb on Feb 6																		Hours of Data: 638			
Maximum Diurnal Average: 24.9 ppb at hour 18																		Minimum Diurnal Average: 12.4 ppb at hour 2																		Hours of Missing Data: 34			
Monthly Average: 17.5 ppb																		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 7 Median = 12 Q <sub>3</sub> = 24 P <sub>90</sub> = 38 P <sub>99</sub> = 67																		Hours of Calibration: 34			
																																				Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Feb	18	16	Z	11	15	14	14	17	15	17	19	25	30	39	53	62	40	29	25	31	32	27	29	44	27.0	62													
2-Feb	56	55	57	Z	35	74	118	86	29	12	10	21	30	12	8	11	19	37	17	16	14	6	7	22	32.7	118													
3-Feb	7	3	3	6	Z	28	26	11	13	11	9	9	9	11	11	19	44	57	41	32	39	34	31	27	20.9	57													
4-Feb	23	15	13	13	12	Z	16	16	18	24	25	36	38	33	4	5	21	45	30	26	26	23	9	8	20.8	45													
5-Feb	Z	13	14	21	7	11	24	42	19	27	68	37	28	25	18	9	16	20	8	5	6	5	4	4	18.7	68													
6-Feb	3	Z	14	12	8	1	1	2	2	3	2	2	1	1	1	1	1	1	1	1	2	3	1	4	3.1	14													
7-Feb	4	5	Z	5	7	7	9	9	10	9	9	9	8	8	9	8	7	9	9	4	4	2	5	10	7.3	10													
8-Feb	15	18	22	Z	25	30	15	16	22	28	20	19	8	13	10	8	42	66	57	56	56	79	53	45	31.4	79													
9-Feb	36	30	32	37	Z	44	36	32	33	33	38	41	44	51	46	53	51	38	35	36	31	22	21	25	36.8	53													
10-Feb	19	25	26	29	12	Z	5	16	18	9	11	13	10	8	6	5	4	14	13	13	19	14	21	24	14.4	29													
11-Feb	Z	8	10	10	15	21	36	32	24	17	18	16	18	16	11	15	14	14	13	16	12	12	11	10	16.0	36													
12-Feb	11	Z	15	17	16	19	29	58	38	18	C	C	C	C	C	C	22	13	13	13	13	10	10	6	--	58													
13-Feb	5	7	Z	14	9	9	9	10	10	13	6	2	3	2	22	14	8	6	8	6	5	5	5	5	8.0	22													
14-Feb	5	5	4	Z	6	5	6	7	9	11	16	15	13	15	7	10	15	28	16	9	13	5	5	5	10.0	28													
15-Feb	7	9	9	15	Z	7	10	13	14	9	12	11	8	10	8	9	12	13	8	7	9	8	5	5	9.5	15													
16-Feb	6	5	5	11	17	Z	13	9	18	15	13	12	14	12	12	17	30	32	27	23	15	12	9	7	14.5	32													
17-Feb	Z	6	4	3	8	22	27	52	31	25	18	36	37	37	53	55	41	46	59	48	36	25	12	12	30.0	59													
18-Feb	12	Z	8	9	11	12	19	22	23	19	20	19	18	19	20	20	12	15	11	10	10	10	12	11	14.9	23													
19-Feb	11	13	Z	10	12	13	18	17	25	26	23	25	31	27	8	29	21	20	29	19	5	3	4	3	17.0	31													
20-Feb	4	4	3	Z	2	2	3	3	2	4	4	7	12	11	6	9	10	8	8	15	14	12	13	14	7.6	15													
21-Feb	10	6	6	9	Z	10	12	16	16	18	23	34	23	23	11	9	39	46	44	43	35	26	28	22	22.1	46													
22-Feb	16	15	15	12	12	Z	19	18	16	14	13	12	17	20	30	58	53	16	7	6	4	3	2	2	16.5	58													
23-Feb	Z	2	5	12	11	7	2	2	5	2	3	2	3	11	13	11	6	5	4	4	3	2	1	1	5.0	13													
24-Feb	1	Z	0	2	2	4	4	5	5	3	2	2	2	2	4	3	3	5	4	5	5	3	3	5	3.2	5													
25-Feb	7	8	Z	19	14	21	22	24	28	25	18	22	36	24	22	26	35	63	61	61	60	54	56	35	32.2	63													
26-Feb	25	22	20	Z	29	34	45	34	35	23	21	20	22	29	9	7	7	12	10	38	43	18	10	8	22.6	45													
27-Feb	8	7	5	5	Z	8	7	10	9	12	9	12	12	11	9	8	6	30	97	70	55	38	38	44	22.2	97													
28-Feb	24	2	6	37	30	Z	11	11	9	4	2	2	2	4	4	4	4	10	8	7	6	3	1	3	8.4	37													
13.9																		12.4																		Diurnal Average			
56																		55																		Diurnal Maximum			
12.8																		13.8																					
13.6																		17.5																					
19.8																		21.1																					
17.7																		15.5																					
15.9																		17.1																					
17.7																		17.4																					
15.4																		18.0																					
20.9																		24.9																					
23.7																		22.2																					
20.5																		16.6																					
14.6																		14.7																					
Z - zerospan																		C - Calibration																					



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - February 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	445	69.75	69.75
21 - 40	138	21.63	91.38
41 - 80	52	8.15	99.53
81 - 159	3	0.47	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Athabasca Valley - February 2015**

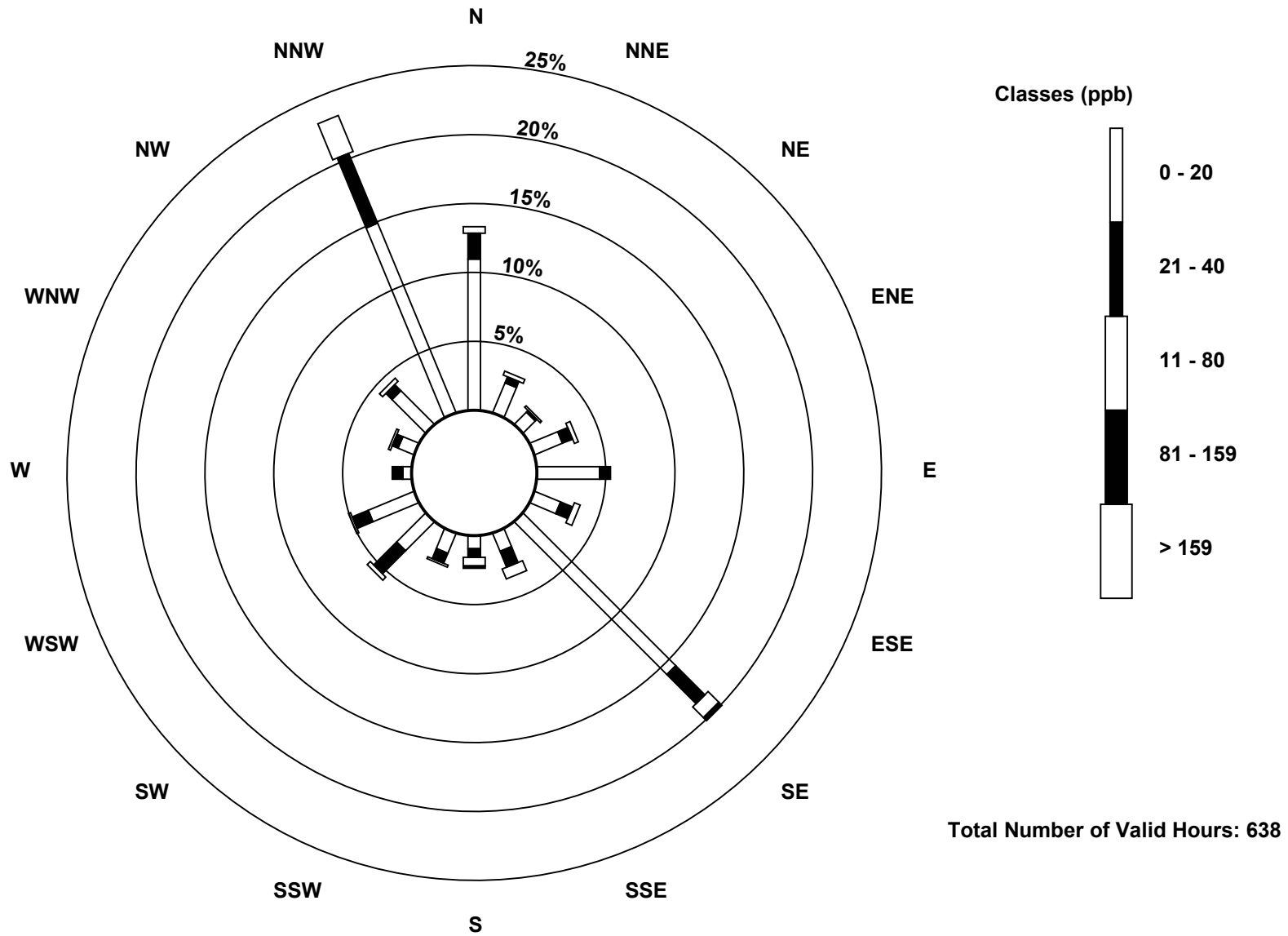
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	70	15	8	14	29	13	100	9	6	10	19	23	4	8	22	95	445
21 - 40	12	3	1	5	5	6	19	8	4	5	15	8	5	3	4	35	138
41 - 80	3	2	1	2	0	3	7	5	4	1	2	1	0	1	2	18	52
81 - 159	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	20	10	21	34	22	128	22	15	16	36	32	9	12	28	148	638

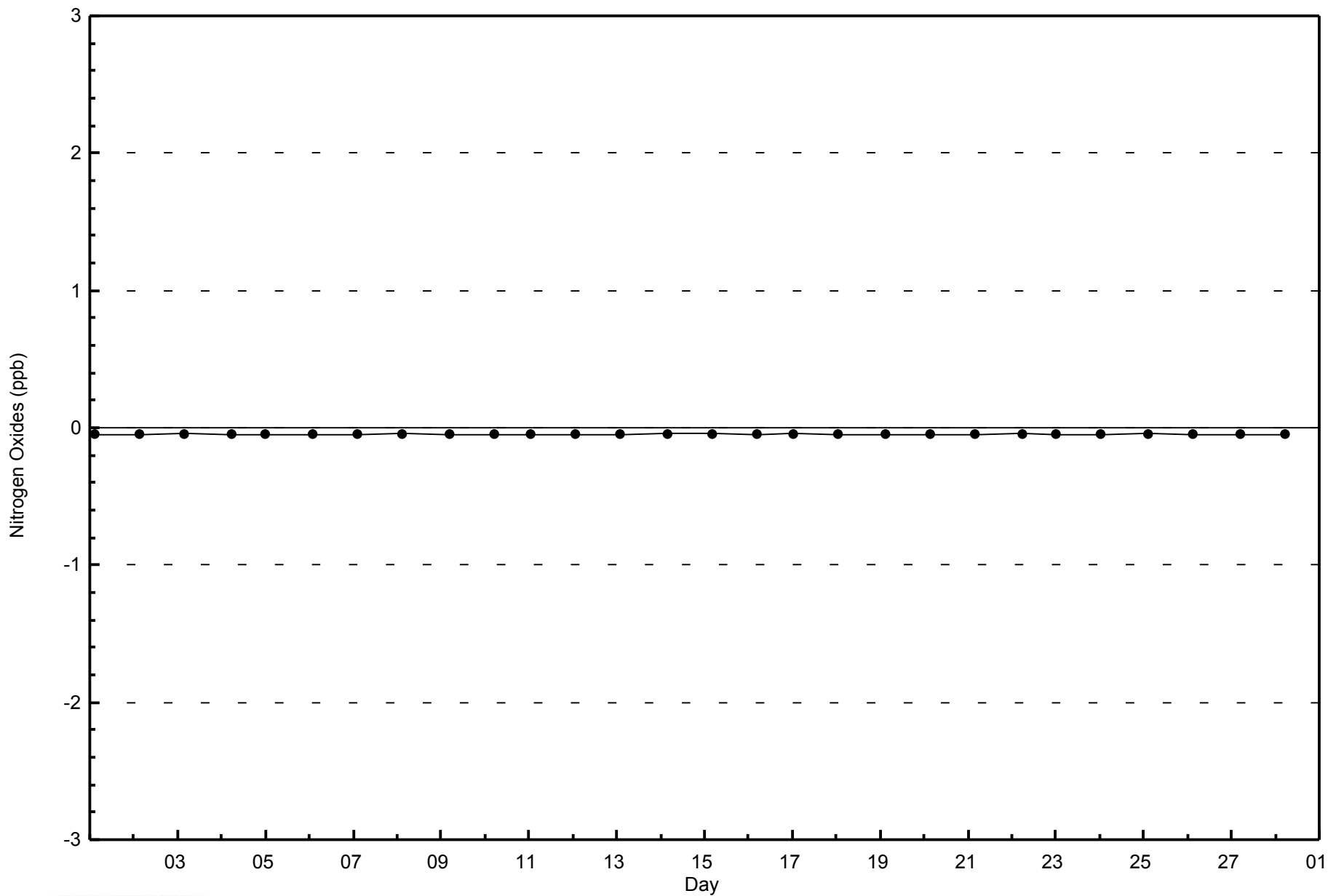
Total Number of Valid Hours: 638

Total Number of Hours: 672

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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley (AMS 7)**



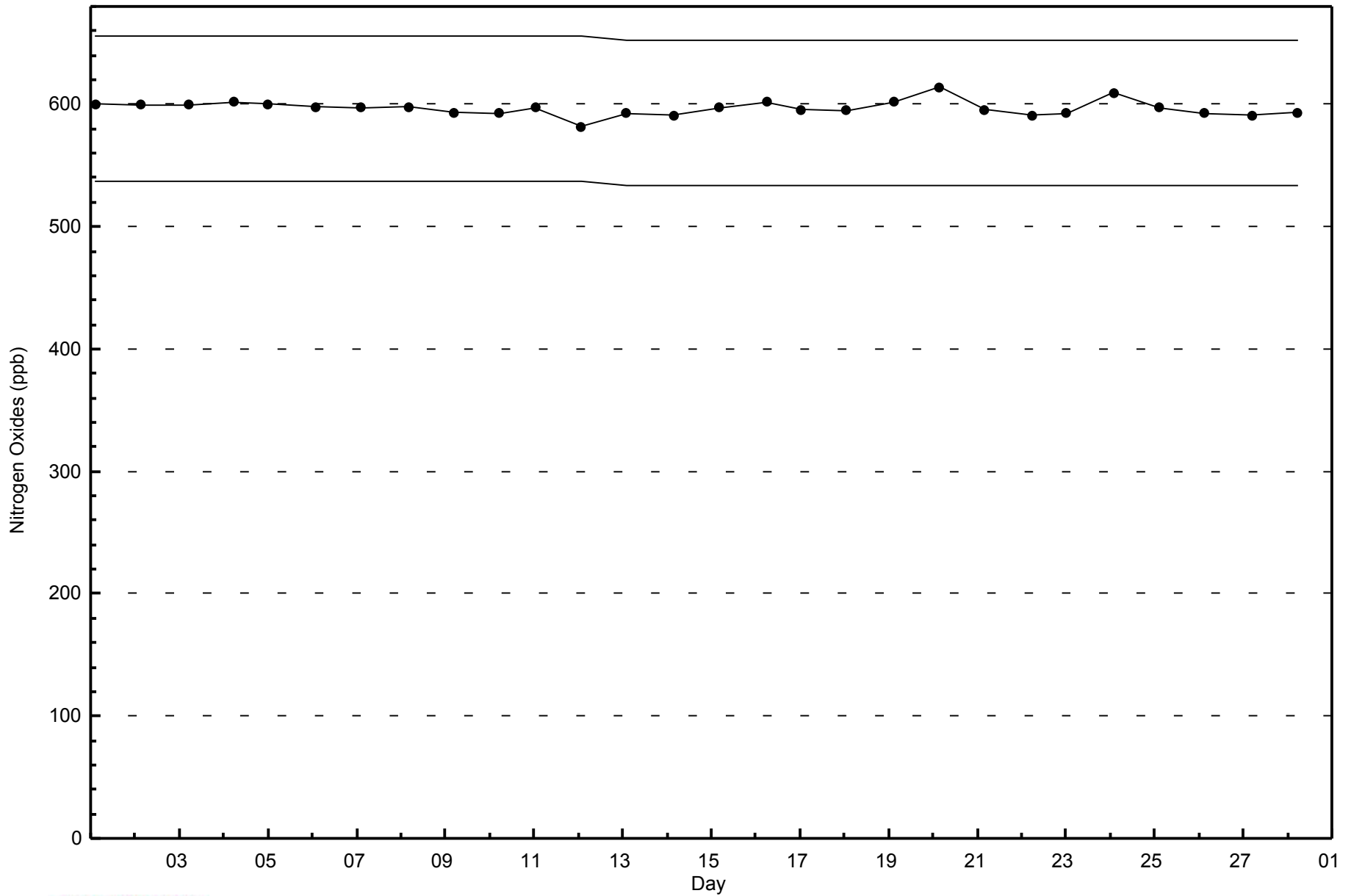






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Athabasca Valley - February 2015



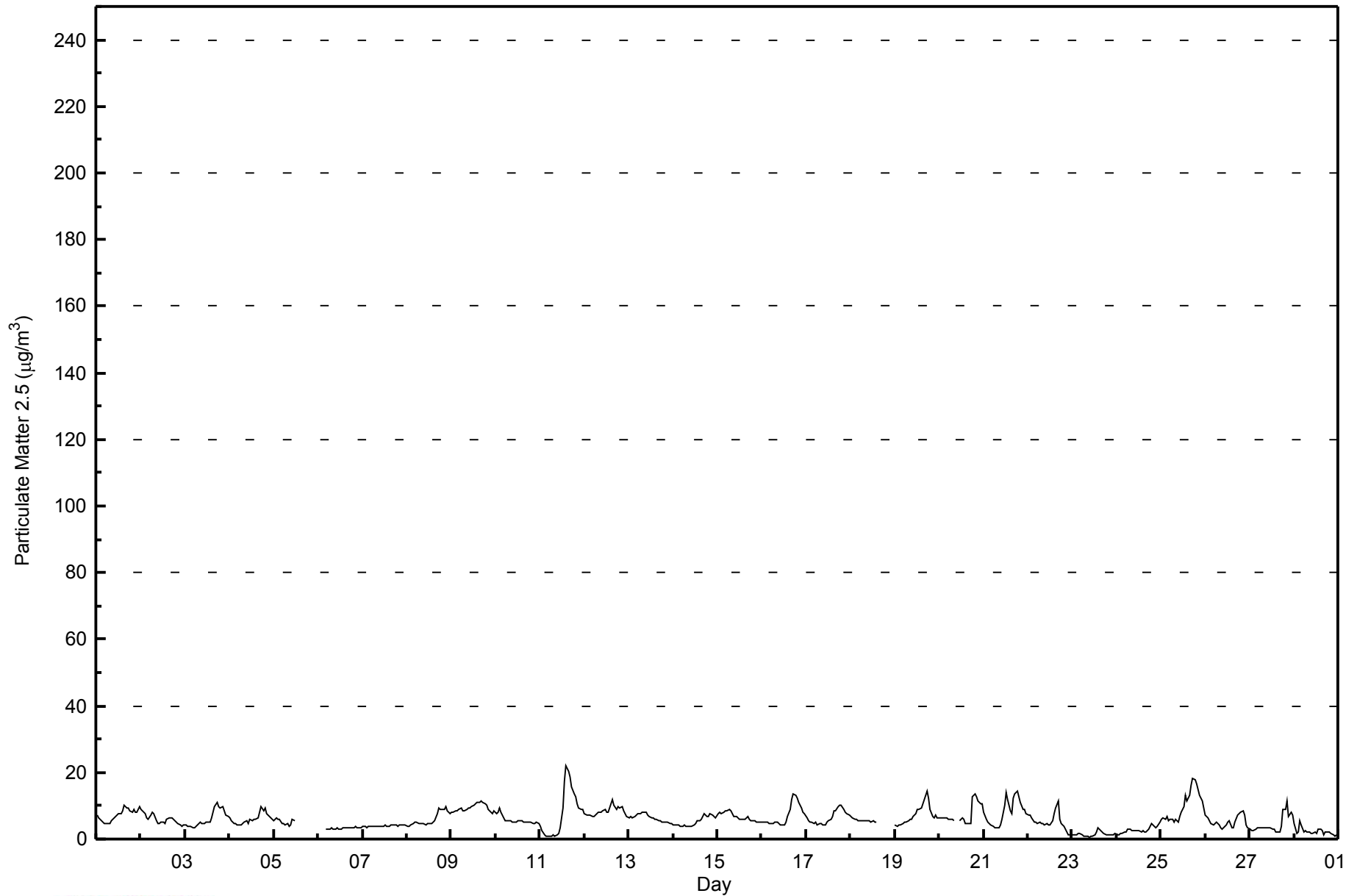


Number of Exceedences (AAAQO):		24-hr: 0		Hours in Service:		672																					
Maximum Value: 21.9 µg/m <sup>3</sup> on Feb 11 15:00		Maximum Daily Average: 9.9 µg/m <sup>3</sup> on Feb 25		Hours of Data:		645																					
Minimum Value: 0.6 µg/m <sup>3</sup> on Feb 23 10:00		Minimum Daily Average: 1.4 µg/m <sup>3</sup> on Feb 23		Hours of Missing Data:		27																					
Maximum Diurnal Average: 8.3 µg/m <sup>3</sup> at hour 19		Minimum Diurnal Average: 4.6 µg/m <sup>3</sup> at hour 10		Hours of Calibration:		0																					
Monthly Average: 5.97 µg/m <sup>3</sup>		Percentiles: P <sub>1</sub> = 0.8 P <sub>10</sub> = 2.3 Q <sub>1</sub> = 4.0 Median = 5.4 Q <sub>3</sub> = 7.7 P <sub>90</sub> = 9.6 P <sub>99</sub> = 16.8		Percent Operational Time:		96.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	7.3	6.5	5.8	5.0	4.7	4.5	4.6	4.8	5.5	6.0	6.6	7.1	7.7	7.8	8.3	10.1	9.5	9.2	8.5	8.2	8.9	8.1	8.0	9.9	7.2	10.1	
2-Feb	8.9	8.4	7.8	6.5	5.8	7.4	8.2	7.7	5.6	4.7	4.8	5.1	5.1	4.7	5.9	6.4	6.4	6.5	5.7	5.2	4.8	4.1	4.0	4.1	6.0	8.9	
3-Feb	4.1	3.9	3.8	3.7	3.4	3.4	4.0	4.6	5.0	4.8	4.8	5.0	5.0	5.2	6.3	7.9	9.9	10.9	9.8	9.2	9.6	8.3	7.4	6.7	6.1	10.9	
4-Feb	6.4	5.3	4.7	4.5	4.3	4.1	4.1	4.7	5.0	5.5	4.8	5.7	5.6	6.1	6.1	6.4	7.9	9.7	8.6	9.2	7.5	7.0	6.1	5.9	6.1	9.7	
5-Feb	5.7	6.2	6.0	5.9	4.7	4.7	4.3	4.5	3.9	4.1	5.8	5.6	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	6.2
6-Feb	UO	UO	UO	UO	2.9	2.8	3.0	3.2	3.0	3.1	3.2	3.1	3.2	3.3	3.5	3.5	3.6	3.4	3.6	3.6	3.7	3.5	3.3	3.5	3.3	3.7	
7-Feb	3.6	3.7	3.6	3.7	3.7	3.7	3.9	3.7	3.6	3.8	3.8	3.7	4.1	3.9	4.0	4.1	4.1	4.2	4.1	4.0	4.0	4.3	4.1	4.3	3.9	4.3	
8-Feb	3.9	4.0	4.2	4.6	5.2	5.3	4.8	4.5	4.6	4.7	4.3	4.7	4.8	4.5	5.2	5.5	7.5	9.3	9.1	8.8	8.7	9.6	8.4	7.7	6.0	9.6	
9-Feb	8.2	8.3	8.4	8.6	8.9	9.2	8.5	8.5	9.0	9.2	9.5	9.6	10.2	10.7	11.1	11.0	11.6	10.9	10.7	10.0	8.7	7.9	7.8	8.4	9.4	11.6	
10-Feb	7.7	7.9	9.3	8.2	6.2	5.7	5.6	5.5	5.4	5.2	5.1	5.3	5.5	5.6	5.4	5.2	5.1	5.1	5.0	4.9	4.7	4.6	4.9	4.5	5.7	9.3	
11-Feb	3.9	2.3	1.5	1.0	0.7	0.7	1.0	1.3	0.9	1.1	1.7	3.4	9.2	17.4	21.9	20.4	18.5	15.7	13.8	12.5	10.6	9.3	9.0	8.8	7.8	21.9	
12-Feb	7.7	7.4	7.1	7.1	6.7	7.0	7.2	7.9	8.0	8.0	8.6	8.7	8.2	8.1	10.8	11.7	10.1	9.0	9.5	9.5	9.6	8.6	7.4	6.8	8.4	11.7	
13-Feb	6.5	6.6	6.6	6.8	7.2	7.4	7.7	7.9	8.0	8.0	7.2	6.8	6.5	6.3	5.9	5.8	5.6	5.3	5.1	5.1	5.0	5.0	4.7	4.7	6.3	8.0	
14-Feb	4.4	4.2	4.2	4.2	4.0	3.9	4.1	3.9	3.8	3.9	4.0	4.4	4.5	5.5	5.5	5.9	6.9	7.6	6.9	7.8	7.2	6.6	6.6	6.6	5.3	7.8	
15-Feb	7.6	8.1	7.7	8.1	8.3	8.3	8.9	8.3	7.8	7.0	6.6	6.5	6.0	5.9	5.8	6.1	6.6	5.7	5.5	5.5	5.4	5.1	5.1	5.0	6.7	8.9	
16-Feb	5.0	4.9	4.9	5.0	4.8	4.9	4.7	4.9	5.1	4.7	4.4	4.4	4.4	5.0	6.6	8.9	11.8	13.7	13.0	12.3	10.8	9.2	8.2	7.5	7.0	13.7	
17-Feb	6.3	5.6	5.2	5.0	4.7	5.0	4.2	4.7	4.6	4.4	4.3	5.3	5.5	5.8	6.8	8.5	8.6	9.6	10.0	10.0	9.1	8.1	7.6	7.0	6.5	10.0	
18-Feb	6.7	6.4	6.1	6.0	5.6	5.4	5.5	5.4	5.4	5.3	5.5	5.2	5.4	5.2	5.2	PF	UO	UO	UO	UO	UO	UO	UO	UO	UO	--	6.7
19-Feb	4.2	4.0	4.1	4.4	4.7	5.1	5.0	5.3	5.9	5.9	6.6	7.6	8.9	9.0	9.4	10.5	11.8	14.4	12.4	8.7	6.8	6.4	7.1	6.5	7.3	14.4	
20-Feb	6.4	6.5	6.3	6.3	6.2	5.9	5.7	5.8	5.4	M	M	5.3	6.2	6.1	4.8	4.7	4.7	4.6	12.5	13.4	12.5	11.3	10.6	10.5	7.3	13.4	
21-Feb	7.9	5.9	5.2	4.7	4.3	3.6	3.3	3.2	3.4	4.4	6.1	10.3	13.9	12.0	8.6	7.7	12.3	13.5	14.6	12.6	11.1	8.9	8.8	7.6	8.1	14.6	
22-Feb	7.0	7.4	6.5	5.1	5.2	4.8	5.2	4.6	4.7	4.4	4.5	4.2	4.4	5.5	7.7	9.3	11.4	6.1	4.5	4.0	3.1	2.1	1.5	1.3	5.2	11.4	
23-Feb	1.3	1.1	1.2	1.6	1.5	1.2	0.8	0.7	0.9	0.6	0.6	0.8	1.2	2.2	3.3	2.6	2.0	1.8	1.5	1.4	1.2	1.2	1.5	1.5	1.4	3.3	
24-Feb	1.4	1.4	1.5	1.9	2.0	2.3	3.0	2.8	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.8	4.0	4.8	4.0	3.5	4.0	5.1	2.7	5.1	
25-Feb	5.7	6.2	6.0	6.6	5.5	5.7	6.1	4.9	5.8	5.0	6.7	8.2	9.9	13.0	11.6	13.3	16.0	18.1	17.9	16.7	15.0	13.2	11.3	9.3	9.9	18.1	
26-Feb	7.3	6.2	5.4	4.7	4.3	4.7	5.0	4.2	3.3	3.1	3.5	4.1	5.0	5.4	3.5	3.6	5.1	7.2	7.6	8.1	8.3	7.4	4.1	3.2	5.2	8.3	
27-Feb	3.0	2.4	2.4	2.8	3.2	3.2	3.3	3.5	3.5	3.3	3.5	3.2	2.9	2.8	2.2	2.1	2.2	3.7	9.0	8.8	11.5	6.8	8.2	7.1	4.4	11.5	
28-Feb	4.5	1.9	2.1	5.3	4.1	2.0	2.4	2.1	2.0	1.7	1.7	2.3	1.9	2.8	2.9	2.7	1.3	1.9	2.2	2.3	1.8	1.4	1.0	1.2	2.3	5.3	
																								Diurnal Average			
																								Diurnal Maximum			
5.7 5.3 5.1 5.1 4.7 4.7 4.8 4.8 4.7 4.6 4.8 5.3 5.8 6.4 6.7 7.2 7.8 8.1 8.3 7.9 7.5 6.6 6.2 6.0																											
8.9 8.4 9.3 8.6 8.9 9.2 8.9 8.5 9.0 9.2 9.5 10.3 13.9 17.4 21.9 20.4 18.5 18.1 17.9 16.7 15.0 13.2 11.3 10.5																											
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>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Athabasca Valley - February 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	327	50.70	50.70
6 - 15	297	46.05	96.74
16 - 25	9	1.40	98.14
26 - 80	0	0.00	98.14
> 81.0	0	0.00	98.14

Total Number of Valid Hours: 645

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - µg/m<sup>3</sup>**  
**Athabasca Valley - February 2015**

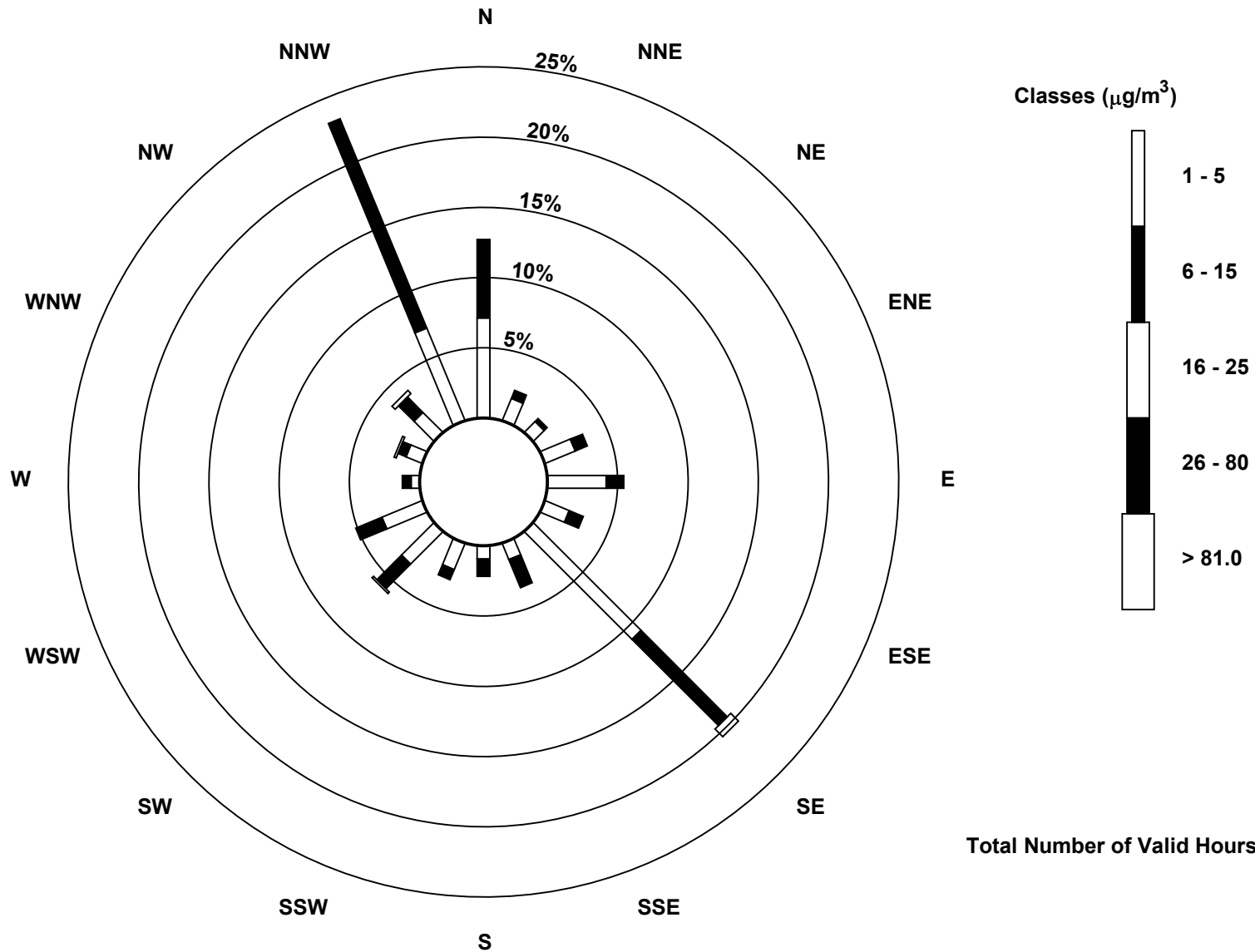
Concentration Ranges (µg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	46	11	7	15	27	12	70	8	6	13	21	20	4	8	13	46	327
6 - 15	36	4	2	6	8	7	56	14	8	5	16	13	4	4	10	104	297
16 - 25	0	0	0	0	0	0	5	0	0	0	1	0	0	1	2	0	9
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	82	15	9	21	35	19	131	22	14	18	38	33	8	13	25	150	633

Total Number of Valid Hours: 645

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Athabasca Valley (AMS 7)

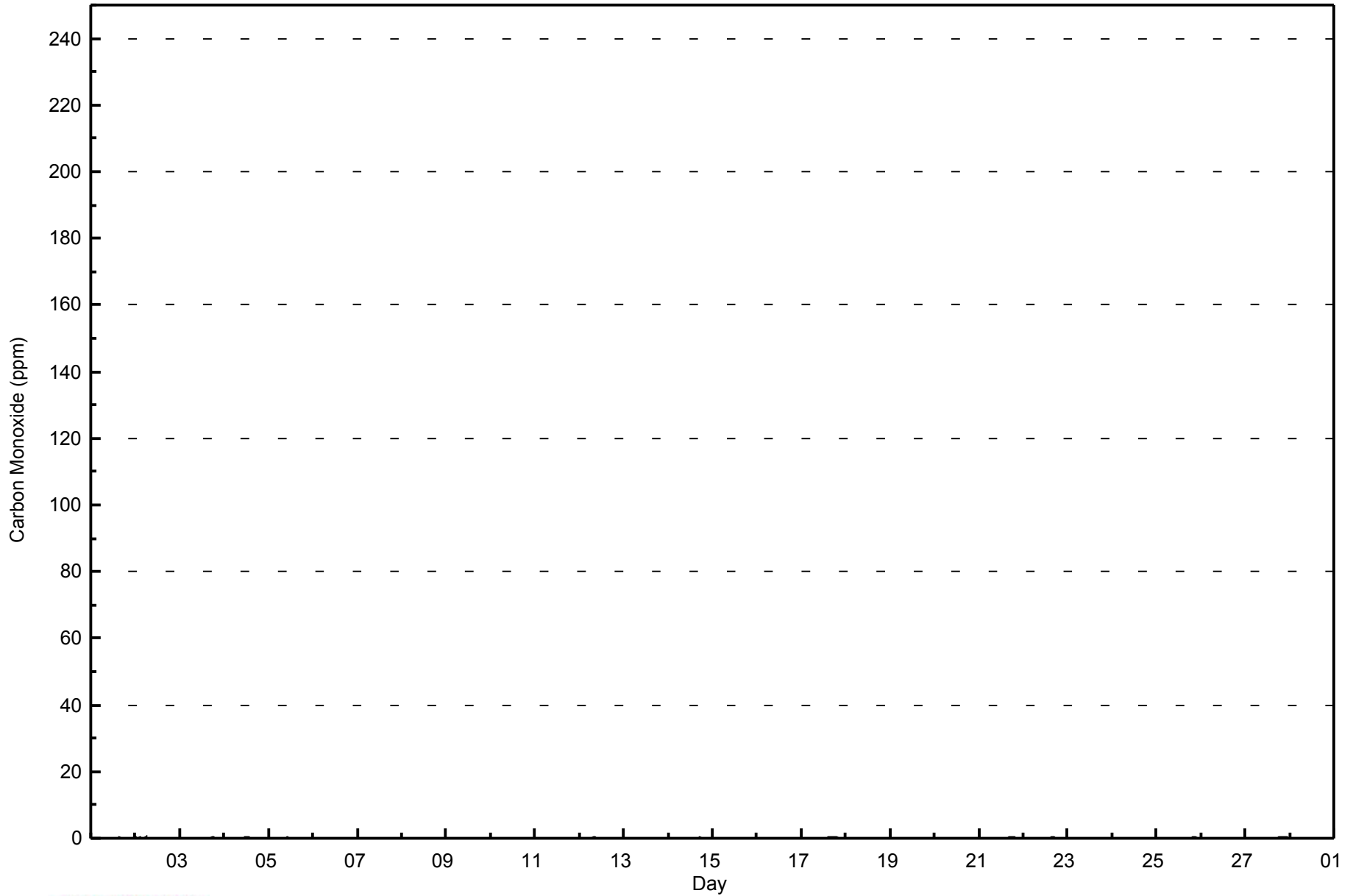






**WBEA**  
**Hourly Averages**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - February 2015**







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

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	637	99.53	99.53
0.4 - 0.5	2	0.31	99.84
0.6 - 0.7	1	0.16	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: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Carbon Monoxide (CO) - ppm**  
**Athabasca Valley - February 2015**

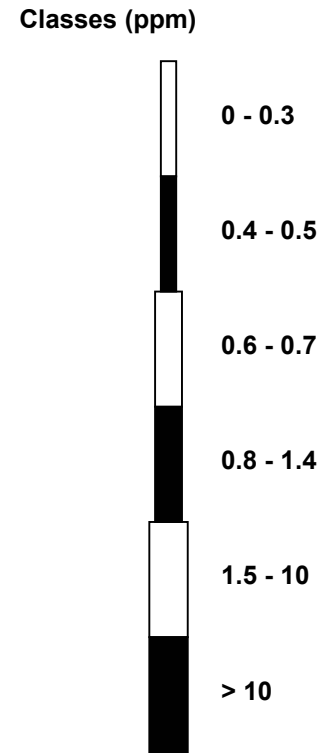
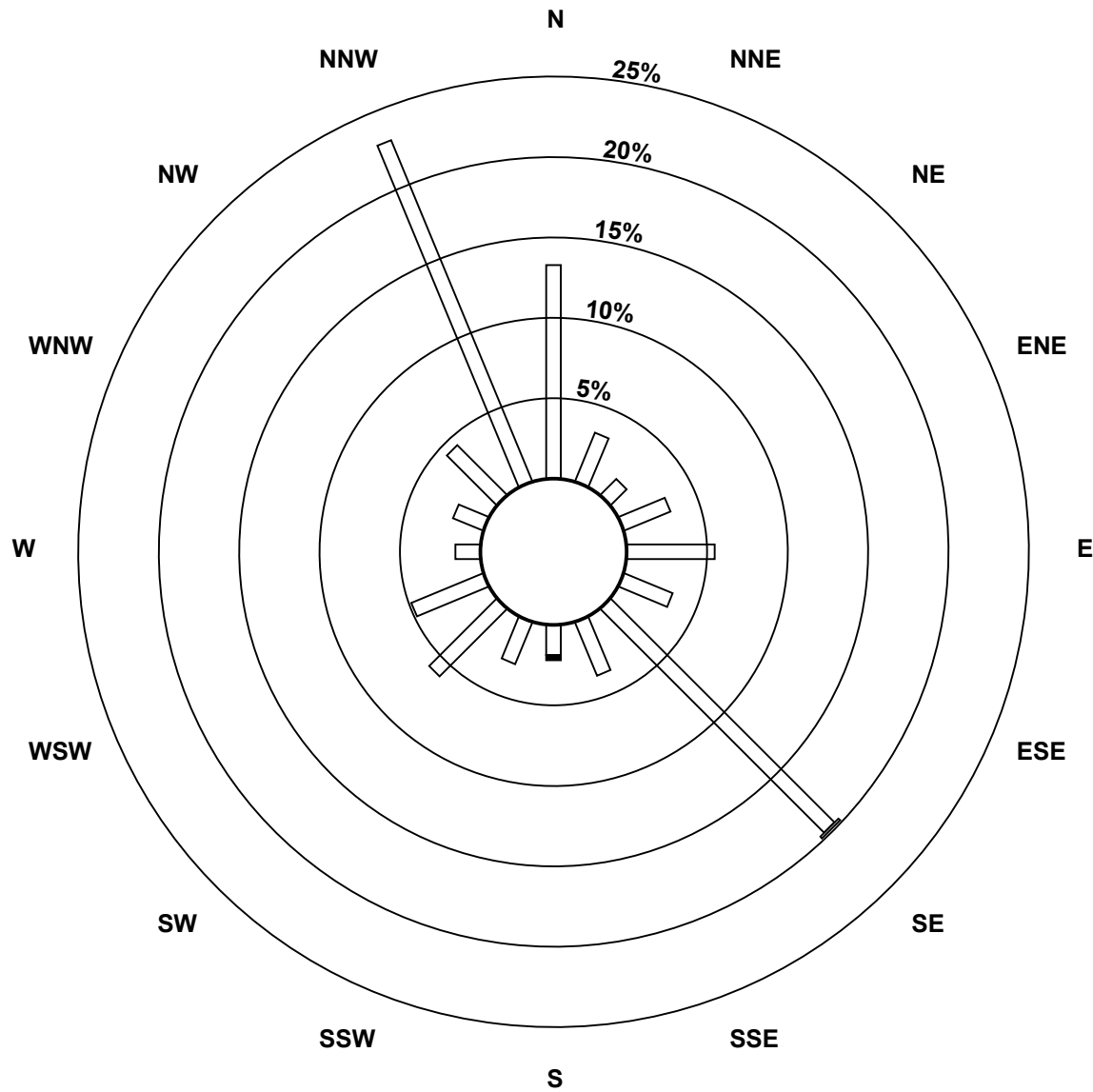
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.3	85	21	9	20	35	21	126	23	12	18	38	31	10	13	28	147	637
0.4 - 0.5	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
0.6 - 0.7	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
0.8 - 1.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.5 - 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	85	21	9	20	35	21	127	23	14	18	38	31	10	13	28	147	640

Total Number of Valid Hours: 640

Total Number of Hours: 672

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

**Carbon Monoxide (CO) - ppm  
Athabasca Valley (AMS 7)**

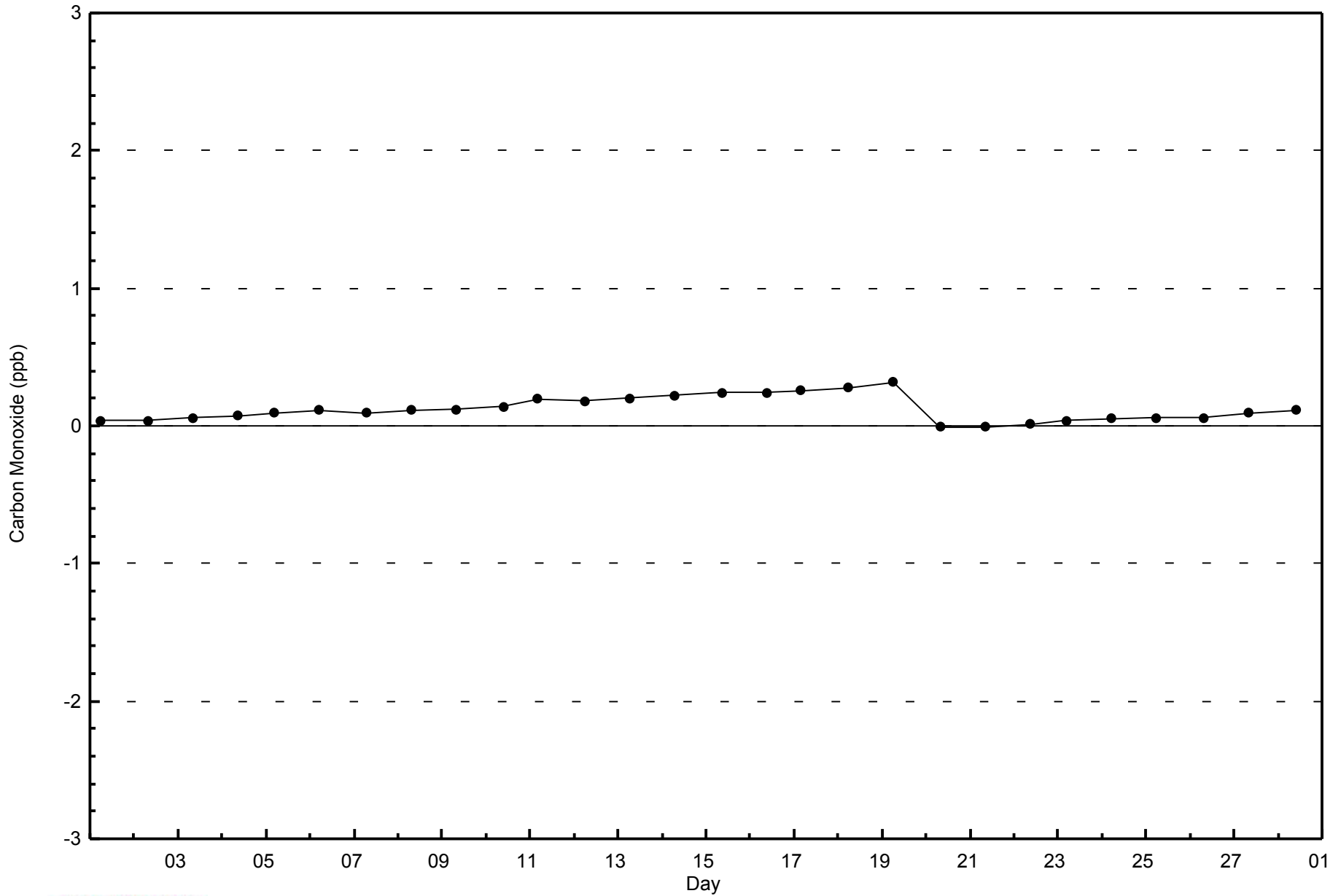


**Total Number of Valid Hours: 640**



WBEA  
Zero Responses

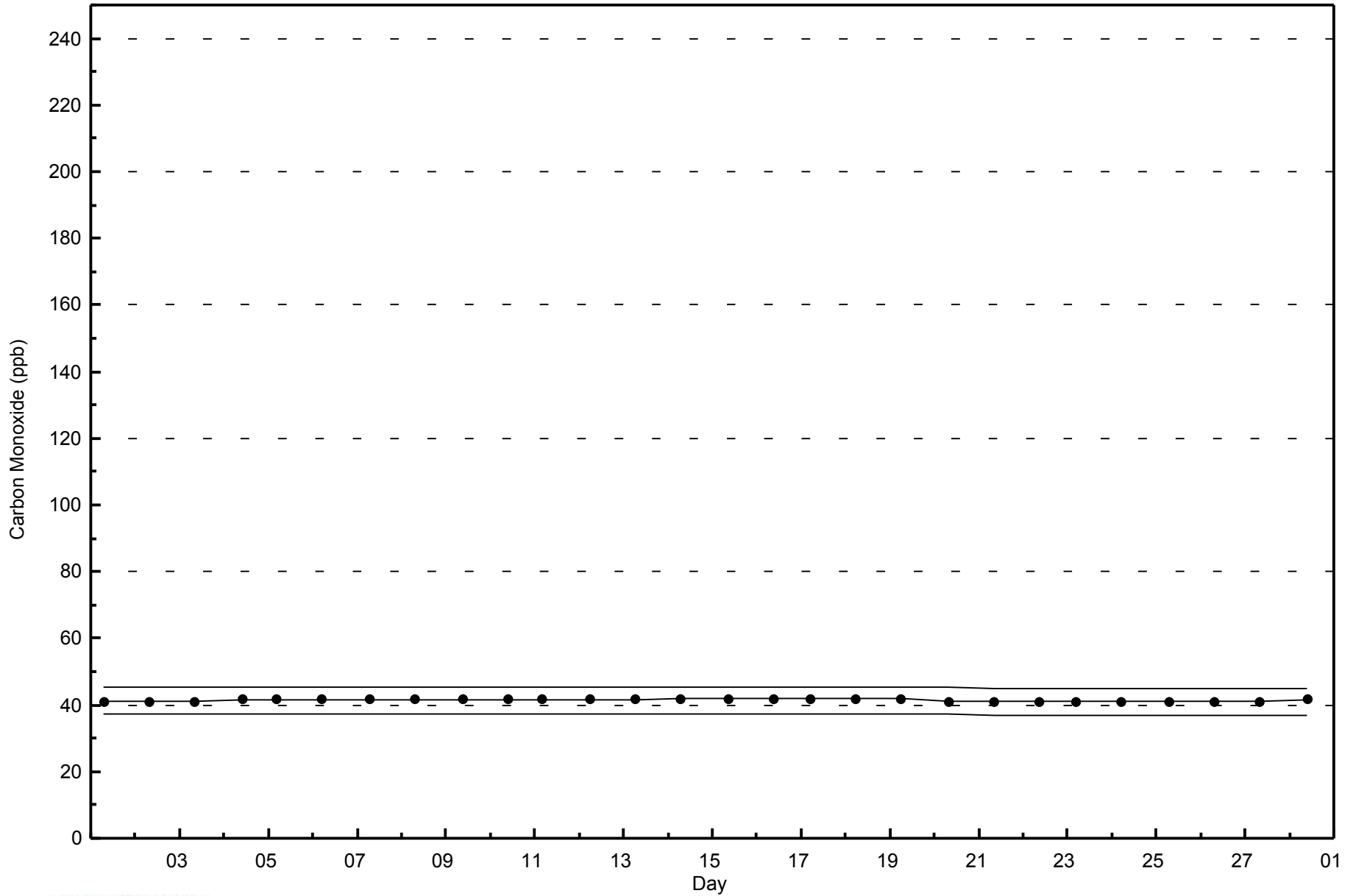
Carbon Monoxide (CO) - ppb  
Athabasca Valley - February 2015





WBEA  
Span Responses

Carbon Monoxide (CO) - ppb  
Athabasca Valley - February 2015



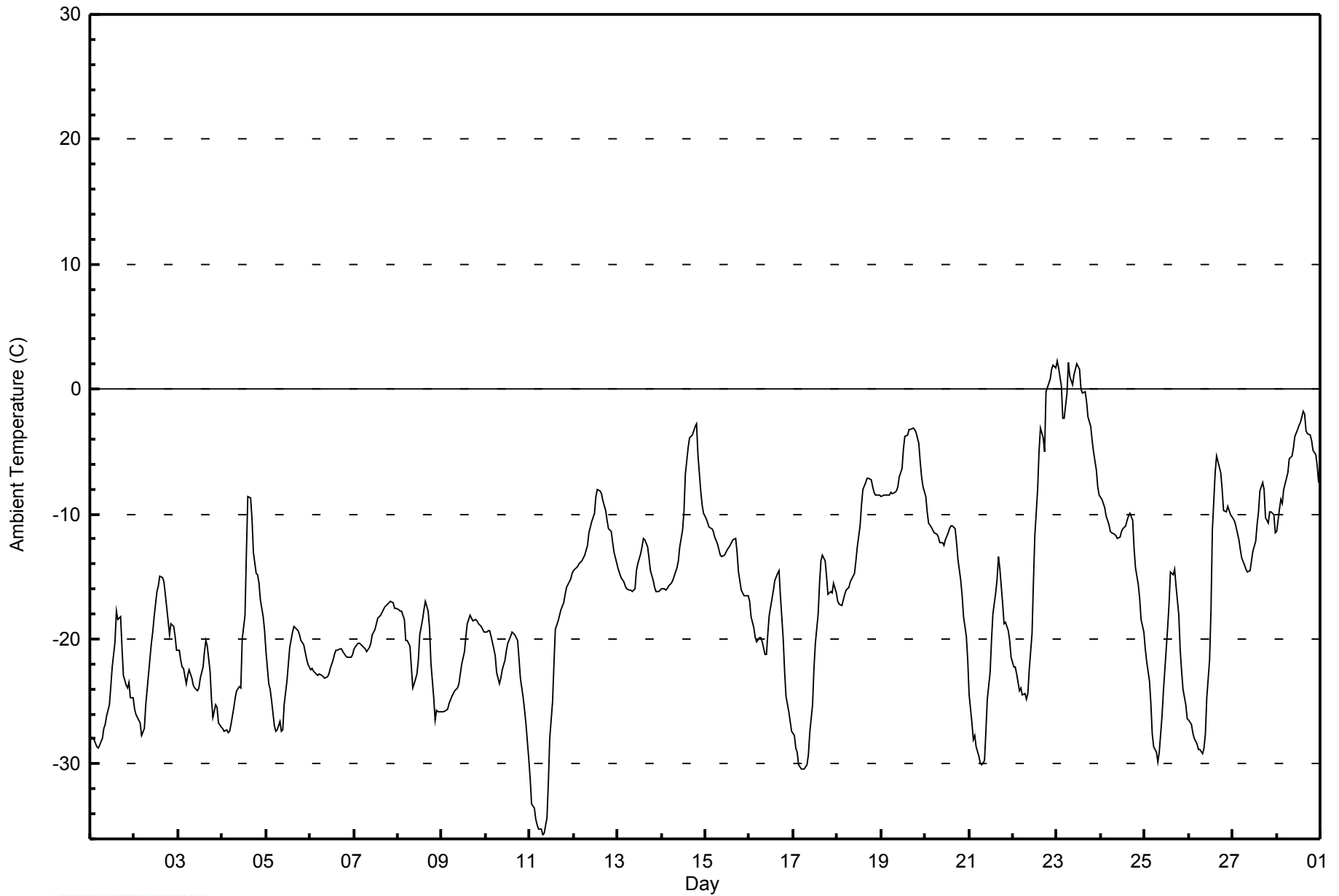


Maximum Value: 2.3 C on Feb 23 01:00		Maximum Daily Average: -1.2 C on Feb 23		Hours in Service: 672																						
Minimum Value: -35.7 C on Feb 11 08:00		Minimum Daily Average: -25.8 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.1 C at hour 16		Minimum Diurnal Average: -20.2 C at hour 5		Hours of Missing Data: 0																						
Monthly Average: -16.85 C		Percentiles: P <sub>1</sub> = -33.9 P <sub>10</sub> = -26.8 Q <sub>1</sub> = -22.6 Median = -17.4 Q <sub>3</sub> = -11.3 P <sub>90</sub> = -6.5 P <sub>99</sub> = 1.6		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-27.9	-27.9	-28.0	-28.6	-28.7	-28.5	-27.9	-27.1	-26.8	-26.2	-25.3	-23.9	-22.3	-20.3	-17.7	-18.4	-18.2	-20.7	-22.9	-23.7	-23.9	-23.5	-24.7	-24.7	-24.5	-17.7
2-Feb	-25.6	-26.0	-26.5	-26.7	-27.7	-27.2	-25.3	-24.0	-21.6	-20.4	-19.4	-18.2	-16.2	-15.7	-15.0	-15.1	-15.4	-16.4	-18.5	-19.7	-18.7	-19.0	-19.8	-21.0	-20.8	-15.0
3-Feb	-20.9	-21.6	-22.3	-22.4	-23.6	-22.9	-22.4	-23.1	-23.7	-23.9	-24.1	-23.9	-23.1	-22.3	-21.0	-20.2	-20.6	-22.6	-24.9	-26.3	-25.2	-25.5	-26.7	-27.1	-23.3	-20.2
4-Feb	-27.2	-27.4	-27.4	-27.4	-27.4	-26.8	-25.5	-24.7	-24.1	-23.8	-24.0	-20.0	-18.1	-13.0	-8.6	-8.7	-10.3	-13.1	-14.7	-14.8	-15.5	-16.9	-18.2	-19.4	-19.9	-8.6
5-Feb	-21.0	-23.6	-24.0	-24.9	-26.9	-27.4	-27.3	-26.6	-27.4	-27.3	-25.2	-23.4	-22.0	-20.7	-19.5	-19.0	-19.1	-19.4	-19.7	-20.1	-20.4	-21.0	-21.6	-22.1	-22.9	-19.0
6-Feb	-22.5	-22.3	-22.5	-22.8	-23.0	-22.8	-22.9	-23.0	-23.1	-23.0	-22.8	-22.3	-21.7	-21.3	-20.9	-20.9	-20.7	-20.8	-21.0	-21.3	-21.5	-21.5	-21.5	-21.2	-22.0	-20.7
7-Feb	-20.8	-20.5	-20.3	-20.4	-20.5	-20.7	-20.8	-21.0	-20.7	-20.3	-19.7	-19.2	-18.7	-18.4	-18.1	-17.9	-17.6	-17.4	-17.2	-17.1	-17.0	-17.1	-17.6	-17.5	-19.0	-17.0
8-Feb	-17.7	-17.7	-17.8	-18.4	-20.1	-20.1	-20.5	-22.3	-23.9	-23.6	-22.8	-21.6	-19.7	-18.4	-17.6	-17.0	-17.8	-19.1	-21.9	-24.7	-26.5	-25.8	-25.8	-25.8	-21.1	-17.0
9-Feb	-25.8	-25.8	-25.7	-25.6	-25.1	-24.6	-24.4	-24.1	-23.9	-23.6	-22.8	-22.1	-21.0	-19.8	-18.8	-18.1	-18.3	-18.5	-18.4	-18.5	-18.8	-19.1	-19.3	-19.4	-21.7	-18.1
10-Feb	-19.4	-19.3	-19.3	-19.7	-20.7	-21.3	-22.7	-23.6	-23.1	-22.4	-21.6	-20.8	-20.3	-19.7	-19.5	-19.6	-19.7	-20.1	-21.5	-23.2	-24.7	-25.7	-26.9	-29.7	-21.9	-19.3
11-Feb	-31.2	-33.2	-33.6	-34.5	-34.9	-35.2	-35.2	-35.7	-35.6	-34.4	-31.6	-28.0	-25.0	-22.0	-19.3	-18.5	-18.1	-17.6	-17.1	-16.4	-15.9	-15.6	-15.2	-14.7	-25.8	-14.7
12-Feb	-14.5	-14.3	-14.2	-13.9	-13.8	-13.5	-13.3	-12.5	-11.5	-11.0	-10.6	-9.9	-8.6	-8.0	-8.1	-8.4	-8.9	-9.7	-10.5	-11.1	-11.4	-12.3	-13.1	-13.5	-11.5	-8.0
13-Feb	-14.5	-14.7	-15.1	-15.4	-15.7	-16.0	-16.1	-16.1	-16.2	-16.0	-14.6	-13.9	-13.2	-12.6	-11.9	-12.1	-12.6	-13.5	-14.5	-15.3	-15.8	-16.2	-16.2	-16.0	-14.8	-11.9
14-Feb	-15.9	-16.0	-16.1	-16.0	-15.8	-15.5	-15.4	-15.0	-14.3	-13.7	-12.7	-11.3	-9.9	-6.8	-4.7	-3.9	-3.8	-3.7	-3.0	-2.8	-5.3	-8.1	-9.3	-9.9	-10.4	-2.8
15-Feb	-10.3	-10.7	-11.1	-11.2	-11.4	-11.9	-12.4	-12.8	-13.2	-13.4	-13.3	-13.1	-12.8	-12.5	-12.3	-12.0	-12.0	-13.1	-14.7	-16.0	-16.3	-16.6	-16.6	-16.5	-13.2	-10.3
16-Feb	-17.0	-18.2	-19.1	-19.9	-20.2	-19.9	-19.9	-20.3	-21.2	-21.3	-19.5	-18.1	-16.7	-16.1	-15.3	-14.8	-14.5	-16.6	-20.0	-22.6	-24.5	-25.8	-26.6	-27.3	-19.8	-14.5
17-Feb	-27.7	-28.7	-29.0	-30.1	-30.4	-30.4	-30.4	-30.1	-29.3	-27.6	-25.3	-22.3	-20.4	-18.0	-15.5	-13.7	-13.3	-13.8	-15.0	-16.4	-16.2	-16.4	-15.6	-16.4	-22.2	-13.3
18-Feb	-16.9	-17.2	-17.3	-16.9	-16.4	-16.1	-15.9	-15.4	-15.2	-14.7	-13.7	-12.6	-10.9	-9.2	-8.1	-7.5	-7.1	-7.1	-7.3	-7.8	-8.3	-8.5	-8.5	-8.5	-12.0	-7.1
19-Feb	-8.5	-8.5	-8.5	-8.5	-8.5	-8.3	-8.3	-8.3	-8.1	-7.8	-7.0	-6.4	-4.8	-3.8	-3.7	-3.2	-3.2	-3.2	-3.2	-3.4	-4.4	-5.8	-7.1	-7.8	-6.3	-3.2
20-Feb	-8.6	-9.8	-10.7	-11.1	-11.3	-11.5	-11.6	-11.9	-12.3	-12.3	-12.5	-12.0	-11.5	-11.2	-11.0	-10.9	-11.1	-12.3	-13.6	-15.3	-16.6	-18.2	-19.8	-21.7	-12.9	-8.6
21-Feb	-24.4	-26.7	-28.0	-27.7	-28.6	-29.4	-29.9	-30.0	-29.7	-27.4	-24.8	-22.7	-20.1	-18.0	-16.3	-15.1	-13.4	-14.5	-17.2	-18.8	-18.7	-19.4	-20.1	-21.5	-22.6	-13.4
22-Feb	-22.3	-22.3	-22.8	-24.2	-23.9	-24.5	-24.4	-24.8	-24.3	-22.5	-19.6	-15.4	-11.7	-8.0	-5.0	-3.2	-3.9	-5.0	-0.2	0.4	0.8	1.5	2.0	1.7	-12.6	2.0
23-Feb	2.3	1.7	0.3	-2.4	-2.3	-0.3	2.1	1.1	0.3	1.2	1.5	2.0	1.6	0.0	-0.4	-0.3	-1.0	-2.2	-2.9	-4.1	-5.0	-6.5	-7.8	-8.4	-1.2	2.3
24-Feb	-8.8	-9.2	-9.5	-10.1	-10.8	-11.4	-11.6	-11.7	-11.8	-11.9	-11.4	-11.2	-10.9	-10.4	-10.1	-9.9	-10.5	-12.7	-14.4	-15.6	-16.7	-18.4	-19.5	-19.5	-12.1	-8.8
25-Feb	-20.8	-21.8	-23.3	-25.2	-27.7	-28.6	-29.1	-29.9	-29.1	-26.1	-24.2	-22.4	-19.1	-17.2	-14.6	-14.9	-14.4	-15.8	-18.1	-20.9	-22.6	-24.1	-25.2	-26.4	-22.6	-14.4
26-Feb	-26.5	-26.8	-27.5	-28.0	-28.4	-28.8	-28.8	-29.2	-28.8	-27.6	-24.7	-21.7	-17.8	-11.3	-6.7	-5.3	-5.8	-6.7	-8.0	-9.7	-9.8	-9.3	-9.7	-10.1	-18.2	-5.3
27-Feb	-10.4	-10.6	-11.1	-12.0	-12.8	-13.5	-14.0	-14.4	-14.7	-14.6	-13.8	-13.0	-12.2	-10.8	-9.8	-8.1	-7.5	-8.0	-10.2	-10.7	-9.9	-9.8	-10.0	-11.5	-11.4	-7.5
28-Feb	-11.3	-9.6	-8.9	-9.1	-8.0	-7.1	-6.6	-5.5	-5.3	-4.6	-3.7	-3.3	-2.9	-2.6	-1.8	-2.0	-3.4	-3.6	-3.7	-4.2	-4.9	-5.2	-6.1	-7.4	-5.5	-1.8
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Athabasca Valley - February 2015**





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

**Ambient Temperature (AT) - C**  
**Athabasca Valley - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	254	37.80	37.80
-20 - 0	403	59.97	97.77
0 - 10	15	2.23	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

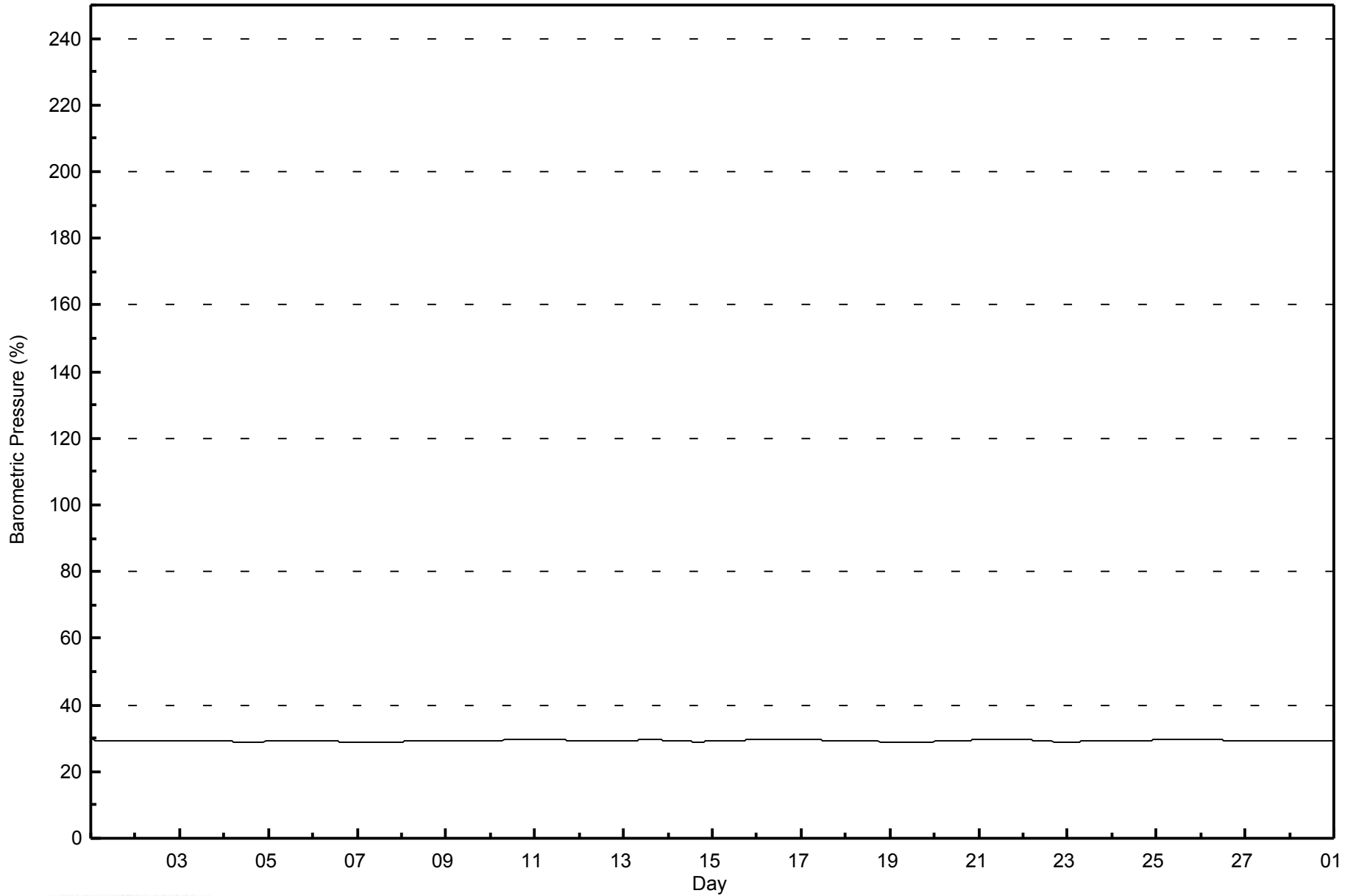






**WBEA**  
**Hourly Averages**

**Barometric Pressure (BP) - %**  
**Athabasca Valley - February 2015**



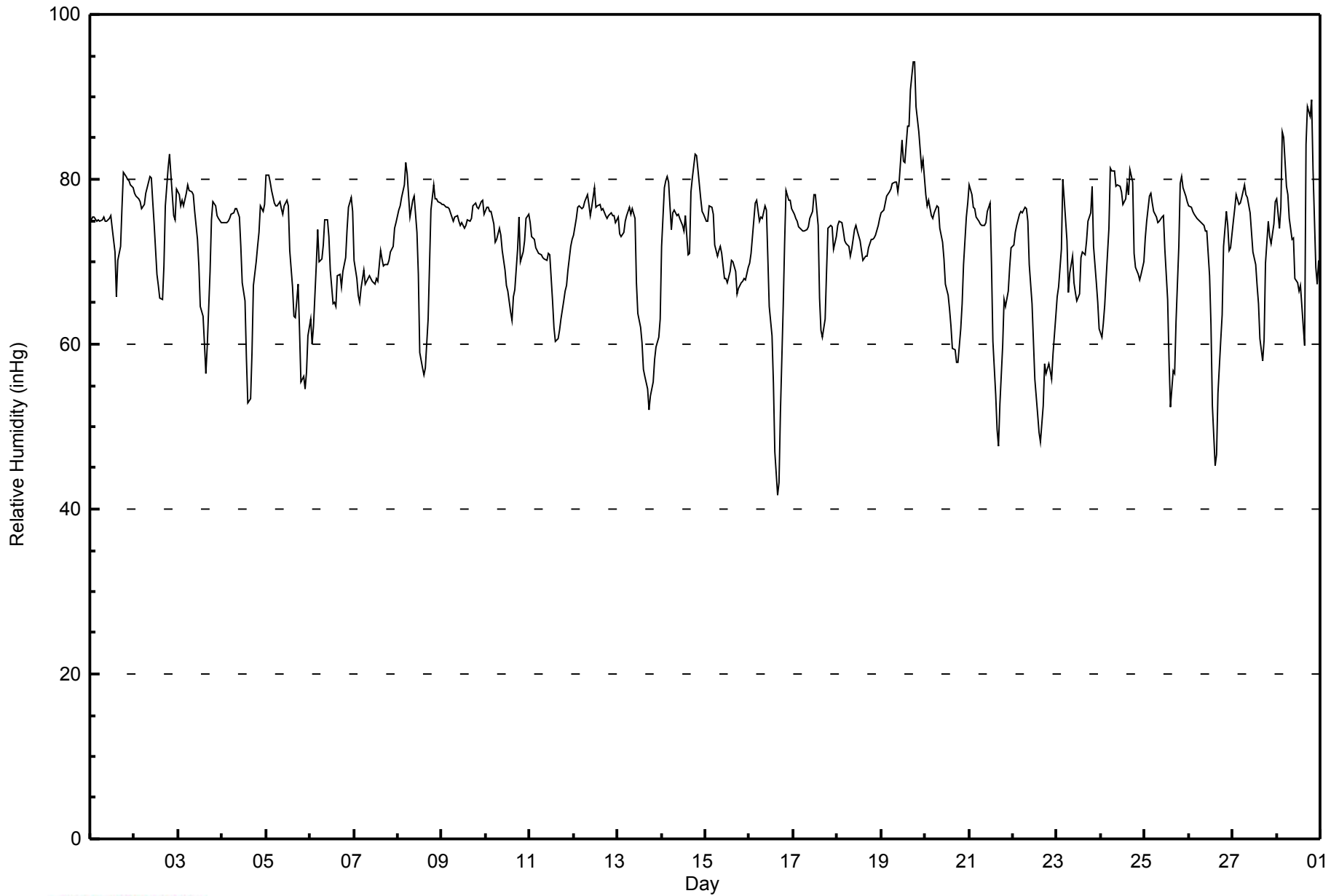


Maximum Value: 94 inHg on Feb 19 18:00																			Maximum Daily Average: 82.7 inHg on Feb 19						Hours in Service: 672	
Minimum Value: 42 inHg on Feb 16 16:00																			Minimum Daily Average: 63.9 inHg on Feb 22						Hours of Data: 672	
Maximum Diurnal Average: 76.1 inHg at hour 5																			Minimum Diurnal Average: 63.2 inHg at hour 16						Hours of Missing Data: 0	
Monthly Average: 71.9 inHg																			Percentiles: P <sub>1</sub> = 49 P <sub>10</sub> = 61 Q <sub>1</sub> = 68 Median = 74 Q <sub>3</sub> = 77 P <sub>90</sub> = 79 P <sub>99</sub> = 87						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-Feb	75	75	75	75	75	75	75	75	75	75	75	76	74	71	66	70	72	77	81	80	80	80	79	79	75.5	81
2-Feb	78	78	78	77	76	77	78	79	80	80	77	75	69	67	66	66	69	77	81	83	81	76	75	79	75.9	83
3-Feb	78	77	78	77	78	79	79	78	78	76	73	69	65	63	60	56	60	69	75	77	77	76	75	75	72.8	79
4-Feb	75	75	75	75	75	76	76	76	77	75	72	68	65	58	53	53	59	67	70	72	73	77	76	77	70.6	77
5-Feb	80	80	80	79	77	77	77	77	76	76	77	78	77	71	67	63	63	67	62	55	56	55	57	61	70.4	80
6-Feb	63	60	62	70	74	70	70	72	75	75	73	69	65	65	65	68	69	67	69	70	74	77	78	76	69.8	78
7-Feb	70	68	66	65	67	69	67	68	68	68	68	67	68	68	71	70	70	70	70	70	71	72	74	75	69.1	75
8-Feb	76	77	78	79	82	81	75	77	77	78	74	69	59	57	56	57	63	70	76	79	78	78	77	77	72.9	82
9-Feb	77	77	77	77	76	75	75	75	76	75	74	75	74	74	75	75	75	77	77	77	76	77	77	76	75.8	77
10-Feb	77	77	76	76	75	72	73	74	73	71	69	67	66	64	63	66	67	72	75	70	71	73	75	76	71.5	77
11-Feb	75	73	73	72	71	71	71	70	70	70	71	71	65	62	60	61	62	63	65	66	67	69	72	73	68.5	75
12-Feb	73	75	77	77	76	77	77	78	77	76	77	79	77	77	77	76	76	76	75	76	76	76	76	75	76.2	79
13-Feb	75	73	73	74	75	76	77	76	76	75	67	64	62	60	57	56	55	52	54	55	58	60	61	63	65.6	77
14-Feb	72	79	80	80	80	74	76	76	76	76	75	74	74	76	71	71	78	80	83	83	81	78	76	76	76.8	83
15-Feb	75	75	77	77	76	72	71	71	72	71	68	68	67	69	70	70	69	66	67	67	68	68	68	69	70.4	77
16-Feb	70	71	75	77	77	75	75	75	77	76	71	65	61	55	47	42	43	52	65	72	79	77	77	76	67.9	79
17-Feb	76	75	75	74	74	74	74	74	74	75	76	78	78	74	66	62	61	63	69	74	74	74	72	73	72.5	78
18-Feb	74	75	75	74	73	72	72	71	72	74	74	74	73	71	70	71	71	72	73	73	73	73	74	75	72.8	75
19-Feb	76	76	77	78	78	79	79	80	80	79	80	85	82	82	86	86	91	94	94	89	86	84	81	82	82.7	94
20-Feb	78	77	78	76	75	76	77	77	74	72	70	67	66	64	62	59	59	58	58	62	65	70	75	77	69.7	78
21-Feb	79	78	77	76	75	75	75	74	74	75	76	77	70	60	54	50	48	53	60	65	65	66	69	72	68.5	79
22-Feb	72	74	74	76	76	76	77	76	75	70	65	60	56	52	49	48	53	58	56	58	57	56	59	63	63.9	77
23-Feb	66	67	71	80	78	73	66	69	71	68	66	65	66	70	71	71	73	75	76	79	72	67	65	62	70.3	80
24-Feb	61	62	65	68	74	81	81	81	79	79	79	78	77	78	79	78	81	80	71	69	68	68	68	70	74.1	81
25-Feb	73	75	78	78	77	76	76	75	75	75	76	71	65	58	52	57	57	63	72	80	80	79	78	77	71.8	80
26-Feb	77	77	76	76	75	75	75	75	74	74	74	68	62	53	45	47	54	60	64	72	76	74	71	72	68.6	77
27-Feb	75	76	78	77	77	78	79	78	78	76	74	71	70	67	65	61	58	61	70	75	73	72	75	77	72.5	79
28-Feb	78	74	77	86	85	79	78	75	73	73	68	67	66	67	62	60	84	89	88	90	81	69	67	70	75.3	90
	74.1	74.2	74.9	75.8	76.1	75.3	75.0	75.1	75.1	74.4	72.8	71.2	68.5	66.3	63.8	63.2	65.6	68.7	71.2	72.8	72.7	72.1	72.5	73.3	Diurnal Average	
	80	80	80	86	85	81	81	81	80	80	80	85	82	82	86	86	91	94	94	90	86	84	81	82	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - inHg**  
**Athabasca Valley - February 2015**





Maximum Speed: 30 km/h on Feb 23 07:00		Maximum Daily Speed Average: 12.0 km/h on Feb 20		Hours in Service:	672																					
Minimum Speed Value: 0 km/h on Feb 4 13:00		Minimum Daily Speed Average: 1.1 km/h on Feb 4		Hours of Data:	672																					
Maximum Diurnal Speed Average: 3.6 km/h at hour 14		Minimum Diurnal Speed Average: 0.8 km/h at hour 6		Hours of Missing Data:	0																					
Monthly Average Velocity: 1.8 km/h 29.2 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 4 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 16 P <sub>99</sub> = 21		Percent Operational Time:	100.0																					
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	SSE6	SE7	SE9	SE9	SE8	SE9	SE11	SE11	SE12	SE10	E5	ENE4	NW2	WNW2	NNW1	WSW4	SW3	SW3	SW3	S1	SE1	SE1	SE2	SSW3	SE4.1	SE12
2-Feb	SSE3	SSE3	SSE3	SE2	ESE3	SSE2	SE4	SE2	SSW7	SSW6	SSW5	E4	ENE2	N5	N7	NNW2	N1	WSW3	WSW4	SSW1	SW5	WSW8	SW2	SSE2	SSW1.4	WSW8
3-Feb	S4	SW3	SSW6	SSW5	W4	NW3	NNW7	N9	N7	N9	NNW14	NNW12	N9	N5	NW2	WSW3	SE2	ESE1	S1	E1	SE7	SE10	SSE8	SSE8	NNW1.3	NNW14
4-Feb	SSE10	SE13	SE10	SE11	SE10	SE9	SE17	SE14	SE10	SE7	N0	ESE4	ENE0	NNW6	NW18	NNW16	NNW15	NNW11	NNW8	NNW9	NNW8	NNW7	NNW11	NNW5	NE1.1	NW18
5-Feb	WNW2	SSW1	E2	E1	WSW4	S1	NW1	ESE2	SSW3	SSW1	ENE2	NE2	NNW1	NNW2	NNW5	NNW8	N6	N7	N7	NE9	NNE7	NNE6	NNE5	NNE4	N2.5	NE9
6-Feb	N4	NNE8	NNE8	NNE7	NNE8	ENE9	ENE9	NE7	NNE6	ENE8	ENE8	E11	E14	E15	ENE15	E15	ENE14	E16	E15	E14	E11	E10	E8	E9	ENE9.5	E16
7-Feb	ESE12	SE14	SE15	SE17	SE14	SE14	SE13	SE14	SE14	SE14	SE15	SE16	SE13	ESE12	SE12	SE16	ESE10	ESE9	ESE8	E7	ENE6	N7	NNW9	NNW7	ESE10.1	SE17
8-Feb	NNW5	NNW5	NNW5	N5	NNW4	NNW9	NNW16	NNW10	NNW4	NNW3	NNW4	NW3	NW2	N5	NNW4	NNW4	NNW10	NNW7	NNW4	NNW5	NNW4	NNW6	NNW10	NNW9	NNW5.8	NNW16
9-Feb	NNW10	N9	NNW11	N8	NNW10	NNW12	NNW12	N11	NNW15	N12	NNW11	NNW8	N6	N6	N7	NNW11	NNW11	NNW9	N11	NNW12	NNW10	N8	NNW10	NNW10	NNW10.1	NNW15
10-Feb	NNW8	N6	N6	NNW12	NNW16	NNW17	NNW15	NNW9	N6	NNW7	NNW7	N7	N9	N11	N10	NNW9	NNW8	N5	N9	NNW10	N7	N5	WNW2	WNW1	NNW8.2	NNW17
11-Feb	NNE1	SSW1	ENE1	SW2	S2	SW1	W2	WSW2	W2	NE2	SSE7	SE7	SE6	SE7	SE18	SE18	SE19	SE17	SE17	SE19	SE21	SE19	SE19	SE18	SE8.8	SE21
12-Feb	SE16	SE13	SE12	SE11	SE12	SE9	SE8	SE4	SE5	SSW8	SW10	SW12	SSW6	NNW4	NNW10	NNW10	NNW11	NNW14	NNW13	NNW15	NNW15	NNW16	NNW16	NNW16	N1.6	NNW16
13-Feb	NNW18	NNW15	NNW15	NNW16	NNW15	NNW14	N13	N13	N11	N9	ENE6	ENE9	E11	E12	ESE13	SE15	SE14	SE17	SE14	SE20	SE20	SE20	SE19	SE17	ENE5.9	SE20
14-Feb	SE17	SE18	SE22	SE21	SE19	SE20	SE20	SE21	SE18	SE19	SE18	SE18	SE17	SE11	S9	S4	SE6	ESE5	SW8	NW10	NNW19	N18	NNW18	NNW13	SE8.8	SE22
15-Feb	NNW10	NW8	NNW6	NNW8	N6	N7	N9	N9	NNW14	NNW12	NNW11	NNW11	NNW13	N10	NNW11	NNW11	N12	N11	N10	NNW9	NNW11	NNW12	NNW10	N7	NNW9.7	NNW14
16-Feb	N9	NNW7	NNW4	NNW5	WNW4	NW4	NNW5	NNW4	W3	NW3	N6	NNE7	NNE5	N6	NNW10	NW5	WSW5	WSW4	SW3	WSW2	WSW5	SW4	SW3	SW3	NW3.2	NNW10
17-Feb	WSW4	SW2	WSW3	WNW3	WSW3	W1	NNW0	ESE2	S2	SW4	SW4	SE2	WSW2	NNW1	NNW2	NNW2	NNE2	NNW2	NW2	SE3	ESE6	SE7	SE11	SE10	S1.2	SE11
18-Feb	SE10	SE10	SE12	SE11	SE11	SE10	SE13	SE12	SE10	SE10	SE7	SE8	SE8	SE6	SE7	SE6	ESE7	SE6	ESE9	ESE11	SE11	SE11	SE7	SSE7	SE9.0	SE13
19-Feb	SSE7	SSE7	SSE7	SSE7	SE6	SE8	SE7	SE8	SE9	SE9	ESE6	E5	E3	NNE3	NNW5	NNW7	NNW7	NNW7	NNW10	NNW14	NNW17	NNW21	N16	N16	NNE2.6	NNW21
20-Feb	N16	N16	NNW18	NNW17	NNW17	NNW17	NNW17	NNW16	N15	N14	N13	NNW12	NNW12	N12	NNW13	NNW12	NNW10	N8	N7	N8	NNW8	NNW6	NW5	NW3	N12.0	NNW18
21-Feb	WSW3	WSW4	WSW4	S1	SW3	SW2	E1	NE1	NE2	WSW3	W4	NNW4	N3	NNE4	N4	NNW3	SSE3	SE7	SE4	SE4	SE6	SE9	SSE9	SSE7	SSE1.4	SSE9
22-Feb	SSE6	SE6	SE6	SSE5	SE9	SE7	SE7	SE8	SE8	SE9	SE10	SE14	SE12	SE9	SE5	SSE5	S4	SW4	SSW12	SW16	WSW19	WSW18	WSW12	WSW9	S6.1	WSW19
23-Feb	WNW18	W15	WSW6	W4	WNW6	NNW11	NW30	NW26	NNW19	NNW19	NW14	NNW19	NW18	NNW15	NNW13	N9	NNE14	N14	NNE14	N15	NNE14	NE16	NE10	ENE11	NNW11.1	NW30
24-Feb	E10	E11	E14	E11	E10	E9	E9	E10	E10	E11	E11	E9	E10	ENE9	NE6	ENE9	NNE6	N11	N17	N14	N14	NNW18	N16	N10	NE7.5	NNW18
25-Feb	NNW8	NNW9	NW4	W5	SW3	SW4	SW2	SW2	S1	ENE3	WNW1	NNW4	NNW7	N6	W2	N5	NW4	NW3	WNW2	SW2	NNE1	NE1	S1	SW2	NW2.0	NNW9
26-Feb	SW4	SW3	SW3	SSW3	SSW5	SSW6	SW6	SW7	SW6	SSW8	SW5	WSW4	N3	ENE4	SW9	SW9	WSW11	W14	WNW6	NNW4	NNW6	NNW10	N11	NNW8	W3.7	W14
27-Feb	NNW8	NNW8	N9	N10	N10	N9	N8	N6	N7	N6	NNE4	E5	E8	E7	ENE5	WSW6	WSW9	SW4	S1	S1	SE6	SSE4	SE2	ENE2	N2.8	N10
28-Feb	WSW2	SW10	SW7	SE3	S5	SW10	SW7	WSW5	WSW6	NW10	NW15	NW16	NW13	NNW13	NNW10	NW14	NW12	N2	NNW11	N9	NNW14	NNW15	NNW11	N8	NW6.6	NW16
NNE1.2 ENE1.0 E1.4 E1.4 E1.0 ENE0.8 NE1.5 NE1.4 ENE0.9 NE1.2 NNE1.3 NE2.1 NE2.5 NE3.6 NNE3.1 N2.5 N2.5 NNE2.4 N2.3 NNE2.9 NNE2.9 N3.1 N3.1 NNE2.0																								Diurnal Average		
WNW18 SE18 SE22 SE21 SE19 SE20 NW30 NW26 WNW19 SE19 SE18 NW19 NW18 NNW15 SE18 SE18 SE19 SE17 SE20 SE21 NNW21 SE19 SE18																								Diurnal Maximum		

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



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

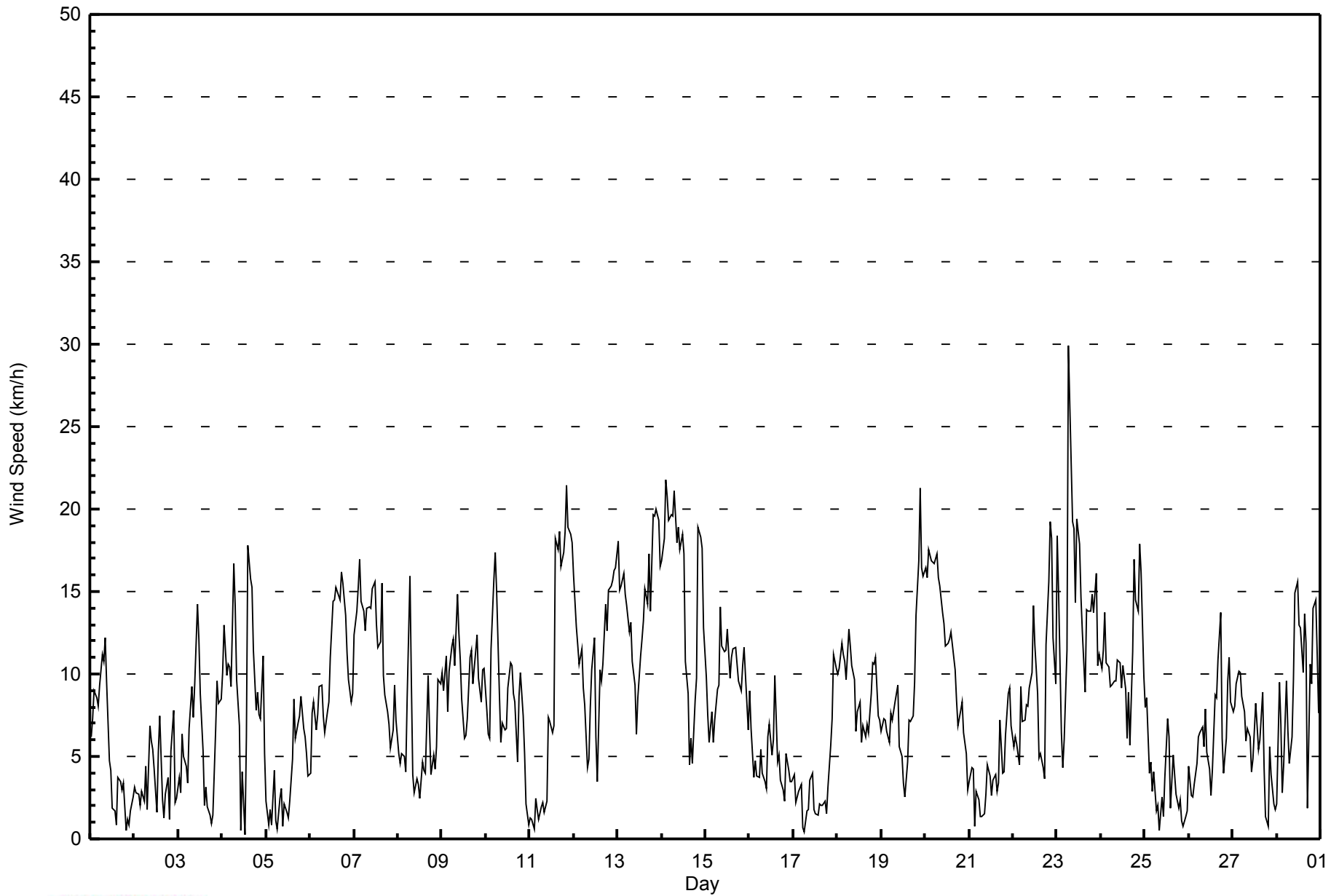
**Wind Speed (WS) - km/h**  
**Athabasca Valley - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 28 20:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 0 km/h on Feb 5 13:00																									
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 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-Feb	3	2	2	2	2	2	3	2	3	2	1	1	1	1	1	1	3	2	1	1	1	1	1	1	3
2-Feb	1	1	1	1	1	1	1	1	3	2	2	1	1	1	2	2	1	2	1	1	3	3	2	1	3
3-Feb	2	3	2	2	2	3	1	2	2	4	3	2	2	1	1	2	1	1	1	1	2	3	3	3	4
4-Feb	3	3	3	2	2	3	4	3	3	2	1	1	1	6	4	4	3	2	2	3	3	3	3	2	6
5-Feb	1	1	1	1	2	2	1	3	4	2	1	1	0	1	2	1	1	1	2	3	2	2	1	1	4
6-Feb	1	2	2	1	2	2	3	2	1	2	2	4	4	3	3	4	4	4	3	3	3	2	1	3	4
7-Feb	3	4	4	4	3	4	4	4	4	4	4	4	4	3	4	4	3	3	2	2	1	2	2	2	4
8-Feb	2	1	1	1	1	4	3	2	1	1	1	1	1	2	1	1	2	2	2	1	2	2	3	3	4
9-Feb	2	3	3	2	3	3	3	2	3	2	1	3	2	1	2	2	2	3	2	2	2	2	2	3	3
10-Feb	2	2	2	3	4	4	2	4	1	2	2	2	2	2	2	2	2	1	4	2	2	2	1	1	4
11-Feb	2	2	1	2	2	2	2	1	2	1	3	2	2	6	5	4	4	4	3	4	5	4	4	3	6
12-Feb	3	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4
13-Feb	4	3	3	3	3	3	3	3	3	2	3	3	4	3	4	4	5	5	4	6	5	5	5	5	6
14-Feb	5	4	5	5	5	4	4	5	4	4	3	3	4	3	4	2	2	1	3	5	4	4	3	2	5
15-Feb	2	2	2	2	2	2	2	2	3	2	2	3	3	2	2	2	3	3	3	2	3	3	2	2	3
16-Feb	3	3	1	1	1	1	2	1	1	1	2	2	1	2	2	2	1	1	2	2	1	2	2	2	3
17-Feb	2	1	2	1	1	1	1	2	1	2	2	1	1	1	1	1	1	1	1	2	2	2	2	2	2
18-Feb	2	2	2	3	3	3	2	3	2	3	2	2	2	1	1	1	2	2	3	3	3	3	2	2	3
19-Feb	2	2	2	2	1	2	2	1	1	2	2	1	2	1	1	2	2	1	2	3	5	5	5	4	5
20-Feb	5	5	5	4	3	4	3	4	4	3	3	2	2	2	2	2	2	2	2	2	2	2	2	1	5
21-Feb	1	2	2	1	2	2	2	1	1	2	1	2	1	1	2	1	2	2	2	2	3	2	3	3	3
22-Feb	3	3	2	2	2	2	1	3	2	2	3	3	3	2	3	2	2	2	4	4	4	4	3	2	4
23-Feb	6	3	2	2	2	5	5	4	3	4	3	3	4	2	3	2	3	3	4	3	4	4	3	3	6
24-Feb	2	3	3	3	2	2	2	2	2	2	3	2	3	3	2	3	3	4	4	3	3	4	4	3	4
25-Feb	2	2	2	1	2	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2
26-Feb	2	2	2	2	2	1	1	2	3	2	2	1	1	1	4	3	3	2	3	1	1	2	3	2	4
27-Feb	2	2	3	3	3	3	3	2	2	1	2	2	2	1	1	3	3	1	1	1	1	2	1	1	3
28-Feb	2	3	3	1	3	2	2	1	2	2	3	3	2	3	3	4	5	2	5	6	2	3	3	2	6
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - February 2015**





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

**Wind Speed (WS) - km/h**  
**Athabasca Valley - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	216	32.14	32.14
6 - 11	287	42.71	74.85
12 - 19	157	23.36	98.21
20 - 28	11	1.64	99.85
29 - 38	1	0.15	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Athabasca Valley - February 2015**

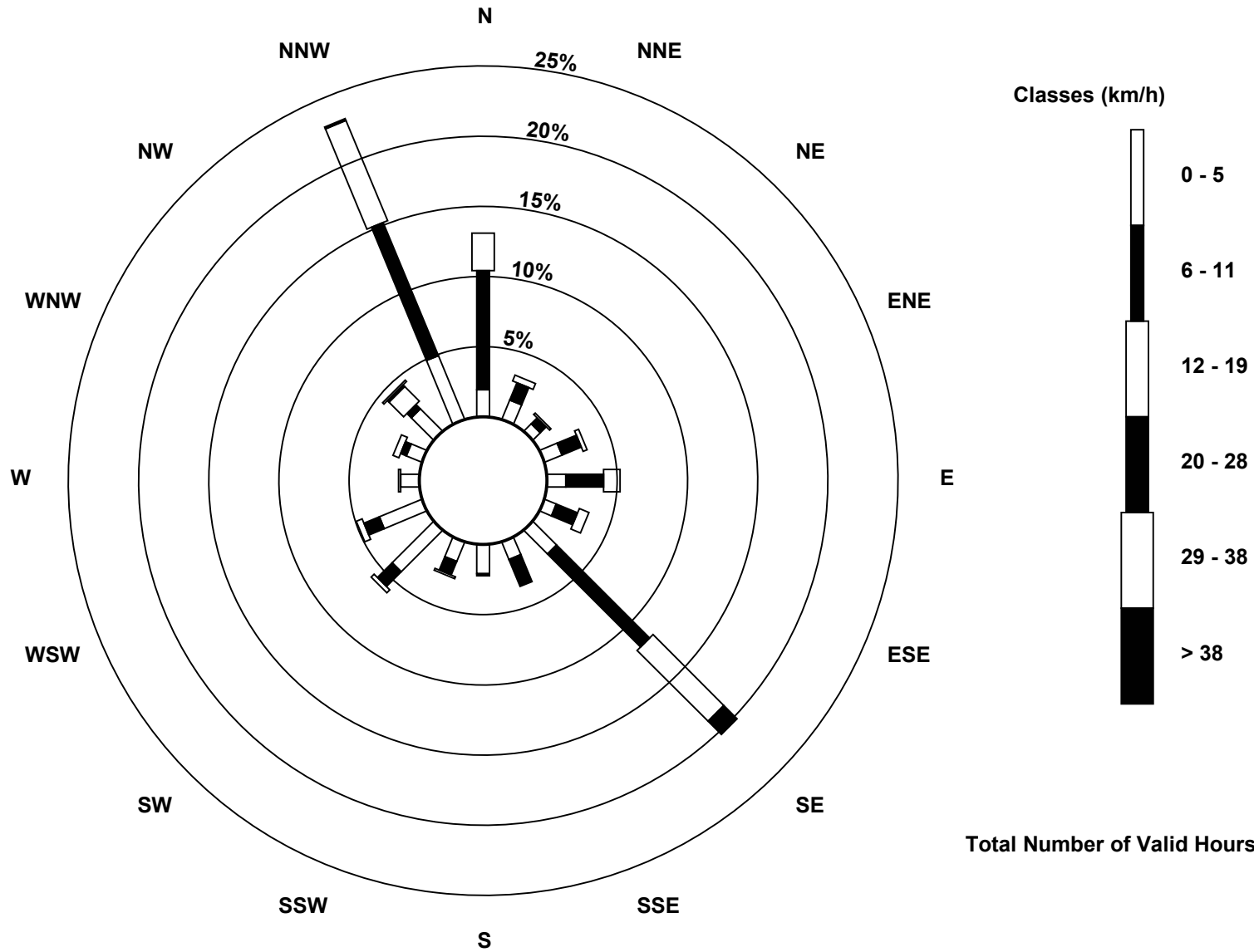
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	13	10	5	9	9	6	16	9	14	10	28	22	9	8	15	33	216
6 - 11	57	9	4	10	18	11	63	14	1	7	10	8	0	3	3	69	287
12 - 19	18	3	1	2	8	5	48	0	0	1	2	3	1	3	10	52	157
20 - 28	0	0	0	0	0	0	9	0	0	0	0	0	0	0	1	1	11
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	88	22	10	21	35	22	136	23	15	18	40	33	10	14	30	155	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Athabasca Valley (AMS 7)**





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

**Wind Direction (WD) - deg**  
**Athabasca Valley - February 2015**

Direction of Maximum Speed: 307 deg on Feb 23 07:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 348.8 deg on Feb 20	Hours of Data: 672
Direction of Minimum Speed: 72 deg on Feb 4 13:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.1 deg on Feb 4	Percent Operational Time: 100.0
Monthly Average Direction: 332.3 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-Feb	153	145	143	132	141	140	140	143	142	135	86	72	318	284	340	238	215	226	221	173	139	143	135	204	146.0
2-Feb	164	159	156	145	118	159	140	136	195	206	206	83	69	354	350	341	355	256	256	209	216	237	236	164	197.0
3-Feb	183	218	212	212	277	310	348	355	359	353	343	346	349	3	323	240	145	119	182	81	135	143	151	152	343.2
4-Feb	152	143	136	134	129	145	144	138	131	137	11	102	72	330	314	328	334	335	334	338	333	346	336	341	54.4
5-Feb	282	198	79	80	254	178	318	116	198	193	74	37	330	347	329	345	359	8	10	35	32	29	20	16	10.2
6-Feb	3	17	13	15	19	72	74	55	29	63	73	92	89	84	76	80	78	82	86	88	87	84	79	96	71.8
7-Feb	116	126	129	132	134	128	126	129	133	130	130	129	124	120	124	127	115	115	110	89	75	7	343	341	120.4
8-Feb	345	347	343	354	333	345	342	344	328	331	327	322	318	358	348	343	345	344	339	343	338	338	343	339	341.4
9-Feb	348	350	346	354	345	344	344	350	345	349	341	346	358	354	353	341	343	348	350	345	342	350	343	345	346.8
10-Feb	348	356	354	345	345	341	340	333	353	345	345	2	351	7	360	347	344	8	351	347	354	351	294	290	348.1
11-Feb	22	196	66	220	176	218	259	246	260	55	147	132	130	131	130	134	134	138	140	143	138	139	136	139	138.8
12-Feb	142	133	138	141	137	134	129	137	139	210	215	217	207	328	346	344	348	343	348	341	342	340	341	347	0.7
13-Feb	344	341	343	340	343	342	353	349	353	353	62	71	91	93	117	126	125	125	124	126	128	127	132	132	74.1
14-Feb	132	131	131	135	135	135	135	136	135	138	140	139	137	145	176	170	140	121	222	311	345	349	342	342	131.4
15-Feb	341	326	336	346	356	352	351	350	344	344	335	330	337	351	340	340	353	360	5	346	343	331	336	351	343.9
16-Feb	349	340	347	346	292	305	332	331	273	307	354	13	29	351	348	322	241	254	226	243	252	232	231	229	319.0
17-Feb	239	222	252	287	253	271	346	102	172	235	235	134	254	334	329	345	13	338	308	136	119	128	136	138	169.4
18-Feb	136	133	137	144	144	138	145	146	135	138	134	135	141	138	146	138	120	124	123	123	134	140	142	149	137.2
19-Feb	147	150	152	153	136	142	141	137	135	134	121	96	83	12	340	345	343	347	340	339	344	344	352	349	26.2
20-Feb	8	6	343	345	342	344	345	347	349	5	349	344	344	350	347	348	348	358	4	351	342	332	319	311	348.8
21-Feb	253	242	248	187	226	221	100	47	40	238	274	340	360	29	352	329	167	146	128	135	131	132	149	154	162.2
22-Feb	147	143	138	147	142	140	135	138	138	136	134	134	133	137	125	163	178	220	210	221	237	248	258	250	175.5
23-Feb	302	281	239	261	289	291	307	307	290	310	318	316	325	339	346	1	15	2	12	352	20	56	49	71	329.7
24-Feb	92	87	88	97	101	101	100	101	94	90	88	80	79	78	55	66	27	6	349	351	352	347	349	354	53.2
25-Feb	335	348	323	263	229	224	215	219	183	60	292	327	342	350	279	355	319	305	286	214	31	41	187	220	315.8
26-Feb	224	236	223	207	204	213	216	221	214	212	223	251	358	76	236	232	256	278	286	332	339	344	349	346	261.2
27-Feb	343	341	354	351	350	349	355	358	351	0	15	84	90	81	78	244	253	218	190	177	144	160	137	75	3.9
28-Feb	244	231	229	133	188	231	219	238	255	313	322	316	306	338	345	322	312	359	330	355	335	346	348	1	314.0
	32.5	73.9	93.7	86.0	88.3	68.3	38.7	55.4	67.5	53.4	26.4	48.4	46.1	33.8	13.3	5.5	5.7	19.5	9.1	11.6	13.1	10.4	5.9	24.2	
	Diurnal Average																								

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



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

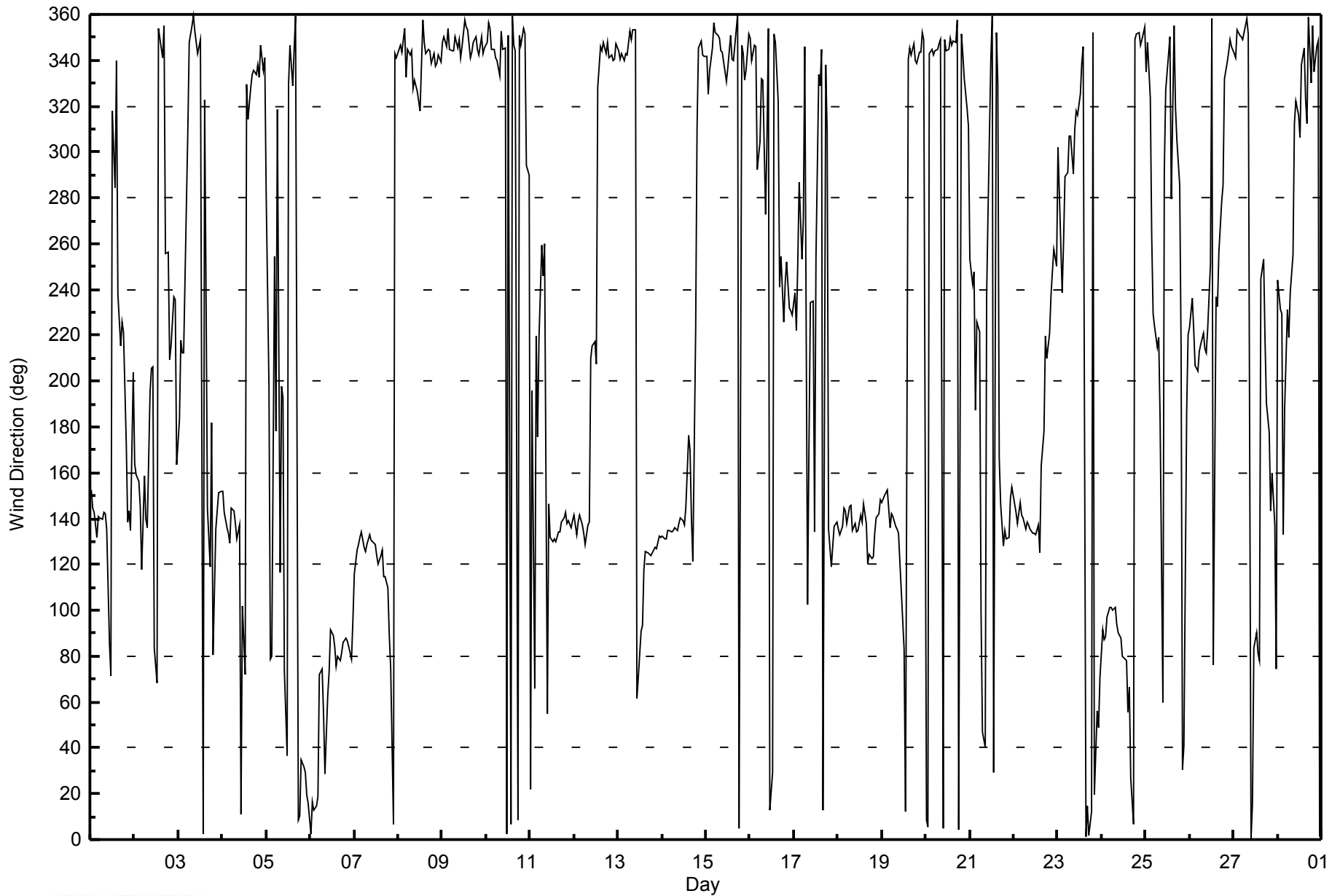
**Wind Direction (WD) - deg**  
**Athabasca Valley - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 110 deg on Feb 4 13:00 Minimum Value: 7 deg on Feb 4 18:00 Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 12 Q <sub>1</sub> = 14 Median = 18 Q <sub>3</sub> = 31 P <sub>90</sub> = 64 P <sub>99</sub> = 95		Hours in Service: 672 Hours of Data: 672 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-Feb	35	23	18	14	17	15	14	14	12	15	26	26	48	32	75	29	64	40	29	100	85	96	62	49	100	
2-Feb	52	43	43	50	33	45	30	77	46	29	60	18	69	22	16	47	59	53	33	55	60	23	95	54	95	
3-Feb	54	94	20	31	33	33	18	15	16	18	12	14	15	25	61	32	58	86	78	81	21	16	28	24	94	
4-Feb	20	15	17	17	17	27	13	15	18	54	99	46	110	93	13	10	9	7	18	17	18	16	13	25	110	
5-Feb	44	87	87	94	56	84	97	80	91	90	64	64	67	42	22	11	16	15	16	16	20	17	14	24	97	
6-Feb	30	18	15	16	19	13	14	24	17	20	15	18	14	11	12	11	11	12	12	12	13	10	12	19	30	
7-Feb	19	18	16	15	14	16	17	15	15	16	17	17	20	20	18	15	22	22	23	18	24	22	10	15	24	
8-Feb	21	18	20	18	23	16	10	12	28	22	11	11	20	26	20	16	13	13	24	24	49	27	14	13	49	
9-Feb	16	22	16	20	15	13	14	14	11	14	9	16	18	15	17	9	11	15	15	13	12	18	13	26	26	
10-Feb	14	17	18	13	13	10	9	17	17	15	19	22	15	16	18	13	13	16	15	13	18	20	45	85	85	
11-Feb	73	84	87	79	72	89	61	72	77	77	53	25	30	84	14	15	14	15	14	11	12	12	12	10	89	
12-Feb	10	9	9	12	9	8	11	48	41	31	9	9	22	59	12	13	14	12	14	9	9	9	8	15	59	
13-Feb	12	10	11	10	16	10	16	14	17	18	36	18	18	19	20	18	17	17	19	16	15	16	15	15	36	
14-Feb	14	14	14	15	15	14	14	13	13	12	10	10	12	20	36	48	35	39	29	44	14	15	10	11	48	
15-Feb	12	11	13	17	27	16	17	19	12	11	10	11	12	16	10	8	17	17	17	14	13	11	13	20	27	
16-Feb	20	25	27	32	32	28	24	27	30	38	25	16	29	23	13	31	11	19	63	73	29	27	54	46	73	
17-Feb	37	55	82	28	25	91	81	78	70	35	26	70	79	60	49	49	46	16	67	49	23	23	12	13	91	
18-Feb	16	15	13	16	17	18	12	13	14	15	18	14	16	19	19	16	21	21	18	19	16	14	18	20	21	
19-Feb	18	17	16	19	14	18	18	13	14	15	26	24	29	28	9	13	11	12	11	11	13	12	18	16	29	
20-Feb	17	19	15	14	12	12	11	14	16	18	15	13	10	15	12	13	13	18	15	17	16	16	21	27	27	
21-Feb	23	41	25	84	34	60	71	70	78	79	33	56	46	42	25	20	51	15	41	50	31	13	18	31	84	
22-Feb	39	31	29	47	23	23	15	23	18	17	18	15	15	18	50	23	45	65	29	21	12	12	11	14	65	
23-Feb	15	13	26	44	41	17	10	11	11	13	13	14	20	10	13	18	15	17	18	17	25	17	16	16	44	
24-Feb	16	11	10	17	17	18	18	18	15	14	14	18	14	16	26	22	28	23	15	17	18	15	16	19	28	
25-Feb	15	14	45	15	36	24	64	67	98	64	72	28	9	20	59	24	19	20	52	56	70	82	71	75	98	
26-Feb	28	72	64	51	37	22	15	14	46	33	38	35	53	25	32	19	20	11	42	24	15	12	16	13	72	
27-Feb	13	16	18	17	15	15	18	19	16	20	38	26	18	17	14	70	19	23	70	100	18	39	58	64	100	
28-Feb	91	22	38	43	57	14	23	26	24	18	12	11	12	18	20	18	15	72	22	29	8	14	15	17	91	
		91	94	87	94	72	91	97	80	98	90	99	70	110	93	75	70	64	86	78	100	85	96	95	85	
		Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Athabasca Valley - February 2015**



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 15, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	16:00
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	26-Sep-17
Gas Cert Reference	S970259A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
DACS voltage range	0-5V	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-681	-681
Analyzer Range (mv)	1000	1000	Lamp voltage	816	820
Calculated slope	1.004138	0.997276	Chamber temp.	43.7	43.7
Calculated intercept	0.803278	1.252457	Pressure (mmHg)	713.0	719.2
Analyzer Background	10.5	10.5	Flow (lpm)	0.555	0.558
Analyzer Coefficient	0.829	0.829	Intensity	48500	48500

Analyzer make Thermo 43c Analyzer serial # 607415781

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	60.7	607.0	608.4	0.998
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	60.7	607.0	608.4	0.998
second point	5000	30.4	304.0	301.9	1.007
third point	5000	15.2	152.0	150.3	1.011
calibrator zero					
as left zero	6000	0.0	0.0	0.9	NA
as left span	5000	60.7	607.0	606.4	1.001
Average Correction Factor					1.005

Corrected As found 608.1 Previous response 603.7 % change -0.7%

#### Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

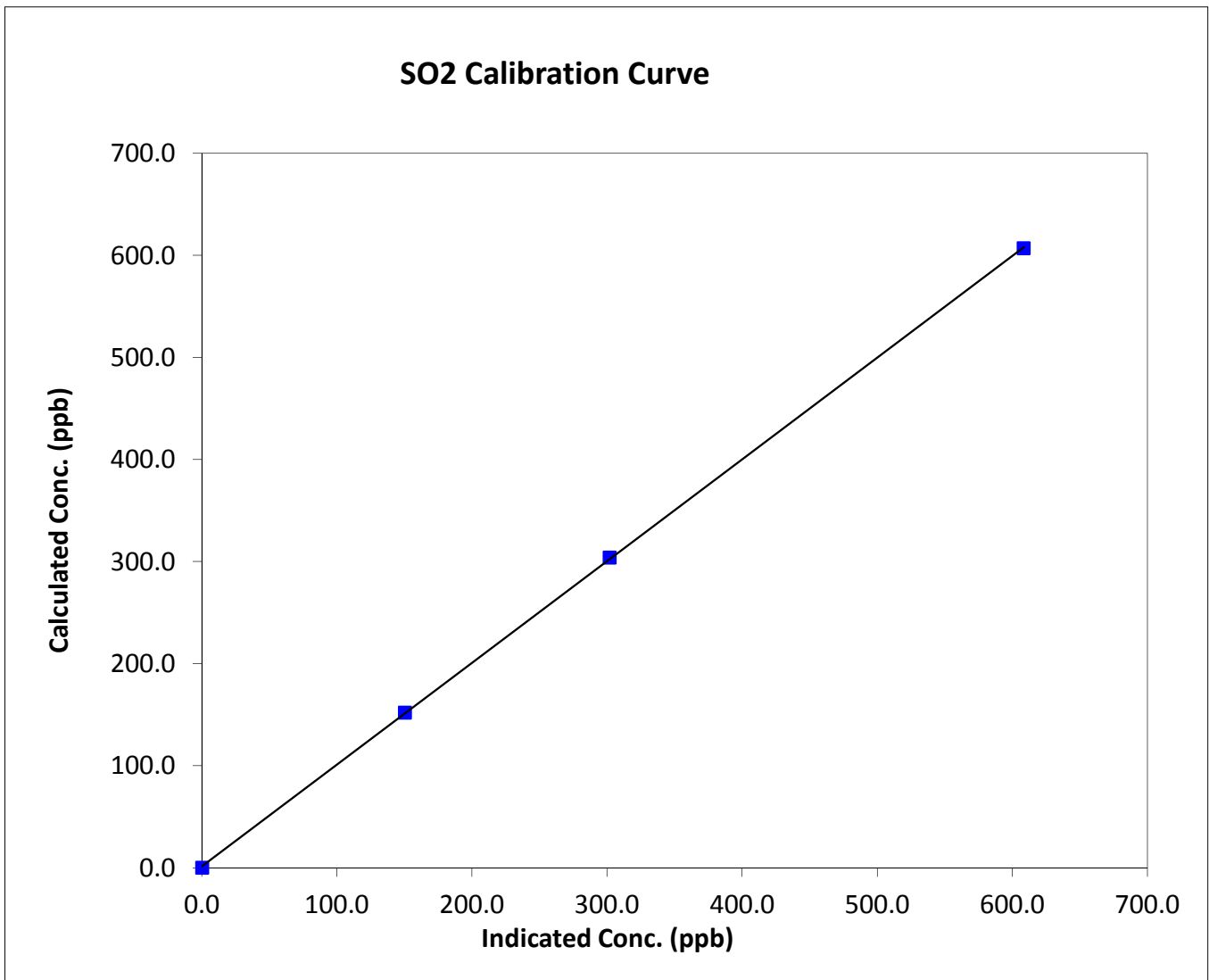
## SO<sub>2</sub> Calibration Summary

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 15, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	16:00
Analyzer make	Thermo 43c	Analyzer serial #	607415781

### Calibration Data

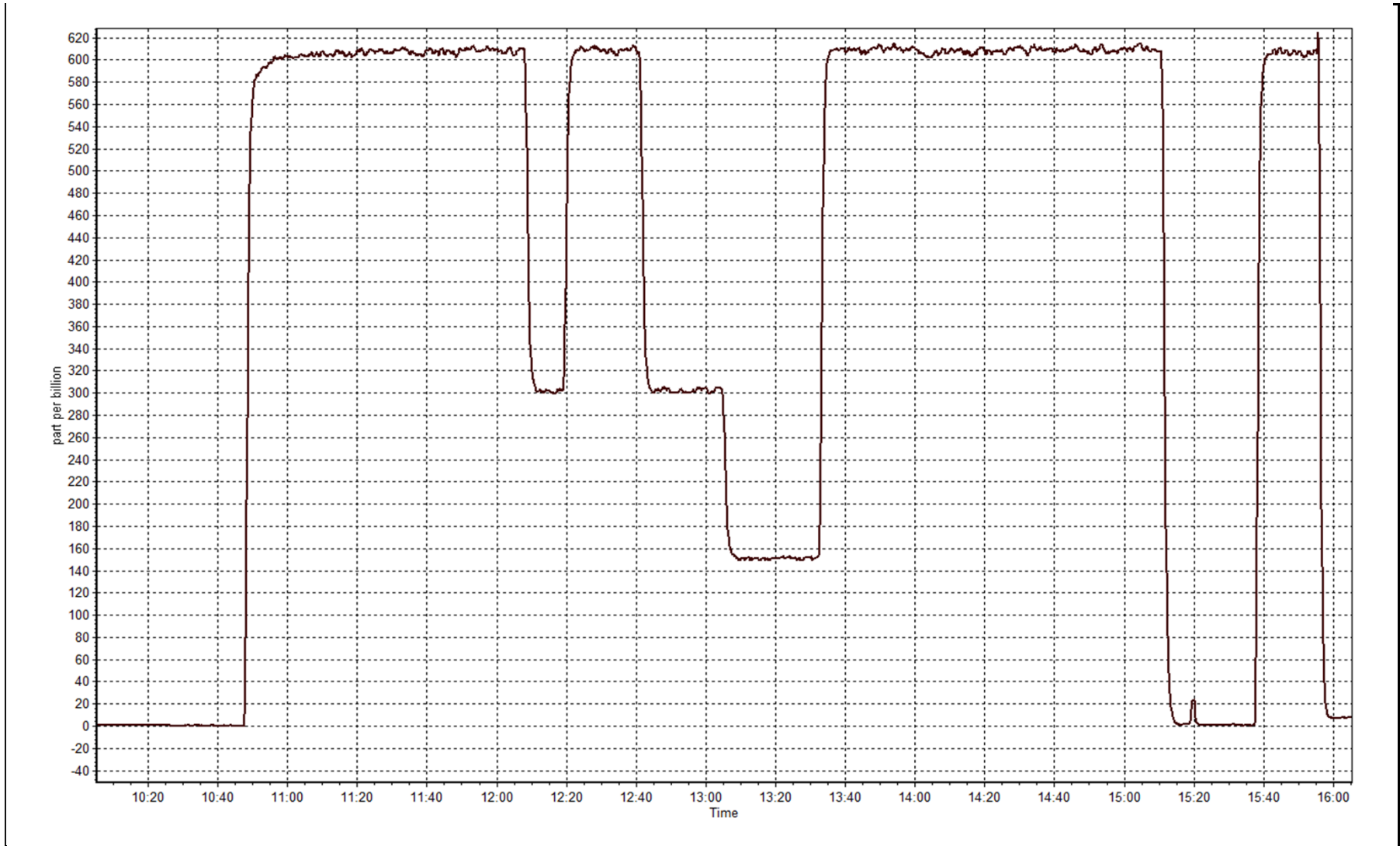
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999967
607.0	608.4	0.9976		
304.0	301.9	1.0069	Slope	0.997276
152.0	150.3	1.0110		
			Intercept	1.252457





SO2 Calibration Plot

Date: February 12, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 16, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	13:05
Barometric Pressure	735 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	5.02 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference	ALMO52589	SO2 gas conc.	50.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2575
DACS voltage range	0-5V	DACS channel #	2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-619	-619
Analyzer Range (input)	100	100	Lamp voltage	805	805
Calculated slope	1.013900	1.000875	Chamber temp.	44	44
Calculated intercept	-0.563783	0.009573	Pressure	665.8	679.3
Analyzer Background	17	18.6	Flow	0.466	0.472
Analyzer Coefficient	1.040	1.064	Intensity	43500	43386
			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	0.7	NA
as found span	6000	79.8	75.0	73.9	1.014
SO2 scrubber check	5000	14.7	149.4	1.1	NA
calibrator zero	6000	0.0	0.0	0.0	NA
high point	6000	89.6	75.0	74.9	1.001
second point	6000	50.2	42.0	41.9	1.003
third point	6000	29.9	25.0	25.1	0.997
calibrator zero					
as left zero	5000	0.0	0.0	-0.2	NA
as left span	6000	89.6	75.0	74.8	1.002
Average Correction Factor					1.000

Corrected As found	73.2	Previous response	74.5	% change	1.8%
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#### Notes:

Sox scrubber check done after as found zero. Changed the inlet filter after the as founds. Adjusted zero and span; cal within specifications.

Calibration Performed By:

Asad Hidayat



# Wood Buffalo Environmental Association

## TRS Calibration Summary

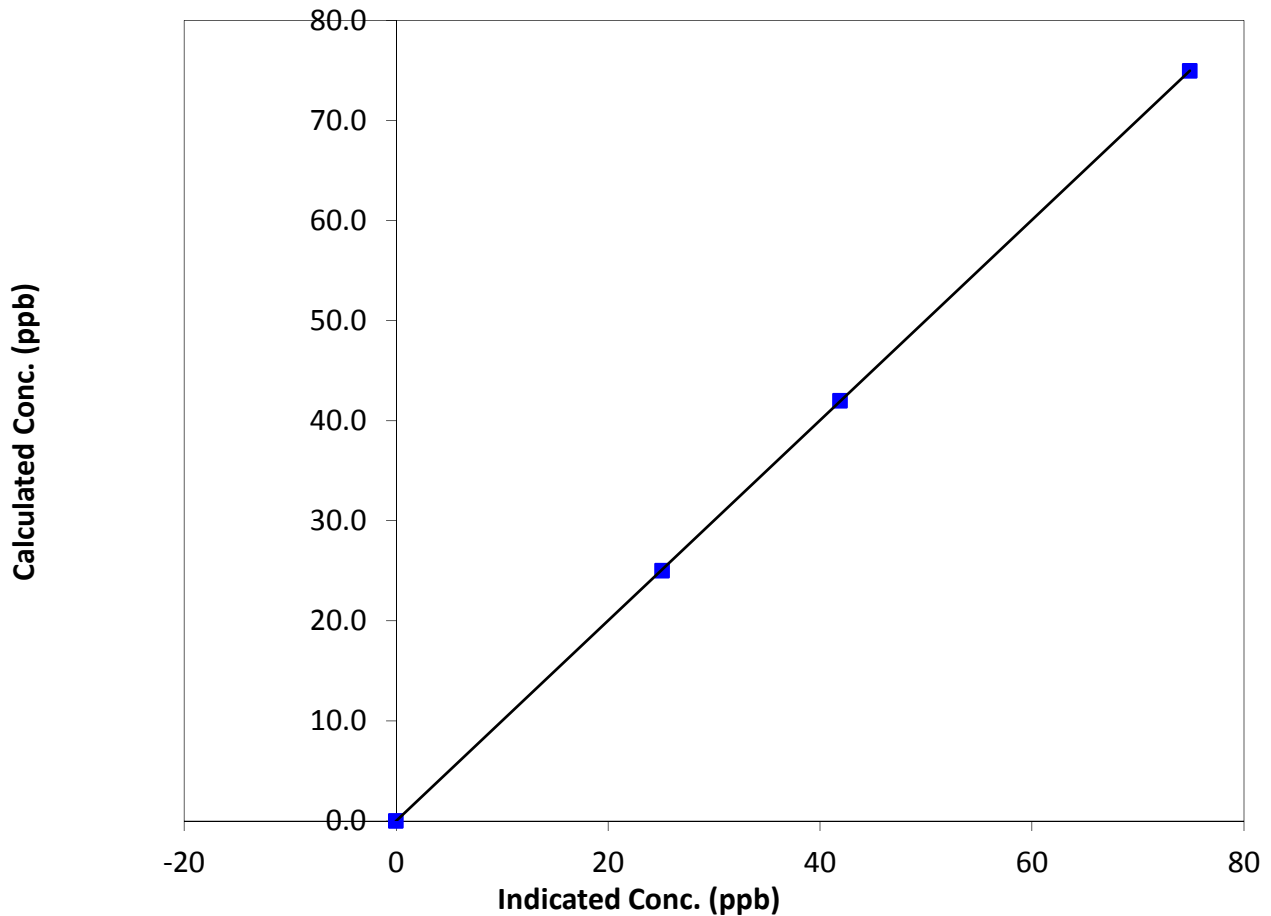
### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 16, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	9:25	End Time (MST)	13:05
Analyzer make	TEI 45C	Analyzer serial #	630718530

### Calibration Data

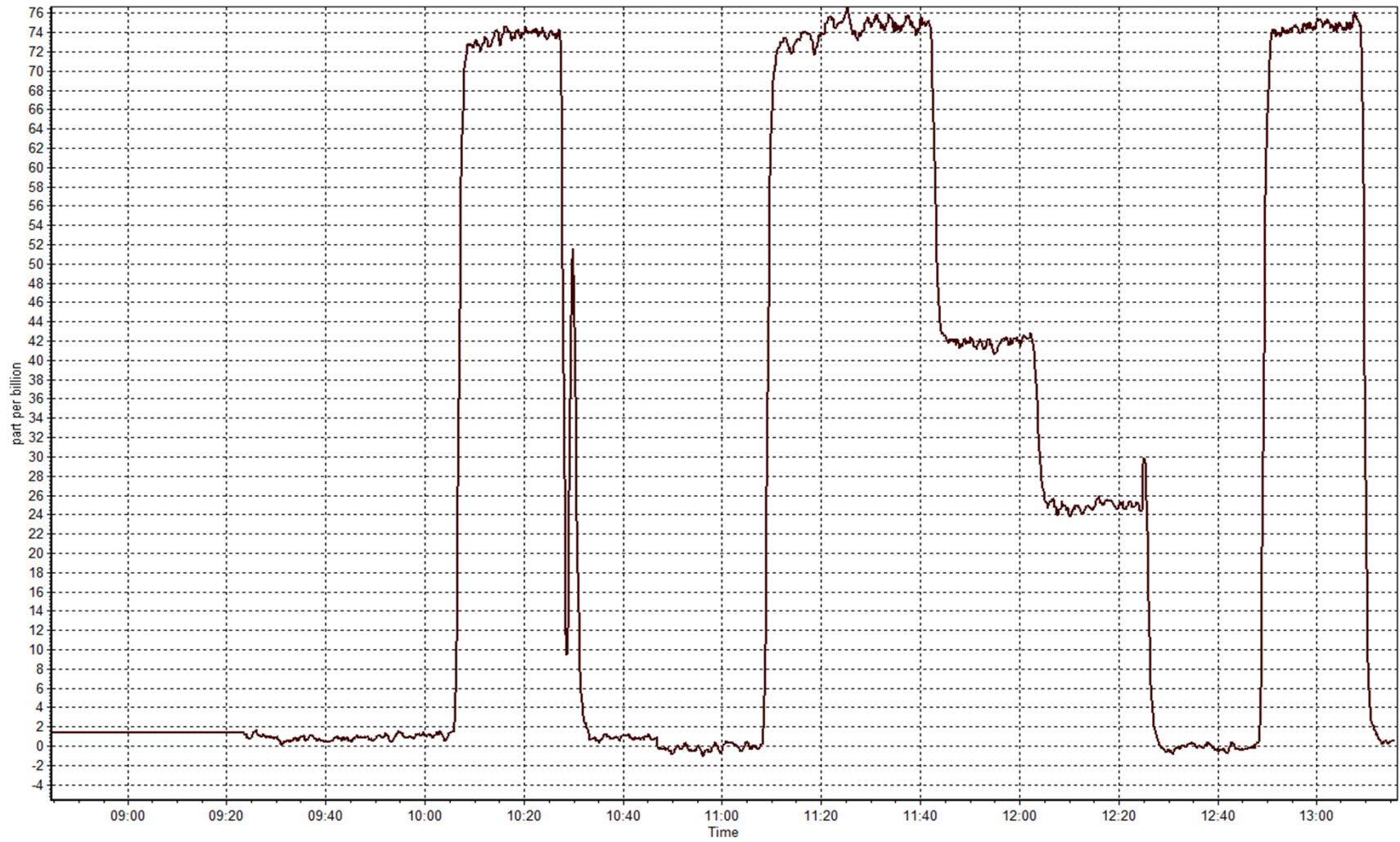
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999995
75.0	74.9	1.0009		
42.0	41.9	1.0029	Slope	1.000875
25.0	25.1	0.9975		
			Intercept	0.009573

TRS Calibration Curve



TRS Calibration Plot

Date: February 19, 2015





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Thursday, February 12, 2015	Prev Calibration	Monday, January 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	14:00
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	S970259A	Cal Gas Expiry Date	Tuesday, September 26, 2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	34.2	31.7
THC Range (input)	50	50	Flame Temp	336.7	309.2
NMHC Range (ppm)	50	50	Carrier Pressure	36.8	36.8
NMHC Range (input)	50	50	Fuel Pressure	42.1	42.1
THC Calc slope	1.003039	0.994637	Air Pressure	32.2	32.2
THC Calc intercept	-0.021712	0.134181			
NMHC Calc slope	1.007935	0.990150			
NMHC Calc intercept	-0.037561	0.121126			

Analyzer make Thermo Scientific 55i Analyzer serial # 1426262594

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	60.7	12.63	12.48	1.012
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	12.63	12.63	1.000
second point	5000	30.4	6.32	6.13	1.032
third point	5000	15.2	3.16	2.93	1.079
calibrator zero					
as left zero					
as left span					
Average Correction Factor					1.037

Corrected As found 12.48 Previous response 12.61 % change 1.0%

**Notes:**

Site changes for sub-systems caused contamination and calibration failure. Restored system and baked column to repair issue; re-calibration will follow next day.

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	5000	0	0.00	0.00	N/A
as found span	5000	60.7	6.68	6.49	1.029
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	6.68	6.68	1.000
second point	5000	30.4	3.34	3.18	1.052
third point	5000	15.2	1.67	1.46	1.145
calibrator zero					
as left zero					
as left span					
Average Correction Factor					1.065

Corrected As found      6.49      Previous response      6.66      % change      2.7%

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	60.7	5.95	5.98	0.995
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	5.95	5.95	1.000
second point	5000	30.4	2.98	2.95	1.010
third point	5000	15.2	1.49	1.47	1.015
calibrator zero					
as left zero					
as left span					
Average Correction Factor					

Corrected As found      5.98      Previous response      5.95      % change      -0.6%



# Wood Buffalo Environmental Association

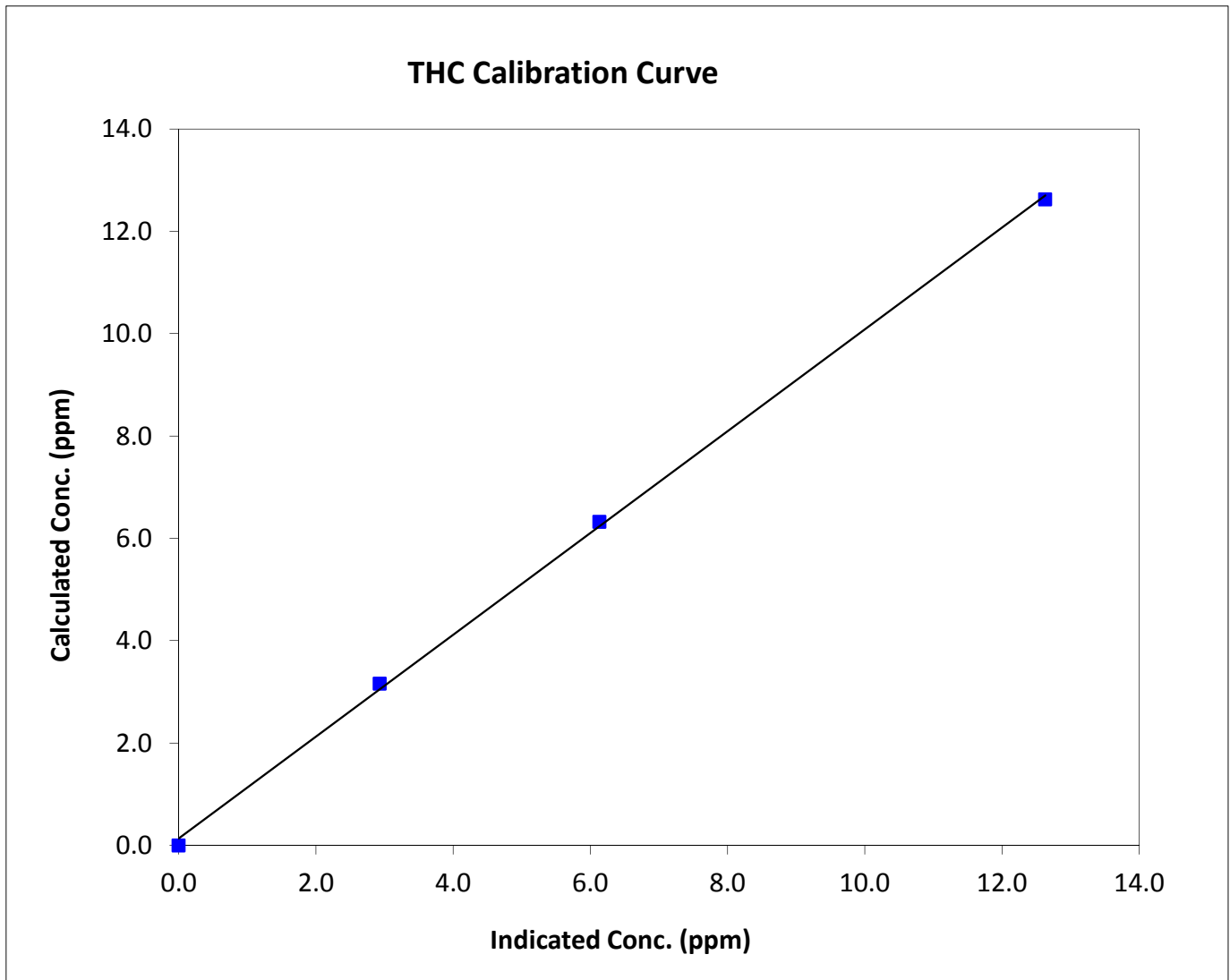
## THC Calibration Summary

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	14:00
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999492
12.63	12.63	0.9997		
6.32	6.13	1.0315	Slope	0.994637
3.16	2.93	1.0790		
			Intercept	0.134181





# Wood Buffalo Environmental Association

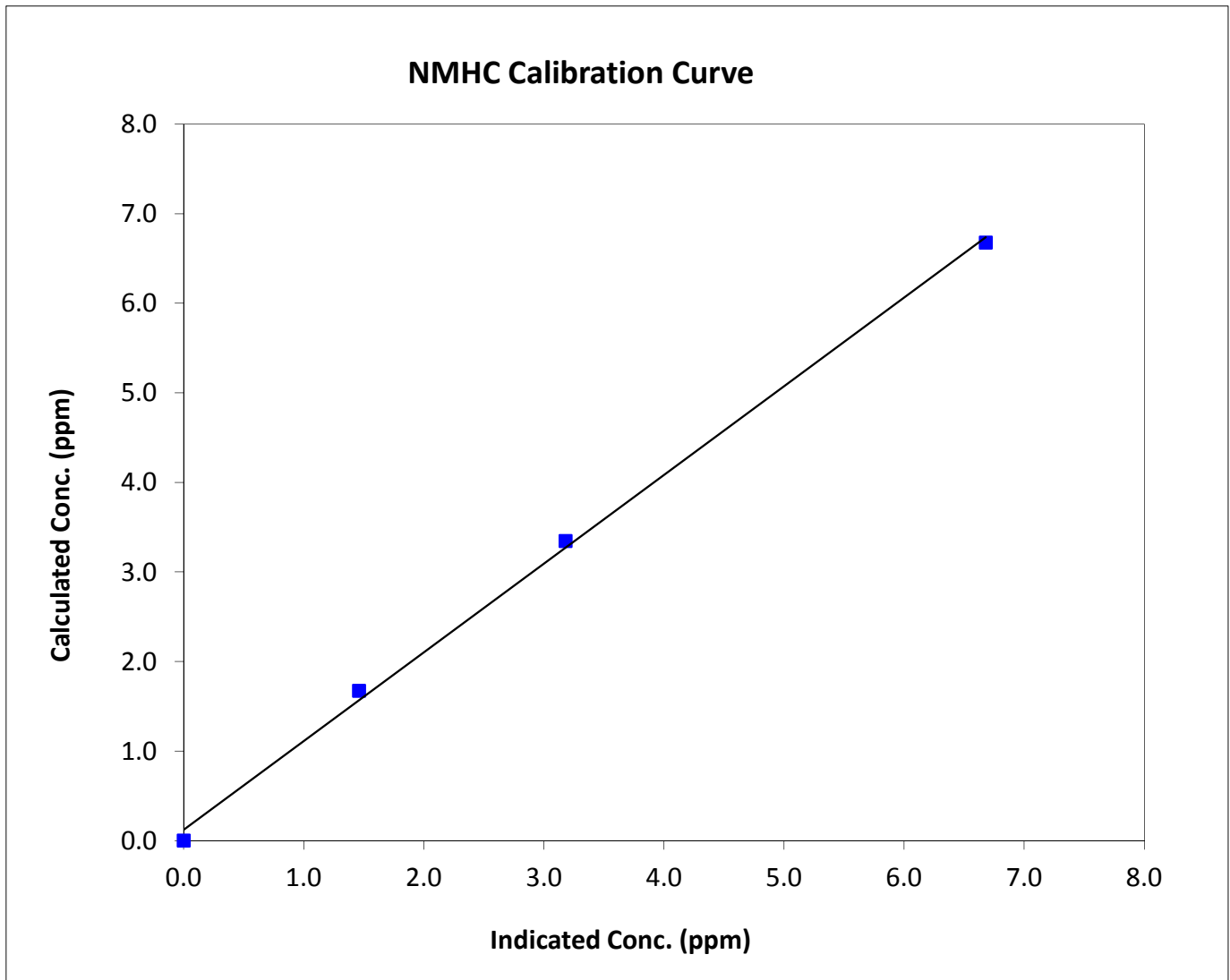
## NMHC Calibration Summary

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 19, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	14:00
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1426262594

### Calibration Data

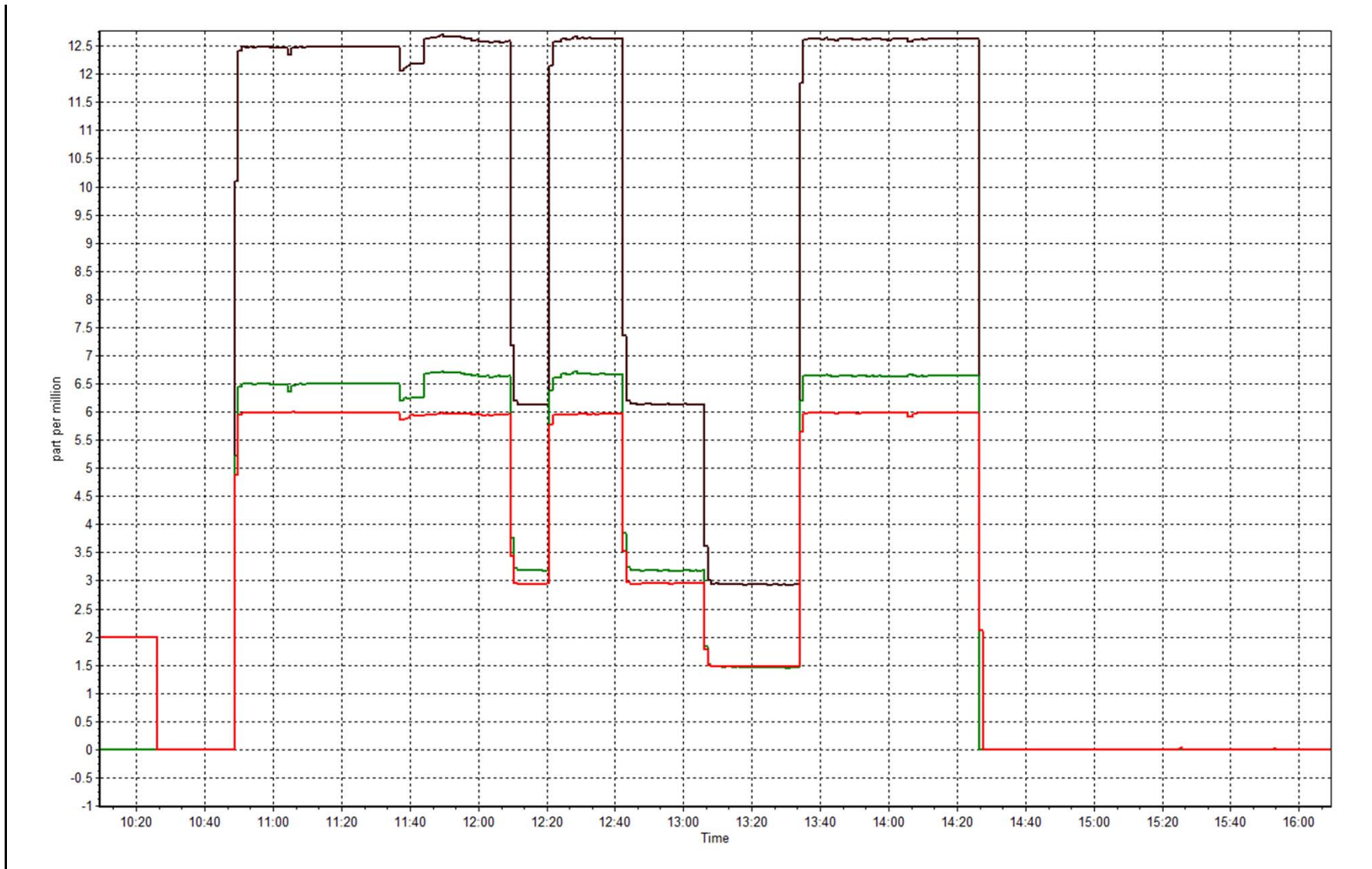
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.998578
6.68	6.68	0.9996		
3.34	3.18	1.0516	Slope	0.990150
1.67	1.46	1.1452		
			Intercept	0.121126





THC/NMHC Calibration Plot

Date: February 12, 2015





# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Friday, February 13, 2015	Prev Calibration	Thursday, February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Other: REPAIR - see notes below		
Start Time (MST)	10:05	End Time (MST)	12:35
Barometric Pressure	750 mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	S970259A	Cal Gas Expiry Date	Tuesday, September 26, 2017
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1040.0 ppm
C3H8 Cal Gas Conc.	200.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	31.7	34.5
THC Range (input)	50	50	Flame Temp	309.2	310.0
NMHC Range (ppm)	50	50	Carrier Pressure	36.8	36.8
NMHC Range (input)	50	50	Fuel Pressure	42.1	42.1
THC Calc slope	0.994637	0.999680	Air Pressure	32.2	32.2
THC Calc intercept	0.134181	0.013614			
NMHC Calc slope	0.990150	1.000179			
NMHC Calc intercept	0.121126	0.000226			

Analyzer make Thermo Scientific 55i Analyzer serial # 1426262594

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	12.63	12.63	1.000
second point	5000	30.4	6.32	6.28	1.006
third point	5000	15.2	3.16	3.15	1.004
calibrator zero					
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	60.7	12.63	12.64	0.999
Average Correction Factor					1.003

Corrected As found      NA      Previous response      NA      % change      NA

**Notes:**

conditioned column overnight. Replaced inlet filter. Carrier gas was previous contaminated by gooseneck extension. Adjusted span.

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					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	6.68	6.68	1.000
second point	5000	30.4	3.34	3.33	1.004
third point	5000	15.2	1.67	1.68	0.995
calibrator zero					
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	60.7	6.68	6.68	1.000
Average Correction Factor					1.000

Corrected As found      NA      Previous response      NA      % change      NA

### CH4 Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	60.7	5.95	5.96	0.998
second point	5000	30.4	2.98	2.95	1.011
third point	5000	15.2	1.49	1.47	1.013
calibrator zero					
as left zero	6000	0.0	0.00	0.00	N/A
as left span	5000	60.7	5.95	5.96	0.998
Average Correction Factor					

Corrected As found      NA      Previous response      NA      % change      NA



# Wood Buffalo Environmental Association

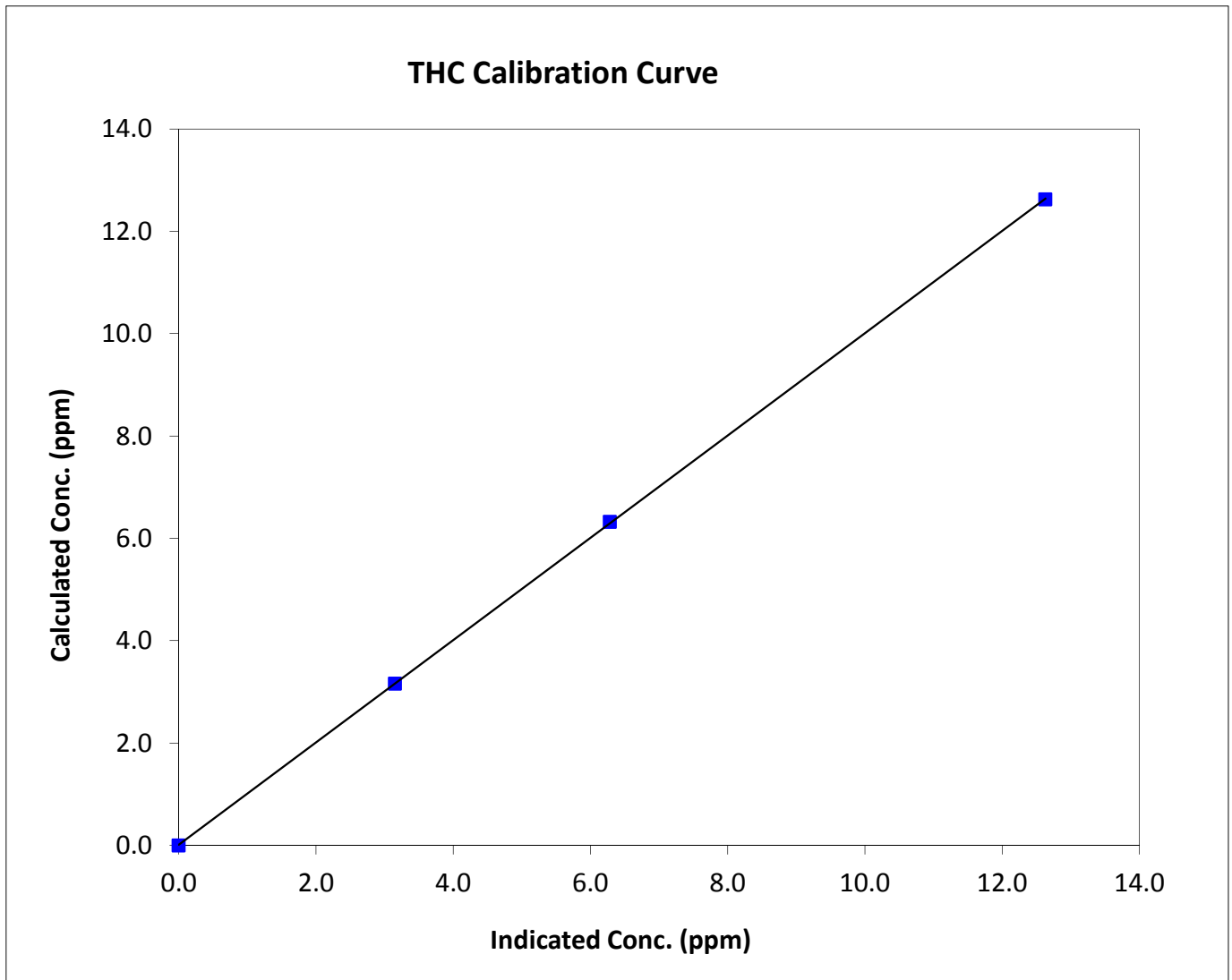
## THC Calibration Summary

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:05	End Time (MST)	12:35
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999986
12.63	12.63	0.9997		
6.32	6.28	1.0064	Slope	0.999680
3.16	3.15	1.0037		
			Intercept	0.013614





# Wood Buffalo Environmental Association

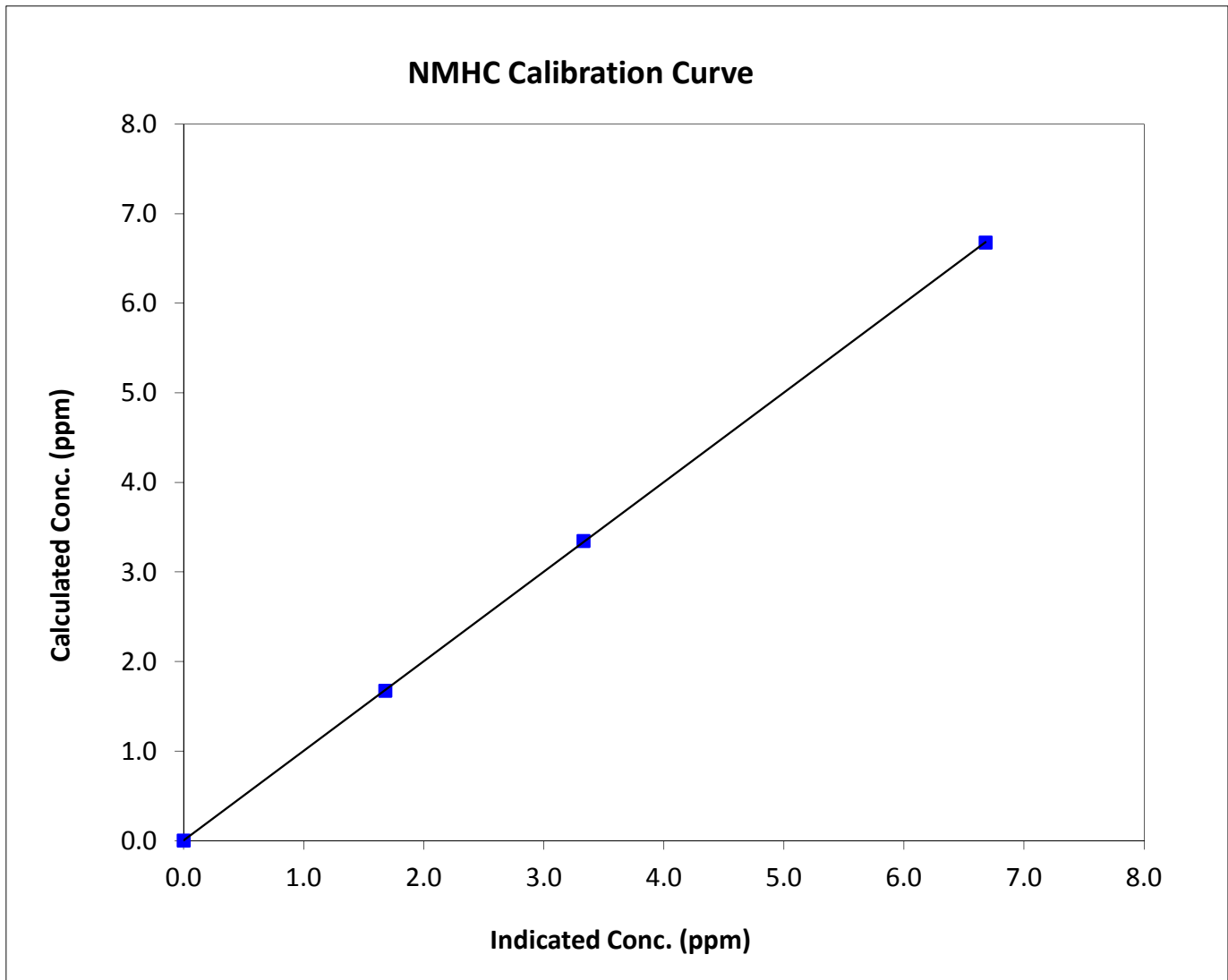
## NMHC Calibration Summary

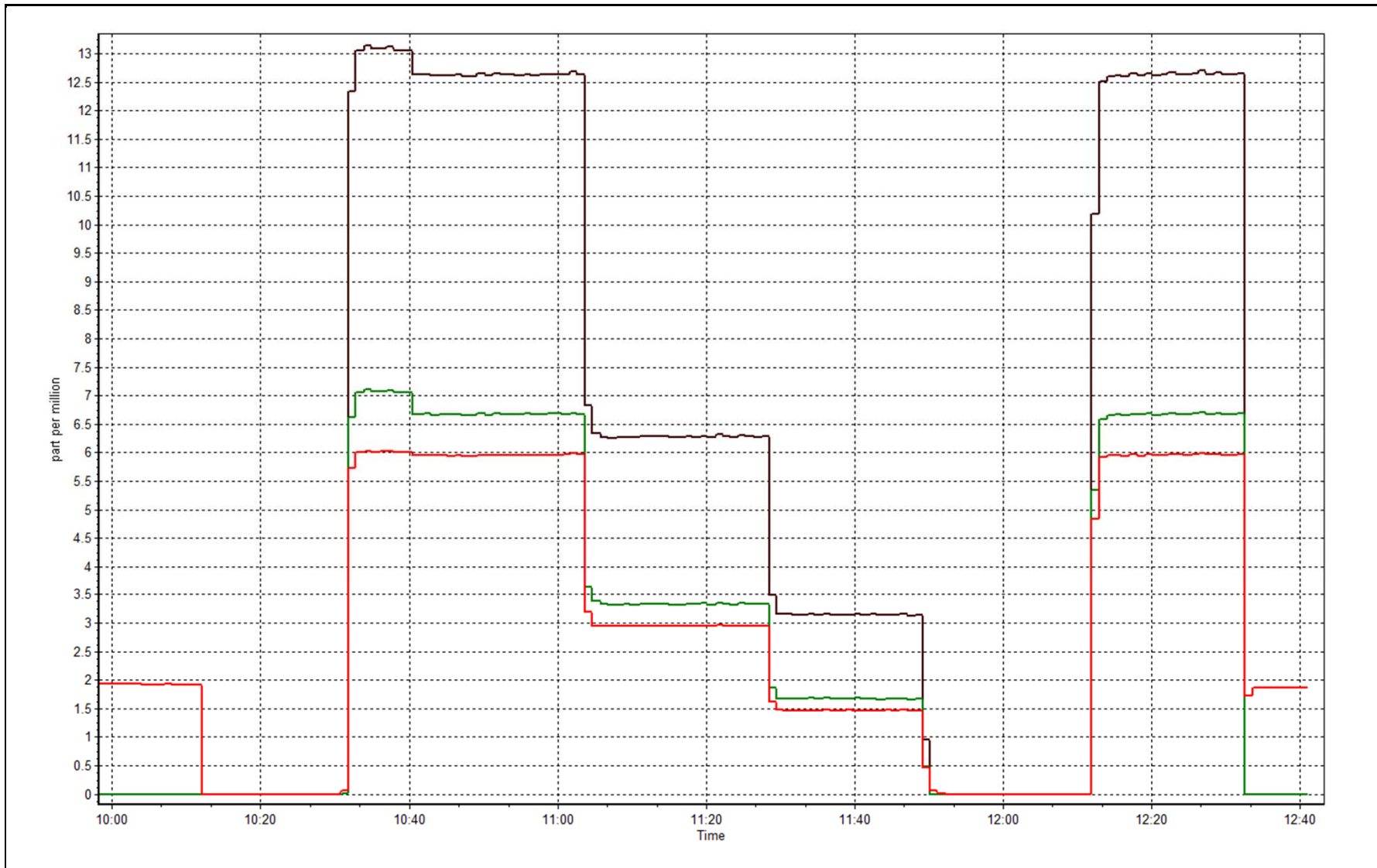
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	February 12, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:05	End Time (MST)	12:35
Analyzer make	Thermo Scientific 55i	Analyzer serial #	1426262594

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999989
6.68	6.68	0.9996		
3.34	3.33	1.0042	Slope	1.000179
1.67	1.68	0.9952		
			Intercept	0.000226







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 16, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	Routine		
Start Time (MST)	11:50	End Time (MST)	15:10
Barometric Pressure	750 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
NO2 calibration used	Thursday, January 15, 2015	Transfer Standard	N/A
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
DACS voltage range	0-5V	DACS channel #	5

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	29.0	28.7
Analyzer Range (input)	500	500	Lamp temp.	70.9	70.9
Calculated slope	1.001780	1.005097	Pressure	702.7	740.2
Calculated intercept	0.599520	-1.649159	Flow cell A	0.669	0.689
Analyzer Background	-0.2	-0.2	Flow cell B	0.733	0.755
Analyzer Coefficient	1.033	1.008	Cell A Intensity	104850	104850
			Cell B Intensity	88150	88150

Analyzer make TEI 49C Analyzer serial # 607415760

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.0	N/A
as found span	5000	N/A	339.3	346.0	0.981
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	N/A	339.3	338.1	1.003
second point	5000	N/A	170.0	172.4	0.986
third point	5000	N/A	84.9	87.3	0.973
calibrator zero					
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	N/A	339.3	334.7	1.014
Average Correction Factor					0.988

Corrected As found 345.9 Previous response 338.1 % change -2.3%

#### Notes:

Changed inlet filter after as founds. Adjusted span

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

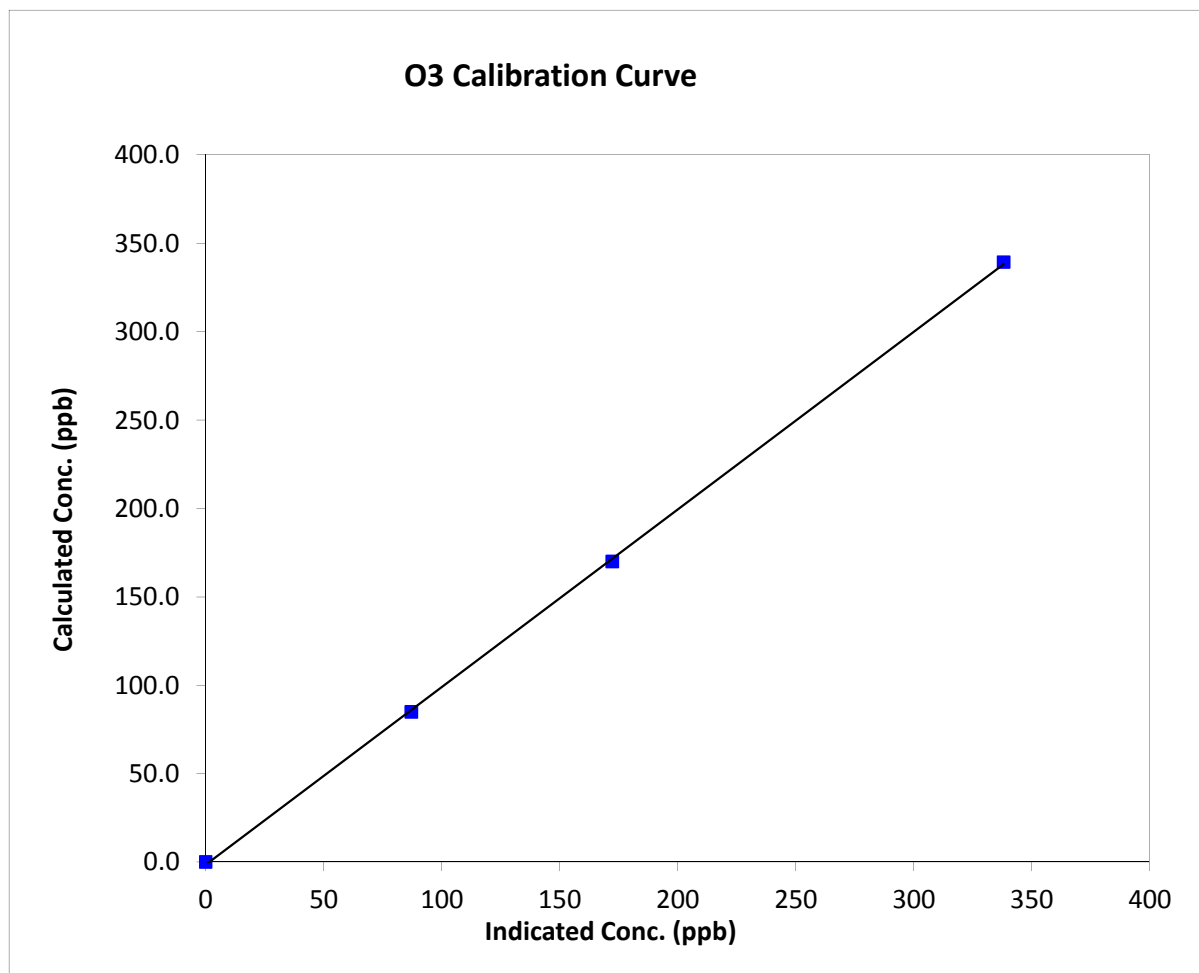
## O<sub>3</sub> Calibration Summary

### Station Information

Calibration Date	Friday, February 13, 2015	Previous Calibration	January 16, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	11:50	End Time (MST)	15:10
Analyzer make	TEI 49C	Analyzer serial #	607415760

### Calibration Data

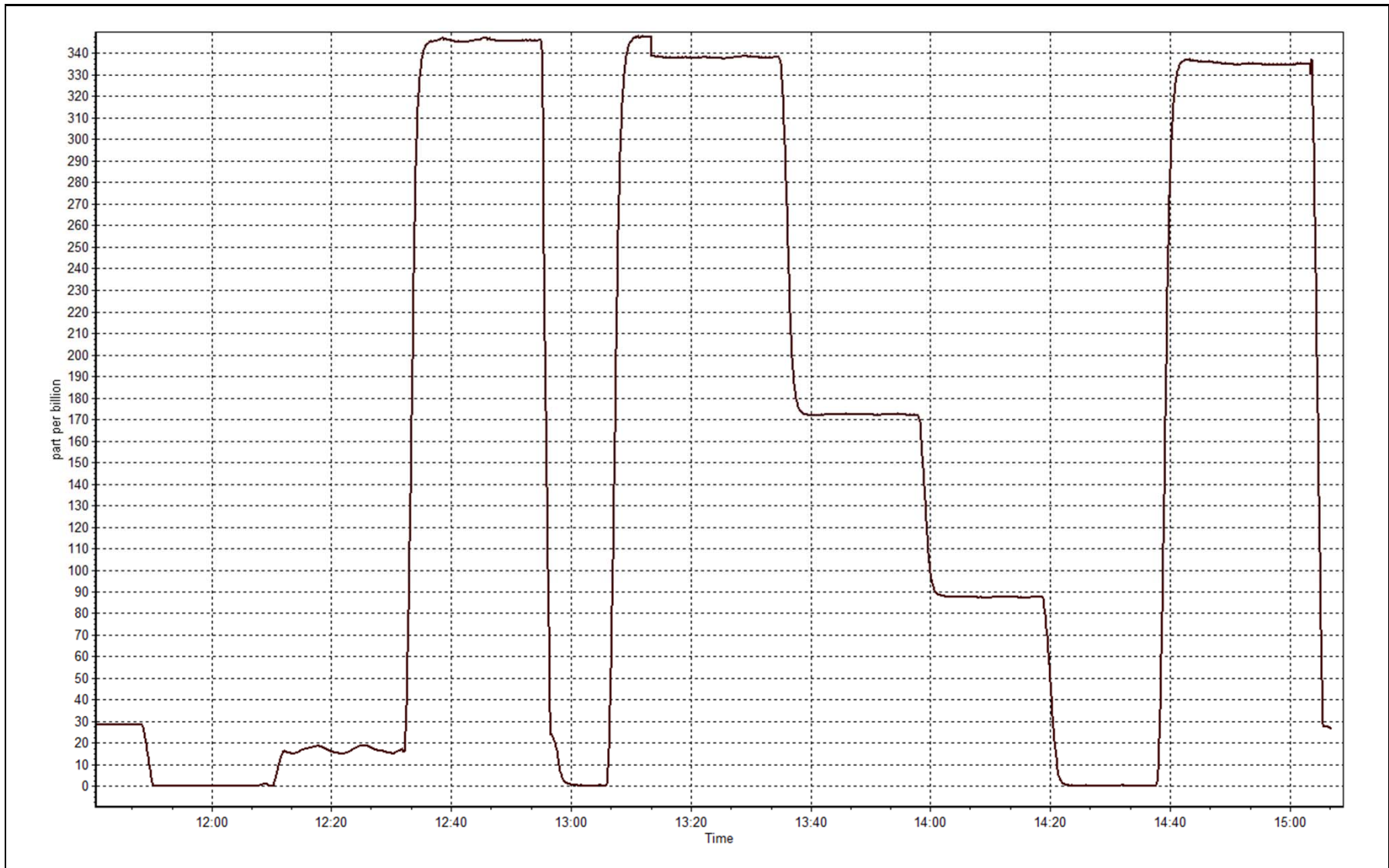
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999877
339.3	338.1	1.0035		
170.0	172.4	0.9864	Slope	1.005097
84.9	87.3	0.9728		
			Intercept	-1.649159





O3 Calibration Plot

Date: February 13, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 15, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:25	End Time (MST)	16:00
Barometric Pressure	740 mmHg	Station Temperature	21.0 Deg C
Calibrator	Sabio 4010	Serial Number	11021107
NO Cal Gas Conc	49.4 ppm	Cal Gas Expiry Date	September 26, 2017
NO <sub>x</sub> Cal Gas Conc	49.4 ppm	Cal Gas Serial #	S970259A

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	2575
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Parameter		NO <sub>x</sub>	NO	NO <sub>2</sub>
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.983012	0.983696	1.000255
	Data Offset	2.166012	2.112832	-0.015773
After	Data Slope	1.000201	1.000361	1.000163
	Data Offset	1.531028	1.589235	-0.671796
Channel #		1	2	3
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model	Thermo 42c	Analyzer serial #	601114773
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.768	ppb	0.783	ppb
NO <sub>x</sub> coefficient	1.000	ppb	1.000	ppb
NO <sub>2</sub> coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.3		3.3	
NO <sub>x</sub> bkgrnd	3.5		3.5	
Nt coefficient	n/a		n/a	
Chamber Temp	49.5	Deg C	49.6	Deg C
Moly Temp	323.0	Deg C	323.0	Deg C
PMT Temp	-3.6	Deg C	-3.6	Deg C
O <sub>3</sub> flow	ok	ccm	ok	ccm
R Cell Press	168.8	mmHg	175.1	mmHg
Sample Flow	0.794	ccm	0.786	ccm

Notes:

Adjusted span



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date: February 12, 2015 Station Number: AMS 7

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	N/A	N/A
as found span	5000	60.7	599.7	599.7	0.0	590.4	589.6	1.1	1.0157	1.0171
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	N/A	N/A
high point	5000	60.7	599.7	599.7	0.0	599.2	599.1	0.4	1.0008	1.0011
second point	5000	30.4	300.4	300.4	0.0	296.7	296.7	0.3	1.0122	1.0124
third point	5000	15.2	150.2	150.2	0.0	148.0	147.9	0.4	1.0146	1.0157
calibrator zero										
as left zero	6000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.2	N/A	N/A
as left span	5000	60.7	599.7	259.7	340.1	592.6	261.8	330.5	1.0121	0.9916
Average Correction Factor									1.0092	1.0097

Corrected As found NO<sub>x</sub>= 590.5 NO= 589.7 Percent Change NO<sub>x</sub>= 3.0% NO= 3.0%  
 Previous Response NO<sub>x</sub>= 607.9 NO= 607.5

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 60.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <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			0.2			N/A	
1st NO <sub>2</sub> (300)	N/A	259.7	339.3	599.3	259.7	339.5	0.9886	1.0000	0.9992	100.1%
2nd NO <sub>2</sub> (200)	N/A	429.0	170.0	600.0	429.0	171.2	0.9876	1.0000	0.9930	100.7%
3rd NO <sub>2</sub> (100)	N/A	514.0	84.9	599.8	514.0	85.9	0.9879	1.0000	0.9888	101.1%
4th NO <sub>2</sub> (0)	598.9	N/A	-0.1	598.8	598.9	0.1	0.9895	1.0000	N/A	N/A
Average Correction Factor							0.9884	1.0000	0.9937	100.6%

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

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

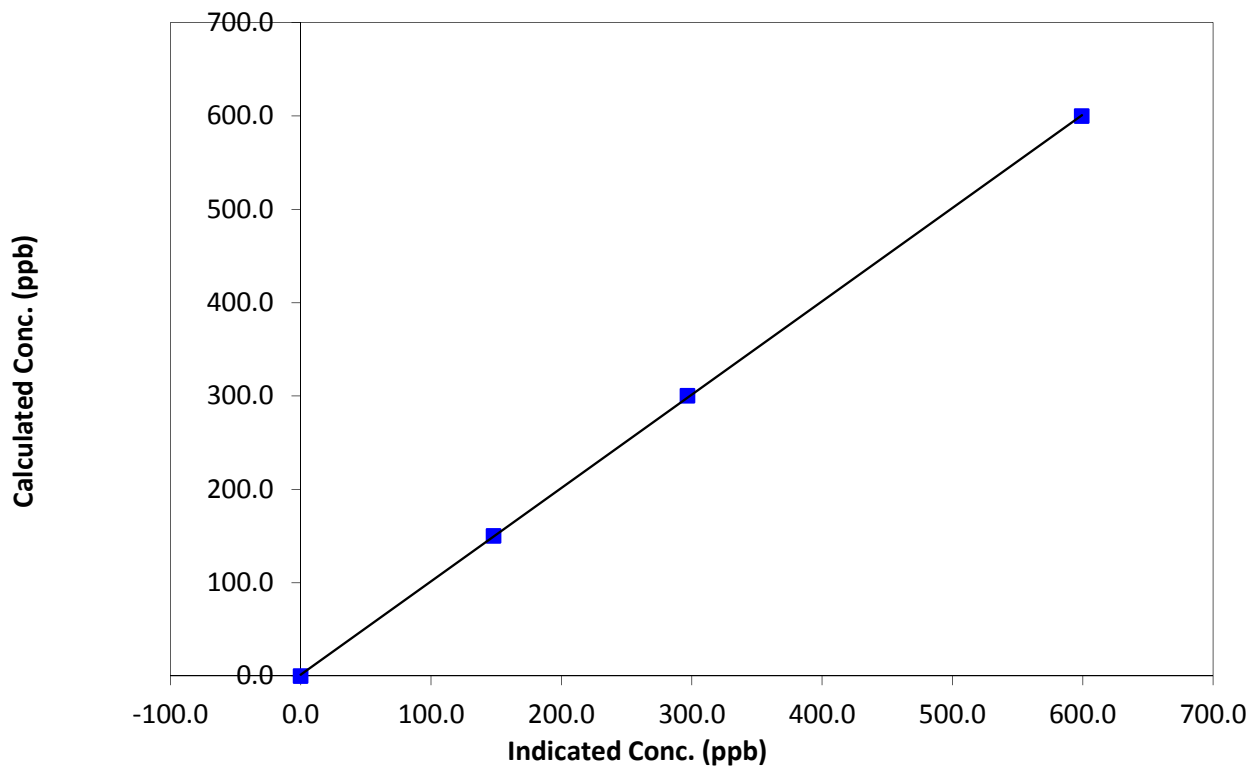
### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 15, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	16:00
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	0.999959
599.7	599.2	1.0008		
300.4	296.7	1.0122	Slope	1.000201
150.2	148.0	1.0146		
			Intercept	1.531028

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

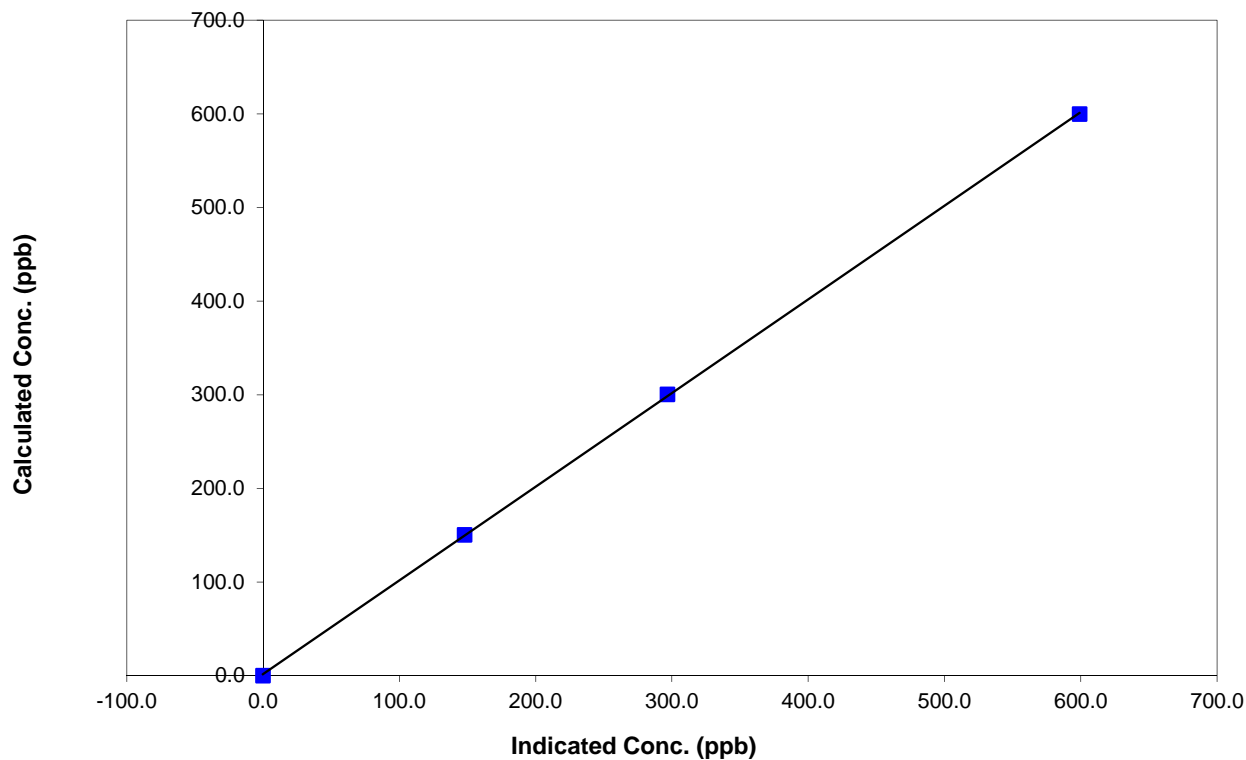
### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 15, 2015
Station Name	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	16:00
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	0.999959
599.7	599.1	1.0011		
300.4	296.7	1.0124	Slope	1.000361
150.2	147.9	1.0157		
			Intercept	1.589235

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

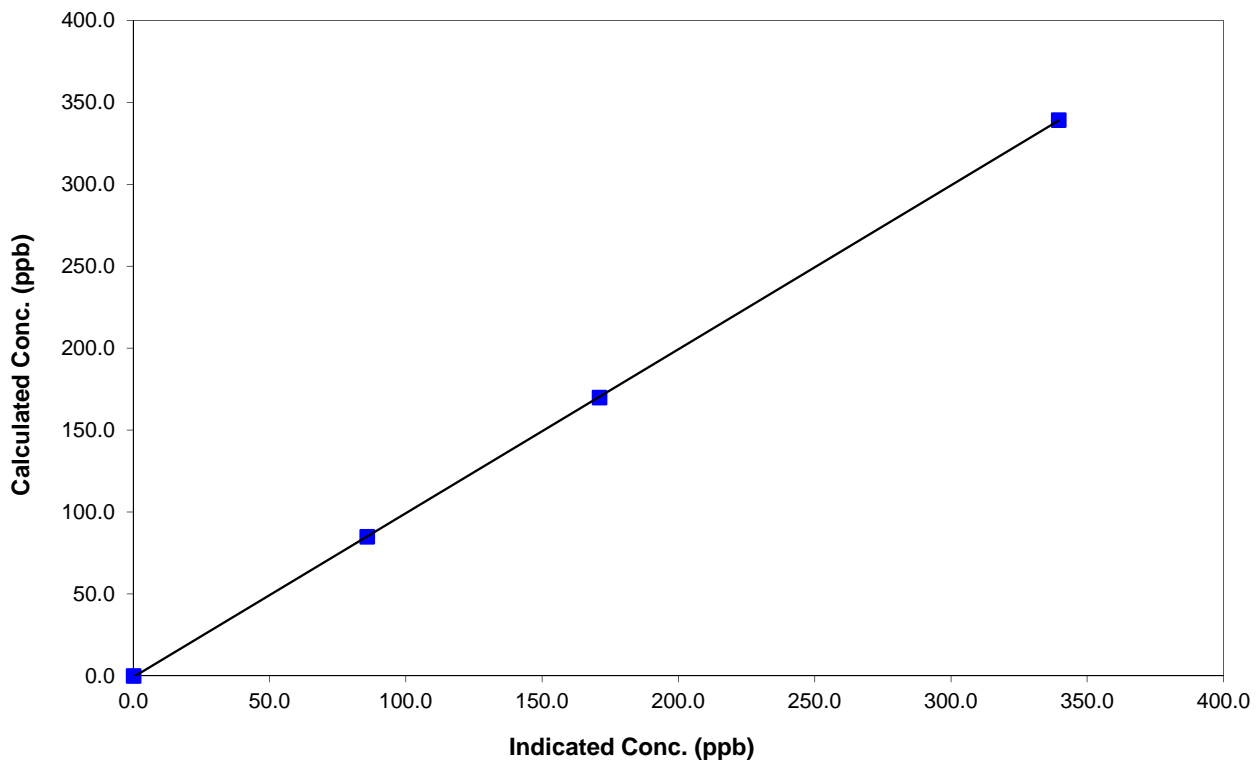
### Station Information

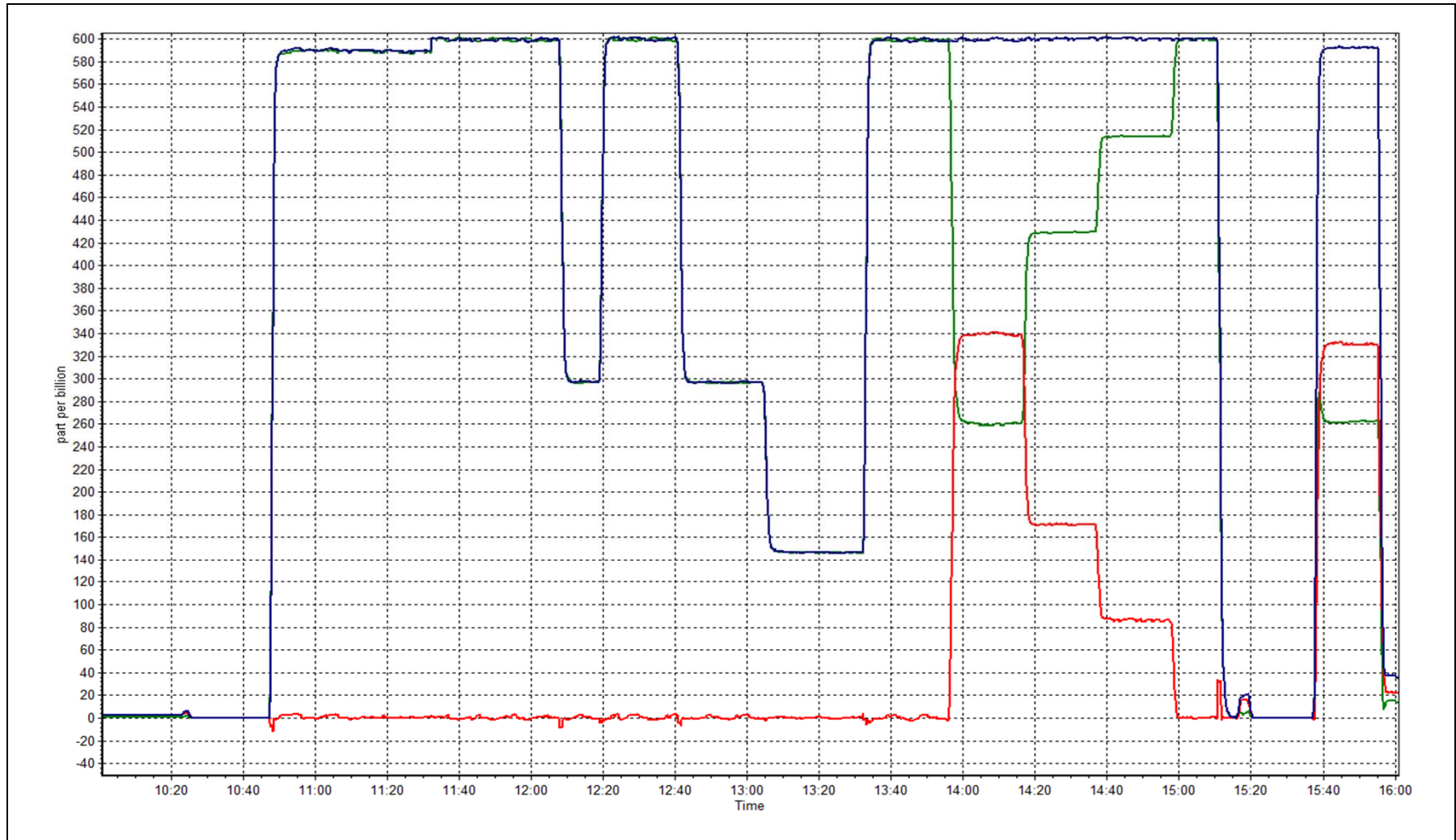
Calibration Date	February 12, 2015	Previous Calibration	January 15, 2015
Station Number	Athabasca Valley	Station Number	AMS 7
Start Time (MST)	10:25	End Time (MST)	16:00
Analyzer make	Thermo 42c	Analyzer serial #	601114773

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999988
339.3	339.5	0.9992		
170.0	171.2	0.9930	Slope	1.000163
84.9	85.9	0.9888		
			Intercept	-0.671796

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







# Wood Buffalo Environmental Association

## CO Calibration Report

### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 27, 2015
Station Name	Athabasca Valley	Station Number	7
Reason:	Routine	Install	Removal
		Other:	REPAIR
Start Time (MST)	13:10	End Time (MST)	16:10
Barometric Pressure	735.1 mmHg	Station temp.	20 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11021107
Cal Gas Concentration	3060 ppm	Cal Gas Expiry Date	4/27/2015
Gas Cert Reference	LL 85940		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	5564
DACS input	ethernet connection	IP address	192.168.1.48

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	50	50	Chamber temp.	48.1	48.1
Analyzer Range (mv)	50	50	Pressure	746.2	737.3
Calculated slope	1.000803	1.003271	Flow	0.492	0.487
Calculated intercept	0.095555	0.096955	Intensity	199755	199606
Analyzer Background	0.892	1.244	S/R ratio	1.181130	1.131286
Analyzer Coefficient	1.009	1.089			

Analyzer make Thermo 48i-TLE Analyzer serial # 1408761381

### Calibration Data

Set Point	Dilution air 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	0.00	0.0	0.3	N/A
as found span	5000	67.70	41.4	42.3	0.980
calibrator zero	5000	0.00	0.0	0.0	N/A
high point	5000	67.70	41.4	41.3	1.004
second point	5000	34.20	20.9	20.6	1.014
third point	5000	14.70	9.0	8.8	1.018
calibrator zero					
as left zero	5000	0.00	0.0	0.0	N/A
as left span	5000	67.70	41.4	41.1	1.008
Average Correction Factor					1.012

Corrected As found 42.0 Previous response 41.4 % change -1.4%

**Notes:**

Changed the inlet filter after the as founds. Adjusted zero. No adjustments on span.

Calibration Performed By: Asad Hidayat





# Wood Buffalo Environmental Association

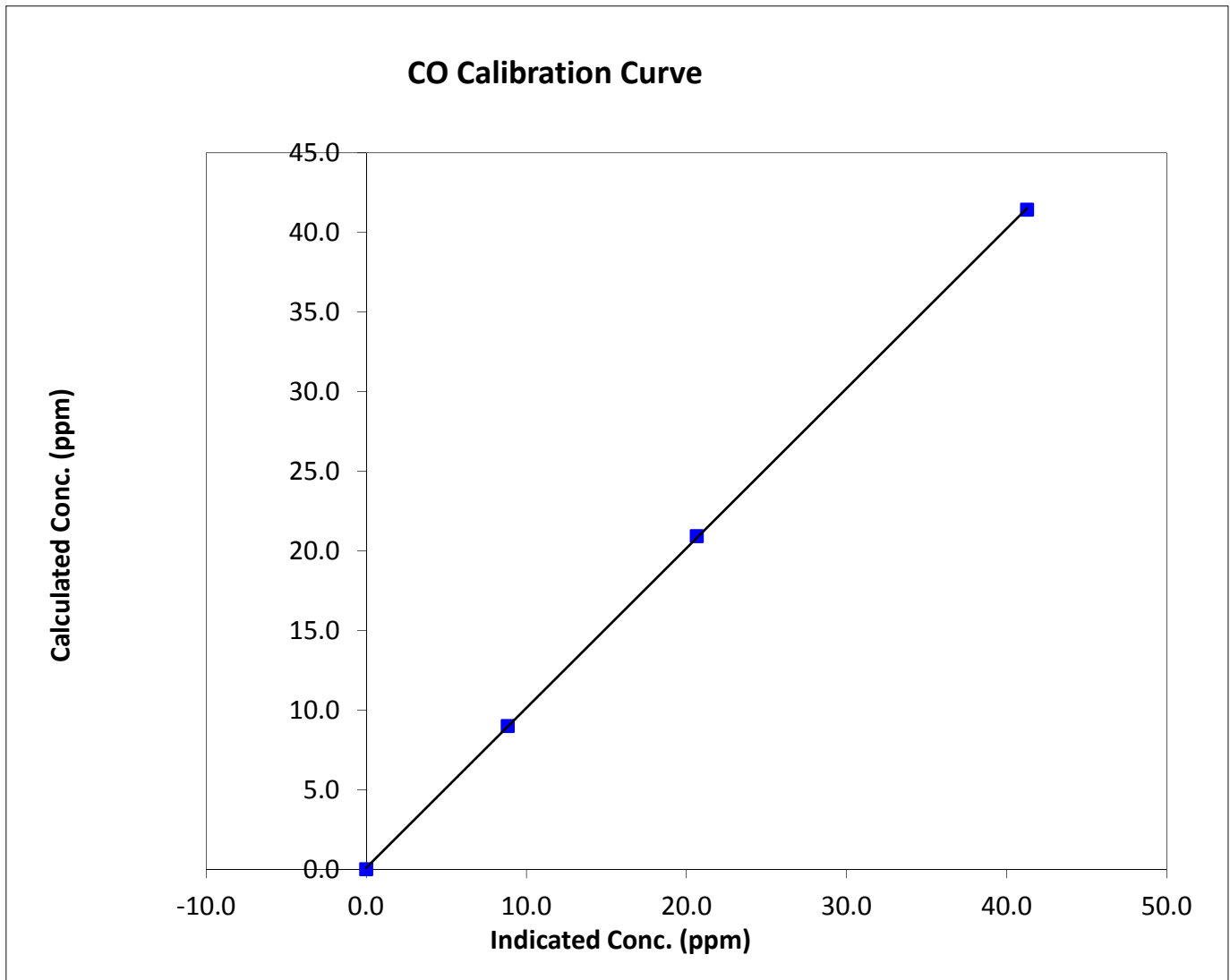
## CO Calibration Summary

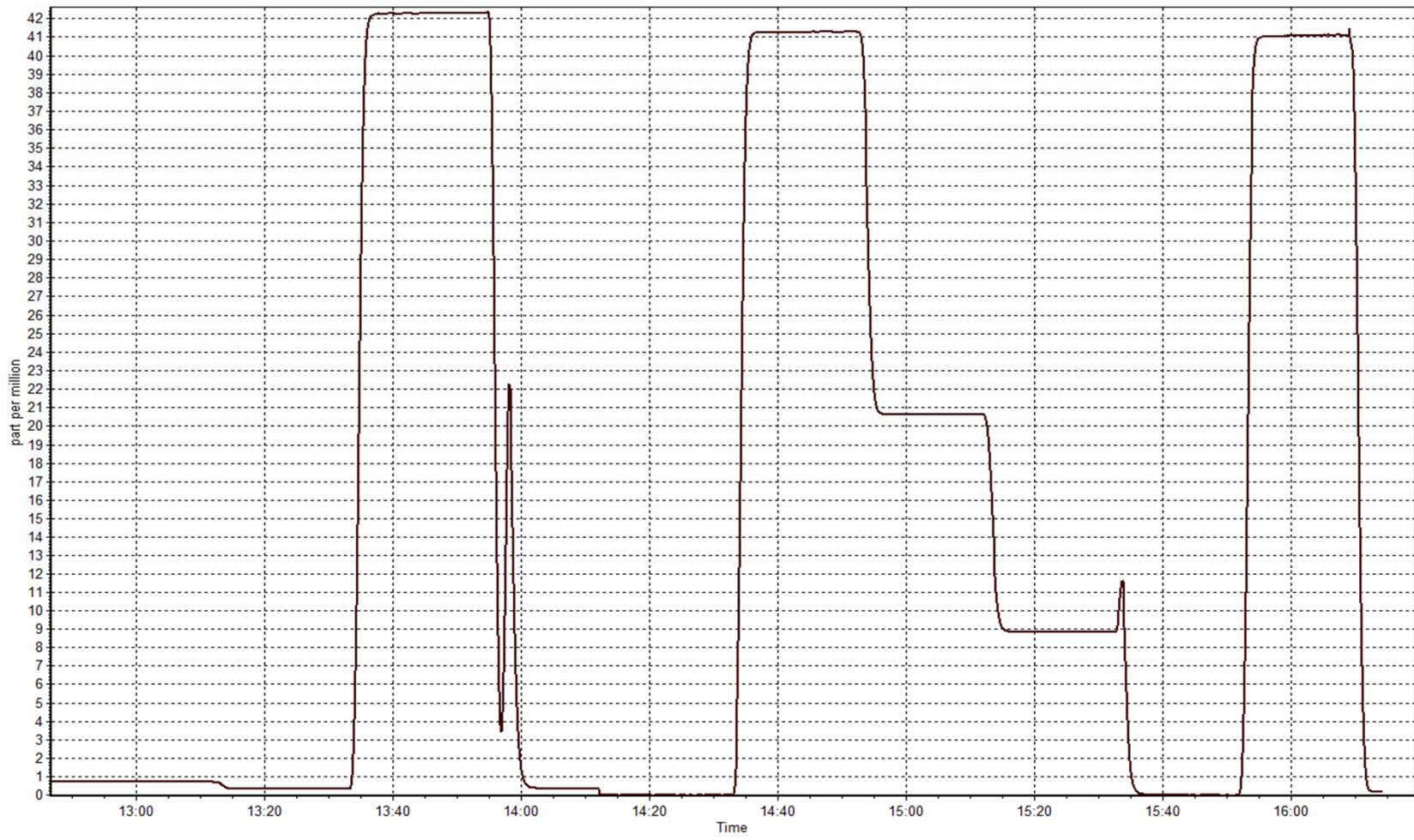
### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 27, 2015
Station Name	Athabasca Valley	Station Number	7
Start Time (MST)	13:10	End Time (MST)	16:10
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	N/A	Correlation Coefficient	0.999970
41.4	41.3	1.0039		
20.9	20.6	1.0141	Slope	1.003271
9.0	8.8	1.0177		
			Intercept	0.096955





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 8  
FORT CHIPEWYAN  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
 FEBRUARY 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
SO <sub>2</sub> (ppb) Average	637	35	35	100.00	11	0	1	0
O <sub>3</sub> (ppb) Average	641	31	31	100.00	36	0	33	-
NO <sub>2</sub> (ppb) Average	637	35	35	100.00	24	0	8	-
NO(ppb) Average	637	35	35	100.00	5	-	1	-
NOX(ppb) Average	637	35	35	100.00	25	-	9	-
PM <sub>2.5</sub> (ug/m <sup>3</sup> ) Average	666	0	6	99.11	30.1	-	11.0	0
Wind Speed 10 m (km/h) Average	670	0	2	99.70	45	-	-	-
Wind Direction 10 m (deg) Average	670	0	2	99.70	-	-	-	-
Temperature 2 m (C) Average	672	0	0	100.00	-3.1	-	-7.6	-
Relative Humidity (%) Average	672	0	0	100.00	92	-	-	-
Precipitation (mm) Total	672	0	0	100.00	0	-	-	-
Global Solar Radiation (W/m <sup>2</sup> ) Average	672	0	0	100.00	521	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
FEBRUARY 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	637	0.3	1	-	0	0	0	0	0	1	11
O3(ppb) Average	641	28.3	4	-	3	24	26	29	31	33	36
NO2(ppb) Average	637	2.7	3	-	0	1	1	2	3	5	24
NO(ppb) Average	637	0.3	0	-	0	0	0	0	0	1	5
NOX(ppb) Average	637	3	3	-	0	1	1	2	3	6	25
PM2.5(ug/m3) Average	666	4.63	2.8	-	1.4	2.4	3	4	5.2	7.5	30.1
Wind Speed 10 m (km/h) Average	670	13.4	8	-	1	6	8	11	17	24	45
Wind Direction 10 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-
Temperature 2 m (C) Average	672	-21.06	6.6	-	-36.2	-28.6	-25.9	-22.2	-17	-11.8	-3.1
Relative Humidity (%) Average	672	74.2	7	-	42	65	71	75	78	82	92
Precipitation (mm) Total	672	-	-	0	0	0	0	0	0	0	0
Global Solar Radiation (W/m2) Average	672	75.3	126	-	0	0	0	1	107	297	521

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT CHIPEWYAN (AMS 8)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
PM2.5	14 Feb 2015 04:00	14 Feb 2015 09:00	6	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	07 Feb 2015 20:00	07 Feb 2015 20:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	11 Feb 2015 06:00	11 Feb 2015 06:00	1	Flat line in sensor output signal -sensor frozen

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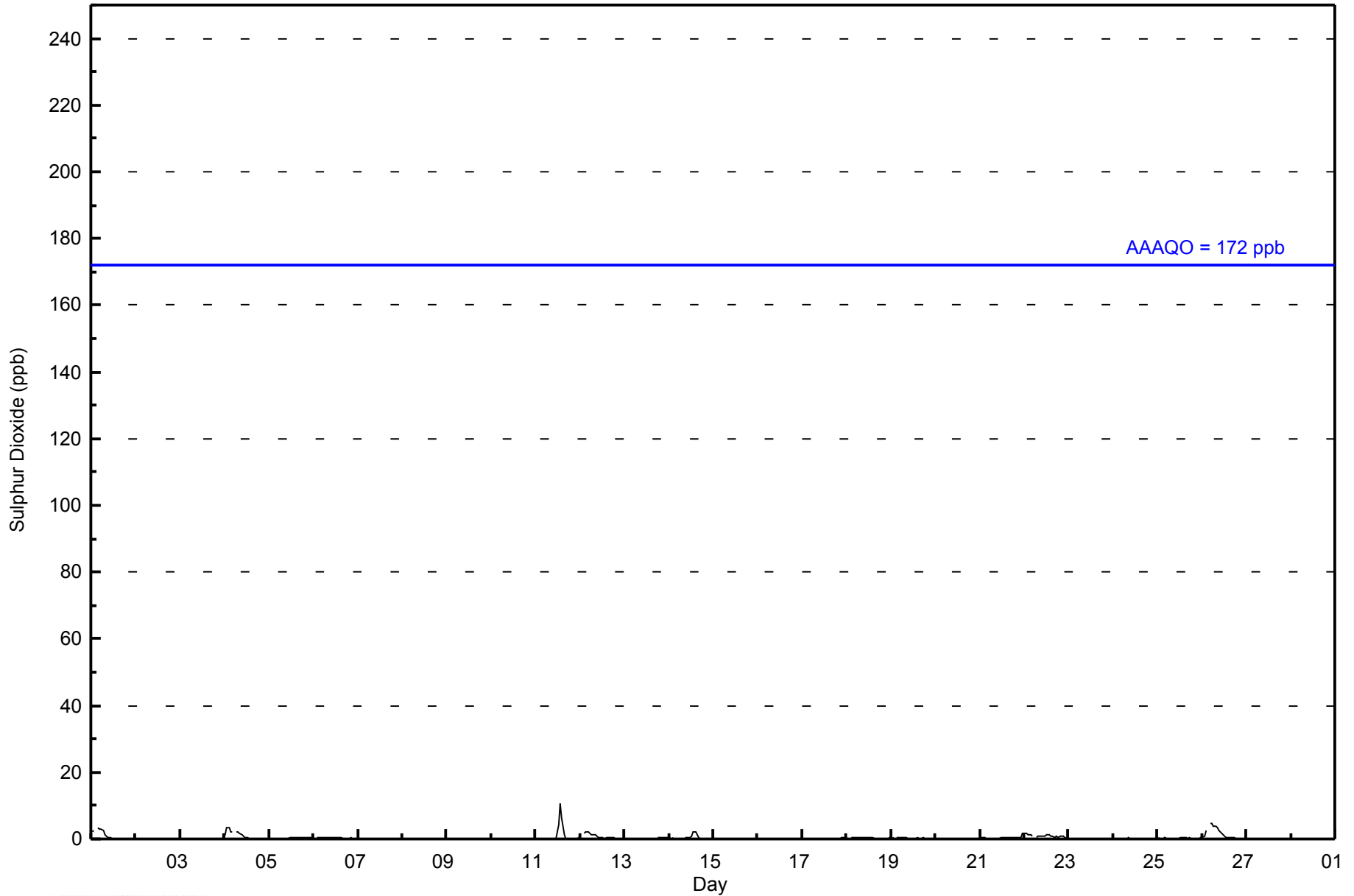


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																	
Maximum Value: 11 ppb on Feb 11 14:00										Maximum Daily Average: 1.4 ppb on Feb 26										Hours of Data: 637							
Minimum Value: 0 ppb on Feb 24 00:00										Minimum Daily Average: 0.0 ppb on Feb 27										Hours of Missing Data: 35							
Maximum Diurnal Average: 0.6 ppb at hour 14										Minimum Diurnal Average: 0.1 ppb at hour 23										Hours of Calibration: 35							
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> =4										Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2	3	Z	3	3	3	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	3
2-Feb	0	0	0	Z	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-Feb	0	0	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-Feb	1	3	3	2	2	Z	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	3
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Feb	0	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
10-Feb	0	0	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-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	4	11	6	1	0	0	0	0	0	0	0	0	0	1.0	11
12-Feb	0	Z	2	2	2	2	1	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.7	2
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0.4	2
15-Feb	0	0	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-Feb	0	0	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-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
18-Feb	0	Z	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	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
22-Feb	2	2	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0.9	2
23-Feb	Z	0	0	0	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-Feb	0	Z	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-Feb	0	0	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-Feb	0	1	3	Z	5	5	4	4	3	3	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1.4	5
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0
28-Feb	0	0	0	0	0	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 0.5 0.5 0.5 0.6 0.5 0.5 0.4 0.4 0.3 0.3 0.2 0.4 0.6 0.5 0.2 0.2 0.2 0.1 0.2 0.1 0.1 0.1 0.1 0.2																								Diurnal Average			
2 3 3 3 5 5 4 4 3 3 2 1 4 11 6 1 1 1 0 1 1 1 0 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**  
**Fort Chipewyan - February 2015**





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	636	99.84	99.84
11 - 20	1	0.16	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: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort Chipewyan - February 2015**

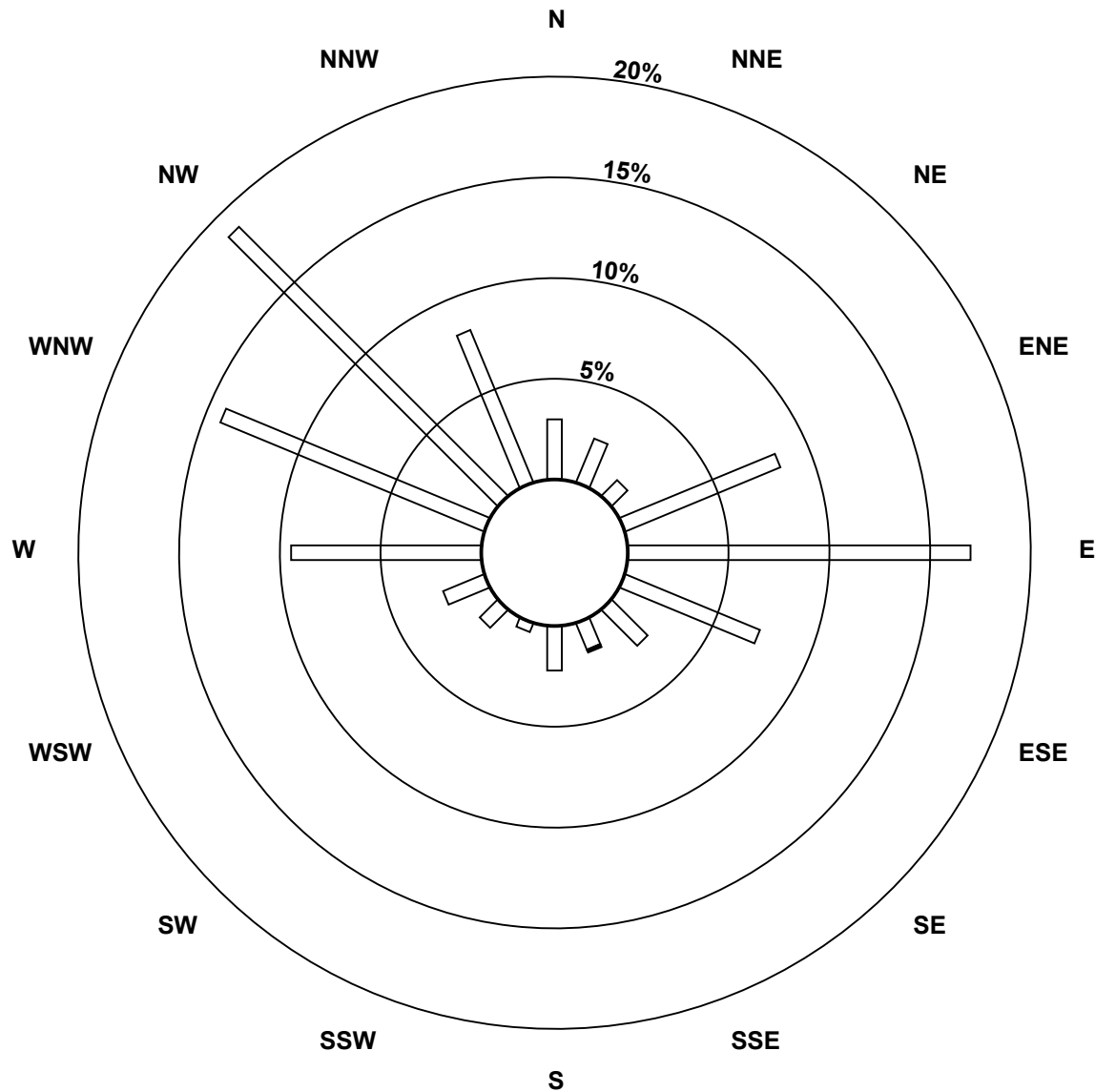
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	19	15	7	53	108	46	16	9	14	3	8	14	60	90	120	52	634
11 - 20	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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>	19	15	7	53	108	46	16	10	14	3	8	14	60	90	120	52	635

Total Number of Valid Hours: 635

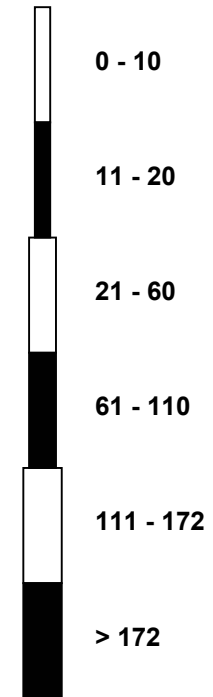
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)



Classes (ppb)

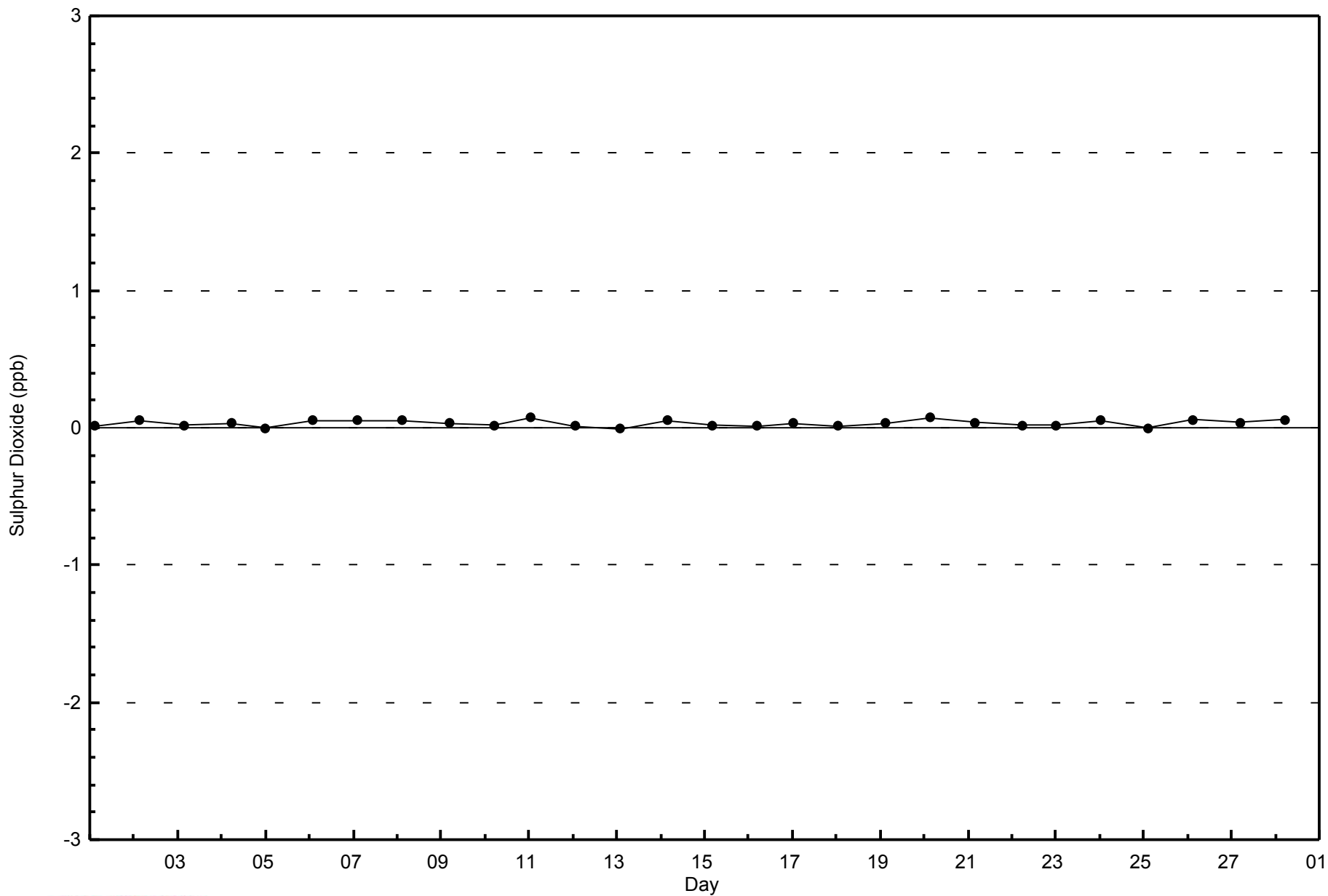


Total Number of Valid Hours: 635



WBEA  
Zero Responses

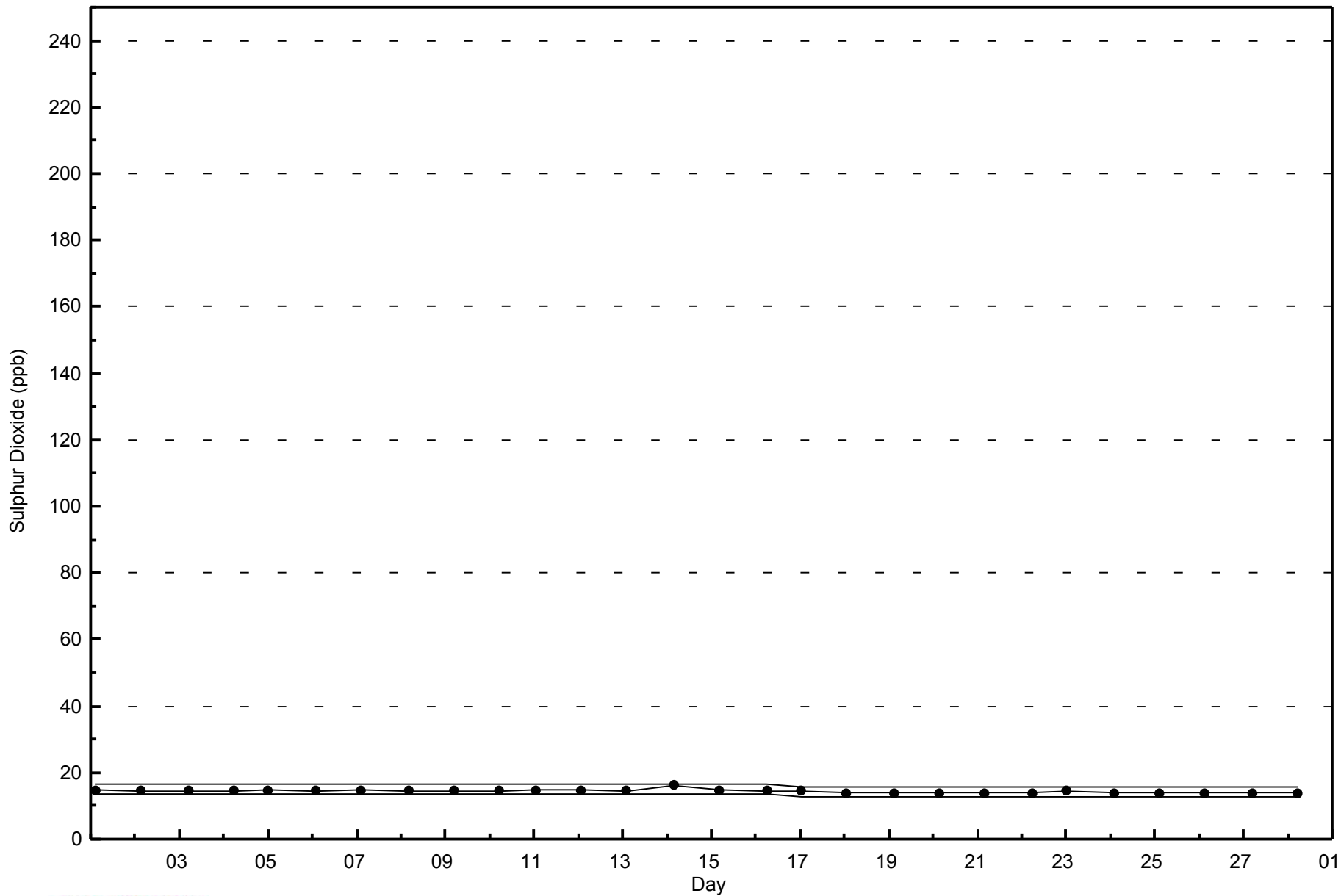
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort Chipewyan - February 2015





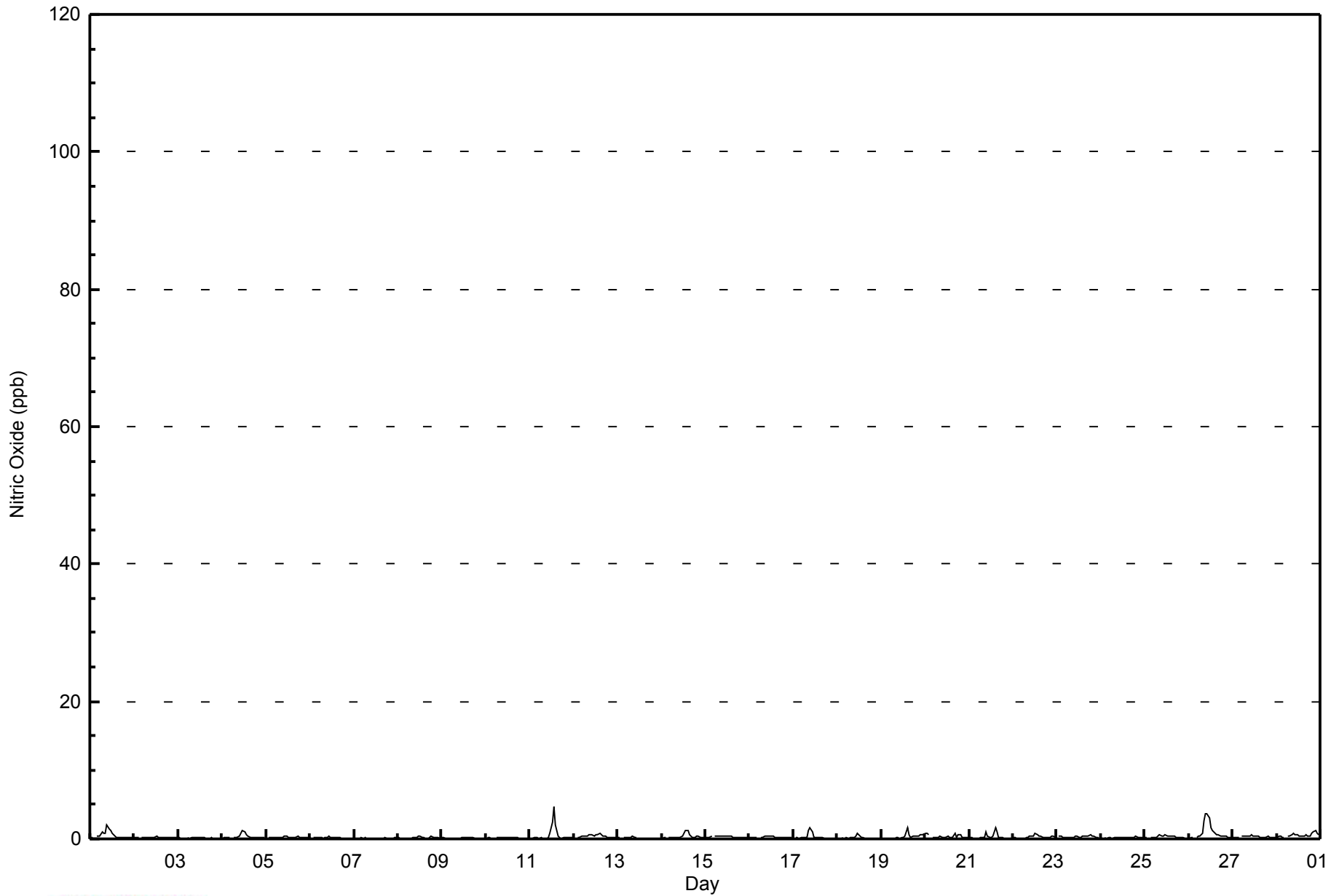
Maximum Value: 5 ppb on Feb 11 14:00																	Maximum Daily Average: 1.0 ppb on Feb 26																	Hours in Service: 672	
Minimum Value: 0 ppb on Feb 4 00:00																	Minimum Daily Average: 0.1 ppb on Feb 7																	Hours of Data: 637	
Maximum Diurnal Average: 0.6 ppb at hour 14																	Minimum Diurnal Average: 0.2 ppb at hour 1																	Hours of Missing Data: 35	
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																	Hours of Calibration: 35	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Feb	0	0	Z	0	0	0	1	1	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2								
2-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1								
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0								
6-Feb	0	Z	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-Feb	0	0	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-Feb	0	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0								
10-Feb	0	0	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-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	2	5	2	0	0	0	0	0	0	0	0	0	0	0.6	5								
12-Feb	0	Z	0	0	0	0	0	0	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1								
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	C	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0								
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1								
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0								
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0								
17-Feb	Z	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	2								
18-Feb	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1								
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	1	1	1	0.3	2								
20-Feb	1	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0.3	1								
21-Feb	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0.3	2								
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1								
23-Feb	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	0.3	1								
24-Feb	0	Z	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-Feb	0	0	Z	0	0	0	0	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0.3	1								
26-Feb	0	0	0	Z	0	0	0	1	3	4	4	3	2	1	1	1	1	0	0	0	0	0	0	0	0	1.0	4								
27-Feb	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	0.3	1								
28-Feb	0	0	0	0	0	Z	0	0	1	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	0.5	1								
																								Diurnal Average											
																								Diurnal Maximum											
0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.4 0.5 0.5 0.5 0.5 0.6 0.5 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																																			
1 1 1 0 0 0 1 1 3 4 4 3 2 5 2 1 1 0 1 1 1 1 1 1 1 1 1																																			
Z - zerospan C - Calibration																																			





**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - February 2015**





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

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	637	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: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort Chipewyan - February 2015**

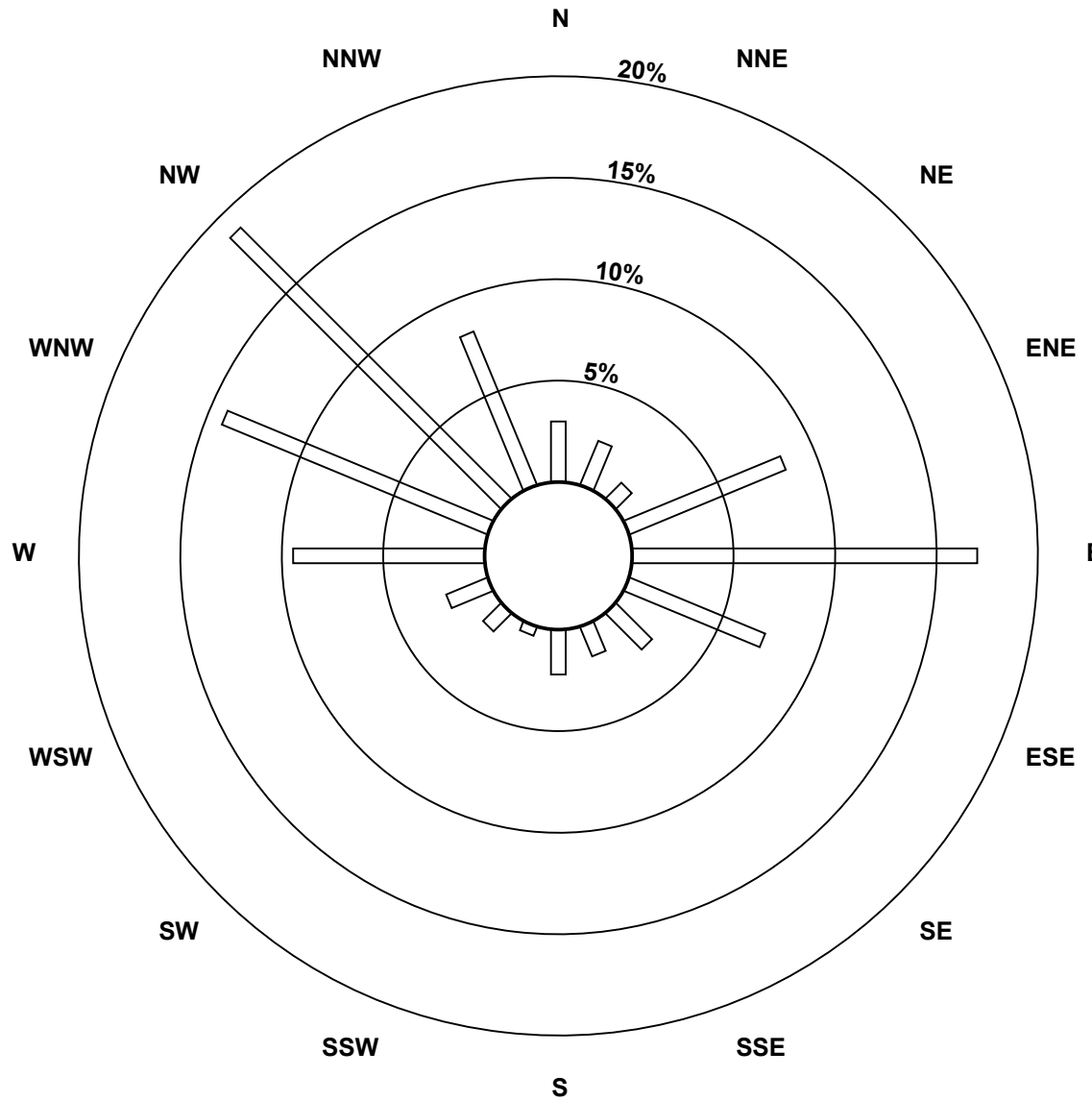
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	15	7	53	108	46	16	10	14	3	8	14	60	90	120	52	635
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	15	7	53	108	46	16	10	14	3	8	14	60	90	120	52	635

Total Number of Valid Hours: 635

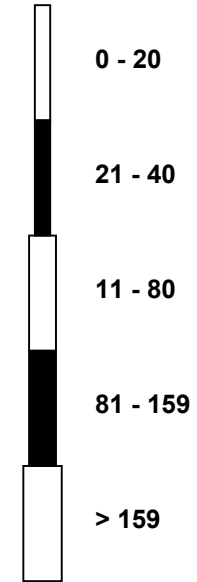
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitric Oxide (NO) - ppb  
Fort Chipewyan (AMS 8)



Classes (ppb)

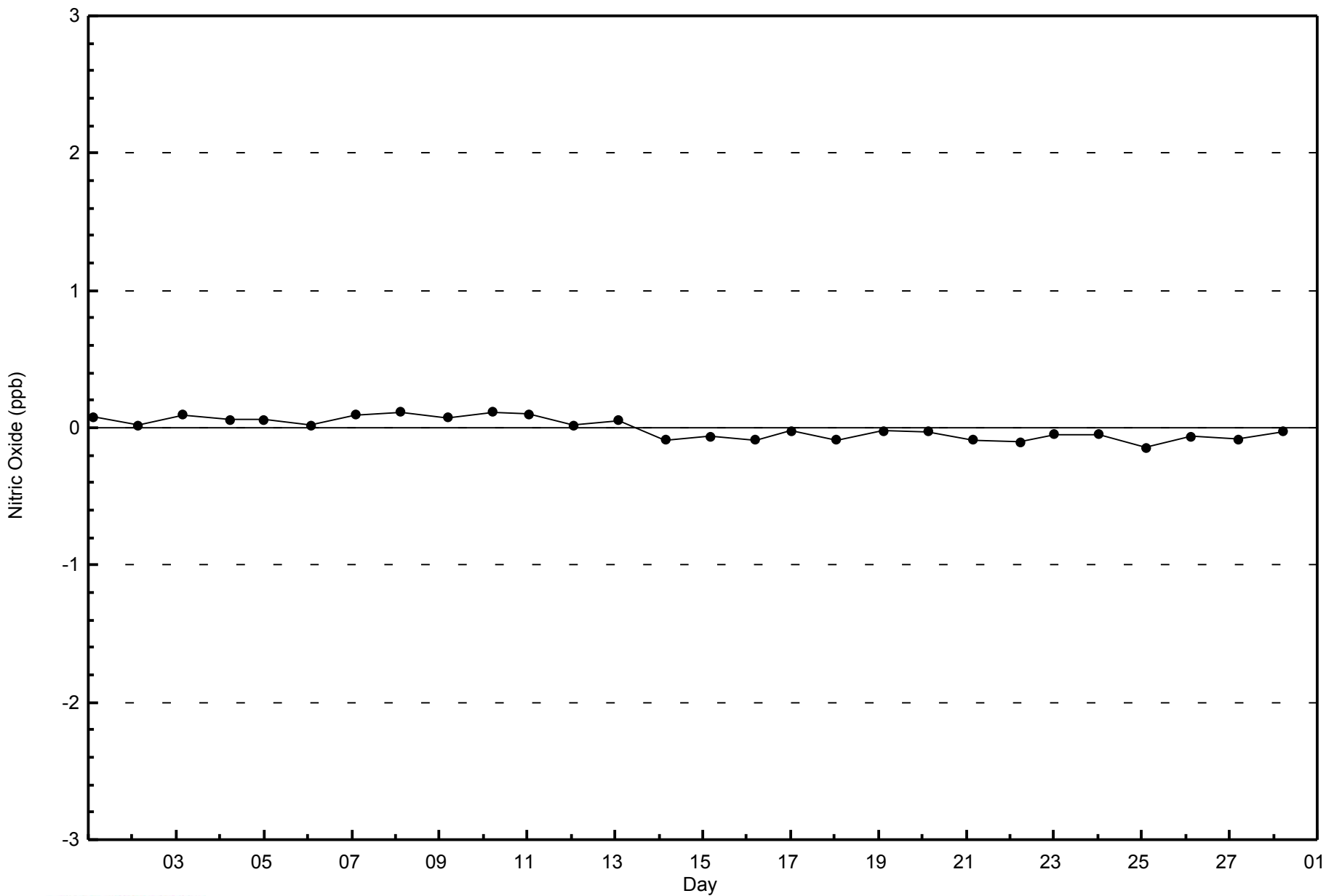


Total Number of Valid Hours: 635



WBEA  
Zero Responses

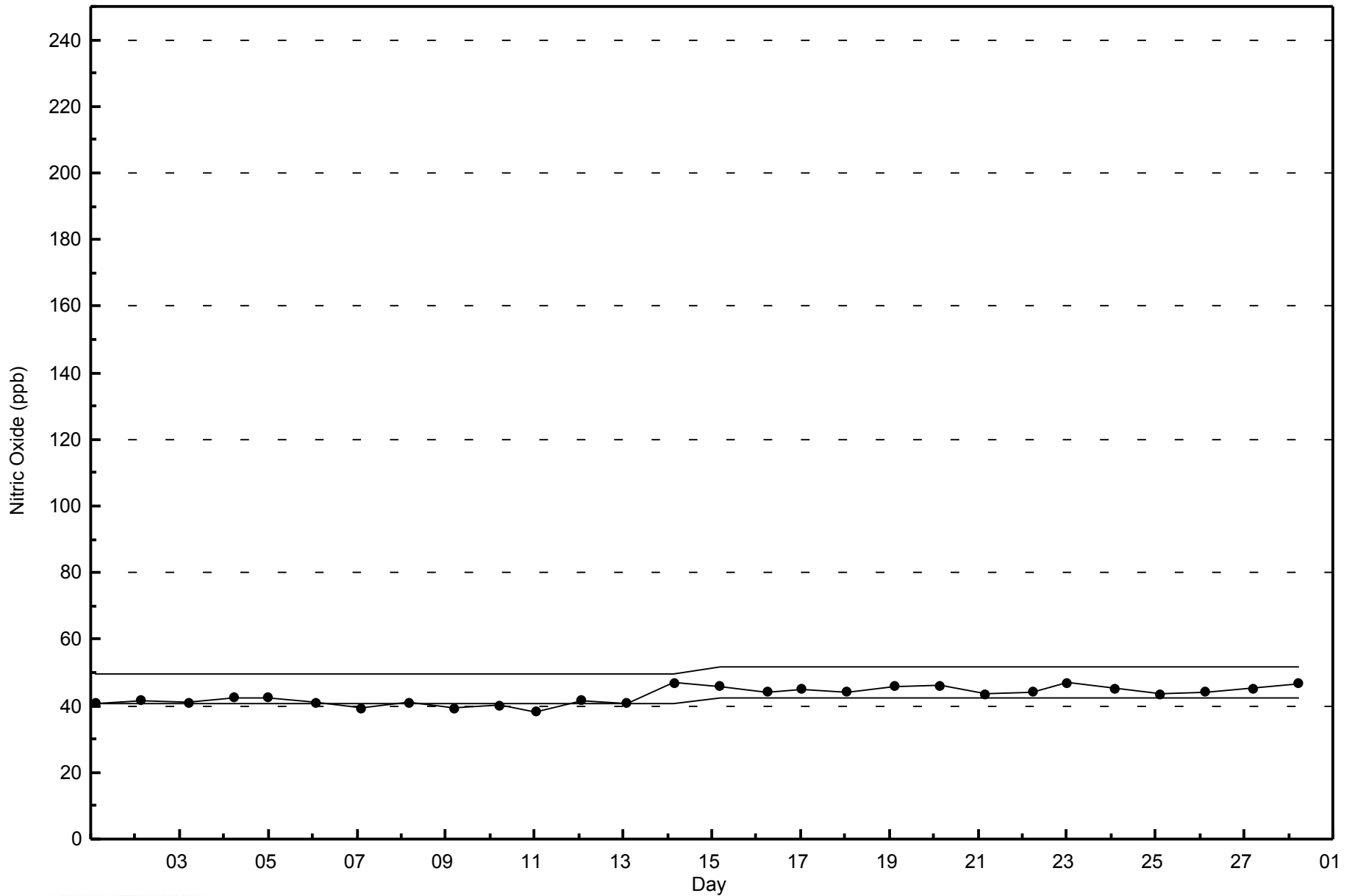
Nitric Oxide (NO) - ppb  
Fort Chipewyan - February 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort Chipewyan - February 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 24 ppb on Feb 1 07:00	Maximum Daily Average: 8.3 ppb on Feb 26		Hours of Data:	637
Minimum Value: 0 ppb on Feb 13 23:00	Minimum Daily Average: 0.9 ppb on Feb 6		Hours of Missing Data:	35
Maximum Diurnal Average: 3.5 ppb at hour 7	Minimum Diurnal Average: 1.8 ppb at hour 24		Hours of Calibration:	35
Monthly Average: 2.7 ppb	Percentiles: P <sub>1</sub> = 0 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> = 18		Percent Operational Time:	100.0

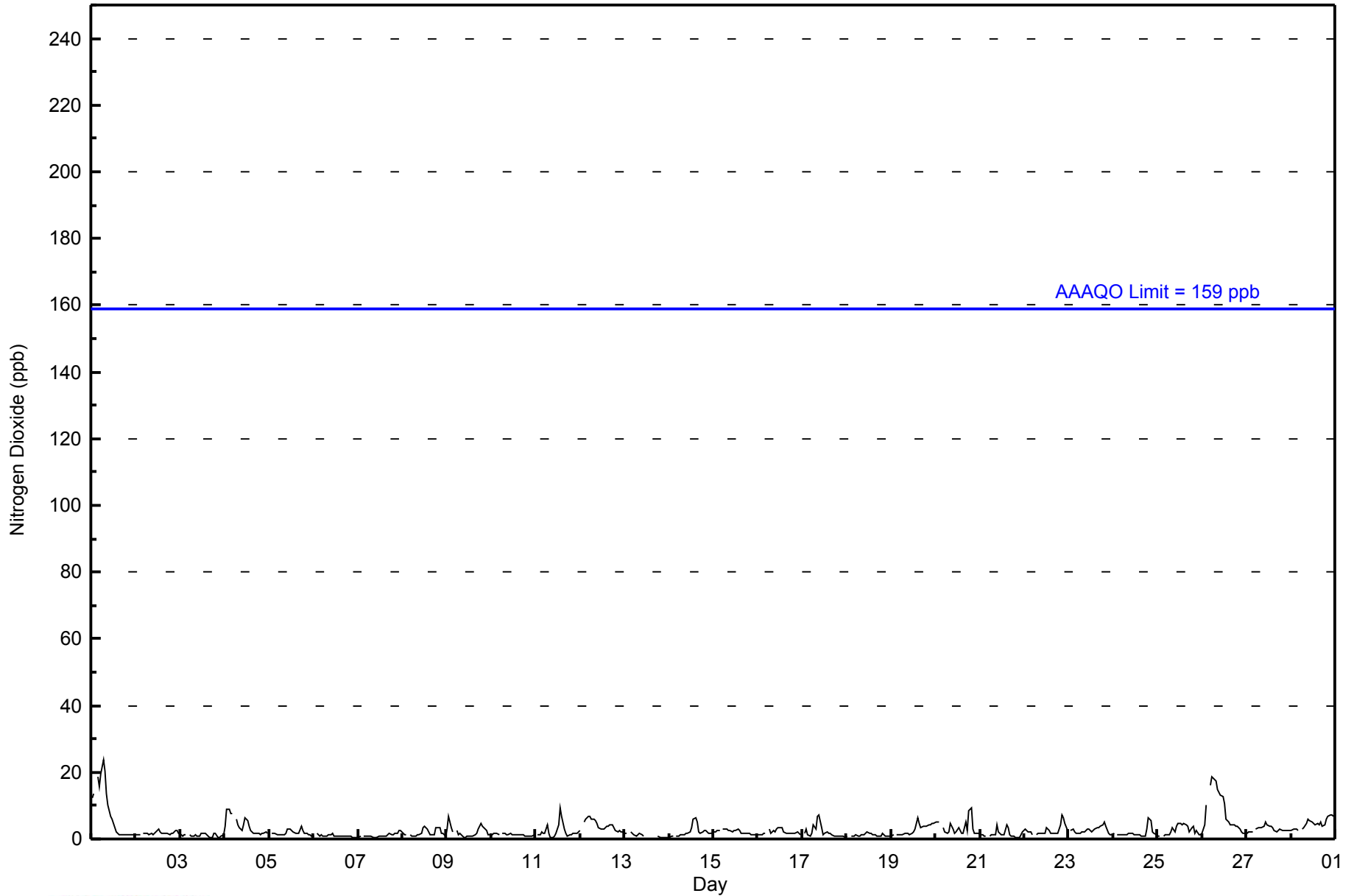
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	12	14	Z	19	16	19	24	20	14	10	7	6	5	2	2	1	1	1	1	1	1	1	1	1	7.8	24	
2-Feb	1	1	1	Z	2	2	2	1	2	1	2	2	3	2	2	2	2	2	1	2	2	3	2	2	1.7	3	
3-Feb	1	1	1	1	Z	1	1	1	1	1	1	2	2	2	1	1	1	1	2	2	0	0	1	1	1.1	2	
4-Feb	4	9	9	8	8	Z	6	4	3	3	4	6	5	4	3	2	2	2	2	1	2	2	2	2	3.9	9	
5-Feb	Z	2	2	2	1	1	1	1	1	2	3	3	3	2	2	2	2	2	4	3	2	1	1	1	1.8	4	
6-Feb	1	Z	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	2	
7-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	2	2	2	3	1.1	3	
8-Feb	2	1	1	Z	1	1	1	1	1	1	2	3	4	3	2	1	1	1	4	3	3	2	2	1	1.9	4	
9-Feb	3	7	4	2	Z	3	1	2	1	1	1	1	1	1	1	1	2	3	5	4	4	3	1	1	2.1	7	
10-Feb	1	2	2	2	1	Z	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.3	2	
11-Feb	Z	1	1	2	2	2	4	2	1	0	1	2	4	10	7	3	2	1	1	1	2	2	2	2	2.3	10	
12-Feb	2	Z	5	6	7	7	6	6	5	5	4	3	3	3	4	4	4	4	3	2	2	2	2	2	4.0	7	
13-Feb	2	2	Z	2	2	1	1	1	2	1	1	C	C	C	C	C	C	C	1	0	0	0	0	1	--	2	
14-Feb	1	1	1	Z	1	1	1	1	1	2	2	2	4	6	6	5	2	2	2	2	2	2	2	2	2.2	6	
15-Feb	2	2	2	3	Z	3	3	3	3	3	2	2	2	3	3	2	2	2	2	2	1	1	1	1	2.2	3	
16-Feb	1	1	1	2	2	Z	3	2	3	2	3	3	3	3	2	2	2	2	2	2	2	2	2	1	2.0	3	
17-Feb	Z	2	3	1	1	2	4	3	7	7	3	1	2	2	2	2	1	1	1	1	1	1	1	1	2.1	7	
18-Feb	1	Z	1	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	2	1	1	1	1	1.2	2	
19-Feb	1	1	Z	1	1	1	1	2	2	2	1	2	2	3	6	5	3	4	4	4	4	4	5	5	2.8	6	
20-Feb	5	5	5	Z	3	2	2	2	5	3	2	2	4	3	2	2	5	3	9	9	3	2	2	2	3.4	9	
21-Feb	1	1	1	1	Z	1	1	1	1	4	2	1	1	1	4	3	1	1	1	1	1	1	1	2	1.5	4	
22-Feb	3	3	2	2	1	Z	1	2	2	2	2	2	3	3	2	2	2	2	2	4	7	6	5	3	2.6	7	
23-Feb	Z	3	3	2	2	2	2	2	2	2	3	3	2	3	3	3	3	4	4	5	4	2	1	1	2.6	5	
24-Feb	2	Z	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	1	3	6	5	2	2	1	1.8	6	
25-Feb	1	1	Z	1	1	1	1	2	3	2	4	5	5	4	5	4	4	2	4	4	2	3	1	1	2.6	5	
26-Feb	2	4	10	Z	16	19	18	17	15	14	13	13	10	6	5	4	4	4	4	4	4	3	2	2	2	8.3	19
27-Feb	2	2	2	2	Z	3	3	4	3	4	5	4	4	4	4	2	2	2	3	3	3	3	3	3	3.0	5	
28-Feb	3	3	3	3	3	Z	3	4	5	6	6	5	5	4	5	4	5	4	4	4	6	7	7	7	4.6	7	
	2.3	2.9	2.8	2.8	3.2	3.3	3.5	3.2	3.1	3.0	2.8	3.0	3.0	3.0	2.8	2.3	2.1	2.1	2.4	2.7	2.4	2.1	1.9	1.8		Diurnal Average	
	12	14	10	19	16	19	24	20	15	14	13	13	10	10	7	5	5	4	9	9	7	7	7	7		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  
Fort Chipewyan - February 2015







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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	636	99.84	99.84
21 - 40	1	0.16	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: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort Chipewyan - February 2015**

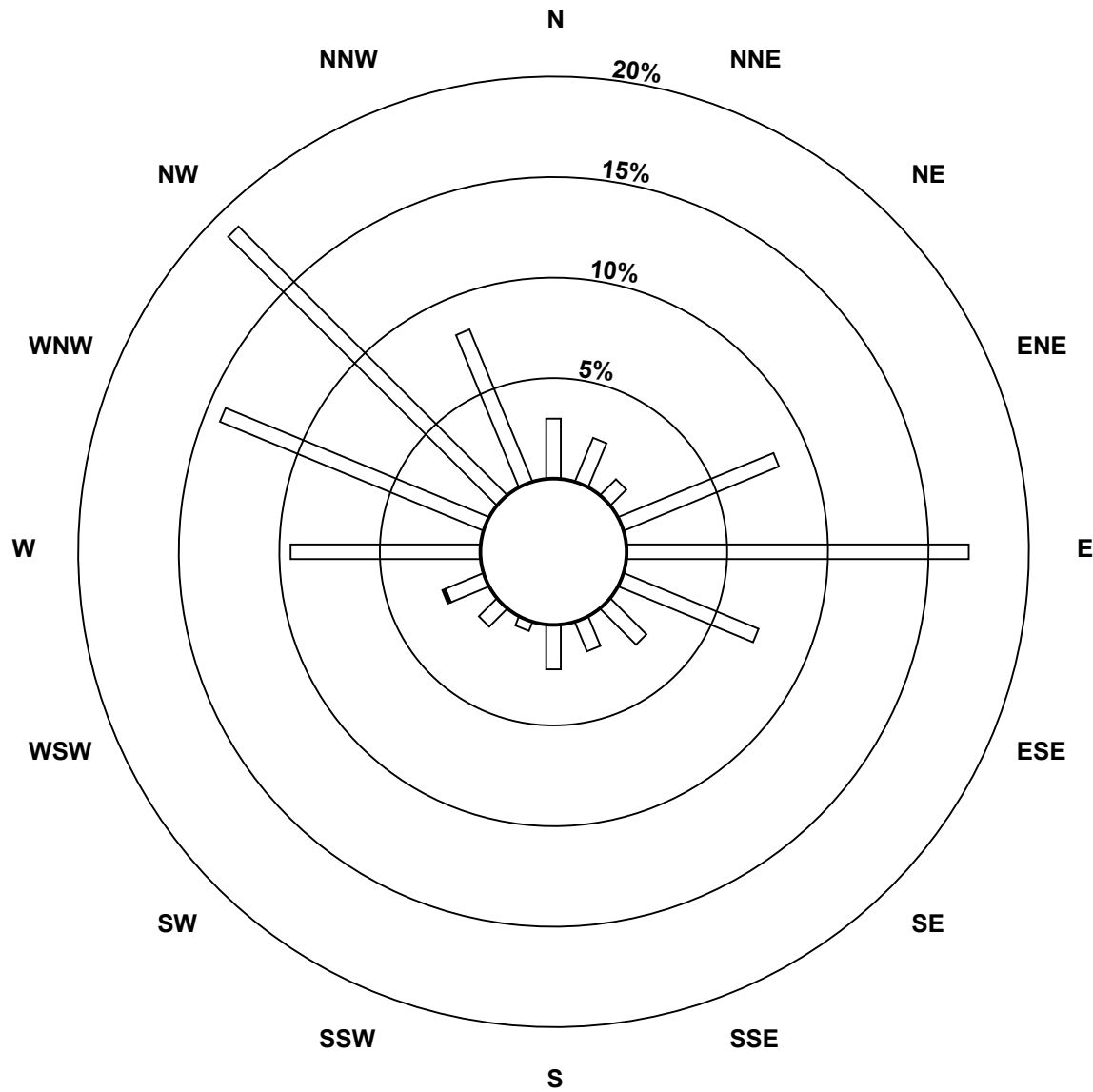
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	15	7	53	108	46	16	10	14	3	8	13	60	90	120	52	634
21 - 40	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	15	7	53	108	46	16	10	14	3	8	14	60	90	120	52	635

Total Number of Valid Hours: 635

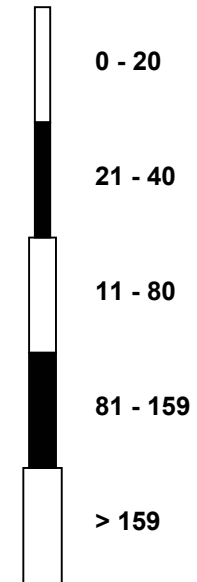
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan (AMS 8)



Classes (ppb)

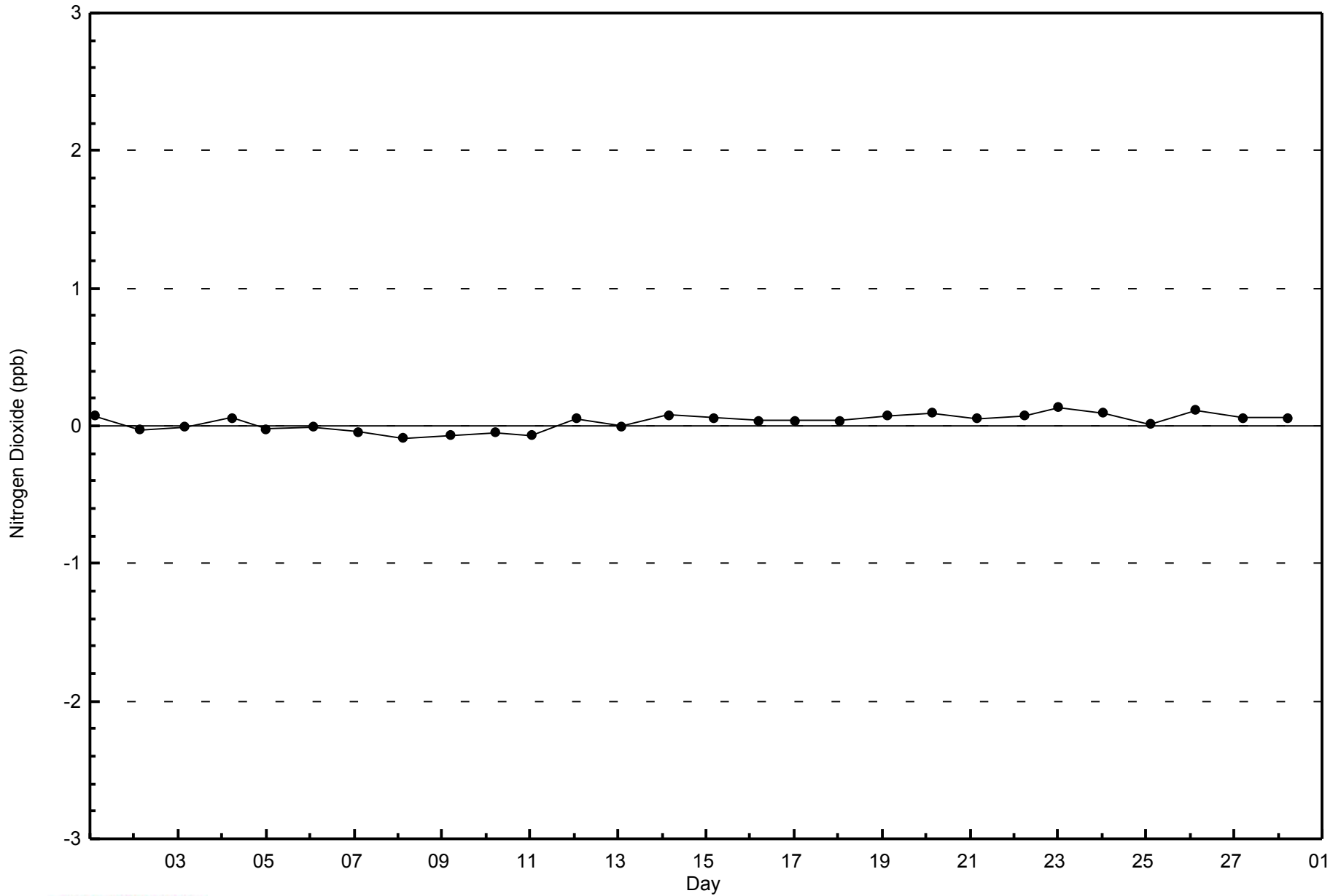


Total Number of Valid Hours: 635



WBEA  
Zero Responses

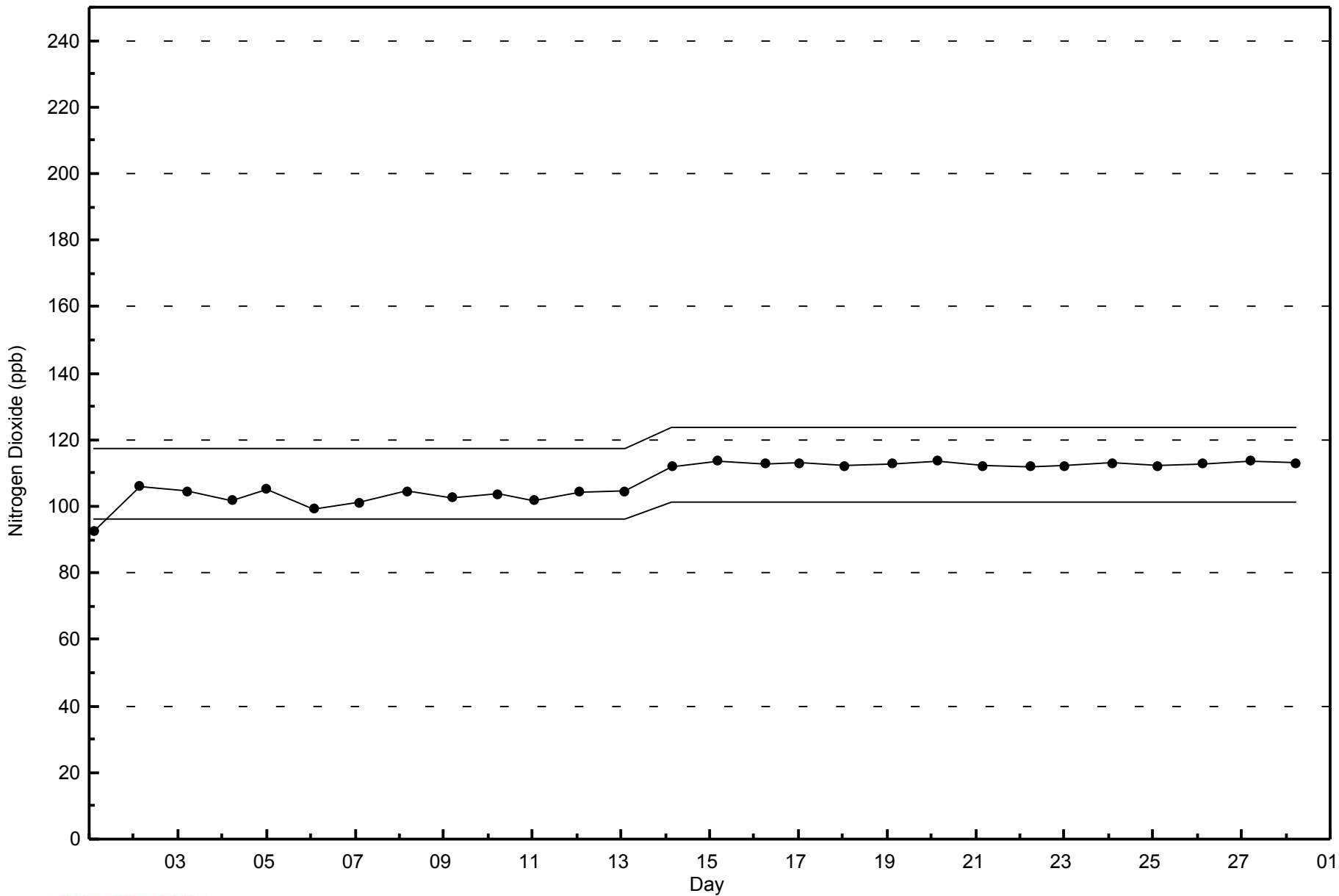
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort Chipewyan - February 2015



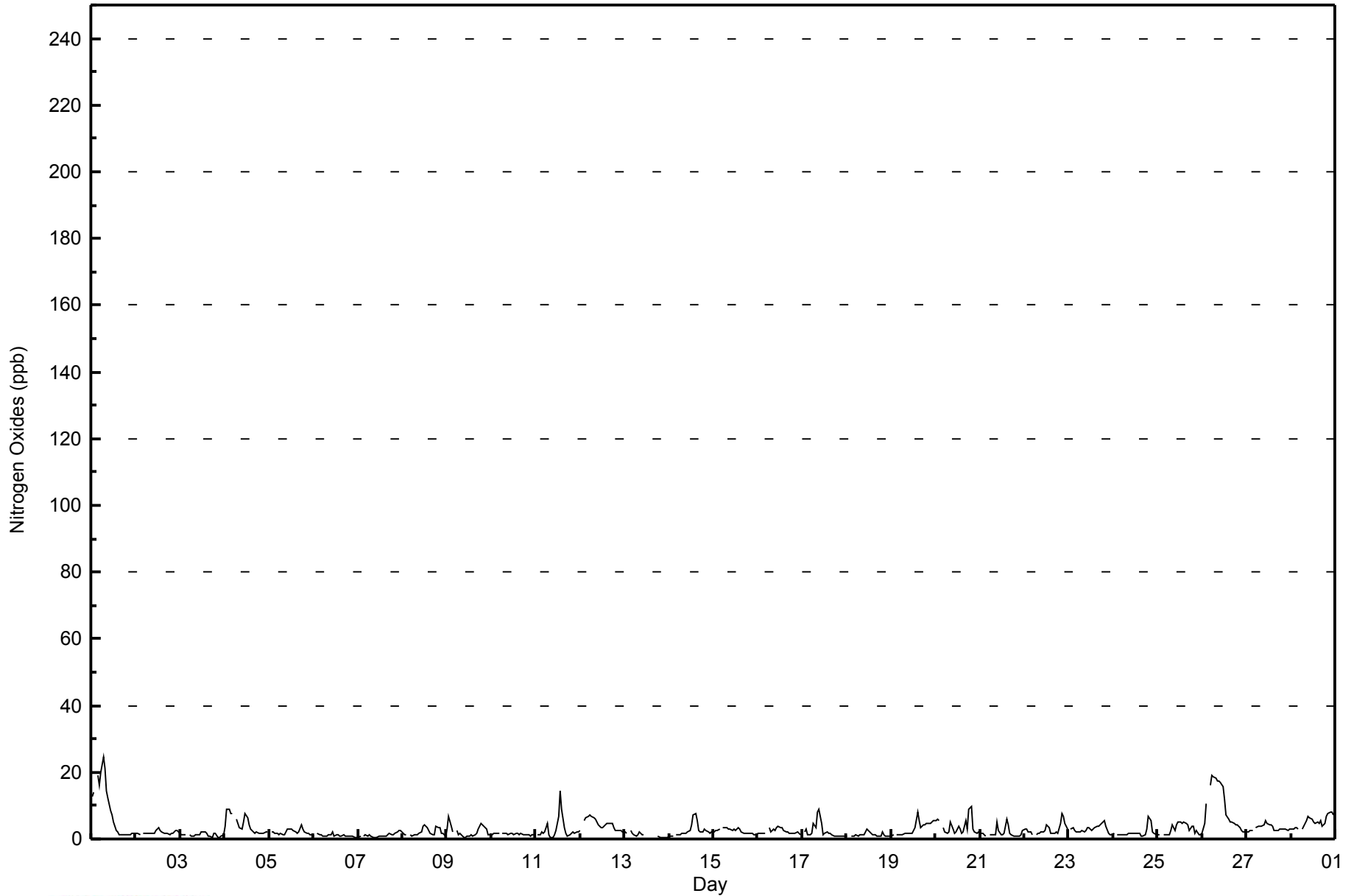


Maximum Value: 25 ppb on Feb 1 07:00																	Maximum Daily Average: 9.3 ppb on Feb 26																	Hours in Service: 672	
Minimum Value: 0 ppb on Feb 13 21:00																	Minimum Daily Average: 1.1 ppb on Feb 6																	Hours of Data: 637	
Maximum Diurnal Average: 3.7 ppb at hour 7																	Minimum Diurnal Average: 1.9 ppb at hour 24																	Hours of Missing Data: 35	
Monthly Average: 3.0 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 6 P <sub>99</sub> = 19																	Hours of Calibration: 35	
																	Percent Operational Time: 100.0																		
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Feb	13	14	Z	19	16	20	25	21	15	12	8	7	5	3	2	1	1	1	1	1	1	1	2	2	8.4	25									
2-Feb	2	2	1	Z	2	2	2	1	2	2	2	2	3	2	2	2	2	2	1	2	2	3	3	2	1.9	3									
3-Feb	1	1	1	1	Z	1	1	1	1	1	1	2	2	2	2	1	1	1	2	2	0	0	1	1	1.2	2									
4-Feb	4	9	9	8	8	Z	6	5	4	3	5	8	6	4	3	2	2	2	2	2	2	2	2	4.2	9										
5-Feb	Z	2	2	2	2	1	2	1	1	2	3	3	3	2	2	2	2	2	4	3	2	1	1	1	2.0	4									
6-Feb	1	Z	2	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.1	2									
7-Feb	1	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	1	1	2	1	1	2	2	3	3	1.2	3									
8-Feb	2	1	1	Z	1	1	1	1	1	2	2	4	4	3	2	2	1	1	4	4	3	2	2	1	2.1	4									
9-Feb	3	7	4	2	Z	3	1	2	1	1	1	1	1	1	1	1	2	3	5	4	4	3	1	1	2.2	7									
10-Feb	1	2	2	2	1	Z	2	2	1	1	2	2	1	2	2	1	2	1	1	1	1	1	1	1	1.4	2									
11-Feb	Z	1	1	2	2	2	5	1	1	0	1	3	7	14	9	4	2	1	1	2	2	2	2	2	2.9	14									
12-Feb	3	Z	6	6	7	7	7	6	6	5	4	3	4	4	5	5	5	5	3	3	2	3	2	2	4.4	7									
13-Feb	2	2	Z	2	2	1	1	1	2	1	1	C	C	C	C	C	C	C	1	0	0	0	0	1	--	2									
14-Feb	1	1	1	Z	1	1	1	1	2	2	2	3	4	7	7	6	3	2	2	3	3	2	2	2	2.6	7									
15-Feb	2	3	3	3	Z	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	1	1	2.4	3									
16-Feb	2	2	2	2	2	Z	3	2	3	3	3	4	4	4	3	2	2	2	2	2	2	2	2	1	2.3	4									
17-Feb	Z	2	3	1	1	2	5	3	8	9	4	1	2	2	2	1	1	1	1	1	1	1	1	1	2.4	9									
18-Feb	1	Z	1	1	1	1	1	1	1	1	2	3	2	2	1	1	1	1	1	2	1	1	1	1	1.3	3									
19-Feb	1	1	Z	1	1	1	1	2	2	2	2	2	2	3	8	5	3	4	4	5	5	5	5	5	3.1	8									
20-Feb	6	6	6	Z	3	2	2	2	5	3	2	2	4	3	2	2	6	3	9	10	3	2	2	2	3.7	10									
21-Feb	1	2	1	1	Z	1	1	1	1	5	3	1	1	2	6	4	2	1	1	1	1	1	1	2	1.8	6									
22-Feb	3	3	2	2	1	Z	1	2	2	2	2	2	4	3	2	2	2	2	2	5	8	7	5	3	2.9	8									
23-Feb	Z	3	3	3	2	2	2	2	2	3	3	3	3	3	4	4	4	4	5	6	4	2	1	1	2.9	6									
24-Feb	2	Z	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	3	7	6	2	2	1	1.9	7									
25-Feb	1	1	Z	1	1	1	1	2	4	2	4	5	5	5	5	5	4	2	4	4	2	3	1	1	2.9	5									
26-Feb	2	4	11	Z	16	19	19	18	18	17	17	16	12	7	6	5	5	5	4	4	3	3	2	2	9.3	19									
27-Feb	2	2	3	3	Z	3	4	4	4	4	6	5	4	4	4	3	2	3	3	3	3	3	3	3	3.3	6									
28-Feb	3	3	3	3	3	Z	3	4	5	7	6	6	5	5	5	5	6	4	5	7	8	8	8	7	5.1	8									
2.4																	3.1																	Diurnal Average	
13																	14																	Diurnal Maximum	
3.0																	11																		
3.0																	19																		
3.4																	16																		
3.5																	20																		
3.7																	25																		
3.4																	21																		
3.5																	18																		
3.5																	17																		
3.3																	17																		
3.5																	16																		
3.5																	12																		
3.5																	14																		
3.3																	9																		
2.6																	6																		
2.4																	6																		
2.2																	5																		
2.7																	9																		
2.9																	10																		
2.6																	8																		
2.3																	8																		
2.0																	8																		
1.9																	7																		
Z - zerospan																								C - Calibration											



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan - February 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	635	99.69	99.69
21 - 40	2	0.31	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort Chipewyan - February 2015**

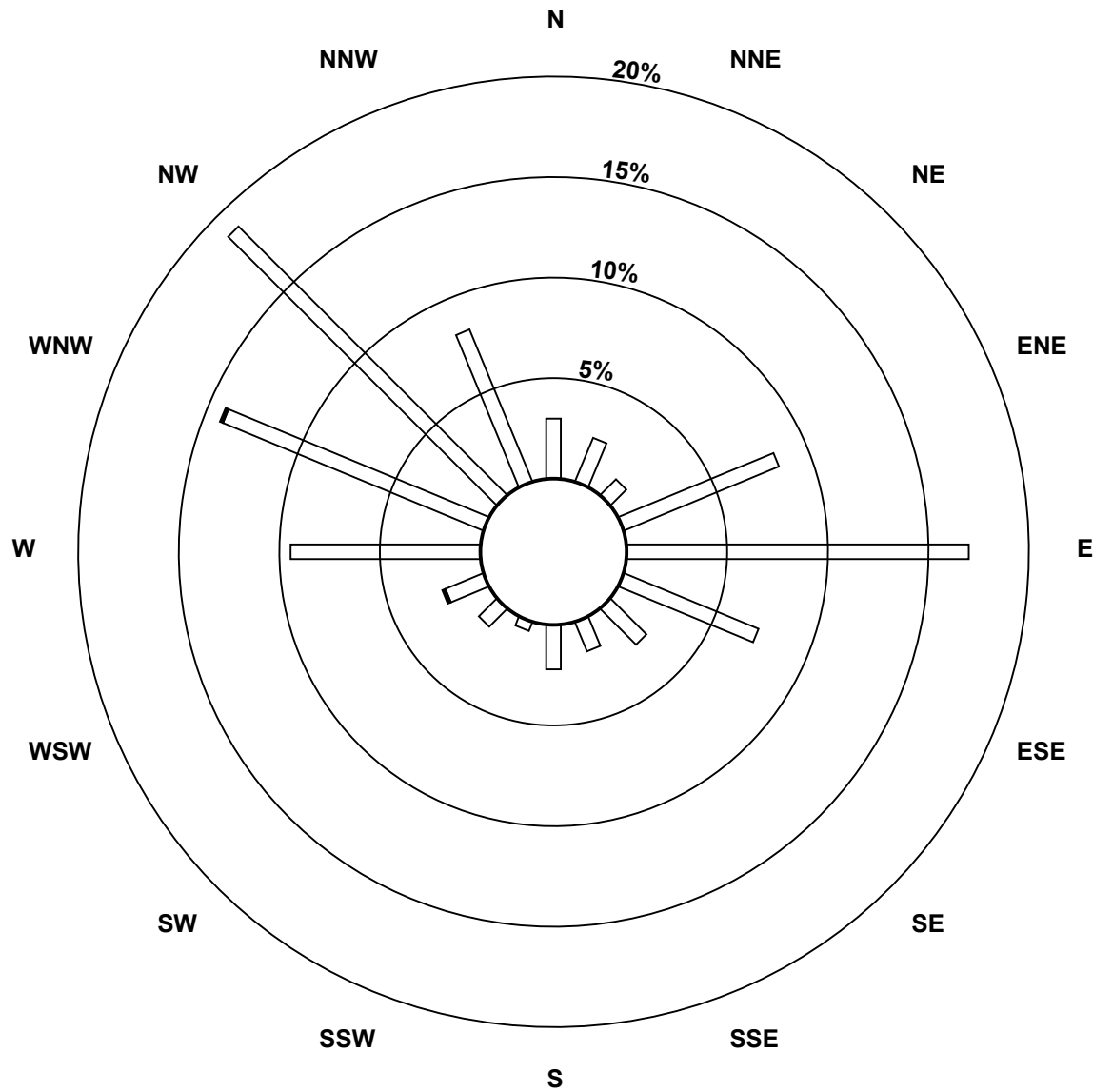
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	19	15	7	53	108	46	16	10	14	3	8	13	60	89	120	52	633
21 - 40	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	19	15	7	53	108	46	16	10	14	3	8	14	60	90	120	52	635

Total Number of Valid Hours: 635

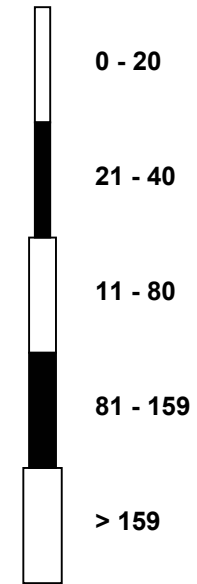
Total Number of Hours: 672

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

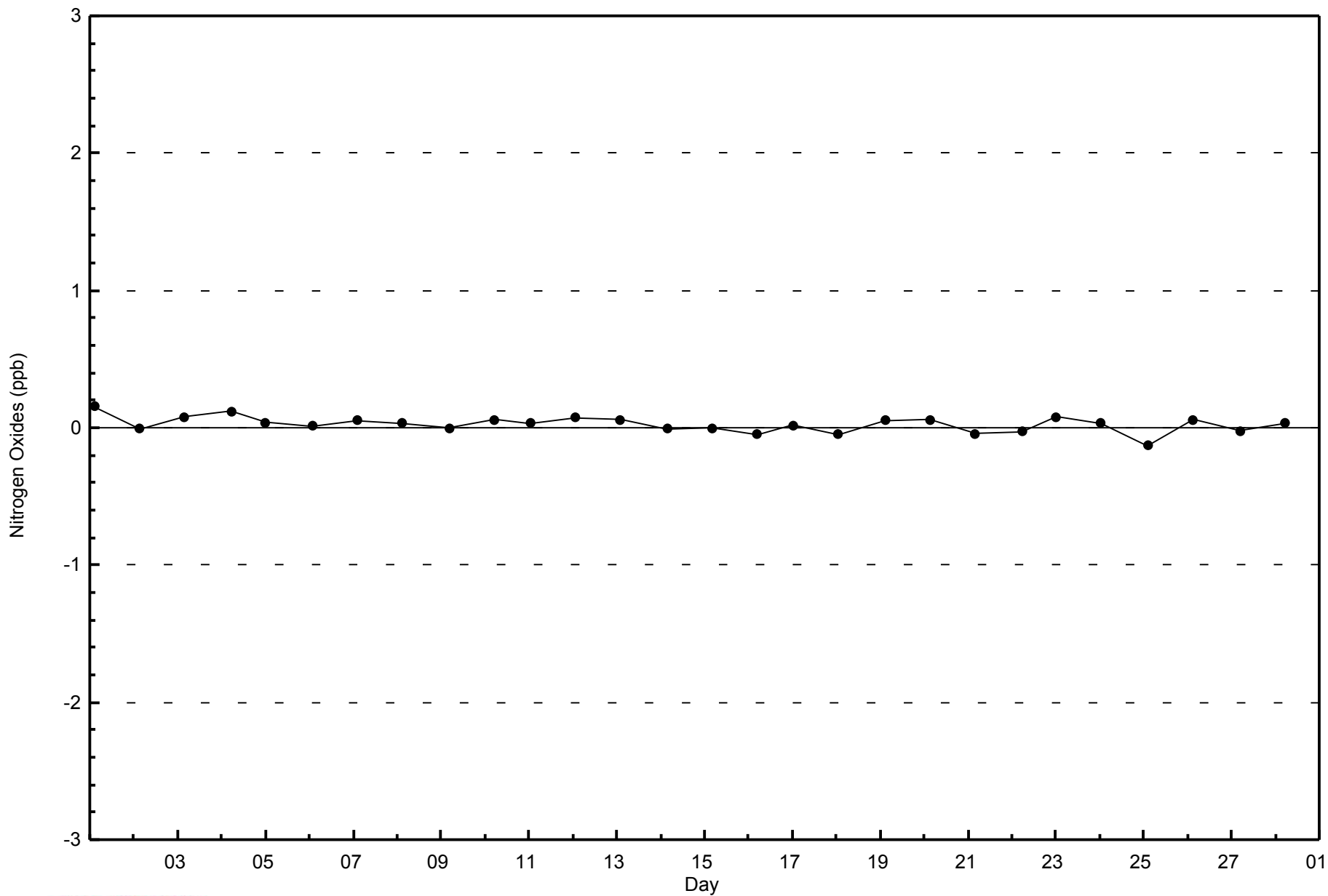
**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan (AMS 8)**



Classes (ppb)



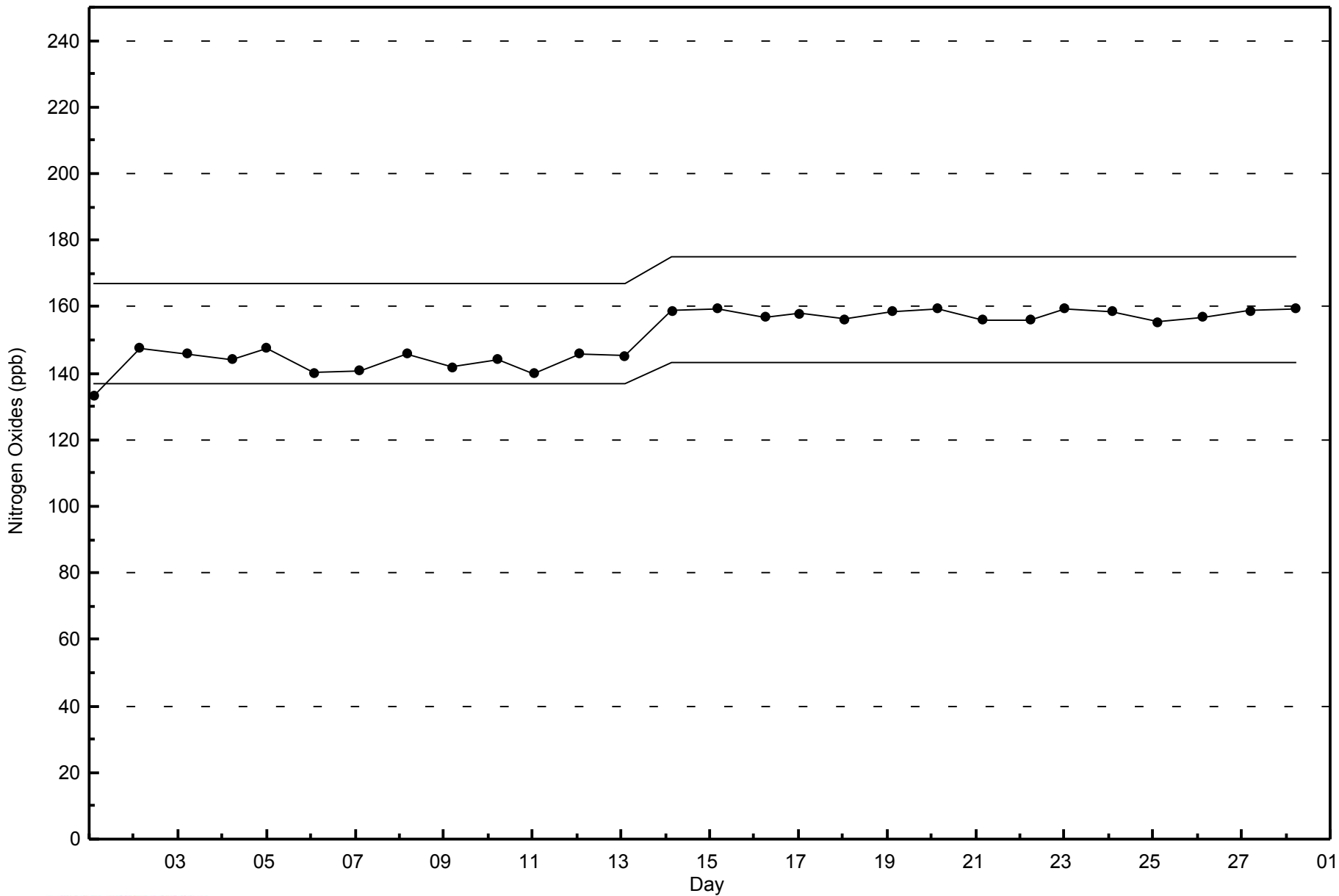
**Total Number of Valid Hours: 635**





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort Chipewyan - February 2015



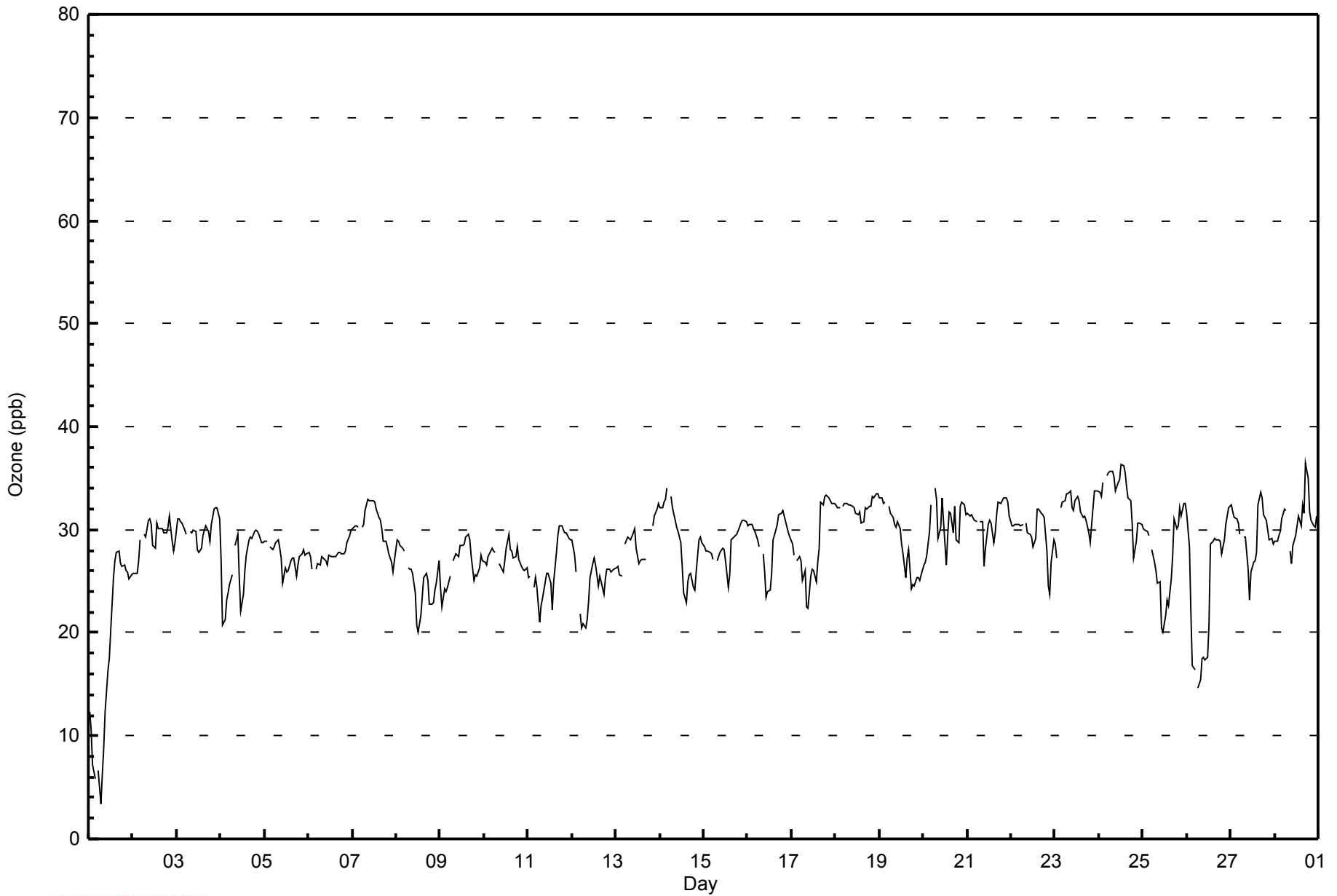


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 36 ppb on Feb 28 18:00										Maximum Daily Average: 33.4 ppb on Feb 24										Hours of Data: 641						
Minimum Value: 3 ppb on Feb 1 07:00										Minimum Daily Average: 18.2 ppb on Feb 1										Hours of Missing Data: 31						
Maximum Diurnal Average: 29.6 ppb at hour 24										Minimum Diurnal Average: 27.1 ppb at hour 12										Hours of Calibration: 31						
Monthly Average: 28.3 ppb										Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 24 Q <sub>1</sub> = 26 Median = 29 Q <sub>3</sub> = 31 P <sub>90</sub> = 33 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-Feb	12	11	7	6	Z	7	3	6	9	12	16	18	20	25	27	28	28	27	26	27	26	26	25	26	18.2	28
2-Feb	26	26	26	27	29	Z	30	29	31	31	31	28	28	31	30	30	30	30	30	30	31	29	28	29	29.1	31
3-Feb	31	31	31	31	30	30	Z	30	30	30	30	28	28	28	29	30	30	30	29	31	32	32	32	31	30.1	32
4-Feb	27	21	21	23	24	25	26	Z	28	30	25	22	24	26	28	29	29	29	30	30	30	30	29	29	26.7	30
5-Feb	29	29	Z	28	28	28	29	29	28	27	25	26	26	26	27	27	27	26	27	27	28	28	28	28	27.4	29
6-Feb	28	27	26	Z	26	27	27	27	27	27	27	28	27	27	27	27	28	28	28	28	28	29	29	30	27.5	30
7-Feb	30	30	30	30	Z	30	31	32	33	33	33	33	33	32	31	31	30	29	29	28	28	27	26	27	30.2	33
8-Feb	29	29	28	28	28	Z	26	26	26	26	24	21	20	22	24	25	26	25	23	23	23	24	25	27	25.1	29
9-Feb	24	23	24	24	24	26	Z	27	28	28	27	28	28	29	29	30	29	27	25	26	25	26	28	27	26.6	30
10-Feb	27	27	27	28	28	28	28	Z	27	26	26	27	28	30	28	28	27	27	28	27	26	26	26	26	27.3	30
11-Feb	25	25	Z	24	25	24	21	23	23	25	26	26	25	22	25	28	29	30	30	30	30	30	29	29	26.3	30
12-Feb	29	28	26	Z	22	20	21	20	21	23	25	27	27	27	25	25	25	24	25	26	26	26	26	26	24.8	29
13-Feb	26	26	26	26	Z	29	29	29	29	30	30	28	27	27	27	27	27	C	C	C	30	31	32	33	28.4	33
14-Feb	32	32	33	33	34	Z	33	32	31	30	30	29	26	24	23	25	26	26	24	24	26	29	29	29	28.7	34
15-Feb	28	28	28	28	28	27	Z	27	27	28	28	28	27	24	26	29	29	29	30	30	31	31	31	31	28.4	31
16-Feb	30	31	30	30	30	29	28	Z	28	26	23	24	24	26	29	30	31	31	32	32	31	30	30	29	28.9	32
17-Feb	29	27	Z	27	27	27	25	26	23	22	26	26	26	25	27	28	33	32	33	33	33	33	33	33	28.4	33
18-Feb	32	32	32	Z	32	32	33	32	32	32	32	32	32	31	32	31	31	32	32	32	32	33	33	34	32.2	34
19-Feb	33	33	32	33	Z	32	32	31	31	30	31	30	29	28	25	27	28	24	25	25	25	25	25	26	28.7	33
20-Feb	27	27	28	30	32	Z	34	33	29	30	33	31	27	29	32	32	30	32	29	29	32	33	32	31	30.5	34
21-Feb	32	31	32	31	31	31	Z	31	31	26	28	30	31	31	29	30	31	33	33	33	33	33	33	31	31.0	33
22-Feb	30	30	30	31	31	30	30	Z	31	30	30	29	28	29	32	32	32	31	31	28	25	24	27	29	29.6	32
23-Feb	29	27	Z	32	33	33	33	34	34	32	32	33	33	33	32	31	31	31	30	29	31	34	34	34	31.9	34
24-Feb	34	33	35	Z	35	35	36	36	35	34	35	35	36	36	35	34	33	33	31	27	29	31	31	30	33.4	36
25-Feb	30	30	30	29	Z	28	27	26	25	25	21	20	22	23	23	25	27	31	30	30	32	31	33	33	27.5	33
26-Feb	32	28	22	17	16	Z	15	16	18	18	17	18	21	29	29	29	29	29	29	28	29	31	31	32	24.4	32
27-Feb	32	32	31	31	31	30	Z	29	29	26	23	26	27	27	28	32	34	33	31	31	30	29	29	29	29.6	34
28-Feb	29	29	29	30	31	32	Z	28	27	29	29	30	31	30	32	32	36	35	32	31	30	30	31	31	30.7	36
28.7 28.0 27.7 27.3 28.5 27.8 27.3 27.5 27.5 27.3 27.2 27.1 27.2 27.8 28.1 29.1 29.4 29.5 29.0 28.7 29.1 29.3 29.4 29.6																								Diurnal Average		
34 33 35 33 35 35 36 36 35 34 35 35 36 36 35 34 34 36 35 33 33 34 34 34																								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 - February 2015





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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	24	3.74	3.74
21 - 50	617	96.26	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - February 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	0	0	5	1	1	0	3	2	1	1	0	9	1	0	24
21 - 50	20	13	7	57	102	46	17	8	11	2	6	13	58	81	119	55	615
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>	20	13	7	57	107	47	18	8	14	4	7	14	58	90	120	55	639

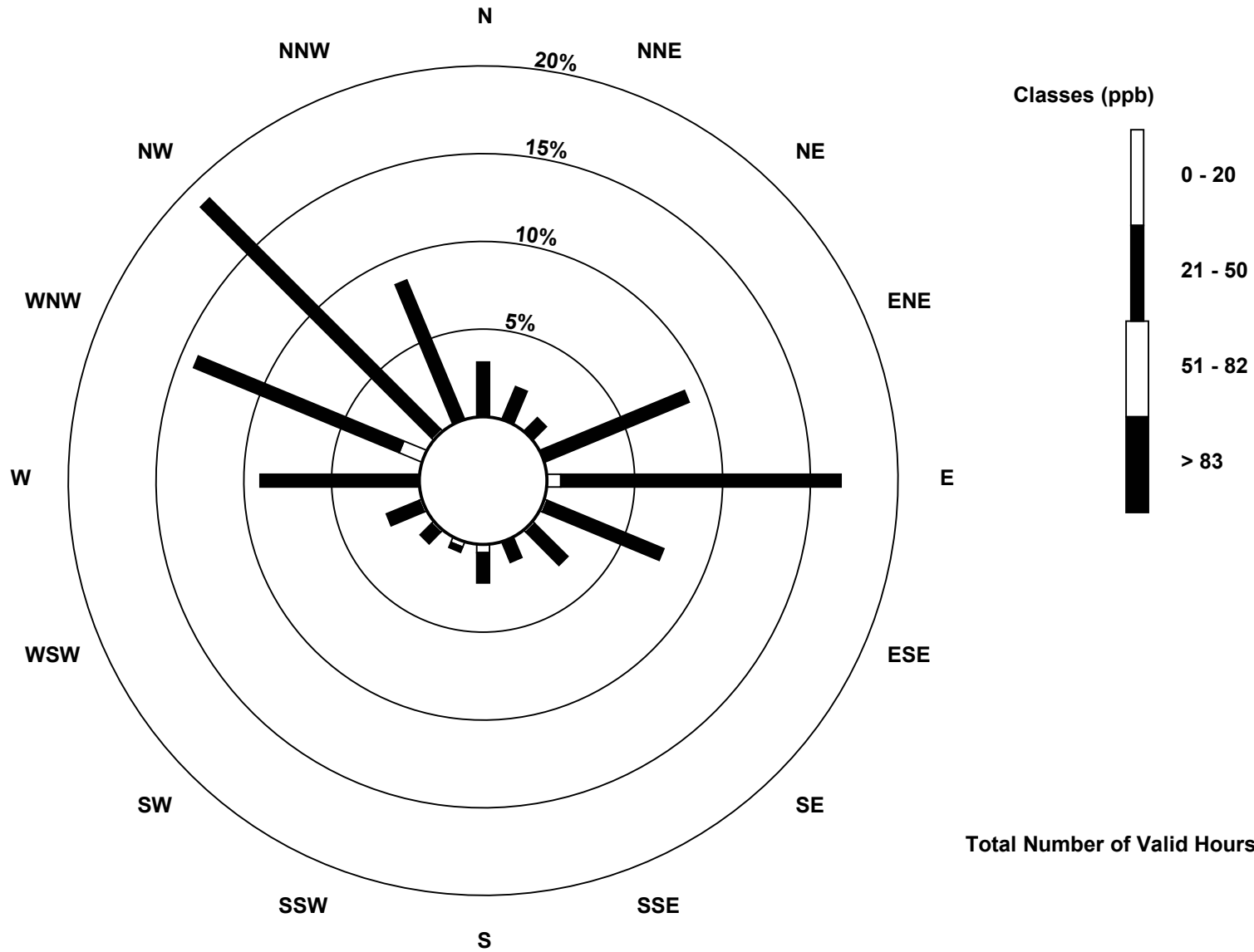
Total Number of Valid Hours: 639

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan (AMS 8)

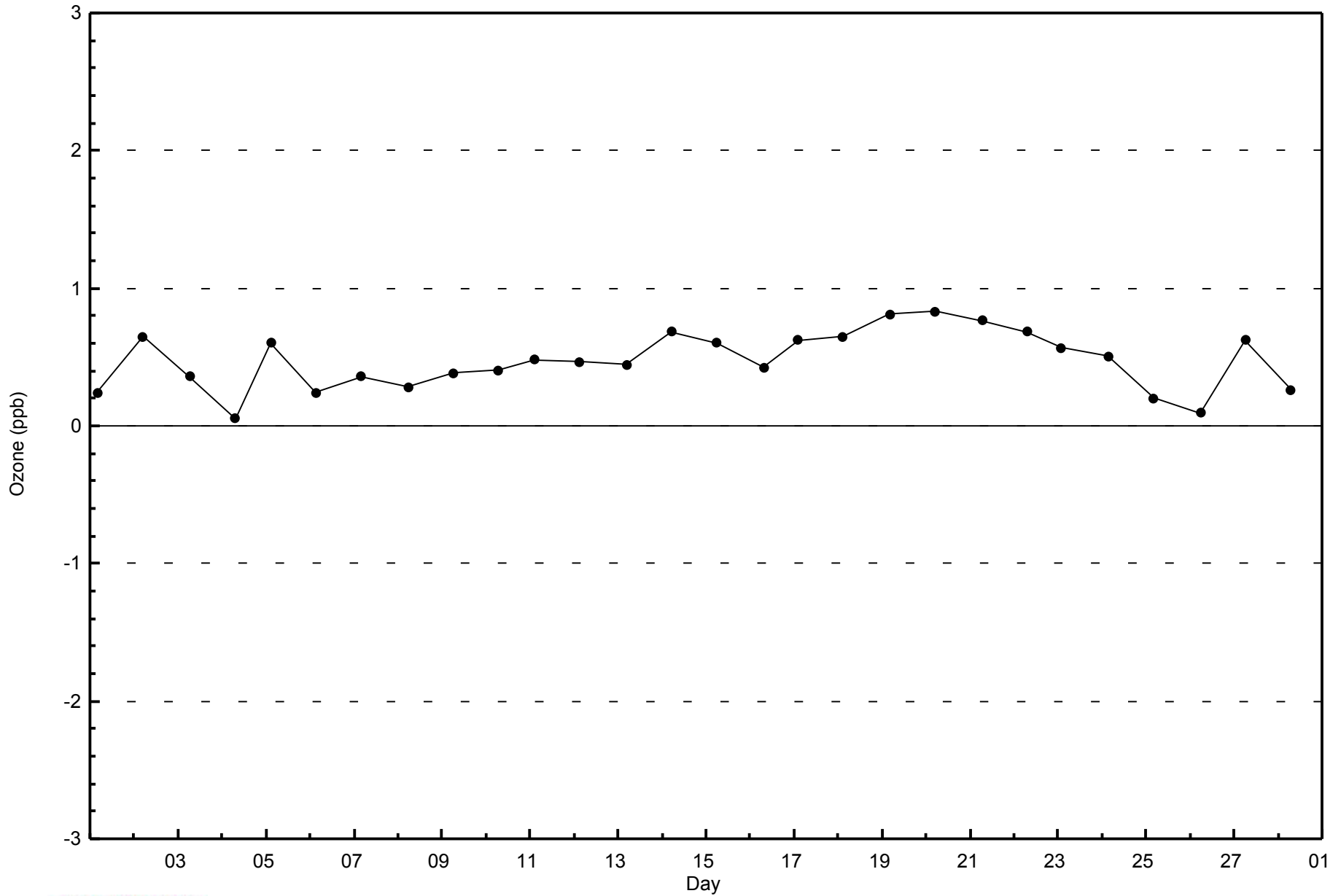


Total Number of Valid Hours: 639



WBEA  
Zero Responses

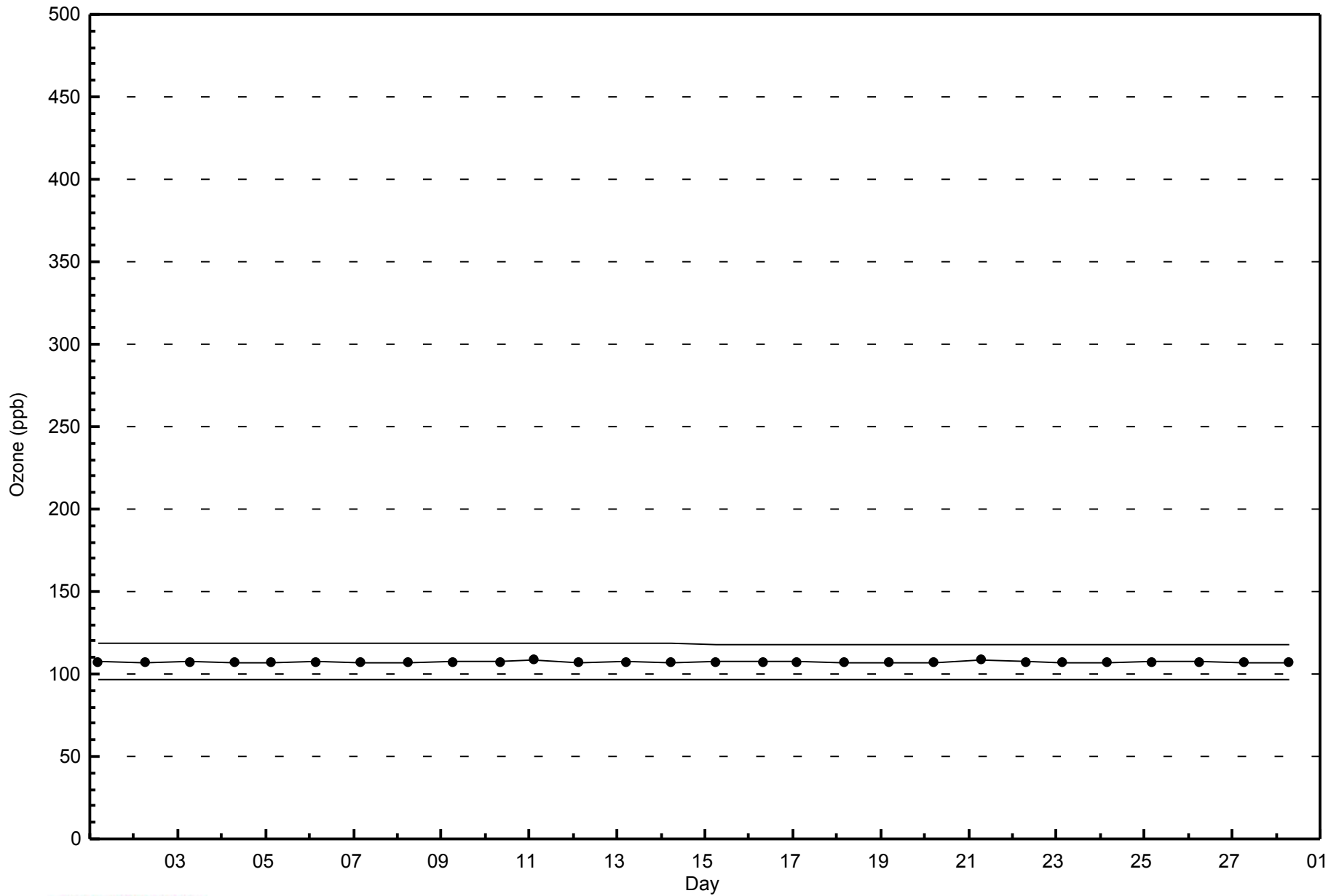
Ozone (O<sub>3</sub>) - ppb  
Fort Chipewyan - February 2015





**WBEA**  
**Span Responses**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort Chipewyan - February 2015**





Summary of Hour Averages

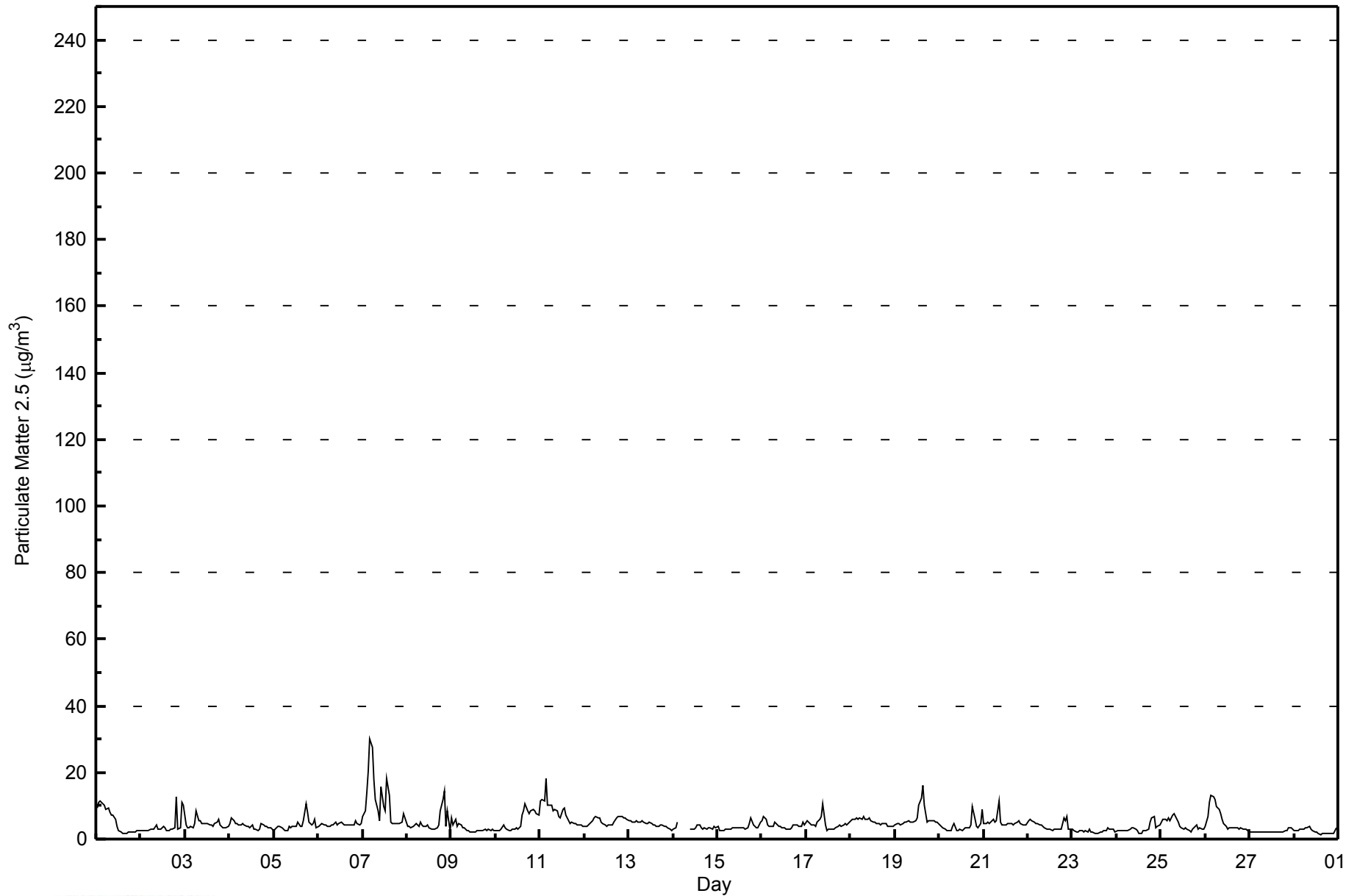
Fort Chipewyan - February 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																																														
Maximum Value: 30.1 µg/m <sup>3</sup> on Feb 7 05:00		Maximum Daily Average: 11.0 µg/m <sup>3</sup> on Feb 7																																														
Minimum Value: 1.4 µg/m <sup>3</sup> on Feb 28 15:00		Hours of Data: 666																																														
Maximum Diurnal Average: 5.8 µg/m <sup>3</sup> at hour 5		Hours of Missing Data: 6																																														
Monthly Average: 4.63 µg/m <sup>3</sup>		Hours of Calibration: 0																																														
Minimum Daily Average: 2.3 µg/m <sup>3</sup> on Feb 27		Percent Operational Time: 99.1																																														
Minimum Diurnal Average: 3.8 µg/m <sup>3</sup> at hour 13		Percentiles: P <sub>1</sub> = 1.7 P <sub>10</sub> = 2.4 Q <sub>1</sub> = 3.0 Median = 4.0 Q <sub>3</sub> = 5.2 P <sub>90</sub> = 7.5 P <sub>99</sub> = 15.9																																														
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-Feb	9.5	10.9	11.5	10.5	10.0	9.0	9.5	7.9	7.4	7.3	6.1	3.8	2.6	2.1	1.7	1.7	1.7	1.9	1.9	1.9	2.1	2.3	2.4	2.5	5.3	11.5																						
2-Feb	2.5	2.6	2.6	2.5	2.5	2.9	3.1	2.8	4.3	2.9	2.9	2.8	3.9	3.4	2.3	2.5	3.1	3.0	3.2	12.6	2.9	3.5	11.1	10.0	4.0	12.6																						
3-Feb	4.1	3.4	3.5	3.7	3.5	4.6	8.5	5.4	5.6	4.5	4.6	4.5	4.7	4.3	4.0	3.9	4.5	5.0	6.0	4.4	3.4	3.2	3.4	3.6	4.4	8.5																						
4-Feb	4.6	6.4	5.7	4.7	4.7	4.3	4.4	4.5	4.1	3.7	4.0	3.6	4.3	3.0	2.9	2.6	2.9	4.8	4.4	3.7	3.7	3.3	3.2	3.0	4.0	6.4																						
5-Feb	2.7	3.3	3.7	3.7	3.5	3.0	2.7	2.6	3.6	3.5	3.6	4.0	4.0	4.9	3.9	3.7	5.6	10.7	8.1	5.1	4.1	4.5	5.7	3.2	4.3	10.7																						
6-Feb	3.7	4.1	4.5	4.2	4.3	4.0	3.9	4.0	4.4	5.2	4.4	4.6	5.0	4.7	4.4	4.3	4.4	4.3	4.3	4.2	5.6	4.8	4.0	4.7	4.4	5.6																						
7-Feb	7.0	8.7	14.1	20.4	30.1	27.7	17.6	12.0	8.4	5.4	15.6	9.7	8.5	18.3	13.3	5.2	4.7	4.7	4.8	4.6	4.5	5.1	7.4	6.3	11.0	30.1																						
8-Feb	3.6	3.9	3.6	3.8	4.4	4.6	3.9	5.1	4.3	3.8	3.9	4.1	3.5	3.2	3.0	3.1	3.4	4.1	8.4	11.8	14.3	3.8	8.5	2.4	4.9	14.3																						
9-Feb	6.3	4.2	6.1	3.8	4.8	4.3	3.6	3.2	2.7	2.4	2.2	2.2	2.2	2.3	2.4	2.5	2.5	2.7	2.8	2.7	2.9	2.7	2.8	2.6	3.2	6.3																						
10-Feb	2.5	2.5	2.6	3.0	4.1	3.4	2.8	2.5	2.6	2.8	3.1	3.4	3.1	3.8	7.2	8.4	10.5	8.4	7.5	8.7	9.0	8.6	7.8	7.3	5.2	10.5																						
11-Feb	11.6	11.8	11.3	18.1	10.0	10.3	10.0	8.4	8.7	8.7	6.9	6.4	8.7	9.5	7.1	5.4	4.8	5.2	4.9	4.6	4.3	4.3	4.4	4.0	7.9	18.1																						
12-Feb	3.7	3.7	4.1	4.8	5.3	6.1	7.0	6.3	6.2	5.2	4.7	4.0	3.9	4.2	4.1	4.2	5.1	6.4	6.7	6.7	6.7	6.5	6.3	5.9	5.3	7.0																						
13-Feb	5.5	5.4	5.3	5.2	5.3	5.2	5.0	5.5	5.2	4.9	4.8	5.0	4.7	4.2	4.0	3.9	4.0	4.4	4.1	4.0	3.8	3.4	2.8	2.5	4.5	5.5																						
14-Feb	2.9	3.6	5.0	M	M	M	M	M	M	3.0	3.0	3.0	3.6	4.2	4.3	3.5	2.8	3.5	3.2	3.5	3.2	2.9	3.9	3.3	3.5	5.0																						
15-Feb	3.7	2.7	2.5	2.6	2.8	3.1	3.1	3.1	3.5	3.5	3.3	3.5	3.2	3.5	3.5	3.1	3.3	4.6	6.2	4.1	3.6	3.3	3.3	5.2	3.5	6.2																						
16-Feb	5.4	6.9	5.8	4.3	3.8	3.9	4.0	5.0	4.1	3.7	3.6	3.3	3.2	3.0	2.9	3.1	3.5	4.1	4.3	4.2	4.0	4.0	4.9	4.2	4.1	6.9																						
17-Feb	5.6	5.2	4.7	4.1	4.1	3.9	5.1	5.8	6.6	10.8	4.3	2.7	3.0	2.8	2.8	2.8	3.4	3.7	4.2	3.7	4.1	4.6	4.3	4.9	4.5	10.8																						
18-Feb	5.6	5.8	5.9	6.3	5.9	6.2	6.0	6.7	6.1	5.9	6.4	5.7	5.2	5.3	4.7	4.5	4.4	4.7	4.8	4.8	3.9	4.0	4.0	4.0	5.3	6.7																						
19-Feb	4.3	4.5	4.7	4.4	4.6	4.9	5.0	5.5	5.2	4.9	4.9	5.4	6.2	10.2	12.5	16.1	10.2	5.1	5.4	5.3	5.4	5.4	5.1	4.9	6.3	16.1																						
20-Feb	4.0	3.7	3.3	3.0	2.7	2.6	2.6	3.7	4.9	2.7	2.7	2.8	2.5	2.8	3.2	3.2	3.6	4.1	9.7	5.8	3.9	3.4	4.5	8.9	3.9	9.7																						
21-Feb	4.7	4.7	4.9	4.8	5.2	6.0	5.1	5.3	11.6	5.0	4.2	4.2	4.2	4.5	4.6	4.5	4.4	4.7	5.2	5.3	4.7	4.1	4.2	4.4	5.0	11.6																						
22-Feb	5.6	5.9	5.4	5.0	4.8	4.7	4.4	4.3	3.7	3.3	3.2	3.1	2.8	2.6	2.9	2.8	3.0	3.0	3.1	6.5	5.7	6.9	2.9	3.1	4.1	6.9																						
23-Feb	3.1	2.4	2.3	2.3	2.4	2.5	2.2	2.5	2.3	2.9	2.2	2.1	1.7	1.6	1.8	2.1	2.2	2.6	2.6	3.4	3.1	3.1	2.8	2.1	2.4	3.4																						
24-Feb	2.5	2.5	2.6	2.5	2.5	2.6	2.6	3.0	3.2	3.3	3.0	2.4	1.7	1.8	2.5	2.5	2.7	3.1	5.3	6.5	6.6	3.5	3.8	4.3	3.2	6.6																						
25-Feb	4.9	5.8	6.1	5.5	6.2	5.6	7.1	7.8	6.8	5.0	3.8	3.3	3.1	3.5	3.1	2.4	2.3	2.8	3.9	4.3	2.8	3.3	3.1	3.1	4.4	7.8																						
26-Feb	3.7	6.6	10.9	13.3	12.8	11.7	9.6	8.9	7.7	6.0	4.6	4.0	3.1	3.4	3.2	3.3	3.4	3.5	3.1	3.4	3.2	2.9	2.9	2.6	5.7	13.3																						
27-Feb	2.3	2.3	2.2	2.1	2.1	2.2	2.0	2.3	2.0	2.0	2.3	2.2	2.3	2.3	2.0	2.1	2.2	2.2	2.3	2.6	2.6	3.4	3.2	2.8	2.3	3.4																						
28-Feb	2.7	2.6	2.7	2.9	3.1	3.2	3.3	3.5	3.6	2.8	2.6	2.1	2.3	1.7	1.4	1.5	1.6	1.7	1.7	1.7	1.9	1.8	2.6	3.2	2.4	3.6																						
																								4.6	4.9	5.3	5.6	5.8	5.6	5.3	5.1	5.1	4.5	4.3	3.9	3.8	4.3	4.1	3.9	3.9	4.2	4.7	5.0	4.5	4.0	4.5	4.3	Diurnal Average
																								11.6	11.8	14.1	20.4	30.1	27.7	17.6	12.0	11.6	10.8	15.6	9.7	8.7	18.3	13.3	16.1	10.5	10.7	9.7	12.6	14.3	8.6	11.1	10.0	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>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Fort Chipewyan - February 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	530	79.58	79.58
6 - 15	128	19.22	98.80
16 - 25	6	0.90	99.70
26 - 80	2	0.30	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 666

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Fort Chipewyan - February 2015**

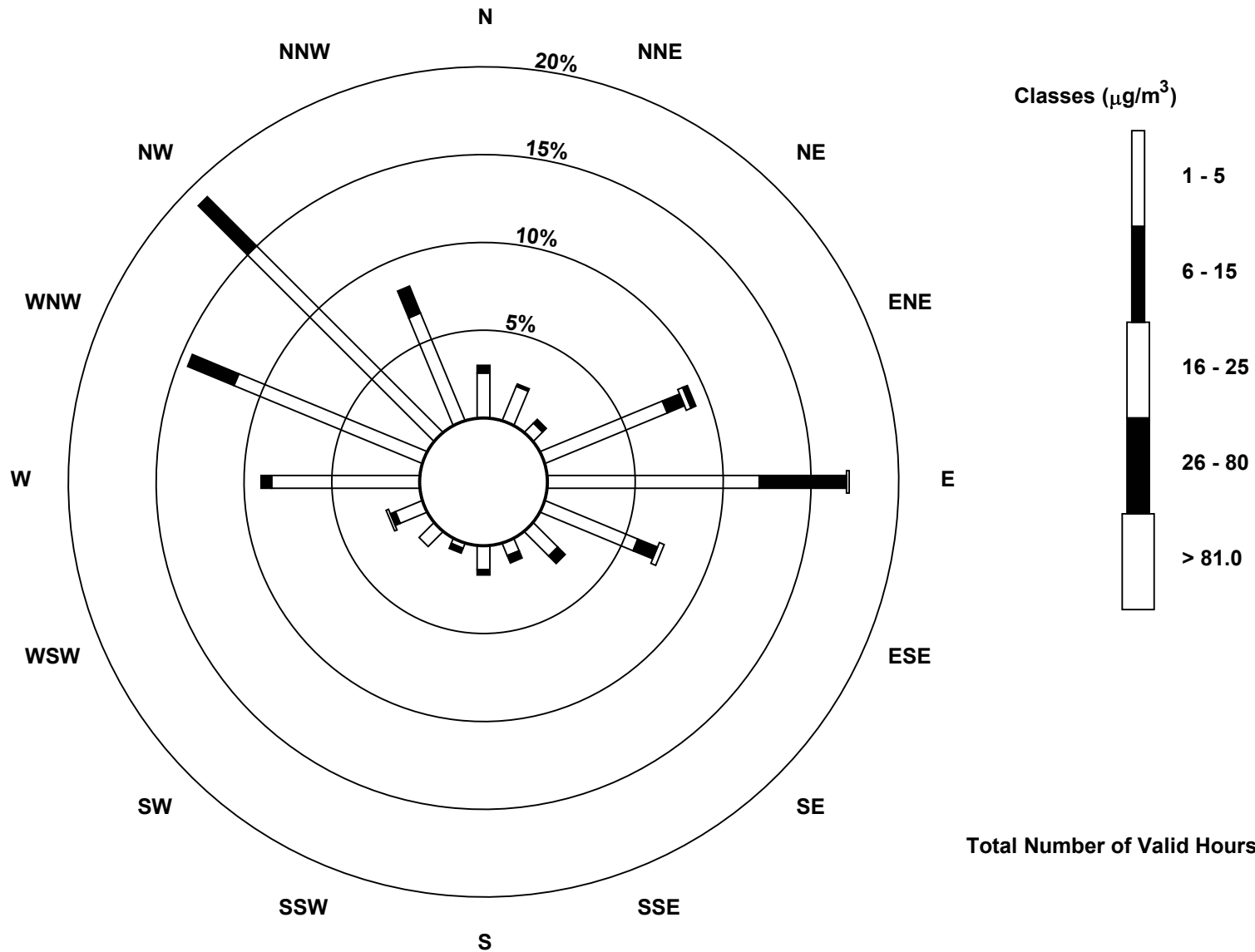
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	17	14	5	50	80	38	13	5	9	2	8	11	56	77	100	44	529
6 - 15	3	1	2	7	33	8	4	3	2	2	0	2	4	19	26	11	127
16 - 25	0	0	0	2	1	2	0	0	0	0	0	1	0	0	0	0	6
26 - 80	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	20	15	7	61	114	48	17	8	11	4	8	14	60	96	126	55	664

Total Number of Valid Hours: 664

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
 Fort Chipewyan (AMS 8)



Total Number of Valid Hours: 664



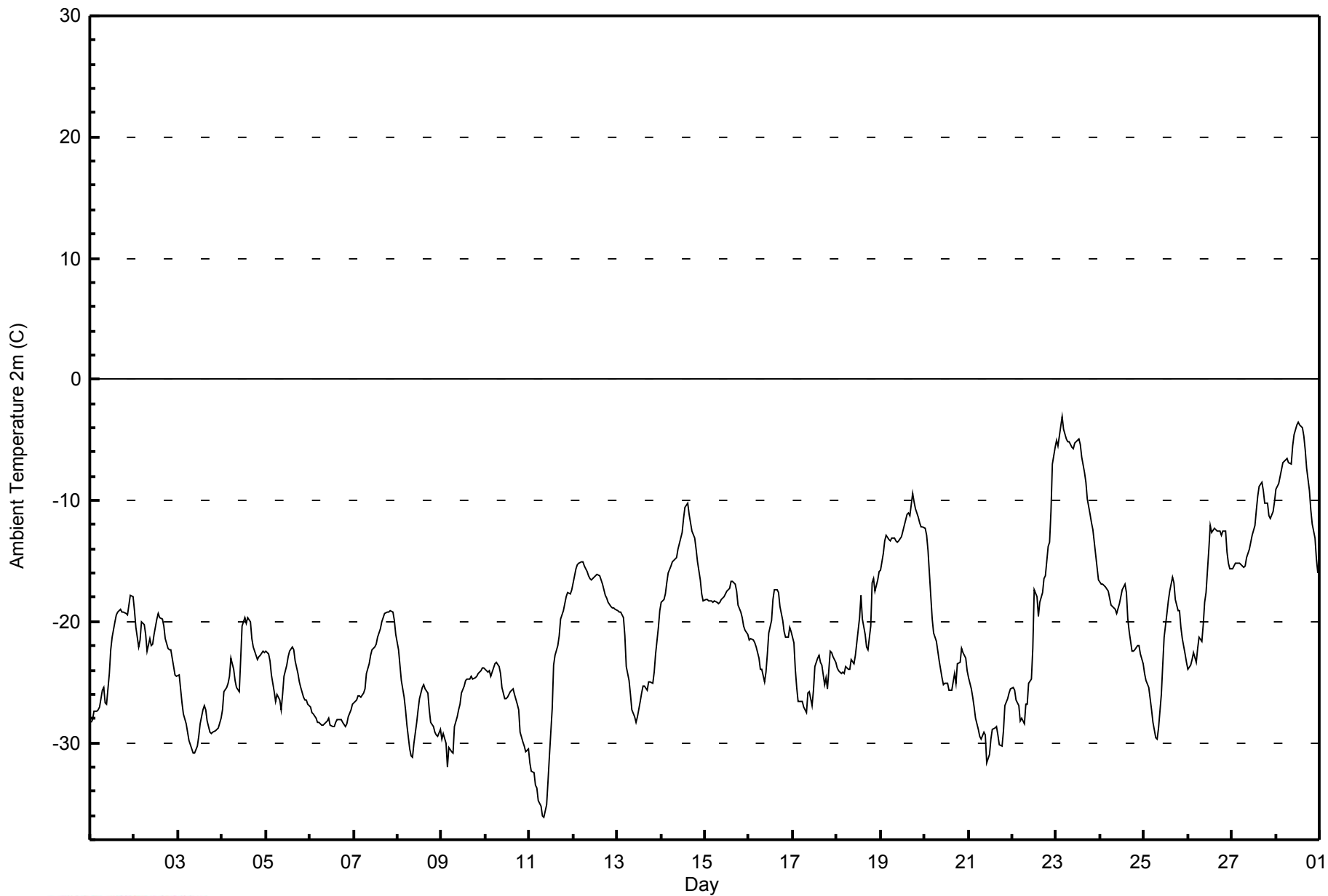


Maximum Value: -3.1 C on Feb 23 04:00      Maximum Daily Average: -7.6 C on Feb 23																						Hours in Service: 672 Hours of Data: 672				
Minimum Value: -36.2 C on Feb 11 09:00      Minimum Daily Average: -28.5 C on Feb 3 Maximum Diurnal Average: -19.1 C at hour 15      Minimum Diurnal Average: -22.9 C at hour 8 Monthly Average: -21.06 C      Percentiles: P <sub>1</sub> = -33.6 P <sub>10</sub> = -28.6 Q <sub>1</sub> = -25.9 Median = -22.2 Q <sub>3</sub> = -17.0 P <sub>90</sub> = -11.8 P <sub>99</sub> = -4.1																						Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0				
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-28.3	-28.1	-27.4	-27.4	-27.3	-27.1	-25.6	-25.4	-26.7	-26.8	-24.2	-22.3	-21.3	-20.0	-19.5	-19.2	-19.0	-19.2	-19.2	-19.3	-19.4	-18.6	-17.8	-18.0	-22.8	-17.8
2-Feb	-19.1	-20.5	-22.1	-21.5	-20.0	-20.2	-21.1	-22.4	-21.4	-22.0	-21.9	-21.1	-19.8	-19.3	-19.7	-19.8	-20.4	-21.4	-22.2	-22.4	-22.4	-23.7	-24.4	-24.5	-21.4	-19.1
3-Feb	-24.4	-25.5	-26.7	-27.6	-28.4	-29.1	-29.8	-30.5	-30.9	-30.9	-30.3	-29.5	-28.4	-27.3	-26.9	-27.3	-28.2	-29.1	-29.3	-29.1	-29.1	-28.8	-28.8	-28.0	-28.5	-24.4
4-Feb	-27.2	-25.8	-25.4	-25.1	-24.5	-23.0	-24.0	-24.9	-25.4	-25.8	-23.1	-20.4	-19.6	-20.2	-19.6	-20.0	-21.4	-22.1	-22.8	-23.2	-22.9	-22.7	-22.4	-22.6	-23.1	-19.6
5-Feb	-22.5	-22.7	-23.2	-24.4	-25.8	-26.5	-26.1	-26.5	-27.2	-26.0	-24.6	-23.6	-22.9	-22.4	-22.0	-22.3	-23.2	-24.2	-25.0	-25.5	-26.2	-26.5	-26.5	-26.8	-24.7	-22.0
6-Feb	-27.1	-27.5	-27.7	-27.9	-28.3	-28.3	-28.6	-28.5	-28.4	-28.2	-28.0	-28.5	-28.6	-28.6	-28.4	-28.1	-28.1	-28.1	-28.3	-28.6	-28.5	-27.9	-27.2	-26.8	-28.1	-26.8
7-Feb	-26.7	-26.5	-26.2	-26.2	-26.3	-25.9	-25.5	-24.3	-23.4	-22.8	-22.3	-22.1	-21.8	-21.2	-20.6	-20.1	-19.7	-19.4	-19.3	-19.2	-19.1	-19.2	-19.9	-21.1	-22.4	-19.1
8-Feb	-22.3	-23.6	-24.9	-26.3	-27.3	-28.6	-30.5	-31.1	-31.1	-30.0	-28.3	-27.3	-26.3	-25.5	-25.2	-25.6	-25.9	-27.3	-28.4	-28.7	-29.1	-29.3	-29.4	-29.0	-27.5	-22.3
9-Feb	-29.7	-29.2	-30.1	-32.0	-30.4	-30.8	-30.8	-28.6	-27.8	-27.3	-26.9	-25.9	-25.4	-24.9	-24.8	-24.7	-24.6	-24.7	-24.7	-24.6	-24.3	-24.1	-23.8	-23.8	-26.8	-23.8
10-Feb	-24.0	-24.1	-24.1	-24.5	-23.8	-23.5	-23.4	-23.7	-24.3	-25.5	-26.3	-26.3	-26.2	-25.7	-25.7	-25.5	-26.0	-26.8	-27.3	-29.1	-29.9	-30.3	-30.7	-30.5	-26.1	-23.4
11-Feb	-31.6	-32.3	-32.5	-33.5	-33.8	-34.8	-35.3	-36.1	-36.2	-35.2	-33.1	-31.1	-27.2	-23.6	-22.8	-21.9	-21.1	-19.8	-19.1	-18.5	-18.0	-17.6	-17.7	-17.4	-27.1	-17.4
12-Feb	-16.8	-15.7	-15.3	-15.1	-15.1	-15.1	-15.4	-15.8	-16.2	-16.4	-16.6	-16.3	-16.2	-16.1	-16.2	-16.6	-16.9	-17.9	-18.1	-18.4	-18.8	-18.9	-18.9	-19.0	-16.7	-15.1
13-Feb	-19.1	-19.2	-19.3	-19.7	-21.2	-23.7	-24.9	-26.0	-27.2	-27.9	-28.3	-27.8	-26.6	-25.9	-25.3	-25.3	-25.6	-24.9	-25.0	-25.1	-24.1	-22.7	-20.5	-19.1	-23.9	-19.1
14-Feb	-18.4	-18.1	-17.7	-16.8	-15.9	-15.5	-15.1	-14.9	-14.7	-14.0	-13.5	-12.7	-11.5	-10.5	-10.2	-11.2	-11.8	-12.5	-13.2	-14.0	-15.1	-16.5	-17.7	-18.3	-14.6	-10.2
15-Feb	-18.2	-18.2	-18.3	-18.3	-18.4	-18.3	-18.4	-18.5	-18.4	-18.2	-17.9	-17.7	-17.5	-17.2	-16.7	-16.7	-17.0	-17.5	-18.6	-19.2	-19.6	-20.4	-20.7	-21.0	-18.4	-16.7
16-Feb	-21.5	-21.5	-21.5	-21.8	-22.1	-23.0	-24.0	-23.9	-25.0	-24.2	-22.6	-21.0	-19.9	-18.2	-17.4	-17.3	-17.6	-18.8	-20.0	-20.9	-21.2	-21.3	-20.5	-20.8	-21.1	-17.3
17-Feb	-21.7	-23.9	-25.4	-26.6	-26.6	-26.6	-27.1	-27.5	-25.9	-25.8	-26.9	-25.6	-23.7	-23.1	-22.8	-23.4	-23.6	-25.3	-24.6	-25.5	-22.4	-22.6	-22.9	-23.3	-24.7	-21.7
18-Feb	-23.8	-24.1	-24.3	-24.2	-24.3	-23.8	-23.9	-23.9	-23.2	-23.5	-22.8	-21.8	-19.7	-17.8	-19.8	-21.1	-22.1	-22.3	-20.3	-16.8	-16.5	-17.4	-16.6	-15.9	-21.2	-15.9
19-Feb	-15.8	-14.3	-13.4	-12.9	-13.2	-13.3	-13.0	-13.1	-13.3	-13.4	-13.3	-13.0	-12.6	-12.0	-11.2	-11.0	-11.2	-9.4	-10.1	-10.7	-11.3	-11.8	-12.1	-12.2	-12.4	-9.4
20-Feb	-12.3	-12.9	-14.2	-17.9	-19.8	-21.0	-21.7	-22.4	-23.3	-24.7	-25.2	-25.1	-25.1	-25.6	-25.6	-25.7	-24.2	-25.1	-23.5	-23.3	-22.2	-22.5	-23.0	-24.1	-22.1	-12.3
21-Feb	-24.7	-25.6	-26.3	-27.1	-28.0	-28.9	-29.5	-29.7	-29.1	-29.4	-31.6	-30.9	-29.7	-28.9	-28.8	-28.7	-29.3	-30.2	-30.3	-29.0	-26.9	-26.4	-26.0	-25.6	-28.4	-24.7
22-Feb	-25.5	-25.7	-26.5	-26.9	-28.2	-28.0	-28.4	-26.8	-26.8	-25.1	-24.7	-22.2	-17.4	-18.0	-19.5	-18.4	-17.6	-16.4	-16.2	-13.8	-13.4	-10.9	-7.0	-5.6	-20.4	-5.6
23-Feb	-5.1	-5.5	-3.9	-3.1	-4.1	-4.9	-5.1	-5.2	-5.7	-5.7	-5.2	-5.2	-5.0	-5.3	-6.4	-7.7	-8.5	-9.8	-11.2	-11.8	-12.4	-14.5	-15.5	-16.6	-7.6	-3.1
24-Feb	-16.9	-16.9	-17.0	-17.1	-17.5	-18.0	-18.6	-18.9	-18.9	-19.3	-18.6	-18.0	-17.3	-16.9	-17.6	-19.8	-20.8	-22.5	-22.5	-22.3	-22.0	-22.0	-22.6	-23.5	-19.4	-16.9
25-Feb	-24.3	-24.9	-25.5	-26.3	-27.3	-28.4	-29.6	-29.8	-28.8	-26.0	-23.6	-21.3	-19.3	-18.3	-17.4	-16.4	-16.8	-18.2	-19.1	-19.1	-20.5	-21.4	-22.7	-23.4	-22.8	-16.4
26-Feb	-24.0	-23.5	-23.2	-22.6	-23.4	-22.2	-21.3	-21.6	-20.3	-18.4	-17.6	-14.0	-12.1	-12.6	-12.3	-12.4	-12.6	-12.5	-12.8	-12.5	-12.6	-14.2	-15.1	-15.7	-17.1	-12.1
27-Feb	-15.7	-15.4	-15.2	-15.2	-15.2	-15.3	-15.6	-15.4	-14.7	-14.0	-13.4	-12.9	-12.0	-10.8	-9.6	-8.9	-8.4	-9.2	-10.2	-10.2	-11.3	-11.5	-11.0	-10.2	-12.6	-8.4
28-Feb	-9.1	-8.6	-8.0	-7.5	-6.9	-6.7	-6.5	-6.9	-7.0	-5.5	-4.6	-3.8	-3.5	-3.8	-4.0	-4.7	-5.8	-7.3	-9.2	-10.8	-12.0	-13.1	-14.8	-16.0	-7.8	-3.5
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - February 2015**





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

**Ambient Temperature 2m (AT 2m) - C**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	400	59.52	59.52
-20 - 0	272	40.48	100.00
0 - 10	0	0.00	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

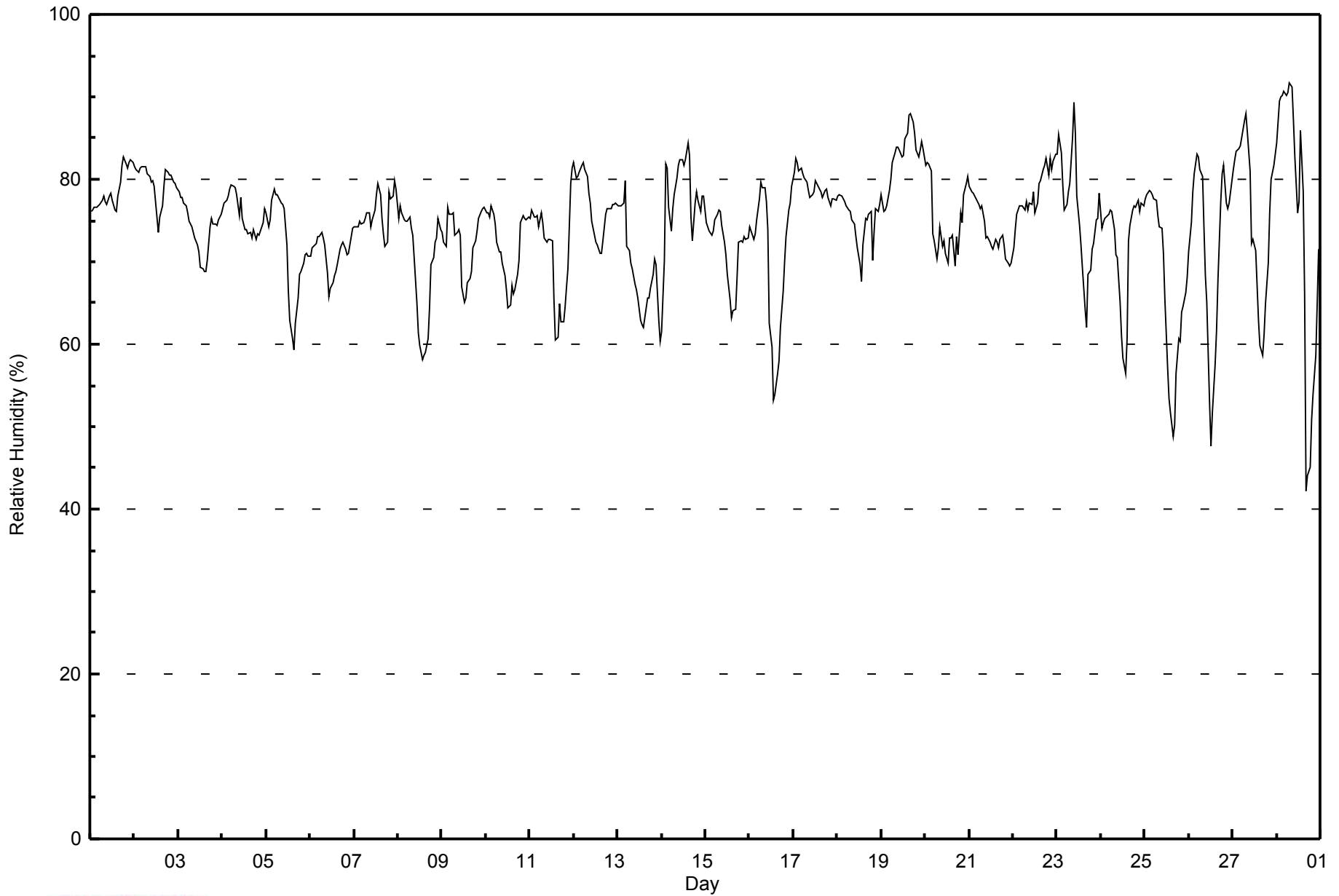


Maximum Value: 92 % on Feb 28 08:00														Maximum Daily Average: 82.7 % on Feb 19														Hours in Service: 672			
Minimum Value: 42 % on Feb 28 17:00														Minimum Daily Average: 67.0 % on Feb 25														Hours of Data: 672			
Maximum Diurnal Average: 78.1 % at hour 4														Minimum Diurnal Average: 68.7 % at hour 17														Hours of Missing Data: 0			
Monthly Average: 74.2 %														Percentiles: P <sub>1</sub> = 52 P <sub>10</sub> = 65 Q <sub>1</sub> = 71 Median = 75 Q <sub>3</sub> = 78 P <sub>90</sub> = 82 P <sub>99</sub> = 90														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-Feb	76	76	77	77	77	77	77	78	77	77	78	78	77	76	76	78	80	82	83	82	81	82	82	82	78.6	83					
2-Feb	81	81	81	81	81	82	81	81	80	80	80	79	75	74	75	77	79	81	81	81	81	80	79	79	79.6	82					
3-Feb	78	78	78	77	77	76	75	74	74	73	72	71	69	69	69	69	70	74	75	75	75	74	75	76	73.9	78					
4-Feb	77	77	77	78	79	79	79	79	78	76	78	75	74	74	73	74	73	74	73	73	73	74	75	76	75.7	79					
5-Feb	76	74	75	77	79	78	78	78	77	77	77	72	66	63	61	59	63	66	69	69	70	71	71	71	71.5	79					
6-Feb	71	72	72	72	73	73	73	73	72	69	66	67	67	68	69	70	71	72	72	72	71	71	73	74	71.0	74					
7-Feb	74	74	74	75	75	75	75	76	76	74	75	76	78	79	78	75	73	72	72	78	78	78	80	79	75.9	80					
8-Feb	75	77	76	75	75	75	75	74	73	71	65	61	60	58	59	59	61	64	70	70	72	73	75	74	69.5	77					
9-Feb	74	72	72	77	76	76	76	73	74	74	73	67	65	66	68	68	69	72	73	74	75	76	76	77	72.5	77					
10-Feb	76	76	75	77	76	75	72	71	71	70	68	67	64	65	67	66	67	68	70	75	76	75	75	76	71.6	77					
11-Feb	75	76	75	75	76	74	76	75	73	72	73	73	73	65	61	61	65	63	63	65	67	69	79	81	71.0	81					
12-Feb	82	80	80	81	82	82	81	80	78	77	75	73	72	72	71	71	72	76	76	76	76	77	77	77	76.9	82					
13-Feb	77	77	77	77	80	72	71	70	69	67	67	66	63	62	62	63	66	66	67	69	70	70	63	60	68.7	80					
14-Feb	61	70	82	81	77	74	76	78	80	82	82	82	82	84	83	75	73	77	78	77	76	78	78	78	77.9	84					
15-Feb	75	74	74	73	74	75	76	76	76	74	72	71	68	65	63	64	64	68	72	73	72	73	73	73	71.7	76					
16-Feb	74	74	73	73	75	78	80	79	79	77	74	63	60	53	54	56	58	62	66	70	73	76	77	79	70.1	80					
17-Feb	81	82	82	81	81	81	80	80	79	78	78	78	80	79	79	79	78	79	79	78	77	78	78	78	79.2	82					
18-Feb	78	78	78	78	77	77	76	76	75	75	73	72	70	68	72	75	75	76	76	70	74	76	76	77	74.9	78					
19-Feb	78	76	76	77	79	80	82	83	84	84	83	83	83	85	86	88	88	87	86	84	83	84	85	84	82.7	88					
20-Feb	82	82	82	81	73	72	70	72	74	72	73	71	70	73	73	70	73	71	76	75	78	79	80	80	74.8	82					
21-Feb	79	79	78	78	78	77	76	77	75	73	73	72	72	72	73	72	72	73	73	72	70	70	69	70	73.9	79					
22-Feb	72	74	76	77	77	77	76	77	76	77	77	78	76	77	80	80	81	82	83	81	82	81	82	83	78.4	83					
23-Feb	83	85	83	79	76	77	79	80	85	89	86	78	74	72	69	64	62	68	69	72	72	75	75	78	76.3	89					
24-Feb	74	75	75	75	76	76	76	74	71	71	65	61	58	56	61	73	74	76	77	77	77	76	77	77	72.0	77					
25-Feb	78	78	79	78	78	78	77	76	74	74	71	66	57	53	52	49	50	56	61	60	64	65	66	68	67.0	79					
26-Feb	71	75	78	81	83	83	81	80	74	68	65	53	48	52	58	62	68	77	81	82	77	76	77	79	72.0	83					
27-Feb	81	82	83	84	84	85	87	88	86	81	72	73	71	67	63	60	59	61	65	70	76	80	82	83	75.9	88					
28-Feb	84	89	90	90	91	90	91	92	91	87	83	76	77	86	78	66	42	44	45	51	54	59	65	71	74.7	92					
76.6														77.3														Diurnal Average			
84														89														Diurnal Maximum			



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort Chipewyan - February 2015**





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

**Relative Humidity (RH) - %**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	30	4.46	4.46
60 - 80	527	78.42	82.89
80 - 100	115	17.11	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

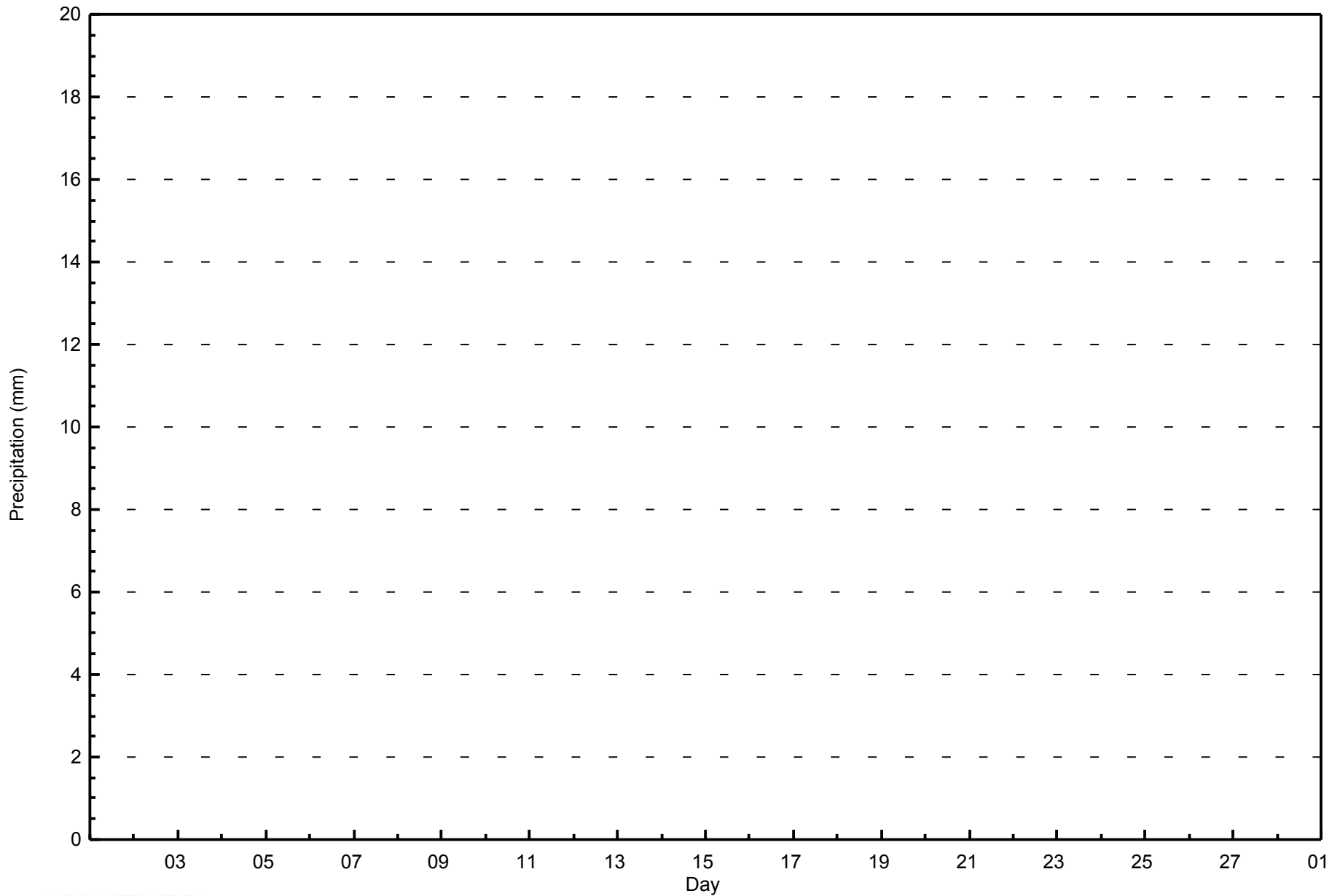


Maximum Value: 0.0 mm on Feb 1 01:00		Maximum Daily Total: 0.0 mm on Feb 1		Hours in Service: 672																								
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 672																								
Maximum Diurnal Total: 0.0 mm at hour 1		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																								
Monthly Total: 0.00 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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 - February 2015







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

**Precipitation (PC) - mm**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (mm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	672	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: 672

Total Number of Hours: 672

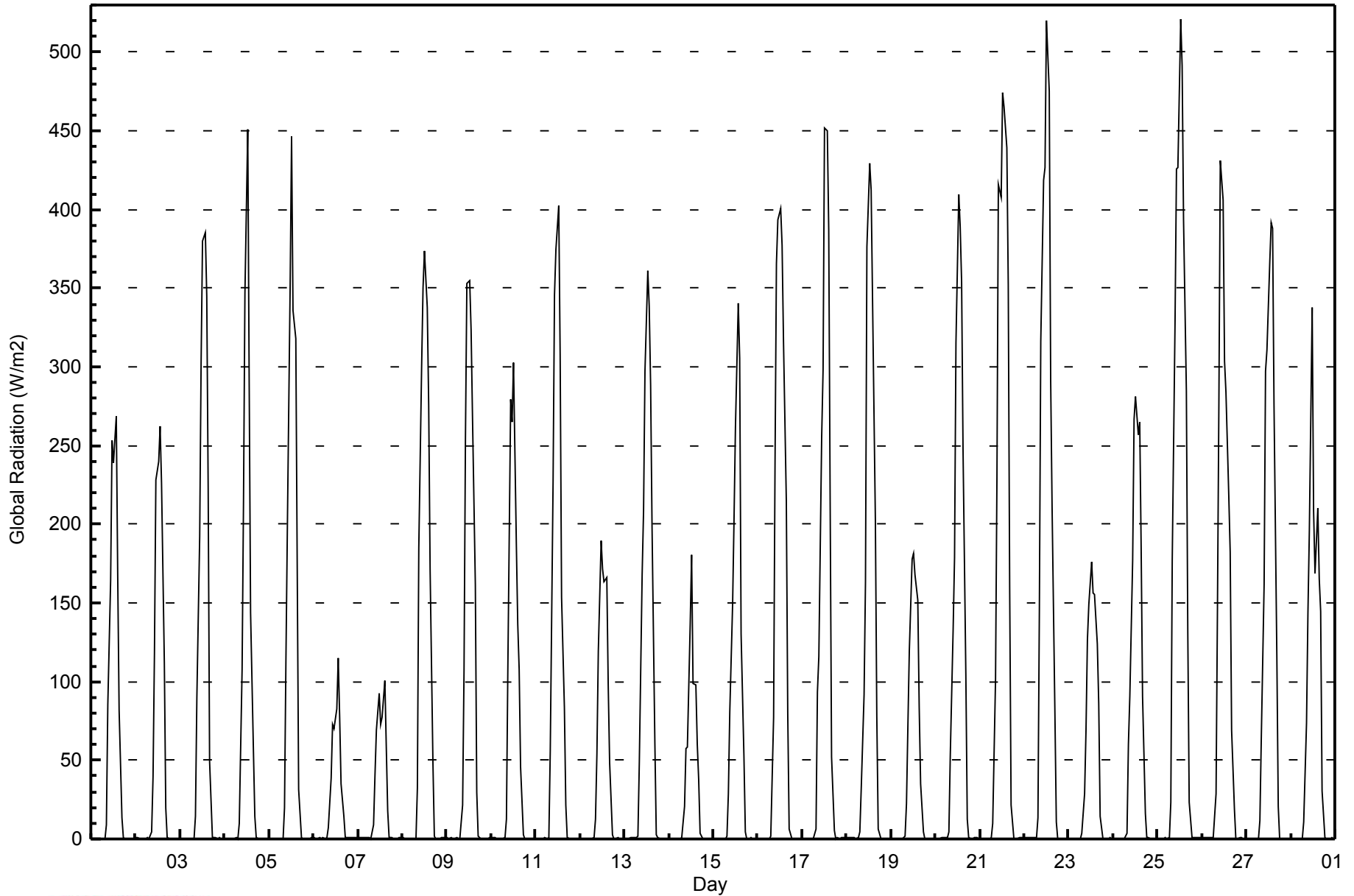


Maximum Value: 521 W/m2 on Feb 25 13:00		Maximum Daily Average: 134.8 W/m2 on Feb 25		Hours in Service: 672																						
Minimum Value: 0 W/m2 on Feb 3 06:00		Minimum Daily Average: 21.8 W/m2 on Feb 6		Hours of Data: 672																						
Maximum Diurnal Average: 323.1 W/m2 at hour 13		Minimum Diurnal Average: 0.2 W/m2 at hour 20		Hours of Missing Data: 0																						
Monthly Average: 75.3 W/m2		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 1 Q <sub>3</sub> = 107 P <sub>90</sub> = 297 P <sub>99</sub> = 449		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-Feb	0	0	0	0	0	0	0	0	9	86	164	253	239	269	168	82	14	0	0	0	0	0	0	0	53.7	269
2-Feb	1	1	0	0	0	0	0	0	5	40	119	228	240	262	227	111	20	1	0	0	0	0	0	0	52.2	262
3-Feb	0	0	0	0	0	0	0	0	14	90	192	303	380	385	345	223	50	1	1	1	0	1	0	0	82.8	385
4-Feb	0	0	0	0	0	0	0	1	0	9	107	214	347	451	292	143	56	15	1	0	0	0	0	0	68.4	451
5-Feb	0	0	0	0	0	0	0	0	20	113	196	352	446	336	318	172	31	1	0	0	0	0	0	0	82.8	446
6-Feb	1	0	0	0	0	0	0	1	7	38	73	70	83	115	78	35	15	1	1	1	1	1	1	1	21.8	115
7-Feb	1	1	1	1	1	1	1	0	9	41	69	93	73	77	101	58	18	1	0	0	0	0	0	1	22.8	101
8-Feb	1	0	0	0	0	0	0	0	32	185	300	351	374	338	276	172	49	2	0	0	0	1	0	1	86.7	374
9-Feb	1	0	1	0	0	1	0	0	21	107	254	353	354	323	268	162	29	2	0	0	0	0	0	0	78.3	354
10-Feb	1	0	0	0	0	0	0	1	13	109	280	265	303	188	136	108	46	3	0	0	0	0	0	0	60.6	303
11-Feb	0	0	0	0	0	1	0	1	56	227	346	375	403	307	154	84	22	1	0	0	0	0	0	0	82.4	403
12-Feb	0	0	0	0	0	0	0	1	12	54	119	189	171	164	166	98	48	3	0	0	1	0	0	0	42.9	189
13-Feb	0	0	0	1	1	1	1	2	48	168	208	298	361	339	289	198	61	3	1	0	0	0	0	0	82.5	361
14-Feb	0	0	0	0	0	0	0	1	21	57	59	137	181	99	98	61	38	4	0	0	0	0	0	0	31.5	181
15-Feb	0	0	0	0	0	0	0	2	29	81	149	203	261	340	306	130	53	5	0	0	1	0	0	0	65.1	340
16-Feb	0	0	0	0	0	0	0	2	77	238	366	394	401	377	316	214	80	6	0	0	0	0	0	0	103.0	401
17-Feb	0	0	0	0	0	0	0	6	93	116	255	298	452	450	387	214	52	5	0	1	0	1	1	1	97.2	452
18-Feb	1	1	0	1	1	0	1	4	32	91	163	376	429	412	342	202	78	6	0	0	0	0	0	0	89.3	429
19-Feb	0	0	0	0	0	0	0	2	23	72	119	178	182	168	152	83	35	4	0	0	0	0	0	0	42.5	182
20-Feb	0	0	0	1	1	0	1	5	54	133	179	316	409	389	354	248	104	13	1	0	0	1	0	0	92.0	409
21-Feb	0	0	0	0	0	0	1	10	102	230	416	408	474	465	439	352	160	22	0	0	0	0	0	1	128.4	474
22-Feb	1	1	1	1	1	1	1	14	145	316	419	427	520	475	292	211	80	10	0	0	0	0	0	0	121.4	520
23-Feb	0	0	0	0	0	0	0	3	29	69	126	149	176	156	155	124	86	14	0	0	0	0	1	0	45.4	176
24-Feb	0	0	0	0	0	0	0	4	60	90	177	267	281	257	265	186	91	16	1	1	0	0	0	0	70.8	281
25-Feb	0	0	0	0	0	0	1	24	177	329	425	427	521	491	393	284	132	24	1	1	1	1	1	1	134.8	521
26-Feb	1	1	1	1	1	1	1	29	148	276	432	406	304	284	218	182	69	19	0	0	0	1	0	0	98.9	432
27-Feb	0	0	0	0	0	0	0	12	64	162	297	311	367	392	388	276	117	21	0	0	0	0	0	0	100.3	392
28-Feb	0	0	0	0	0	0	0	11	73	143	196	338	208	169	210	165	145	31	1	0	0	0	1	0	70.5	338
		0.3	0.3	0.3	0.3	0.3	0.3	0.3	4.8	49.4	134.6	225.5	289.7	323.1	297.2	249.4	160.5	62.0	7.8	0.3	0.2	0.3	0.3	0.3	0.3	Diurnal Average
		1	1	1	1	1	1	1	29	177	329	432	427	521	491	439	352	160	31	1	1	1	1	1	1	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**Fort Chipewyan - February 2015**





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

**Global Radiation (GR) - W/m2**  
**Fort Chipewyan - February 2015**

<b>Concentration Ranges (W/m2)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	428	63.69	63.69
21 - 100	70	10.42	74.11
101 - 300	108	16.07	90.18
301 - 600	66	9.82	100.00
601 - 900	0	0.00	100.00
> 900	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 45 km/h on Feb 7 02:00	Maximum Daily Speed Average: 23.8 km/h on Feb 13	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 17 09:00	Minimum Daily Speed Average: 1.8 km/h on Feb 25	Hours of Data: 670
Maximum Diurnal Speed Average: 4.1 km/h at hour 24	Minimum Diurnal Speed Average: 2.2 km/h at hour 15	Hours of Missing Data: 2
Monthly Average Velocity: 3.1 km/h 36.2 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 11 Q <sub>3</sub> = 17 P <sub>90</sub> = 24 P <sub>99</sub> = 41	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-Feb	E6	E7	E6	E6	E6	E3	WSW3	WNW6	WNW6	WNW6	WNW5	WNW7	WNW9	WNW8	W8	W8	W8	W9	W10	W11	W11	W12	W13	W13	W4.8	W13
2-Feb	WNW12	W11	W11	WNW10	WNW11	WNW11	W11	WNW10	WNW8	W7	W8	W10	WNW9	WNW9	W10	W8	W7	WNW9	WNW9	WNW7	NW4	WNW4	WNW5	NW6	WNW8.5	WNW12
3-Feb	NW7	NNW4	NW5	WNW5	WNW5	NW6	WNW8	NW10	NW7	NW7	NW7	NW8	WNW8	WNW7	W7	WSW8	WSW6	SW4	SE3	SSE5	ESE7	SE7	ESE8	E9	WNW2.8	NW10
4-Feb	ESE9	SE11	ESE11	ESE13	ESE11	ESE10	ESE11	ESE11	ESE8	E5	NW5	NW11	NW12	WNW14	NW13	NW14	NW14	NW14	NW15	NW12	NW13	WNW11	WNW10	WNW10	NW3.1	NW15
5-Feb	NW13	NW13	NW10	WNW9	WNW10	WNW10	WNW9	WNW9	WNW7	NW9	WNW11	NW12	WNW11	NW12	NW12	NW11	NW9	NW7	NW6	NW9	NNW7	NW5	NW5	NNW5	WN9.0	NW13
6-Feb	N4	NNW3	NW3	NNE4	N4	N4	N6	N7	NNE6	NNE9	ENE13	ENE21	ENE22	ENE24	ENE23	ENE23	ENE26	ENE27	ENE30	ENE34	ENE36	ENE37	E39	ENE40	ENE17.2	ENE40
7-Feb	E44	ENE45	ENE43	ENE39	ENE36	ENE35	ENE36	E34	E32	E28	ESE28	ESE24	E24	ESE24	ESE21	SE20	SE12	S9	S7	AF	SW3	W5	NW9	NW12	E20.6	ENE45
8-Feb	NW13	NW11	NW12	NW9	WNW8	W7	W8	WNW9	WNW10	WNW11	WNW10	NW9	WNW9	W8	W11	W12	W9	W6	WNW7	WNW8	NW7	NNW5	NNW4	NNE7	WNW7.8	NW13
9-Feb	NE4	ENE7	E6	E8	E8	E8	ENE9	E13	E16	E16	E16	ENE18	ENE20	ENE20	E22	ENE22	ENE11	NNE10	NNE6	NNE7	NNE4	NNE5	NNE5	NNW6	ENE10.1	ENE22
10-Feb	NNW9	NW9	NW10	NW10	NW12	NW11	NW14	NW17	NW14	NW18	NW18	NW17	NW14	NW14	NW15	NW16	NW12	NW11	WNW8	WNW9	WNW9	W8	WNW10	NW8	NW11.9	NW18
11-Feb	WNW12	W3	W4	WSW3	WSW3	AF	E8	E9	E9	ESE11	E12	E18	SE19	SSE24	SSE26	SE23	SE25	SE24	SE26	SSE27	SSE26	S24	SSE19	SSE15	SE12.7	SSE27
12-Feb	S12	SSW13	SW11	SW8	W7	WNW10	NW9	NW9	NW9	NW9	WNW13	NW13	NW12	NW12	NW10	NNW10	NNW9	NNW8	N8	N8	NNW9	NNW9	NNW12	N12	NW7.3	NW13
13-Feb	N10	N6	N8	N8	NNE8	ENE20	ENE20	ENE23	ENE25	ENE27	ENE28	ENE25	ENE26	ENE27	ENE29	ENE30	ENE32	E41	E44	E41	E34	E35	ESE37	SE42	ENE23.8	E44
14-Feb	SE41	SE29	SE38	SE39	SSE35	SSE32	S31	S35	S33	S34	S30	S22	SSW16	SW14	WNW13	NW16	NW18	NW17	WNW13	NW14	NW15	NW16	NW13	NW10	S11.8	SE41
15-Feb	NW9	NW8	NW8	NW8	NW8	NW8	NW10	NW8	NW8	NW8	NW12	NW13	NW14	NW15	NW16	NW15	NW18	NW16	NW15	NNW12	NNW13	NNW14	NNW13	NW13	NW12.0	NW18
16-Feb	NW14	NW13	NW12	NW11	WNW11	WNW9	WNW12	WNW11	WNW11	W13	W13	WNW14	W14	W16	W17	WNW18	WNW15	WNW12	WNW15	WNW15	WNW14	WNW13	NW15	NW16	WNW13.1	WNW18
17-Feb	NW11	WNW9	WNW10	W9	W9	WNW8	WNW8	WNW7	NW1	NW2	E7	E7	E9	E9	E10	E11	E14	E15	E18	E17	E24	E28	E27	E30	E6.7	E30
18-Feb	E28	E27	E29	E30	E29	E28	E30	ENE25	E23	E25	E22	E24	E19	E18	ESE15	ESE20	E19	E17	E14	ENE8	E16	E22	E20	E20	E21.7	E30
19-Feb	E18	E15	E13	E13	E15	E14	E12	E10	ESE10	ESE11	ESE12	ESE8	ESE6	E4	E4	E9	E6	NNW11	NNW12	NNW14	NNW12	NNW10	NNW9	NNW10	ENE6.8	E18
20-Feb	N10	N10	NE7	E9	ENE11	ENE11	NE8	NNE4	ENE3	E6	ESE13	ESE8	ESE7	E9	ESE11	ESE7	E7	E7	ENE4	NNW4	N8	N9	NNW8	NNW9	ENE5.3	ESE13
21-Feb	NNW12	NNW12	NNW13	NNW12	NNW7	NNW6	NW3	NNW6	NNE4	E7	ESE9	E9	E8	E10	E10	ESE13	ESE15	ESE19	E19	E19	E22	E19	E18	E19	E7.9	E22
22-Feb	E17	E16	ESE19	ESE19	ESE18	ESE20	ESE19	E20	ESE16	ESE18	E18	E15	E14	E22	E20	ESE11	E10	E12	E9	E4	WNW5	WNW12	WNW17	NW18	E11.2	E22
23-Feb	WNW13	WNW14	WNW16	NW20	NW21	NW19	NW16	NW18	NW18	NW16	NW18	NW21	NNW21	NNW21	NNW19	N17	N13	NNE12	NNE9	NE11	ENE15	E19	E17	E16	NNW11.6	NW21
24-Feb	ENE15	ENE15	E22	ENE22	ENE22	ENE24	ENE24	ENE25	ENE19	ENE21	NE20	ENE23	ENE24	ENE17	ENE18	E17	E16	E11	ENE5	ENE4	NE5	NNW8	NNW11	N11	ENE15.2	ENE25
25-Feb	NNW8	NNW6	NNW10	NNW6	NW5	NW5	W5	WNW6	WNW6	WNW6	WNW9	W9	W8	WNW7	SW6	S3	SE4	ESE4	SE6	ESE7	E8	E10	ESE10	WNW1.8	E10	
26-Feb	E11	ESE10	ESE8	SE7	ESE7	SSE5	S7	S8	SSW9	SSW8	S2	SW6	W15	W14	W13	W13	W11	WSW10	W9	WNW9	N14	NNW15	NNW12	NNW14	W3.3	W15
27-Feb	NNW13	NW9	NW11	NW9	NW9	WNW7	WNW8	WNW7	W7	W11	W13	W16	WSW18	WSW17	WSW18	WSW20	WSW17	WSW14	WSW14	WSW15	W14	W15	W16	W17	W11.9	WSW20
28-Feb	W17	W17	W17	W18	WNW18	WNW17	WNW14	WNW11	WNW11	WNW11	WNW15	NW14	NW14	NW13	NNW12	NNW15	NNW14	NNW13	N10	NNW9	NNW11	NNW8	NE3	SW3	NW11.0	W18
NNE3.9 NE3.5 NE3.5 ENE3.0 NE2.9 NE3.1 NE3.1 NE3.1 NE2.5 NE2.2 NE2.6 NNE3.4 NNE2.7 NNE2.5 NNE2.2 NE2.5 NNE2.9 NE3.0 NE2.8 NNE3.0 NNE4.0 NE3.6 NE3.8 NNE4.1 E44 ENE45 ENE43 SE39 ENE36 ENE35 ENE36 S35 S33 S34 S30 ENE25 ENE26 ENE27 ENE29 ENE30 ENE32 E41 E44 E41 ENE36 ENE37 ENE39 SE42																								Diurnal Average	Diurnal Maximum	

AF - Analyzer Failure

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

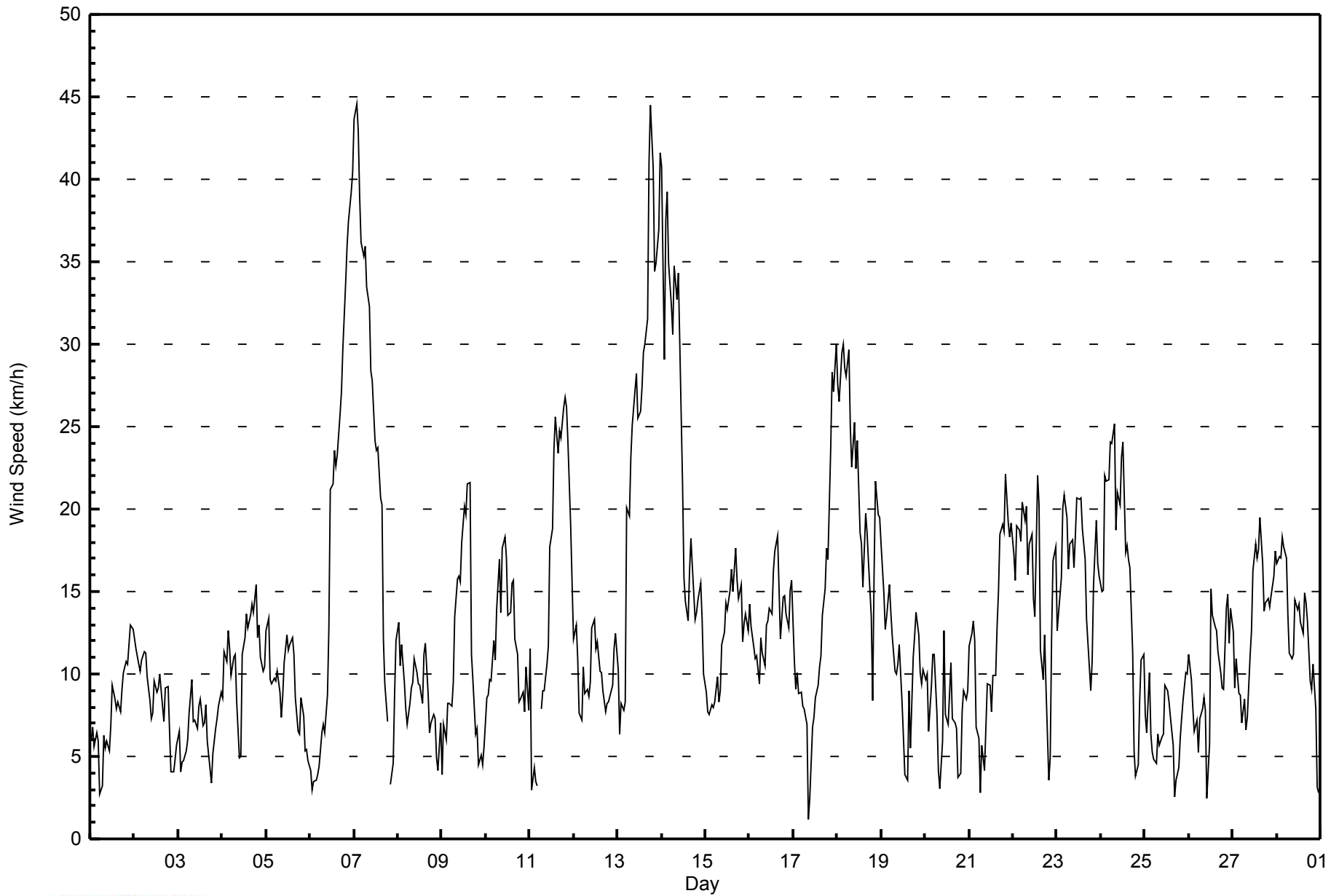


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 23 14:00																	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Minimum Value: 0 km/h on Feb 1 04:00																									
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 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-Feb	1	0	0	0	1	2	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3	3
2-Feb	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	1	2	1	1	1	1	1	3
3-Feb	2	2	1	1	1	1	1	2	2	2	2	3	2	2	2	2	1	1	1	1	1	1	1	1	3
4-Feb	1	1	1	1	1	1	1	1	1	1	1	3	3	4	3	4	4	3	4	4	3	3	2	2	4
5-Feb	3	4	3	2	2	2	2	2	1	2	3	3	3	3	4	3	2	2	2	2	2	2	2	1	4
6-Feb	1	1	1	1	1	1	2	2	2	3	4	3	3	4	3	3	4	4	4	4	5	5	4	4	5
7-Feb	4	4	5	5	4	4	5	3	3	2	3	2	2	2	2	2	3	2	1	AF	1	1	2	4	5
8-Feb	4	3	3	2	2	2	1	1	1	2	3	3	3	3	3	2	2	1	2	1	1	2	1	1	4
9-Feb	2	2	1	1	1	1	2	3	2	2	2	3	3	3	3	3	3	3	2	2	1	2	2	2	3
10-Feb	2	2	3	2	3	3	4	4	4	5	5	5	4	4	4	4	4	2	2	1	2	2	2	2	5
11-Feb	1	3	2	1	2	AF	2	1	1	1	2	3	4	3	3	3	3	3	4	4	4	4	3	2	4
12-Feb	3	2	2	1	1	3	2	3	3	3	4	4	4	4	4	3	3	2	3	3	3	2	3	3	4
13-Feb	4	2	3	2	4	4	4	3	3	4	4	4	4	3	4	3	3	5	4	4	3	3	4	4	5
14-Feb	5	4	4	5	5	6	5	5	4	5	5	4	3	4	4	5	5	5	3	4	4	4	4	3	6
15-Feb	2	2	2	2	2	2	3	2	3	3	4	4	4	4	5	4	5	4	3	4	4	5	5	4	5
16-Feb	3	3	3	3	3	2	3	3	2	3	3	4	4	4	4	4	4	2	3	3	3	3	4	4	4
17-Feb	4	2	2	2	1	2	2	3	2	2	2	1	2	2	2	1	1	4	2	2	2	2	2	3	4
18-Feb	3	2	3	3	3	3	3	3	2	2	3	3	4	3	2	2	3	4	2	2	2	2	2	2	4
19-Feb	2	2	2	2	1	2	1	1	1	2	1	2	1	1	1	2	1	4	4	4	4	3	3	3	4
20-Feb	3	3	4	3	2	2	3	1	1	2	3	2	1	2	1	2	1	1	1	3	1	2	2	2	4
21-Feb	2	2	2	2	4	3	2	3	2	2	2	1	1	1	2	2	1	2	2	3	2	2	2	2	4
22-Feb	2	2	2	2	1	2	2	2	2	3	3	1	2	4	3	2	1	1	2	2	3	4	4	4	4
23-Feb	3	3	6	6	7	5	4	4	5	4	6	7	7	7	6	6	5	5	2	2	3	2	2	2	7
24-Feb	2	4	2	2	2	3	3	4	3	4	4	4	5	4	3	2	2	2	1	2	2	1	2	2	5
25-Feb	3	3	3	2	2	2	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	2	1	1	3
26-Feb	1	1	1	1	1	1	2	2	2	2	1	1	5	4	4	3	3	2	2	4	5	5	5	5	5
27-Feb	4	3	3	2	3	2	2	2	3	3	4	4	4	4	3	4	4	3	3	3	3	3	3	3	4
28-Feb	4	3	4	4	4	3	3	2	2	3	4	4	4	5	4	5	5	4	3	2	2	2	1	1	5
																	Diurnal Maximum								
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - February 2015**





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

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	61	9.10	9.10
6 - 11	283	42.24	51.34
12 - 19	212	31.64	82.99
20 - 28	73	10.90	93.88
29 - 38	29	4.33	98.21
> 38	12	1.79	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort Chipewyan - February 2015**

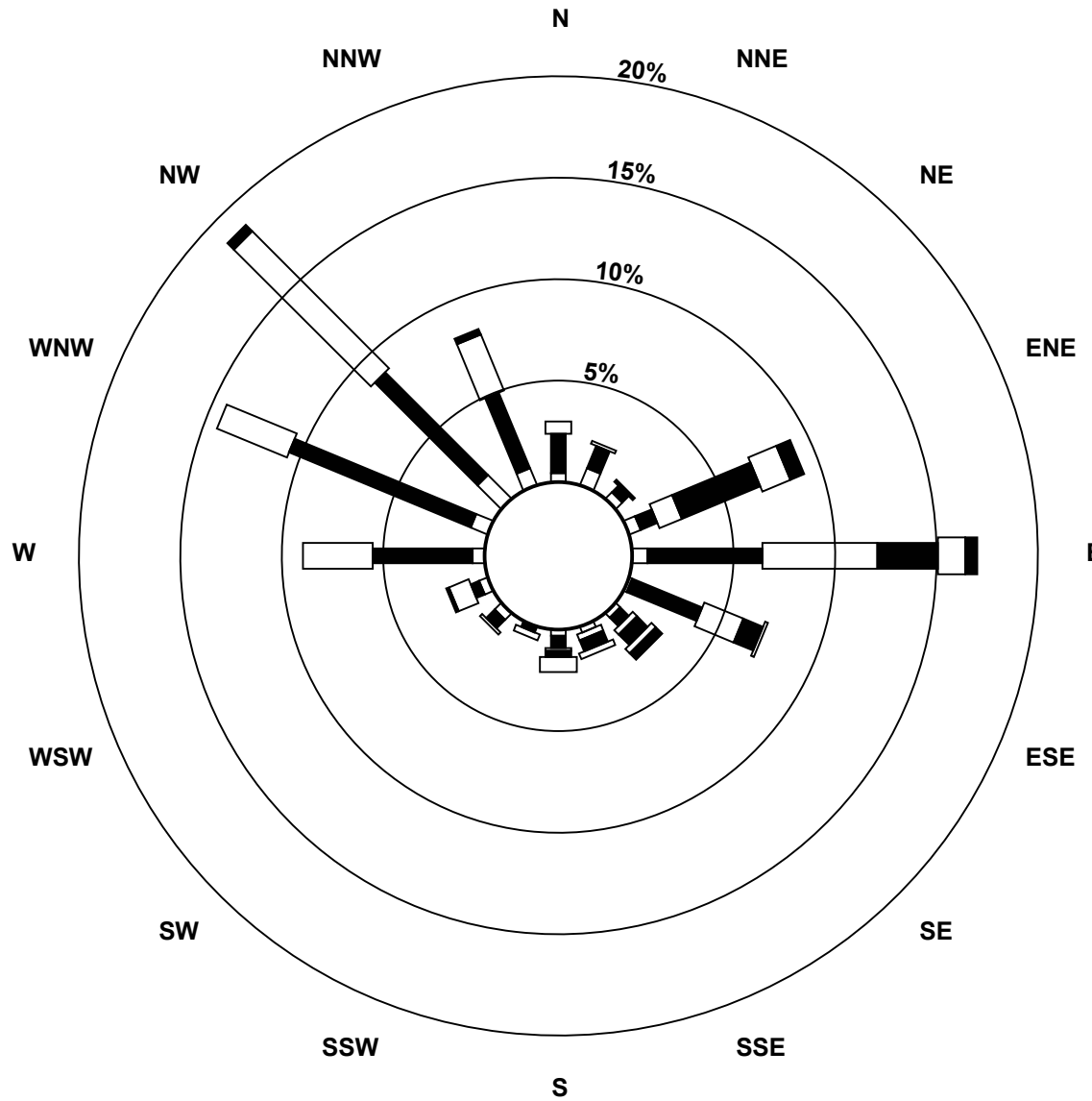
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	3	6	3	4	5	1	2	2	2	0	3	3	4	6	11	6	61
6 - 11	13	8	3	6	38	25	4	0	4	2	4	3	33	65	48	27	283
12 - 19	4	1	0	8	38	14	2	2	1	2	1	7	23	25	64	20	212
20 - 28	0	0	1	28	20	7	5	4	2	0	0	1	0	0	3	2	73
29 - 38	0	0	0	10	9	1	2	2	5	0	0	0	0	0	0	0	29
> 38	0	0	0	5	4	0	3	0	0	0	0	0	0	0	0	0	12
<b>Totals</b>	20	15	7	61	114	48	18	10	14	4	8	14	60	96	126	55	670

Total Number of Valid Hours: 670

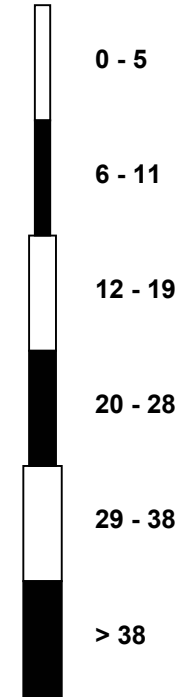
Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Fort Chipewyan (AMS 8)**



**Classes (km/h)**



**Total Number of Valid Hours: 670**



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

**Wind Direction (WD) - deg**  
**Fort Chipewyan - February 2015**

Direction of Maximum Speed: 75 deg on Feb 7 02:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 77.1 deg on Feb 13	Hours of Data: 670
Direction of Minimum Speed: 305 deg on Feb 17 09:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 1.8 deg on Feb 25	Percent Operational Time: 99.7
Monthly Average Direction: 310.4 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-Feb	97	96	100	97	98	93	254	295	287	287	300	294	291	299	265	266	267	271	266	268	268	274	277	280	277.7
2-Feb	283	278	278	285	290	288	281	283	294	277	272	274	294	289	263	271	275	283	282	298	318	294	287	307	283.5
3-Feb	319	335	320	303	299	305	316	320	310	306	306	304	299	282	265	242	239	217	141	159	110	130	107	96	294.5
4-Feb	107	125	114	117	118	120	104	104	103	90	306	312	314	300	306	319	311	304	313	308	310	293	291	290	325.2
5-Feb	310	319	304	283	286	290	291	289	294	307	302	314	297	312	320	319	313	304	305	320	328	323	320	337	307.1
6-Feb	354	335	315	16	354	349	359	1	21	31	68	78	73	68	65	66	66	66	67	67	66	74	79	78	64.3
7-Feb	79	75	76	77	70	68	70	80	89	99	108	105	100	108	123	125	143	170	189	AF	230	276	316	310	88.3
8-Feb	324	323	323	324	299	276	270	282	287	290	296	310	287	276	265	265	259	272	292	303	314	338	347	19	297.4
9-Feb	47	58	81	88	83	88	76	86	94	89	95	75	76	73	79	67	57	31	26	32	13	26	12	338	70.4
10-Feb	332	322	316	304	309	313	323	318	318	318	316	313	318	316	312	317	310	310	294	283	284	280	291	313	311.4
11-Feb	296	260	265	256	258	AF	81	89	88	104	92	93	131	147	154	142	129	141	145	159	163	175	162	166	143.9
12-Feb	182	205	223	232	277	300	312	317	324	311	297	315	315	308	326	334	334	342	350	351	338	330	341	351	311.1
13-Feb	359	7	358	8	20	63	63	64	65	68	67	68	72	71	73	68	69	79	84	86	92	98	115	124	77.1
14-Feb	130	135	129	139	154	164	172	177	182	187	189	190	195	225	283	309	316	313	298	304	313	319	313	306	180.6
15-Feb	306	315	312	307	305	305	320	319	317	314	311	311	316	311	316	321	321	313	315	318	329	330	334	320	316.8
16-Feb	307	311	315	304	299	289	301	302	284	280	280	288	271	278	278	282	283	286	287	286	289	297	317	317	292.4
17-Feb	316	295	288	263	279	287	289	292	305	311	82	90	86	91	94	98	93	92	91	97	87	86	86	86	80.2
18-Feb	85	82	82	85	81	79	81	78	81	82	80	82	83	82	102	102	98	97	94	73	93	94	94	94	86.0
19-Feb	92	85	83	86	89	90	92	97	108	107	103	115	104	90	87	101	100	339	338	348	345	338	336	346	68.4
20-Feb	350	357	42	81	67	60	51	16	72	99	108	106	104	100	106	106	84	87	66	330	354	349	348	338	56.8
21-Feb	335	341	342	339	335	327	307	337	19	91	105	98	95	96	99	104	102	105	101	100	100	96	91	90	78.8
22-Feb	90	92	102	105	104	105	102	100	103	104	98	87	95	99	101	107	95	97	88	89	288	291	297	314	95.1
23-Feb	302	293	301	308	318	311	306	310	314	315	321	322	327	333	348	352	357	16	21	44	59	85	92	91	337.6
24-Feb	78	77	80	78	71	70	66	65	65	65	55	60	63	59	77	92	95	98	65	71	38	338	345	349	66.1
25-Feb	341	333	345	334	314	325	260	288	290	288	291	286	268	260	289	233	191	136	121	137	117	100	99	105	300.0
26-Feb	99	102	121	141	120	148	173	171	205	201	171	224	269	271	278	265	264	258	264	290	350	338	337	338	264.7
27-Feb	329	321	312	312	310	284	285	283	281	270	273	267	252	250	244	240	249	255	252	254	261	262	260	267	267.7
28-Feb	272	270	274	277	284	284	291	287	285	295	293	304	305	326	336	344	346	343	353	347	343	337	48	229	304.6
	33.6	36.4	42.2	56.7	40.7	42.8	39.5	36.9	49.4	51.7	47.0	26.5	18.4	20.8	26.0	33.8	33.5	38.6	38.3	25.9	33.2	34.6	34.2	33.1	
	Diurnal Average																								

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



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

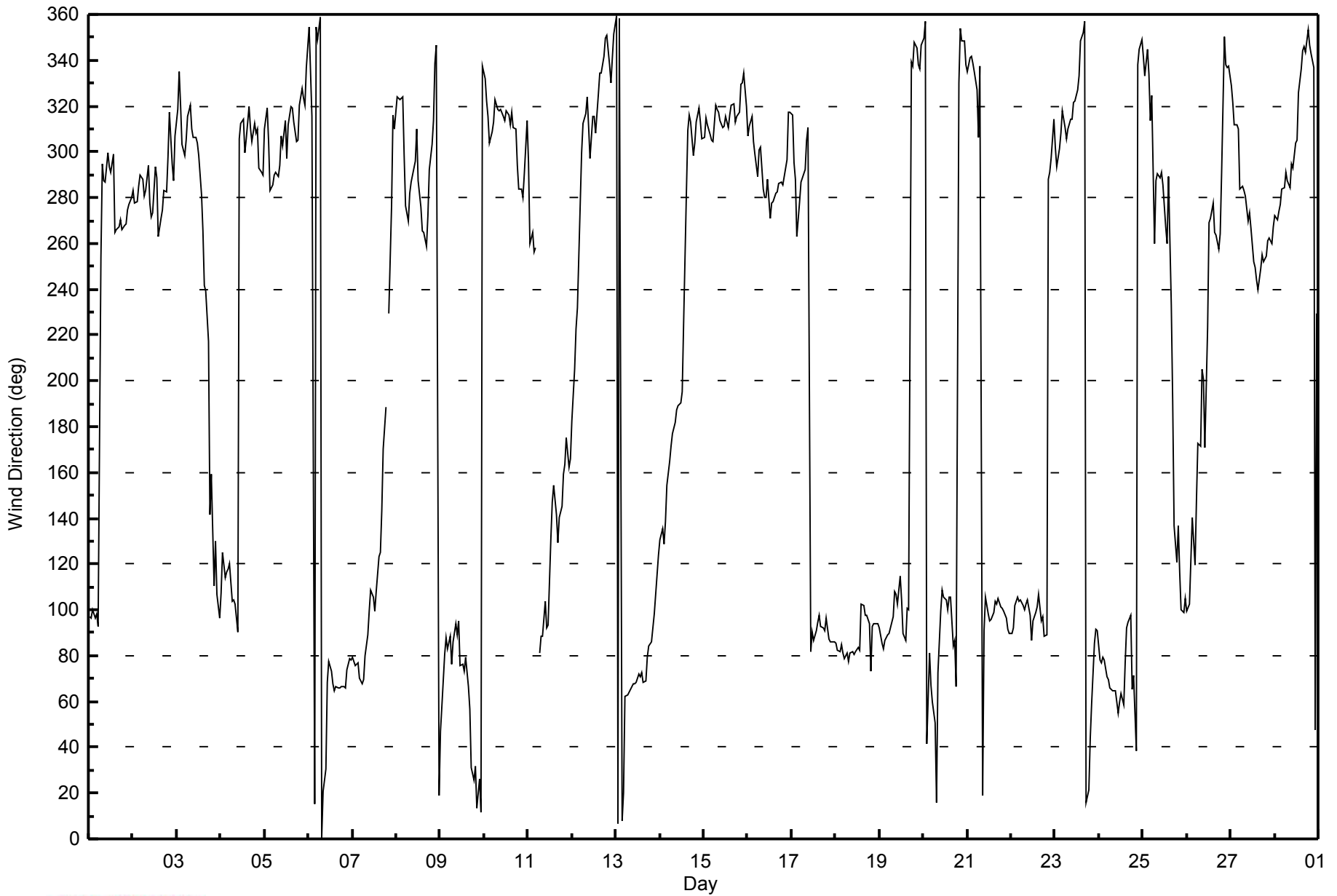
**Wind Direction (WD) - deg**  
**Fort Chipewyan - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 74 deg on Feb 11 02:00 Minimum Value: 3 deg on Feb 18 16:00 Percentiles: P <sub>1</sub> = 4 P <sub>10</sub> = 6 Q <sub>1</sub> = 8 Median = 13 Q <sub>3</sub> = 18 P <sub>90</sub> = 23 P <sub>99</sub> = 59																	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7								
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	4	5	9	5	5	39	23	11	11	11	17	15	13	17	21	16	15	13	13	11	12	13	13	13	39
2-Feb	13	13	12	13	12	12	11	12	17	14	14	13	21	21	16	14	13	11	10	13	20	21	9	10	21
3-Feb	17	24	12	17	14	12	12	13	14	16	20	16	18	22	19	13	11	21	26	16	18	20	10	9	26
4-Feb	13	12	7	7	11	11	7	6	5	14	72	15	17	15	17	16	15	15	17	16	14	13	13	72	
5-Feb	17	17	21	13	13	13	13	14	14	16	18	16	18	17	17	17	14	15	24	14	15	23	33	25	33
6-Feb	26	28	26	20	25	22	19	20	18	16	20	7	9	9	8	9	8	8	7	7	8	9	6	6	28
7-Feb	6	6	6	6	7	7	7	6	5	5	6	7	4	7	7	5	10	15	6	AF	26	14	15	14	26
8-Feb	17	15	15	17	18	16	6	7	9	10	18	24	23	23	17	13	14	15	9	7	16	42	44	10	44
9-Feb	33	8	24	13	9	7	11	9	6	7	7	11	10	12	9	8	11	22	23	21	23	22	34	23	34
10-Feb	20	17	16	13	14	16	18	16	18	16	17	17	20	18	16	16	15	13	20	12	9	11	8	16	20
11-Feb	7	74	52	25	56	AF	8	6	7	15	6	4	30	8	7	8	5	7	7	10	10	10	10	10	74
12-Feb	15	10	10	10	21	14	15	19	24	19	16	19	20	20	26	22	20	22	20	23	20	17	18	19	26
13-Feb	22	23	23	19	30	8	8	7	7	7	7	8	8	7	7	7	6	5	5	4	5	8	4	30	
14-Feb	5	6	5	8	10	11	10	8	8	8	8	8	9	18	21	16	16	15	13	15	15	16	15	17	21
15-Feb	18	22	24	19	16	18	17	19	17	16	17	18	18	21	19	18	16	16	14	15	22	23	24	19	24
16-Feb	15	14	15	16	14	15	15	14	13	12	14	19	16	14	15	14	14	11	11	11	12	16	14	13	19
17-Feb	16	13	8	19	11	10	8	8	53	66	9	4	6	10	4	5	5	6	6	6	5	5	5	5	66
18-Feb	6	5	5	5	5	6	5	6	6	6	6	8	11	10	9	3	5	7	7	15	7	4	5	5	15
19-Feb	7	6	6	5	4	5	6	5	6	8	4	6	11	13	10	6	12	23	20	22	23	22	20	20	23
20-Feb	21	19	47	10	7	8	17	29	40	15	7	16	14	5	6	9	9	11	10	37	13	15	16	10	47
21-Feb	11	11	12	13	32	46	70	69	54	21	8	7	6	4	5	6	4	5	6	5	5	6	5	6	70
22-Feb	6	6	5	5	7	5	5	5	5	6	6	6	8	5	5	6	7	10	11	27	20	13	12	15	27
23-Feb	18	15	18	16	18	15	15	16	15	15	21	19	21	22	22	24	23	20	15	10	10	7	7	6	24
24-Feb	8	7	6	7	8	7	8	8	10	10	11	11	9	13	12	4	4	6	15	43	37	11	13	18	43
25-Feb	34	47	42	43	34	56	29	15	16	22	24	16	22	21	17	20	59	35	18	17	13	13	7	9	59
26-Feb	6	11	11	11	12	24	25	24	12	11	70	18	20	15	16	14	14	13	14	20	26	23	26	22	70
27-Feb	23	21	18	17	18	17	16	18	15	14	17	15	15	14	13	12	12	12	12	12	12	13	12	12	23
28-Feb	13	14	14	13	14	13	13	12	12	15	15	23	16	31	21	21	22	22	19	15	15	14	49	60	60
																	Diurnal Maximum								
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort Chipewyan - February 2015**



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	17:05
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	747
Cal Gas Concentration	2.45 ppm	Cal Gas Expiry Date	9/16/2016
Gas Cert Reference	LL103809		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	8205
DACS voltage range	0-5v	DACS channel #	DIFF 1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	20	20	PMT voltage (mV)	-826	-826
Analyzer Range (mv)	20	20	Flash power supply (V)	1008	1012
Calculated slope	0.995684	0.998154	Chamber temp.	45.2	45.1
Calculated intercept	-0.028903	-0.086707	Pressure (mm Hg)	711.6	722.2
Analyzer Background	1.2	1.18	Flow (l/m)	0.431	0.440
Analyzer Coefficient	1.043	1.027	UV Lamp (%)	90	90

Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241
---------------	----------------	-------------------	------------

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.08	NA
as found span	5000	37.1	18.18	18.18	1.000
calibrator zero	5000	0.0	0.0	0.05	NA
high point	5000	37.1	18.18	18.27	0.995
second point	5000	19.8	9.70	9.85	0.985
third point	5000	9.9	4.85	4.97	0.976
calibrator zero					
as left zero	5000	0.0	0.0	0.0	NA
as left span	5000	37.1	18.2	17.8	1.022
Average Correction Factor					0.985

Corrected As found	18.1	Previous response	18.3	% change	1.0%
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#### Notes:

Span with a slight adjustment, filter changed after As Found

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

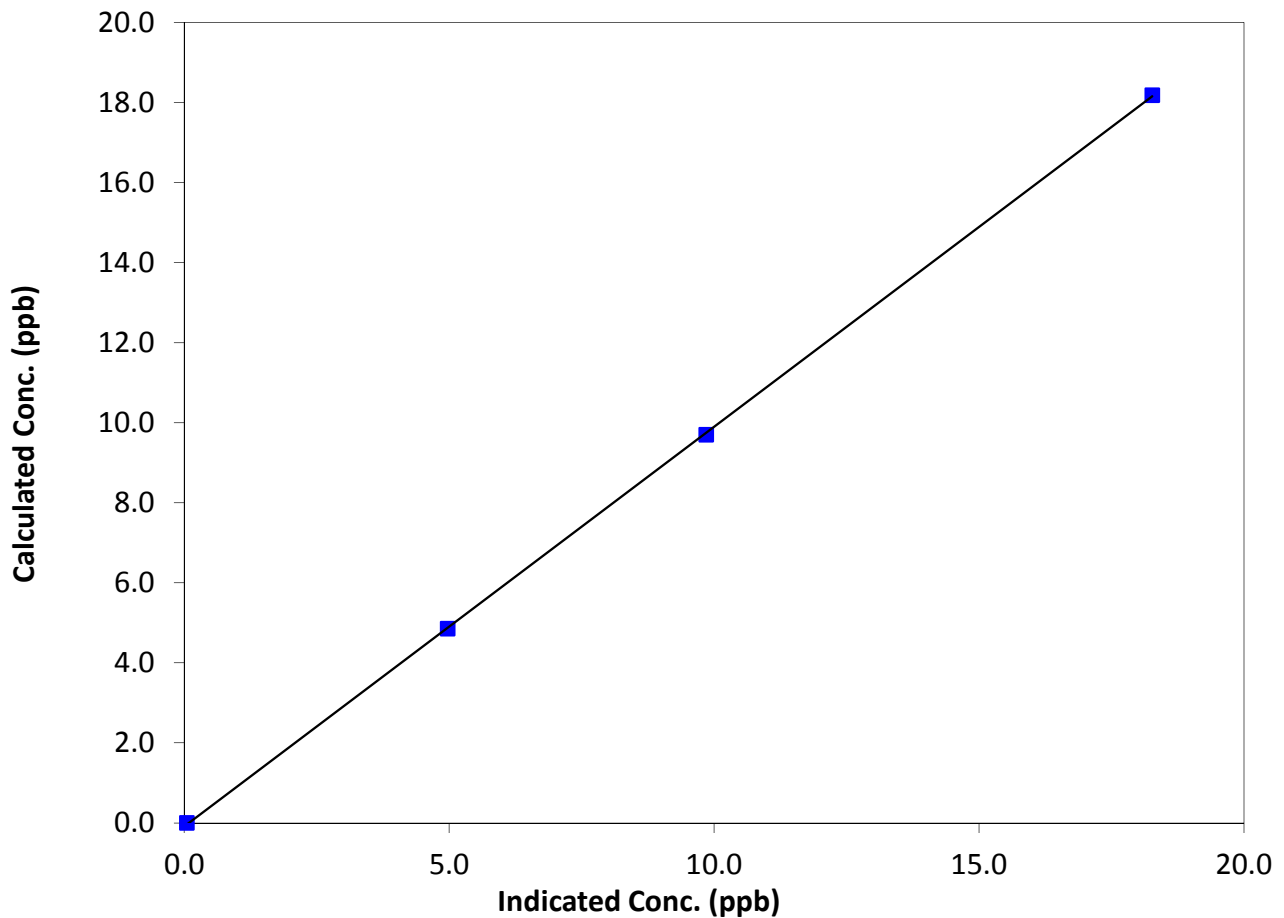
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	17:05
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1136451241

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999974
18.2	18.3	0.9950		
9.7	9.9	0.9850	Slope	0.998154
4.9	5.0	0.9761		
			Intercept	-0.086707

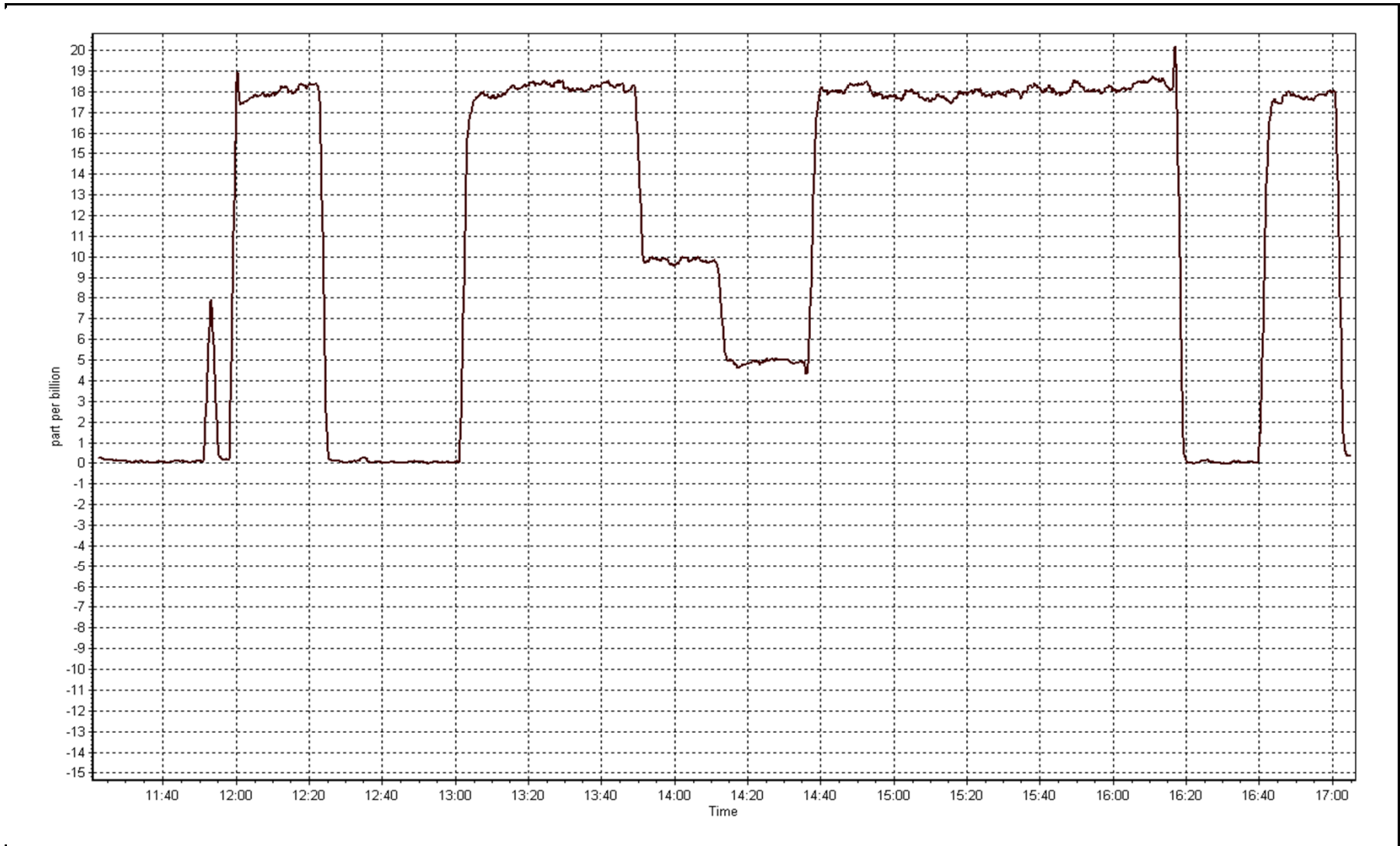
**SO<sub>2</sub> Calibration Curve**





SO2 Calibration Plot

Date: February 13, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	17:05	End Time (MST)	19:16
Barometric Pressure	740 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	API T700	Serial Number	735
NO2 calibration used	Wednesday, December 03, 2014	Transfer Standard	NA
DACS make/model	Campebls CR3000	DACS serial No.	8205
DACS voltage range	0-5V	DACS channel #	Digital

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	200	200	Bench temp. (Deg C)	28.5	22.5
Analyzer Range (input)	200	200	Lamp temp. (Deg C)	58.0	58.0
Calculated slope	0.985466	0.990563	Pressure (in Hg)	27.4	27.6
Calculated intercept	-0.048058	-0.611961	Flow cell (LPM)	0.766	0.808
Analyzer Background	-0.60	-0.6	Cell A Intensity	NA	NA
Analyzer Coefficient	1.015	1.015	Cell B Intensity	NA	NA

Analyzer make API T400 Analyzer serial # 1020

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	O3 Ref -- O3 Drive (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	0.5	N/A
as found span	5000	197.5 -- 810.1	104.5	105.9	0.987
calibrator zero	5000	0.00	0.0	0.5	N/A
high point	5000	197.5 -- 810.1	104.5	105.9	0.987
second point	5000	148 -- 772	79.7	81.3	0.980
third point	5000	93 -- 715	52.9	54.1	0.979
calibrator zero					
as left zero	5000	0.00	0.0	0.8	N/A
as left span	5000	197.5 -- 810.1	104.5	107.7	0.970
Average Correction Factor					0.982

Corrected As found 105.3 Previous response 106.1 % change 0.7%

#### Notes:

No adjustments, As Finds used for calibrator zero and high point. Filter changed after third point.

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

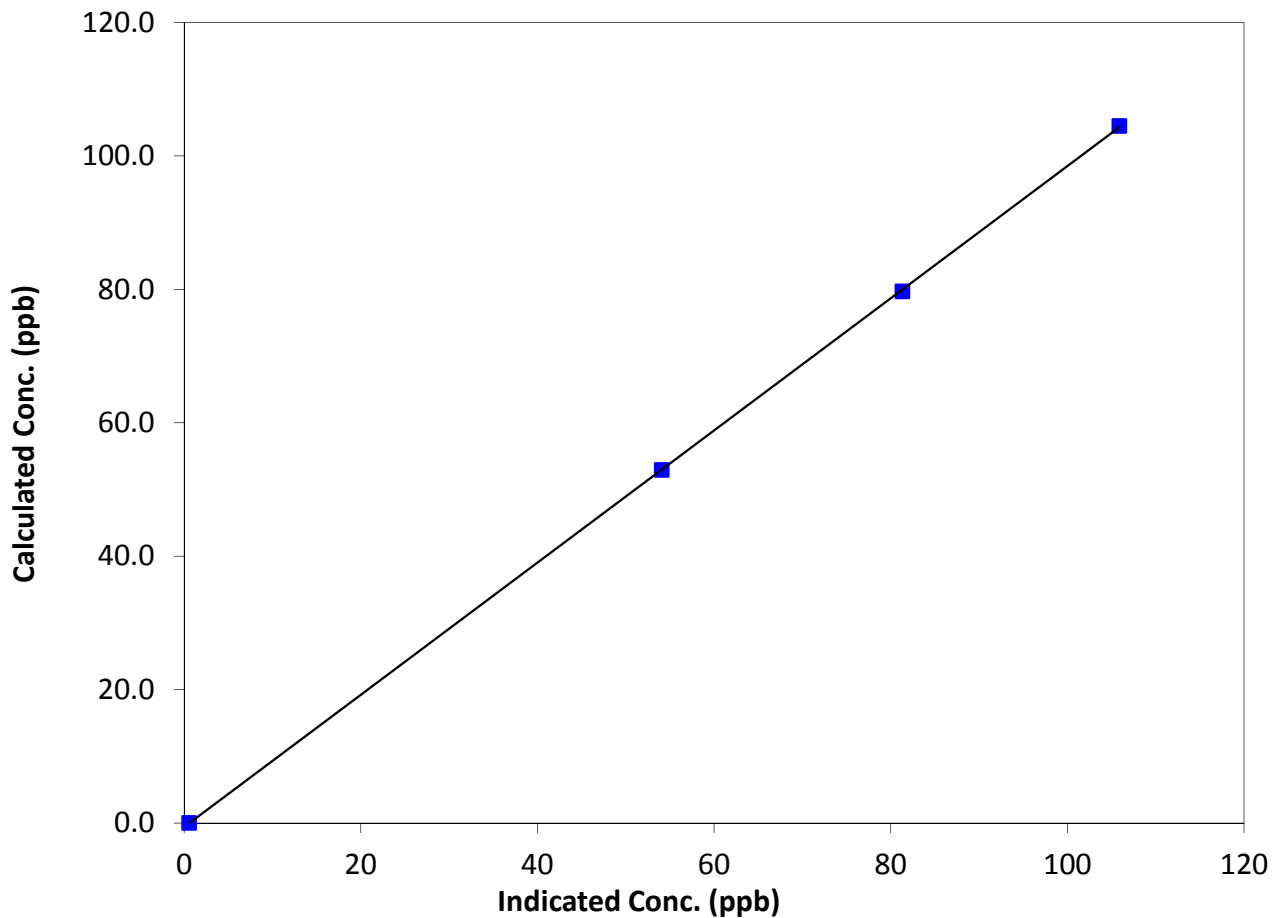
### Station Information

Calibration Date	Friday, February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	17:05	End Time (MST)	19:16
Analyzer make	API T400	Analyzer serial #	1020

### Calibration Data

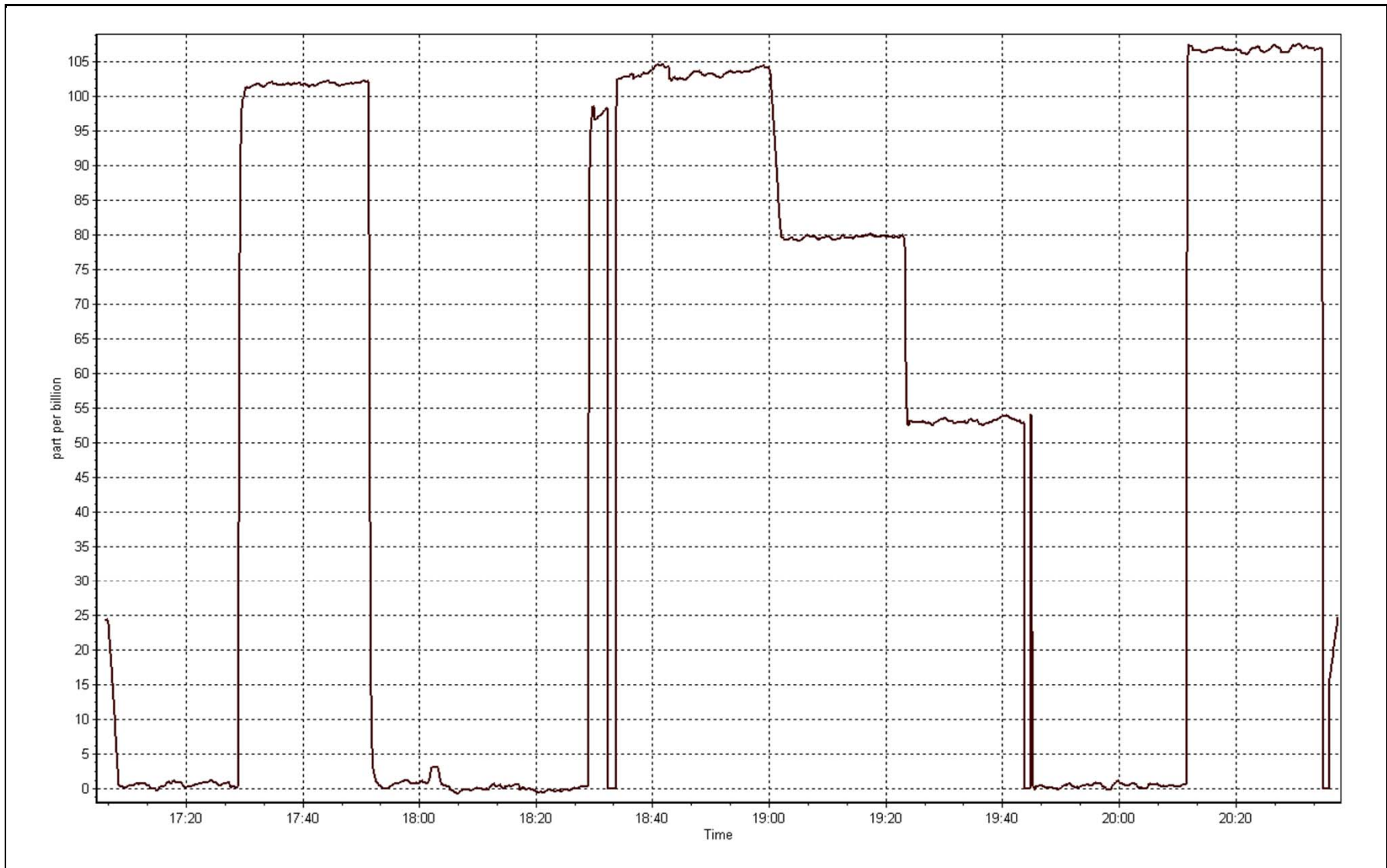
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999981
104.5	105.9	0.9868		
79.7	81.3	0.9800	Slope	0.990563
52.9	54.1	0.9785		
			Intercept	-0.611961

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: February 13, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Reason:	Routine		
Start Time (MST)	11:30	End Time (MST)	17:05
Barometric Pressure	740 mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	747
NO Cal Gas Conc	20.2 ppm	Cal Gas Expiry Date	September 16, 2016
NOx Cal Gas Conc	20.3 ppm	Cal Gas Serial #	LL103809

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	8205
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	200	200	200
	Analyzer Range (mv)	200	200	200
Before	Data Slope	1.001936	1.001021	0.993139
	Data Offset	0.048583	0.156814	0.098998
After	Data Slope	1.000448	1.000235	0.993967
	Data Offset	0.161684	0.234682	-0.042502
Channel #		DIFF 3	DIFF 1	DIFF 2
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model	API T200u	Analyzer serial #	172
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Test Point	before		after	
Concentration range	200	ppb	200	ppb
NO coefficient	1.208	ppb	1.175	ppb
NOX coefficient	1.221	ppb	1.188	ppb
NO bkgrnd	-0.1		0.1	
NOX bkgrnd	0.1		0.2	
HVPS	502.0		502.0	
Chamber Temp	40.0	Deg C	40.0	Deg C
Moly Temp	316.0	Deg C	316.0	Deg C
PMT Temp	5.1	Deg C	5.1	Deg C
O3 flow	89.0	ccm	90.0	ccm
R Cell Press	2.6	"Hg	3.8	"Hg
Sample Flow	1131	ccm	1152	ccm

**Notes:**

Pump changed after As Found. Nightly spans drifting lately. Filter changed after As Found.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date: February 13, 2015 Station Number: AMS 8

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	0.2	0.0	0.2	N/A	N/A
as found span	5000	37.1	150.6	149.9	0.7	141.6	140.3	1.3	1.0640	1.0685
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
high point	5000	37.1	150.6	149.9	0.7	150.6	149.8	0.8	1.0004	1.0005
second point	5000	19.8	80.4	80.0	0.4	79.9	79.4	0.5	1.0066	1.0073
third point	5000	9.9	40.2	40.0	0.2	40.1	39.7	0.4	1.0033	1.0082
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as left span	5000	37.1	150.6	45.2	105.4	151.1	45.6	105.5	0.9971	0.9921
Average Correction Factor									1.0035	1.0053

Corrected As found NO<sub>x</sub>= 141.4 NO= 140.2 Percent Change NO<sub>x</sub>= 6.3% NO= 6.7%  
 Previous Response NO<sub>x</sub>= 150.3 NO= 149.6

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 37.10 ccm

O3 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			N/A	
1st NO <sub>2</sub> (100)	N/A	45.2	104.5	150.3	45.2	105.1	0.9949	1.0000	0.9942	100.6%
2nd NO <sub>2</sub> (75)	N/A	70.0	79.7	150.2	70.0	80.2	0.9954	1.0000	0.9934	100.7%
3rd NO <sub>2</sub> (50)	N/A	96.7	52.9	150.2	96.7	53.4	0.9956	1.0000	0.9908	100.9%
4th NO <sub>2</sub> (0)	149.7	N/A	0.7	150.4	149.7	0.7	0.9942	1.0000	N/A	N/A
Average Correction Factor							0.9950	1.0000	0.9928	100.7%

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

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

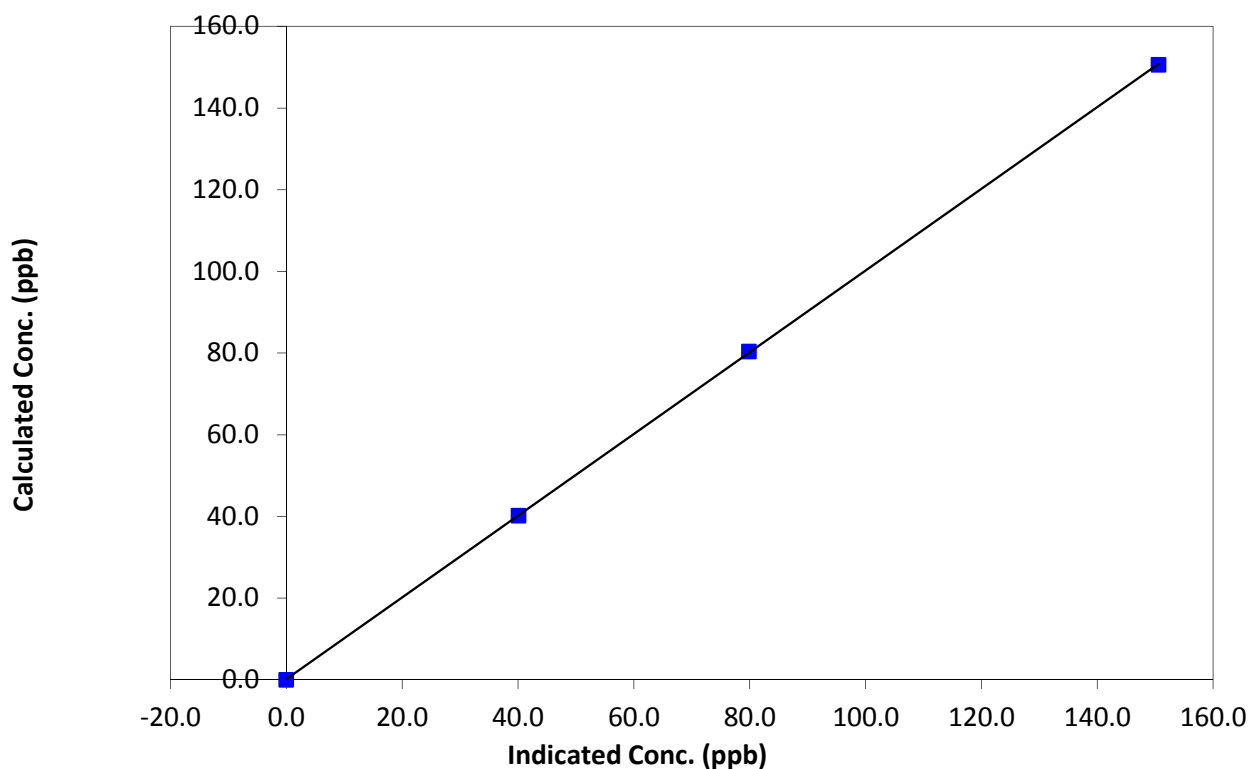
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	17:05
Analyzer make	API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999988
150.6	150.6	1.0004		
80.4	79.9	1.0066	Slope	1.000448
40.2	40.1	1.0033		
			Intercept	0.161684

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

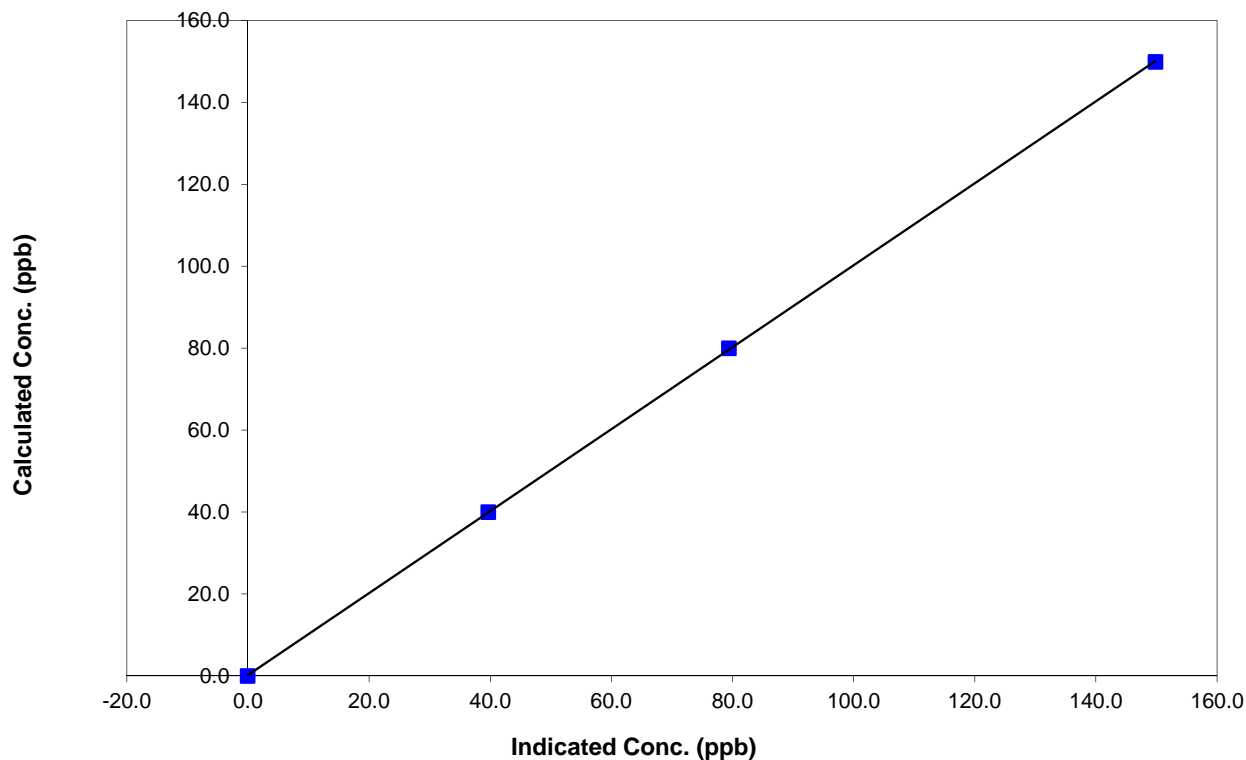
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Name	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	17:05
Analyzer make	API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999984
149.9	149.8	1.0005		
80.0	79.4	1.0073	Slope	1.000235
40.0	39.7	1.0082		
			Intercept	0.234682

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

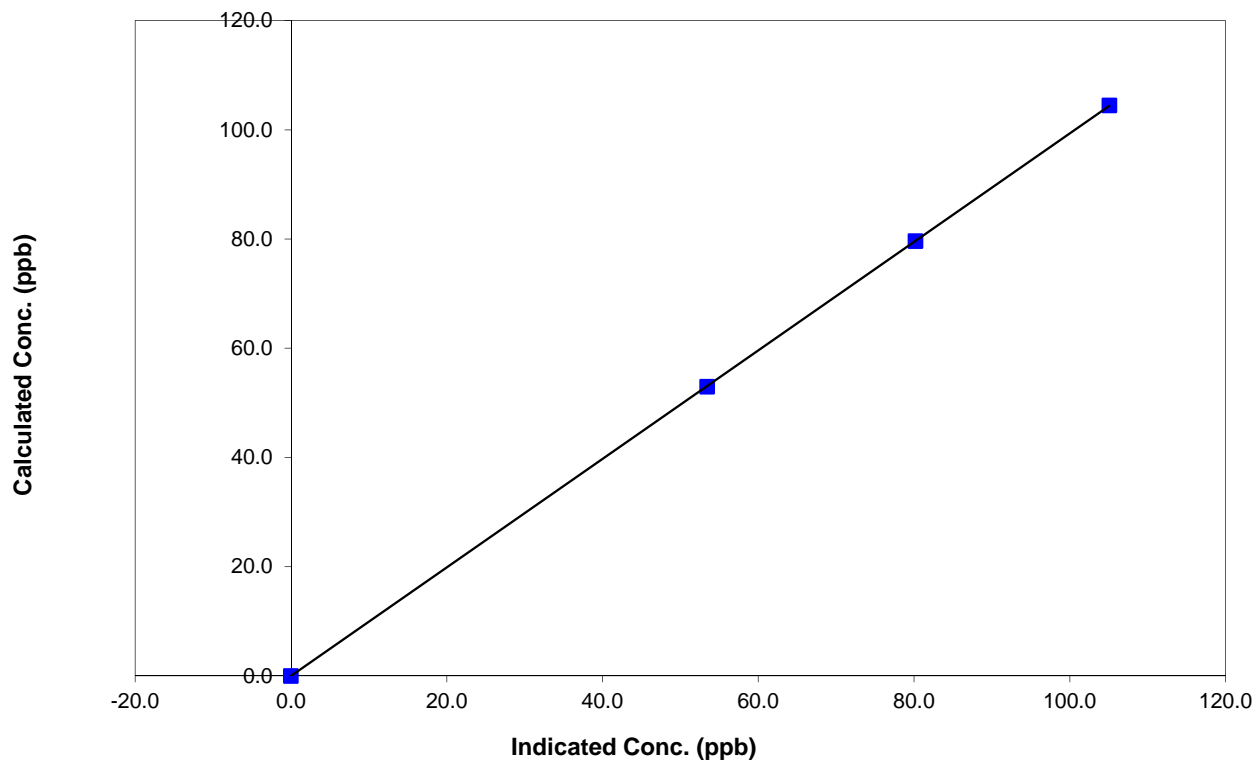
### Station Information

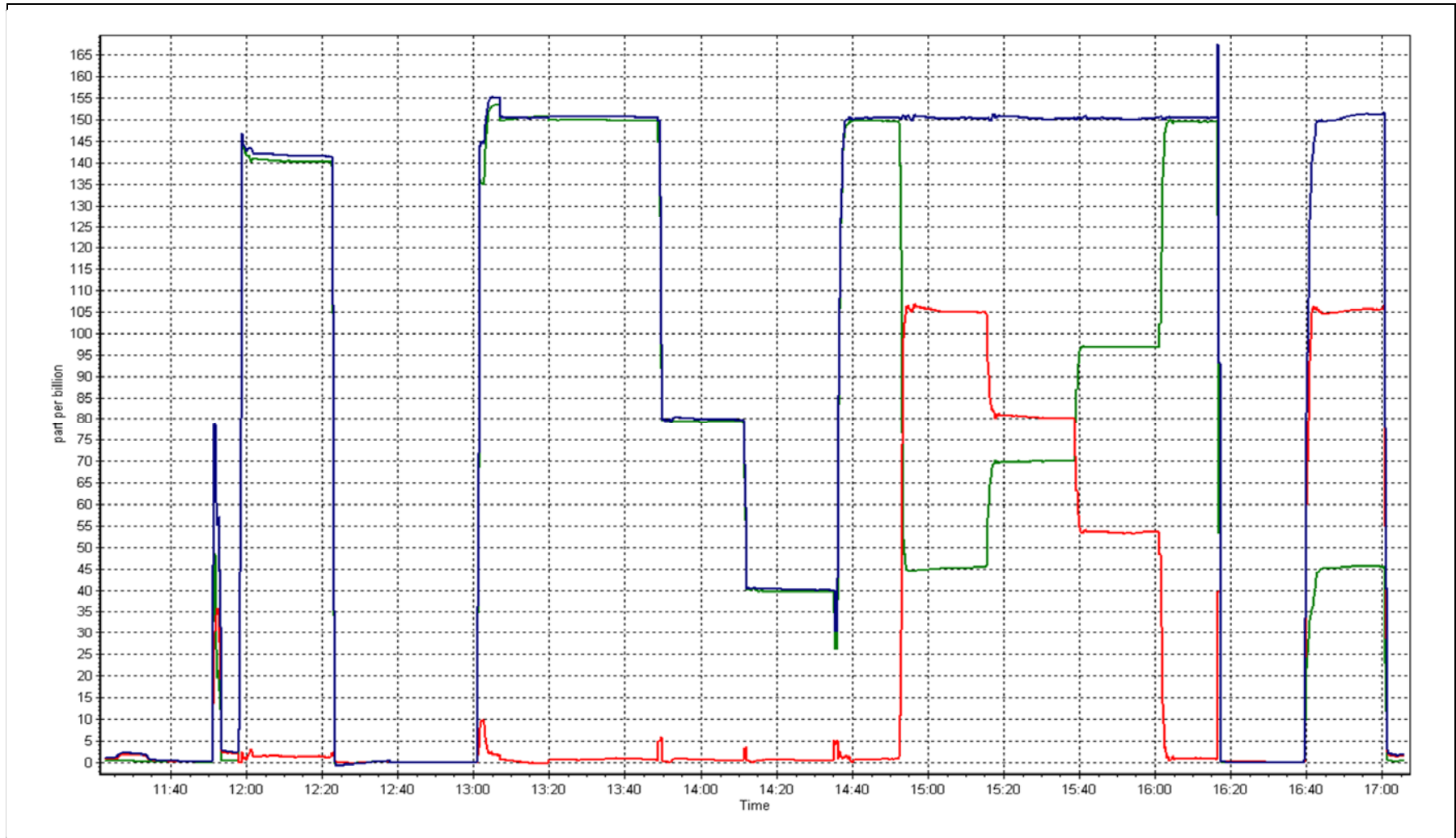
Calibration Date	February 13, 2015	Previous Calibration	January 12, 2015
Station Number	Fort Chipewyan	Station Number	AMS 8
Start Time (MST)	11:30	End Time (MST)	17:05
Analyzer make	API T200u	Analyzer serial #	172

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999996
104.5	105.1	0.9942		
79.7	80.2	0.9934	Slope	0.993967
52.9	53.4	0.9908		
			Intercept	-0.042502

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 9  
BARGE LANDING  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 FEBRUARY 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	640	32	32	100.00	5	0	1	0
THC(ppm) Average	641	31	31	100.00	3.8	-	2.6	-
Temperature (C) Average	672	0	0	100.00	1.1	-	-3.1	-
Relative Humidity (%) Average	672	0	0	100.00	91	-	-	-
Wind Speed 10 m (km/h) Average	670	0	2	99.70	16	-	-	-
Wind Direction 10 m (deg) Average	670	0	2	99.70	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
 FEBRUARY 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	640	0.4	0	-	0	0	0	0	0	1	5
THC(ppm) Average	641	2.34	0.2	-	2	2.1	2.2	2.3	2.4	2.6	3.8
Temperature (C) Average	672	-17.21	7.4	-	-36.5	-25.7	-22.8	-17.7	-12.1	-7.6	1.1
Relative Humidity (%) Average	672	73.1	8	-	43	62	69	75	78	80	91
Wind Speed 10 m (km/h) Average	670	5.6	3	-	0	2	3	5	7	9	16
Wind Direction 10 m (deg) Average	670	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - BARGE LANDING (AMS 9)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
Wind Speed, Wind Direction	12 Feb 2015 09:00	12 Feb 2015 09:00	1	Flat line in sensor output signal -sensor frozen
Wind Speed, Wind Direction	21 Feb 2015 09:00	21 Feb 2015 09:00	1	Flat line in sensor output signal -sensor frozen

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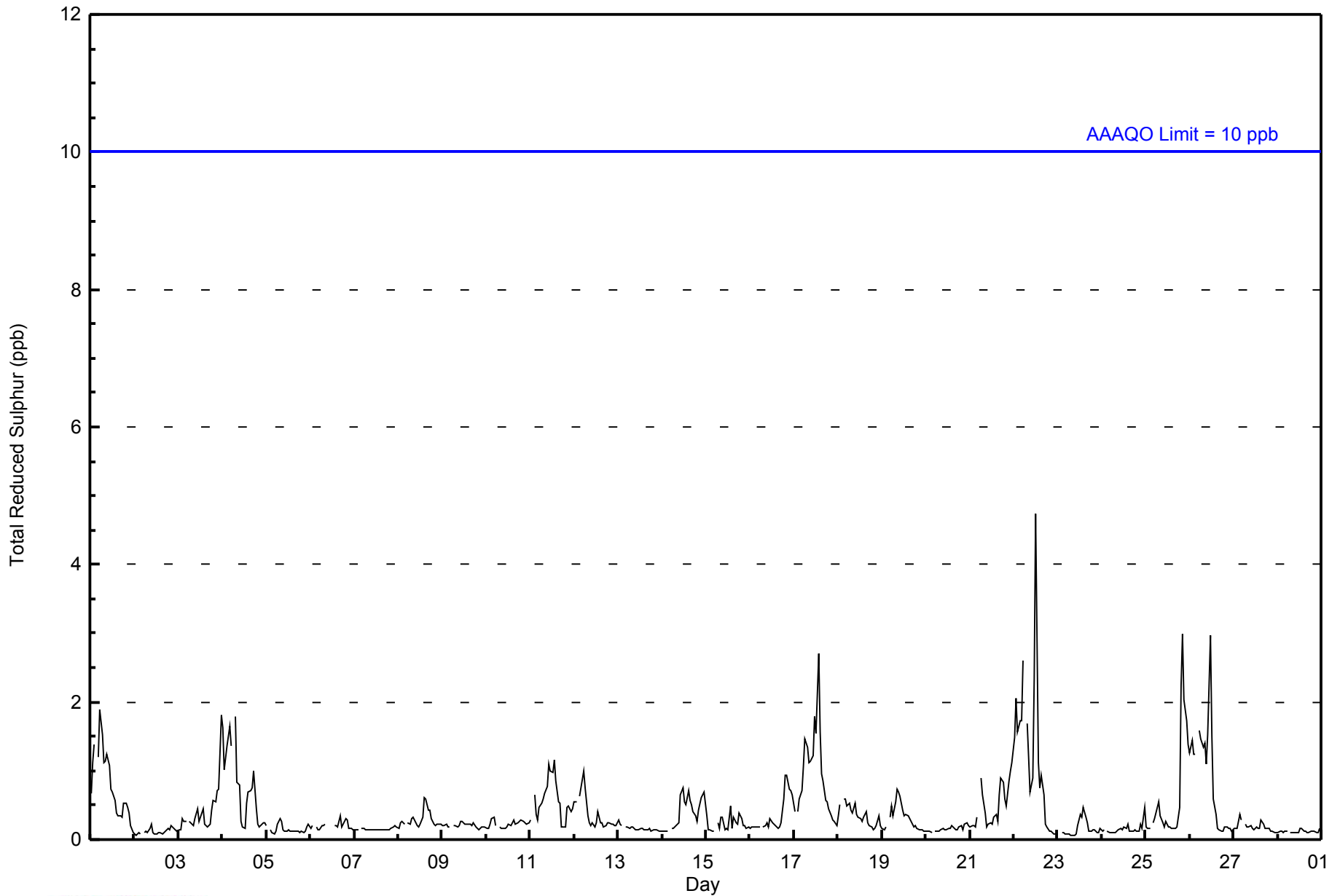


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 5 ppb on Feb 22 13:00										Maximum Daily Average: 1.2 ppb on Feb 22																
Minimum Value: 0 ppb on Feb 23 10:00										Minimum Daily Average: 0.1 ppb on Feb 28																
Maximum Diurnal Average: 0.6 ppb at hour 6										Minimum Diurnal Average: 0.3 ppb at hour 18																
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> =2																
										Hours of Data: 640																
										Hours of Missing Data: 32																
										Hours of Calibration: 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-Feb	1	1	1	Z	1	2	2	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0.8	2
2-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	0.4	2
4-Feb	2	1	1	2	2	1	Z	2	1	1	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0.8	2
5-Feb	0	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
6-Feb	0	0	Z	0	0	0	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.2	0
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0.3	1
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Feb	0	Z	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.6	1
12-Feb	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
13-Feb	0	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
14-Feb	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0.4	1
15-Feb	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.3	1
17-Feb	0	Z	0	1	1	1	1	1	1	1	1	2	2	3	2	1	1	1	1	0	0	0	0	0	0.9	3
18-Feb	0	1	Z	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Feb	0	0	0	Z	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Feb	0	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-Feb	0	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	0.5	1
22-Feb	1	2	2	2	2	3	Z	2	1	1	1	2	5	1	1	1	1	0	0	0	0	0	0	0	1.2	5
23-Feb	0	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
24-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Feb	0	0	0	Z	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	3	2	2	1	0.7	3
26-Feb	1	1	1	1	Z	2	1	1	1	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0.9	3
27-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Feb	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
																								Diurnal Average	Diurnal Maximum	
0.4 0.4 0.4 0.4 0.4 0.6 0.5 0.5 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.4																										
2 2 2 2 2 3 2 2 1 1 2 3 5 3 2 1 1 1 1 1 2 3 2 2 2																										
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	635	99.22	99.22
3 - 4	4	0.63	99.84
5 - 7	1	0.16	100.00
8 - 11	0	0.00	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - February 2015**

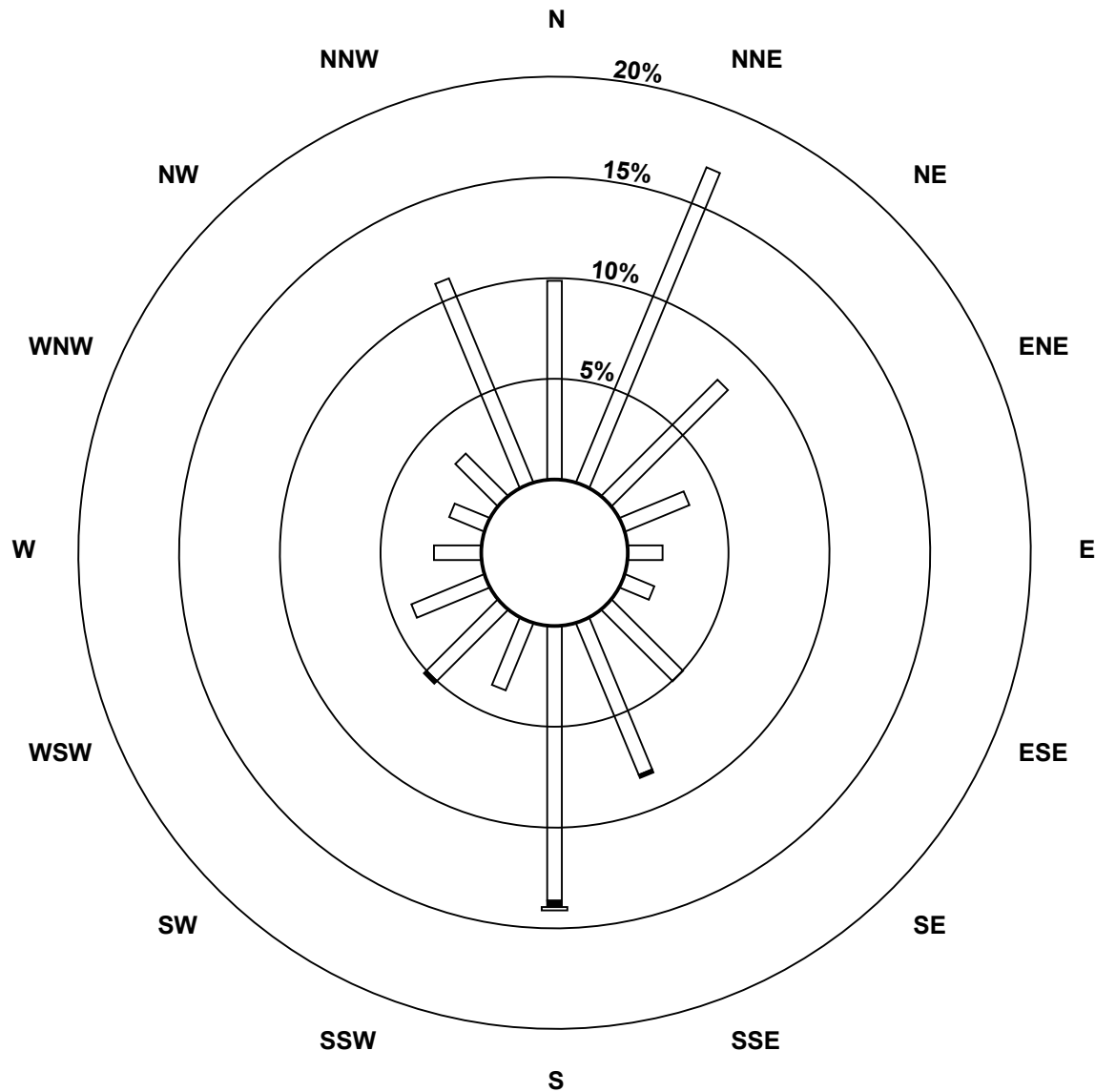
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	63	108	52	22	11	10	32	52	87	23	32	25	15	12	19	70	633
3 - 4	0	0	0	0	0	0	0	1	2	0	1	0	0	0	0	0	4
5 - 7	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	63	108	52	22	11	10	32	53	90	23	33	25	15	12	19	70	638

Total Number of Valid Hours: 638

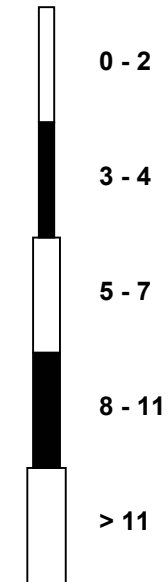
Total Number of Hours: 672

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

**Total Reduced Sulphur (TRS) - ppb  
Barge Landing (AMS 9)**



Classes (ppb)

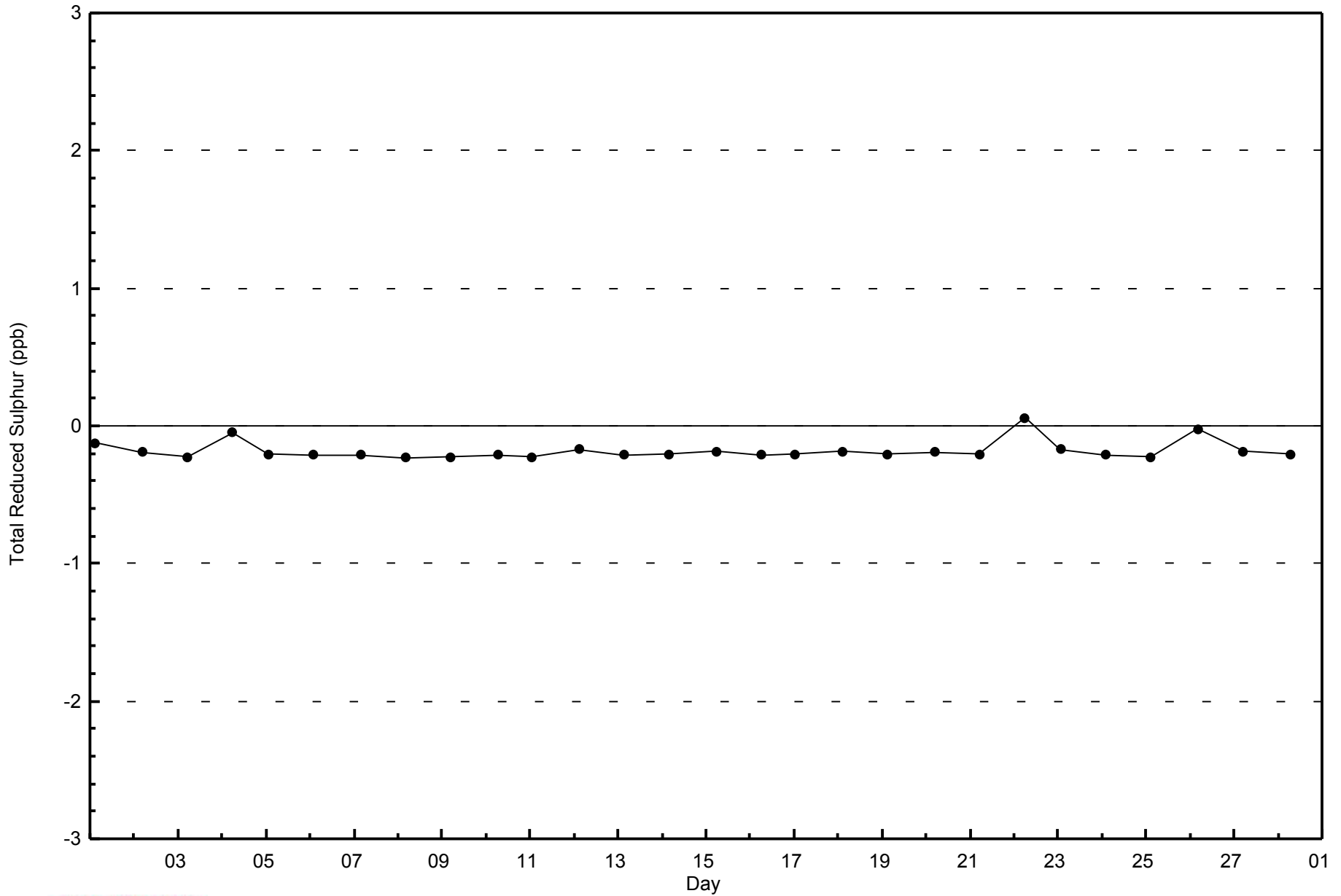


**Total Number of Valid Hours: 638**



**WBEA**  
**Zero Responses**

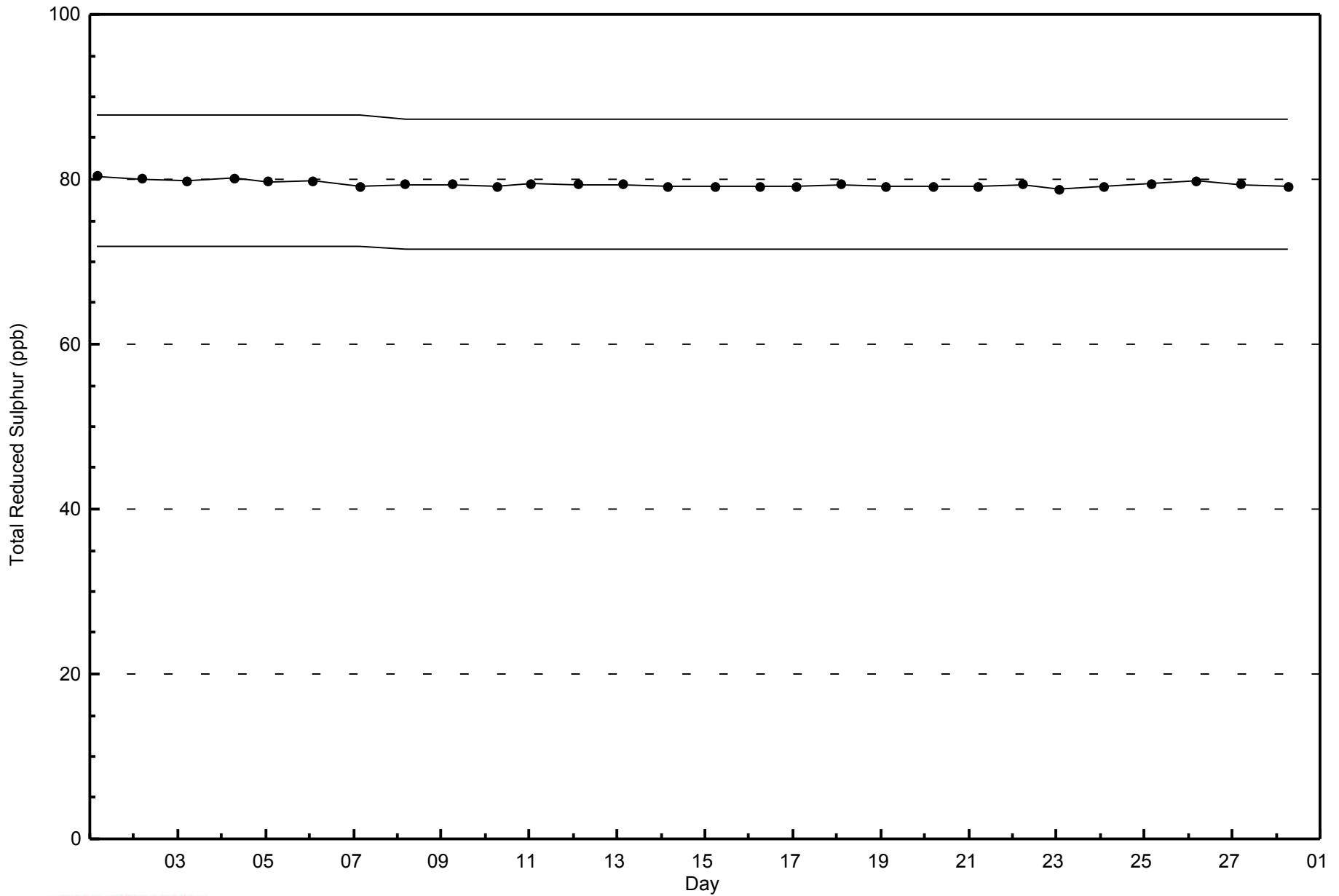
**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - February 2015**





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Barge Landing - February 2015**





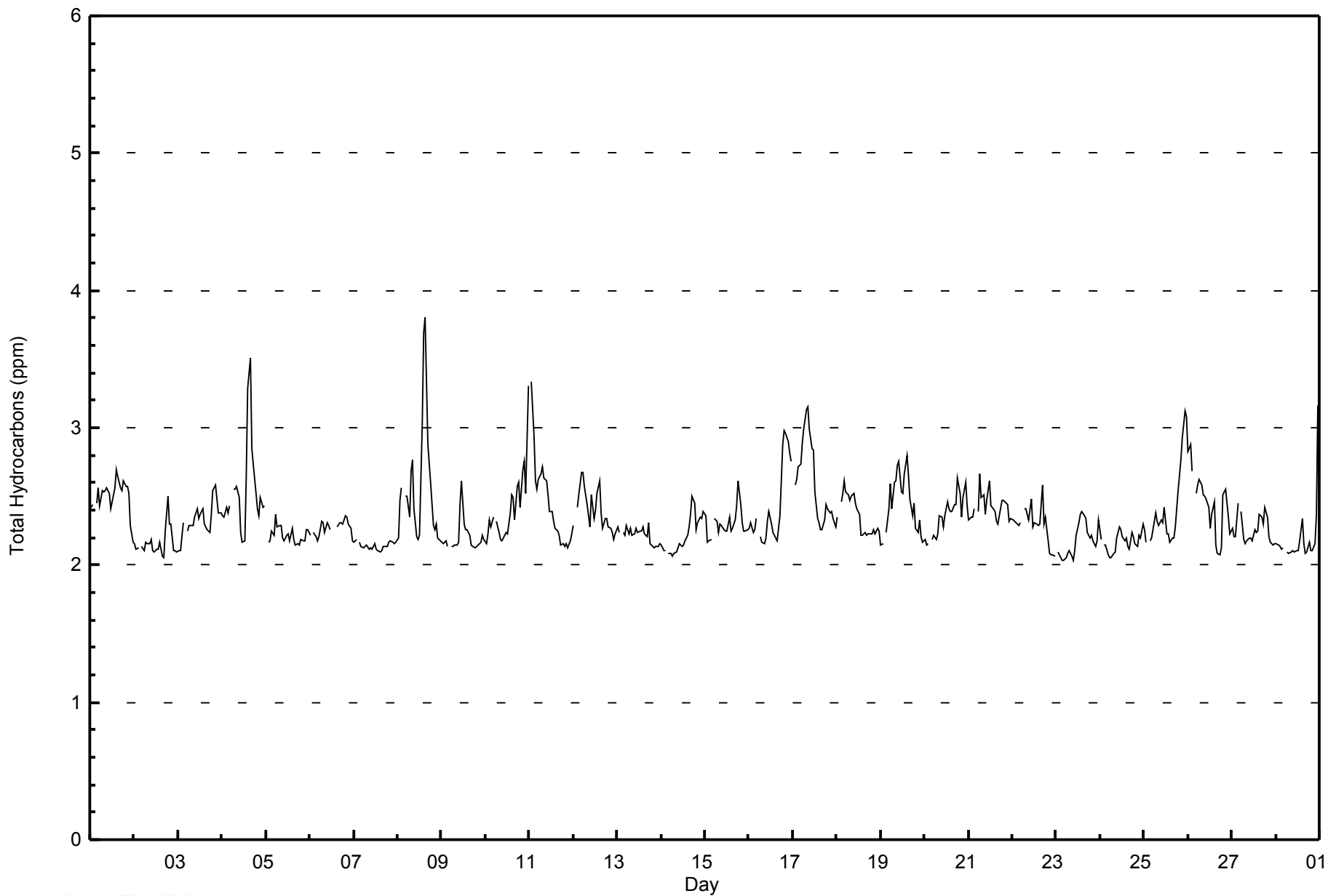
Maximum Value: 3.8 ppm on Feb 8 16:00		Maximum Daily Average: 2.6 ppm on Feb 17		Hours in Service: 672																							
Minimum Value: 2.0 ppm on Feb 23 04:00		Minimum Daily Average: 2.1 ppm on Feb 7		Hours of Data: 641																							
Maximum Diurnal Average: 2.4 ppm at hour 15		Minimum Diurnal Average: 2.3 ppm at hour 1		Hours of Missing Data: 31																							
Monthly Average: 2.34 ppm		Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.3 Q <sub>3</sub> = 2.4 P <sub>90</sub> = 2.6 P <sub>99</sub> = 3.3		Hours of Calibration: 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-Feb	2.4	2.4	Z	2.4	2.6	2.4	2.5	2.5	2.5	2.6	2.5	2.4	2.5	2.6	2.7	2.6	2.6	2.5	2.6	2.6	2.6	2.5	2.3	2.2	2.5	2.7	
2-Feb	2.2	2.1	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.5	2.3	2.3	2.1	2.1	2.1	2.2	2.5	
3-Feb	2.1	2.1	2.2	2.3	Z	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.3	2.3	2.3	2.2	2.4	2.5	2.6	2.5	2.4	2.4	2.3	2.6	
4-Feb	2.4	2.3	2.4	2.4	2.4	Z	2.2	2.6	2.6	2.6	2.5	2.2	2.2	2.2	2.6	3.3	3.5	2.9	2.7	2.5	2.4	2.4	2.5	2.4	2.4	2.5	
5-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.1	2.2	2.2	2.3	2.3	2.2	2.4	
6-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.2	2.3	2.3	2.3	C	C	C	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.2	2.3	2.4	
7-Feb	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	
8-Feb	2.2	2.5	2.6	Z	2.5	2.5	2.3	2.7	2.8	2.4	2.2	2.2	2.2	3.0	3.7	3.8	2.9	2.7	2.6	2.3	2.3	2.3	2.2	2.2	2.6	3.8	
9-Feb	2.2	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.4	2.6	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.6	
10-Feb	2.2	2.2	2.3	2.3	2.3	Z	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.5	2.5	2.3	2.6	2.6	2.4	2.7	2.8	2.5	3.3	2.4	3.3	
11-Feb	Z	3.3	2.9	2.6	2.6	2.6	2.7	2.7	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.2	2.4	3.3	
12-Feb	2.3	Z	2.4	2.5	2.7	2.7	2.6	2.4	2.4	2.3	2.5	2.3	2.4	2.5	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.2	2.4	2.7	
13-Feb	2.3	2.2	Z	2.2	2.2	2.3	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3	
14-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.2	2.3	2.4	2.5	2.4	2.3	2.3	2.3	2.4	2.2	2.5	
15-Feb	2.4	2.2	2.2	2.2	Z	2.3	2.3	2.2	2.3	2.3	2.3	2.2	2.2	2.4	2.2	2.3	2.3	2.4	2.6	2.4	2.3	2.2	2.2	2.3	2.3	2.6	
16-Feb	2.3	2.3	2.2	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.2	2.2	2.2	2.3	2.4	2.9	3.0	3.0	2.9	2.8	2.8	2.4	3.0	
17-Feb	Z	2.6	2.6	2.7	2.7	2.9	3.0	3.1	3.2	3.0	2.8	2.8	2.5	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.3	2.3	2.6	3.2	
18-Feb	2.3	Z	2.5	2.5	2.6	2.5	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.4	2.6	
19-Feb	2.2	2.2	Z	2.2	2.4	2.6	2.4	2.6	2.6	2.7	2.8	2.5	2.5	2.7	2.8	2.6	2.5	2.4	2.5	2.3	2.2	2.3	2.2	2.2	2.4	2.8	
20-Feb	2.2	2.1	2.2	Z	2.2	2.2	2.2	2.2	2.4	2.4	2.3	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.6	2.5	2.4	2.5	2.6	2.4	2.4	2.6	
21-Feb	2.3	2.3	2.3	2.4	Z	2.4	2.7	2.5	2.5	2.4	2.5	2.6	2.4	2.4	2.4	2.3	2.3	2.4	2.5	2.5	2.5	2.4	2.3	2.3	2.4	2.7	
22-Feb	2.3	2.3	2.3	2.3	2.3	Z	2.4	2.4	2.4	2.3	2.5	2.3	2.3	2.3	2.3	2.3	2.6	2.3	2.4	2.2	2.1	2.1	2.1	2.1	2.3	2.6	
23-Feb	Z	2.1	2.1	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.2	2.3	2.4	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.4	
24-Feb	2.2	Z	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.3	
25-Feb	2.3	2.2	Z	2.2	2.2	2.3	2.4	2.3	2.3	2.3	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.7	2.8	2.9	3.1	3.1	2.4	3.1
26-Feb	2.8	2.9	2.7	Z	2.5	2.6	2.6	2.6	2.5	2.5	2.5	2.4	2.3	2.4	2.5	2.1	2.1	2.1	2.1	2.5	2.6	2.5	2.3	2.2	2.4	2.9	
27-Feb	2.3	2.2	2.2	2.5	Z	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.4	2.4	2.3	2.4	2.3	2.2	2.2	2.1	2.2	2.5	
28-Feb	2.2	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	2.2	2.3	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.4	3.2	2.2	3.2
																								Diurnal Average			
																								Diurnal Maximum			
2.3 2.3 2.3 2.3 2.3 2.4 2.3 2.4 2.4 2.3 2.3 2.3 2.4 2.4 2.4 2.4 2.3 2.3 2.4 2.3 2.3 2.3 2.3 2.4 2.4 2.4 2.4																											
2.8 3.3 2.9 2.7 2.7 2.9 3.0 3.1 3.2 3.0 2.8 2.8 2.5 3.0 3.7 3.8 2.9 2.7 2.9 3.0 3.0 2.9 3.1 3.3																											
Z - zerospan C - Calibration																											





**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	4	0.62	0.62
2.1 - 3.0	626	97.66	98.28
3.1 - 10.0	11	1.72	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 641

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - February 2015**

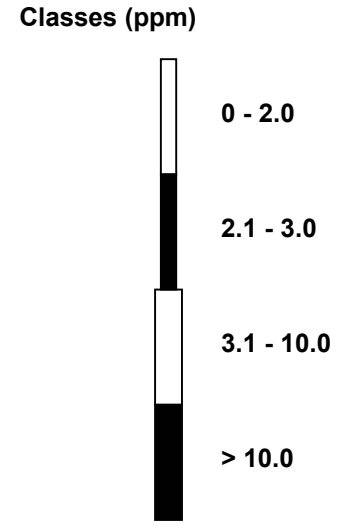
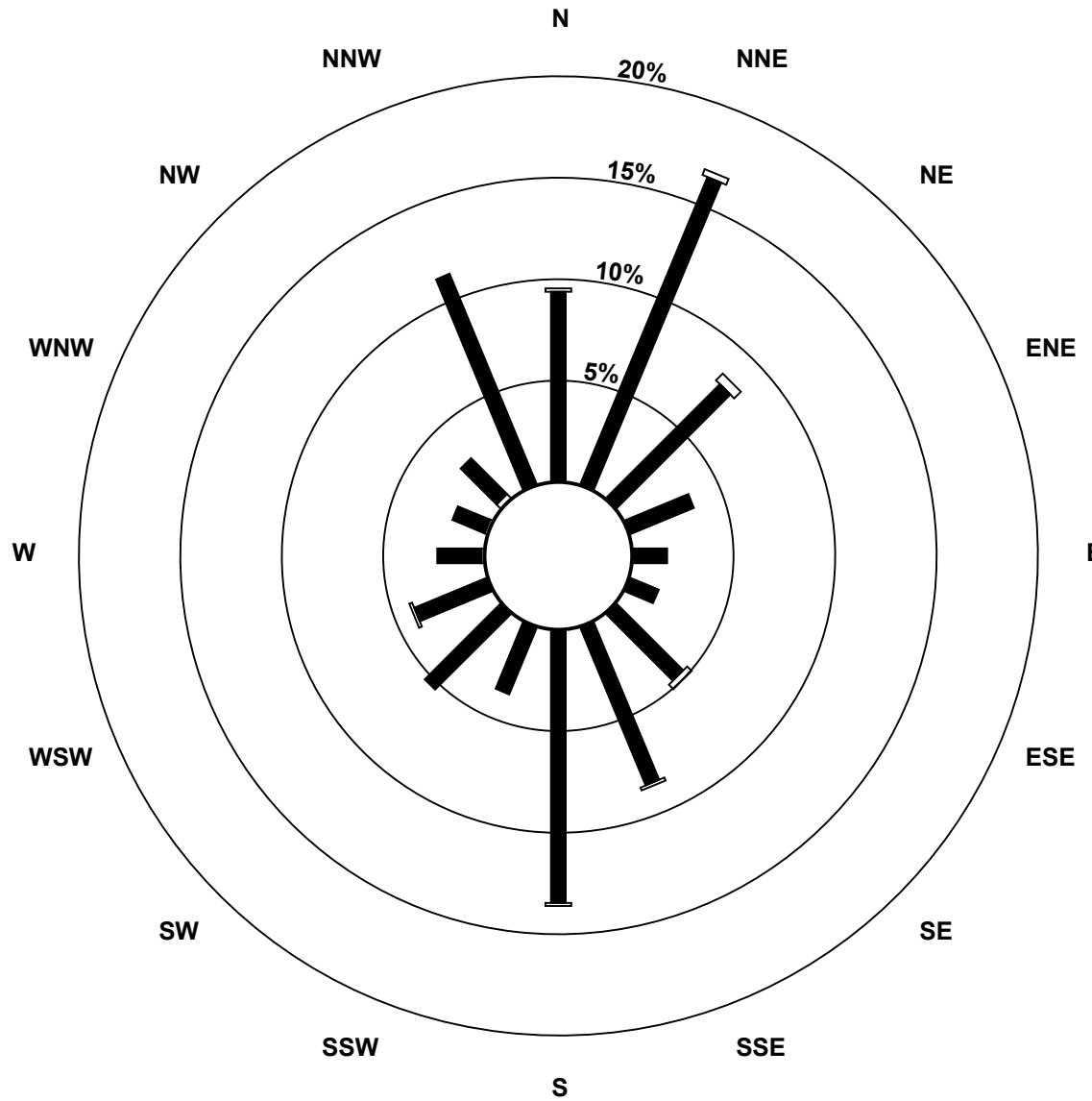
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	4
2.1 - 3.0	60	105	51	22	11	10	30	54	86	23	34	25	14	11	16	72	624
3.1 - 10.0	1	2	3	0	0	0	2	1	1	0	0	1	0	0	0	0	11
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	61	107	54	22	11	10	32	55	87	23	34	26	15	12	18	72	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Total Hydrocarbons (THC) - ppm  
Barge Landing (AMS 9)

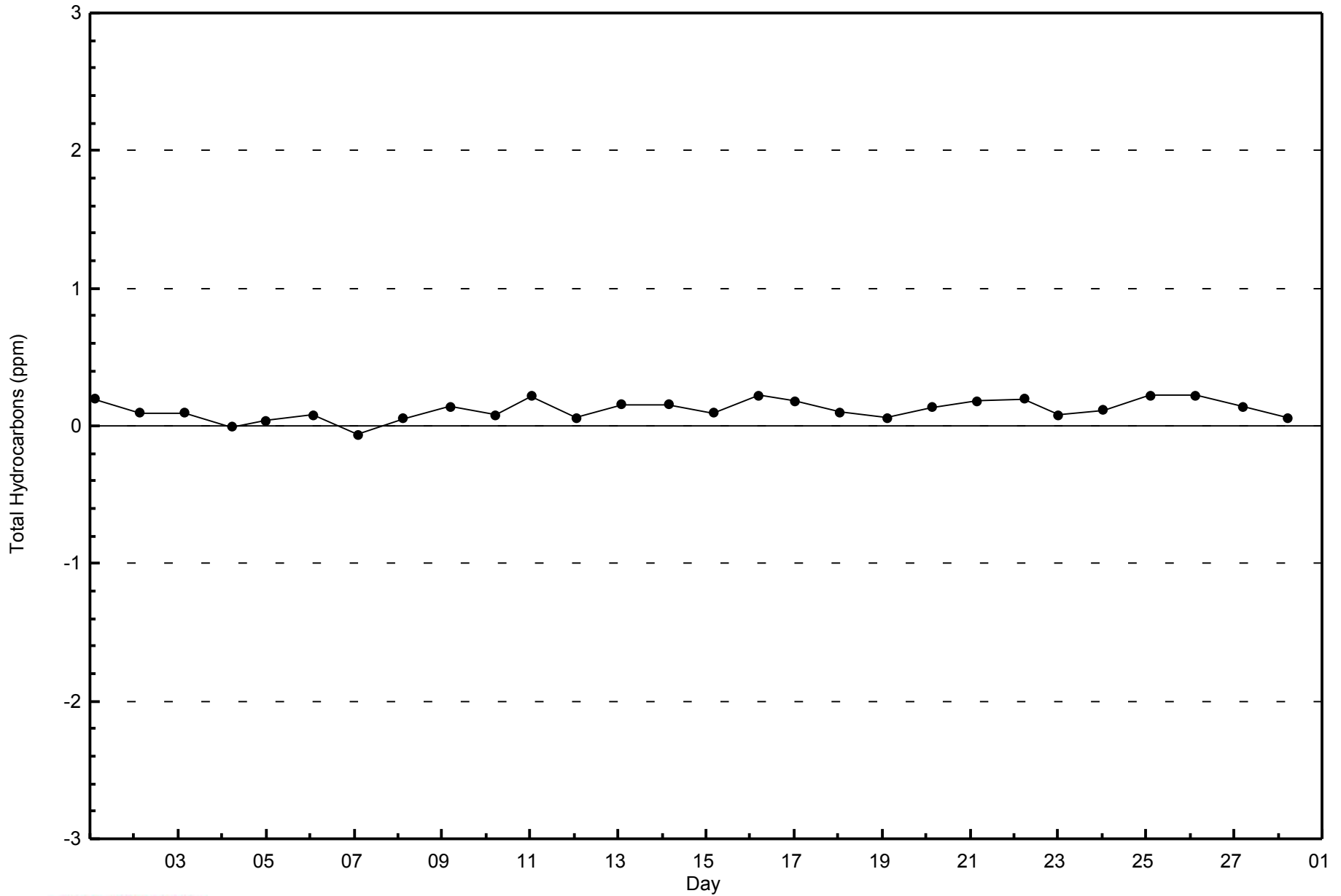


Total Number of Valid Hours: 639



WBEA  
Zero Responses

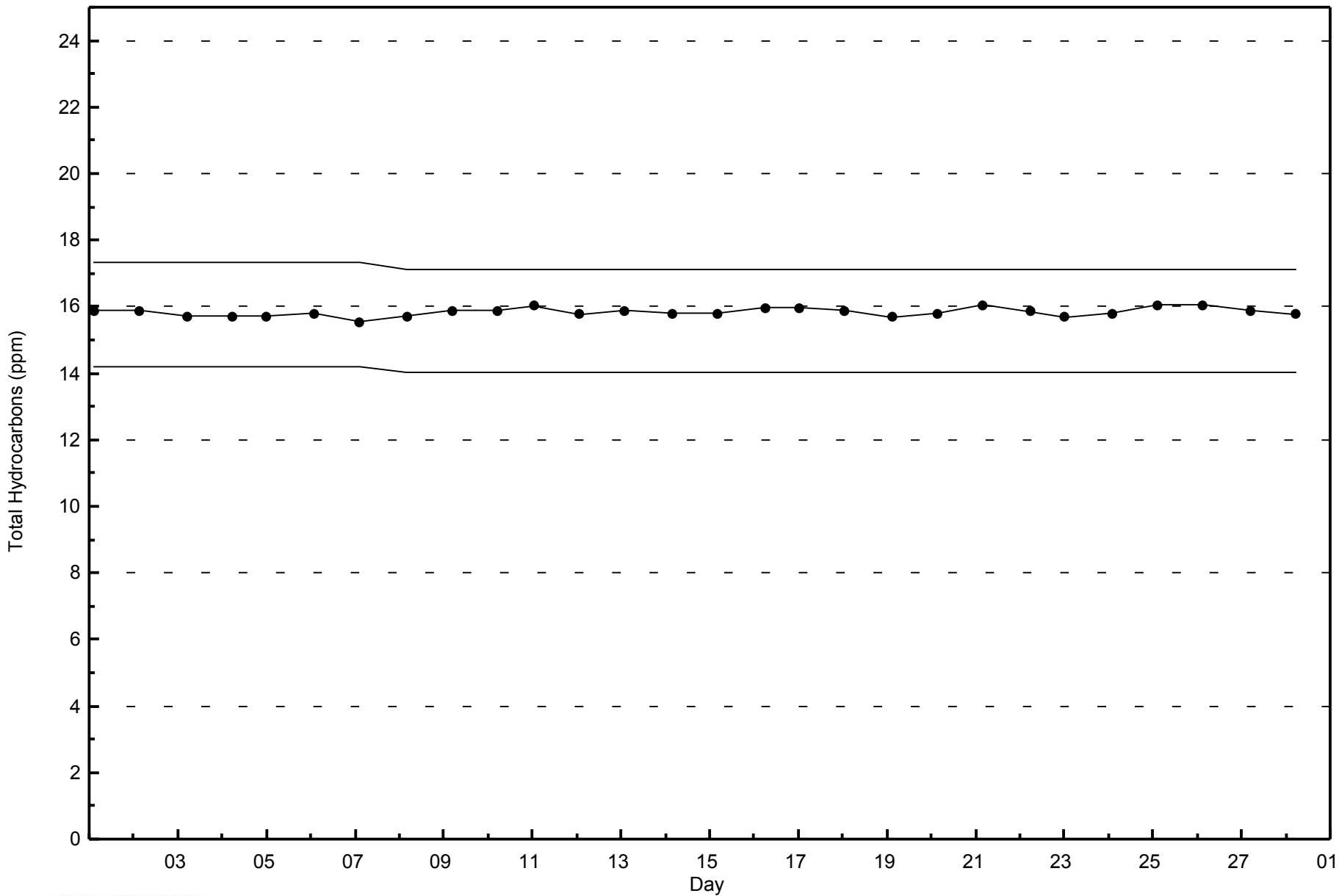
Total Hydrocarbons (THC) - ppm  
Barge Landing - February 2015





**WBEA**  
**Span Responses**

**Total Hydrocarbons (THC) - ppm**  
**Barge Landing - February 2015**





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

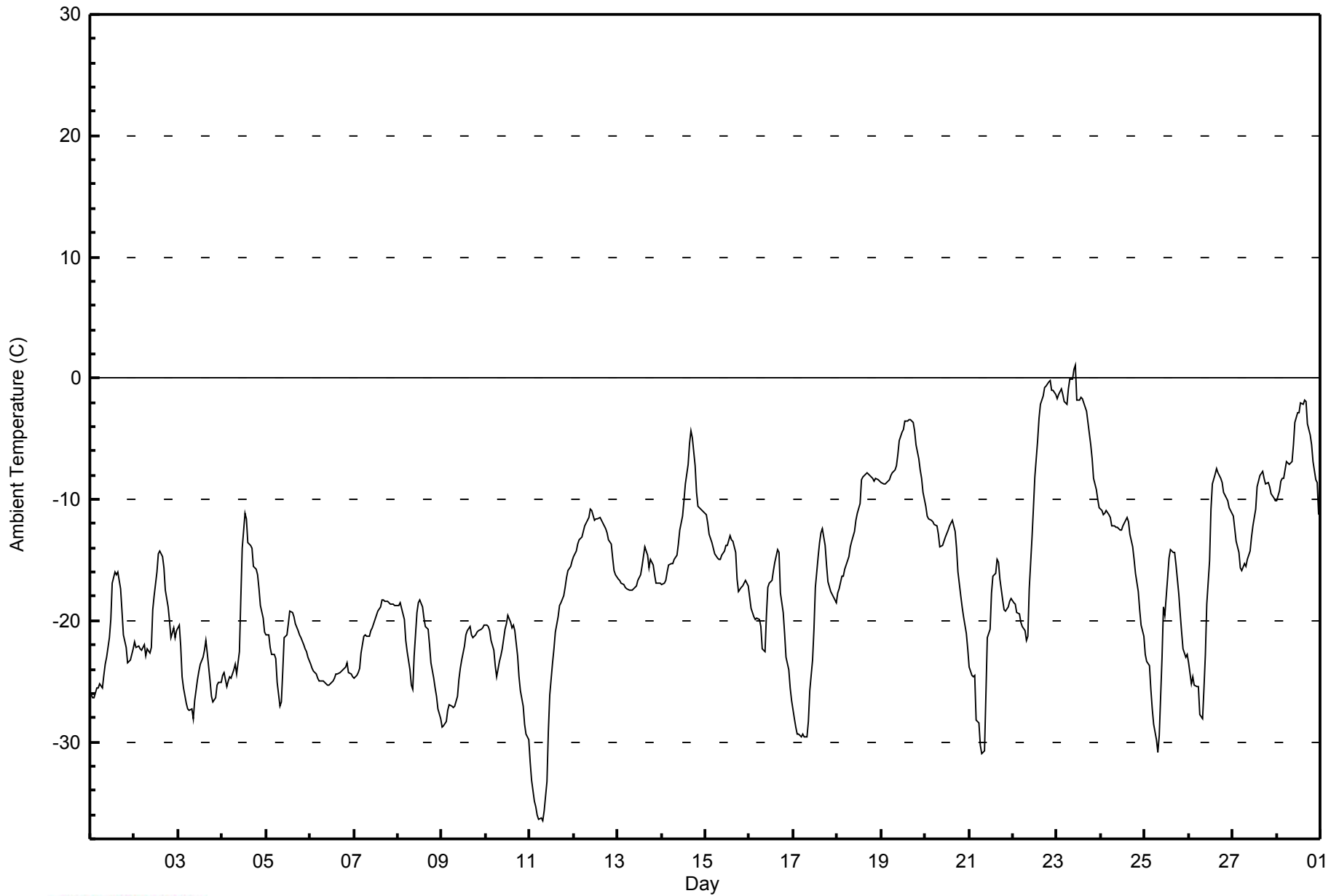
**Ambient Temperature (AT) - C**  
**Barge Landing - February 2015**

Maximum Value: 1.1 C on Feb 23 11:00		Maximum Daily Average: -3.1 C on Feb 23		Hours in Service: 672																							
Minimum Value: -36.5 C on Feb 11 08:00		Minimum Daily Average: -26.1 C on Feb 11		Hours of Data: 672																							
Maximum Diurnal Average: -13.1 C at hour 16		Minimum Diurnal Average: -20.5 C at hour 8		Hours of Missing Data: 0																							
Monthly Average: -17.21 C		Percentiles: P <sub>1</sub> = -33.4 P <sub>10</sub> = -25.7 Q <sub>1</sub> = -22.8 Median = -17.7 Q <sub>3</sub> = -12.1 P <sub>90</sub> = -7.6 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-Feb	-26.1	-26.4	-26.4	-25.5	-25.5	-25.2	-25.5	-24.5	-23.6	-23.1	-21.4	-19.9	-16.9	-16.0	-16.3	-16.0	-17.4	-19.3	-21.1	-22.3	-23.4	-23.4	-23.2	-22.3	-22.1	-16.0	
2-Feb	-21.7	-22.2	-22.1	-22.4	-22.5	-22.0	-22.8	-22.4	-22.7	-22.3	-19.1	-18.0	-16.0	-14.5	-14.3	-14.7	-15.6	-17.5	-18.8	-20.0	-21.4	-20.6	-21.4	-20.9	-19.8	-14.3	
3-Feb	-20.3	-22.0	-24.7	-25.5	-26.8	-27.2	-27.4	-27.3	-28.1	-26.6	-24.9	-24.2	-23.6	-23.0	-22.5	-21.6	-22.7	-24.9	-26.2	-26.7	-26.3	-25.4	-25.1	-25.0	-24.9	-20.3	
4-Feb	-24.5	-24.3	-25.4	-25.0	-24.7	-24.8	-24.1	-23.5	-24.4	-22.6	-18.2	-14.1	-11.1	-11.6	-13.6	-13.7	-14.0	-15.5	-15.7	-16.2	-17.3	-18.7	-19.8	-20.9	-19.3	-11.1	
5-Feb	-21.2	-21.2	-22.2	-22.8	-22.8	-23.1	-25.1	-27.0	-26.7	-24.2	-21.4	-21.2	-20.3	-19.2	-19.3	-19.6	-20.3	-20.8	-21.2	-21.4	-22.0	-22.4	-22.6	-23.0	-22.1	-19.2	
6-Feb	-23.6	-24.0	-24.2	-24.4	-24.7	-24.9	-24.9	-25.0	-25.1	-25.3	-25.3	-25.2	-25.0	-24.8	-24.4	-24.4	-24.3	-24.2	-24.1	-23.8	-23.5	-24.3	-24.4	-24.7	-24.5	-23.5	
7-Feb	-24.8	-24.5	-24.3	-24.0	-22.7	-21.3	-21.2	-21.3	-20.8	-20.5	-19.9	-19.6	-19.3	-18.9	-18.3	-18.3	-18.4	-18.5	-18.5	-18.6	-18.7	-18.7	-18.8	-20.5	-20.5	-18.3	
8-Feb	-18.8	-18.6	-18.9	-20.0	-21.6	-22.6	-24.1	-25.3	-25.6	-22.8	-19.3	-18.5	-18.3	-18.9	-19.8	-20.4	-20.7	-22.0	-23.5	-24.7	-25.6	-26.3	-27.2	-28.1	-22.2	-18.3	
9-Feb	-28.8	-28.7	-28.3	-27.4	-26.9	-27.0	-27.2	-27.0	-26.3	-24.9	-23.9	-23.2	-22.1	-21.2	-20.8	-20.5	-21.1	-21.4	-21.2	-21.0	-20.8	-20.7	-20.6	-20.4	-23.8	-20.4	
10-Feb	-20.4	-20.4	-20.9	-21.6	-22.4	-23.8	-24.6	-23.3	-22.9	-22.4	-20.7	-20.2	-19.6	-20.1	-20.6	-20.4	-20.8	-22.9	-24.7	-25.7	-27.0	-28.5	-29.4	-29.8	-23.1	-19.6	
11-Feb	-31.7	-33.1	-34.8	-35.4	-36.1	-36.4	-36.2	-36.5	-35.7	-33.3	-29.2	-26.2	-23.5	-22.3	-21.0	-19.6	-18.7	-18.5	-17.9	-17.2	-16.4	-15.9	-15.5	-15.1	-26.1	-15.1	
12-Feb	-14.7	-14.2	-13.7	-13.3	-13.1	-12.6	-12.2	-11.8	-11.5	-10.8	-11.0	-11.8	-11.6	-11.6	-11.5	-11.7	-12.0	-12.4	-12.7	-13.4	-13.7	-14.9	-15.8	-16.2	-12.8	-10.8	
13-Feb	-16.5	-16.7	-16.9	-17.0	-17.2	-17.4	-17.5	-17.5	-17.5	-17.2	-17.1	-16.7	-16.2	-15.5	-14.7	-13.9	-14.6	-15.7	-14.9	-15.5	-16.2	-16.9	-17.0	-17.0	-16.4	-13.9	
14-Feb	-17.0	-16.9	-16.6	-16.0	-15.4	-15.3	-15.2	-15.0	-14.6	-13.7	-12.6	-11.4	-10.1	-8.7	-7.2	-5.4	-4.3	-4.9	-7.2	-9.4	-10.6	-10.8	-10.9	-11.0	-11.7	-4.3	
15-Feb	-11.3	-12.0	-12.8	-13.6	-14.0	-14.5	-14.8	-15.0	-15.0	-14.6	-14.3	-13.8	-13.7	-13.0	-13.3	-13.4	-14.4	-16.5	-17.6	-17.3	-17.2	-16.9	-16.7	-17.1	-14.7	-11.3	
16-Feb	-18.0	-19.0	-19.7	-19.9	-19.8	-19.8	-20.5	-22.3	-22.5	-19.6	-17.2	-17.0	-16.6	-15.9	-15.1	-14.2	-14.4	-17.7	-19.3	-21.1	-23.0	-24.0	-25.5	-26.5	-19.5	-14.2	
17-Feb	-28.1	-28.8	-29.4	-29.4	-29.6	-29.3	-29.6	-29.6	-28.4	-25.8	-23.2	-20.7	-17.3	-14.7	-13.6	-12.7	-12.4	-13.9	-15.5	-16.8	-17.6	-17.9	-18.0	-18.6	-21.7	-12.4	
18-Feb	-17.7	-17.3	-16.4	-16.4	-15.8	-15.4	-14.7	-13.9	-13.5	-12.7	-11.8	-11.1	-10.3	-8.4	-8.1	-7.9	-7.8	-7.9	-8.1	-8.2	-8.5	-8.3	-8.4	-8.5	-11.5	-7.8	
19-Feb	-8.6	-8.7	-8.7	-8.6	-8.4	-8.0	-7.8	-7.6	-7.2	-6.3	-5.1	-4.4	-4.2	-3.5	-3.6	-3.4	-3.5	-3.7	-4.4	-5.5	-6.7	-7.6	-8.3	-9.4	-6.4	-3.4	
20-Feb	-10.6	-11.4	-11.6	-11.7	-11.8	-12.0	-12.2	-12.9	-13.9	-13.8	-13.4	-13.1	-12.5	-12.1	-12.0	-11.7	-12.7	-14.0	-16.0	-18.0	-18.8	-19.6	-21.0	-22.3	-14.1	-10.6	
21-Feb	-23.8	-24.5	-24.6	-24.5	-28.3	-28.4	-30.2	-30.9	-30.7	-26.2	-21.4	-20.8	-17.7	-16.3	-16.1	-14.9	-15.1	-16.5	-18.3	-19.1	-19.2	-18.9	-18.4	-18.2	-21.8	-14.9	
22-Feb	-18.5	-18.6	-19.3	-19.5	-20.2	-20.5	-20.8	-21.6	-21.3	-17.3	-13.1	-10.7	-8.1	-5.2	-3.3	-2.2	-1.5	-0.8	-0.7	-0.3	-0.2	-1.0	-1.0	-1.3	-10.3	-0.2	
23-Feb	-1.7	-1.4	-0.9	-1.3	-2.0	-2.2	-0.9	-0.1	0.0	0.7	1.1	-1.8	-1.9	-1.6	-1.7	-2.4	-2.8	-3.7	-5.4	-6.7	-8.2	-9.2	-10.0	-10.7	-3.1	1.1	
24-Feb	-11.0	-11.2	-11.2	-10.9	-11.3	-11.5	-12.1	-12.2	-12.3	-12.3	-12.6	-12.6	-12.1	-11.7	-11.5	-11.8	-12.9	-13.9	-14.9	-16.2	-17.7	-19.1	-20.3	-21.3	-13.5	-10.9	
25-Feb	-22.8	-23.4	-23.7	-25.7	-27.3	-28.6	-29.8	-30.9	-29.5	-23.0	-18.9	-19.5	-16.5	-14.9	-14.1	-14.3	-14.4	-15.4	-17.8	-19.4	-20.9	-22.3	-23.0	-22.8	-21.6	-14.1	
26-Feb	-23.4	-25.2	-24.6	-25.3	-25.4	-25.5	-27.7	-28.1	-25.6	-22.8	-18.6	-15.1	-10.8	-8.7	-7.9	-7.4	-7.8	-8.2	-8.7	-9.4	-9.8	-10.2	-10.6	-11.0	-16.6	-7.4	
27-Feb	-11.4	-12.4	-13.5	-14.3	-15.6	-15.8	-15.3	-15.5	-15.0	-14.3	-13.1	-12.2	-10.7	-8.9	-8.5	-8.1	-7.7	-8.3	-8.7	-8.6	-8.9	-9.5	-9.8	-10.1	-11.5	-7.7	
28-Feb	-10.1	-9.3	-8.4	-8.3	-8.3	-6.8	-7.0	-7.1	-6.9	-5.5	-3.7	-2.8	-2.9	-2.1	-2.2	-1.8	-1.9	-3.7	-4.7	-5.4	-6.8	-8.4	-8.6	-11.3	-6.0	-1.8	
		-18.8	-19.2	-19.4	-19.6	-20.0	-20.1	-20.4	-20.5	-20.3	-18.7	-16.8	-15.9	-14.6	-13.7	-13.4	-13.1	-13.4	-14.4	-15.3	-16.0	-16.7	-17.2	-17.6	-17.9	Diurnal Average	
		-1.7	-1.4	-0.9	-1.3	-2.0	-2.2	-0.9	-0.1	0.0	0.7	1.1	-1.8	-1.9	-1.6	-1.7	-1.8	-1.5	-0.8	-0.7	-0.3	-0.2	-1.0	-1.0	-1.3	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Barge Landing - February 2015**







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

**Ambient Temperature (AT) - C**  
**Barge Landing - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	265	39.43	39.43
-20 - 0	405	60.27	99.70
0 - 10	2	0.30	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

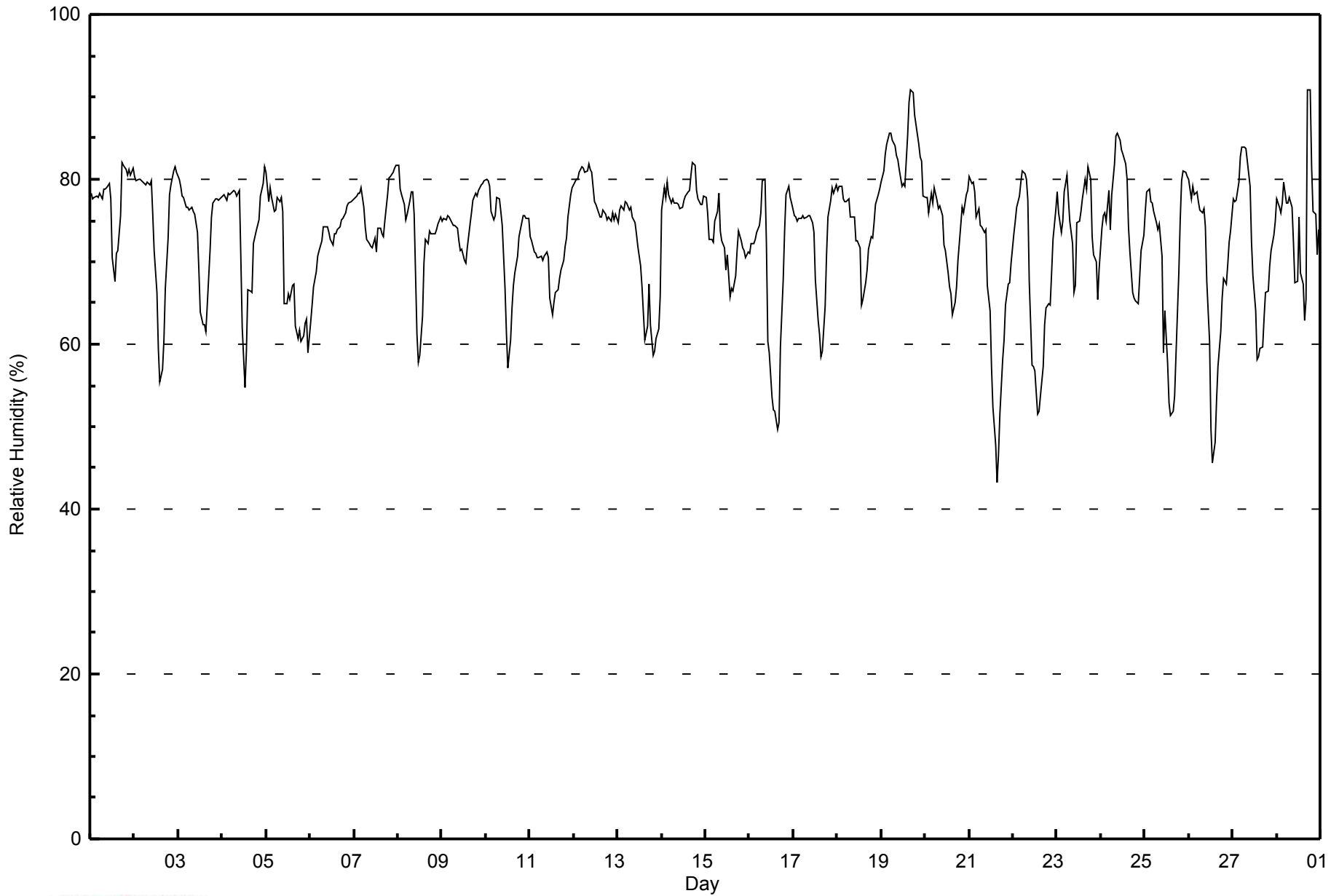


Maximum Value: 91 % on Feb 28 18:00																		Maximum Daily Average: 83.7 % on Feb 19																		Hours in Service: 672			
Minimum Value: 43 % on Feb 21 16:00																		Minimum Daily Average: 66.0 % on Feb 21																		Hours of Data: 672			
Maximum Diurnal Average: 77.3 % at hour 8																		Minimum Diurnal Average: 65.0 % at hour 14																		Hours of Missing Data: 0			
Monthly Average: 73.1 %																		Percentiles: P <sub>1</sub> = 50 P <sub>10</sub> = 62 Q <sub>1</sub> = 69 Median = 75 Q <sub>3</sub> = 78 P <sub>90</sub> = 80 P <sub>99</sub> = 86																		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-Feb	78	78	78	78	78	78	78	79	79	79	79	78	71	68	71	71	76	82	82	81	80	81	80	81	77.7	82													
2-Feb	80	80	80	80	80	79	79	80	79	80	76	71	66	59	55	57	61	67	73	78	79	81	81	81	74.3	81													
3-Feb	80	79	78	78	77	77	76	77	76	76	74	69	64	62	61	65	71	75	77	78	78	77	78	73.5	80														
4-Feb	78	78	78	78	78	78	79	78	78	79	71	62	55	59	67	67	66	72	74	74	75	78	79	81	73.4	81													
5-Feb	81	77	79	78	76	76	78	77	78	76	65	65	66	65	67	67	62	61	62	60	61	63	63	59	69.3	81													
6-Feb	63	65	67	69	71	71	73	74	74	74	74	73	72	73	73	74	74	75	75	76	77	77	77	77	72.9	77													
7-Feb	78	78	78	78	79	77	74	73	72	72	72	73	71	74	74	73	73	75	78	80	80	81	81	82	76.1	82													
8-Feb	82	79	78	77	75	76	77	79	78	76	61	58	59	63	70	73	72	74	73	73	73	74	75	75	72.9	82													
9-Feb	75	75	75	76	75	75	74	74	74	72	71	72	70	70	72	75	76	78	78	78	79	79	80	80	75.1	80													
10-Feb	80	80	79	76	75	76	78	78	76	74	67	61	57	61	64	67	69	71	73	74	76	76	75	75	72.4	80													
11-Feb	73	72	71	71	71	70	71	70	71	71	70	66	64	65	66	67	68	69	70	72	73	76	78	79	70.6	79													
12-Feb	79	80	80	81	82	81	81	81	82	81	81	77	77	76	75	75	76	76	75	75	75	76	75	76	78.1	82													
13-Feb	75	76	77	76	77	77	76	77	75	75	73	72	70	67	64	60	62	67	62	59	59	61	62	66	69.4	77													
14-Feb	76	79	78	80	78	77	78	77	77	77	76	77	78	78	79	81	82	82	79	78	77	77	78	78	78.1	82													
15-Feb	78	76	73	73	72	75	76	78	74	73	72	69	71	66	67	66	68	71	74	72	72	71	70	71	72.0	78													
16-Feb	71	72	72	73	74	74	76	80	80	72	60	59	54	52	52	50	50	60	68	74	78	79	78	77	68.1	80													
17-Feb	76	75	75	75	75	76	75	75	76	76	75	73	68	63	61	58	59	65	71	75	77	79	78	79	72.4	79													
18-Feb	79	79	79	78	77	77	78	75	75	76	73	73	72	65	65	67	69	72	73	73	75	77	78	79	74.3	79													
19-Feb	80	81	83	84	86	86	85	84	83	82	81	79	79	79	85	89	91	90	88	87	84	83	82	78	83.7	91													
20-Feb	78	78	76	78	77	79	77	76	77	76	72	71	69	67	66	64	65	67	70	74	77	76	78	79	73.6	79													
21-Feb	80	79	80	79	76	76	74	74	74	74	67	64	57	52	48	43	47	51	58	60	65	67	67	70	66.0	80													
22-Feb	73	75	77	78	80	81	81	80	77	68	57	57	57	52	52	54	57	62	64	65	65	69	73	76	67.9	81													
23-Feb	78	76	74	75	78	80	78	75	72	66	67	75	75	76	78	80	79	82	80	73	71	70	65	69	74.7	82													
24-Feb	74	76	76	75	79	74	78	82	85	86	85	84	83	82	80	74	71	66	66	65	65	68	71	73	75.7	86													
25-Feb	76	78	79	77	77	76	75	74	75	71	59	64	58	53	51	52	54	59	69	75	80	81	81	80	69.7	81													
26-Feb	80	78	79	78	78	77	76	76	76	74	68	60	50	46	48	53	57	61	66	68	67	70	72	74	68.1	80													
27-Feb	78	77	78	80	83	84	84	84	82	79	72	68	64	58	58	59	60	63	66	66	70	71	73	75	72.2	84													
28-Feb	78	77	76	77	80	77	77	78	77	72	67	68	75	69	67	63	65	91	91	82	76	76	71	74	75.1	91													
																								Diurnal Average															
																								Diurnal Maximum															



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Barge Landing - February 2015**





Maximum Speed: 16 km/h on Feb 14 02:00	Maximum Daily Speed Average: 8.2 km/h on Feb 14	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 21 08:00	Minimum Daily Speed Average: 0.8 km/h on Feb 3	Hours of Data: 670
Maximum Diurnal Speed Average: 2.1 km/h at hour 19	Minimum Diurnal Speed Average: 0.2 km/h at hour 10	Hours of Missing Data: 2
Monthly Average Velocity: 0.9 km/h 60.0 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 5 Q <sub>3</sub> = 7 P <sub>90</sub> = 9 P <sub>99</sub> = 15	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-Feb	SSE4	SSE4	S4	SSE7	SSE5	SSE4	S5	SE4	SSE1	W1	NNW1	WSW2	SW1	NNW1	NNE3	NNE2	E2	ENE1	SSW2	SW2	S1	SSW3	SW3	WSW5	S1.8	SSE7
2-Feb	WSW5	SW6	SW7	SSW5	SW5	SSW5	S4	SW2	E0	S2	WSW3	NNE2	E3	NNW4	WNW6	NW6	NW4	NW3	W2	WSW3	WSW4	W4	NNW2	NW3	WSW2.4	SW7
3-Feb	W4	NNW1	N2	NNW3	NNW3	NNW4	NNW4	NNW4	NNW5	N4	NE6	NNE5	NE5	ENE4	E3	SSE3	SE3	SE3	ESE4	SE3	SSE5	S7	S6	S6	ENE0.8	S7
4-Feb	S7	S6	SW5	S6	SSW6	S5	SSW6	SW4	WSW3	S4	S6	SW5	W5	N3	NE5	NNE3	N4	NW3	NNW4	N4	NE5	N3	ENE2	NNW3	SW1.2	S7
5-Feb	WNW3	NNW3	N2	NNE2	NNE3	N3	W2	SSE4	SE3	SW4	SW2	NNW1	ENE4	ENE4	ENE5	ENE4	ENE6	ENE6	ENE6	NE5	ENE5	ENE5	NE6	NNE8	NE2.4	NNE8
6-Feb	NE9	NNE8	NE7	NE8	NE8	NE9	NE8	NE7	NNE8	NNE8	NNE8	NNE9	NNE10	NNE8	NNE8	NNE9	NNE10	NNE11	NNE10	NNE9	NNE9	NNW5	NNW5	NNW5	NNE7.8	NNE11
7-Feb	NNW5	NNW5	NNW5	NNW3	ESE4	ESE7	SE8	SE9	SSE9	SE10	SE12	SSE11	SE11	SE9	SE9	SE7	SE6	SSE4	S1	N1	N2	NNW2	NNW2	SW1	SE3.8	SE12
8-Feb	NNW2	N4	NNE3	NNE6	NE7	NE6	NNE2	NNE1	W2	WSW3	WSW4	SW2	SE4	E4	NE5	NE5	N5	N5	NNW5	N5	N5	N6	NNW3	NNW4	N2.7	NE7
9-Feb	NW4	NNW6	NNW6	NNW5	NNW6	NNW6	NNW5	NNW5	NNW4	NNW4	NNW5	NNW4	NNW4	NNW4	N4	NNW6	NNW6	NNW6	NNW5	NNW5	NNW5	NNW5	N4	NNW4	NNW4.9	NNW6
10-Feb	NNW4	N5	NNE6	NNE8	NNE6	N4	NNW2	NW3	NW2	NNW4	NNW6	NNW8	NNW7	NE6	NE5	NE4	NNE6	NNE6	NNE4	N5	NNE3	NE2	N1	N3	N4.0	NNW8
11-Feb	WNW1	WSW1	SW1	SW3	S2	SSE3	SSE4	S3	S3	S4	SSW5	SSW6	S9	S10	S10	S9	SSE9	SSE12	SSE12	SSE13	SSE13	S13	S13	S12	S6.8	S13
12-Feb	S9	SSE8	SSE6	S5	S6	SSE5	SSW4	SSW3	AF	NNW3	NNE6	NNE7	NNE6	NNE7	NNE7	NNE7	NE7	NNE6	NNE7	NE7	NE8	NNE9	NNE8	NNE8	NE2.9	NNE9
13-Feb	NNE8	NNE8	NNE8	NNE8	NNE7	NNE9	NNE8	NNE7	NNE8	NE8	NNE8	NNE8	NNE8	N7	NNW6	NNW5	N3	ESE6	SE9	SE13	SE14	SE14	SE12	SSE14	ENE4.4	SSE14
14-Feb	SSE13	SSE16	SSE15	SSE14	SSE15	SSE15	SSE15	SSE15	SSE14	S14	SSE15	S15	S14	S13	SSE12	S8	S8	N7	NNE9	NNE9	NNE8	NNE7	NE4	NNE5	SSE8.2	SSE16
15-Feb	NE5	ENE5	E6	ENE5	ENE5	ENE6	NE6	NE5	NE6	NNE5	NNE7	NNE6	NNE6	NE6	NNE7	NNE7	NE7	NE5	NE4	NNE4	N4	N5	NNE8	NNE7	NE5.4	NNE8
16-Feb	N6	N6	N6	NNE5	N5	NNW3	W2	W2	WSW1	SE2	SE1	NNE2	ENE5	ENE5	ESE4	SSE5	SSE2	ENE3	N3	N2	W1	WSW2	S1	S2	NNE1.4	N6
17-Feb	SE4	SE4	SE2	SSE2	SE3	SE3	SE3	SE4	SE3	SSE2	SW2	SSW4	S6	S6	S5	S5	S3	WSW1	NE1	E2	ESE3	ESE3	ESE3	ESE4	SSE2.8	S6
18-Feb	S0	NNE1	NNW0	NNW3	NNW3	NNW2	NE1	SE2	SE1	NW3	WNW3	N3	NNE3	SSW3	SW6	S7	S5	S3	SE3	S3	S3	S6	S7	S6	SSW1.5	S7
19-Feb	S6	S6	S6	S6	S7	S7	SSE7	S5	SSE5	SSE4	SSW3	WNW2	NNE3	NNE4	NNE4	N5	NNW4	N4	NNE6	NNE9	NNE11	NNE13	NNE13	NNE13	NE1.5	NNE13
20-Feb	NNE13	NNE12	NNE12	NNE10	NNE9	NNE8	NNE9	NNE10	NNE8	NNE7	NNE7	NNE7	NE7	NE6	NE6	NE6	NE5	NE6	NNE4	N4	N5	N3	N3	NNW2	NNE6.8	NNE13
21-Feb	NNW2	NNE1	N3	N3	NNW2	NNW1	NNE0	NNW0	AF	SW1	SW3	NE3	WSW5	S5	SSE7	S6	SSE7	SSE5	SE7	SSE7	S6	S7	SSE6	S7	S2.5	SSE7
22-Feb	S8	S8	S7	S8	S6	S6	SSE7	S6	S5	S7	S6	S11	S11	S9	S9	S10	S9	S10	SSW10	SSW9	SW10	S3	WSW4	NW4	S7.1	S11
23-Feb	NW5	NNW5	NNW6	NW3	W4	NNW6	NW8	NW7	NW7	NW4	NNW8	NNE9	NE7	NE6	NE7	NE8	NNE8	NNE11	NNE14	NNE13	NE11	ENE9	NE7	NNE7	N5.6	NNE14
24-Feb	NE7	NE6	ENE7	ENE5	E4	ESE6	E6	ENE7	NE7	NE7	NNE8	NNE9	NNE9	NNE9	NNE9	N10	N11	N11	N10	N14	N12	NNE9	N6	N6	NNE7.3	N14
25-Feb	NNW4	NNW5	NNW5	NNW2	WSW2	WNW1	NNW1	NNW1	NW1	SW1	WSW2	E4	WSW5	W3	WSW4	SSE4	SSE5	SSE4	S4	S5	SSE4	SSE5	SSE6	S5	SSW1.2	SSE6
26-Feb	SSE5	SW3	S5	S4	S6	SSW5	SSW3	SW3	SSW5	SW5	WSW5	SW5	S8	SW8	SSW10	SW11	WSW8	W3	NNW5	N6	N5	N5	NNW4	N4	SW3.1	SW11
27-Feb	N6	N9	N8	NNE5	N4	N4	E4	S2	WSW1	WSW2	S1	SW3	SW6	SSW8	S8	S9	S8	S6	S7	SSW6	SSW5	SSW5	SW7	WSW5	SSW1.9	N9
28-Feb	SW4	SW5	WSW6	SW5	SW3	W6	W5	W5	W7	WNW5	WNW4	NW3	NE3	ENE5	NE6	NW4	NW9	N6	N5	N8	N6	N4	N5	NNE3	NW2.8	NW9
NE0.6 NE0.9NNE0.8 ENE0.8 E0.7 E0.8 SE0.8 SE0.6 E0.3 S0.2 NW0.3 NE1.0 E1.0 E1.5 E1.6 E0.9ENE0.8 NE1.9 NE2.1 NE2.0 NE1.8 ENE1.4 NE1.0NNE0.8																								Diurnal Average		
SSE13 SSE16 SSE15 SSE14 SSE15 SSE15 SSE15 SSE15 SSE14 S14 SSE15 S15 S14 S13 SSE12 SW11 N11 SSE12 NNE14 N14 SE14 SE14 S13 SSE14																								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 - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 14 13:00	Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7
Minimum Value: 0 km/h on Feb 7 21:00	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 2 P <sub>90</sub> = 3 P <sub>99</sub> = 5	

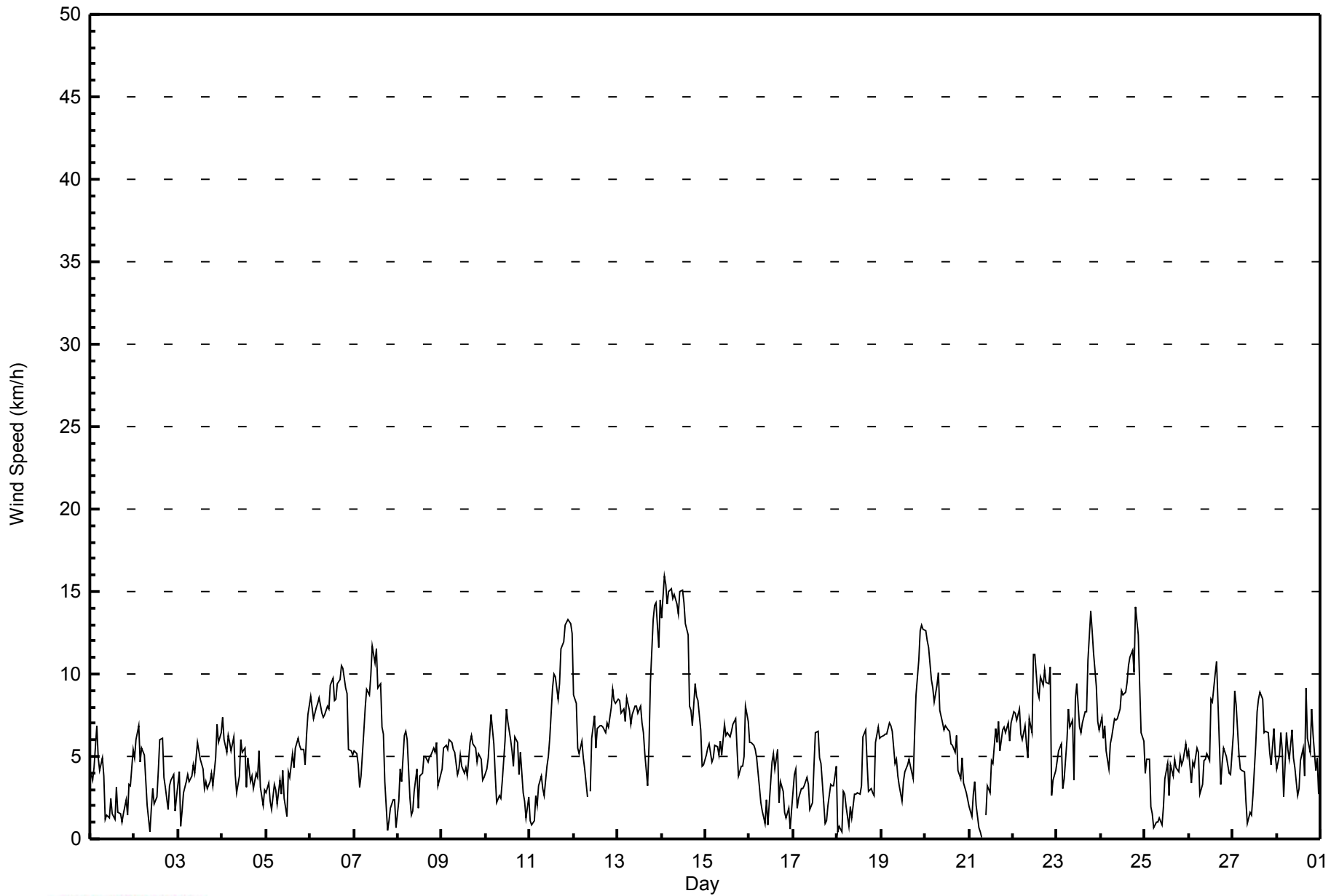
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	
2-Feb	1	2	1	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1	1	1	2	1	1	1	3	
3-Feb	2	1	1	1	1	1	1	1	1	1	2	1	1	2	1	2	1	1	1	1	1	2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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Barge Landing - February 2015**





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

**Wind Speed (WS) - km/h**  
**Barge Landing - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	371	55.37	55.37
6 - 11	261	38.96	94.33
12 - 19	38	5.67	100.00
20 - 28	0	0.00	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 670

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Barge Landing - February 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	42	29	19	17	9	7	18	28	31	16	26	24	14	11	14	66	371
6 - 11	19	78	36	6	2	3	10	13	54	8	8	2	2	3	5	12	261
12 - 19	2	8	0	0	0	0	5	16	7	0	0	0	0	0	0	0	38
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>	63	115	55	23	11	10	33	57	92	24	34	26	16	14	19	78	670

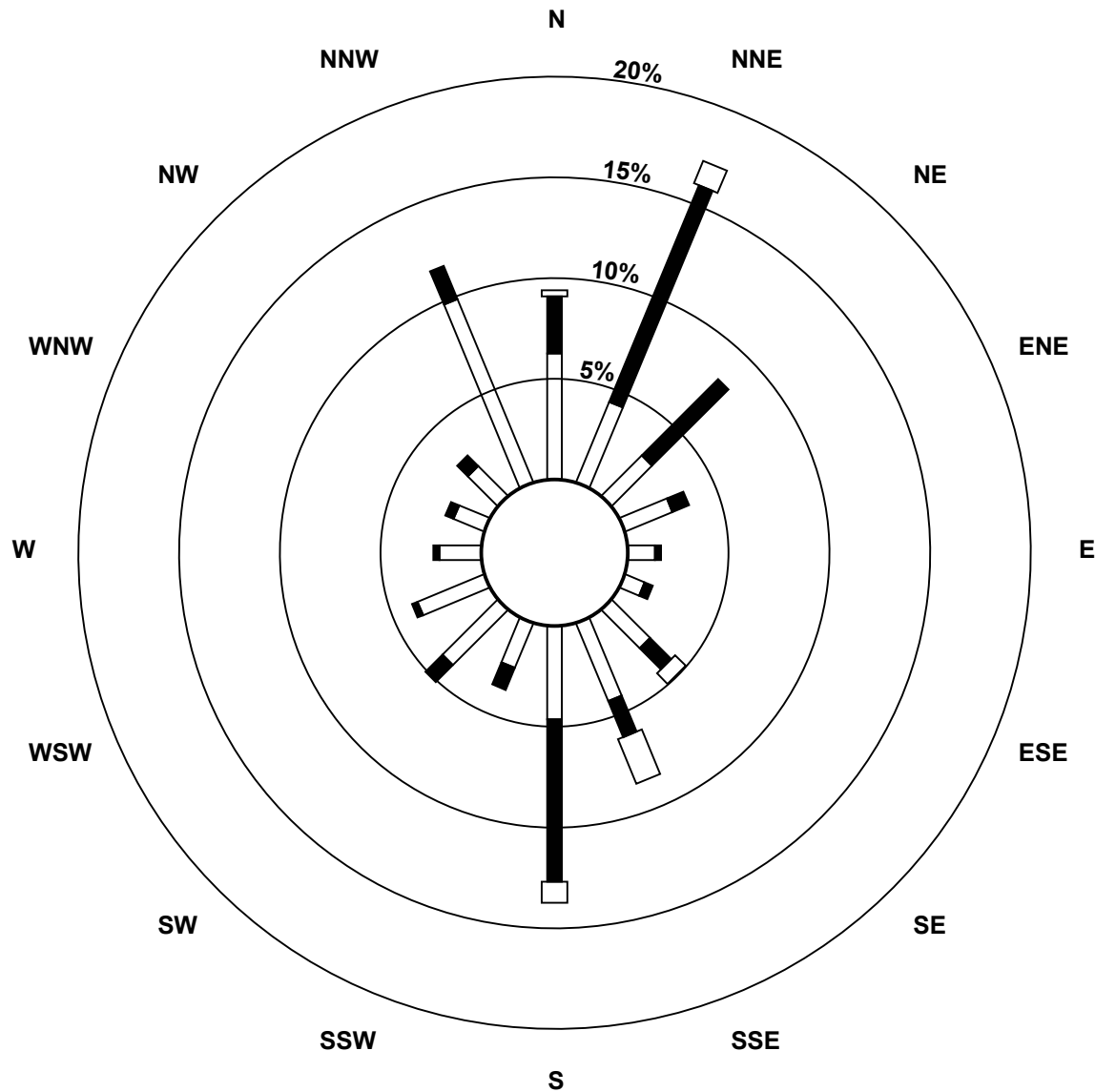
Total Number of Valid Hours: 670

Total Number of Hours: 672

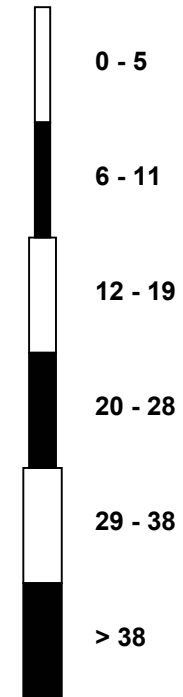


**Wood Buffalo Environmental Association  
Wind Rose Feb 2015**

**Wind Speed (WS) - km/h  
Barge Landing (AMS 9)**



**Classes (km/h)**



**Total Number of Valid Hours: 670**



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

**Wind Direction (WD) - deg**  
**Barge Landing - February 2015**

Direction of Maximum Speed: 147 deg on Feb 14 02:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 154.6 deg on Feb 14	Hours of Data: 670
Direction of Minimum Speed: 328 deg on Feb 21 08:00	Hours of Missing Data: 2
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 3	Percent Operational Time: 99.7
Monthly Average Direction: 283.9 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-Feb	167	167	175	167	160	161	178	140	163	259	297	246	230	335	21	20	84	67	198	226	190	206	232	250	185.3
2-Feb	237	228	233	204	223	211	188	232	101	184	241	19	79	327	283	316	305	308	270	239	239	268	340	304	253.5
3-Feb	262	290	349	343	335	336	345	336	346	355	40	29	36	68	100	158	134	126	120	140	166	171	176	177	76.2
4-Feb	178	189	230	188	192	172	197	228	253	175	185	221	263	10	47	26	357	326	338	354	40	3	67	333	215.1
5-Feb	291	329	1	30	14	354	260	154	140	231	231	334	58	72	61	62	74	60	73	55	71	66	39	28	50.1
6-Feb	34	33	42	49	54	47	35	35	23	20	23	25	26	21	19	24	17	23	21	18	14	337	329	330	24.1
7-Feb	336	343	345	346	114	118	136	141	147	145	145	147	131	139	132	140	146	158	178	0	9	336	333	235	133.3
8-Feb	335	11	22	31	37	41	26	22	268	237	237	229	137	84	47	47	4	350	346	351	349	355	332	335	9.9
9-Feb	326	340	339	333	334	333	332	334	329	329	343	343	335	333	0	345	334	332	338	342	337	341	356	333	337.2
10-Feb	330	353	15	25	24	9	335	318	311	335	333	328	330	41	51	45	14	28	17	8	31	55	358	9	5.8
11-Feb	297	246	219	236	175	160	147	177	181	178	195	202	182	172	170	188	165	159	161	164	166	170	174	169	173.1
12-Feb	175	168	166	175	174	164	195	207	AF	341	12	16	25	24	27	31	37	24	32	37	34	31	18	24	45.3
13-Feb	22	28	13	20	13	29	25	24	28	44	28	26	19	3	339	327	352	103	136	136	138	140	146	148	60.6
14-Feb	147	147	149	157	165	163	164	165	167	172	167	170	170	171	167	175	183	356	21	31	33	31	34	31	154.6
15-Feb	42	76	80	77	58	41	40	48	36	25	13	28	31	43	27	31	46	43	38	25	1	351	13	13	35.2
16-Feb	359	11	1	16	359	337	272	273	241	132	127	23	76	77	108	147	152	66	349	352	275	256	179	169	31.9
17-Feb	131	127	141	161	141	128	146	136	146	150	215	201	184	184	177	180	176	255	36	90	117	113	104	107	151.8
18-Feb	189	32	347	336	335	342	49	145	135	315	302	355	17	200	220	183	190	191	146	173	169	176	181	184	193.0
19-Feb	179	180	177	183	181	180	168	170	158	168	212	282	17	32	32	354	338	5	19	21	13	28	24	19	50.5
20-Feb	21	16	17	15	12	12	14	20	18	17	32	33	41	42	41	35	48	45	31	4	351	359	354	343	21.3
21-Feb	344	26	351	350	348	327	29	328	AF	225	236	55	247	180	151	172	165	168	143	156	171	172	164	175	169.1
22-Feb	172	186	182	184	172	170	166	181	191	183	175	182	182	184	176	174	186	188	193	203	218	187	254	307	186.4
23-Feb	317	302	283	307	271	301	309	315	326	322	327	30	43	39	40	34	22	20	16	28	43	58	40	32	6.8
24-Feb	48	54	61	74	90	107	86	67	51	36	31	29	26	24	22	5	3	7	4	5	6	13	355	357	27.6
25-Feb	332	339	346	340	255	299	333	333	325	235	238	88	257	267	240	153	154	161	173	173	161	149	161	177	193.5
26-Feb	162	215	187	176	178	195	194	221	193	234	237	236	191	225	212	218	240	273	348	6	357	357	336	354	223.3
27-Feb	9	11	10	20	349	11	87	190	244	252	169	215	229	206	189	171	177	181	181	198	210	208	227	244	203.4
28-Feb	231	229	237	225	221	278	281	268	259	293	303	305	40	67	54	305	318	354	353	359	360	354	4	20	311.5
Diurnal Average																									
33.9	39.5	27.2	71.9	97.6	92.0	125.5	128.1	96.4	177.1	325.3	37.6	84.8	85.1	90.9	90.8	57.0	39.7	41.2	39.9	44.9	58.5	41.0	27.2		

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



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

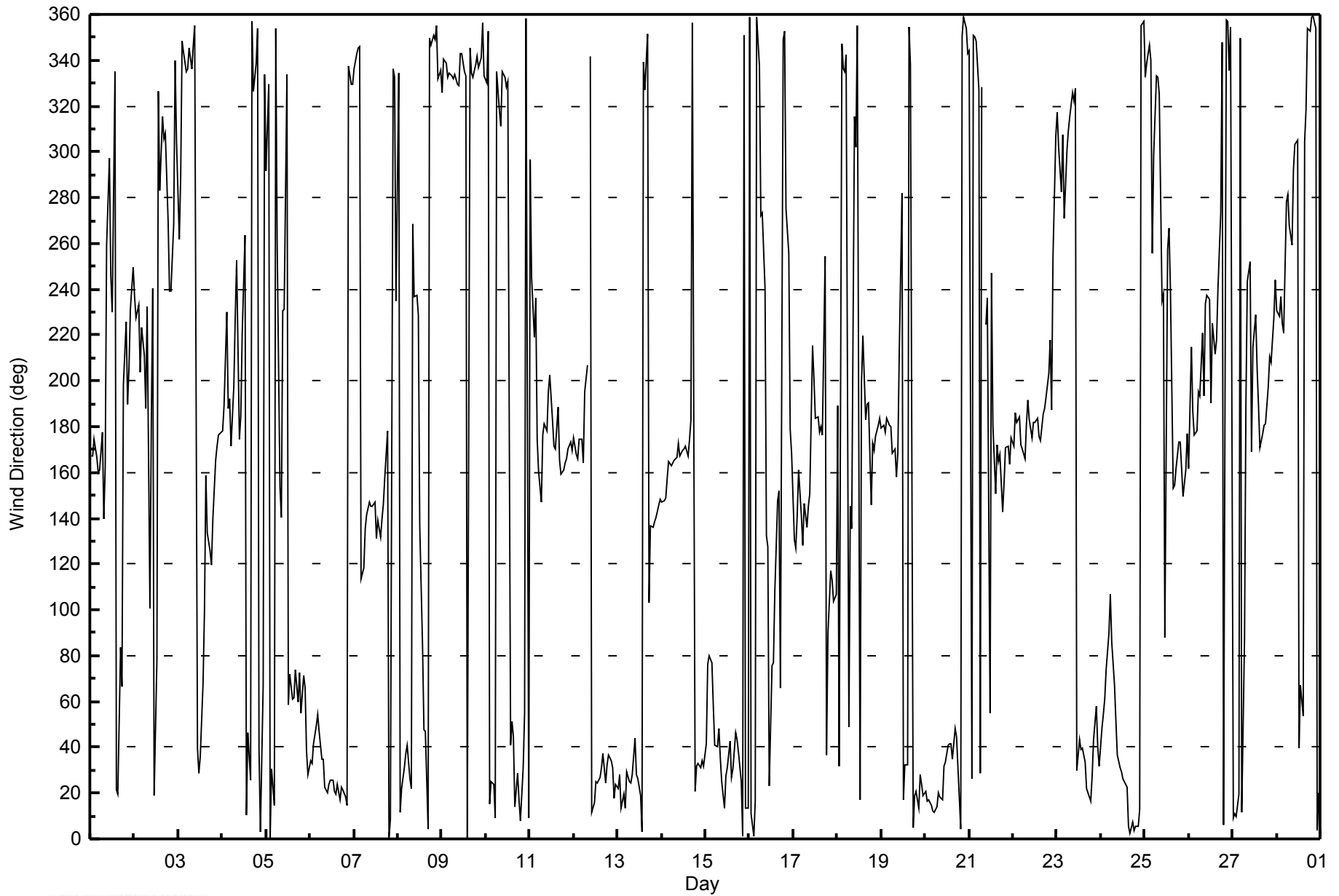
**Wind Direction (WD) - deg**  
**Barge Landing - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 97 deg on Feb 11 02:00		Hours in Service: 672 Hours of Data: 670 Hours of Missing Data: 2 Hours of Calibration: 0 Percent Operational Time: 99.7																							
Minimum Value: 8 deg on Feb 21 19:00																									
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 17 Q <sub>1</sub> = 19 Median = 22 Q <sub>3</sub> = 29 P <sub>90</sub> = 47 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-Feb	18	19	23	22	26	28	34	21	51	63	48	27	87	72	26	34	31	29	34	23	42	30	33	13	87
2-Feb	23	14	9	21	16	15	49	54	83	55	37	47	46	77	35	20	23	25	42	22	20	25	17	29	83
3-Feb	26	88	35	12	20	8	10	9	16	29	21	20	26	32	52	45	26	20	11	20	14	19	21	22	88
4-Feb	21	25	20	20	19	22	29	41	35	27	27	32	31	62	28	20	22	28	19	18	28	31	46	18	62
5-Feb	28	23	21	34	16	15	49	35	33	21	58	61	30	23	25	28	22	21	20	23	20	22	21	18	61
6-Feb	18	19	20	20	19	18	18	18	17	18	19	17	16	17	17	18	17	17	16	16	21	24	18	32	32
7-Feb	34	17	19	32	50	15	19	17	22	22	19	22	17	21	20	27	22	24	93	30	17	23	24	87	93
8-Feb	46	27	20	18	20	19	28	31	60	11	19	84	38	52	19	24	25	22	19	16	16	16	21	15	84
9-Feb	15	18	18	19	18	17	17	18	21	21	22	28	23	26	26	21	18	17	19	22	18	20	25	20	28
10-Feb	17	20	21	18	16	16	21	25	28	26	27	23	27	29	19	25	18	16	25	26	37	29	47	19	47
11-Feb	65	97	57	19	39	26	21	25	31	37	42	35	27	24	26	25	26	23	23	24	24	23	24	25	97
12-Feb	24	21	23	22	20	19	24	31	AF	36	24	20	21	17	16	18	20	16	18	20	18	18	20	18	36
13-Feb	18	20	21	18	19	17	17	18	18	21	17	17	20	23	24	19	31	19	15	16	18	17	20	20	31
14-Feb	20	19	20	24	24	25	24	25	24	25	24	30	25	23	27	25	64	18	17	17	17	19	18	18	64
15-Feb	21	20	20	23	25	20	21	22	20	22	19	21	18	21	19	21	18	17	17	16	26	25	20	22	26
16-Feb	26	19	20	19	21	28	43	33	61	39	86	74	29	32	42	24	59	19	22	37	55	12	66	48	86
17-Feb	18	14	43	33	25	19	23	18	26	53	57	37	27	33	40	31	33	46	49	17	10	15	20	14	57
18-Feb	85	68	68	24	28	27	57	27	82	24	32	40	45	71	32	29	29	27	18	22	35	22	24	22	85
19-Feb	24	23	23	23	22	23	25	25	26	32	38	53	34	29	21	25	18	28	21	19	21	18	17	20	53
20-Feb	18	18	18	20	18	19	17	16	18	18	28	19	20	20	19	17	17	16	17	17	15	17	17	17	28
21-Feb	23	56	17	14	58	54	67	81	AF	52	44	59	52	48	24	31	22	18	8	13	19	20	20	20	81
22-Feb	20	19	20	20	21	17	18	20	22	27	30	23	25	31	28	24	24	21	23	23	23	60	26	34	60
23-Feb	20	25	30	49	40	26	25	20	20	28	27	19	19	19	18	19	20	18	19	21	21	22	20	17	49
24-Feb	19	21	19	17	25	17	23	19	18	18	17	17	16	16	21	22	20	21	21	21	20	19	17	16	25
25-Feb	18	13	15	75	45	51	40	43	46	72	64	48	38	74	42	46	25	13	16	18	11	10	14	18	75
26-Feb	17	28	19	25	24	31	31	22	24	35	28	44	30	26	25	22	19	37	19	17	20	21	16	22	44
27-Feb	20	20	20	19	18	22	32	55	75	89	74	85	32	34	32	25	22	18	17	24	18	23	16	14	89
28-Feb	15	14	15	17	59	37	41	34	22	29	32	59	40	31	24	58	29	23	29	21	19	18	26	45	59
85 97 68 75 59 54 67 81 83 89 86 85 87 77 52 58 59 64 93 37 55 60 66 87																									
Diurnal Maximum																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Barge Landing - February 2015**





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	9:15	End Time (MST)	12:15
Barometric Pressure	NA mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11071107
Cal Gas Concentration	4.77 ppm H2S	Cal Gas Expiry Date	05/30/13
Gas Cert Reference	LL86129	SO2 gas conc.	59.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
DACS voltage range		DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-690	-690
Analyzer Range (input)	100	100	Lamp voltage	1023	1020
Calculated slope	0.991922	0.995202	Chamber temp.	45	45
Calculated intercept	0.055314	0.099270	Pressure	690.9	690.3
Analyzer Background	2.07	2.08	Flow	0.438	0.436
Analyzer Coefficient	0.984	0.984	Intensity	91	91
			Converter temp.	800	800

Analyzer make/model	Thermo 43i-TLE	Analyzer serial #	1331259320
Converter make/model	CDN-101	Converter serial #	519

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.2	NA
as found span	5000	83.7	79.8	80.1	0.997
SO2 scrubber check	6000	12.2	120.0	0.4	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5000	83.7	79.8	80.1	0.997
second point	5000	41.9	40.0	40.1	0.997
third point	5000	20.8	19.8	20.0	0.995
calibrator zero					
as left zero	6000	0.0	0.0	-0.1	NA
as left span	5000	83.7	79.8	79.9	0.999
Average Correction Factor					0.996

Corrected As found	80.3	Previous response	80.4	% change	0.2%
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#### Notes:

Changed the filter after as founds. Scubber check completed after as founds. No adjustments made.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## TRS Calibration Summary

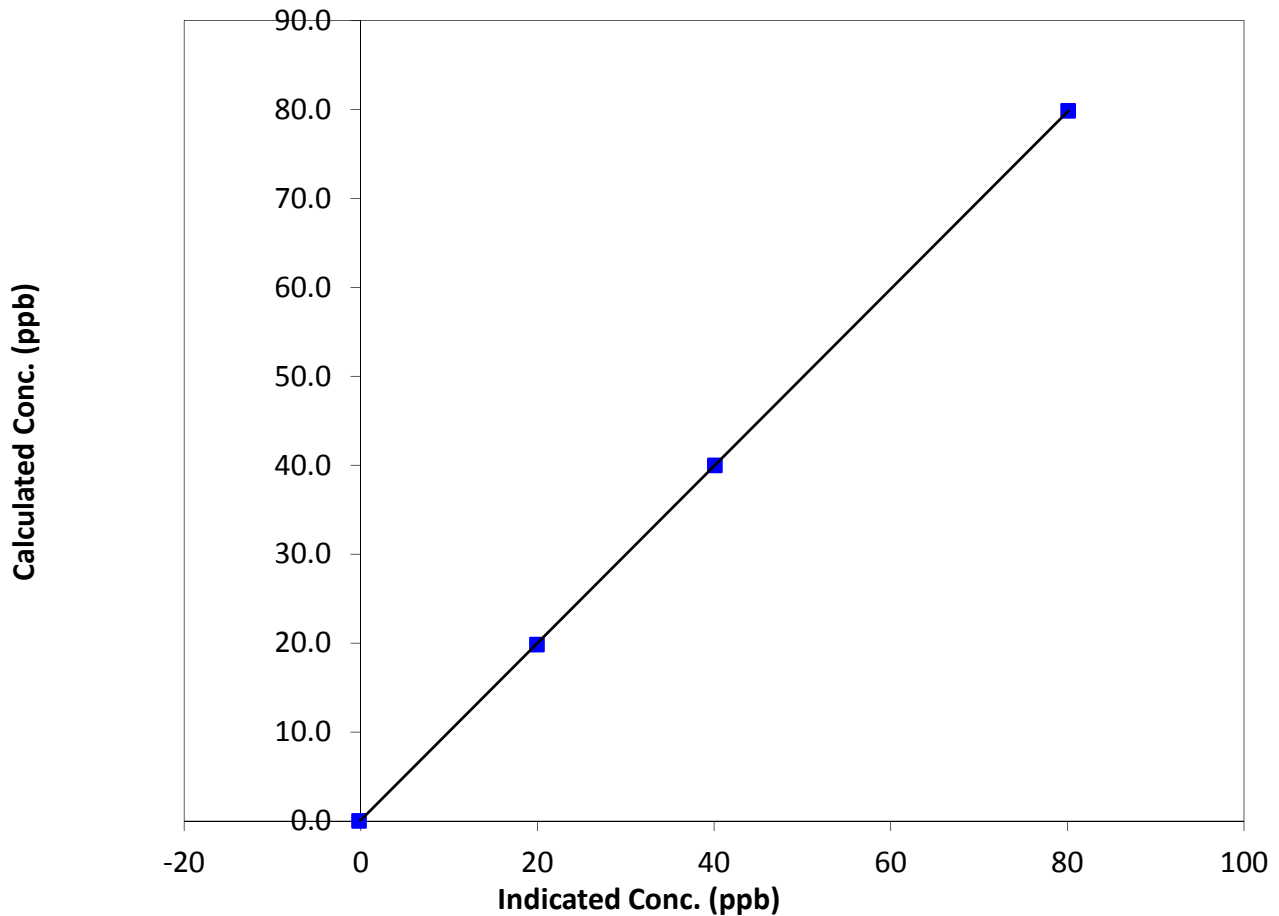
### Station Information

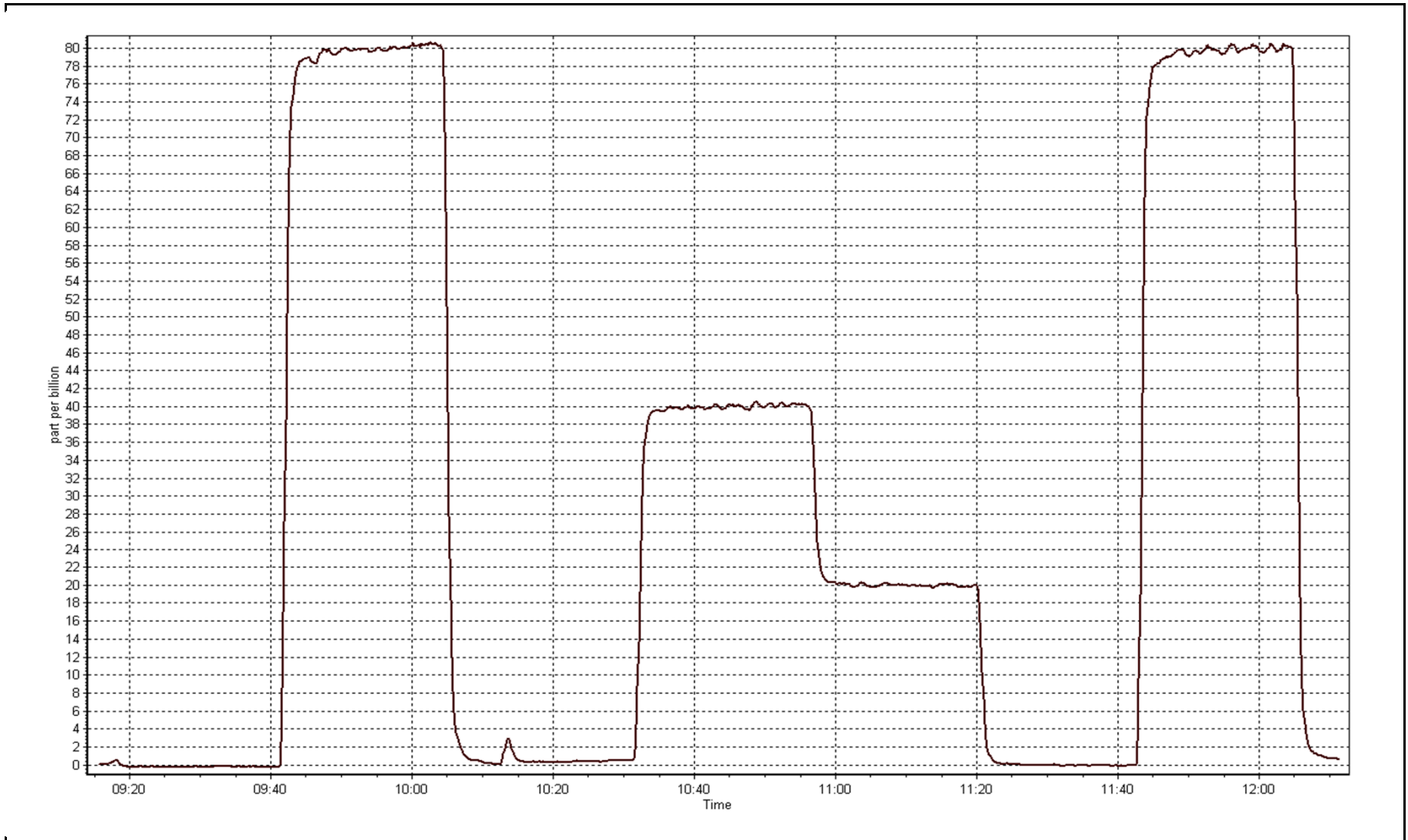
Calibration Date	February 6, 2015	Previous Calibration	January 9, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	9:15	End Time (MST)	12:15
Analyzer make	Thermo 43i-TLE	Analyzer serial #	1331259320

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999994
79.8	80.1	0.9969		
40.0	40.1	0.9973	Slope	0.995202
19.8	20.0	0.9946		
			Intercept	0.099270

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Friday, February 06, 2015	Previous Calibration	Tuesday, January 13, 2015
Station Name	Barge Landing	Station Number	AMS 9
Reason:	Routine		
Start Time (MST)	12:05	End Time (MST)	12:30
Barometric Pressure	730 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11071107
Gas Cert Reference	139843	Cal Gas Expiry Date	11/24/2012
CH4 Cal Gas Conc.	494 ppm	CH4 Equiv Conc.	1049.5 ppm
C3H8 Cal Gas Conc.	202 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6466
DACS voltage range		DACS channel #	5

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	9.1	9.1
Analyzer Range (mv)	25	25	Air or Bypass press	34.7	34.7
Calculated slope	1.003828	1.005082	Fuel Pressure	24.1	24.1
Calculated intercept	-0.095196	0.006739	BKG	5.75	5.75
			COEF	4.334	4.334

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	0.02	N/A
as found span	6000	89.7	15.69	15.63	1.004
calibrator zero	6000	0.0	0.00	0.02	N/A
high point	6000	89.7	15.69	15.63	1.004
second point	6000	48.0	8.40	8.30	1.012
third point	6000	18.0	3.15	3.12	1.009
calibrator zero					
as left zero	6000	0.5	0.09	0.01	N/A
as left span	6000	89.7	15.69	15.57	1.008
Average Correction Factor					1.008

Corrected As found	15.61	Previous response	15.73	% change	0.7%
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#### Notes:

No adjustments made.

Calibration Performed By:

Devin Russell





# Wood Buffalo Environmental Association

## THC Calibration Summary

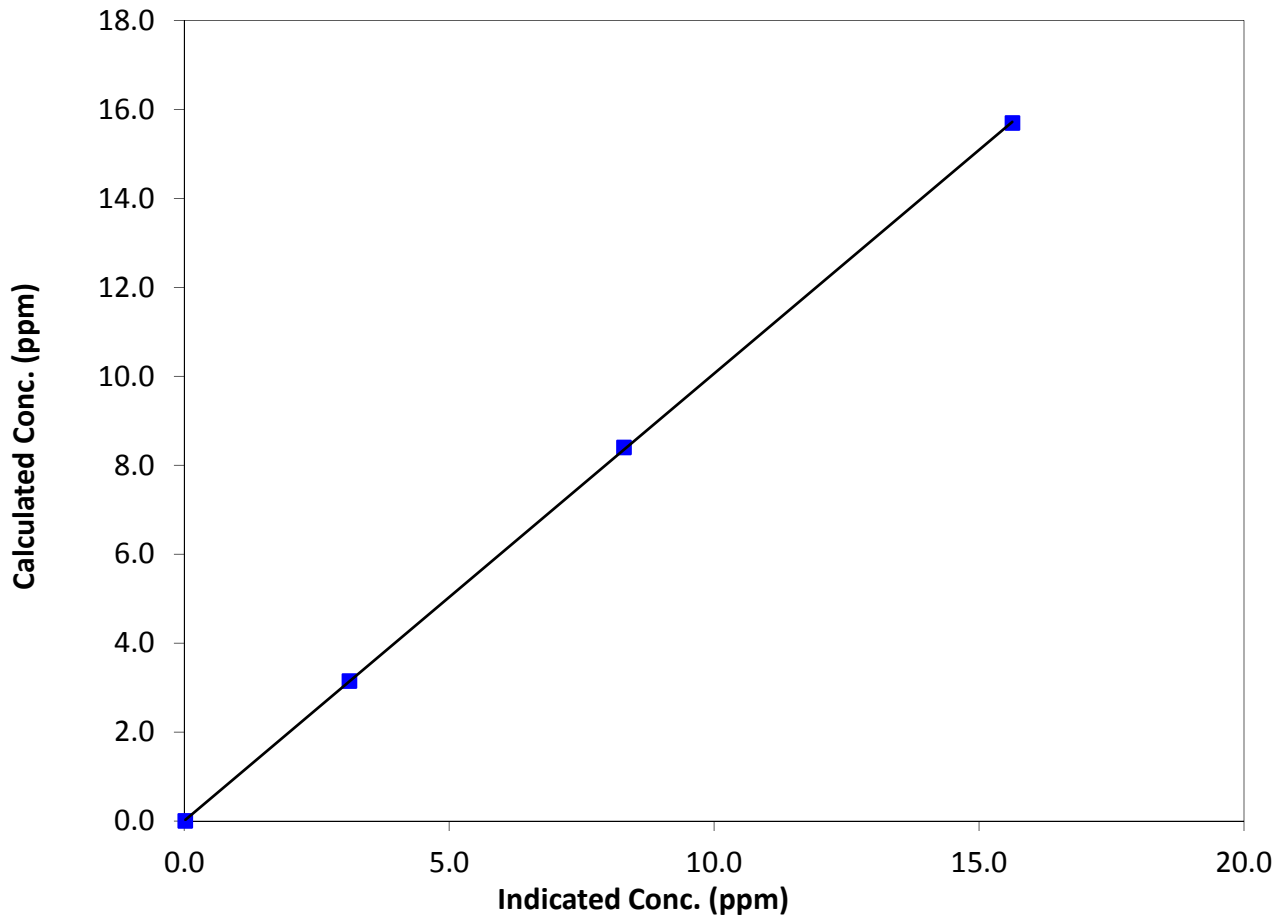
### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Barge Landing	Station Number	AMS 9
Start Time (MST)	12:05	End Time (MST)	12:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1327059296

### Calibration Data

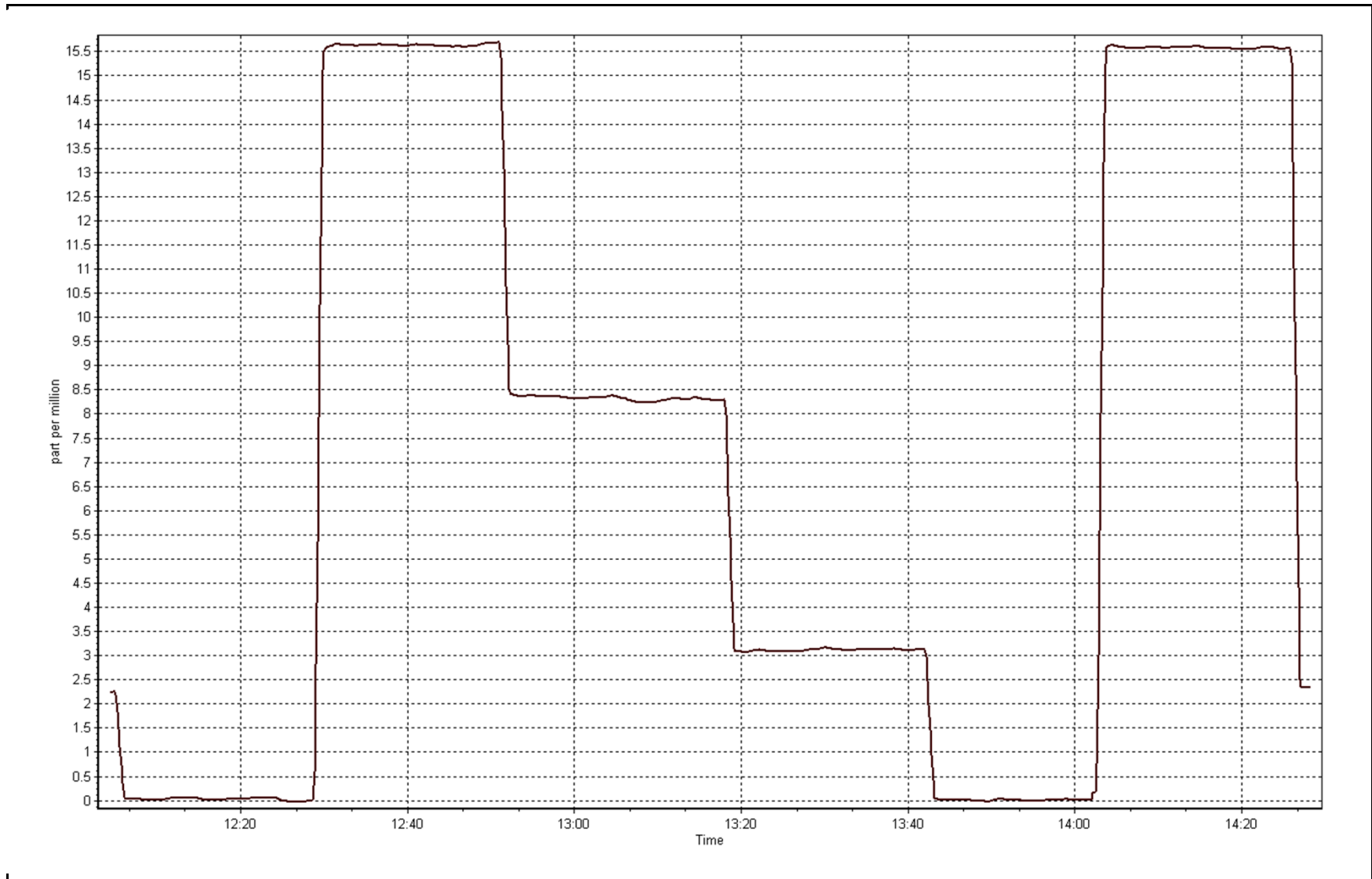
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999974
15.69	15.63	1.0038		
8.40	8.30	1.0116	Slope	1.005082
3.15	3.12	1.0091		
			Intercept	0.006739

### THC Calibration Curve



THC Calibration Plot

Date: February 6, 2015



**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 11  
LOWER CAMP  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 FEBRUARY 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	638	34	34	100.00	54	0	14	0
H2S (ppb) Average	637	35	35	100.00	8	0	3	0
THC (ppm) Average	600	33	72	94.20	3.3	-	2.7	-
Temperature (C) Average	672	0	0	100.00	1.6	-	-1.8	-
Relative Humidity (%) Average	672	0	0	100.00	92	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	32	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
 FEBRUARY 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	638	2.5	6	-	0	0	0	1	1	7	54
H2S (ppb) Average	637	0.9	1	-	0	0	0	1	1	2	8
THC (ppm) Average	600	2.35	0.3	-	2	2.1	2.2	2.3	2.5	2.7	3.3
Temperature 2 m (C) Average	672	-17.34	8.1	-	-37.6	-27	-23.6	-18	-11.4	-6.9	1.6
Relative Humidity (%) Average	672	72.5	7	-	44	64	69	74	77	80	92
Wind Speed 10 m (km/h) Average	672	9.2	6	-	0	2	5	8	12	17	32
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - LOWER CAMP (AMS 11)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	14 Feb 2015 05:00	15 Feb 2015 19:00	39	Analyzer failure - depleted hydrogen cylinder

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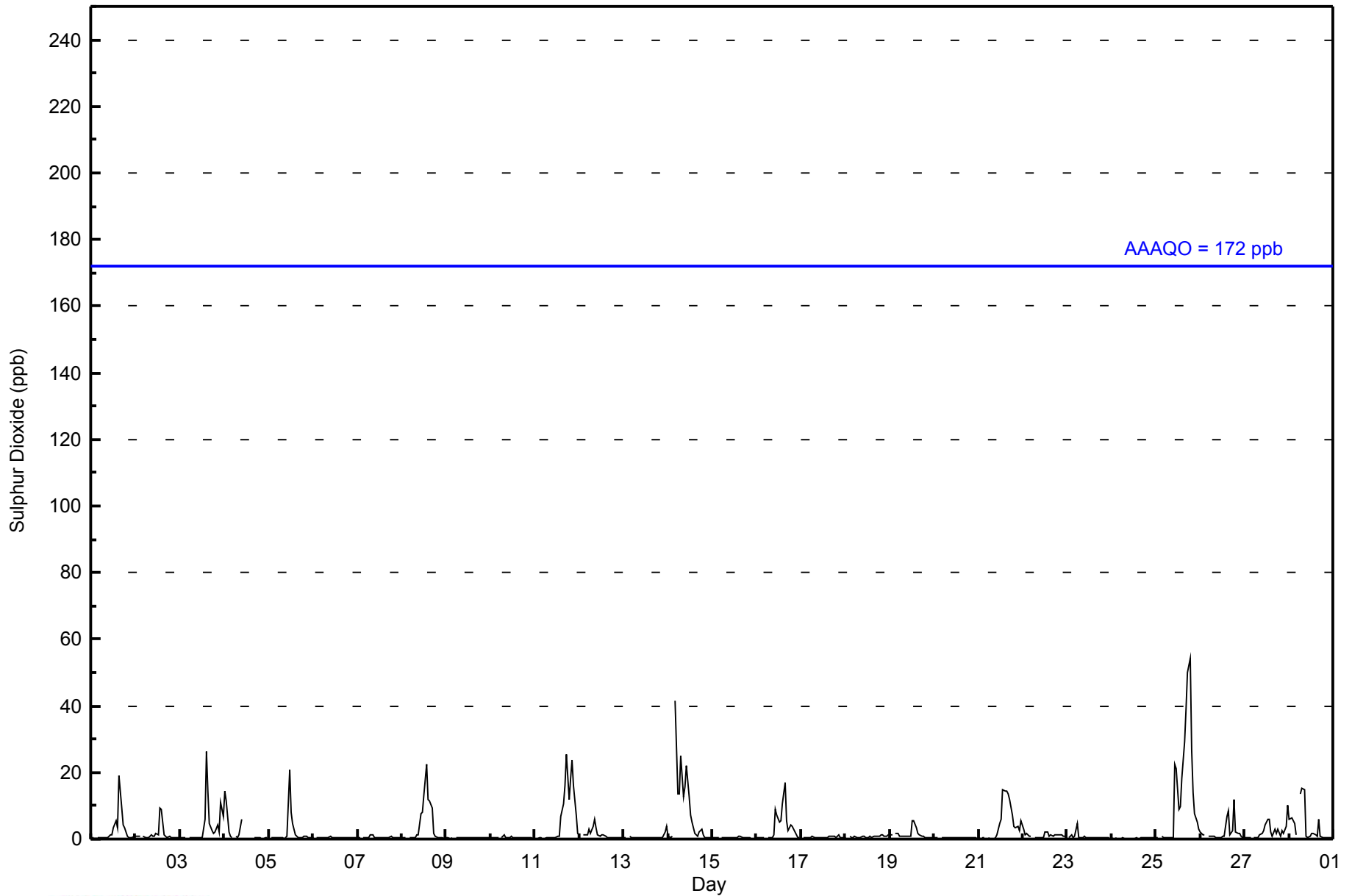


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 54 ppb on Feb 25 19:00										Maximum Daily Average: 13.6 ppb on Feb 25										Hours of Data: 638						
Minimum Value: 0 ppb on Feb 24 16:00										Minimum Daily Average: 0.2 ppb on Feb 24										Hours of Missing Data: 34						
Maximum Diurnal Average: 5.1 ppb at hour 16										Minimum Diurnal Average: 0.7 ppb at hour 4										Hours of Calibration: 34						
Monthly Average: 2.5 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> = 7 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-Feb	0	0	Z	0	0	0	0	0	0	0	1	1	3	6	3	19	9	4	3	1	1	1	1	1	2.5	19
2-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	1	9	9	1	1	0	1	0	0	0	0	0	1.5	9
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	6	6	26	14	5	2	2	2	4	2	11	7	3.7	26
4-Feb	14	12	2	1	1	Z	1	0	1	6	C	C	C	C	C	C	0	0	0	0	0	0	0	0	-	14
5-Feb	Z	0	0	0	0	0	0	0	0	0	1	21	8	5	1	1	1	1	1	1	1	1	0	1	1.9	21
6-Feb	0	Z	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.5	1
7-Feb	0	0	Z	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0.5	1
8-Feb	0	0	0	Z	1	0	0	1	1	1	8	8	13	22	12	11	9	2	1	1	0	0	0	0	4.1	22
9-Feb	0	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-Feb	0	0	0	0	0	Z	0	1	0	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0.4	1
11-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	7	11	16	25	12	18	24	16	7	2	6.2	25	
12-Feb	1	Z	1	1	1	3	2	4	6	3	1	1	1	1	1	1	1	0	0	0	0	0	0	1.4	6	
13-Feb	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	0.6	4	
14-Feb	1	0	1	Z	42	13	14	25	13	16	22	13	7	5	2	1	1	2	3	1	1	0	0	7.9	42	
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0.3	1	
16-Feb	0	0	0	0	0	Z	0	0	0	1	9	7	5	5	10	17	5	3	4	4	3	1	1	1	3.5	17
17-Feb	Z	0	0	0	1	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0.6	1
18-Feb	0	Z	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
19-Feb	1	1	Z	2	2	1	1	1	1	1	1	1	6	5	3	2	1	1	1	0	0	0	0	0	1.4	6
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Feb	0	0	0	0	Z	0	0	0	0	0	1	5	6	15	14	14	14	12	7	4	4	4	2	5	4.7	15
22-Feb	3	1	2	1	1	Z	0	0	0	1	0	0	2	2	1	1	1	1	1	1	1	1	1	1	1.1	3
23-Feb	Z	1	1	1	1	5	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	5
24-Feb	0	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-Feb	0	0	Z	1	0	0	0	0	0	0	23	21	9	10	18	29	39	50	54	27	14	8	5	3	13.6	54
26-Feb	2	1	1	Z	1	1	1	1	1	1	1	1	1	1	7	8	1	2	12	2	2	2	1	1	2.1	12
27-Feb	1	0	0	0	Z	0	0	0	1	2	3	4	6	6	2	1	3	2	3	1	2	2	4	10	2.3	10
28-Feb	6	6	6	5	1	Z	13	15	15	1	1	1	1	2	1	1	6	1	0	0	0	0	0	0	3.7	15
1.4 1.2 0.8 0.7 2.4 1.3 1.4 2.0 1.7 1.4 2.8 3.4 2.8 3.9 4.6 5.1 4.2 4.1 4.0 2.4 2.2 1.5 1.5 1.4																								Diurnal Average		
14 12 6 5 42 13 14 25 15 16 23 21 13 22 26 29 39 50 54 27 24 16 11 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  
Lower Camp - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	593	92.95	92.95
11 - 20	30	4.70	97.65
21 - 60	15	2.35	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: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Lower Camp - February 2015**

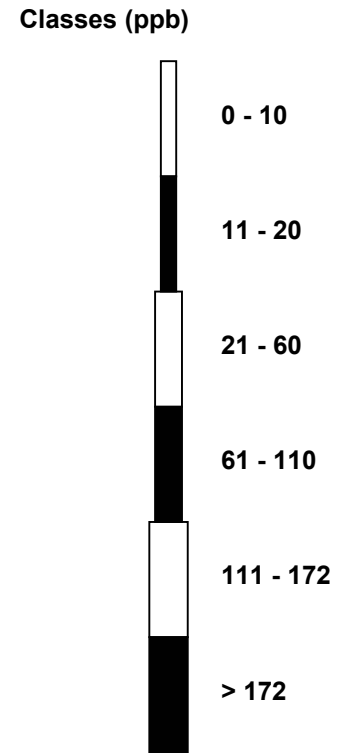
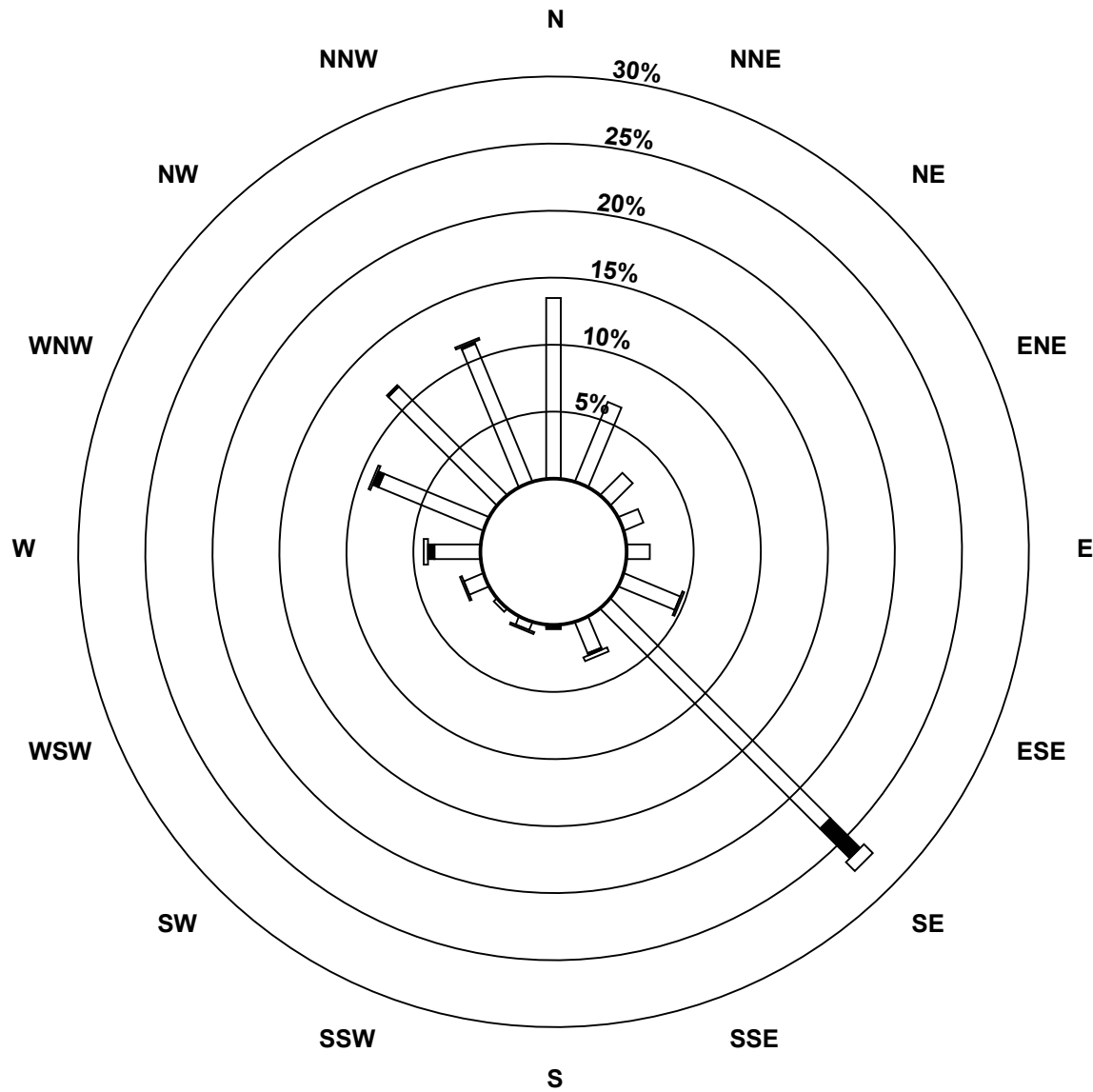
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	86	41	15	10	11	29	148	16	1	4	2	10	22	54	73	71	593
11 - 20	0	0	0	0	0	0	20	1	1	0	0	0	3	3	1	1	30
21 - 60	0	0	0	0	0	1	6	2	0	1	0	1	2	1	0	1	15
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	86	41	15	10	11	30	174	19	2	5	2	11	27	58	74	73	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp (AMS 11)**

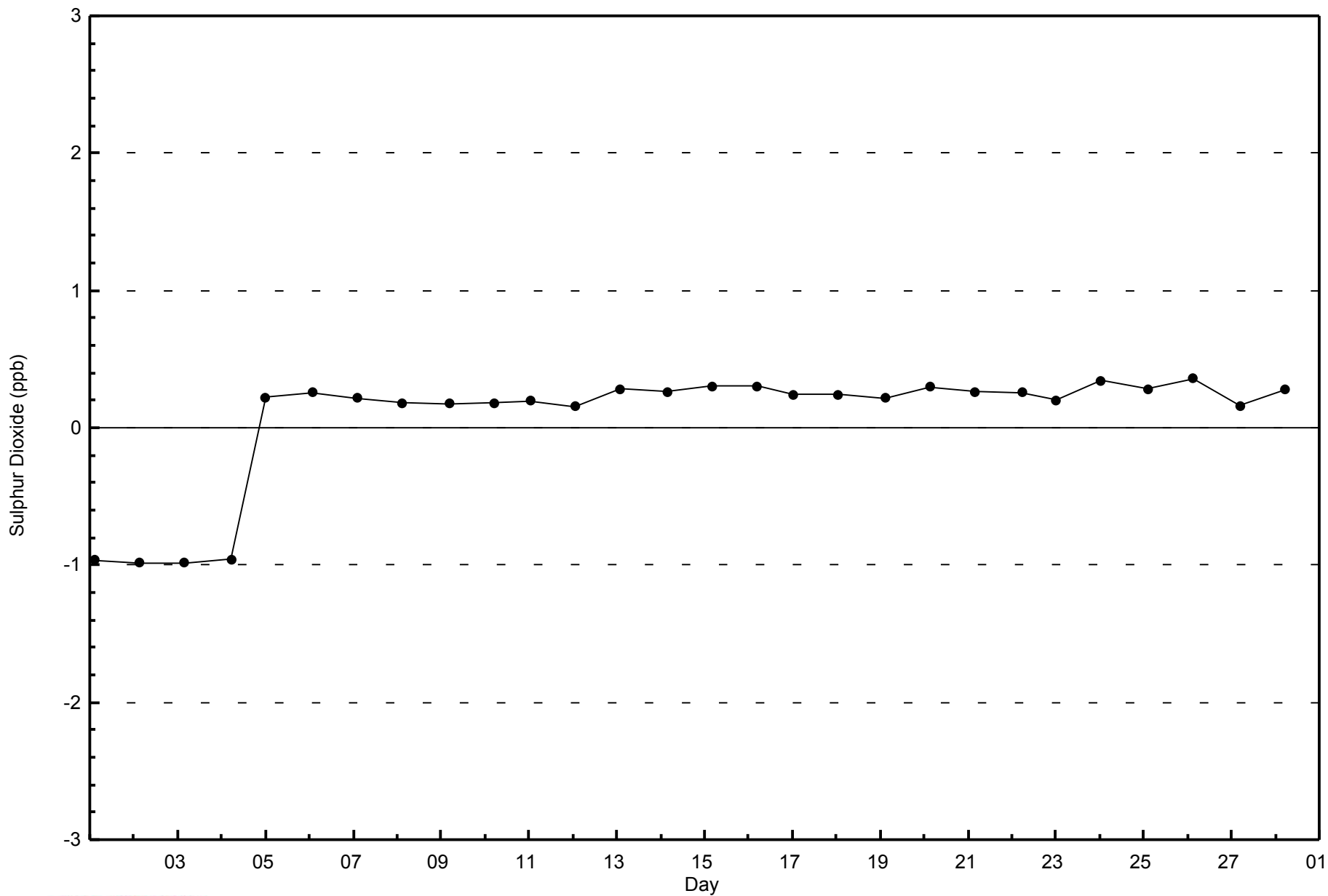


**Total Number of Valid Hours: 638**



WBEA  
Zero Responses

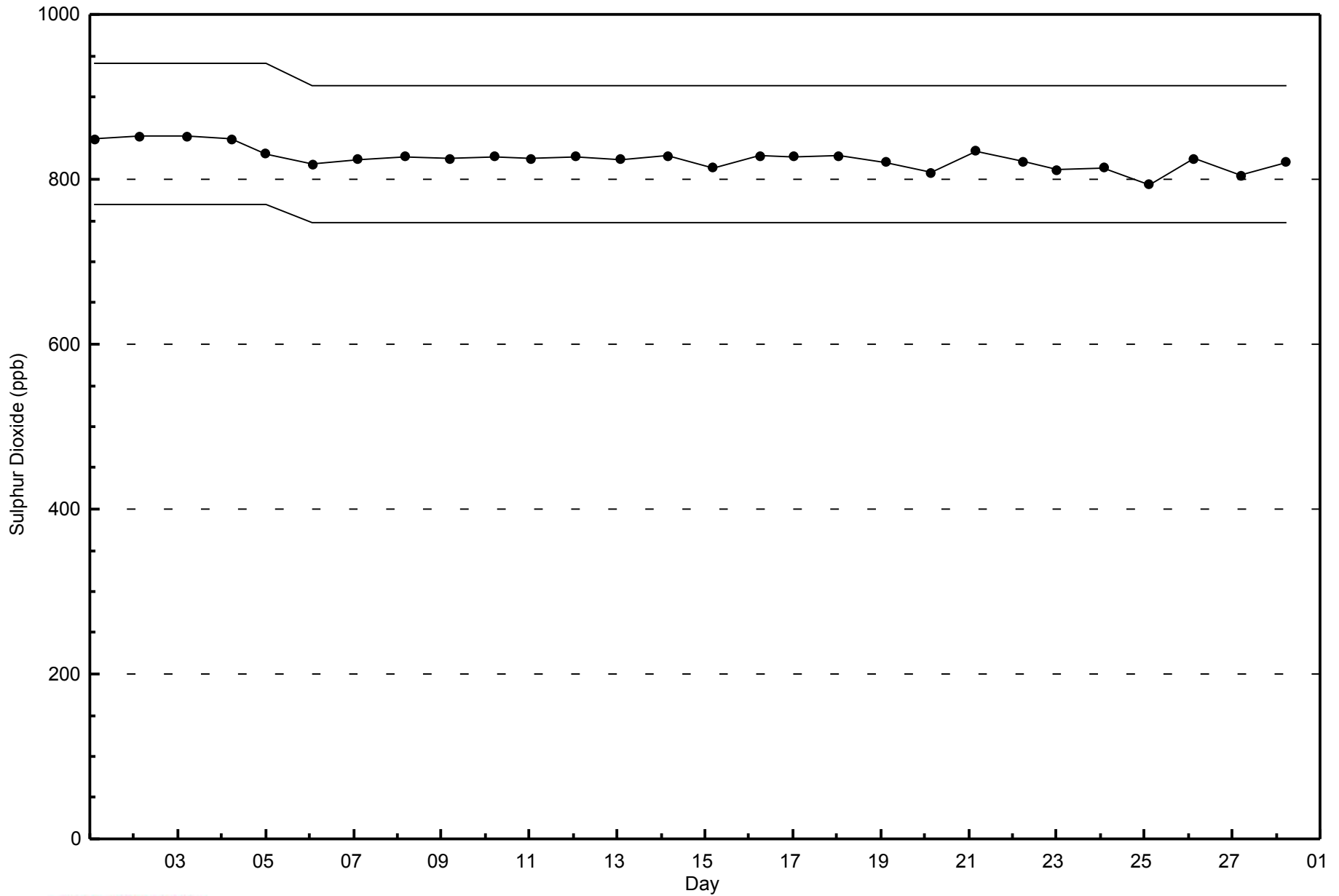
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Lower Camp - February 2015





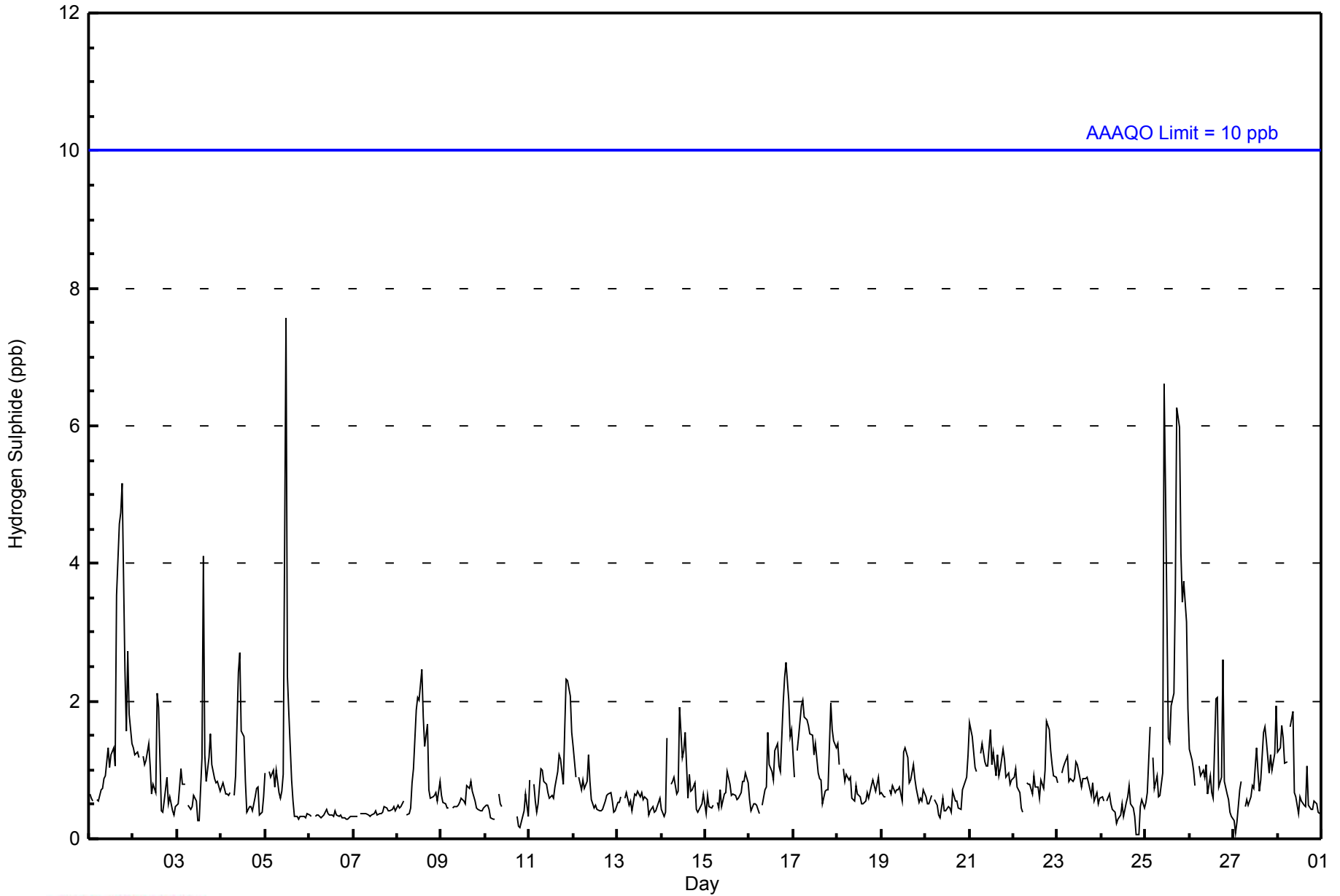
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 8 ppb on Feb 5 12:00										Maximum Daily Average: 2.6 ppb on Feb 25										Hours of Data: 637						
Minimum Value: 0 ppb on Feb 24 21:00										Minimum Daily Average: 0.3 ppb on Feb 6										Hours of Missing Data: 35						
Maximum Diurnal Average: 1.2 ppb at hour 12										Minimum Diurnal Average: 0.7 ppb at hour 2										Hours of Calibration: 35						
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> = 5										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	4	5	5	5	2	2	3	2	1	1.7	5	
2-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	2	2	0	0	1	1	1	1	0	0	0	0.9	2	
3-Feb	1	1	1	1	1	Z	0	0	0	1	1	0	0	1	4	1	1	1	2	1	1	1	1	0.9	4	
4-Feb	1	1	1	1	1	1	Z	1	1	2	3	2	1	1	0	0	0	0	1	1	1	0	0	0.9	3	
5-Feb	1	Z	1	1	1	1	1	1	1	1	1	8	2	2	1	1	0	0	0	0	0	0	0	1.1	8	
6-Feb	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	
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	
8-Feb	0	0	0	1	Z	0	0	0	1	1	2	2	2	2	2	1	2	1	1	1	1	1	1	1.0	2	
9-Feb	1	1	1	0	0	Z	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0.5	1	
10-Feb	0	0	0	0	0	0	Z	1	1	0	C	C	C	C	C	C	C	0	0	0	0	0	1	--	1	
11-Feb	1	Z	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1.0	2	
12-Feb	1	1	Z	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0.7	1	
13-Feb	1	1	1	Z	1	1	0	1	0	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0.5	1	
14-Feb	0	0	0	1	Z	1	1	1	1	1	2	1	1	2	1	1	1	1	1	0	0	0	1	0.8	2	
15-Feb	0	1	0	0	0	Z	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.6	1	
16-Feb	1	0	1	1	0	0	Z	0	1	1	2	1	1	1	1	1	1	1	2	2	3	2	1	1.1	3	
17-Feb	1	Z	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	2	1	1.3	2	
18-Feb	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
19-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
20-Feb	1	1	1	1	Z	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	1	1	1	0.6	1	
21-Feb	2	1	1	1	1	Z	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1.1	2	
22-Feb	1	1	1	1	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	0.9	2	
23-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1	
24-Feb	1	1	Z	1	1	1	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	1	0.4	1	
25-Feb	1	1	2	Z	1	1	1	1	1	1	7	5	1	1	2	2	4	6	6	4	3	4	3	2.6	7	
26-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	2	2	1	1	3	1	1	1	0	1.0	3	
27-Feb	0	0	0	1	1	Z	0	1	0	1	1	1	1	1	1	1	2	2	1	1	1	1	2	0.9	2	
28-Feb	1	1	2	1	1	1	Z	2	2	1	1	0	1	1	0	0	1	0	0	0	1	1	0	0.8	2	
	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.8	1.1	1.2	0.9	1.0	1.0	1.0	1.0	1.1	1.2	0.9	0.9	0.9	0.8	0.8	Diurnal Average	
	2	1	2	1	2	2	2	2	2	2	7	8	2	2	4	4	5	6	6	4	3	4	3	2	Diurnal Maximum	
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										





**WBEA**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - February 2015**





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	618	97.02	97.02
3 - 4	11	1.73	98.74
5 - 7	7	1.10	99.84
8 - 11	1	0.16	100.00
> 11	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Lower Camp - February 2015**

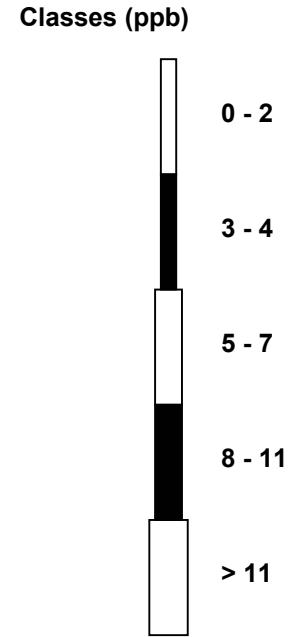
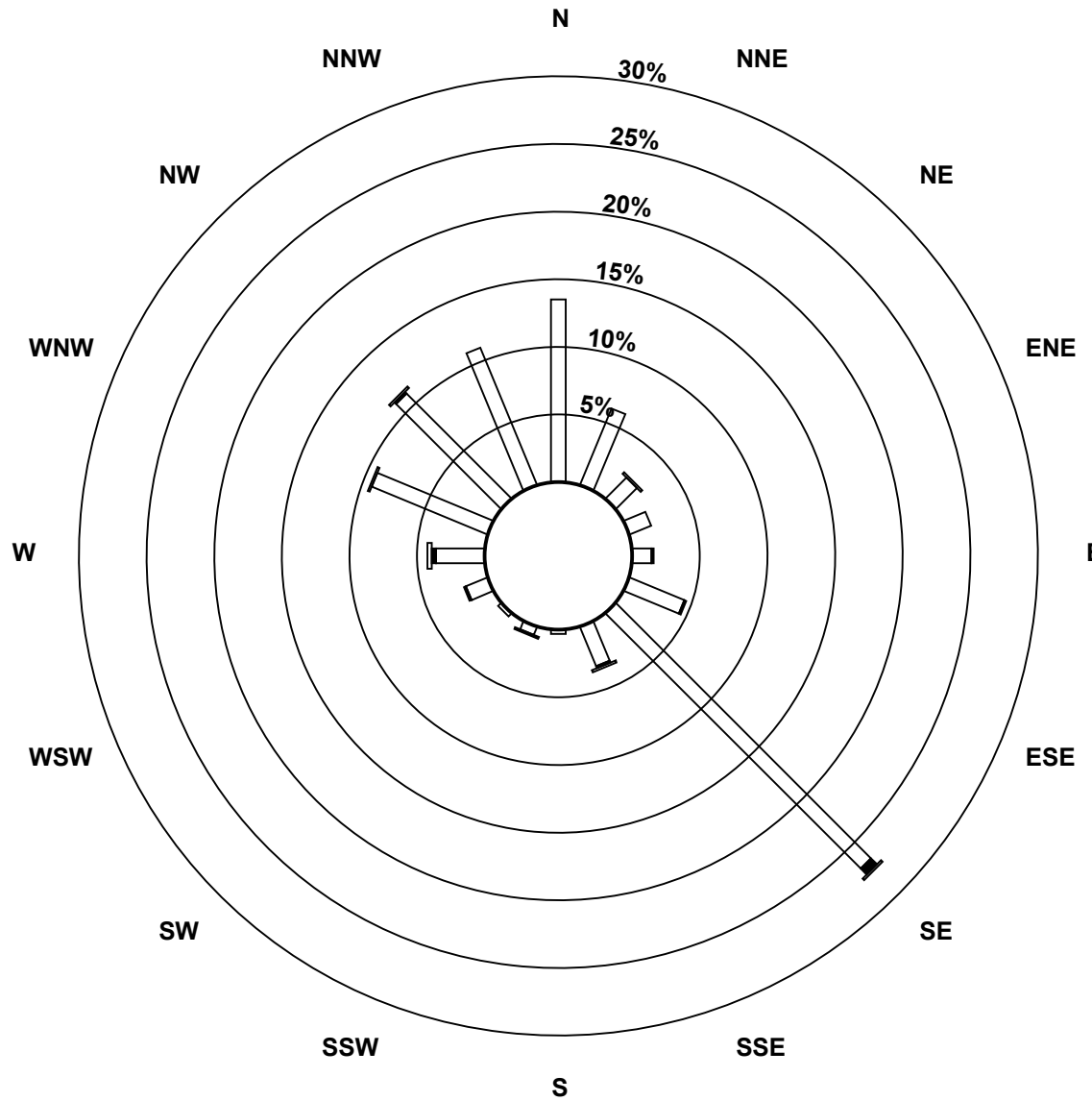
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	86	39	14	11	9	28	170	20	2	4	2	11	23	59	70	70	618
3 - 4	0	0	0	0	1	1	4	1	0	0	0	1	2	0	1	0	11
5 - 7	0	0	1	0	0	0	1	1	0	0	0	0	2	1	1	0	7
8 - 11	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	86	39	15	11	10	29	175	22	2	5	2	12	27	60	72	70	637

Total Number of Valid Hours: 637

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp (AMS 11)

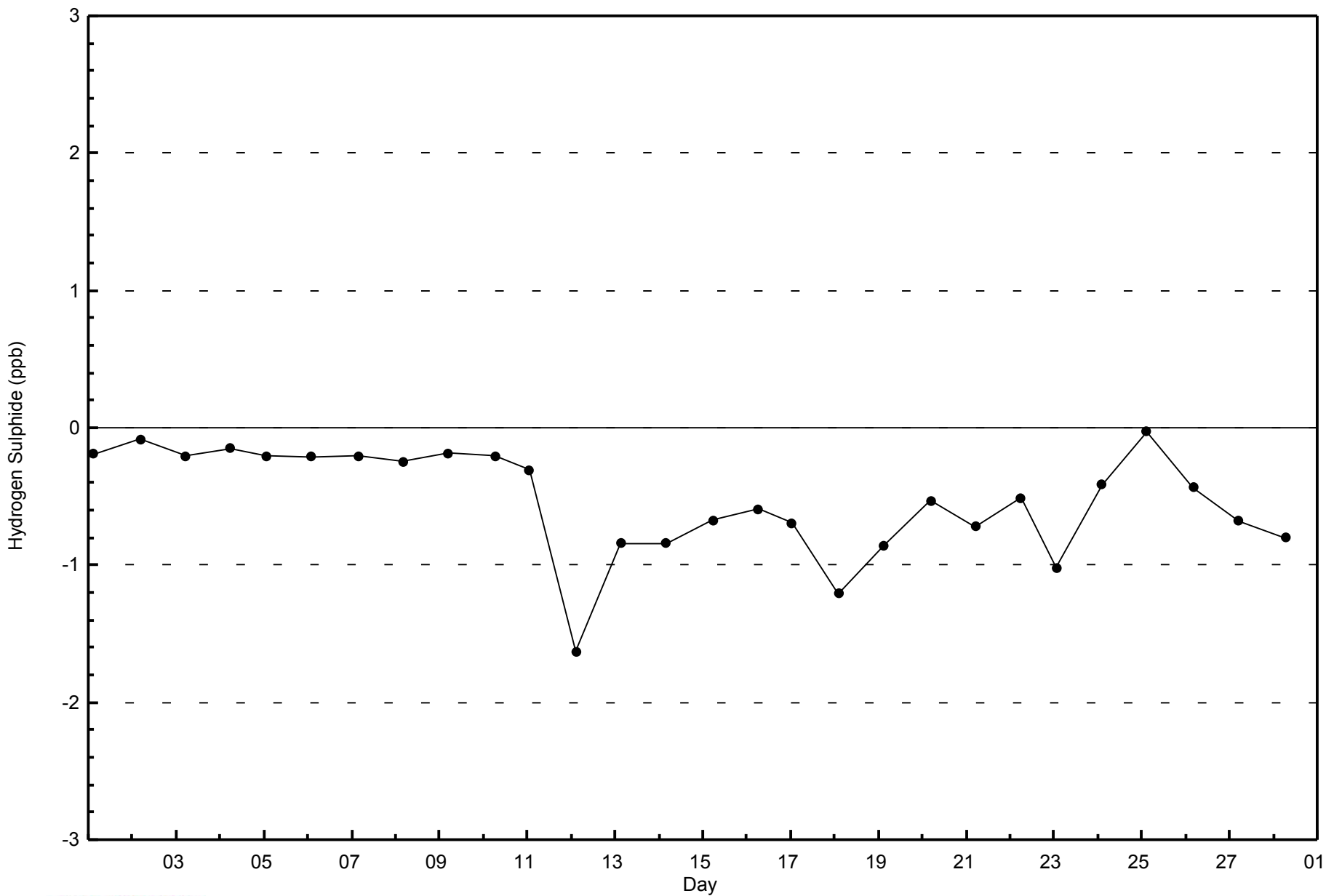


Total Number of Valid Hours: 637



WBEA  
Zero Responses

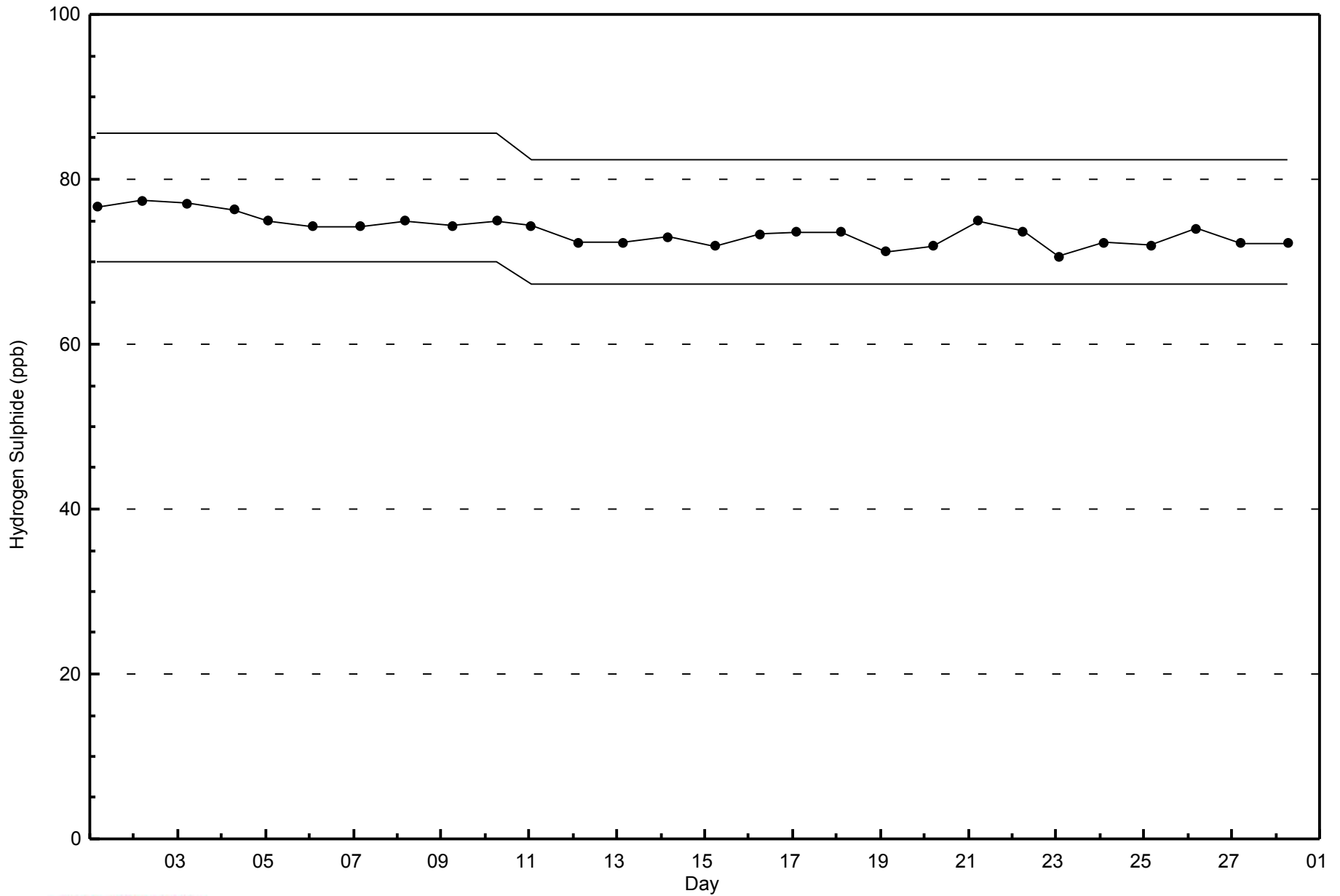
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - February 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Lower Camp - February 2015



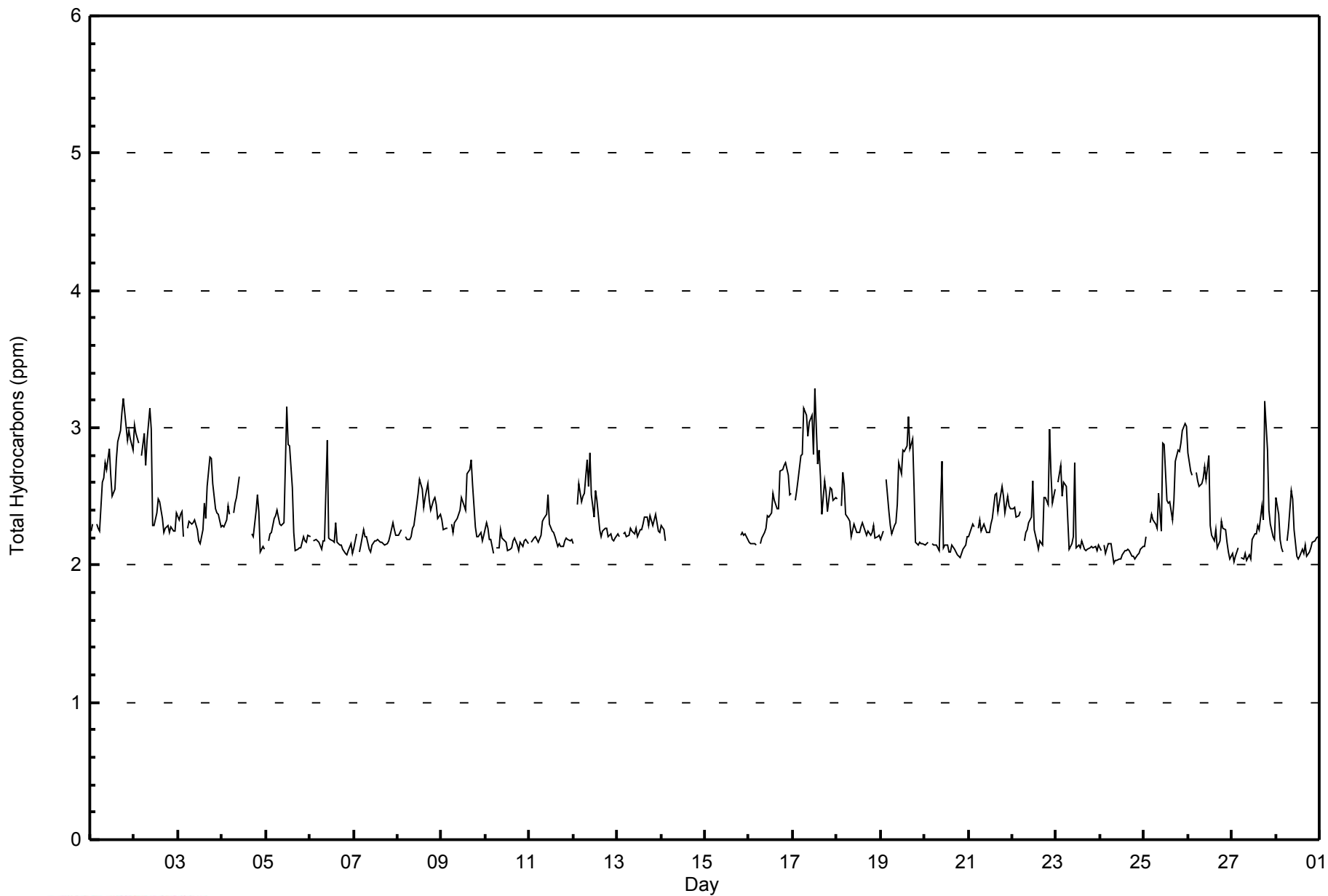


Maximum Value: 3.3 ppm on Feb 17 13:00		Maximum Daily Average: 2.7 ppm on Feb 17		Hours in Service: 672																						
Minimum Value: 2.0 ppm on Feb 24 08:00		Minimum Daily Average: 2.1 ppm on Feb 24		Hours of Data: 600																						
Maximum Diurnal Average: 2.4 ppm at hour 10		Minimum Diurnal Average: 2.3 ppm at hour 23		Hours of Missing Data: 72																						
Monthly Average: 2.35 ppm		Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.3 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.7 P <sub>99</sub> = 3.1		Hours of Calibration: 33																						
				Percent Operational Time: 94.2																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.2	2.3	Z	2.3	2.3	2.2	2.6	2.6	2.7	2.7	2.8	2.7	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.0	2.9	3.0	2.9	2.8	2.7	3.2
2-Feb	3.0	3.0	2.9	Z	2.8	3.0	2.7	2.9	3.1	3.0	2.3	2.3	2.4	2.5	2.5	2.3	2.2	2.3	2.3	2.2	2.3	2.2	2.2	2.4	2.6	3.1
3-Feb	2.3	2.4	2.4	2.2	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.5	2.3	2.6	2.8	2.8	2.6	2.4	2.4	2.4	2.3	2.4	2.8
4-Feb	2.3	2.3	2.3	2.4	2.4	Z	2.4	2.5	2.5	2.6	C	C	C	C	C	C	2.2	2.2	2.4	2.5	2.4	2.1	2.1	2.1	2.6	
5-Feb	Z	2.2	2.2	2.2	2.3	2.4	2.4	2.3	2.3	2.3	2.3	3.2	2.9	2.9	2.6	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.3	3.2
6-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.9	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	2.9
7-Feb	2.1	2.2	Z	2.1	2.1	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.2	2.2	2.3
8-Feb	2.2	2.2	2.3	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.6	2.6	2.4	2.5	2.6	2.5	2.4	2.5	2.5	2.4	2.3	2.4	2.4	2.6
9-Feb	2.3	2.3	2.3	2.3	Z	2.3	2.2	2.3	2.3	2.4	2.4	2.5	2.4	2.4	2.7	2.7	2.8	2.6	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.8
10-Feb	2.3	2.3	2.2	2.2	2.1	Z	2.1	2.1	2.3	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.3
11-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.4	2.5	2.3	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.5
12-Feb	2.2	Z	2.4	2.6	2.5	2.5	2.5	2.8	2.6	2.8	2.5	2.4	2.5	2.5	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.8
13-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.2	2.3	2.4
14-Feb	2.3	2.3	2.2	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	2.3
15-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
16-Feb	2.2	2.2	2.2	2.2	2.1	Z	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.5	2.5	2.4	2.4	2.7	2.7	2.7	2.7	2.5	2.5	2.5	2.4	2.7
17-Feb	Z	2.5	2.5	2.6	2.8	2.8	3.1	3.1	2.9	3.0	3.1	2.8	3.3	2.7	2.8	2.6	2.4	2.6	2.5	2.4	2.6	2.6	2.5	2.5	2.5	2.7
18-Feb	2.5	Z	2.4	2.7	2.6	2.4	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.7
19-Feb	2.2	2.3	Z	2.6	2.4	2.3	2.2	2.3	2.3	2.4	2.7	2.7	2.8	2.8	2.9	3.1	2.9	2.9	2.6	2.2	2.1	2.2	2.2	2.2	2.5	3.1
20-Feb	2.1	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.8	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.8
21-Feb	2.2	2.3	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.5	2.5	2.4	2.5	2.6	2.5	2.4	2.5	2.4	2.4	2.4	2.6
22-Feb	2.4	2.4	2.4	2.4	2.4	Z	2.2	2.2	2.3	2.3	2.4	2.6	2.3	2.2	2.1	2.2	2.1	2.5	2.5	2.4	3.0	2.7	2.5	2.6	2.4	3.0
23-Feb	Z	2.6	2.7	2.5	2.6	2.6	2.3	2.1	2.2	2.2	2.7	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.7
24-Feb	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2
25-Feb	2.1	2.2	Z	2.3	2.4	2.3	2.3	2.3	2.5	2.3	2.9	2.9	2.5	2.5	2.5	2.3	2.5	2.8	2.8	2.8	2.9	3.0	3.0	3.0	2.6	3.0
26-Feb	2.8	2.7	2.7	Z	2.7	2.6	2.6	2.6	2.6	2.7	2.6	2.8	2.3	2.2	2.2	2.3	2.1	2.2	2.3	2.3	2.3	2.2	2.1	2.0	2.4	2.8
27-Feb	2.1	2.0	2.1	2.1	Z	2.1	2.0	2.1	2.0	2.1	2.0	2.2	2.2	2.2	2.3	2.3	2.4	2.3	3.2	2.8	2.4	2.3	2.2	2.2	2.2	3.2
28-Feb	2.5	2.4	2.2	2.1	2.1	Z	2.2	2.3	2.5	2.5	2.3	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.5
																								Diurnal Average		
																								Diurnal Maximum		
2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.4 2.4 2.4 2.4 2.4 2.4 2.3 2.4 2.3 2.3 2.4 2.4 2.3 2.3 2.3 2.3 2.3 2.3 2.3																										
3.0 3.0 2.9 2.7 2.8 3.0 3.1 3.1 3.1 3.0 3.1 3.2 3.3 2.9 2.9 3.1 3.0 3.1 3.2 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0																										
Z - zerospan                      C - Calibration                      AF - Analyzer Failure																										



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - February 2015**







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

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	12	2.00	2.00
2.1 - 3.0	578	96.33	98.33
3.1 - 10.0	10	1.67	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 600

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Lower Camp - February 2015**

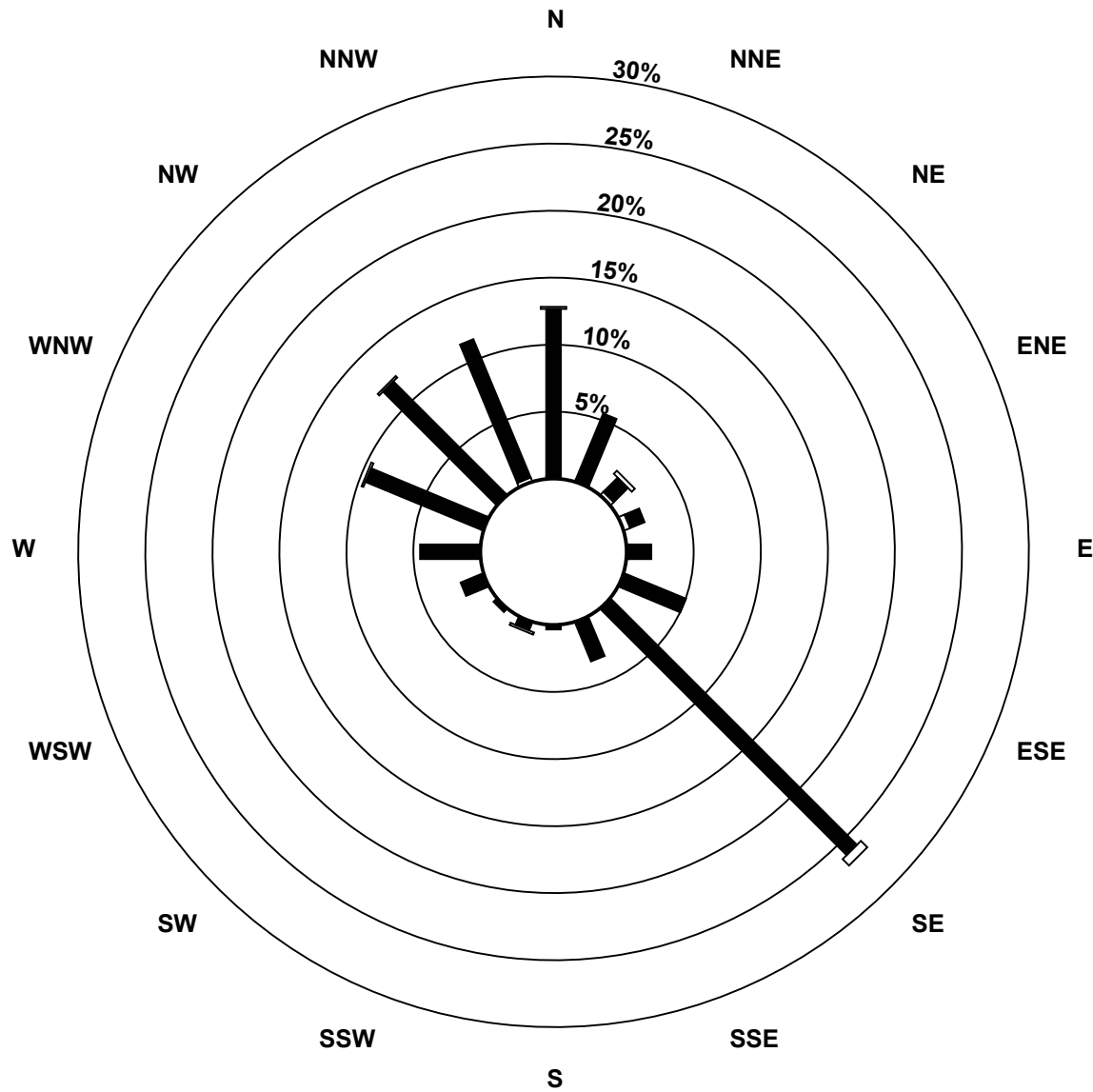
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	1	2	3	1	0	0	0	0	0	0	0	0	1	1	2	12
2.1 - 3.0	75	32	9	7	10	30	156	19	2	4	2	11	27	56	71	67	578
3.1 - 10.0	1	0	2	0	0	0	4	0	0	1	0	0	0	1	1	0	10
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	77	33	13	10	11	30	160	19	2	5	2	11	27	58	73	69	600

Total Number of Valid Hours: 600

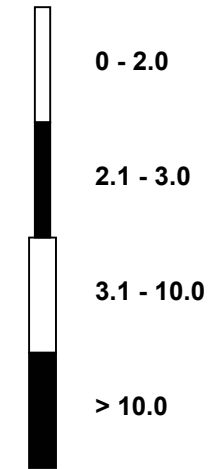
Total Number of Hours: 672

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

**Total Hydrocarbons (THC) - ppm  
Lower Camp (AMS 11)**



**Classes (ppm)**

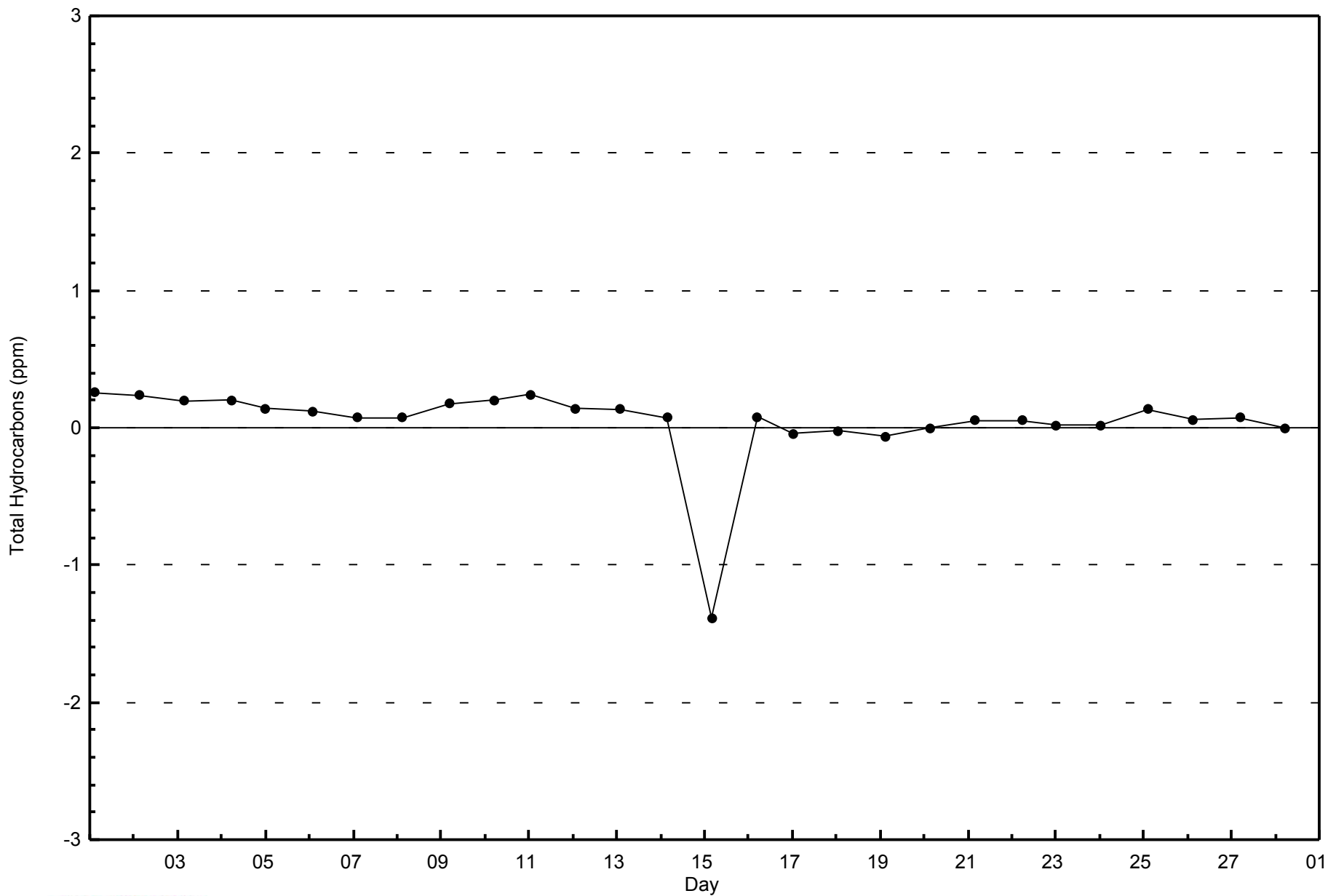


**Total Number of Valid Hours: 600**



WBEA  
Zero Responses

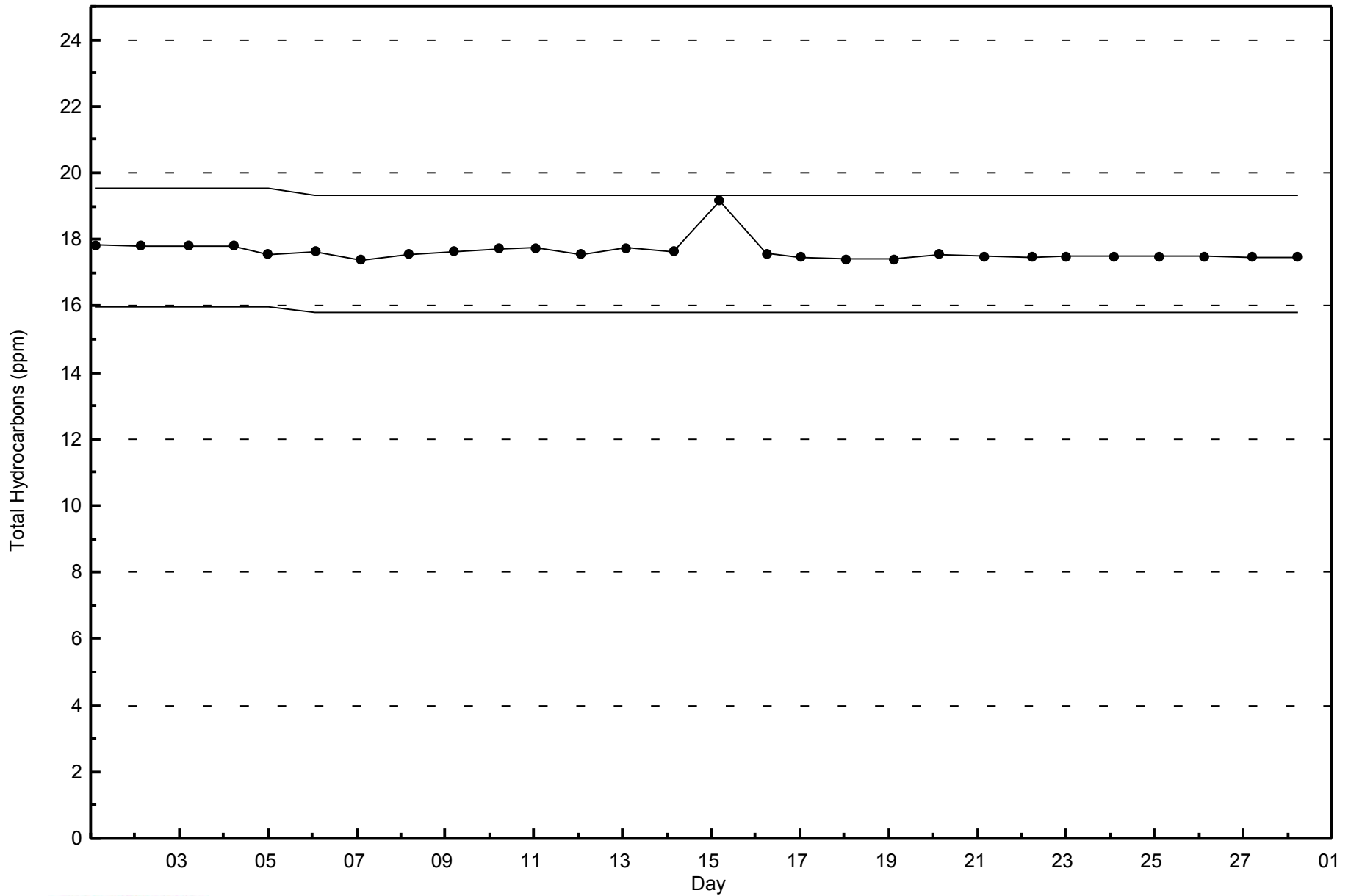
Total Hydrocarbons (THC) - ppm  
Lower Camp - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Lower Camp - February 2015



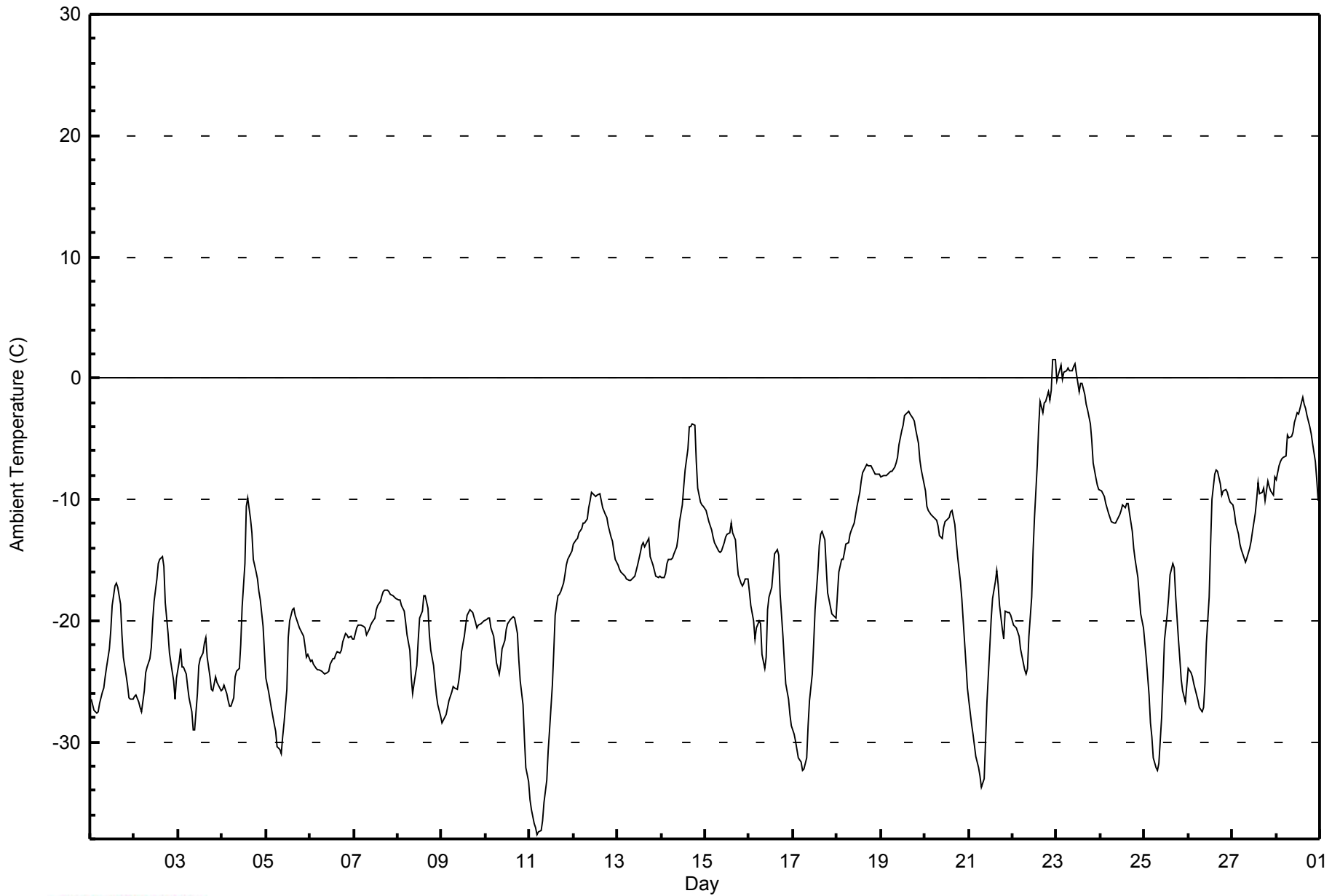


Maximum Value: 1.6 C on Feb 22 23:00		Maximum Daily Average: -1.8 C on Feb 23		Hours in Service: 672																						
Minimum Value: -37.6 C on Feb 11 05:00		Minimum Daily Average: -26.4 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.6 C at hour 16		Minimum Diurnal Average: -20.8 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -17.34 C		Percentiles: P <sub>1</sub> = -35.1 P <sub>10</sub> = -27.0 Q <sub>1</sub> = -23.6 Median = -18.0 Q <sub>3</sub> = -11.4 P <sub>90</sub> = -6.9 P <sub>99</sub> = 0.6		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-Feb	-26.5	-26.9	-27.4	-27.7	-27.5	-26.8	-25.9	-25.5	-24.6	-23.8	-22.4	-20.8	-18.7	-17.1	-16.9	-17.2	-18.7	-21.2	-23.0	-24.5	-25.3	-26.3	-26.5	-26.5	-23.7	-16.9
2-Feb	-26.3	-26.2	-26.7	-27.2	-27.5	-25.8	-24.3	-23.8	-23.1	-22.2	-20.0	-18.5	-16.6	-15.3	-15.0	-14.8	-15.5	-18.5	-21.1	-22.7	-23.5	-25.0	-26.5	-24.8	-22.1	-14.8
3-Feb	-23.4	-22.3	-23.9	-23.8	-24.4	-25.5	-26.3	-27.6	-29.0	-29.0	-26.1	-23.7	-23.1	-22.7	-21.8	-21.4	-23.0	-24.6	-25.7	-25.7	-24.6	-25.1	-25.4	-25.8	-24.7	-21.4
4-Feb	-25.6	-25.3	-26.0	-26.6	-27.0	-26.4	-24.6	-24.2	-23.9	-22.0	-18.8	-15.3	-10.5	-9.9	-11.6	-12.7	-15.0	-15.9	-16.6	-17.6	-18.3	-20.4	-22.7	-20.2	-9.9	
5-Feb	-24.7	-25.9	-26.6	-27.3	-28.0	-29.1	-30.4	-30.7	-30.9	-29.6	-28.4	-25.7	-21.4	-20.0	-19.1	-19.0	-19.6	-20.2	-20.6	-20.9	-21.3	-22.1	-23.0	-22.8	-24.5	-19.0
6-Feb	-23.3	-23.2	-23.5	-23.9	-24.1	-24.1	-24.1	-24.3	-24.4	-24.3	-24.2	-23.6	-23.2	-23.1	-22.8	-22.5	-22.6	-22.4	-21.8	-21.1	-21.2	-21.4	-21.3	-21.5	-23.0	-21.1
7-Feb	-21.5	-20.6	-20.4	-20.4	-20.4	-20.5	-20.7	-21.2	-20.7	-20.4	-20.2	-19.8	-19.0	-18.8	-18.5	-18.0	-17.6	-17.5	-17.5	-17.6	-17.9	-18.0	-18.1	-18.2	-19.3	-17.5
8-Feb	-18.3	-18.3	-18.7	-19.2	-20.1	-21.2	-22.5	-24.6	-26.0	-25.2	-23.7	-21.7	-19.8	-19.3	-18.0	-17.9	-18.9	-21.2	-22.4	-23.7	-25.0	-26.1	-26.9	-27.9	-21.9	-17.9
9-Feb	-28.5	-28.2	-27.8	-27.2	-26.5	-25.9	-25.4	-25.6	-25.6	-25.0	-24.0	-22.6	-21.3	-20.3	-19.6	-19.1	-19.2	-19.4	-20.2	-20.6	-20.3	-20.2	-20.2	-20.0	-23.0	-19.1
10-Feb	-19.9	-19.8	-19.8	-20.6	-21.3	-22.4	-23.5	-24.4	-23.6	-22.3	-21.7	-20.7	-20.2	-19.9	-19.8	-19.7	-19.8	-21.1	-23.2	-25.0	-26.9	-29.7	-32.1	-33.3	-22.9	-19.7
11-Feb	-34.7	-35.6	-36.7	-37.1	-37.6	-37.4	-37.3	-36.5	-35.0	-33.2	-30.7	-29.0	-25.3	-22.6	-19.5	-18.0	-17.8	-17.6	-17.0	-16.2	-15.5	-14.9	-14.5	-14.2	-26.4	-14.2
12-Feb	-13.7	-13.4	-13.3	-12.8	-12.5	-12.0	-12.0	-11.6	-10.7	-10.1	-9.4	-9.6	-9.8	-9.7	-9.6	-10.1	-10.7	-11.3	-11.5	-12.2	-13.1	-13.5	-14.3	-15.0	-11.7	-9.4
13-Feb	-15.4	-15.7	-15.9	-16.2	-16.3	-16.5	-16.6	-16.7	-16.6	-16.3	-15.8	-15.4	-14.3	-13.8	-13.6	-14.0	-13.5	-13.3	-14.7	-15.4	-15.9	-16.4	-16.4	-16.3	-15.5	-13.3
14-Feb	-16.4	-16.5	-16.1	-15.3	-15.0	-14.9	-14.8	-14.4	-14.0	-13.1	-11.8	-10.4	-9.0	-7.6	-5.8	-4.0	-4.0	-3.7	-3.9	-6.9	-9.1	-10.3	-10.4	-10.6	-10.8	-3.7
15-Feb	-10.9	-11.4	-11.9	-12.6	-13.1	-13.5	-14.0	-14.2	-14.4	-14.2	-13.6	-13.1	-12.8	-12.7	-12.0	-12.8	-13.3	-14.9	-16.3	-16.9	-17.2	-16.9	-16.5	-16.6	-14.0	-10.9
16-Feb	-17.5	-18.8	-20.1	-21.5	-20.6	-20.0	-20.2	-22.8	-24.0	-23.1	-19.1	-18.1	-17.3	-15.9	-14.5	-14.1	-14.6	-17.8	-21.3	-23.4	-25.3	-26.4	-27.7	-28.6	-20.5	-14.1
17-Feb	-29.4	-30.0	-30.7	-31.3	-31.7	-32.4	-32.3	-31.3	-28.6	-26.6	-24.4	-21.8	-19.2	-15.8	-13.8	-12.8	-12.6	-13.4	-15.6	-17.7	-18.9	-19.4	-19.5	-19.8	-22.9	-12.6
18-Feb	-17.9	-16.0	-14.9	-14.9	-14.3	-13.7	-13.6	-12.9	-12.5	-12.0	-11.2	-10.6	-9.4	-8.5	-7.8	-7.3	-7.1	-7.2	-7.3	-7.4	-7.6	-7.9	-7.9	-8.0	-10.7	-7.1
19-Feb	-8.1	-8.1	-8.0	-8.0	-7.8	-7.7	-7.7	-7.4	-7.0	-6.5	-5.6	-4.3	-3.8	-3.1	-2.8	-2.8	-3.0	-3.3	-3.5	-4.2	-5.4	-6.7	-7.6	-8.2	-5.8	-2.8
20-Feb	-9.3	-10.6	-11.0	-11.2	-11.3	-11.5	-11.7	-12.2	-13.0	-13.2	-12.3	-11.8	-11.7	-11.5	-11.0	-10.9	-12.1	-13.5	-14.8	-16.8	-18.1	-20.0	-23.6	-25.6	-13.7	-9.3
21-Feb	-26.5	-28.6	-29.3	-30.3	-31.2	-32.1	-32.8	-33.7	-33.1	-30.0	-26.7	-22.2	-19.9	-18.2	-16.8	-15.8	-17.0	-18.7	-20.7	-21.5	-19.3	-19.3	-19.3	-19.5	-24.3	-15.8
22-Feb	-20.3	-20.5	-20.6	-21.3	-22.3	-23.0	-24.1	-24.4	-23.9	-21.2	-18.1	-14.3	-11.5	-7.1	-4.0	-1.9	-2.8	-2.1	-1.9	-1.1	-1.9	-1.0	1.6	1.5	-11.9	1.6
23-Feb	-0.1	0.2	1.0	-0.1	0.5	0.6	0.9	0.6	0.6	1.0	1.2	0.4	-1.1	-0.4	-0.4	-1.3	-2.1	-2.7	-3.8	-5.1	-7.0	-8.3	-8.9	-9.2	-1.8	1.2
24-Feb	-9.3	-9.5	-9.8	-10.3	-11.1	-11.5	-11.8	-11.9	-11.7	-11.3	-10.9	-10.4	-10.6	-10.4	-10.4	-11.1	-12.6	-14.0	-15.0	-16.5	-17.9	-19.5	-20.6	-20.6	-12.5	-9.3
25-Feb	-21.9	-23.2	-26.1	-28.4	-29.5	-31.3	-32.1	-32.4	-31.8	-28.0	-24.9	-21.6	-19.4	-18.0	-16.2	-15.3	-15.6	-17.9	-21.5	-23.1	-24.9	-25.8	-26.7	-25.4	-24.2	-15.3
26-Feb	-23.9	-24.3	-24.6	-25.2	-26.1	-26.6	-27.1	-27.5	-27.2	-25.2	-21.9	-18.1	-13.8	-10.0	-7.9	-7.6	-7.7	-8.8	-9.7	-9.3	-9.2	-9.4	-9.9	-10.2	-17.1	-7.6
27-Feb	-10.5	-11.0	-12.0	-12.9	-13.7	-14.2	-14.8	-15.2	-14.9	-14.0	-13.4	-12.6	-11.1	-10.0	-8.6	-9.5	-9.4	-9.1	-10.1	-8.5	-8.9	-9.3	-9.6	-8.2	-11.3	-8.2
28-Feb	-8.3	-7.3	-6.8	-6.7	-6.6	-6.4	-4.7	-5.0	-4.8	-4.4	-3.7	-2.8	-2.9	-2.5	-1.6	-2.2	-2.5	-3.1	-4.1	-4.6	-5.3	-6.9	-8.3	-10.1	-5.1	-1.6
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Lower Camp - February 2015**





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

**Ambient Temperature (AT) - C**  
**Lower Camp - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	276	41.07	41.07
-20 - 0	384	57.14	98.21
0 - 10	12	1.79	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



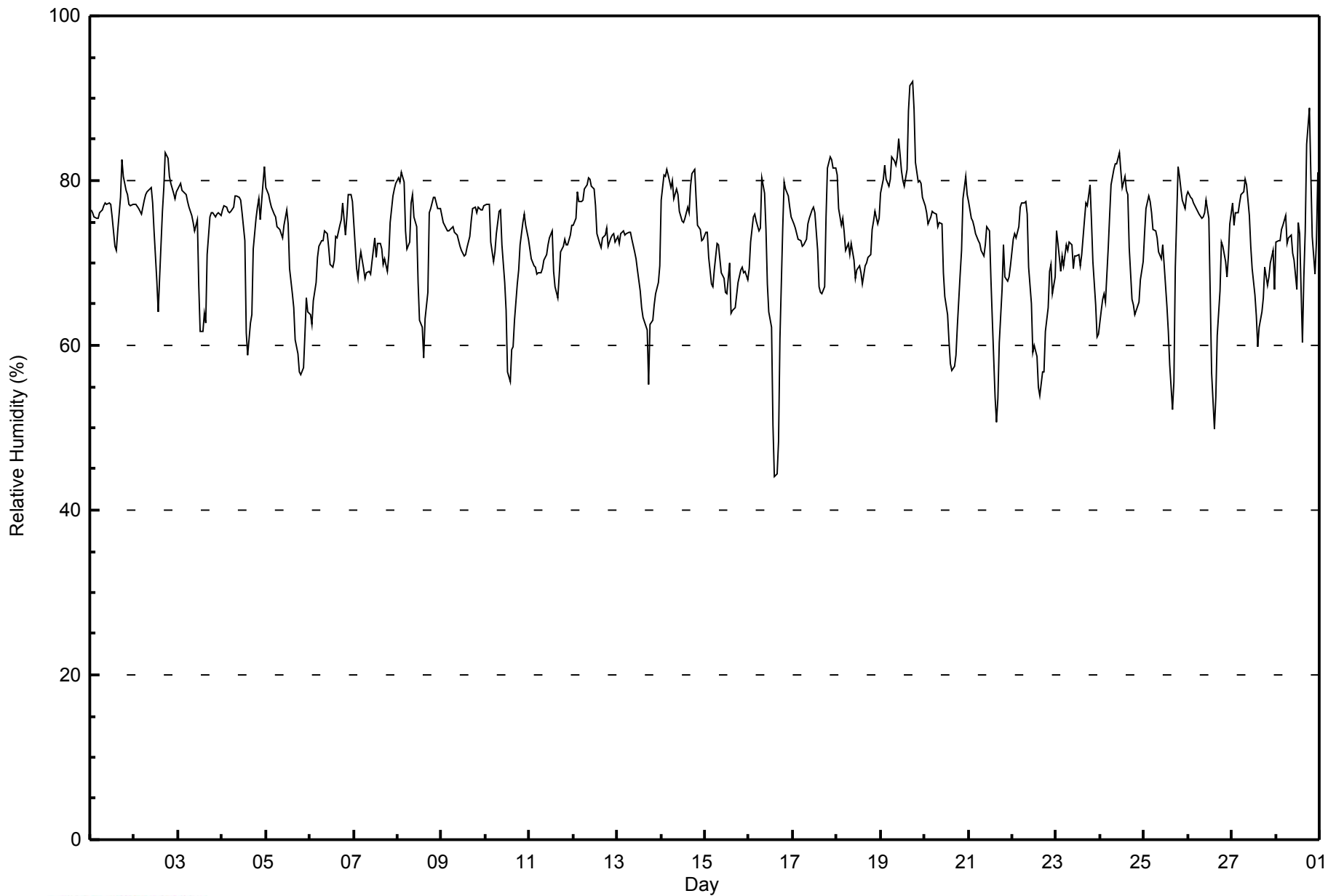


Maximum Value: 92 % on Feb 19 18:00																		Maximum Daily Average: 82.4 % on Feb 19						Hours in Service: 672		
Minimum Value: 44 % on Feb 16 15:00																		Minimum Daily Average: 67.2 % on Feb 22						Hours of Data: 672		
Maximum Diurnal Average: 75.4 % at hour 8																		Minimum Diurnal Average: 64.7 % at hour 15						Hours of Missing Data: 0		
Monthly Average: 72.5 %																		Percentiles: P <sub>1</sub> = 53 P <sub>10</sub> = 64 Q <sub>1</sub> = 69 Median = 74 Q <sub>3</sub> = 77 P <sub>90</sub> = 80 P <sub>99</sub> = 84						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-Feb	76	76	76	75	75	76	77	77	77	77	77	76	72	72	74	78	83	80	79	78	77	77	77	77	76.6	83
2-Feb	77	77	77	76	76	78	78	79	79	79	77	74	68	64	68	76	79	83	83	80	80	78	78	79	76.8	83
3-Feb	79	80	79	79	78	77	77	76	75	74	75	67	62	62	64	63	71	76	76	76	76	76	76	76	73.7	80
4-Feb	76	77	77	76	76	76	77	78	78	78	78	76	73	62	59	63	64	72	75	77	78	75	80	82	74.2	82
5-Feb	79	78	77	77	76	76	74	74	73	73	75	76	75	69	66	65	61	59	57	56	57	61	66	64	69.4	79
6-Feb	64	63	65	68	71	72	73	73	74	74	72	70	69	70	73	73	75	75	77	73	76	78	78	77	72.2	78
7-Feb	75	69	68	70	71	69	68	69	69	69	70	73	71	72	72	70	71	69	71	75	78	79	80	71.7	80	
8-Feb	80	80	81	80	74	72	73	77	78	76	74	68	63	62	59	63	66	76	77	78	78	77	77	77	73.5	81
9-Feb	76	75	74	74	74	74	74	74	73	73	72	72	71	71	72	73	75	77	77	76	77	76	76	77	74.3	77
10-Feb	77	77	77	73	70	71	74	76	76	72	68	64	57	56	60	60	63	67	69	72	75	76	75	73	69.9	77
11-Feb	72	71	70	69	69	69	69	69	70	71	72	73	74	69	67	66	68	71	72	73	72	72	73	75	70.7	75
12-Feb	75	75	79	78	77	78	79	79	80	80	79	79	77	74	72	72	73	73	74	72	73	73	74	73	75.8	80
13-Feb	73	72	74	74	73	74	74	74	73	71	71	69	67	65	63	63	62	55	63	63	65	66	68	70	68.3	74
14-Feb	78	81	80	81	81	79	80	78	79	78	76	75	75	77	76	79	81	81	78	75	74	73	73	73	77.6	81
15-Feb	74	74	71	67	67	69	72	72	70	69	68	66	66	70	64	64	65	66	68	69	69	69	69	68	68.6	74
16-Feb	69	73	76	76	75	74	74	80	79	74	68	64	62	50	44	44	48	61	74	80	79	78	77	76	69.0	80
17-Feb	75	74	74	73	73	72	72	73	75	75	77	77	76	72	67	67	66	67	76	82	83	83	82	82	74.6	83
18-Feb	81	77	75	75	74	72	72	71	72	70	68	69	70	69	68	70	70	71	71	74	75	76	75	75	72.5	81
19-Feb	78	80	82	80	79	80	83	82	82	83	85	81	80	79	81	88	92	92	89	82	80	80	80	78	82.4	92
20-Feb	77	76	75	76	76	76	76	74	75	75	69	66	64	61	58	57	57	59	62	69	72	78	80	78	70.2	80
21-Feb	78	75	75	74	74	73	72	72	71	72	74	74	68	63	54	51	54	60	67	72	68	68	68	70	68.6	78
22-Feb	73	73	73	74	77	77	77	78	76	70	65	59	60	59	55	54	57	57	62	65	69	70	66	68	67.2	78
23-Feb	74	72	69	71	70	72	72	73	72	69	71	71	70	71	75	77	77	80	75	70	65	61	61	71.2	80	
24-Feb	64	66	66	65	72	76	80	81	82	82	83	81	79	81	79	78	72	66	65	64	65	65	68	70	72.9	83
25-Feb	74	77	78	78	76	74	74	73	71	71	72	70	65	62	58	52	56	70	82	80	79	78	77	78	71.7	82
26-Feb	79	78	78	77	77	76	76	75	76	76	78	75	66	57	50	54	61	67	73	72	70	68	71	75	71.0	79
27-Feb	77	75	76	76	77	78	79	80	79	76	72	69	66	64	60	62	64	66	69	67	68	70	72	67	71.3	80
28-Feb	73	73	73	74	75	76	72	73	73	71	70	67	75	73	60	68	74	84	89	81	73	69	73	81	73.7	89
75.1 74.8 74.7 74.5 74.4 74.5 74.9 75.4 75.4 74.2 73.4 71.5 69.4 66.8 64.7 65.8 67.7 70.7 73.4 73.5 73.3 73.4 73.8 74.2																		Diurnal Average								
81 81 82 81 81 80 83 82 82 83 85 81 80 81 81 88 92 92 89 82 83 83 83 82 82																		Diurnal Maximum								



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Lower Camp - February 2015**





Maximum Speed: 32 km/h on Feb 14 02:00		Maximum Daily Speed Average: 15.7 km/h on Feb 14		Hours in Service: 672																						
Minimum Speed Value: 0 km/h on Feb 21 12:00		Minimum Daily Speed Average: 1.4 km/h on Feb 27		Hours of Data: 672																						
Maximum Diurnal Speed Average: 3.2 km/h at hour 4		Minimum Diurnal Speed Average: 1.3 km/h at hour 14		Hours of Missing Data: 0																						
Monthly Average Velocity: 2.1 km/h 73.3 deg		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 2 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 12 P <sub>90</sub> = 17 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-Feb	SE12	SE12	SE14	SE15	SE14	SE13	SE8	SE8	SE10	SE6	NNW1	NNW3	W5	W8	WNW6	W4	W2	NE0	NW2	NNW0	ESE2	E2	SE5	SE7	SE4.4	SE15
2-Feb	SE8	SE9	SE7	SE8	SE7	SE9	SE8	SE8	SE10	SSW4	WSW6	W2	SSW0	SW3	WSW4	NW2	NNE2	NNW1	NNW1	ENE1	ESE1	NNE3	NNW4	NNE3	SE2.5	SE10
3-Feb	N3	WNW5	WNW5	W4	WNW4	WNW5	WNW4	WNW4	WNW3	NNW3	NW6	NNW9	N8	WNW3	WSW3	SE5	SE7	SE6	SE9	SE12	ESE14	SE15	SE15	SE15	ESE1.6	SE15
4-Feb	SE18	SE14	SE14	SE20	SE17	SE21	ESE20	SE22	SE10	W2	SE4	SE7	SSE3	NW10	NNW10	N12	NNW7	WNW6	NW6	NNW5	N8	NNW6	NW3	NW2	ESE4.3	SE22
5-Feb	NW3	N2	WNW2	N2	NW3	WNW4	WNW3	N1	E1	WNW1	NW1	SSW1	SSW1	SE3	ENE1	NNE7	NE9	NNE7	NNE6	NE5	NNE6	NNE6	NNW3	WNW4	N2.3	NE9
6-Feb	N8	N9	NNE12	NNE11	NNE9	NNE10	N12	NNE12	N13	N12	NNE13	NNE13	N14	N11	N14	N12	N12	N9	NNW4	E10	E9	ENE7	E8	ENE6	NNE9.1	N14
7-Feb	E7	ESE16	ESE23	ESE20	ESE23	ESE22	SE24	SE25	SE26	SE28	SE23	ESE23	ESE19	ESE18	ESE17	ESE14	SE12	SE11	SE8	SSE4	NNE4	NNW4	NNW5	NW4	ESE14.4	SE28
8-Feb	NNW4	NW4	NW4	NNW6	NNE11	N8	NNW5	WNW4	NNW2	NW2	W3	SSE1	S1	NNW1	W1	NNW3	WNW4	WNW5	W5	NW5	NW4	NNW6	NW5	NW4	NW3.6	NNE11
9-Feb	NNW4	NNW5	NW5	NNW6	NNW6	NW7	NW6	NW10	NW8	WNW7	NW6	NW6	NW8	NW9	NNW8	NW8	NW10	NW9	NW10	NW9	NW8	NW9	NW8	NW8	NW7.3	NW10
10-Feb	NW9	NW8	NNW9	N15	N16	N10	NW6	WNW4	NW3	NW5	NW10	NNW8	NNW12	NNW10	NNW9	N10	N9	N12	N9	NNW6	WNW4	NW5	NW3	NW4	NNW7.5	N16
11-Feb	NW3	NNW2	NW2	N0	NNW1	NNE1	NW2	ESE1	SE9	SE11	SE10	SE10	SE9	SE10	SE15	SE17	SE23	SE24	SE23	SE21	SE20	SSE19	SSE17	SSE12	SE9.9	SE24
12-Feb	SSE11	SSE10	SE10	SE8	SE8	SE7	SE8	SE5	ESE3	SSE1	NNW6	NNW10	NNW10	N9	N10	N13	N12	N11	N11	N12	NNE12	NNE11	N13	N13	NNE4.3	N13
13-Feb	NNE13	N11	N13	N12	N13	NNE12	N11	N12	NNE11	NNE12	N13	N13	N10	NNW10	NNW8	NNW7	ESE3	ESE22	SE23	SE28	SE30	SE31	SE30	SE29	ENE7.4	SE31
14-Feb	SE30	SE32	SE31	SE31	SE29	SE30	SE31	SE28	SE25	SE25	SE21	SE21	SE22	SE16	SE14	SE14	SE15	SE9	N13	N18	NNE17	N9	NNW8	N8	SE15.7	SE32
15-Feb	NNE6	NE7	NE7	NNE5	NNE9	NNE9	NNE9	N9	N10	N8	NNW1	N11	N10	NNW9	NNW9	NNE13	NNE13	NNE10	NW6	NW5	NW5	WNW6	NNW7	N7	N7.5	NNE13
16-Feb	NNW9	NNW5	NW5	WNW5	WNW6	WNW6	WNW5	NW1	NW2	WNW3	W5	WSW7	WSW10	WSW7	W2	SE0	SE5	SE2	WNW2	NW4	NW3	NNW1	E1	ENE0	WNW2.9	WSW10
17-Feb	ENE1	E1	NNW1	N1	NW1	NE1	NE2	N2	SE6	SE10	SE8	SE11	SE12	SE11	SE10	SE8	SE8	SE3	N1	NNW1	WNW3	W2	WNW2	W1	SE3.1	SE12
18-Feb	SSW1	SSE2	SE5	SE6	SE4	SE7	SE10	SE7	SE15	ESE14	SE14	ESE14	SE12	ESE14	SE9	SE9	SE7	SE10	SE9	SE11	SE10	SE11	SSE9	SSE8	SE8.9	SE15
19-Feb	SE8	SE7	SSE7	SSE6	SSE10	SSE9	SE12	SE10	SE9	SE8	SE8	SE7	NE2	W5	W6	WNW8	NW9	NW8	NNW9	N15	N13	N16	N18	N18	NE1.8	N18
20-Feb	N16	N17	N16	N16	N15	N13	NNW13	N14	N11	NNE10	N12	N9	N12	N12	N12	NNW9	NNE10	NNE6	NNW6	WNW6	WNW7	WNW5	WNW3	NW2	N9.9	N17
21-Feb	NW3	NW3	WNW4	WNW3	WNW3	NW2	NW3	NW1	NW3	WNW3	NW3	ENE0	SE7	SE8	SE12	SE12	SE10	SE9	SE6	SE12	SE14	SE16	ESE11	E8	SE3.7	SE16
22-Feb	SE13	SE14	ESE15	SE19	SE21	SE17	SE19	SE21	SE17	SE11	SE11	SE13	SE17	SE18	SE17	SE15	SE15	SE11	SE11	SE12	SE9	W5	WNW14	NW12	SE12.0	SE21
23-Feb	NNW7	NW14	WNW20	NW10	WNW23	WNW22	WNW24	WNW19	WNW16	NW11	WNW12	N12	N11	N14	N11	NNE14	N15	NNE14	N19	N18	NNE19	ENE15	NE10	NE8	NNW10.9	WNW24
24-Feb	NE7	E10	E12	ESE15	ESE12	ESE10	ESE6	E9	ENE7	ENE7	NE5	NE10	NE9	N11	N15	N17	N18	N18	N14	N14	NNW14	NNW13	NNW9	NNW9	NNE7.8	N18
25-Feb	WNW9	WNW6	WSW4	NNW2	NW3	WNW3	WNW3	WNW3	W1	WNW2	W5	W6	WSW7	W6	W3	SSE2	SE4	SE3	ESE2	SE2	SE3	SE6	SE5	SE5	W1.7	WNW9
26-Feb	SE9	SE11	SE12	SE11	SE16	SE15	SE15	SE17	SE17	SE17	SE16	SE15	SE15	SE11	S2	W4	W11	W4	W3	NW4	NW5	NNW7	NNW7	NW8	SE6.4	SE17
27-Feb	NNW8	NNW9	NNW9	N9	N8	N7	NNE7	NE4	WNW2	ESE2	ENE3	ESE4	SSE2	SE7	SE12	SE13	SE8	SE5	SE3	SE6	SE7	SSE7	SW5	WSW13	E1.4	WSW13
28-Feb	WNW7	W11	WSW9	WSW11	WSW13	WNW8	NW17	WNW16	WNW16	NW16	NW14	NW10	NNW11	NNW9	NNW9	NNE9	W6	NNW13	NNW5	NNW10	NNW8	NW8	WNW3	NNW2	NW8.6	NW17
ENE2.3 E2.2 E2.5 E3.2 E2.5 E2.6 E2.4 ESE2.6 ESE3.0 ESE2.4 ENE1.3 ENE2.4 ENE1.9 NE1.3 NE1.8 NE2.9 ENE2.4 ENE2.5 NE2.3 NE2.7 ENE3.1 NE2.2 NE1.4 NNE1.6																								Diurnal Average		
SE30 SE32 SE31 SE31 SE29 SE30 SE31 SE28 SE26 SE28 ESE23 ESE23 SE22 SE18 ESE17 N17 SE23 SE24 SE23 SE28 SE30 SE31 SE30 SE29																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										



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

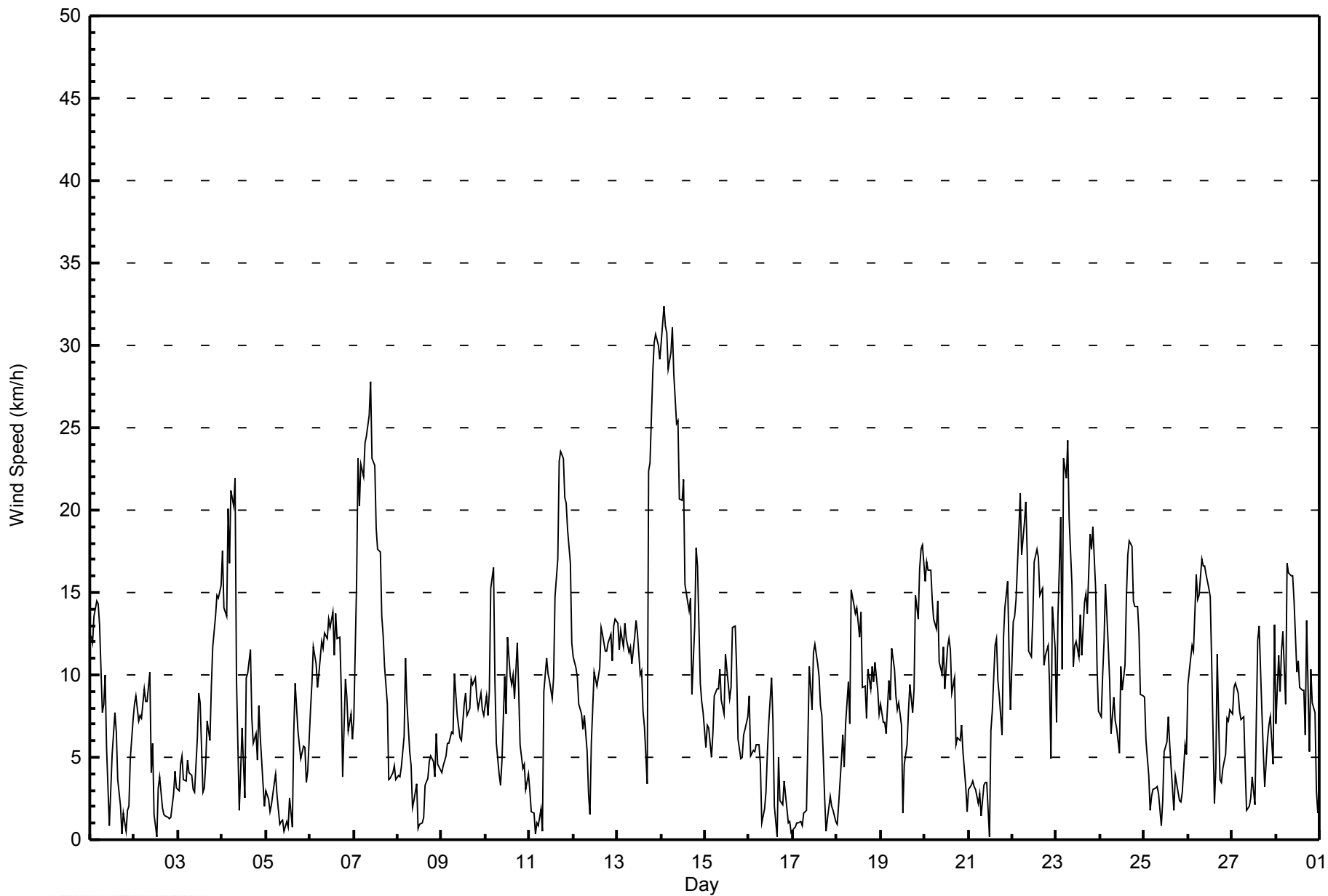
**Wind Speed (WS) - km/h**  
**Lower Camp - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 8 km/h on Feb 13 17:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Feb 19 13:00																									
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> = 4 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-Feb	2	2	3	2	4	3	3	2	2	2	1	1	2	2	2	2	1	1	1	1	1	1	2	2	4
2-Feb	2	1	2	2	1	2	3	2	3	3	2	1	1	1	2	2	1	2	1	1	1	1	2	1	3
3-Feb	2	1	1	2	1	1	1	1	1	1	3	2	2	1	2	3	1	3	3	3	3	4	4	3	4
4-Feb	3	3	4	3	3	5	4	3	5	2	3	2	3	3	2	3	2	1	2	2	3	1	2	1	5
5-Feb	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2	1	1	1	1	1	1	3
6-Feb	3	2	2	2	2	2	2	2	2	2	3	2	2	3	2	3	3	2	2	2	2	1	2	2	3
7-Feb	3	6	4	3	3	4	5	4	4	5	4	4	4	3	3	3	3	3	2	2	2	1	1	1	6
8-Feb	2	2	1	2	2	3	2	2	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	3
9-Feb	1	1	1	1	1	1	1	3	2	1	1	1	2	2	2	2	1	2	2	2	1	2	2	2	3
10-Feb	1	1	2	5	3	4	1	2	1	3	2	2	3	2	2	2	2	4	2	1	1	1	1	1	5
11-Feb	2	1	2	1	1	1	1	1	4	2	2	2	1	2	5	5	7	5	6	5	5	5	6	3	7
12-Feb	3	2	2	2	2	1	2	1	1	1	3	2	2	2	2	2	3	3	2	3	3	3	3	3	3
13-Feb	3	3	3	3	3	2	2	2	3	2	2	3	3	2	2	2	8	4	5	5	6	6	6	6	8
14-Feb	5	5	6	7	6	6	6	7	6	6	5	6	7	5	3	3	3	4	5	4	4	3	2	2	7
15-Feb	2	1	2	2	3	3	3	2	2	2	2	2	3	2	3	3	3	3	1	1	2	1	3	2	3
16-Feb	2	3	1	1	1	1	2	1	1	1	1	2	2	2	1	1	3	3	2	2	2	1	1	1	3
17-Feb	1	1	1	1	1	1	1	1	4	3	2	1	3	2	2	1	2	1	1	1	1	1	1	1	4
18-Feb	2	1	3	2	2	2	4	3	3	3	2	3	3	3	2	3	2	2	3	2	3	4	3	3	4
19-Feb	3	2	3	3	3	2	2	2	2	1	1	2	1	1	1	3	1	1	5	5	4	5	5	4	5
20-Feb	4	5	3	3	3	3	3	4	2	4	3	2	3	3	3	2	2	1	1	2	2	2	1	1	5
21-Feb	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	2	2	1	3	3	3	4	2	4
22-Feb	3	3	2	3	3	4	3	3	2	3	2	2	3	3	3	3	2	3	2	2	3	5	3	4	5
23-Feb	2	4	5	4	4	4	4	3	3	3	3	4	2	3	3	3	4	3	5	5	4	4	3	2	5
24-Feb	1	2	2	3	2	2	3	2	2	2	2	2	2	2	3	3	3	4	3	5	3	3	2	2	5
25-Feb	1	2	2	1	1	2	1	1	1	1	1	2	1	1	1	1	1	2	1	1	1	1	2	2	2
26-Feb	3	3	2	3	2	2	2	2	3	3	3	3	3	2	2	2	3	2	1	1	1	2	2	1	3
27-Feb	2	2	2	2	2	1	2	1	1	1	1	1	1	2	2	1	4	3	1	2	2	3	3	4	4
28-Feb	3	2	3	4	4	5	4	3	3	4	3	3	3	3	2	3	3	5	2	5	2	3	1	1	5
														5 6 6 7 6 6 6 7 6 6 5 6 7 5 5 5 8 5 6 5 6 6 6 6 6											
Diurnal Maximum																									



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Lower Camp - February 2015**





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

**Wind Speed (WS) - km/h**  
**Lower Camp - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	205	30.51	30.51
6 - 11	266	39.58	70.09
12 - 19	156	23.21	93.30
20 - 28	34	5.06	98.36
29 - 38	11	1.64	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Lower Camp - February 2015**

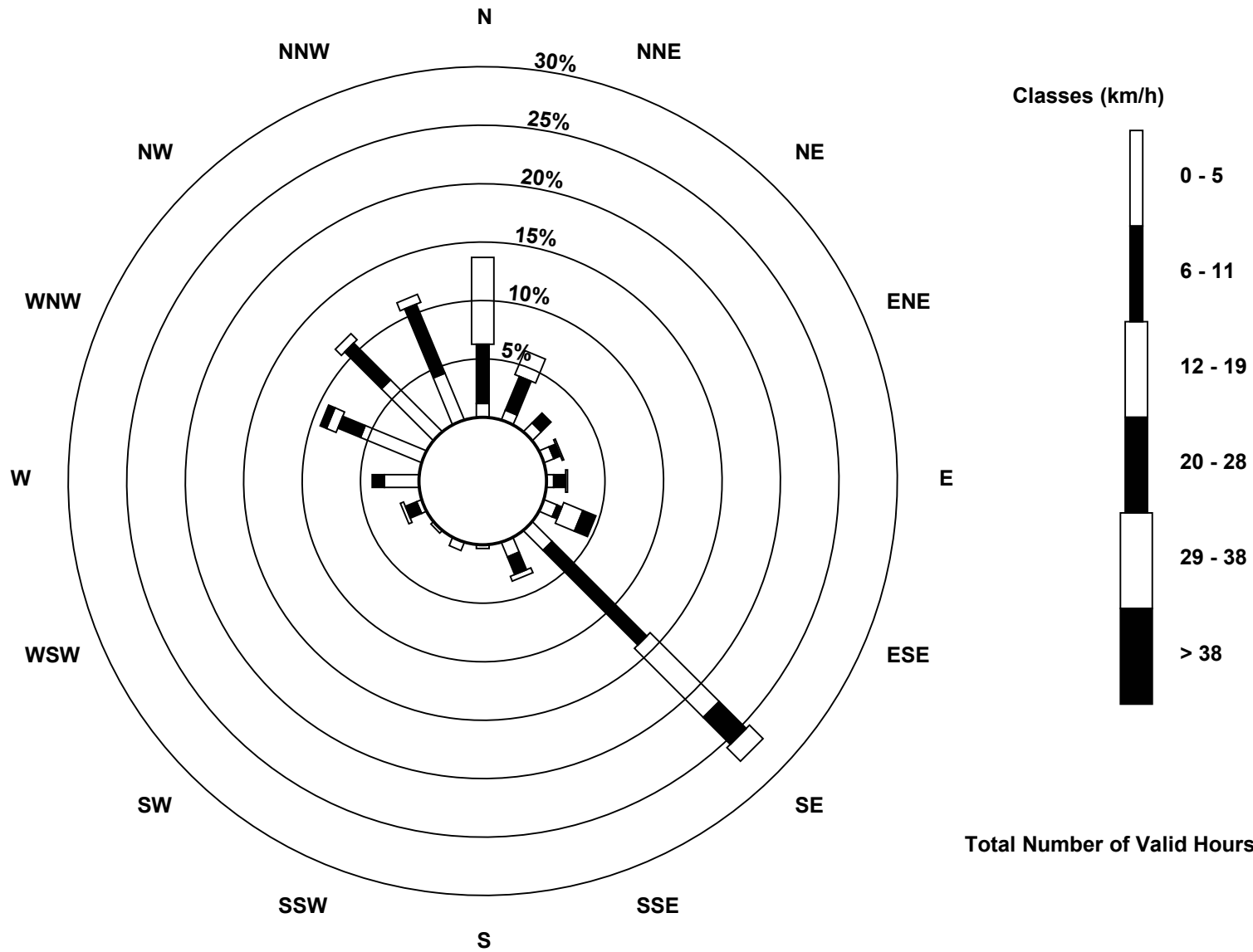
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	6	7	6	4	8	16	9	2	5	2	3	20	38	42	29	205
6 - 11	34	21	8	4	7	3	77	11	0	0	0	7	7	14	30	43	266
12 - 19	50	15	0	1	1	12	56	3	0	0	0	2	0	6	5	5	156
20 - 28	0	0	0	0	0	8	22	0	0	0	0	0	0	4	0	0	34
29 - 38	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	11
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	92	42	15	11	12	31	182	23	2	5	2	12	27	62	77	77	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Lower Camp (AMS 11)**



**Total Number of Valid Hours: 672**





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

**Wind Direction (WD) - deg**  
**Lower Camp - February 2015**

Direction of Maximum Speed: 128 deg on Feb 14 02:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 126.4 deg on Feb 14	Hours of Data: 672
Direction of Minimum Speed: 63 deg on Feb 21 12:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 1.4 deg on Feb 27	Percent Operational Time: 100.0
Monthly Average Direction: 323.3 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-Feb	136	136	137	136	136	138	143	140	140	141	347	343	273	260	282	261	265	41	323	336	118	97	125	132	144.5
2-Feb	127	129	128	132	125	131	136	131	135	212	255	260	207	234	250	311	29	327	339	68	107	30	342	26	134.8
3-Feb	1	294	295	280	299	291	294	299	295	332	318	347	354	286	242	132	131	125	129	130	120	127	130	134	122.7
4-Feb	131	128	126	133	132	128	123	130	140	264	132	135	154	307	340	4	347	293	315	327	350	330	306	315	116.7
5-Feb	307	351	303	353	304	302	303	353	99	289	318	196	209	124	70	33	43	30	21	38	30	15	345	294	7.0
6-Feb	11	11	33	30	13	13	11	12	9	10	21	13	358	349	356	351	351	350	343	91	84	66	86	62	16.7
7-Feb	82	116	123	115	120	121	125	126	129	127	124	122	114	113	116	122	129	139	145	147	18	334	328	311	121.0
8-Feb	337	325	311	331	14	352	335	293	327	314	264	155	175	347	281	327	297	295	281	324	326	329	324	324	324.4
9-Feb	327	338	323	330	334	326	324	312	306	302	319	314	308	320	329	321	309	313	321	313	319	317	318	317	317.9
10-Feb	316	315	328	5	1	351	312	286	323	320	317	332	331	334	343	356	350	5	0	330	293	308	306	305	337.3
11-Feb	314	329	326	349	344	19	315	114	136	140	135	133	138	140	131	142	134	133	132	136	142	148	152	158	138.8
12-Feb	159	149	137	143	142	146	142	144	123	163	333	341	344	353	4	5	2	3	3	4	19	24	2	356	24.4
13-Feb	12	4	4	1	5	21	8	10	14	21	0	353	353	348	335	338	103	117	128	130	126	127	132	129	70.5
14-Feb	127	128	130	133	133	132	133	134	133	135	139	143	146	146	135	140	138	134	2	3	21	351	347	359	126.4
15-Feb	22	49	43	25	21	19	21	7	11	356	347	2	349	336	340	16	20	13	325	326	326	291	343	360	2.8
16-Feb	337	329	308	296	298	296	297	318	314	289	263	248	256	254	261	144	144	146	302	309	316	327	84	75	287.3
17-Feb	63	84	344	358	310	51	36	1	137	144	142	138	133	135	136	134	135	145	350	338	292	276	296	281	135.1
18-Feb	211	158	134	139	146	145	131	126	127	121	126	120	130	119	127	128	134	136	139	136	140	143	166	150	133.2
19-Feb	129	127	150	160	165	156	134	139	125	130	136	138	43	270	268	301	322	316	348	357	354	358	356	1	44.0
20-Feb	10	353	2	357	352	349	348	353	351	14	7	359	356	2	357	335	26	12	340	303	298	293	298	315	353.2
21-Feb	307	304	299	295	299	320	312	323	306	295	313	63	134	135	132	135	133	133	129	137	141	133	109	92	131.2
22-Feb	130	131	112	140	137	134	134	138	136	141	136	136	131	130	134	144	139	145	142	140	139	275	282	324	137.3
23-Feb	335	311	294	306	287	295	294	294	304	298	350	5	9	355	15	7	12	11	10	32	57	52	52	337.0	
24-Feb	43	82	95	109	106	103	102	85	68	63	49	41	41	349	2	10	357	358	350	349	348	343	332	332	27.5
25-Feb	302	299	254	339	313	308	296	296	303	262	292	261	262	248	266	261	161	146	127	123	127	128	136	140	258.9
26-Feb	138	140	138	136	134	138	140	138	138	135	130	129	132	133	174	262	267	266	276	306	310	342	332	323	140.3
27-Feb	330	340	340	358	3	355	30	50	283	118	75	110	150	128	135	134	145	145	142	141	146	147	220	252	99.1
28-Feb	290	261	254	253	252	292	306	302	288	306	305	317	345	335	333	14	265	337	333	346	339	319	283	346	305.8
	69.2	85.2	94.0	99.4	97.5	95.8	98.0	106.3	114.3	107.7	75.1	74.4	61.5	42.5	40.9	46.1	57.7	58.5	38.2	51.7	58.0	52.2	40.5	28.5	
	Diurnal Average																								

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



**Wood Buffalo Environmental Association**

**Summary of Hour Standard Deviations**

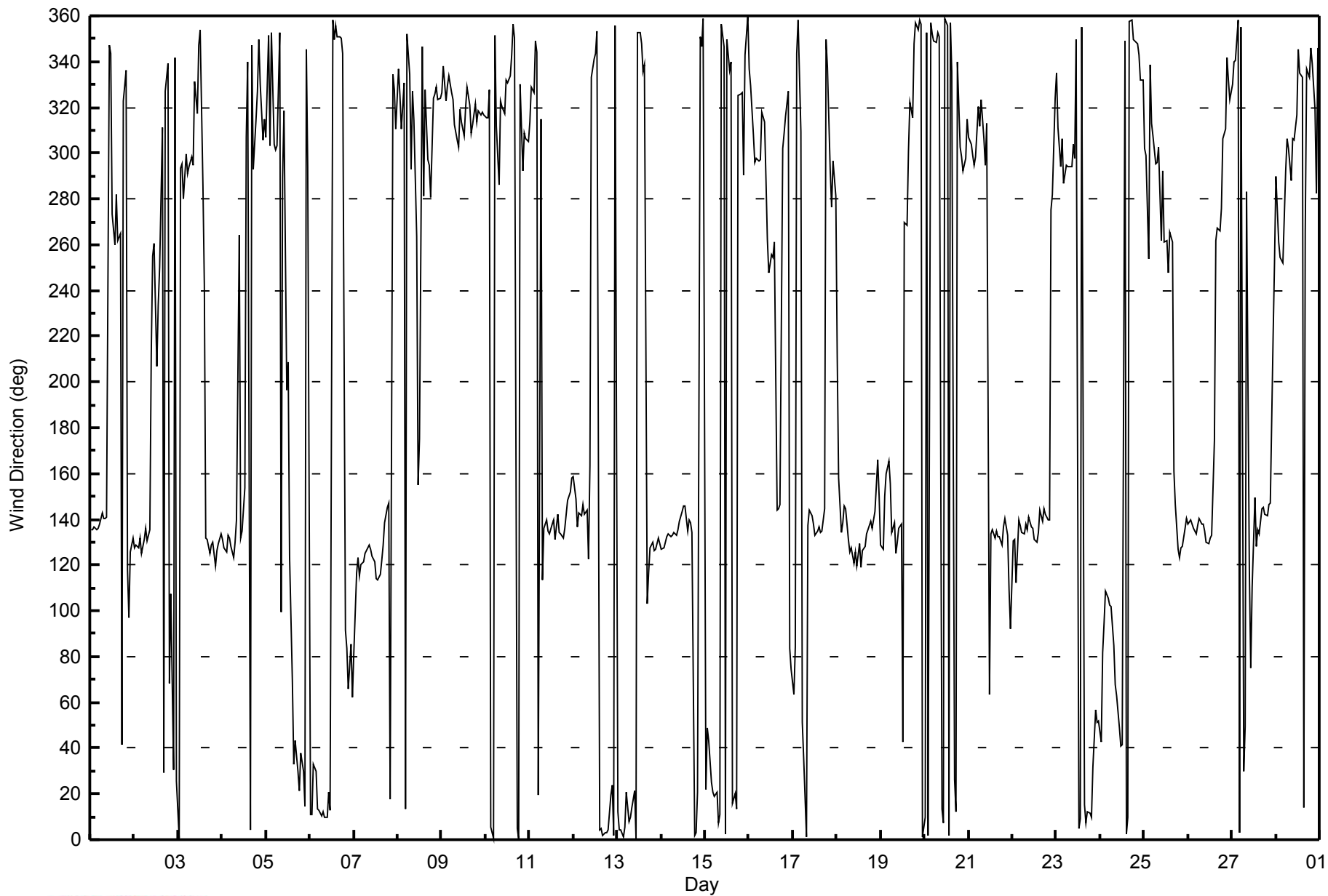
**Wind Direction (WD) - deg  
Lower Camp - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 101 deg on Feb 17 00:00		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 4 deg on Feb 21 15:00																									
Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 18 Q <sub>3</sub> = 28 P <sub>90</sub> = 53 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-Feb	12	11	10	9	10	12	17	12	11	21	79	32	39	13	15	65	45	69	51	85	80	31	16	15	85
2-Feb	8	7	8	11	7	14	14	20	12	59	24	76	99	48	42	46	63	63	52	60	40	32	54	45	99
3-Feb	60	28	28	37	22	19	14	15	36	31	30	18	16	60	78	24	9	25	12	10	14	10	12	10	78
4-Feb	10	15	9	7	7	8	9	7	20	86	31	12	88	29	24	12	21	12	26	18	19	24	26	42	88
5-Feb	43	31	53	37	36	27	49	64	78	52	93	64	87	51	81	30	13	19	24	27	17	11	32	33	93
6-Feb	17	12	13	15	11	13	10	10	11	13	12	11	15	17	15	16	16	20	63	18	17	15	21	41	63
7-Feb	44	16	10	9	9	9	10	9	9	8	9	9	12	11	11	13	13	17	24	39	26	28	15	35	44
8-Feb	23	21	16	19	16	28	29	20	35	46	31	87	71	89	90	37	28	19	18	18	20	9	17	17	90
9-Feb	18	17	24	19	21	17	22	11	11	18	18	18	15	23	21	17	9	10	10	10	10	9	20	13	24
10-Feb	9	10	17	15	14	16	29	33	23	20	12	27	16	21	20	13	14	20	17	17	26	37	46	39	46
11-Feb	42	43	71	82	54	64	39	77	14	11	14	11	9	12	16	18	16	13	14	15	16	20	22	21	82
12-Feb	19	17	13	10	12	12	12	19	58	77	40	23	22	15	13	11	15	15	15	16	20	16	20	16	77
13-Feb	14	15	15	15	13	15	15	14	19	17	14	16	26	19	34	21	91	10	10	10	10	10	10	10	91
14-Feb	9	9	10	11	12	11	11	13	14	13	14	17	17	19	12	15	13	25	38	16	14	20	17	17	38
15-Feb	25	15	19	27	23	18	18	18	19	20	18	16	18	20	21	18	16	21	21	23	25	16	37	18	37
16-Feb	25	29	20	20	15	15	28	84	33	23	19	11	10	18	66	95	37	81	57	35	47	89	67	101	101
17-Feb	79	41	54	59	67	75	48	39	37	15	14	7	10	8	8	8	10	45	76	50	32	50	51	75	79
18-Feb	98	68	66	25	53	21	20	25	13	12	11	12	14	16	15	17	15	13	18	15	20	22	26	25	98
19-Feb	23	21	37	42	25	28	10	11	13	10	9	9	62	21	16	23	10	8	21	20	18	18	19	16	62
20-Feb	20	17	16	16	16	16	17	17	16	19	17	21	18	20	18	19	24	23	22	20	18	23	29	51	51
21-Feb	35	27	33	27	29	38	18	46	27	16	13	87	6	6	4	4	8	9	9	9	11	11	25	24	87
22-Feb	11	10	11	8	7	10	8	7	7	10	8	8	10	12	9	13	8	14	11	9	17	91	19	20	91
23-Feb	16	18	14	22	9	11	9	10	10	17	17	43	21	16	20	18	15	17	15	19	16	14	15	12	43
24-Feb	12	14	12	10	11	13	29	18	16	15	22	12	29	18	16	13	16	15	17	18	17	17	21	15	29
25-Feb	11	17	51	29	29	35	40	18	36	73	28	32	24	11	19	21	63	41	50	24	23	16	16	21	73
26-Feb	12	12	11	12	8	8	9	8	8	9	10	12	10	10	64	33	12	45	38	18	20	17	20	12	64
27-Feb	18	19	19	24	16	18	25	18	73	59	20	25	71	16	8	5	45	19	27	19	15	24	53	27	73
28-Feb	31	12	18	31	19	52	16	13	12	15	12	21	23	23	21	25	31	23	23	19	16	26	44	76	76
	98	68	71	82	67	75	49	84	78	86	93	87	99	89	90	95	91	81	76	85	80	91	67	101	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Lower Camp - February 2015**





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 26, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	10:45	End Time (MST)	15:00
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Cal Gas Concentration	51.3 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107920		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	SE1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-675	-675
Analyzer Range (mv)	1000	1000	Lamp voltage	805	807
Calculated slope	0.999939	0.999652	Chamber temp.	44.9	45.0
Calculated intercept	1.889049	0.981259	Pressure (mmHg)	715.6	707.8
Analyzer Background	11.5	10.4	Flow (lpm)	0.502	0.491
Analyzer Coefficient	1.006	0.995	Intensity	91	90

Analyzer make TEI 431 Analyzer serial # 100841398

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-1.1	NA
as found span	5000	80.9	830.0	844.8	0.983
calibrator zero	5000	0.0	0.0	0.2	NA
high point	5000	80.9	830.0	830.4	1.000
second point	5000	40.9	419.6	417.0	1.006
third point	5002	20.4	209.2	208.0	1.006
calibrator zero					NA
as left zero	5000	0.0	0.0	0.5	NA
as left span	5000	80.9	830.0	827.5	1.003
Average Correction Factor					1.004

Corrected As found 845.8 Previous response 828.2 % change -2.1%

#### Notes:

Changed filter after as founds, and also changed zero/span tubing configuration after as founds. Adjusted zero and span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

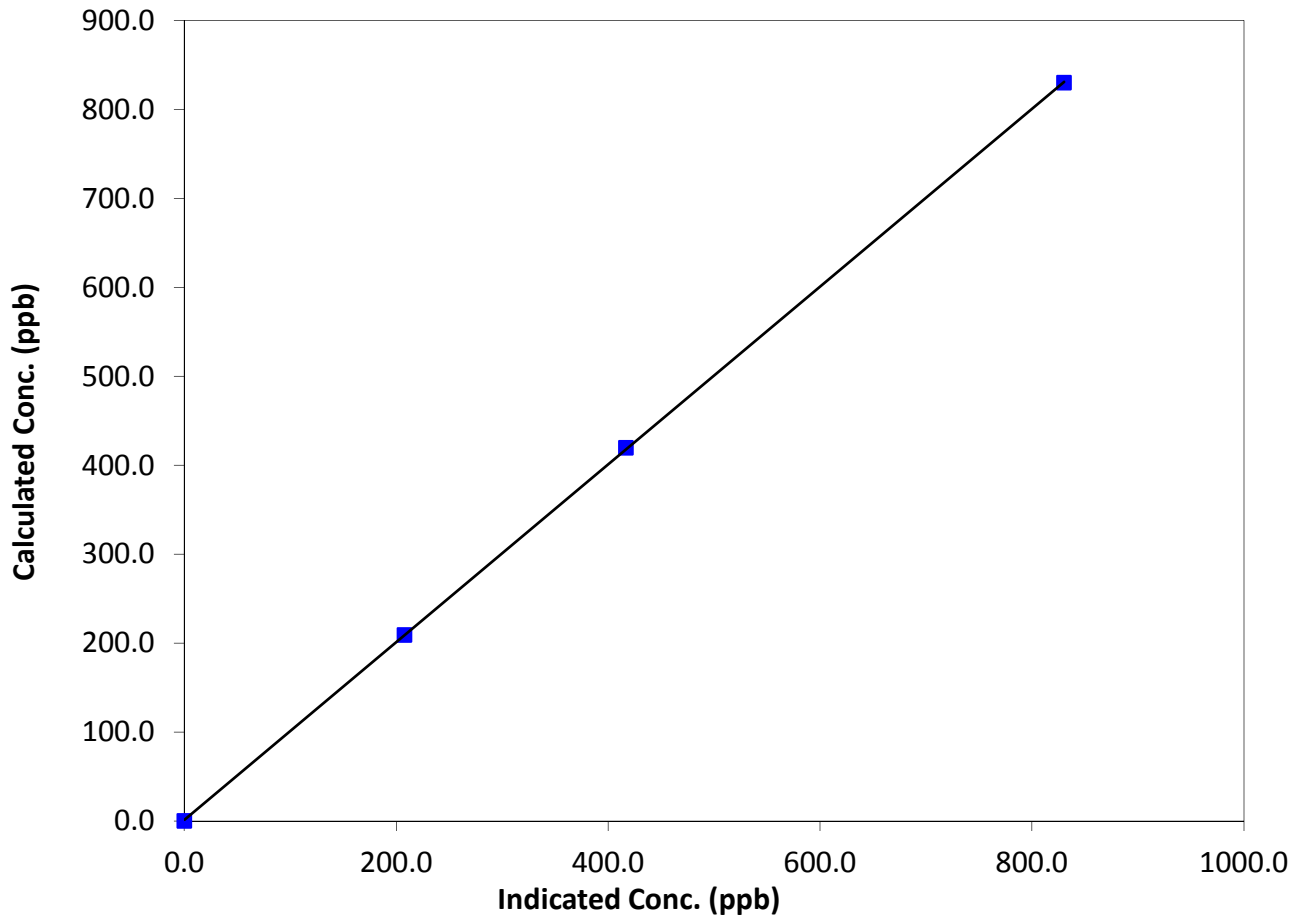
### Station Information

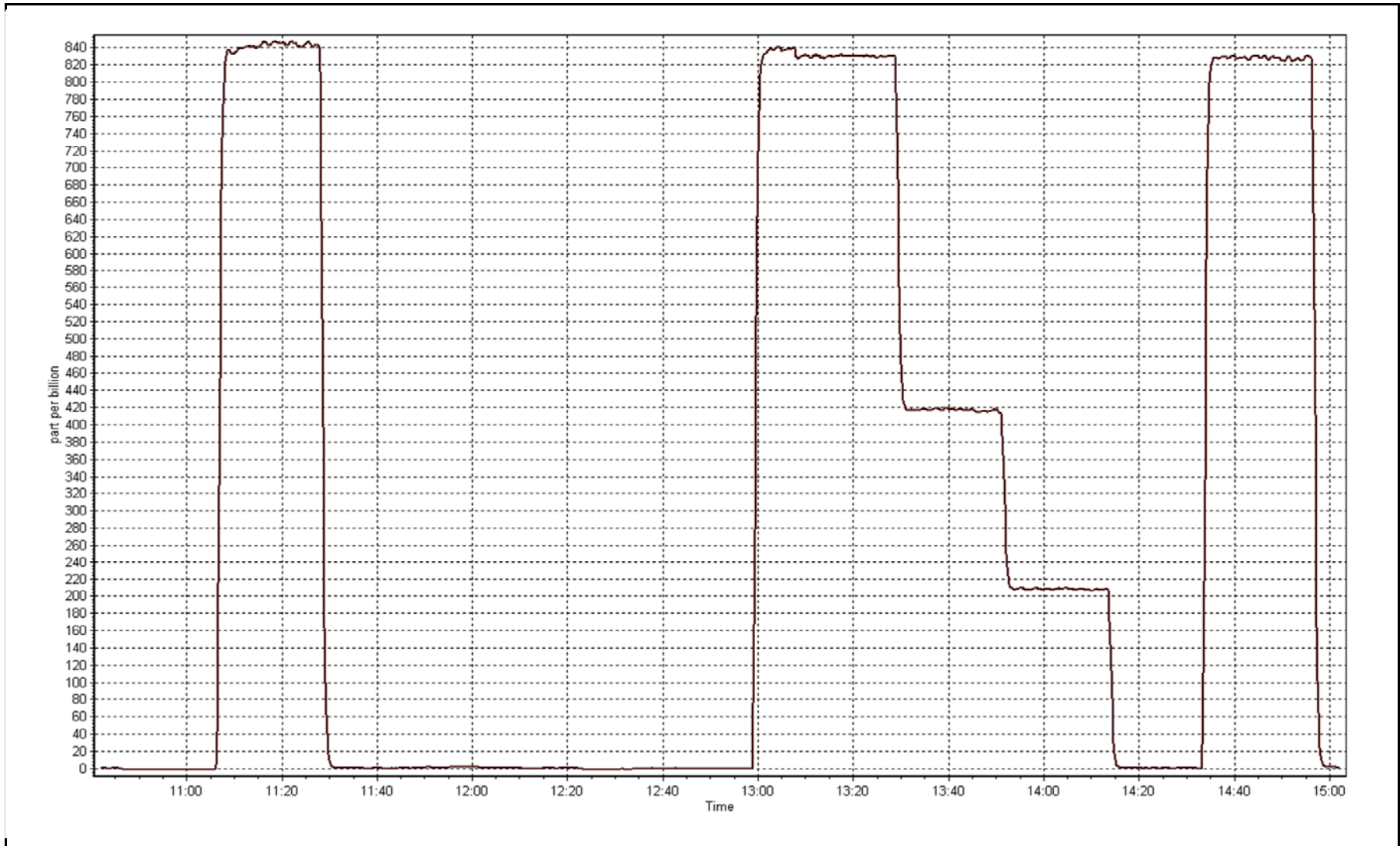
Calibration Date	February 4, 2015	Previous Calibration	January 26, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:45	End Time (MST)	15:00
Analyzer make	TEI 43I	Analyzer serial #	100841398

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999984
830.0	830.4	0.9996		
419.6	417.0	1.0064	Slope	0.999652
209.2	208.0	1.0059		
			Intercept	0.981259

**SO<sub>2</sub> Calibration Curve**







# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	January 19, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Removal		
Start Time (MST)	10:05	End Time (MST)	12:10
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11051107
Cal Gas Concentration	5.15 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference	LL20284	SO2 gas conc.	51.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	3492
DACS voltage range	0-5v	DACS channel #	SE2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage (v)	-680	NA
Analyzer Range (mv)	100	100	Lamp voltage (v)	984	NA
Calculated slope	0.996260	NA	Chamber temp. (deg C)	45	NA
Calculated intercept	0.271671	NA	Pressure (mmHg)	477.0	NA
Analyzer Background	1.97	NA	Flow(LPM)	0.318	NA
Analyzer Coefficient	0.938	NA	Intensity(%)	92	NA
			Converter temp.(deg C)	370	NA

Analyzer make/model	Thermo 43i	Analyzer serial #	1008841400
Converter make/model	TEI 340	Converter serial #	328702539

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	NA
as found span	5000	72.9	75.1	75.4	0.996
SO2 scrubber check	5000	20.5	210.3	1.9	NA
calibrator zero	5000	0.0	0.0	-0.2	NA
high point	5001	72.9	75.1	75.4	0.995
second point	5002	38.8	39.9	40.5	0.986
third point	5002	19.4	20.0	20.1	0.995
calibrator zero					
as left zero					
as left span					
Average Correction Factor					0.992

Corrected As found	75.6	Previous response	75.1	% change	-0.7%
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**Notes:**

Removal Calibration.

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

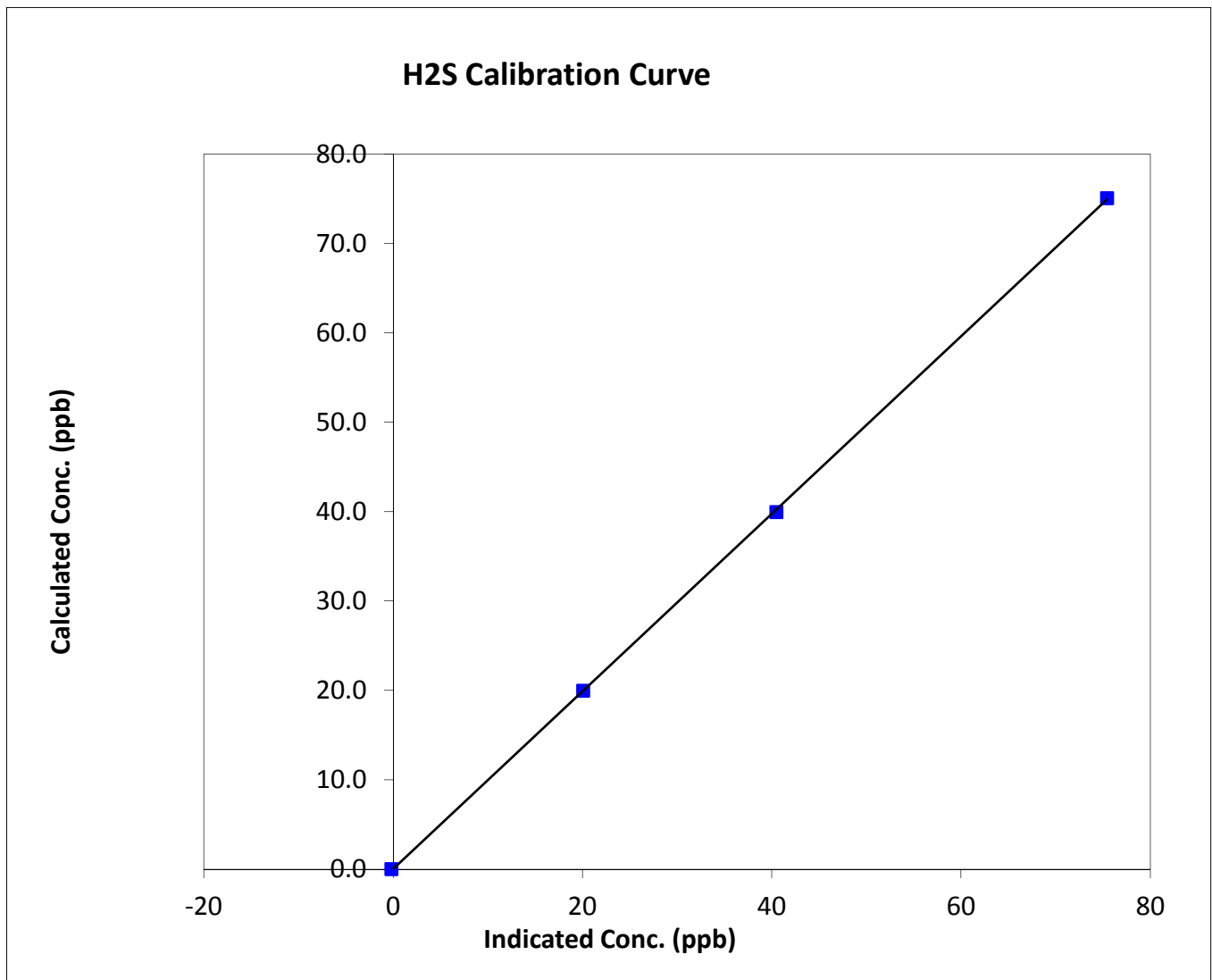
## H2S Calibration Summary

### Station Information

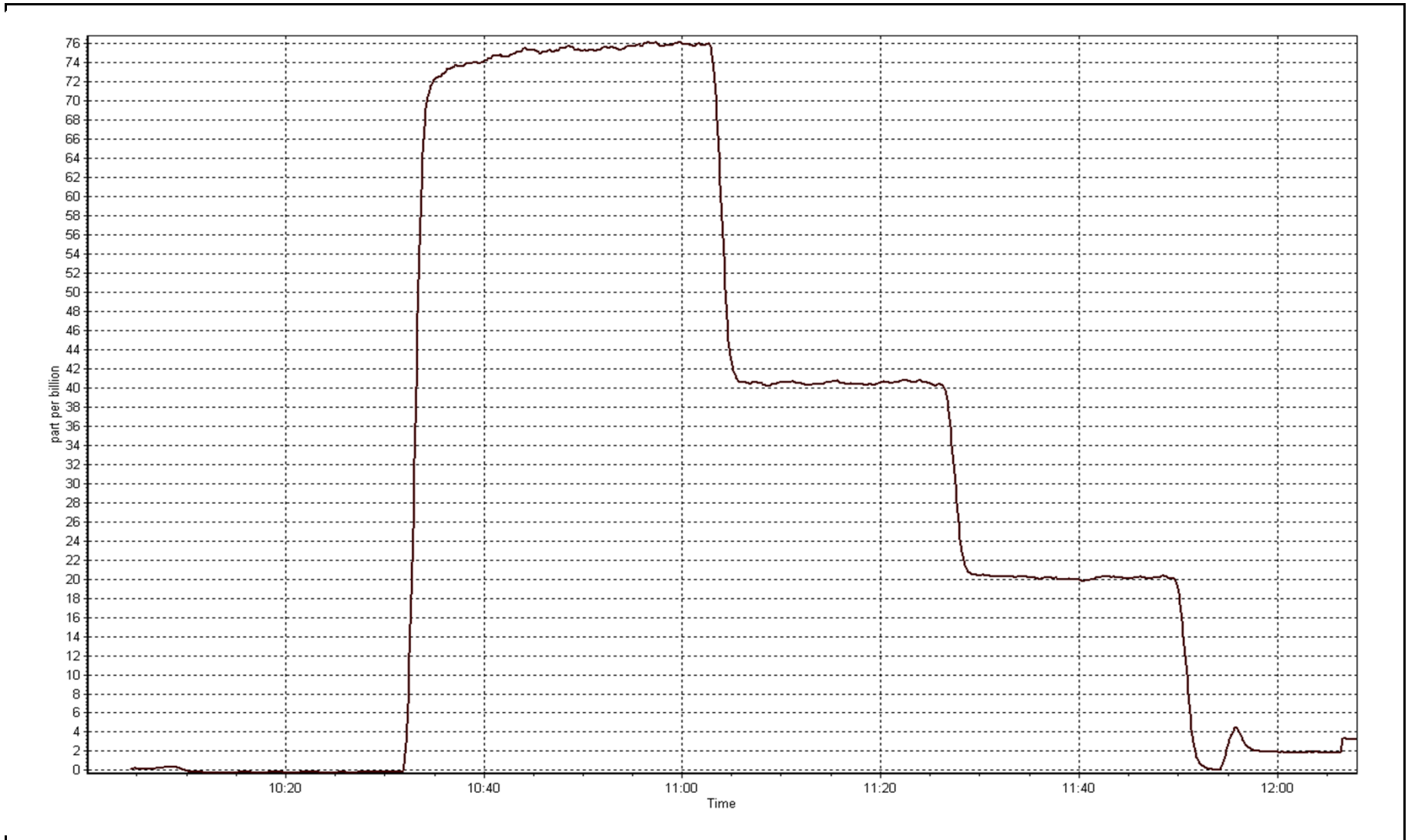
Calibration Date	February 10, 2015	Previous Calibration	January 19, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:05	End Time (MST)	12:10
Analyzer make	Thermo 43i	Analyzer serial #	1008841400

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999957
75.1	75.4	0.9954		
39.9	40.5	0.9864	Slope	0.992719
20.0	20.1	0.9947		
			Intercept	0.040740









# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	NA
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	12:40	End Time (MST)	15:55
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11051107
Cal Gas Concentration	5.15 ppm H2S	Cal Gas Expiry Date	9/9/2017
Gas Cert Reference	LL20284	SO2 gas conc.	51.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2634
DACS voltage range	0-5v	DACS channel #	SE2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage (v)	NA	-683
Analyzer Range (mv)	100	100	Lamp voltage (v)	NA	892
Calculated slope	NA	0.985655	Chamber temp. (deg C)	NA	45
Calculated intercept	NA	0.482633	Pressure (mmHg)	NA	580.2
Analyzer Background	NA	44.5	Flow(LPM)	NA	1.149
Analyzer Coefficient	NA	0.929	Intensity(%)	NA	111
			Converter temp.(deg C)	NA	340

Analyzer make/model	Thermo / 450i	Analyzer serial #	922436966
Converter make/model	TEI 340	Converter serial #	internal

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero					
as found span					
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	-0.5	NA
high point	5001	72.9	75.1	75.6	0.993
second point	5002	38.8	39.9	40.1	0.995
third point	5002	19.4	20.0	19.8	1.010
calibrator zero					
as left zero	5000	0.0	0.0	-0.9	NA
as left span	4999	72.9	75.1	75.6	0.994
Average Correction Factor					0.999

Corrected As found	NA	Previous response	NA	% change	NA
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**Notes:**

Installation calibration. Adjusted zero and span.

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

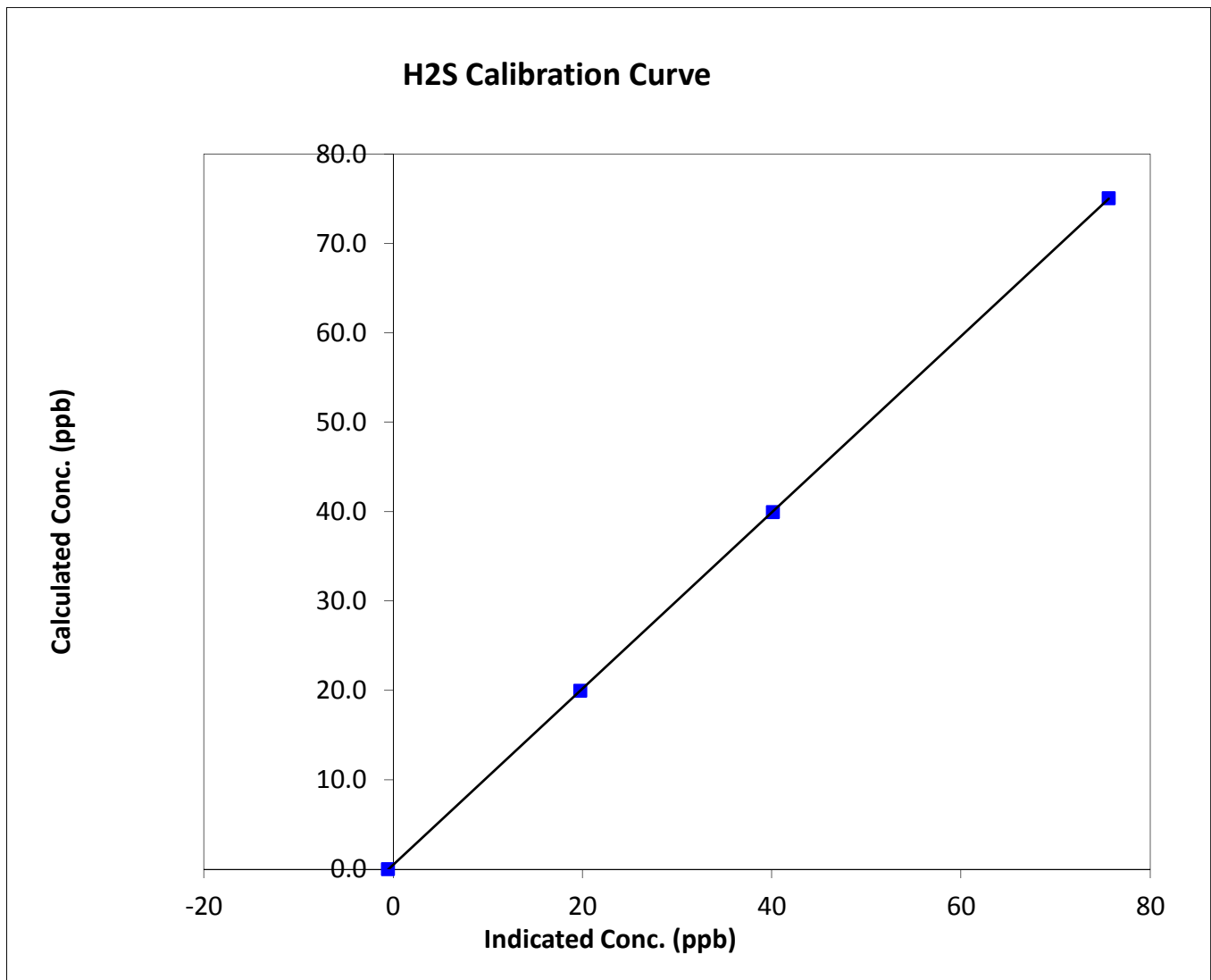
## H2S Calibration Summary

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	12:40	End Time (MST)	15:55
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	-0.5	N/A	Correlation Coefficient	0.999995
75.1	75.6	0.9928		
39.9	40.1	0.9952	Slope	0.985655
20.0	19.8	1.0098		
			Intercept	0.482633





SO2 scrubber



# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Wednesday, February 04, 2015	Previous Calibration	Sunday, January 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Reason:	Install		
Start Time (MST)	10:45	End Time (MST)	15:00
Barometric Pressure	760 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11051107
Gas Cert Reference	CC 302056	Cal Gas Expiry Date	
CH4 Cal Gas Conc.	510 ppm	CH4 Equiv Conc.	1073.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2634
DACS voltage range	0-5v	DACS channel #	SE3

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.5	8.5
Analyzer Range (mv)	25	25	Air or Bypass press	37.3	37.3
Calculated slope	1.002207	1.006652	Fuel Pressure	24.0	24.0
Calculated intercept	0.026302	-0.050219			

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	0.14	N/A
as found span	5000	80.9	17.37	17.65	0.984
calibrator zero	5000	0.0	0.00	0.08	N/A
high point	5001	80.9	17.37	17.32	1.003
second point	5000	40.9	8.78	8.76	1.003
third point	5002	20.4	4.38	4.37	1.002
calibrator zero					
as left zero	5000	0.0	0.00	0.06	N/A
as left span	5000	80.9	17.37	17.42	0.997
Average Correction Factor					1.003

Corrected As found	17.51	Previous response	17.31	% change	-1.1%
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#### Notes:

Changed filter after as founds, and also changed zero/span tubing configuration after as founds. Adjusted zero and span.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## THC Calibration Summary

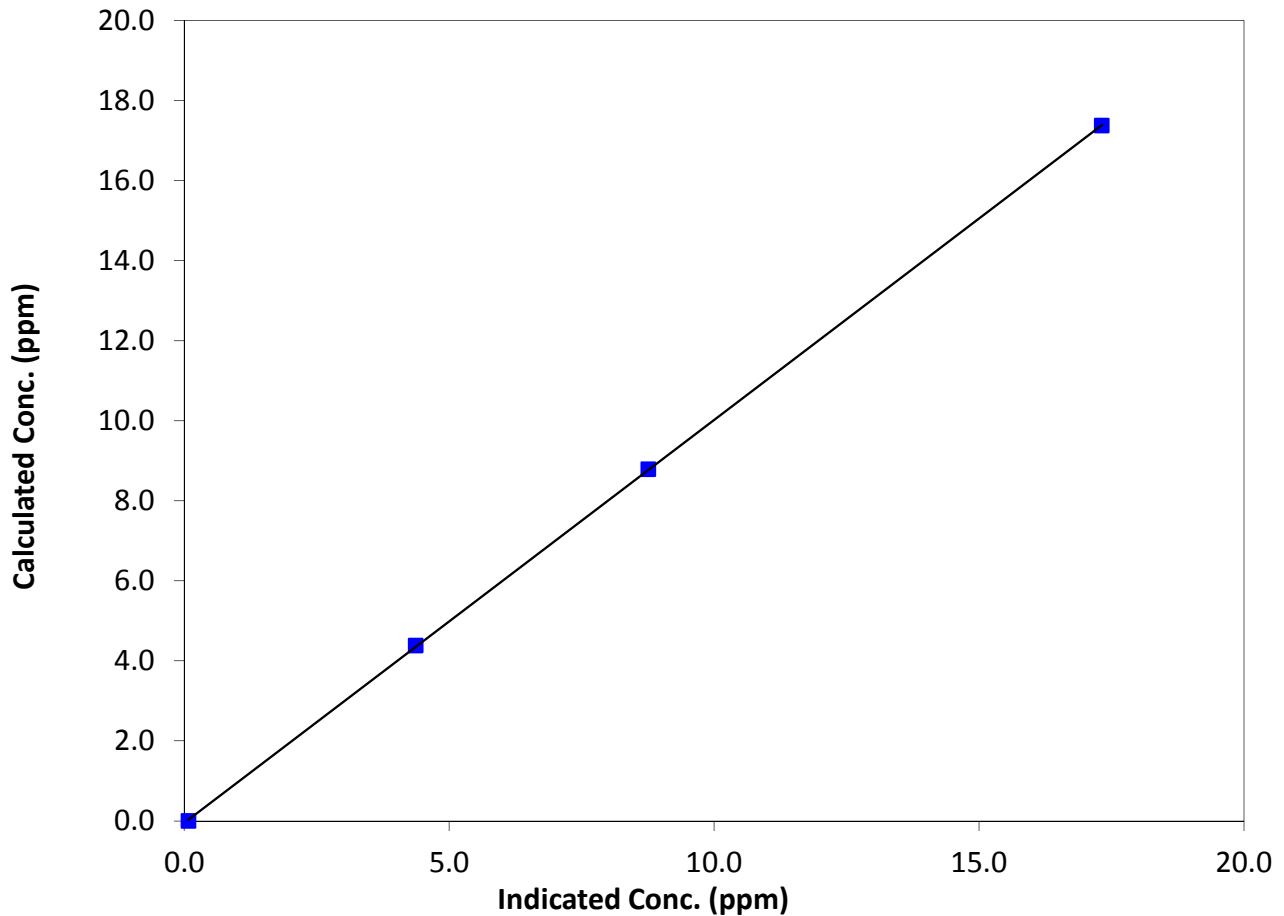
### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 11, 2015
Station Name	Lower Camp	Station Number	AMS 11
Start Time (MST)	10:45	End Time (MST)	15:00
Analyzer make	51i-LT	Analyzer serial #	1410661326

### Calibration Data

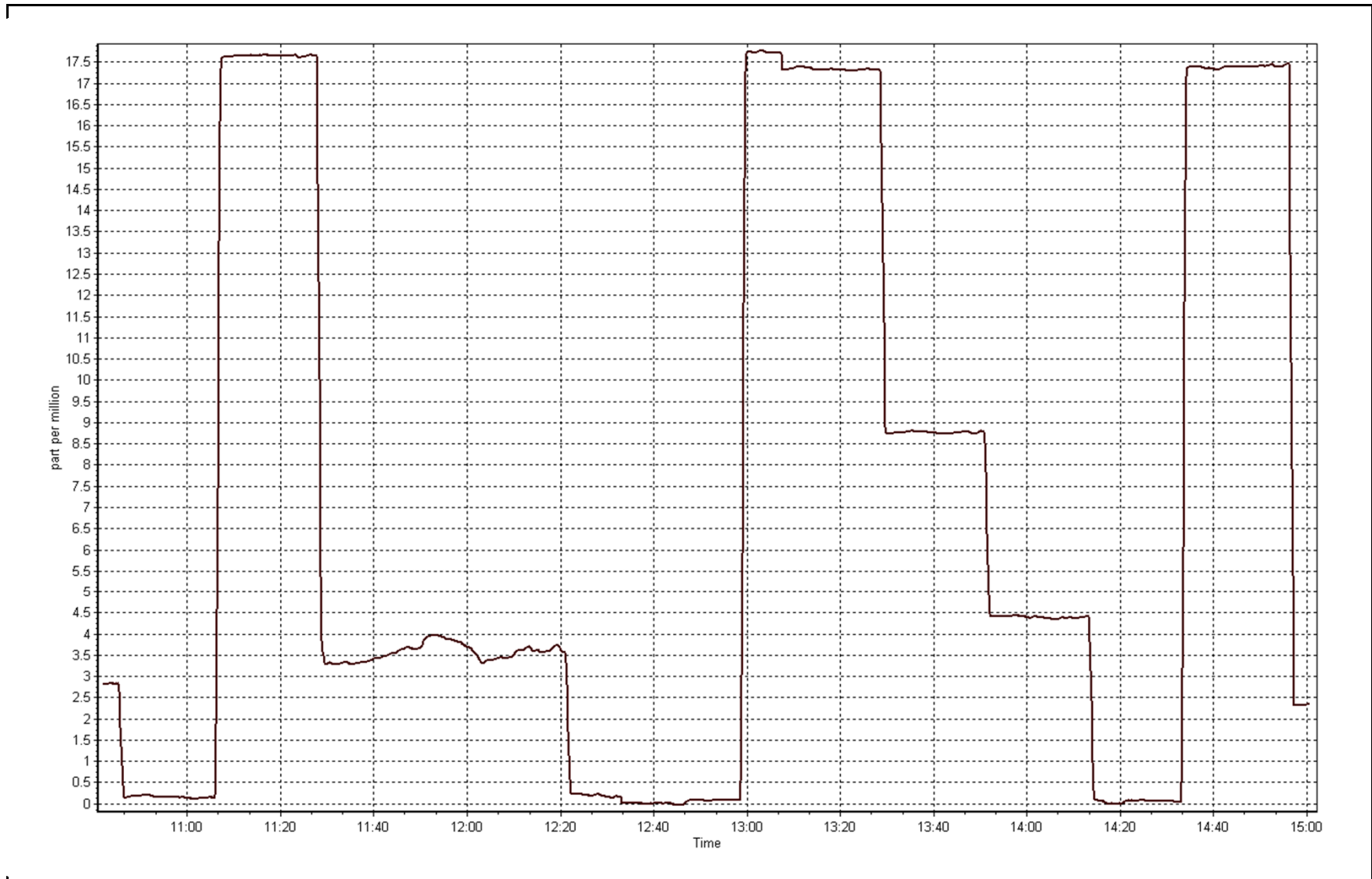
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.08	N/A	Correlation Coefficient	0.999986
17.37	17.32	1.0029		
8.78	8.76	1.0027	Slope	1.006652
4.38	4.37	1.0021		
			Intercept	-0.050219

### THC Calibration Curve



THC Calibration Plot

Date: February 4, 2015



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**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 12  
MILLENNIUM MINE  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)  
 FEBRUARY 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	639	33	33	100.00	67	0	14	0
TRS(ppb) Average	640	31	32	99.85	3	0	1	0
THC(ppm) Average	637	33	35	99.70	6.7	-	3	-
NO2(ppb) Average	639	33	33	100.00	60	0	34	-
NO(ppb) Average	639	33	33	100.00	264	-	73	-
NOX(ppb) Average	639	33	33	100.00	324	-	106	-
PM2.5(ug/m3) Average	671	0	1	99.85	39.7	-	18.2	0
Temperature 2 m (C) Average	672	0	0	100.00	1.5	-	-2.7	-
Relative Humidity (%) Average	672	0	0	100.00	94	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	27	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - MILLENNIUM MINE (AMS 12)  
 FEBRUARY 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	639	1.4	5	-	0	0	0	0	1	2	67
TRS(ppb) Average	640	0.4	0	-	0	0	0	0	0	1	3
THC(ppm) Average	637	2.41	0.5	-	2	2.1	2.2	2.2	2.5	2.9	6.7
NO2(ppb) Average	639	16.1	12	-	1	3	6	13	25	34	60
NO(ppb) Average	639	11.9	26	-	0	0	0	2	12	35	264
NOX(ppb) Average	639	27.9	36	-	1	4	6	16	35	66	324
PM2.5(ug/m3) Average	671	7.14	5.1	-	1	3.3	4.4	5.8	7.5	12.6	39.7
Temperature 2 m (C) Average	672	-16.78	7	-	-34.6	-24.7	-21.9	-17.7	-12.2	-7.2	1.5
Relative Humidity (%) Average	672	75.6	7	-	50	67	72	77	80	82	94
Wind Speed 10 m (km/h) Average	672	8.4	5	-	1	4	5	7	11	15	27
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -MILLENNIUM MINE (AMS 12)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
TRS	18 Feb 2015 09:00	18 Feb 2015 09:00	1	Maintenance - manifold cleaning
THC	13 Feb 2015 11:00	13 Feb 2015 12:00	2	Intermittent unstable operation - baseline drift
PM2.5	19 Feb 2015 11:00	19 Feb 2015 11:00	1	Maintenance - Flow and zero check, sample head cleaning

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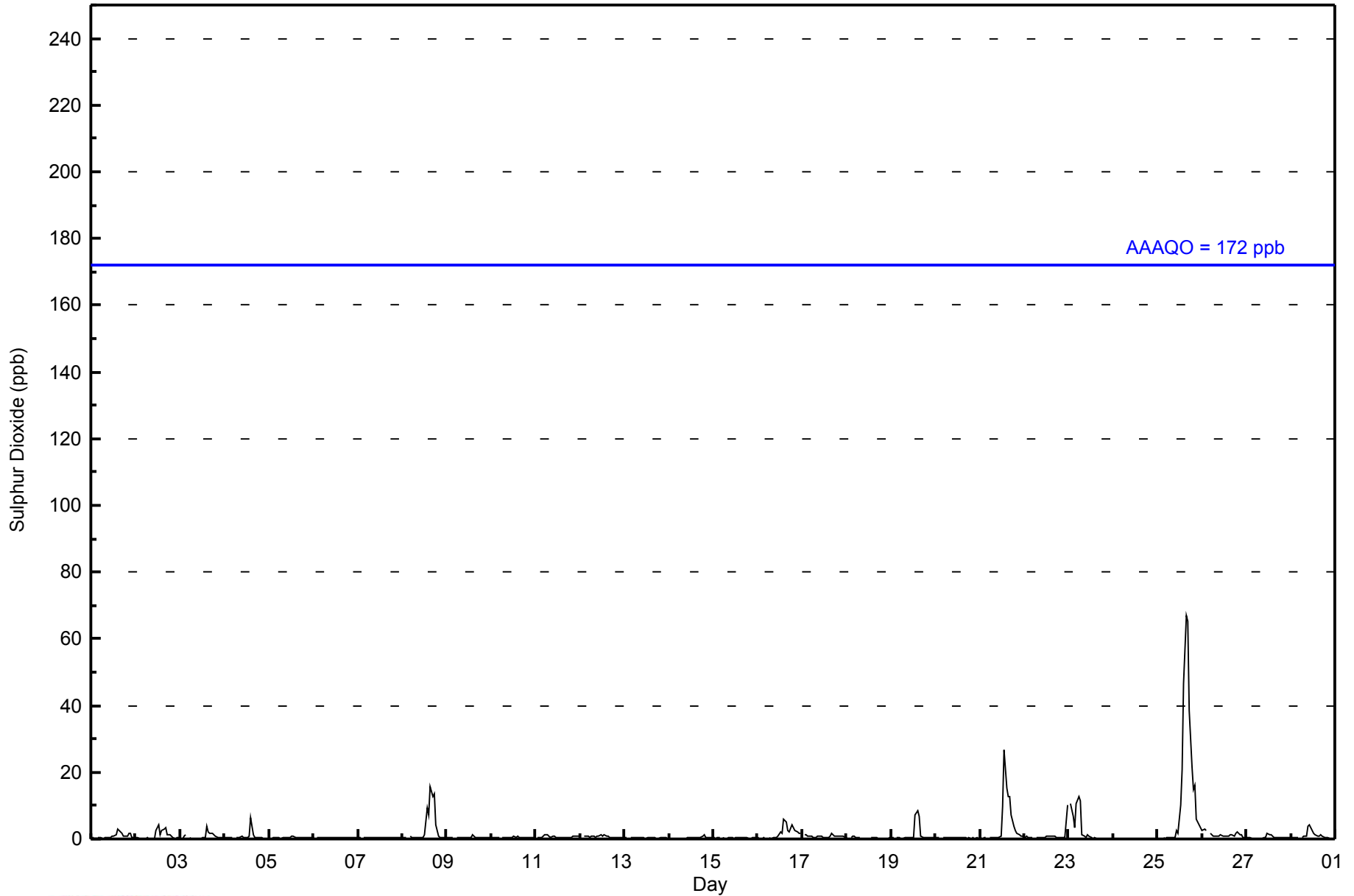


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																	
Maximum Value: 67 ppb on Feb 25 16:00										Maximum Daily Average: 14.0 ppb on Feb 25										Hours of Data: 639							
Minimum Value: 0 ppb on Feb 24 04:00										Minimum Daily Average: 0.1 ppb on Feb 24										Hours of Missing Data: 33							
Maximum Diurnal Average: 4.5 ppb at hour 16										Minimum Diurnal Average: 0.4 ppb at hour 9										Hours of Calibration: 33							
Monthly Average: 1.4 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> =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-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	3	2	2	1	1	1	2	2	1	0	0.8	3	
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	3	4	1	2	3	3	1	1	1	0	0	0	0	1.0	4	
3-Feb	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	4	2	2	2	1	1	1	1	0	0	0.8	4	
4-Feb	0	0	0	0	0	Z	0	0	0	1	1	1	1	1	7	1	1	0	0	0	0	0	0	0	0.7	7	
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	1	0	0	1	0.4	1	
6-Feb	0	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	
7-Feb	0	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-Feb	0	0	0	Z	1	1	0	0	0	0	1	1	1	9	7	16	13	14	4	1	1	0	0	1	3.1	16	
9-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0.4	1	
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1	
11-Feb	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1	0.7	1	
12-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.7	1	
13-Feb	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	
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1	
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.3	1	
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	2	2	6	5	3	2	4	4	3	2	2	2	1.7	6	
17-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	0.8	2	
18-Feb	1	Z	1	1	1	1	0	0	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
19-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	7	9	7	1	1	0	0	0	0	0	0	1.3	9	
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	10	27	15	13	13	7	4	3	2	1	1	1	4.3	27	
22-Feb	1	1	1	0	0	Z	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0	1	10	1.0	10	
23-Feb	Z	11	7	3	11	13	12	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.7	13	
24-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	1	2	2	10	21	47	67	65	38	22	15	16	6	4	3	14.0	67
26-Feb	3	3	2	Z	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	1	0	1.3	3	
27-Feb	0	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	1	1	0	0	0	0	0	0	0	0.5	2	
28-Feb	1	1	0	0	0	Z	0	1	1	4	4	3	2	1	1	1	1	1	0	0	0	0	0	0	1.0	4	
																								Diurnal Average			
																								Diurnal Maximum			
0.5 0.9 0.8 0.6 0.9 0.9 0.8 0.4 0.4 0.5 0.7 0.8 1.5 2.9 3.9 4.5 4.0 2.7 1.6 1.2 1.1 0.7 0.6 0.8																											
3 11 7 3 11 13 12 1 1 4 4 3 10 27 47 67 65 38 22 15 16 6 4 10																											
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  
Millennium - February 2015







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	620	97.03	97.03
11 - 20	12	1.88	98.90
21 - 60	5	0.78	99.69
61 - 110	2	0.31	100.00
111 - 172	0	0.00	100.00
> 172	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Millennium - February 2015**

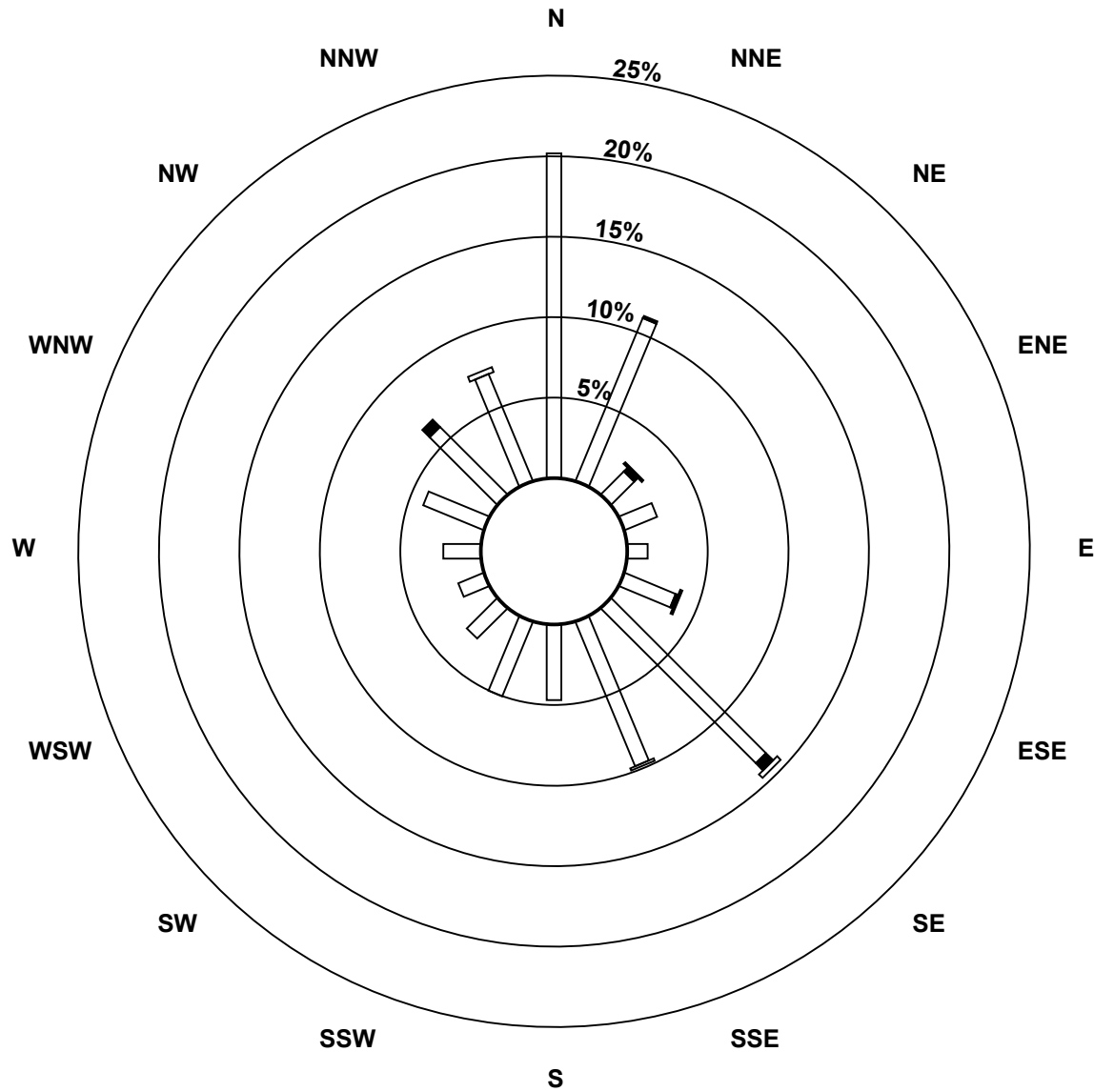
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	129	70	13	14	8	22	87	62	30	32	17	11	15	26	38	46	620
11 - 20	0	1	2	0	0	1	4	0	0	0	0	0	0	0	4	0	12
21 - 60	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	2	5
61 - 110	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	129	71	16	14	8	24	93	63	30	32	17	11	15	26	42	48	639

Total Number of Valid Hours: 639

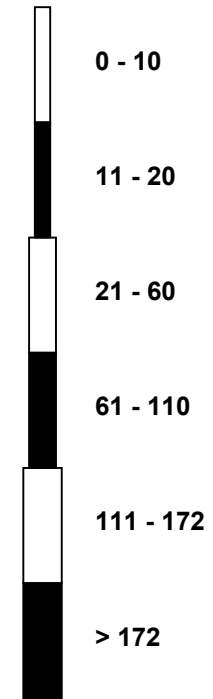
Total Number of Hours: 672

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium (AMS 12)**



**Classes (ppb)**

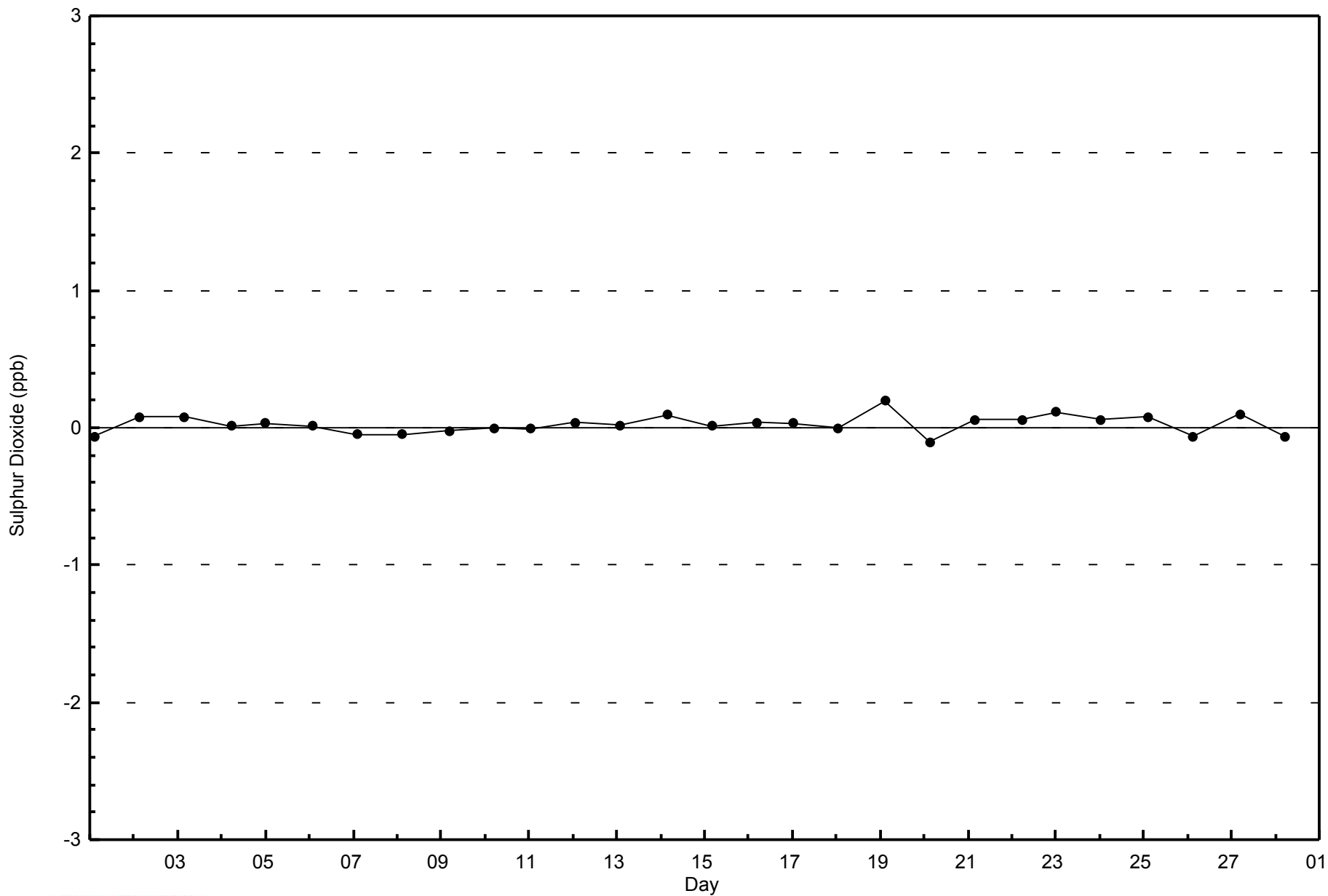


**Total Number of Valid Hours: 639**



WBEA  
Zero Responses

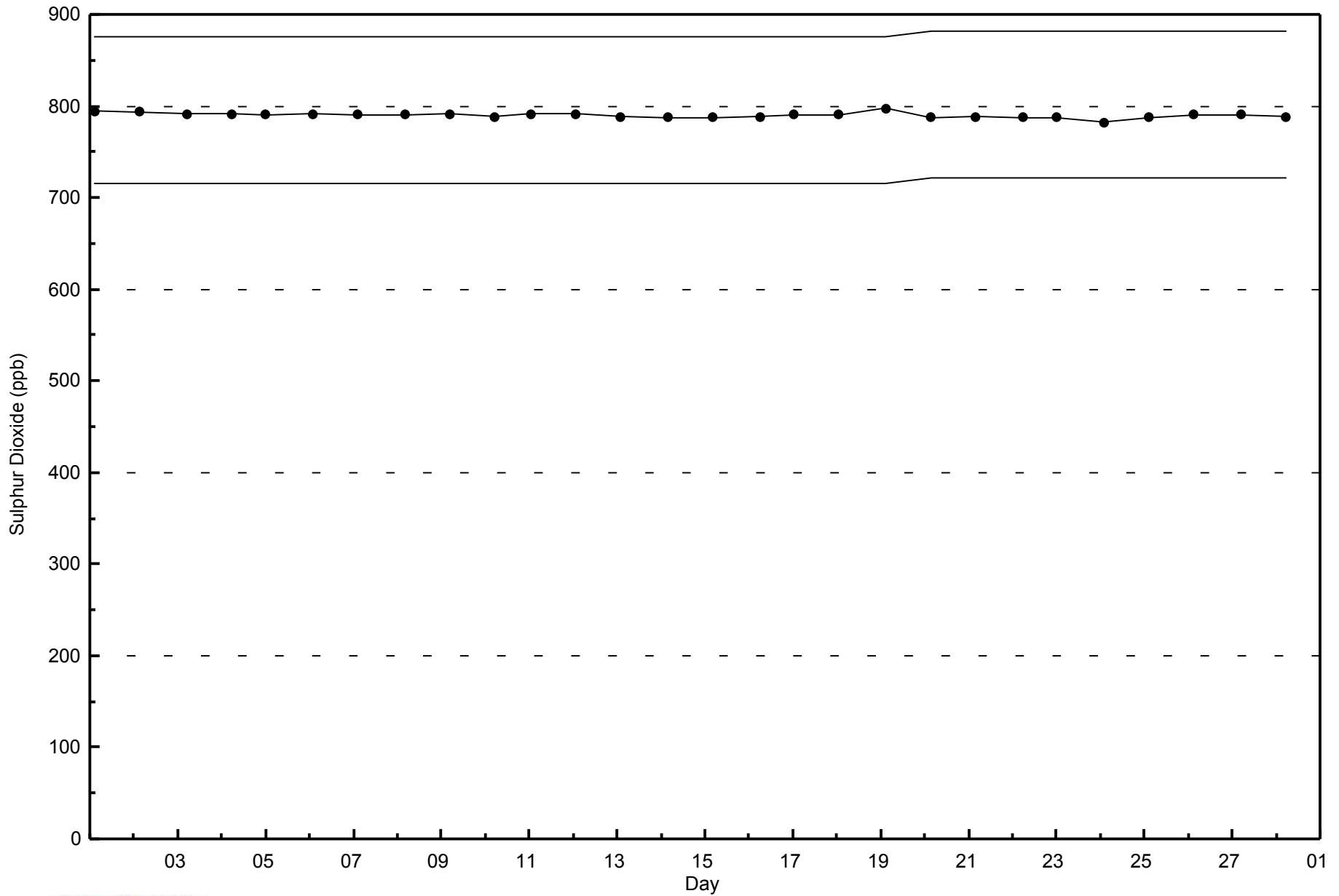
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Millennium - February 2015





Summary of Hour Averages

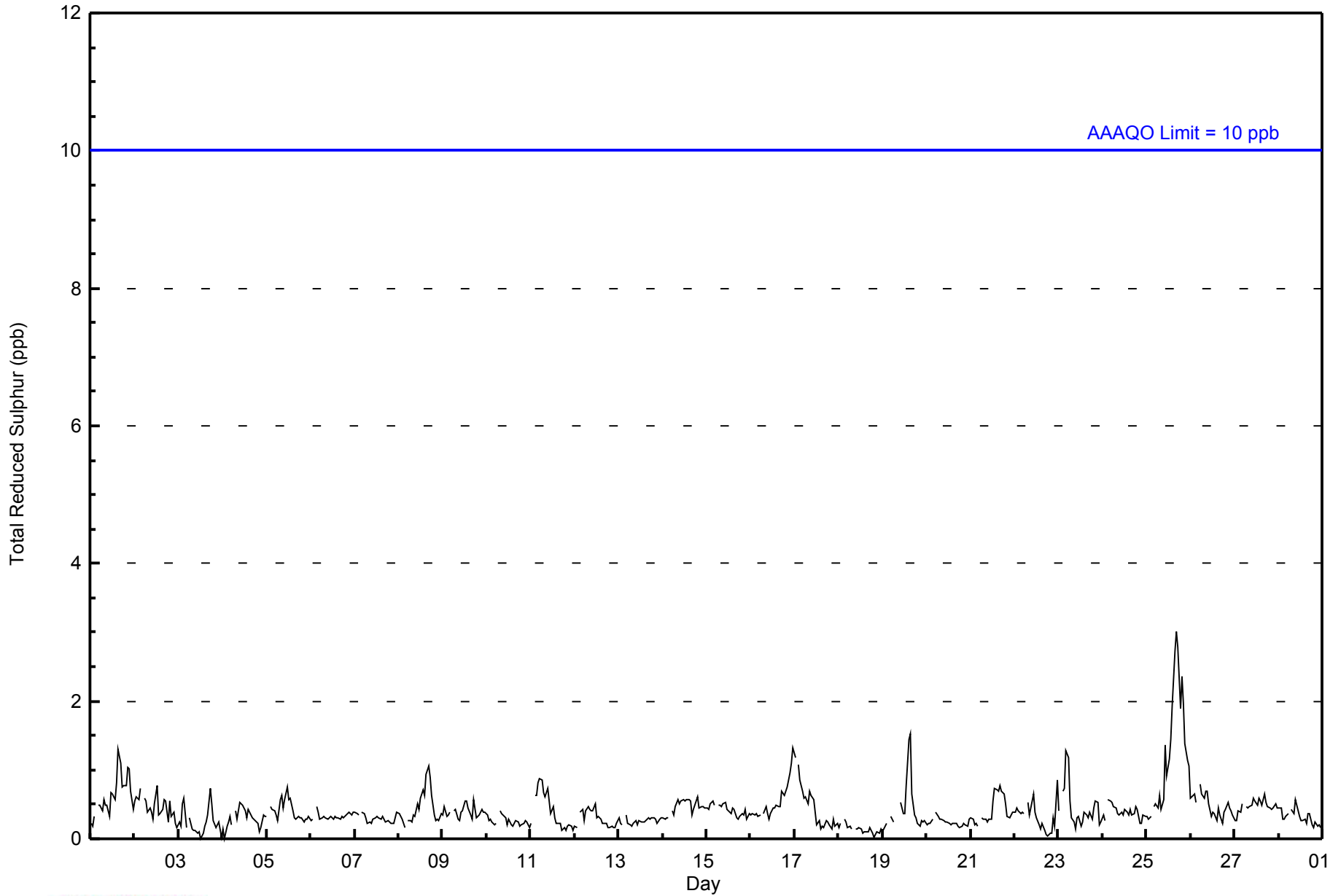
Millennium - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																								
Maximum Value: 3 ppb on Feb 25 17:00										Maximum Daily Average: 1.3 ppb on Feb 25										Hours of Data: 640																														
Minimum Value: 0 ppb on Feb 3 13:00										Minimum Daily Average: 0.1 ppb on Feb 18										Hours of Missing Data: 32																														
Maximum Diurnal Average: 0.5 ppb at hour 16										Minimum Diurnal Average: 0.3 ppb at hour 2										Hours of Calibration: 31																														
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> =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-Feb	0	0	0	Z	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0.6	1																								
2-Feb	1	1	1	1	Z	1	1	0	0	0	0	1	1	0	0	0	1	1	0	1	0	0	0	0	0.5	1																								
3-Feb	0	0	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0.2	1																								
4-Feb	0	0	0	0	0	0	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
5-Feb	0	Z	0	0	0	0	0	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1																								
6-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0																								
8-Feb	0	0	0	0	Z	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0.5	1																								
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0.4	1																								
10-Feb	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																								
11-Feb	0	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
13-Feb	0	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																								
14-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0.5	1																								
15-Feb	0	0	1	1	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
16-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0.5	1																								
17-Feb	1	Z	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
18-Feb	0	0	Z	0	0	0	0	0	M	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																								
19-Feb	0	0	0	Z	0	0	0	C	C	C	1	0	0	1	1	2	1	0	0	0	0	0	0	0	0.4	2																								
20-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0.4	1																								
22-Feb	0	0	0	0	0	0	Z	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1																								
23-Feb	0	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0.4	1																								
24-Feb	0	0	Z	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																								
25-Feb	0	0	0	Z	0	1	0	1	0	1	1	1	1	1	2	3	3	3	2	2	2	1	1	1	1.3	3																								
26-Feb	1	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0.5	1																								
27-Feb	0	0	0	0	1	Z	0	0	0	0	1	1	0	1	1	0	1	1	0	0	0	0	0	0	0.5	1																								
28-Feb	0	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																								
																								0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	Diurnal Average		
																								1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	3	3	3	2	2	2	1	1	1	Diurnal Maximum	
Z - zerospan      C - Calibration      M - Maintenance																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb																																																		



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	637	99.53	99.53
3 - 4	3	0.47	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: 640

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Millennium - February 2015**

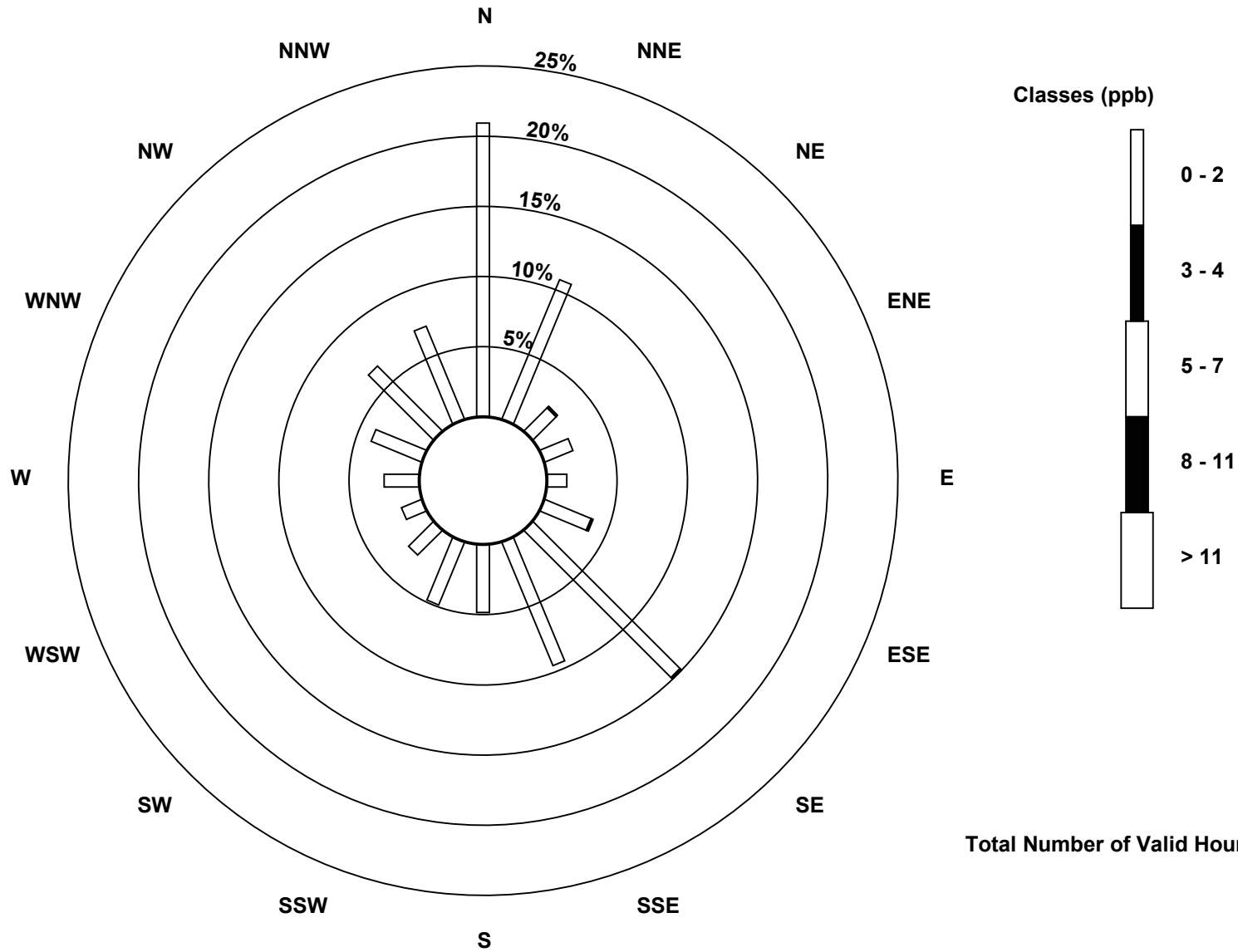
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	134	69	15	14	9	23	95	61	31	31	16	10	16	25	42	46	637
3 - 4	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	3
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	134	69	16	14	9	24	96	61	31	31	16	10	16	25	42	46	640

Total Number of Valid Hours: 640

Total Number of Hours: 672

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

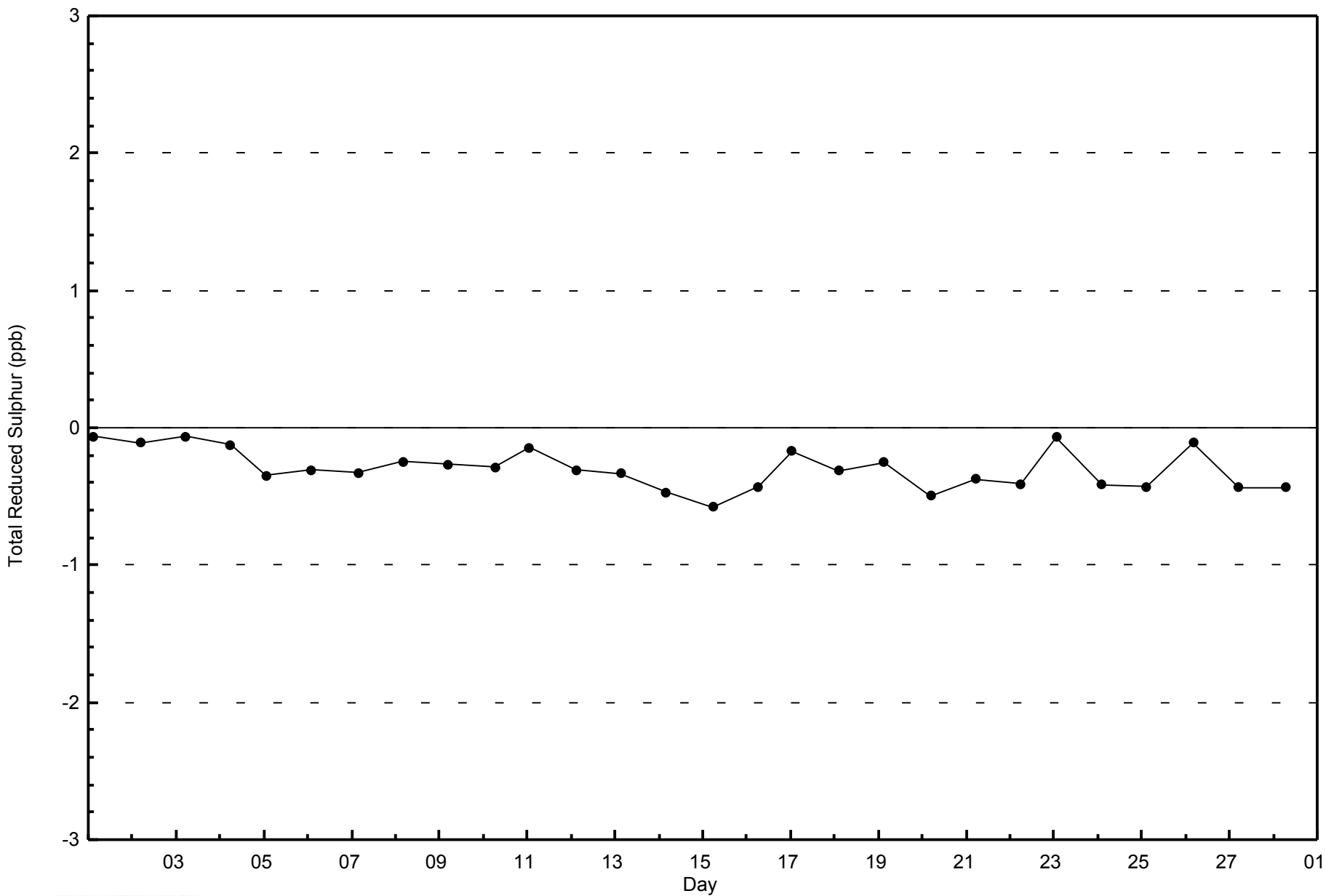
**Total Reduced Sulphur (TRS) - ppb  
Millennium (AMS 12)**





WBEA  
Zero Responses

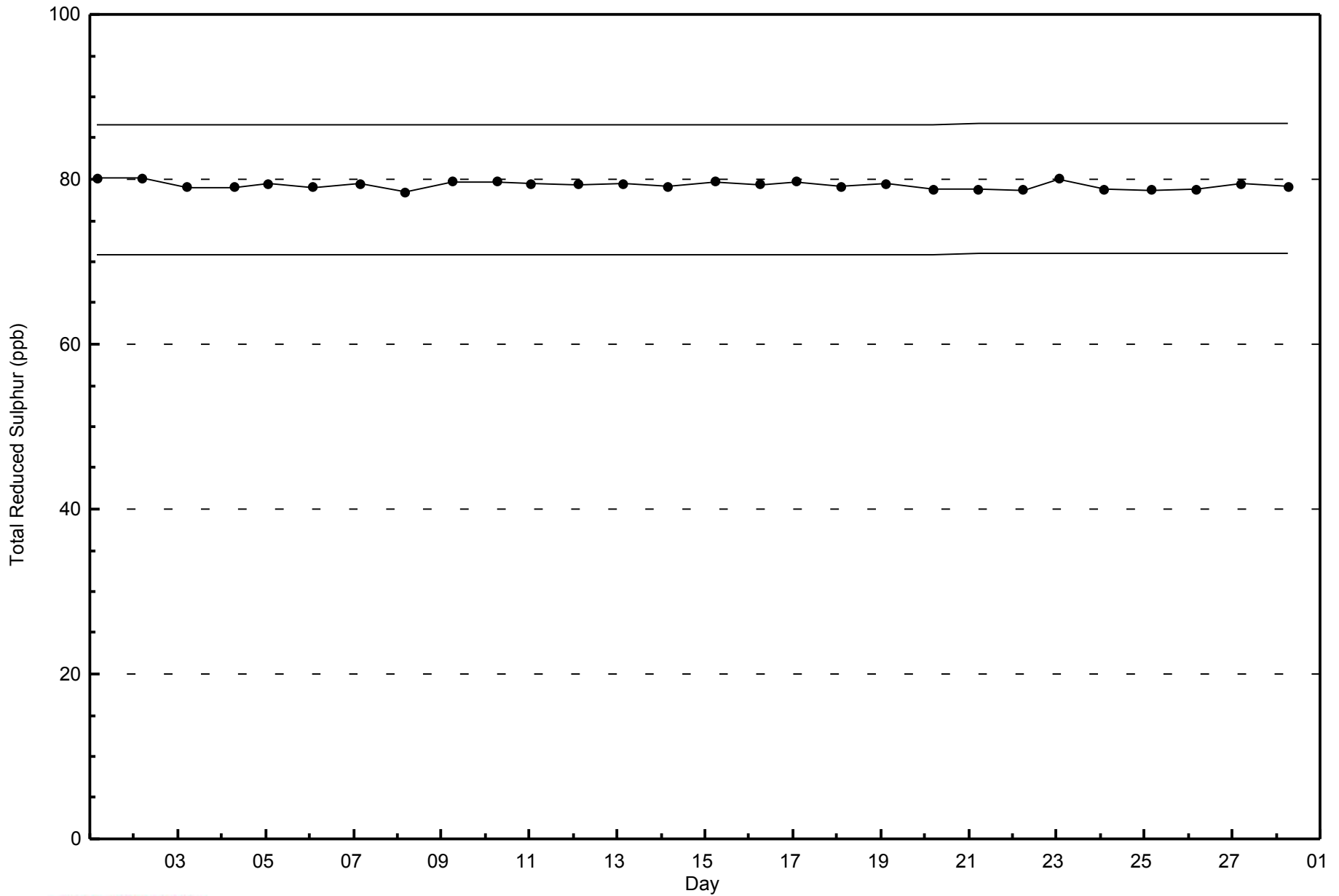
Total Reduced Sulphur (TRS) - ppb  
Millennium - February 2015





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
Millennium - February 2015





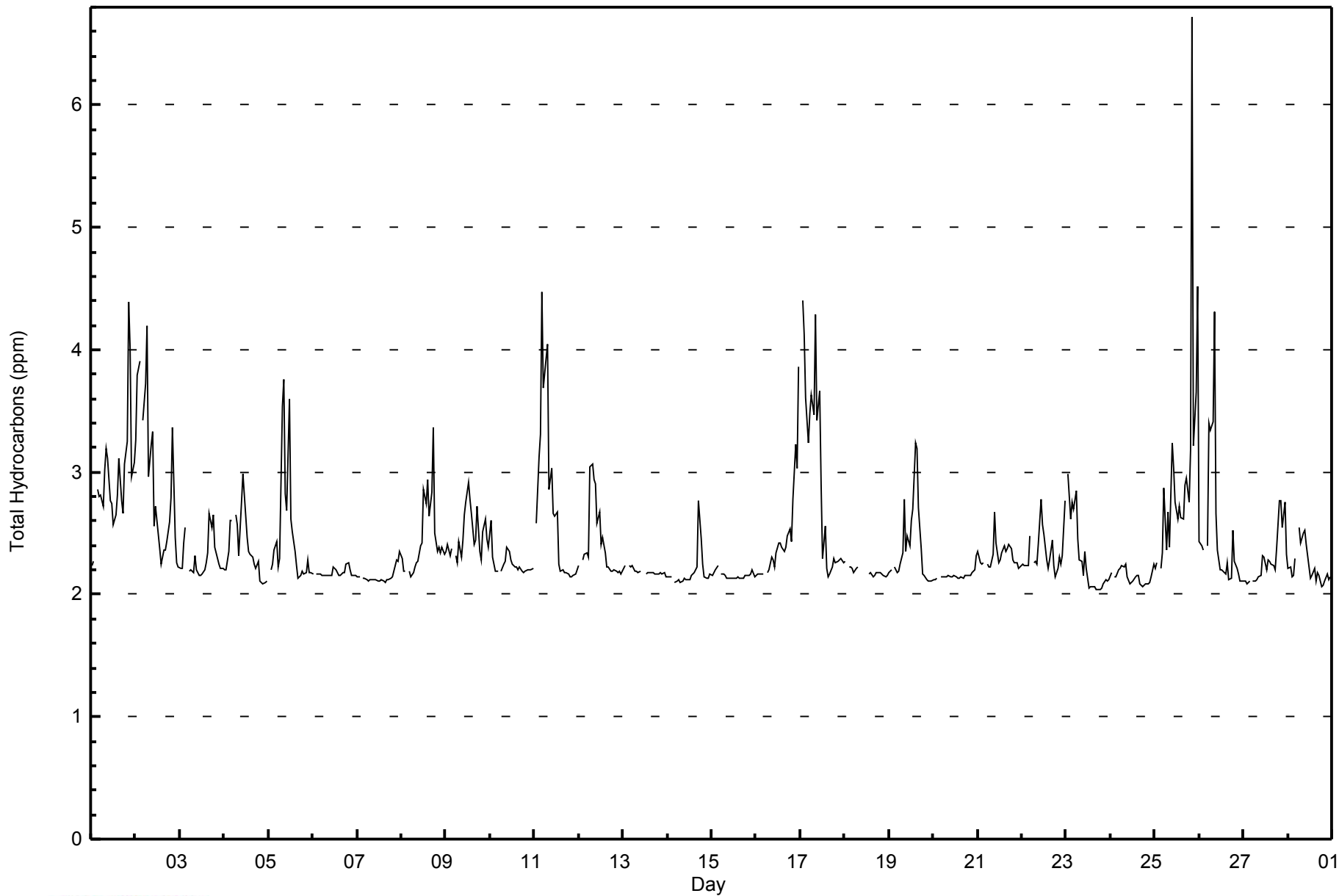
Maximum Value: 6.7 ppm on Feb 25 21:00		Maximum Daily Average: 3.0 ppm on Feb 25		Hours in Service: 672																						
Minimum Value: 2.0 ppm on Feb 23 18:00		Minimum Daily Average: 2.1 ppm on Feb 24		Hours of Data: 637																						
Maximum Diurnal Average: 2.6 ppm at hour 9		Minimum Diurnal Average: 2.3 ppm at hour 1		Hours of Missing Data: 35																						
Monthly Average: 2.41 ppm		Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.1 Q <sub>1</sub> = 2.2 Median = 2.2 Q <sub>3</sub> = 2.5 P <sub>90</sub> = 2.9 P <sub>99</sub> = 4.2		Hours of Calibration: 33																						
				Percent Operational Time: 99.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.2	2.3	Z	2.9	2.8	2.8	2.7	3.0	3.2	3.1	2.8	2.7	2.6	2.6	2.8	3.1	2.8	2.7	3.1	3.3	4.4	4.0	3.0	3.1	2.9	4.4
2-Feb	3.3	3.8	3.9	Z	3.4	3.7	4.2	3.0	3.2	3.3	2.6	2.7	2.5	2.4	2.3	2.4	2.4	2.4	2.6	2.8	3.4	2.5	2.3	2.2	2.9	4.2
3-Feb	2.2	2.2	2.4	2.5	Z	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.7	2.5	2.7	2.4	2.3	2.2	2.2	2.2	2.3	2.7
4-Feb	2.2	2.2	2.3	2.6	2.6	Z	2.6	2.6	2.3	2.8	3.0	2.8	2.5	2.4	2.3	2.3	2.2	2.2	2.3	2.1	2.1	2.1	2.1	2.1	2.4	3.0
5-Feb	Z	2.2	2.2	2.4	2.4	2.2	2.3	3.5	3.8	2.8	2.7	3.6	2.6	2.5	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.5	3.8
6-Feb	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.3
7-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.4	2.1	2.4
8-Feb	2.3	2.2	2.2	Z	2.2	2.1	2.2	2.2	2.3	2.3	2.4	2.4	2.9	2.7	2.9	2.6	2.8	3.4	2.5	2.3	2.4	2.3	2.4	2.3	2.5	3.4
9-Feb	2.4	2.4	2.3	2.4	Z	2.3	2.3	2.4	2.3	2.4	2.7	2.7	2.9	2.8	2.7	2.4	2.4	2.7	2.4	2.3	2.5	2.6	2.5	2.4	2.5	2.9
10-Feb	2.6	2.3	2.2	2.2	2.2	Z	2.2	2.2	2.3	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	2.2	2.6
11-Feb	Z	2.6	3.1	3.3	4.5	3.7	3.9	4.0	2.9	3.0	2.7	2.6	2.7	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.7	4.5
12-Feb	2.2	Z	2.3	2.3	2.3	2.3	3.0	3.1	2.9	2.9	2.6	2.7	2.4	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	3.1
13-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	UO	UO	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2
14-Feb	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	2.2	2.1	2.1	2.1	2.1	2.2	2.8
15-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.2	2.2
16-Feb	2.2	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.3	2.3	2.2	2.3	2.4	2.4	2.4	2.3	2.4	2.5	2.5	2.4	2.8	3.2	3.0	3.9	2.5	3.9
17-Feb	Z	4.4	4.1	3.6	3.2	3.5	3.6	3.5	4.3	3.4	3.7	2.9	2.3	2.6	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.9	4.4
18-Feb	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	C	C	C	C	C	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3
19-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.8	2.4	2.5	2.4	2.6	2.7	3.2	3.2	2.7	2.4	2.2	2.2	2.1	2.1	2.1	2.1	2.4	3.2
20-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3
21-Feb	2.3	2.3	2.3	2.3	Z	2.2	2.2	2.2	2.3	2.7	2.4	2.3	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.3	2.7
22-Feb	2.3	2.2	2.2	2.2	2.5	Z	2.3	2.3	2.2	2.4	2.8	2.6	2.5	2.3	2.2	2.3	2.4	2.2	2.1	2.2	2.3	2.2	2.3	2.8	2.3	2.8
23-Feb	Z	3.0	2.6	2.8	2.7	2.8	2.5	2.3	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.3	3.0
24-Feb	2.2	Z	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2
25-Feb	2.2	2.3	Z	2.2	2.3	2.9	2.4	2.7	2.4	3.2	3.0	2.8	2.6	2.7	2.6	2.6	2.9	3.0	2.8	3.2	6.7	3.2	3.7	4.5	3.0	6.7
26-Feb	2.4	2.4	2.4	Z	2.4	3.4	3.3	3.4	4.3	2.7	2.4	2.2	2.2	2.2	2.2	2.3	2.1	2.1	2.5	2.3	2.2	2.2	2.1	2.1	2.5	4.3
27-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.3	2.3	2.2	2.2	2.2	2.4	2.8	2.8	2.6	2.7	2.3	2.3	2.8
28-Feb	2.2	2.2	2.1	2.2	2.3	Z	2.5	2.4	2.5	2.5	2.4	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	2.2	2.5
																								Diurnal Average		
																								Diurnal Maximum		
																								2.3 3.3		
																								2.4 4.4		
																								2.4 4.1		
																								2.4 3.6		
																								2.5 4.5		
																								2.5 3.7		
																								2.5 4.2		
																								2.5 4.0		
																								2.6 4.3		
																								2.5 3.4		
																								2.5 3.7		
																								2.5 3.6		
																								2.4 2.9		
																								2.3 2.8		
																								2.3 3.2		
																								2.3 3.2		
																								2.3 2.9		
																								2.3 3.4		
																								2.3 3.1		
																								2.3 3.3		
																								2.5 6.7		
																								2.4 4.0		
																								2.3 3.7		
																								2.4 4.5		

Z - zerospan                      C - Calibration                      UO - Unstable Operation



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Millennium - February 2015





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

**Total Hydrocarbons (THC) - ppm**  
**Millennium - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	4	0.63	0.63
2.1 - 3.0	581	91.21	91.84
3.1 - 10.0	52	8.16	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Millennium - February 2015**

Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
2.1 - 3.0	128	67	13	14	8	23	88	61	27	15	5	9	13	22	41	47	581
3.1 - 10.0	0	1	1	0	0	1	5	2	3	17	12	2	2	4	1	1	52
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	129	71	14	14	8	24	93	63	30	32	17	11	15	26	42	48	637

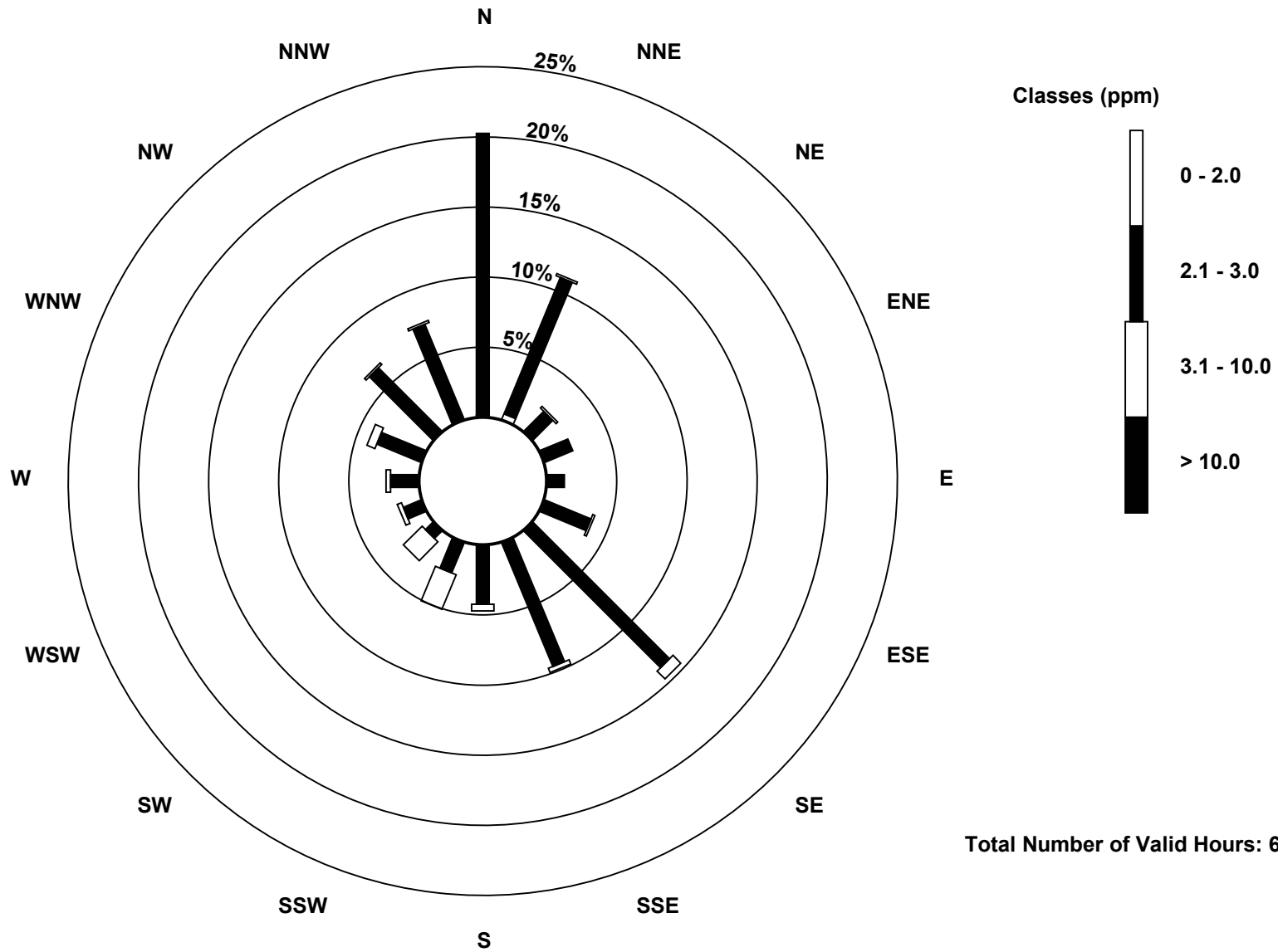
Total Number of Valid Hours: 637

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Total Hydrocarbons (THC) - ppm  
Millennium (AMS 12)

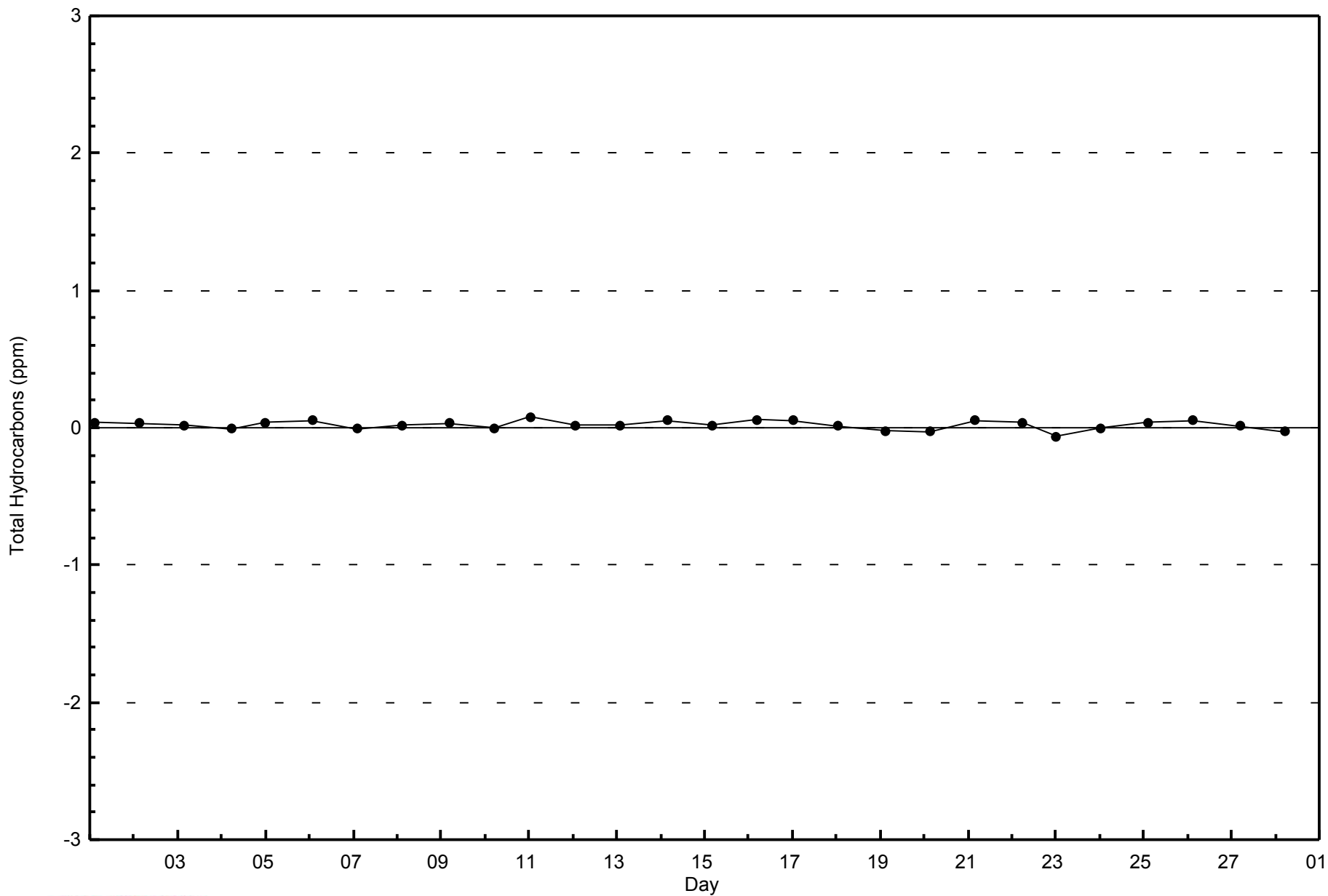


Total Number of Valid Hours: 637



WBEA  
Zero Responses

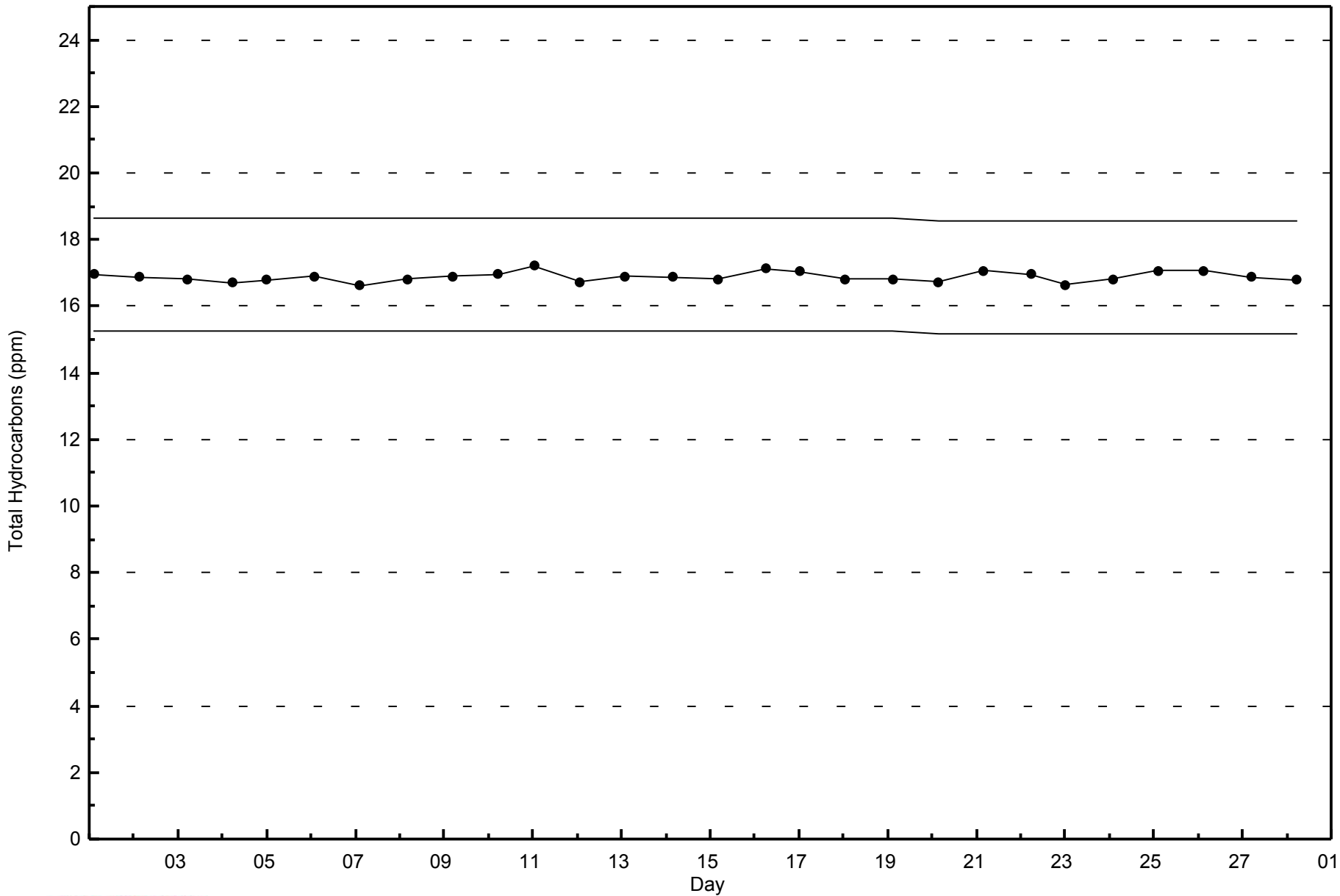
Total Hydrocarbons (THC) - ppm  
Millennium - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Millennium - February 2015



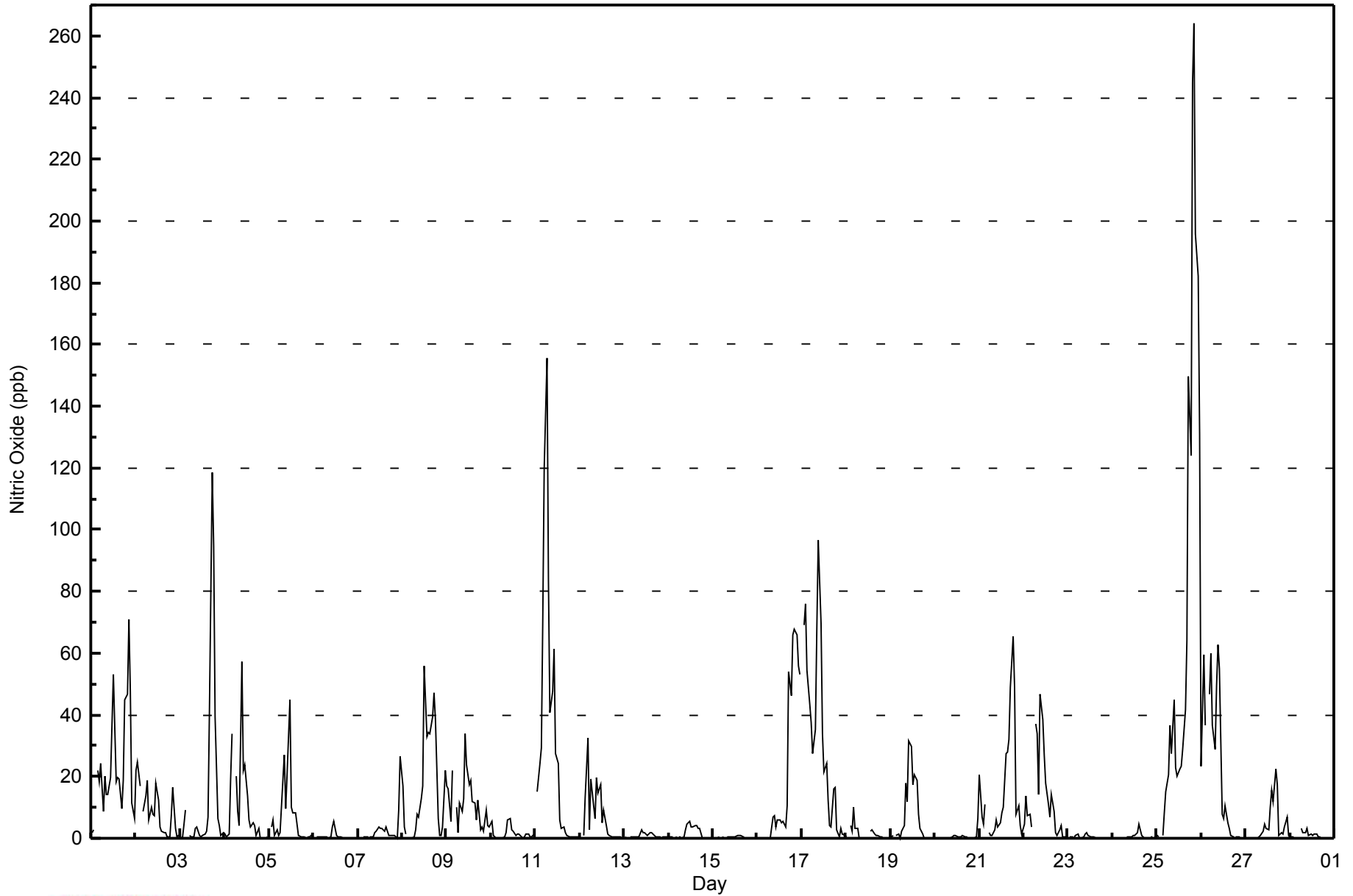


Maximum Value: 264 ppb on Feb 25 21:00																		Maximum Daily Average: 72.6 ppb on Feb 25																		Hours in Service: 672	
Minimum Value: 0 ppb on Feb 4 20:00																		Minimum Daily Average: 0.3 ppb on Feb 15																		Hours of Data: 639	
Maximum Diurnal Average: 17.7 ppb at hour 10																		Minimum Diurnal Average: 4.9 ppb at hour 1																		Hours of Missing Data: 33	
Monthly Average: 11.9 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 2 Q <sub>3</sub> = 12 P <sub>90</sub> = 35 P <sub>99</sub> = 144																		Hours of Calibration: 33	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Feb	2	3	Z	22	18	24	9	20	14	14	20	37	53	18	20	19	9	19	45	47	71	47	11	6	23.9	71											
2-Feb	22	25	17	Z	9	14	19	6	10	8	8	18	13	4	2	2	2	1	0	7	16	3	0	1	8.9	25											
3-Feb	0	0	5	9	Z	1	0	0	3	4	1	0	1	1	2	7	41	119	95	40	6	4	1	2	14.9	119											
4-Feb	2	0	1	19	34	Z	20	8	4	57	22	24	14	6	4	5	4	1	3	0	0	0	0	0	10.0	57											
5-Feb	Z	3	6	1	3	1	2	19	27	10	21	45	10	8	8	5	1	1	0	0	0	1	1	1	7.5	45											
6-Feb	0	Z	0	1	1	1	1	0	0	1	3	5	1	0	1	0	0	0	0	0	0	0	0	0	0.7	5											
7-Feb	0	0	Z	0	0	0	0	0	1	2	2	4	3	3	2	4	2	1	1	1	1	0	9	27	2.8	27											
8-Feb	17	4	1	Z	0	0	1	3	8	7	13	17	56	33	34	34	39	47	38	7	1	1	4	22	16.8	56											
9-Feb	17	16	5	22	Z	10	2	11	8	13	34	24	17	19	12	12	6	12	3	4	2	9	4	4	11.6	34											
10-Feb	5	1	0	0	0	Z	0	1	2	6	6	3	2	1	1	1	1	0	0	1	1	0	0	2	1.6	6											
11-Feb	Z	15	24	29	71	120	155	84	41	48	61	27	24	6	3	4	2	1	0	1	0	1	1	0	31.3	155											
12-Feb	1	Z	1	13	32	3	19	10	7	20	14	17	5	9	4	1	1	0	1	0	0	0	0	0	7.0	32											
13-Feb	0	0	Z	0	0	0	0	0	0	3	2	2	1	1	2	2	1	0	0	0	0	0	1	0	0.8	3											
14-Feb	0	0	0	Z	0	0	0	0	0	1	3	5	5	3	4	4	3	3	0	0	0	0	0	0	1.6	5											
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0.3	1											
16-Feb	0	0	0	0	0	Z	0	0	7	8	4	6	6	5	6	4	10	54	46	66	68	66	56	53	20.2	68											
17-Feb	Z	69	76	54	43	37	28	35	68	97	70	34	21	24	12	4	4	16	17	3	1	3	1	1	31.2	97											
18-Feb	1	Z	4	2	10	3	3	0	C	C	C	C	C	2	3	1	1	1	0	0	0	0	0	0	1.8	10											
19-Feb	0	1	Z	1	1	0	2	4	18	12	32	30	17	20	19	8	3	1	0	0	0	0	0	0	7.4	32											
20-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	6	0.5	6											
21-Feb	20	7	4	11	Z	2	1	1	3	6	4	5	8	10	27	28	32	49	65	49	8	10	4	2	15.5	65											
22-Feb	4	14	8	8	4	Z	37	34	14	47	39	27	18	11	7	14	9	2	1	3	4	0	1	1	13.2	47											
23-Feb	Z	0	0	0	1	1	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	2											
24-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	2	4	3	1	0	0	0	0	0	0	0.6	4											
25-Feb	1	1	Z	1	8	15	20	36	28	45	23	20	22	23	29	42	64	150	124	245	264	196	182	131	72.6	264											
26-Feb	23	60	37	Z	47	60	37	29	50	63	55	8	6	11	5	3	1	0	0	0	0	0	0	0	21.5	63											
27-Feb	0	0	0	0	Z	0	0	0	1	2	5	3	3	10	16	12	23	17	1	2	2	4	7	1	4.7	23											
28-Feb	0	0	0	0	0	Z	3	2	2	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.8	3											
																		4.9 9.2 8.3 8.5 12.3 12.8 12.9 10.9 11.7 17.7 16.5 13.5 11.5 8.5 8.2 7.8 9.3 17.7 15.8 17.0 16.0 12.4 10.1 9.3																		Diurnal Average	
																		23 69 76 54 71 120 155 84 68 97 70 45 56 33 34 42 64 150 124 245 264 196 182 131																		Diurnal Maximum	
Z - zerospan C - Calibration																																					



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Millennium - February 2015





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

**Nitric Oxide (NO) - ppb**  
**Millennium - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	534	83.57	83.57
21 - 40	52	8.14	91.71
41 - 80	40	6.26	97.97
81 - 159	9	1.41	99.37
> 159	4	0.63	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Millennium - February 2015**

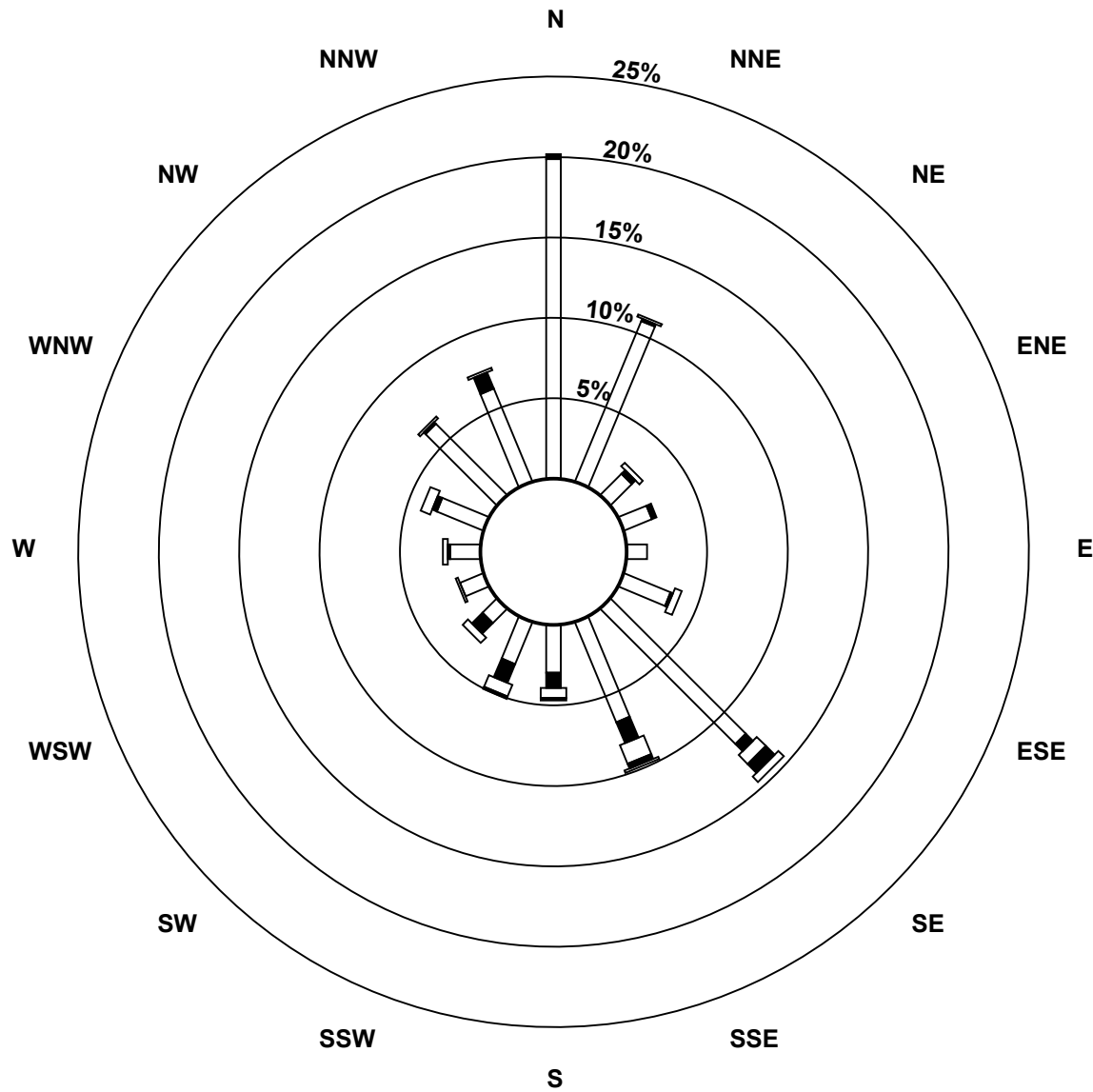
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	127	69	12	12	8	20	76	43	19	18	8	10	12	20	40	40	534
21 - 40	2	1	2	2	0	1	4	9	6	8	6	0	1	2	1	7	52
11 - 80	0	1	2	0	0	3	5	8	4	5	3	1	2	4	1	1	40
81 - 159	0	0	0	0	0	0	5	2	1	1	0	0	0	0	0	0	9
> 159	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	4
<b>Totals</b>	129	71	16	14	8	24	93	63	30	32	17	11	15	26	42	48	639

Total Number of Valid Hours: 639

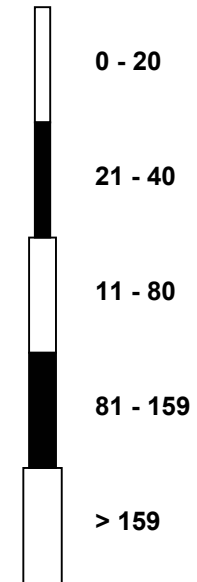
Total Number of Hours: 672

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

**Nitric Oxide (NO) - ppb  
Millennium (AMS 12)**



**Classes (ppb)**



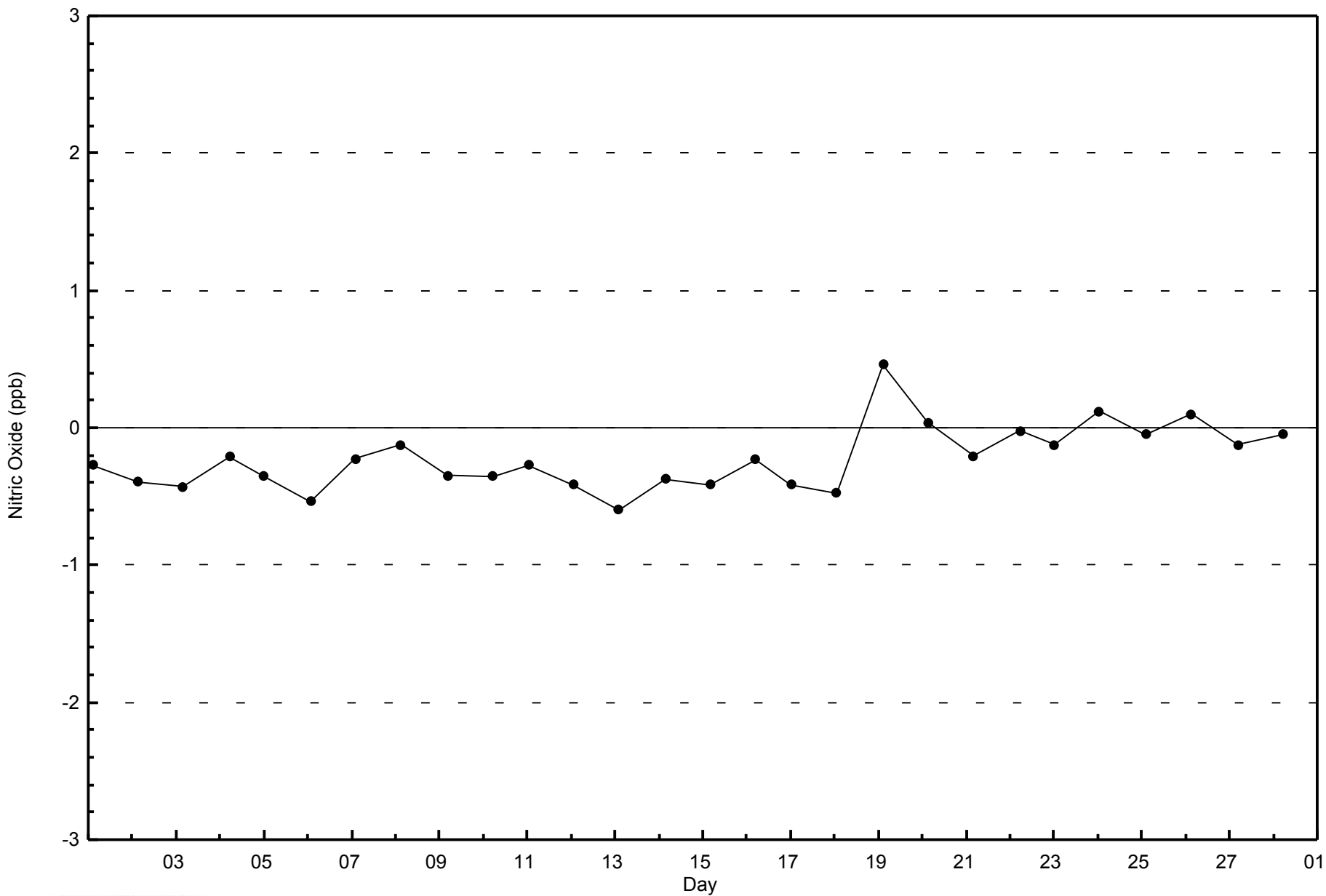
**Total Number of Valid Hours: 639**





WBEA  
Zero Responses

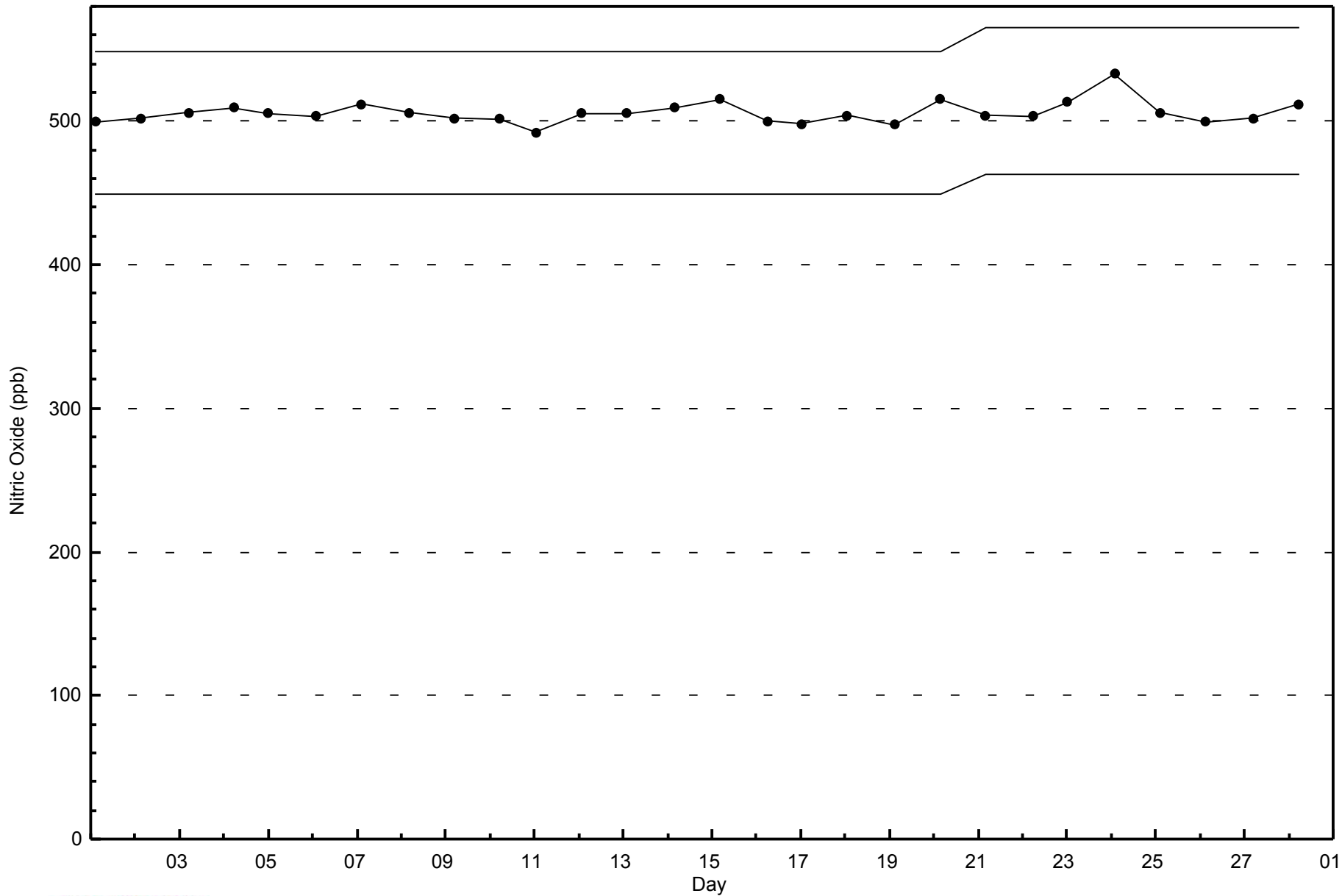
Nitric Oxide (NO) - ppb  
Millennium - February 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Millennium - February 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 60 ppb on Feb 25 21:00	Maximum Daily Average: 33.9 ppb on Feb 25
Minimum Value: 1 ppb on Feb 20 13:00	Hours of Data: 639
Maximum Diurnal Average: 19.6 ppb at hour 6	Hours of Missing Data: 33
Monthly Average: 16.1 ppb	Hours of Calibration: 33
Minimum Daily Average: 4.3 ppb on Feb 20	Percent Operational Time: 100.0
Minimum Diurnal Average: 9.6 ppb at hour 14	
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 13 Q <sub>3</sub> = 25 P <sub>90</sub> = 34 P <sub>99</sub> = 46	

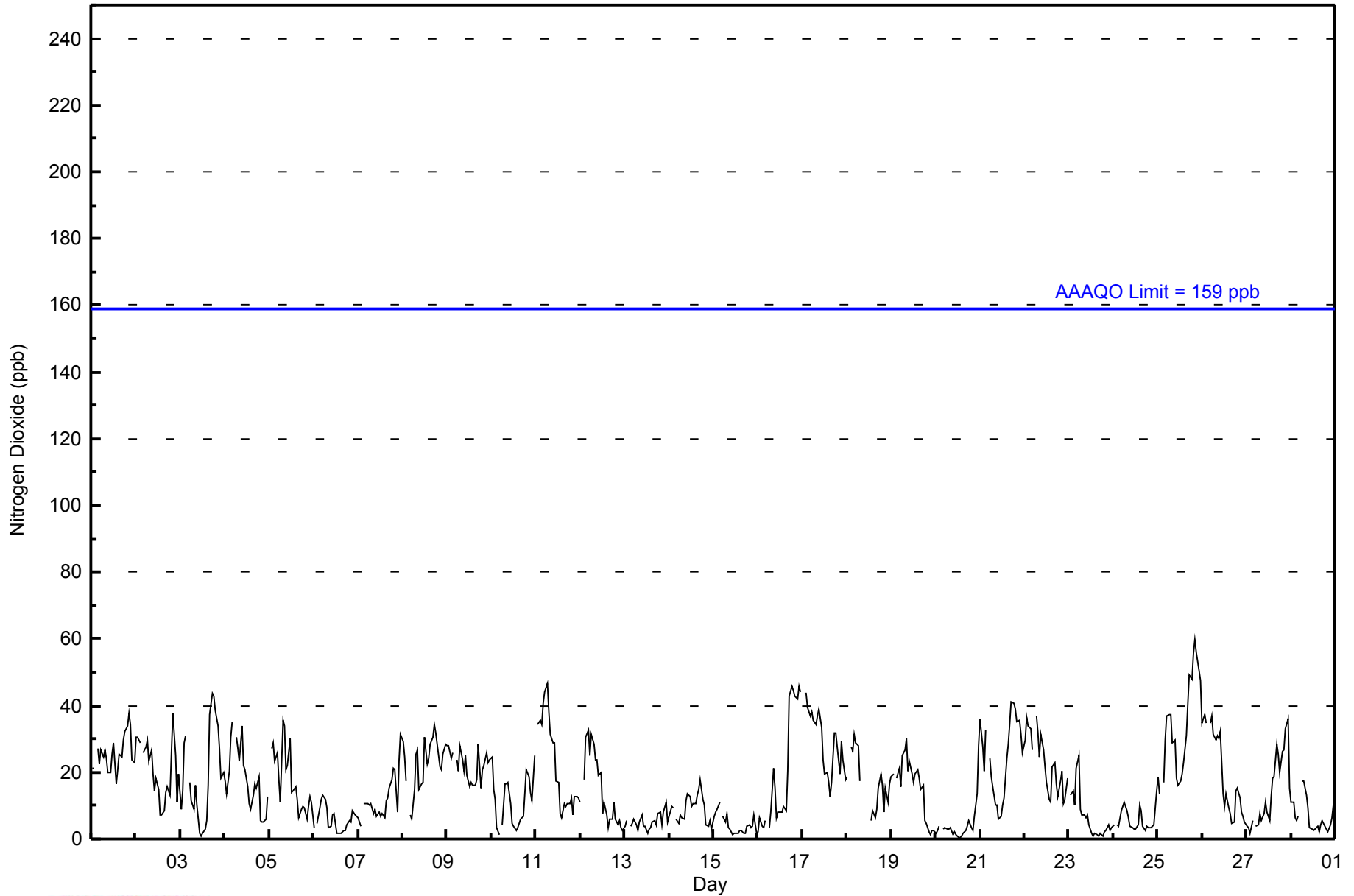
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	21	21	Z	27	23	27	25	27	24	20	20	26	29	16	21	25	25	30	32	34	38	34	24	23	25.7	38																							
2-Feb	31	31	Z	29	26	28	30	23	27	20	14	18	15	7	7	8	14	16	13	26	38	25	11	19	20.6	38																							
3-Feb	9	14	29	31	Z	17	11	9	16	10	2	1	2	3	5	16	37	44	43	39	34	27	18	20	19.0	44																							
4-Feb	17	14	20	30	35	Z	30	27	23	34	22	21	16	10	9	13	17	15	19	5	5	5	6	13	17.7	35																							
5-Feb	Z	27	29	23	26	18	11	36	34	21	22	30	14	14	16	12	7	9	10	9	6	10	13	11	17.7	36																							
6-Feb	3	Z	5	10	12	13	12	10	4	4	7	8	2	2	2	2	2	3	4	5	5	8	7	7	5.9	13																							
7-Feb	6	4	Z	10	11	10	10	11	8	9	7	8	7	8	7	11	12	15	18	21	21	8	23	32	12.0	32																							
8-Feb	29	24	17	Z	7	6	15	26	27	15	17	17	30	22	24	28	31	34	32	25	22	21	25	28	22.7	34																							
9-Feb	28	28	24	26	Z	24	20	28	24	20	25	19	16	17	16	16	18	28	15	21	22	26	23	24	22.1	28																							
10-Feb	25	15	12	3	1	Z	4	17	17	17	10	5	4	3	3	5	6	7	14	21	19	14	12	25	11.2	25																							
11-Feb	Z	34	36	34	41	44	47	38	31	29	29	17	17	8	6	10	10	10	11	12	7	13	13	12	22.1	47																							
12-Feb	11	Z	18	31	33	25	32	28	24	24	19	20	8	11	7	3	6	6	11	6	4	5	4	3	14.7	33																							
13-Feb	4	5	Z	4	5	6	4	2	5	7	4	4	2	3	4	5	6	4	8	8	4	8	11	5	5.1	11																							
14-Feb	7	10	10	Z	6	5	7	6	6	11	14	13	10	10	10	13	15	18	12	10	4	4	5	3	9.1	18																							
15-Feb	7	8	9	11	Z	7	5	8	4	3	1	2	2	2	3	2	2	2	4	4	4	4	7	2	4.4	11																							
16-Feb	2	6	4	4	6	Z	4	8	21	15	6	8	8	8	10	9	20	43	46	44	43	42	46	44	19.4	46																							
17-Feb	Z	44	44	39	37	38	36	35	37	39	34	24	19	20	17	13	17	32	32	28	20	29	24	18	29.2	44																							
18-Feb	19	Z	28	26	31	29	28	18	C	C	C	C	C	6	9	6	9	15	20	16	8	15	11	17	17.2	31																							
19-Feb	19	19	Z	18	21	16	25	27	30	20	23	20	17	20	21	18	15	16	6	5	2	1	2	3	15.8	30																							
20-Feb	2	3	4	Z	3	3	3	3	3	1	2	1	1	1	1	2	2	4	5	4	3	7	14	28	4.3	28																							
21-Feb	36	28	20	33	Z	24	19	16	10	10	6	7	10	12	24	28	35	41	41	39	35	36	32	26	24.6	41																							
22-Feb	30	36	34	33	27	Z	37	32	25	31	27	22	17	12	11	22	23	16	13	17	21	11	12	18	22.9	37																							
23-Feb	Z	13	14	10	21	25	9	7	7	6	7	4	2	1	2	1	1	2	1	2	2	4	3	3	6.5	25																							
24-Feb	4	Z	4	4	9	10	11	9	6	4	3	3	3	4	10	8	4	2	4	4	3	4	4	14	5.7	14																							
25-Feb	19	14	Z	17	30	37	37	37	29	30	18	16	17	19	23	31	40	49	48	55	60	56	50	47	33.9	60																							
26-Feb	35	37	35	Z	35	37	31	30	31	30	32	14	10	14	10	8	5	5	14	15	12	8	7	5	19.9	37																							
27-Feb	4	3	2	6	Z	4	4	8	6	8	11	8	6	13	18	19	29	25	20	26	27	33	36	15	14.2	36																							
28-Feb	11	11	7	5	7	Z	17	17	13	9	3	3	3	3	4	2	4	6	4	3	2	4	6	10	6.7	17																							
																								15.7	18.7	18.7	19.0	19.6	19.6	18.7	19.3	18.2	16.6	14.3	12.5	10.5	9.6	10.6	12.1	14.6	17.7	17.7	18.0	16.8	16.5	16.0	17.0	Diurnal Average	
																								36	44	44	39	41	44	47	38	37	39	34	30	30	22	24	31	40	49	48	55	60	56	50	47	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  
Millennium - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	431	67.45	67.45
21 - 40	185	28.95	96.40
41 - 80	23	3.60	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Millennium - February 2015**

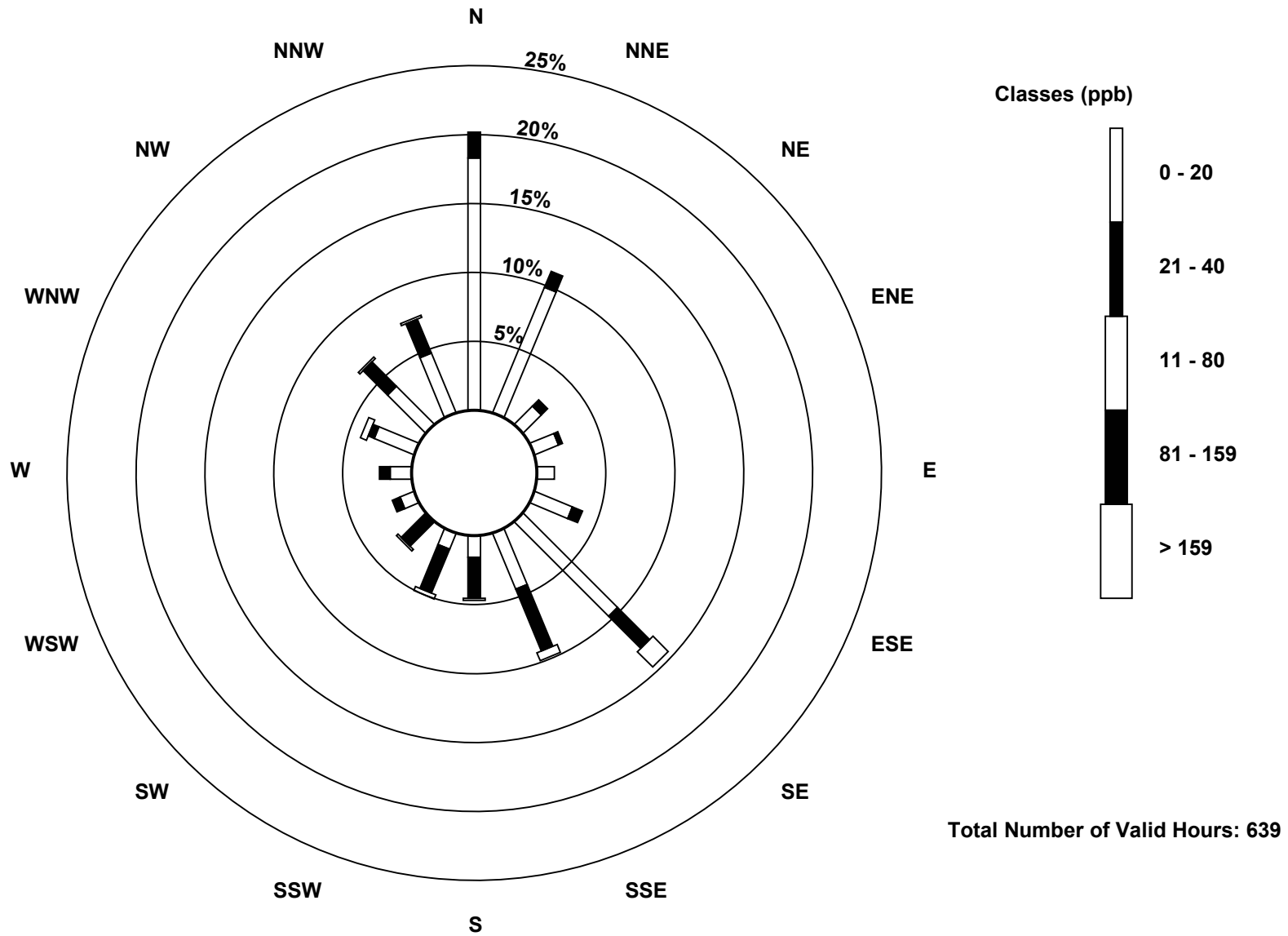
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	117	63	12	12	8	19	62	28	10	8	0	7	10	20	25	30	431
21 - 40	12	8	4	2	0	5	21	31	19	22	16	4	5	3	16	17	185
41 - 80	0	0	0	0	0	0	10	4	1	2	1	0	0	3	1	1	23
81 - 159	0	0	0	0	0	0	0	0	0	0	0	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>	129	71	16	14	8	24	93	63	30	32	17	11	15	26	42	48	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

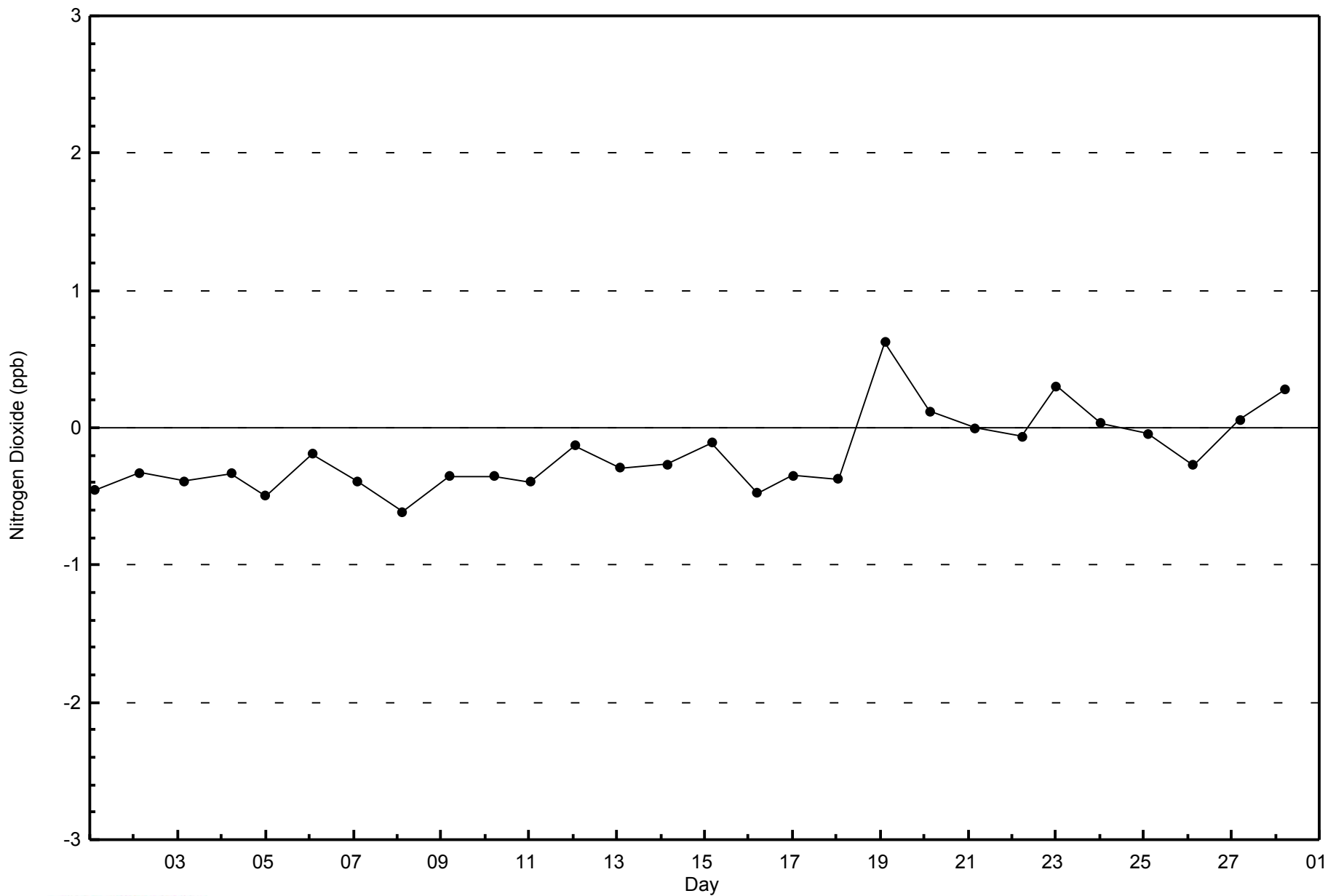
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium (AMS 12)





WBEA  
Zero Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium - February 2015

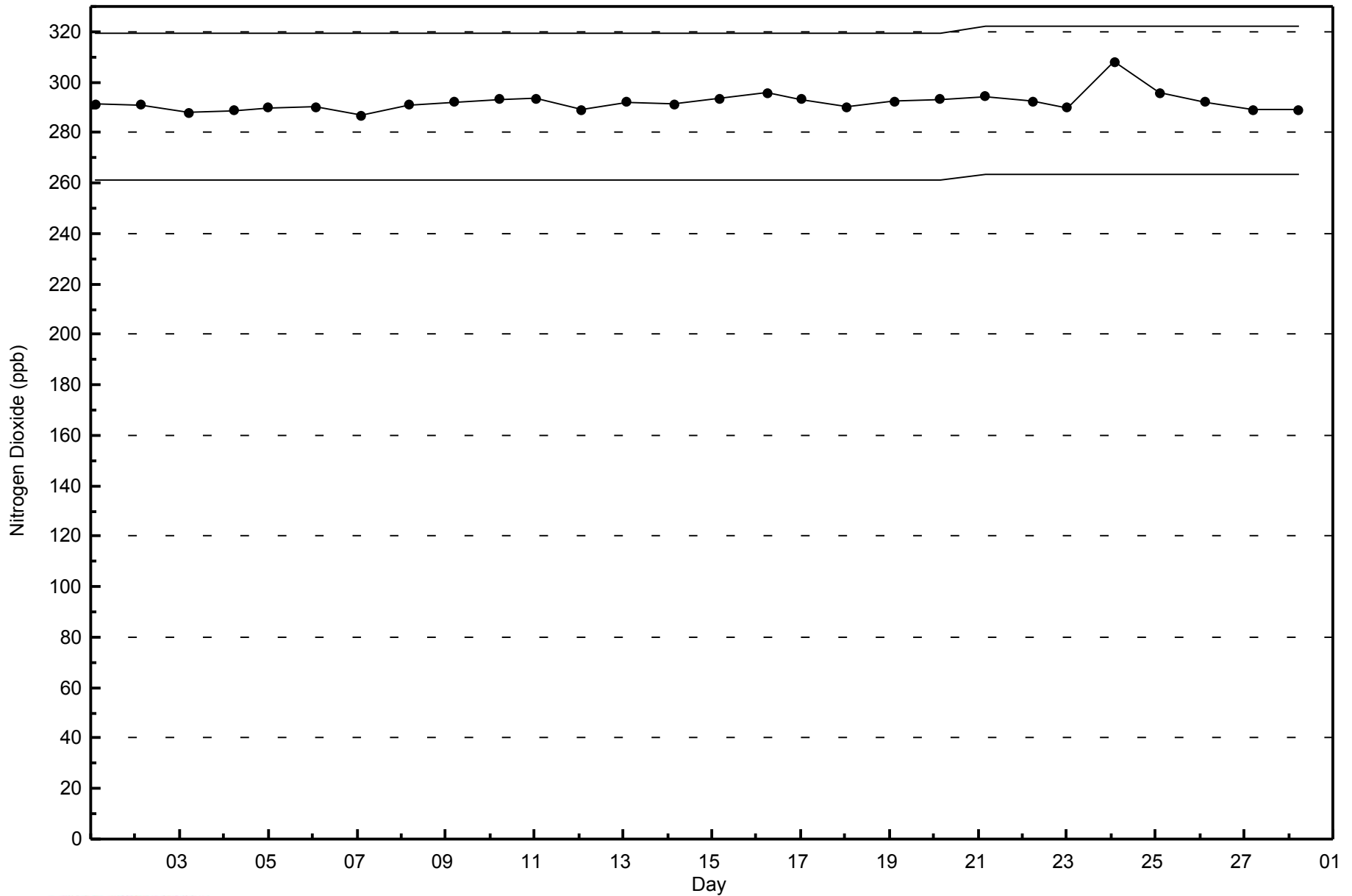






WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Millennium - February 2015



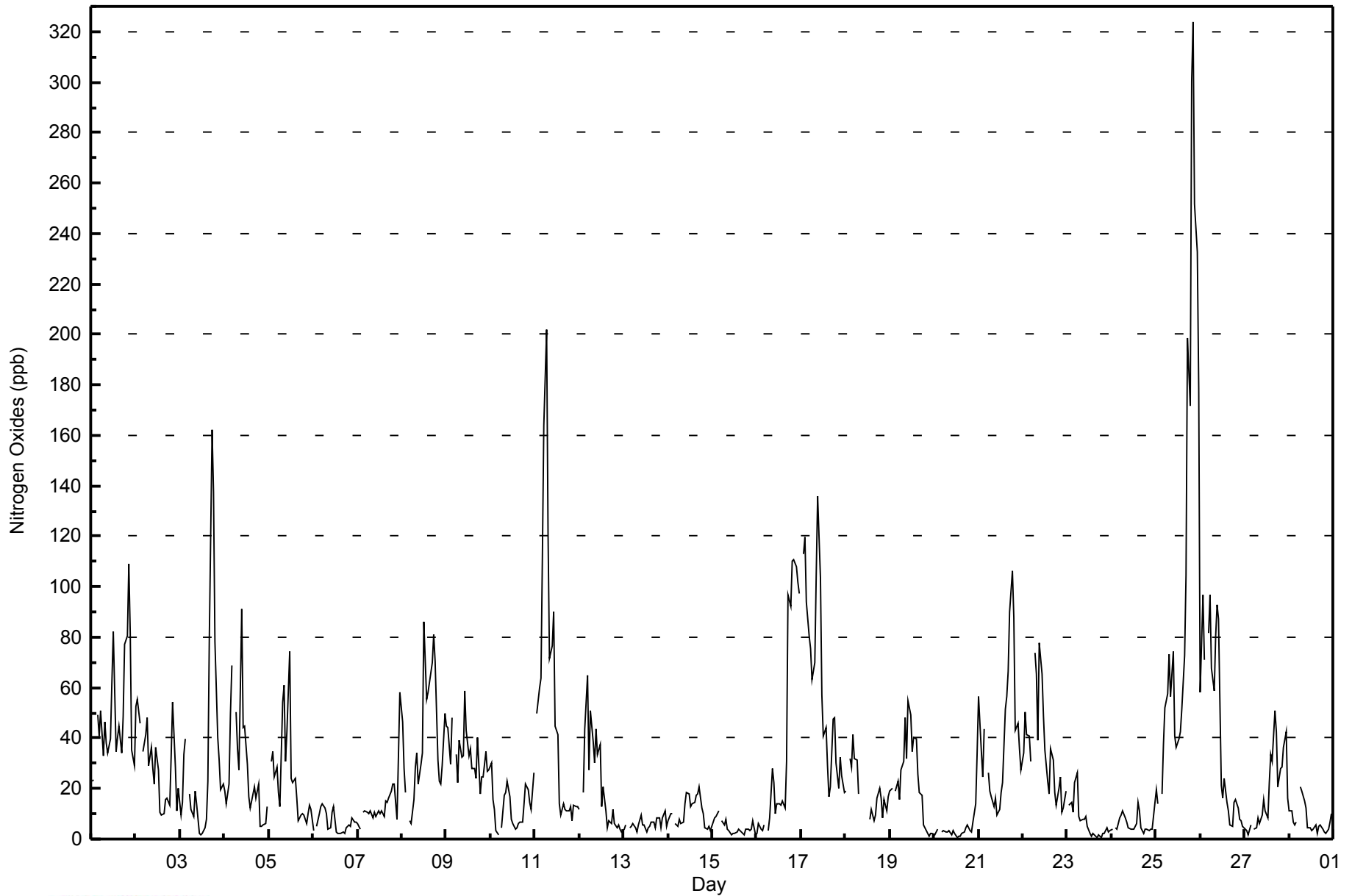


Maximum Value: 324 ppb on Feb 25 21:00		Maximum Daily Average: 106.5 ppb on Feb 25		Hours in Service: 672																							
Minimum Value: 1 ppb on Feb 23 19:00		Minimum Daily Average: 4.7 ppb on Feb 15		Hours of Data: 639																							
Maximum Diurnal Average: 35.4 ppb at hour 18		Minimum Diurnal Average: 18.0 ppb at hour 14		Hours of Missing Data: 33																							
Monthly Average: 27.9 ppb		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 16 Q <sub>3</sub> = 35 P <sub>90</sub> = 66 P <sub>99</sub> = 196		Hours of Calibration: 33																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	23	24	Z	49	41	51	33	47	38	34	40	62	82	35	40	45	34	49	77	80	109	82	35	29	49.5	109	
2-Feb	53	55	46	Z	35	41	48	29	37	28	22	36	28	11	10	10	16	16	13	33	54	29	11	20	29.6	55	
3-Feb	9	15	33	40	Z	18	12	9	19	14	3	1	2	4	8	23	78	162	138	78	40	32	19	22	33.9	162	
4-Feb	19	14	22	50	69	Z	50	36	27	91	44	45	30	17	12	18	21	16	22	5	5	5	6	13	27.7	91	
5-Feb	Z	31	35	24	28	19	13	54	61	31	43	75	24	22	16	7	10	10	10	10	6	10	13	12	25.2	75	
6-Feb	3	Z	5	10	13	14	12	10	4	4	10	13	3	2	2	2	3	2	4	6	5	9	7	7	6.5	14	
7-Feb	6	4	Z	11	11	11	10	11	8	11	9	11	10	11	9	15	14	16	19	22	22	8	32	58	14.8	58	
8-Feb	46	28	19	Z	7	6	15	28	34	22	29	34	86	55	58	62	70	81	70	31	23	22	29	50	39.5	86	
9-Feb	45	44	30	48	Z	34	22	39	32	33	59	43	33	36	28	28	24	40	18	25	24	35	27	27	33.7	59	
10-Feb	30	16	12	3	1	Z	4	17	18	23	17	8	6	4	5	6	7	7	14	22	20	15	12	27	12.8	30	
11-Feb	Z	50	60	63	112	164	202	122	72	77	90	45	41	14	9	14	12	11	11	13	7	14	13	13	53.4	202	
12-Feb	12	Z	18	44	65	28	51	39	30	44	34	37	13	20	11	5	7	6	12	6	4	6	4	3	21.7	65	
13-Feb	4	6	Z	4	5	6	4	3	6	10	6	6	3	4	5	7	7	4	8	8	4	8	11	5	5.9	11	
14-Feb	7	10	10	Z	6	5	8	6	7	14	18	13	14	14	17	18	21	12	10	4	4	5	3	10.7	21		
15-Feb	7	8	9	11	Z	7	5	8	4	4	2	2	2	3	4	3	2	2	4	4	3	4	7	2	4.7	11	
16-Feb	2	6	4	3	6	Z	4	8	28	23	10	14	14	13	15	12	31	97	92	110	111	108	102	97	39.6	111	
17-Feb	Z	113	120	94	80	76	63	70	104	136	103	57	41	44	29	17	21	48	48	30	20	32	25	18	60.4	136	
18-Feb	19	Z	32	29	41	32	31	18	C	C	C	C	C	8	11	7	10	16	20	16	8	15	11	17	19.0	41	
19-Feb	19	20	Z	19	23	16	27	31	48	32	55	49	35	40	40	26	18	17	6	4	2	1	2	2	23.1	55	
20-Feb	2	3	4	Z	3	3	3	3	4	1	3	2	1	1	1	2	3	4	5	4	3	7	14	34	4.8	34	
21-Feb	56	35	25	44	Z	26	19	17	13	16	10	12	18	23	52	56	67	90	106	88	43	46	36	27	40.2	106	
22-Feb	34	50	42	41	31	Z	74	65	39	78	65	49	35	23	18	36	31	18	13	20	24	11	12	19	36.1	78	
23-Feb	Z	14	15	10	22	27	9	7	8	8	9	5	2	1	2	1	1	2	1	2	2	4	3	3	6.9	27	
24-Feb	4	Z	4	4	9	10	11	9	7	4	4	4	4	6	15	11	5	2	4	4	3	4	4	15	6.3	15	
25-Feb	20	14	Z	18	38	52	58	73	56	74	41	36	40	43	51	73	104	199	172	300	324	252	233	178	106.5	324	
26-Feb	58	97	71	Z	82	97	68	59	80	93	87	21	16	24	15	11	6	5	14	16	12	8	7	5	41.4	97	
27-Feb	4	3	2	6	Z	4	4	8	6	10	16	11	9	23	34	31	51	43	21	28	28	37	43	16	18.9	51	
28-Feb	11	11	7	5	7	Z	21	19	15	13	4	4	4	4	5	2	5	6	4	3	2	4	6	10	7.5	21	
20.6		27.9	27.0	27.5	31.9	32.4	31.5	30.2	29.8	34.3	30.8	26.0	22.0	18.0	18.9	19.9	24.0	35.4	33.5	35.0	32.7	28.9	26.1	26.2	Diurnal Average		
58		113	120	94	112	164	202	122	104	136	103	75	86	55	58	73	104	199	172	300	324	252	233	178	Diurnal Maximum		
Z - zerospan		C - Calibration																									



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium - February 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	372	58.22	58.22
21 - 40	130	20.34	78.56
41 - 80	95	14.87	93.43
81 - 159	31	4.85	98.28
> 159	10	1.56	99.84

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Millennium - February 2015**

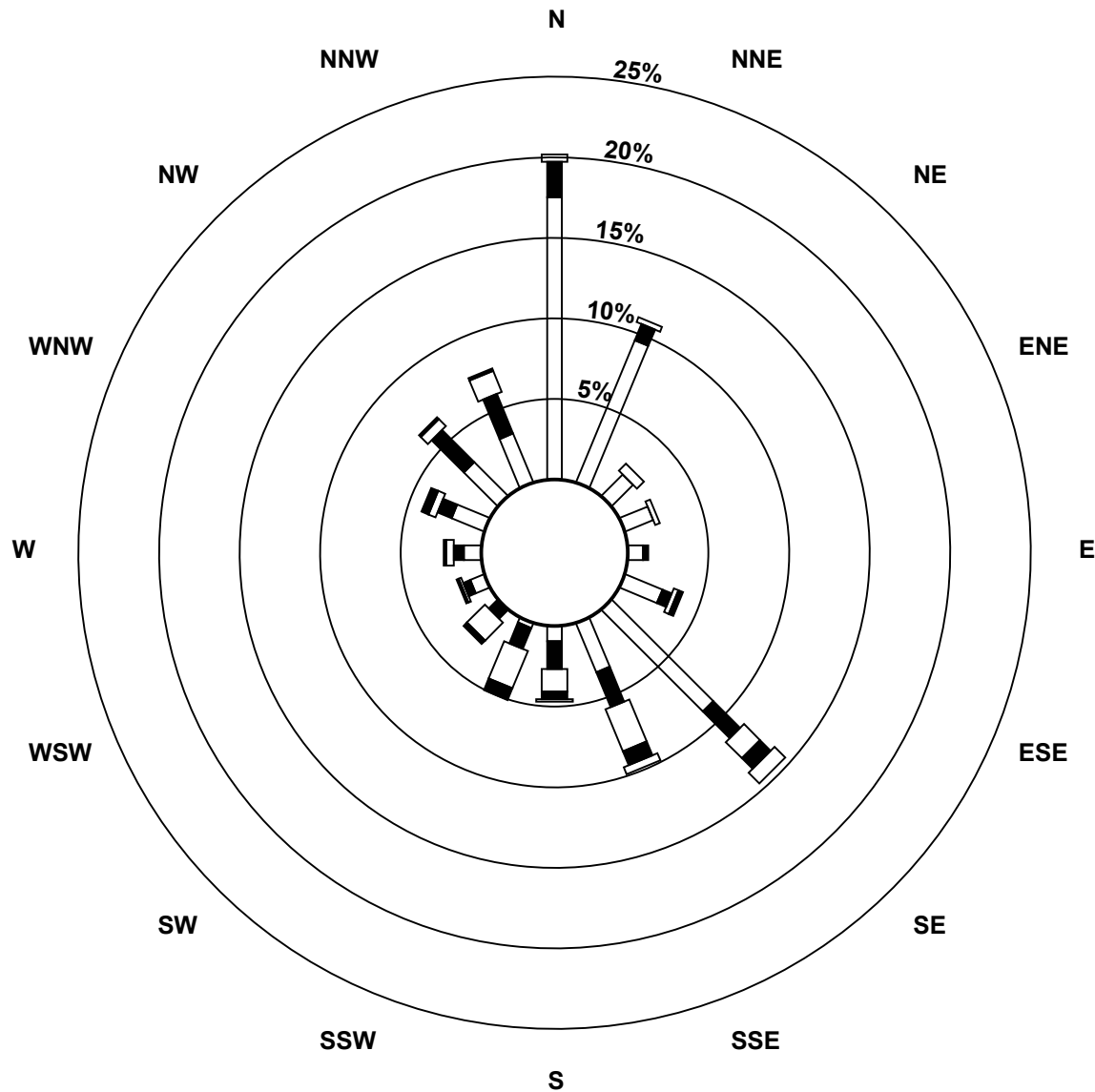
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	112	61	12	12	6	16	57	21	6	2	0	6	7	14	19	21	372
21 - 40	14	7	0	0	2	4	15	15	11	9	5	3	4	6	18	17	130
41 - 80	3	2	4	2	0	2	9	18	9	16	10	1	3	3	4	9	95
81 - 159	0	0	0	0	0	2	6	6	3	5	2	1	1	3	1	1	31
> 159	0	0	0	0	0	0	6	3	1	0	0	0	0	0	0	0	10
<b>Totals</b>	129	70	16	14	8	24	93	63	30	32	17	11	15	26	42	48	638

Total Number of Valid Hours: 639

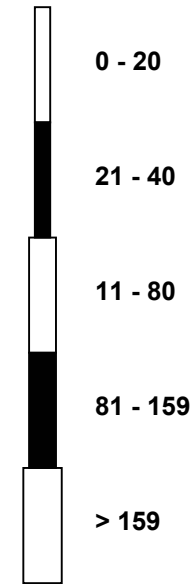
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

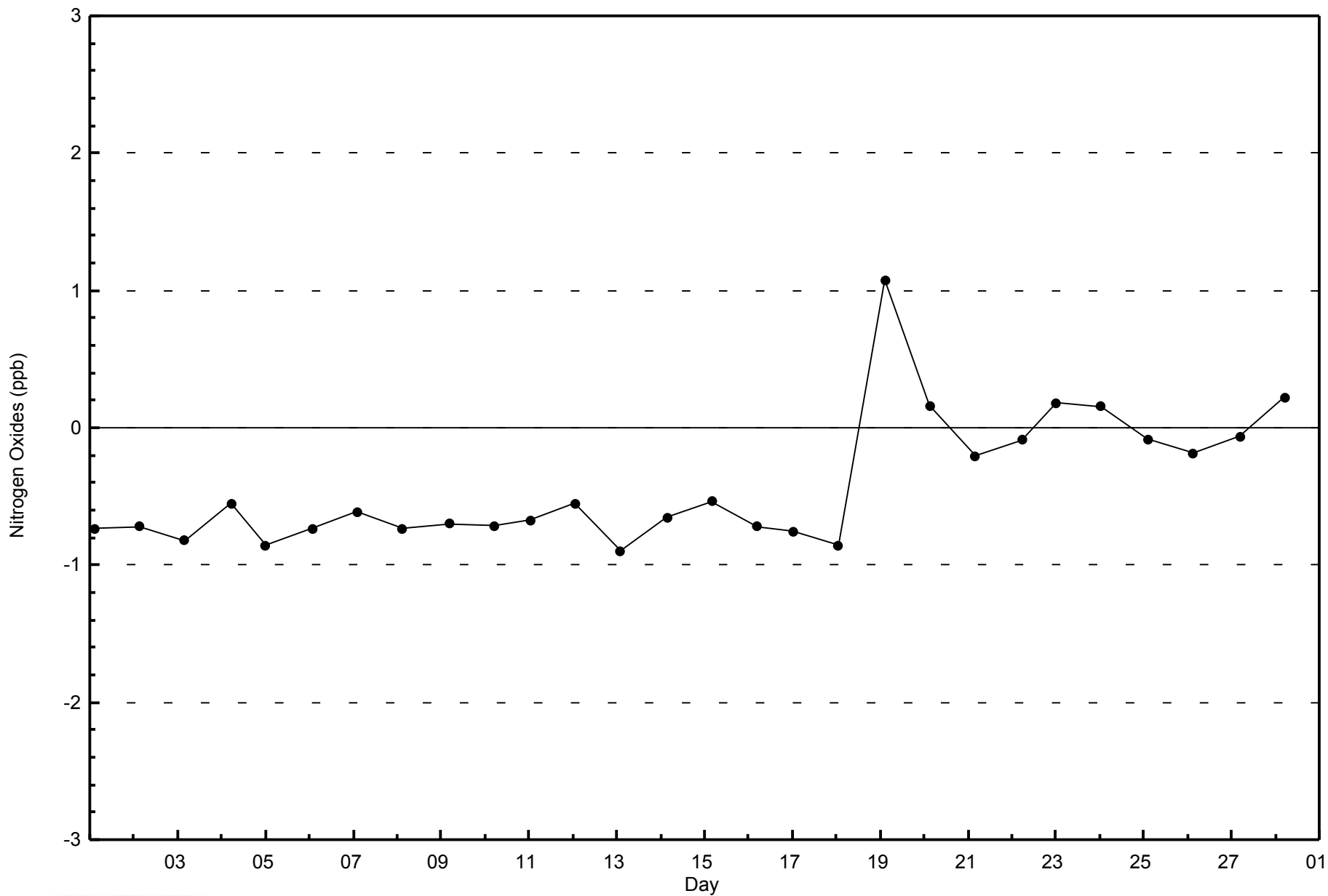
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium (AMS 12)



Classes (ppb)



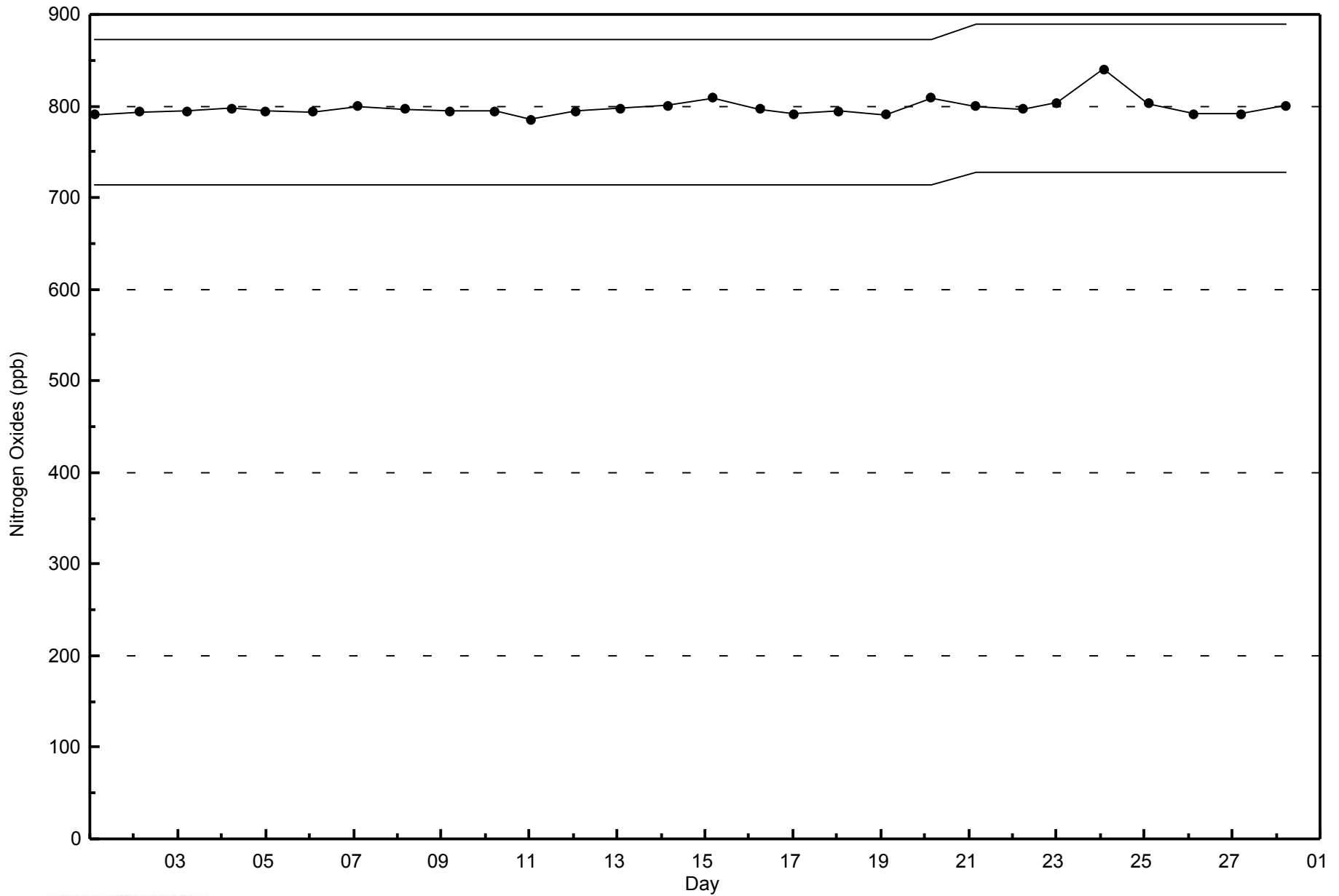
Total Number of Valid Hours: 639





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Millennium - February 2015







Summary of Hour Averages

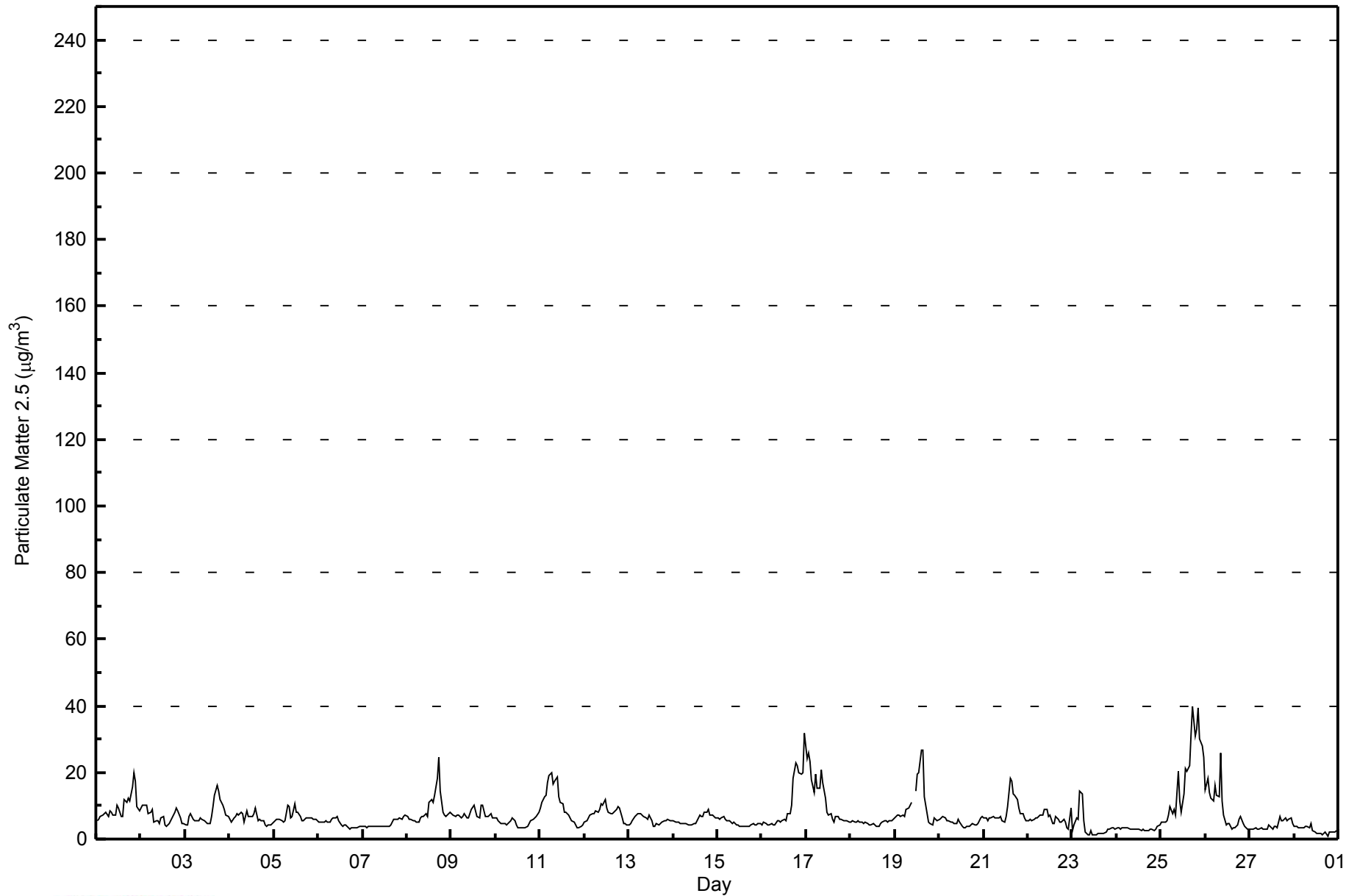
Millennium - February 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																																														
Maximum Value: 39.7 µg/m <sup>3</sup> on Feb 25 18:00		Maximum Daily Average: 18.2 µg/m <sup>3</sup> on Feb 25																																														
Minimum Value: 1.0 µg/m <sup>3</sup> on Feb 28 19:00		Hours of Data: 671																																														
Maximum Diurnal Average: 8.6 µg/m <sup>3</sup> at hour 18		Hours of Missing Data: 1																																														
Monthly Average: 7.14 µg/m <sup>3</sup>		Hours of Calibration: 0																																														
Minimum Daily Average: 2.7 µg/m <sup>3</sup> on Feb 28		Percent Operational Time: 99.9																																														
Minimum Diurnal Average: 6.4 µg/m <sup>3</sup> at hour 12		Percentiles: P <sub>1</sub> = 1.5 P <sub>10</sub> = 3.3 Q <sub>1</sub> = 4.4 Median = 5.8 Q <sub>3</sub> = 7.5 P <sub>90</sub> = 12.6 P <sub>99</sub> = 30.1																																														
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-Feb	5.5	5.8	6.8	7.4	7.6	7.9	6.8	8.3	8.1	7.4	7.2	10.3	9.4	6.7	6.9	11.7	10.9	12.1	11.3	15.6	20.1	17.4	9.6	8.6	9.6	20.1																						
2-Feb	9.3	10.4	10.3	10.0	7.6	8.1	9.0	5.0	5.6	5.3	4.6	6.2	6.7	4.1	3.9	4.5	5.3	6.3	8.1	9.2	8.3	6.2	4.7	4.8	6.8	10.4																						
3-Feb	4.2	4.4	7.0	7.5	6.0	5.7	5.7	5.4	6.3	6.1	5.5	5.1	4.9	4.6	6.6	9.6	13.0	16.0	14.4	12.0	10.3	9.0	7.1	6.9	7.6	16.0																						
4-Feb	6.0	5.3	6.3	6.9	7.7	7.3	7.9	7.5	5.3	8.3	6.9	6.6	6.6	7.6	9.5	5.4	5.9	5.6	5.7	4.1	4.0	4.1	4.2	4.6	6.2	9.5																						
5-Feb	5.2	5.8	5.7	6.0	5.6	4.9	5.5	10.1	9.6	6.5	6.9	10.4	7.9	8.0	6.8	5.6	5.4	6.2	6.5	6.3	6.2	5.9	5.9	5.8	6.6	10.4																						
6-Feb	5.3	5.0	5.2	5.2	5.5	5.3	5.1	5.9	6.2	6.2	7.0	5.5	4.3	3.9	4.4	4.4	3.4	3.0	3.3	3.3	3.2	3.6	3.8	4.0	4.7	7.0																						
7-Feb	3.8	3.7	3.5	3.7	3.7	3.8	3.7	3.7	3.8	4.0	3.9	3.7	3.6	3.8	3.7	4.2	5.2	6.1	6.1	6.1	6.1	5.8	6.8	7.3	4.6	7.3																						
8-Feb	6.8	5.9	5.8	5.5	5.4	4.9	5.0	6.3	6.7	6.6	7.5	6.8	11.2	11.8	11.0	13.0	18.2	24.6	14.4	7.9	7.1	6.9	7.2	8.1	8.9	24.6																						
9-Feb	7.5	7.4	6.7	7.3	7.3	6.5	6.9	7.8	6.3	6.3	7.6	9.0	10.3	8.7	6.6	6.5	10.2	10.1	6.6	6.6	6.9	7.5	6.5	6.2	7.5	10.3																						
10-Feb	6.5	5.4	5.1	4.7	4.5	4.6	4.4	5.0	5.5	6.3	5.4	4.2	3.6	3.2	3.4	3.6	3.5	3.8	4.5	5.6	6.0	6.4	6.9	8.1	5.0	8.1																						
11-Feb	9.2	11.0	12.6	13.2	17.0	19.1	20.1	16.7	17.4	18.8	12.8	10.9	10.7	8.2	8.1	7.0	6.5	5.6	5.0	4.1	3.5	3.6	3.7	4.1	10.4	20.1																						
12-Feb	4.9	5.4	6.3	7.3	7.8	7.7	8.6	8.1	8.8	10.5	10.3	12.1	9.4	7.9	7.6	7.5	7.9	9.0	9.8	9.5	6.2	4.8	4.6	4.1	7.8	12.1																						
13-Feb	4.1	4.8	5.5	6.9	7.1	7.5	7.5	7.2	7.0	6.3	6.0	7.2	5.4	3.9	3.8	4.7	4.4	4.7	5.0	5.4	5.7	5.8	5.7	5.4	5.7	7.5																						
14-Feb	5.5	5.2	5.0	5.0	4.5	4.5	4.8	4.5	4.4	4.4	4.4	4.5	4.8	5.5	7.0	7.0	6.9	7.9	8.0	9.0	7.2	7.1	6.9	6.4	5.8	9.0																						
15-Feb	6.3	6.0	6.5	6.7	5.7	5.4	5.5	5.1	4.8	4.9	4.3	4.2	3.8	3.8	3.7	3.8	3.6	3.9	4.4	4.5	4.4	4.4	4.5	4.5	4.8	6.7																						
16-Feb	4.4	4.9	4.6	4.4	4.3	4.6	4.4	4.2	5.5	5.4	5.1	5.7	6.1	5.5	7.5	7.7	10.1	18.2	23.1	21.9	19.9	19.5	19.8	31.7	10.4	31.7																						
17-Feb	24.4	26.0	23.3	17.9	14.0	19.6	15.2	15.3	20.9	16.8	12.3	7.8	7.2	7.8	6.0	5.1	6.8	6.9	6.1	6.0	5.5	5.6	5.5	5.2	12.0	26.0																						
18-Feb	4.9	5.7	5.0	4.9	5.3	5.1	5.1	4.9	5.2	4.8	4.2	4.2	4.5	4.3	3.9	3.9	4.6	5.2	5.6	5.4	5.2	5.6	5.7	5.9	5.0	5.9																						
19-Feb	6.4	7.0	7.3	6.9	7.1	6.9	9.0	9.3	10.1	11.0	M	14.5	19.3	19.8	26.8	26.6	12.5	7.7	5.0	4.6	4.1	6.6	6.1	5.6	10.5	26.8																						
20-Feb	5.9	6.2	6.8	6.6	5.7	5.3	5.2	4.9	4.8	4.5	6.1	5.1	4.0	3.5	3.5	4.0	3.8	4.2	4.8	4.4	4.4	4.9	6.2	6.8	5.1	6.8																						
21-Feb	6.3	6.3	5.7	6.4	6.3	6.6	6.5	6.6	6.2	6.9	5.6	5.0	6.7	9.6	18.0	17.4	13.6	13.1	12.1	9.2	7.7	7.4	6.2	5.7	8.4	18.0																						
22-Feb	5.4	5.9	5.6	6.0	6.4	6.5	7.1	7.4	7.3	9.0	9.0	6.9	7.1	4.6	4.7	6.6	6.0	5.2	5.0	6.0	5.2	3.6	2.9	9.4	6.2	9.4																						
23-Feb	2.6	4.1	6.2	5.7	14.6	13.7	5.5	2.0	1.4	1.4	2.5	1.5	1.2	1.3	1.5	1.9	1.9	1.8	2.0	2.8	3.1	3.3	3.4	3.1	3.7	14.6																						
24-Feb	3.2	3.2	3.1	3.2	3.4	3.4	3.4	3.0	2.8	2.8	2.8	3.2	3.0	2.6	2.8	2.7	2.5	2.7	3.1	2.9	2.7	3.1	3.8	4.3	3.1	4.3																						
25-Feb	5.1	5.1	5.3	5.6	7.3	9.8	7.6	9.1	7.4	20.5	11.3	8.0	13.6	21.2	20.1	21.9	31.2	39.7	30.9	33.2	39.3	30.3	28.0	24.7	18.2	39.7																						
26-Feb	14.6	18.1	13.8	12.4	11.6	16.3	13.0	12.8	26.0	11.6	7.2	4.2	4.7	4.7	3.1	3.6	3.5	4.2	6.0	6.7	4.8	3.8	3.4	3.1	8.9	26.0																						
27-Feb	2.9	2.9	3.0	3.3	3.2	3.0	3.2	3.1	3.0	3.2	4.0	3.7	3.1	3.7	3.8	3.2	6.6	5.3	5.4	6.4	5.4	5.9	6.3	4.9	4.1	6.6																						
28-Feb	3.9	3.8	3.3	3.4	3.5	3.5	3.8	3.7	3.5	4.7	2.5	2.0	1.7	1.6	1.6	1.4	1.7	2.1	1.0	2.0	2.3	2.1	2.1	2.5	2.7	4.7																						
																								6.4	6.8	6.8	6.8	7.0	7.4	7.0	6.9	7.5	7.5	6.4	6.4	6.6	6.5	7.0	7.3	7.7	8.6	8.0	7.9	7.7	7.1	6.7	7.2	Diurnal Average
																								24.4	26.0	23.3	17.9	17.0	19.6	20.1	16.7	26.0	20.5	12.8	14.5	19.3	21.2	26.8	26.6	31.2	39.7	30.9	33.2	39.3	30.3	28.0	31.7	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>) -  $\mu\text{g}/\text{m}^3$**   
**Millennium - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Millennium - February 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	299	44.56	44.56
6 - 15	325	48.44	93.00
16 - 25	35	5.22	98.21
26 - 80	12	1.79	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Millennium - February 2015**

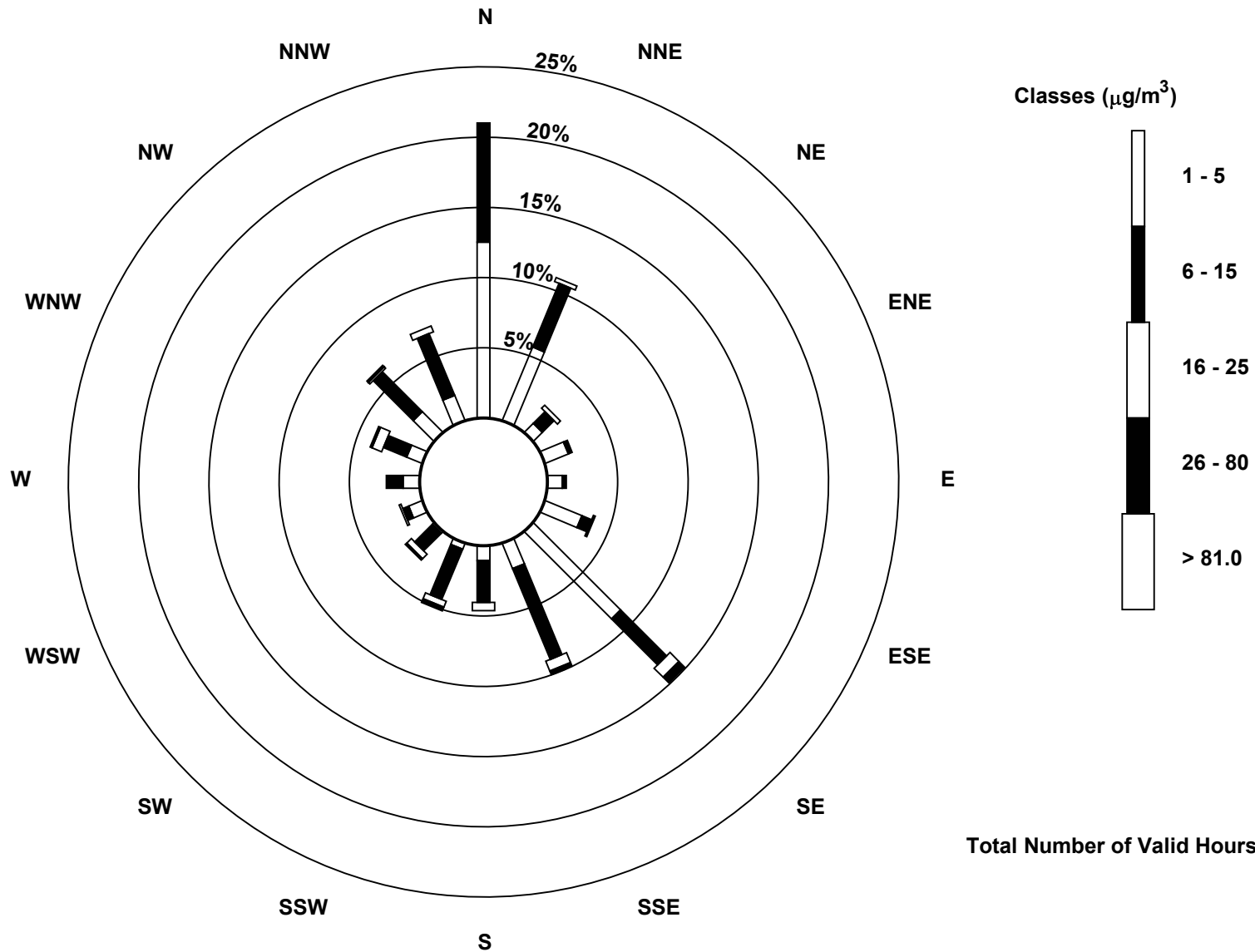
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	84	38	6	12	7	19	59	13	7	3	1	7	8	8	14	13	299
6 - 15	57	33	8	2	2	5	31	47	20	26	12	3	8	12	27	32	325
16 - 25	0	2	2	0	0	0	6	5	4	3	3	1	0	5	1	3	35
26 - 80	0	0	0	0	0	1	4	2	0	2	1	0	0	1	1	0	12
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	73	16	14	9	25	100	67	31	34	17	11	16	26	43	48	671

Total Number of Valid Hours: 671

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Millennium (AMS 12)



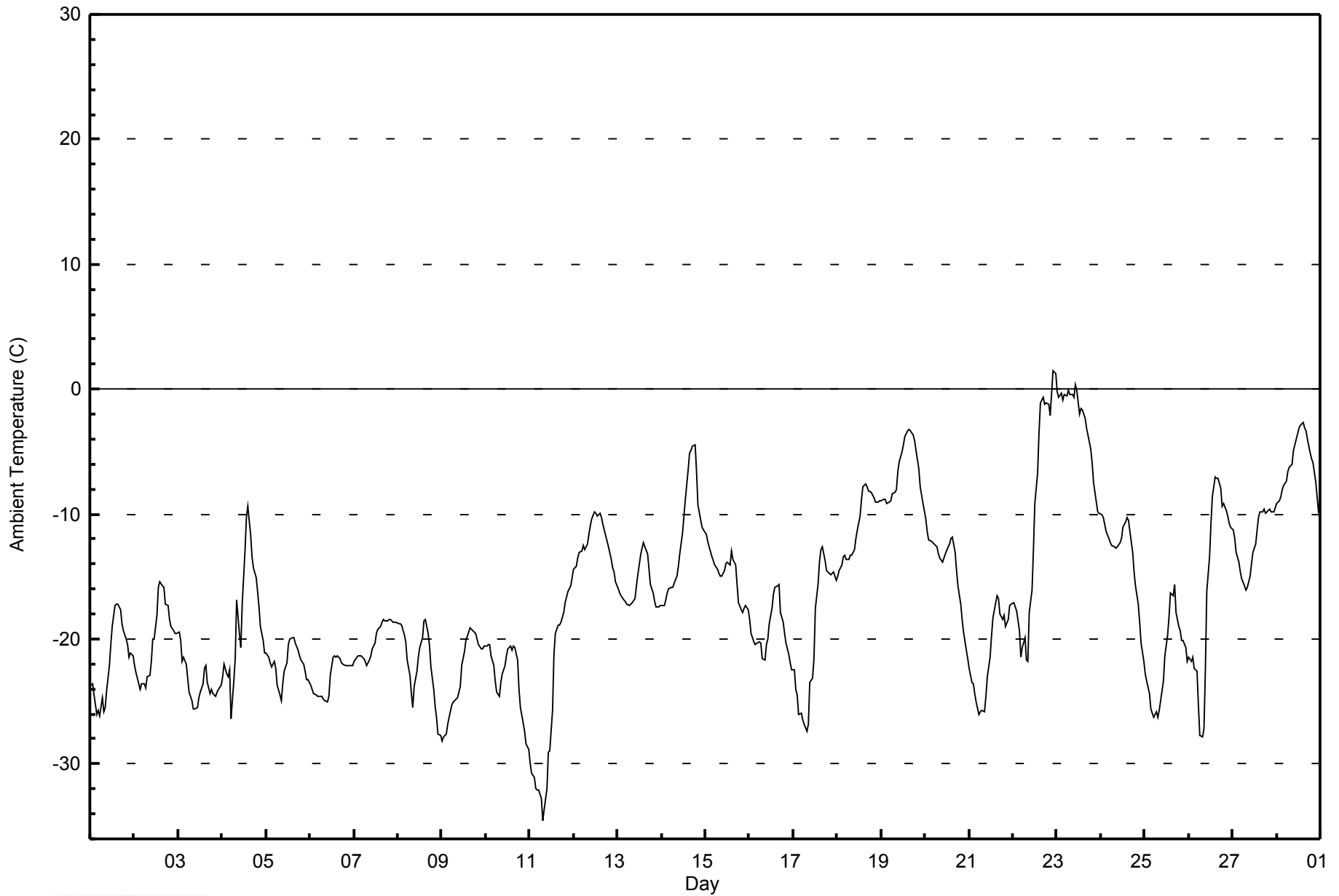


Maximum Value: 1.5 C on Feb 22 23:00		Maximum Daily Average: -2.7 C on Feb 23		Hours in Service: 672																						
Minimum Value: -34.6 C on Feb 11 08:00		Minimum Daily Average: -25.0 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.0 C at hour 16		Minimum Diurnal Average: -19.8 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -16.78 C		Percentiles: P <sub>1</sub> = -31.4 P <sub>10</sub> = -24.7 Q <sub>1</sub> = -21.9 Median = -17.7 Q <sub>3</sub> = -12.2 P <sub>90</sub> = -7.2 P <sub>99</sub> = -0.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-23.7	-23.6	-24.4	-26.0	-25.7	-26.2	-24.7	-25.8	-25.4	-24.2	-22.2	-20.5	-19.1	-17.3	-17.2	-17.2	-17.6	-18.8	-19.3	-20.0	-20.4	-21.5	-21.1	-21.3	-21.8	-17.2
2-Feb	-22.1	-22.7	-23.6	-24.0	-23.6	-23.6	-23.9	-23.0	-22.9	-21.8	-20.0	-20.1	-18.1	-15.9	-15.4	-15.7	-15.9	-17.3	-17.3	-18.4	-19.0	-19.3	-19.6	-19.6	-20.1	-15.4
3-Feb	-19.4	-20.1	-21.8	-21.5	-22.0	-23.2	-24.2	-24.9	-25.6	-25.6	-25.5	-24.8	-24.2	-23.6	-22.4	-22.2	-23.5	-24.4	-24.0	-24.4	-24.6	-24.3	-24.0	-23.7	-23.5	-19.4
4-Feb	-23.0	-22.0	-22.8	-23.0	-22.5	-26.3	-23.4	-21.6	-16.9	-19.6	-20.6	-17.3	-13.0	-10.3	-9.3	-11.6	-13.5	-14.3	-15.0	-16.2	-17.5	-19.0	-20.1	-21.1	-18.3	-9.3
5-Feb	-21.2	-21.4	-21.9	-22.3	-21.8	-22.3	-23.7	-24.5	-24.9	-23.6	-22.6	-21.9	-20.5	-20.0	-19.9	-19.9	-20.3	-20.9	-21.4	-21.7	-22.0	-22.6	-23.2	-23.2	-22.0	-19.9
6-Feb	-23.7	-24.0	-24.3	-24.5	-24.6	-24.6	-24.6	-24.8	-25.0	-25.0	-24.6	-22.9	-21.4	-21.3	-21.5	-21.3	-21.5	-21.9	-22.1	-22.1	-22.1	-22.1	-22.1	-22.2	-23.1	-21.3
7-Feb	-21.8	-21.4	-21.3	-21.3	-21.3	-21.6	-21.8	-22.1	-21.7	-21.3	-20.8	-20.3	-19.5	-19.3	-19.0	-18.6	-18.5	-18.5	-18.5	-18.5	-18.4	-18.6	-18.7	-18.7	-20.1	-18.4
8-Feb	-18.7	-18.7	-18.9	-19.7	-20.2	-21.7	-22.9	-24.4	-25.5	-23.8	-22.6	-21.5	-20.7	-19.9	-18.6	-18.5	-19.6	-20.6	-22.2	-24.0	-25.4	-26.3	-27.6	-27.7	-22.1	-18.5
9-Feb	-28.1	-27.9	-27.7	-26.9	-26.2	-25.2	-25.0	-24.9	-24.7	-24.3	-23.8	-22.1	-21.0	-20.1	-19.8	-19.1	-19.2	-19.4	-19.5	-20.0	-20.5	-20.8	-20.8	-20.6	-22.8	-19.1
10-Feb	-20.5	-20.4	-20.4	-21.3	-22.1	-23.3	-24.3	-24.6	-23.5	-22.8	-22.2	-21.3	-20.8	-20.6	-20.9	-20.5	-20.6	-21.7	-24.0	-25.4	-26.7	-27.3	-28.4	-28.9	-23.0	-20.4
11-Feb	-30.0	-30.7	-31.1	-31.9	-32.1	-32.1	-32.8	-34.6	-33.6	-31.9	-29.0	-29.0	-25.7	-21.3	-19.6	-18.9	-18.9	-18.6	-17.8	-17.1	-16.7	-16.2	-15.7	-15.1	-25.0	-15.1
12-Feb	-14.5	-14.1	-13.5	-13.1	-13.0	-12.5	-12.8	-12.3	-11.6	-10.9	-10.4	-9.9	-9.9	-10.1	-10.0	-10.3	-10.9	-11.7	-12.1	-12.6	-13.6	-14.3	-14.6	-15.4	-12.3	-9.9
13-Feb	-16.0	-16.4	-16.6	-16.8	-17.0	-17.3	-17.3	-17.2	-17.2	-16.7	-15.7	-14.8	-13.3	-12.7	-12.3	-12.7	-13.2	-14.5	-15.6	-16.4	-17.0	-17.4	-17.4	-17.3	-15.8	-12.3
14-Feb	-17.3	-17.4	-16.9	-16.3	-16.0	-15.9	-15.8	-15.5	-15.0	-14.1	-13.2	-11.5	-10.1	-8.9	-6.5	-5.2	-4.9	-4.5	-4.4	-6.6	-9.3	-10.5	-11.0	-11.2	-11.6	-4.4
15-Feb	-11.6	-12.2	-12.6	-13.4	-13.7	-14.1	-14.4	-14.7	-15.0	-15.0	-14.5	-14.0	-13.8	-14.0	-13.0	-13.6	-14.1	-15.6	-17.1	-17.7	-17.9	-17.5	-17.3	-17.7	-14.8	-11.6
16-Feb	-18.4	-19.6	-20.3	-20.5	-20.3	-20.2	-20.3	-21.5	-21.6	-20.4	-20.0	-18.7	-17.5	-16.4	-15.9	-15.7	-15.7	-17.9	-18.6	-19.5	-20.3	-21.2	-21.9	-22.5	-19.4	-15.7
17-Feb	-22.5	-24.0	-24.5	-26.1	-25.9	-26.5	-26.9	-27.3	-26.8	-23.5	-23.1	-21.6	-17.5	-15.5	-13.7	-12.8	-12.6	-13.8	-14.5	-14.6	-14.8	-14.8	-14.6	-15.3	-19.7	-12.6
18-Feb	-15.0	-14.5	-14.1	-13.4	-13.3	-13.7	-13.6	-13.3	-13.3	-12.8	-12.0	-11.3	-10.2	-8.8	-7.8	-7.6	-7.8	-8.2	-8.2	-8.5	-8.7	-9.0	-9.0	-8.9	-11.0	-7.6
19-Feb	-8.9	-8.9	-8.9	-9.1	-9.0	-8.9	-8.4	-8.3	-8.0	-6.6	-5.8	-5.0	-4.5	-3.8	-3.4	-3.2	-3.3	-3.7	-4.1	-4.9	-6.4	-7.8	-8.4	-9.1	-6.6	-3.2
20-Feb	-10.4	-11.4	-12.0	-12.2	-12.3	-12.4	-12.7	-13.2	-13.6	-13.9	-13.6	-13.1	-12.6	-12.4	-12.0	-11.8	-13.1	-14.5	-15.7	-17.2	-18.4	-19.4	-20.9	-21.6	-14.2	-10.4
21-Feb	-22.4	-23.5	-23.5	-24.4	-25.1	-26.1	-25.8	-25.8	-25.9	-24.6	-23.0	-21.4	-19.8	-18.3	-17.1	-16.5	-16.7	-17.9	-18.4	-18.1	-19.0	-18.4	-17.3	-17.2	-21.1	-16.5
22-Feb	-17.1	-17.4	-17.8	-19.4	-21.5	-20.7	-19.9	-21.6	-21.8	-17.9	-16.1	-12.8	-9.2	-6.7	-3.5	-1.1	-0.7	-1.2	-1.1	-1.2	-2.1	-0.4	1.5	1.3	-10.3	1.5
23-Feb	-0.2	-0.6	-0.3	-0.8	-0.4	-0.6	0.0	-0.4	-0.5	-0.6	0.3	-0.1	-2.0	-1.6	-1.7	-2.3	-3.2	-3.7	-4.8	-6.0	-7.5	-9.1	-9.8	-10.0	-2.7	0.3
24-Feb	-10.0	-10.3	-10.8	-11.4	-12.0	-12.3	-12.5	-12.6	-12.7	-12.6	-12.3	-11.9	-11.0	-10.6	-10.3	-10.5	-11.4	-13.1	-14.7	-15.7	-17.2	-18.7	-20.3	-21.8	-13.2	-10.0
25-Feb	-22.8	-23.4	-24.3	-25.6	-25.9	-26.2	-25.8	-26.3	-25.7	-24.1	-23.4	-21.4	-19.7	-18.2	-16.3	-16.5	-15.6	-17.9	-19.1	-19.4	-20.1	-20.1	-20.7	-21.7	-21.7	-15.6
26-Feb	-21.4	-21.8	-21.5	-22.3	-22.6	-25.3	-27.8	-27.8	-27.2	-22.5	-16.2	-13.4	-10.8	-8.6	-7.0	-7.2	-7.1	-8.0	-9.3	-9.1	-9.8	-10.2	-10.8	-11.0	-15.8	-7.0
27-Feb	-11.3	-11.9	-13.0	-13.9	-14.7	-15.2	-15.8	-16.1	-15.8	-15.0	-14.0	-13.0	-12.4	-11.3	-10.3	-9.8	-9.9	-9.6	-10.0	-9.7	-9.6	-9.8	-9.8	-9.4	-12.1	-9.4
28-Feb	-9.1	-8.9	-8.6	-8.0	-7.7	-7.3	-6.6	-6.2	-6.0	-4.9	-4.4	-3.6	-3.1	-2.9	-2.7	-3.2	-3.3	-4.0	-5.1	-5.6	-6.0	-7.5	-8.7	-9.9	-6.0	-2.7
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Millennium - February 2015**





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

**Ambient Temperature (AT) - C**  
**Millennium - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	262	38.99	38.99
-20 - 0	407	60.57	99.55
0 - 10	3	0.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672





**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Relative Humidity (RH) - %**

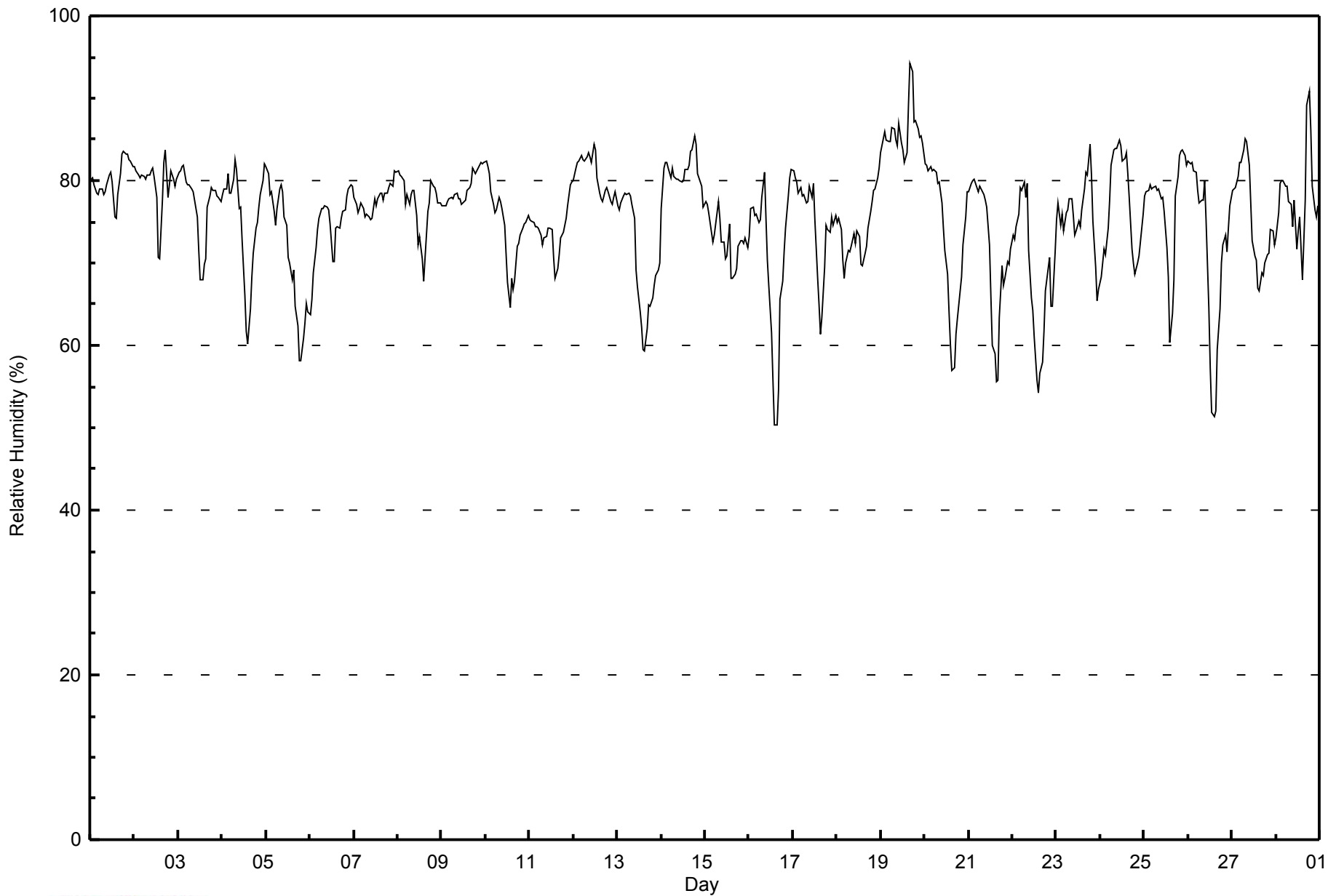
**Millennium - February 2015**

Maximum Value: 94 % on Feb 19 17:00														Maximum Daily Average: 86.0 % on Feb 19														Hours in Service: 672																				
Minimum Value: 50 % on Feb 16 15:00														Minimum Daily Average: 68.7 % on Feb 22														Hours of Data: 672																				
Maximum Diurnal Average: 78.9 % at hour 9														Minimum Diurnal Average: 68.4 % at hour 15														Hours of Missing Data: 0																				
Monthly Average: 75.6 %														Percentiles: P <sub>1</sub> = 56 P <sub>10</sub> = 67 Q <sub>1</sub> = 72 Median = 77 Q <sub>3</sub> = 80 P <sub>90</sub> = 82 P <sub>99</sub> = 87														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-Feb	80	80	79	79	78	79	79	78	79	80	81	81	80	76	75	78	81	83	83	83	83	83	82	82	80.1	83																						
2-Feb	82	81	81	80	81	81	80	81	81	81	81	80	78	71	71	78	82	84	78	79	81	80	79	80	79.6	84																						
3-Feb	81	81	82	82	80	80	80	79	79	78	76	72	68	68	70	70	77	78	79	79	79	78	78	78	77.0	82																						
4-Feb	78	79	79	81	78	78	80	83	81	77	77	73	66	62	60	64	68	71	74	75	77	78	80	82	75.1	83																						
5-Feb	82	81	78	79	76	75	77	79	79	79	76	75	71	70	68	69	65	62	58	58	61	63	65	64	71.2	82																						
6-Feb	64	66	69	72	74	75	77	77	77	77	76	75	70	70	74	74	74	75	76	76	78	79	79	79	74.4	79																						
7-Feb	78	77	76	77	77	77	76	76	76	75	75	78	77	78	78	79	78	78	78	79	80	79	81	81	77.7	81																						
8-Feb	81	81	80	80	77	78	77	78	79	79	76	72	73	71	68	71	76	77	80	79	79	78	77	77	76.9	81																						
9-Feb	77	77	77	77	78	78	78	78	78	78	78	77	77	78	79	79	80	82	81	81	82	82	82	82	79.0	82																						
10-Feb	82	82	81	79	77	76	76	78	77	77	74	71	68	65	68	67	68	72	72	73	74	75	75	76	74.3	82																						
11-Feb	75	75	75	74	74	74	73	72	73	73	74	74	74	71	68	69	71	73	74	75	75	77	79	80	74.0	80																						
12-Feb	80	82	82	82	83	83	82	83	83	83	82	84	84	80	78	78	78	79	79	79	77	77	78	79	80.7	84																						
13-Feb	77	77	77	78	79	78	78	78	77	75	69	67	64	62	59	59	62	65	65	66	67	68	69	70	70.4	79																						
14-Feb	77	82	82	82	81	80	82	80	80	80	80	80	81	81	82	84	84	86	84	81	80	79	77	77	81.1	86																						
15-Feb	77	77	76	74	72	73	76	77	75	73	73	70	71	75	68	68	69	69	72	73	73	72	73	72	72.9	77																						
16-Feb	73	77	77	76	76	75	75	78	81	75	70	67	61	56	50	50	55	66	68	71	74	78	80	81	70.5	81																						
17-Feb	81	80	80	78	79	78	78	77	78	79	78	80	75	68	65	61	63	69	75	74	74	76	75	76	74.9	81																						
18-Feb	75	75	74	70	68	70	72	71	72	74	72	74	73	70	70	71	72	74	76	77	79	79	80	81	73.8	81																						
19-Feb	83	85	86	85	85	85	86	86	85	84	87	85	84	82	83	89	94	93	87	87	86	85	85	85	86.0	94																						
20-Feb	82	82	81	82	81	81	81	80	80	77	74	72	69	64	60	57	57	61	63	67	68	72	76	79	72.7	82																						
21-Feb	79	80	80	80	80	79	79	79	78	78	77	72	66	60	59	56	56	63	70	67	68	70	70	72	71.5	80																						
22-Feb	73	73	74	76	79	79	80	78	80	72	66	64	61	56	54	57	58	62	67	69	71	65	65	71	68.7	80																						
23-Feb	75	77	75	76	74	76	76	78	78	76	73	74	75	74	76	79	81	81	84	81	75	70	65	67	75.7	84																						
24-Feb	68	70	72	71	74	78	82	84	84	84	85	84	82	83	83	81	78	72	70	69	70	71	73	76	76.8	85																						
25-Feb	78	79	79	79	79	79	79	79	79	78	78	76	72	68	60	64	68	78	80	83	84	84	83	82	77.0	84																						
26-Feb	82	82	82	81	81	79	77	78	78	80	75	65	57	52	51	52	60	64	70	72	73	71	74	77	71.4	82																						
27-Feb	79	79	79	81	82	82	84	85	85	82	77	73	71	70	67	67	69	69	70	71	71	74	74	72	75.5	85																						
28-Feb	73	76	80	80	80	79	79	78	77	74	78	72	74	76	68	73	78	89	91	86	79	76	76	77	77.8	91																						
																								77.7	78.2	78.3	78.3	78.0	78.0	78.6	78.9	78.9	77.7	76.4	74.5	72.2	69.8	68.4	69.4	71.4	74.1	75.2	75.5	75.7	75.8	76.2	76.9	Diurnal Average
																								83	85	86	85	85	85	86	86	85	84	87	85	84	83	83	89	94	93	91	87	86	85	85	85	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Millennium - February 2015**





Maximum Speed: 27 km/h on Feb 19 22:00		Maximum Daily Speed Average: 13.0 km/h on Feb 20		Hours in Service: 672																						
Minimum Speed Value: 1 km/h on Feb 27 13:00		Minimum Daily Speed Average: 1.2 km/h on Feb 25		Hours of Data: 672																						
Maximum Diurnal Speed Average: 4.4 km/h at hour 22		Minimum Diurnal Speed Average: 0.8 km/h at hour 8		Hours of Missing Data: 0																						
Monthly Average Velocity: 2.4 km/h 38.4 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 5 Median = 7 Q <sub>3</sub> = 11 P <sub>90</sub> = 15 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-Feb	SSE5	SSE5	SSE5	SSE6	S4	SSE5	S4	SW2	SW1	NNW1	NNW3	WNW5	W5	W6	WNW4	W3	NNE2	NNE4	NE4	SW5	SW7	SSW6	WSW5	SW5	SW2.0	SW7
2-Feb	SSW5	SW5	SSW4	SSW6	SSW6	SSW5	SSW6	SW5	SSW5	WSW3	W3	N5	NNW4	WNW6	NNW5	NNE4	ENE1	NNW2	NW5	SW4	SW3	W7	W7	W6	WSW2.9	W7
3-Feb	WSW5	WNW4	N3	NNW4	N6	N7	N6	N9	NW5	N10	N13	N13	N9	N5	NE3	ESE5	SE6	SE7	SE8	SSE5	SSE5	SSE6	SSE6	SSE7	NNE2.1	N13
4-Feb	SSE9	SSE7	SSE6	SSE7	SSE8	SSW8	SSE7	SSE6	SE8	S4	SSW6	SW4	WNW6	NNW12	NW9	NNE13	N11	NNW5	N10	N12	N14	N12	N7	N4	N1.2	N14
5-Feb	N6	NNW4	NNW4	NNW4	NNW6	N11	N2	SW4	SW5	WSW4	W3	ESE1	SE2	E1	NNE3	NE7	NNE9	NNE10	NNE11	NNE10	NNE9	NE10	NNE7	N7	NNE4.2	NNE11
6-Feb	N10	N12	NNE13	NNE12	NNE10	NNE11	NNE10	NNE11	N13	N12	NNE12	NE9	E7	ENE7	ENE10	ENE8	ENE9	ENE10	E8	E7	ESE8	ESE7	ESE8	ESE8	NE7.8	NNE13
7-Feb	ESE10	SE13	SE13	SE12	SE13	SE14	SE15	SE14	SE16	SE17	SE16	SE14	SE13	SE12	SE12	SE13	SE11	SE9	SE7	SE5	ESE3	NNE4	NNE5	NNE3	SE10.3	SE17
8-Feb	N3	N3	N5	N7	NNE15	NNE16	NNE10	NNE6	N4	WNW3	W4	S3	ESE4	ENE5	ENE4	NE4	NE5	NNE7	N6	N5	NNW6	N5	NNW4	NNW4	NNE4.7	NNE16
9-Feb	NW4	N6	N7	NNW5	N6	NNW6	N7	NNW7	N8	NW5	NW5	WNW4	NW5	NW6	NW7	NNW7	NNW6	NW5	NNW8	NNW7	NW5	NW6	NW6	NW4	NNW5.6	NNW8
10-Feb	NW6	NNW5	N9	N16	N16	N13	N11	NW5	NW5	NW6	NW6	NW8	NW8	NNW9	N10	N7	N7	NNE14	NNE13	NNE11	NNE11	NNE11	NNE8	NNE6	N8.5	N16
11-Feb	N3	WSW4	SW4	SSW4	SSW5	SE3	SSE4	SSW6	SSE5	SSE3	SSE4	SSW7	SSW6	SSE8	SE15	SSE12	SE16	SE19	SE19	SE19	SE18	SE16	SE14	SSE9	SSE8.2	SE19
12-Feb	SSE8	SSE6	SSE6	SE5	SSE4	S4	SSW6	SSW7	SW6	SSW4	SSW2	NW4	NNW6	N9	N9	N10	N12	N15	NNE17	N16	NNE13	NNE15	N13	N13	NNE4.1	NNE17
13-Feb	NNE15	NNE14	N13	N13	N12	NNE13	N12	NNE11	NNE11	NE10	NE7	E6	ESE6	SE7	SE11	ESE13	ESE14	SE17	SE18	SE20	SE21	SE20	SE21	E7.1	SE21	
14-Feb	SE20	SE21	SE23	SE23	SE24	SE22	SE22	SE20	SE19	SE16	SE15	SSE12	SSE10	SSE9	S10	SSE8	SSW11	N5	NNE20	N16	N14	N10	N13	SE10.4	SE24	
15-Feb	NNE10	NNE9	NNE9	NE9	NNE9	NNE12	NNE11	NNE11	N13	N12	N9	N11	N12	N10	N9	N14	N13	NNE15	N7	N10	N10	N9	N11	NNE15	N10.6	NNE15
16-Feb	N13	N8	N10	NNE13	NNE13	N13	N9	NNW4	NW4	NNW3	N5	WNW4	W5	WNW7	NNW6	NNE4	SE4	SSE4	SE2	NW1	NNW3	WNW4	WNW3	SSW3	N4.3	N13
17-Feb	S3	SW1	WNW2	WSW3	W3	SW3	SSW4	SW4	S3	SE3	SSW5	S4	SSE5	SSE5	SE5	SSE5	SSE4	SE4	SE8	SE10	ESE9	SE8	SE8	SE10	SSE3.8	SE10
18-Feb	SE11	SE7	SE10	SE9	SE9	SSE8	SE9	SE9	SE13	SE11	SE11	SE12	ESE10	ESE9	SE7	SSE6	SE8	SE9	SE9	SE10	SE8	SE8	SSE7	SSE5	SE8.9	SE13
19-Feb	SSE6	SSE5	S6	SSW5	SSW6	SSW5	S5	SSW5	S4	SSE3	S4	S4	NNE3	WNW4	NW4	WNW5	NNW5	N7	N12	N13	N18	N27	N20	N22	N3.2	N27
20-Feb	NNE23	N21	N18	N14	N15	N17	N15	N14	N13	N15	NNE13	NNE11	N14	N13	N12	N12	N12	N10	NNE11	N9	N12	N11	N6	NW4	N13.0	NNE23
21-Feb	NW4	N5	NNW5	NNW4	N5	N3	NW4	NNW5	NW5	NW6	WNW4	ENE2	SE4	SE5	SE6	SE7	ESE7	SE7	SE7	SSE8	SSE6	SE9	SE9	SSE8	ESE1.5	SE9
22-Feb	SE10	SSE8	SSE6	SSE6	SSE6	SSE6	SSE7	S5	S6	S5	S4	S7	S7	SSW10	S8	S9	S8	S8	S10	SSE6	S5	S3	WNW9	WNW11	S5.6	WNW11
23-Feb	NW9	WNW9	WNW13	WNW12	NW16	NW12	NW15	NW10	NNW9	N8	NW8	NNW12	NNE13	N13	N12	N17	N19	NNE21	NNE25	NNE20	NNE19	NE19	NE11	ENE7	N11.3	NNE25
24-Feb	E5	E6	ESE9	ESE10	ESE9	ESE10	ESE10	ESE9	E7	ENE7	NE7	NE9	ENE6	ENE4	NNW3	NE14	N17	N21	N19	N18	N18	N12	NNW8	NE7.4	N21	
25-Feb	NW6	NNW7	N9	N4	NNW4	NNW4	NNW4	NNW3	WNW3	NNW3	E1	N4	NNW4	NNW1	NE4	ESE4	SE3	SSE4	SE5	SE5	SSE4	SE4	S5	N1.2	N9	
26-Feb	SSE5	SSE5	SE7	SSE5	SSE6	S5	SSW6	SSW7	SSW6	SSE5	SE9	SSE7	SSE7	S9	S8	WNW3	WSW8	WSW5	NNW5	N7	N10	N14	NNE13	N12	SSE1.4	N14
27-Feb	N11	N15	NNE18	NNE13	NNE12	NNE14	NNE12	NNE10	NNE7	SSE1	SE4	SE4	ENE1	ESE5	SE7	ESE6	SE6	SSW5	SSW6	S5	SSE4	SSE3	SSW7	WSW6	NE3.1	NNE18
28-Feb	W7	W6	W5	WSW8	WSW8	W10	WNW10	WNW10	W10	WNW12	NW11	NW9	NW9	NW7	NNW7	NNW8	WNW6	NNW10	N11	N16	N13	N9	N8	NNE7	NW7.0	N16
NE2.0 NE2.0 NE2.5 NE1.9 NNE2.1 NNE2.7 NE1.9 NNE0.8 NE0.8 NNE1.3 NNE1.3 NE1.3 NE1.3 NNE1.1 NE1.9 NE3.3 ENE3.0 NE3.3 NE4.3 NE4.3 NE4.2 NE4.4 NNE3.0 NNE2.4																								Diurnal Average		
NNE23 SE21 SE23 SE23 SE24 SE22 SE23 SE22 SE20 SE19 SE16 SE15 N14 N13 SE15 N17 N19 NNE21 NNE25 NNE20 SE20 N27 SE20 N22																								Diurnal Maximum		
All monthly, daily, and diurnal averages have been calculated using vector methods																										



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

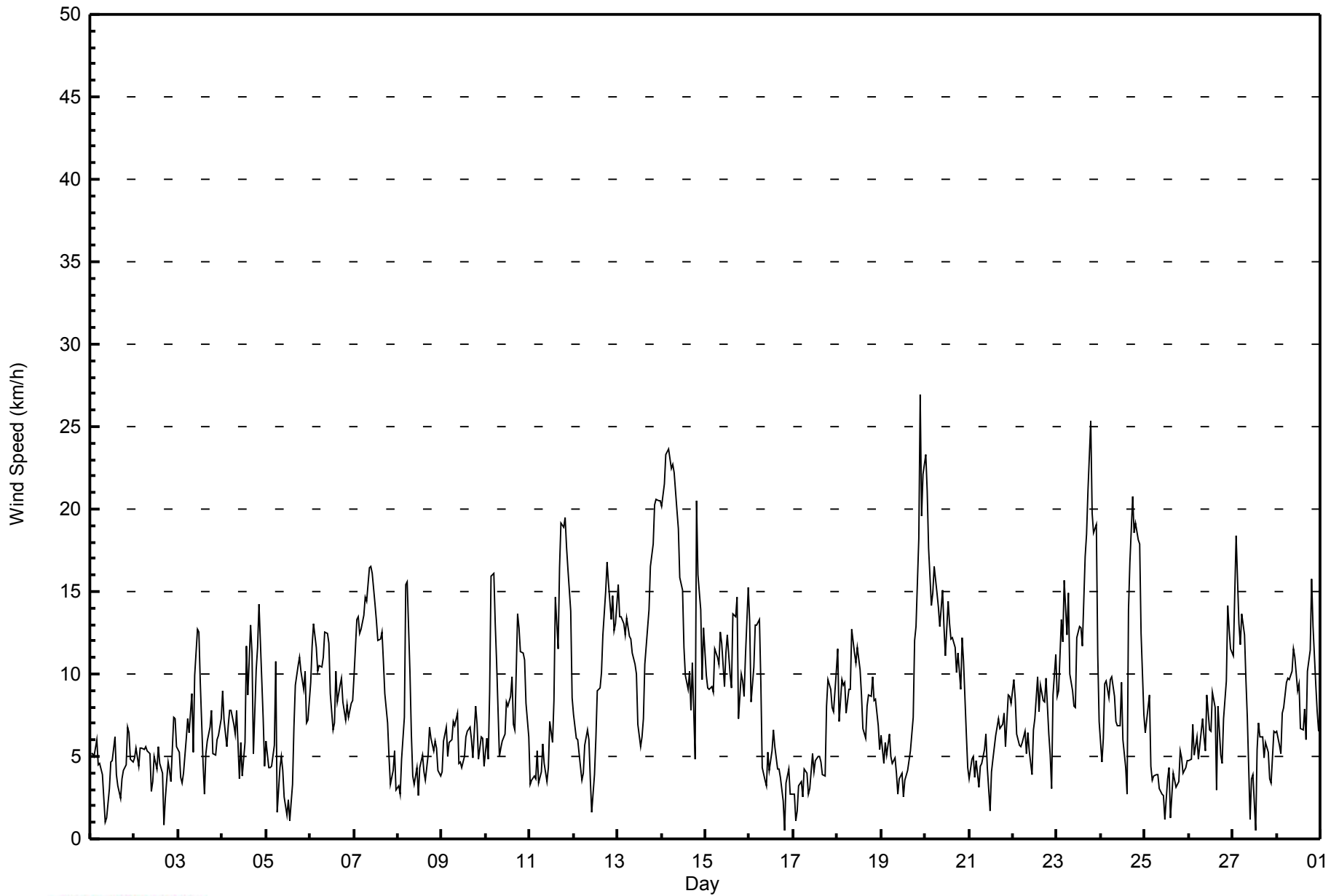
**Wind Speed (WS) - km/h**  
**Millennium - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 14 06:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 1 km/h on Feb 25 08:00																									
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> = 4 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-Feb	1	1	1	1	1	2	2	2	1	1	1	1	1	2	2	1	1	1	1	1	1	1	2	1	2
2-Feb	1	1	1	1	1	3	2	2	2	2	2	1	1	2	1	1	1	2	2	1	1	2	2	1	3
3-Feb	2	2	1	1	2	1	2	2	2	4	3	3	2	1	2	2	1	1	2	1	1	1	1	1	4
4-Feb	2	2	1	2	3	2	3	1	2	2	3	1	2	4	3	3	2	2	4	3	6	3	2	2	6
5-Feb	1	1	2	2	2	3	2	2	1	1	1	1	1	1	1	4	2	2	2	2	2	1	3	4	
6-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
7-Feb	3	5	4	4	4	4	4	4	5	5	5	4	4	3	3	3	3	3	2	1	2	2	1	1	5
8-Feb	2	2	2	3	3	3	4	2	2	1	1	1	1	2	1	2	1	1	2	1	1	1	1	1	4
9-Feb	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2	2	2	3
10-Feb	2	2	4	5	4	4	3	1	2	2	2	3	3	3	2	2	2	4	3	2	2	2	2	1	5
11-Feb	1	1	2	2	1	1	2	2	1	1	1	2	1	3	4	4	6	5	5	5	6	5	4	3	6
12-Feb	2	2	2	1	1	1	1	2	1	2	1	1	2	1	2	2	2	3	3	4	3	3	3	3	4
13-Feb	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	3	4	4	5	5	6	6	6	6	6
14-Feb	6	6	7	6	7	7	6	6	6	5	5	5	4	3	3	4	2	3	5	4	4	3	3	2	7
15-Feb	2	3	2	2	3	3	2	2	2	2	2	3	3	2	3	3	3	3	2	2	2	3	5	3	5
16-Feb	4	2	2	2	3	2	3	2	1	1	1	2	2	2	2	1	1	1	1	2	1	1	1	1	4
17-Feb	1	1	1	1	1	1	1	1	1	1	2	2	1	2	2	2	1	1	3	2	2	2	2	3	3
18-Feb	3	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	2	3	2	3	2	2	3
19-Feb	2	1	2	1	2	2	1	1	1	1	1	1	2	1	1	2	2	2	3	4	6	5	5	5	6
20-Feb	5	5	5	5	3	4	4	4	3	3	2	2	3	3	3	3	3	2	2	3	2	2	3	1	5
21-Feb	1	2	2	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	2	2	1	2	2	2	2
22-Feb	2	2	1	1	1	1	1	1	1	2	1	1	2	3	2	2	2	2	2	2	2	2	3	3	3
23-Feb	3	3	4	3	5	4	5	5	3	2	3	6	4	2	3	4	4	5	5	5	4	4	2	2	6
24-Feb	2	2	4	3	3	3	3	3	3	2	2	2	2	3	1	4	4	4	4	4	4	4	4	3	4
25-Feb	2	2	2	2	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	2
26-Feb	1	1	1	1	2	1	1	1	2	2	2	2	2	2	3	2	3	1	1	2	2	3	2	3	3
27-Feb	3	5	4	3	3	3	2	2	3	1	1	1	2	1	2	1	1	2	1	1	1	1	2	2	5
28-Feb	2	2	2	2	2	3	3	3	3	4	4	3	3	3	2	3	2	6	5	6	3	3	3	1	6
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Millennium - February 2015**





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

**Wind Speed (WS) - km/h**  
**Millennium - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	222	33.04	33.04
6 - 11	292	43.45	76.49
12 - 19	135	20.09	96.58
20 - 28	23	3.42	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Millennium - February 2015**

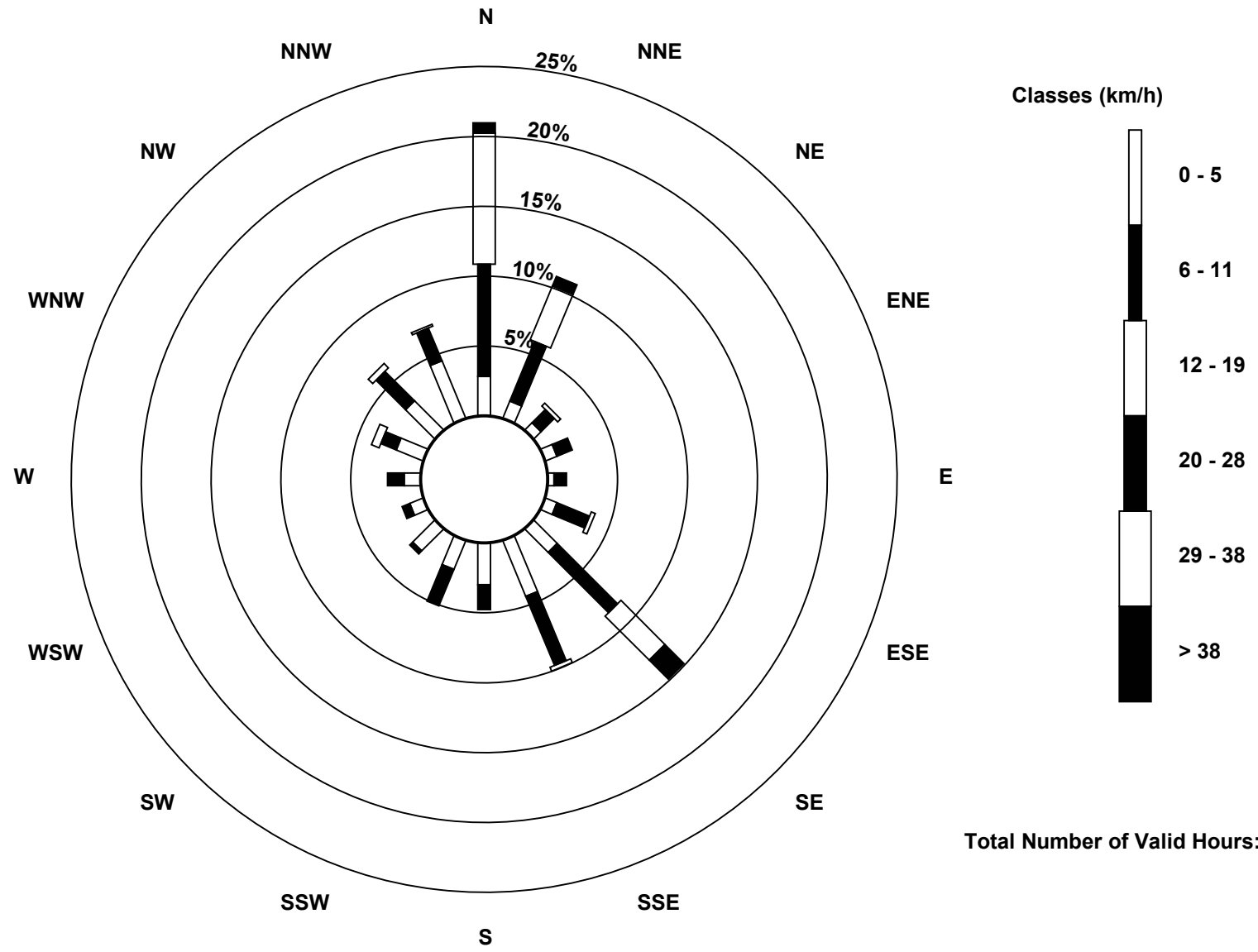
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	19	9	5	6	3	6	16	29	20	15	15	7	8	14	20	30	222
6 - 11	54	31	9	8	6	17	41	36	12	19	2	4	8	8	20	17	292
12 - 19	63	28	2	0	0	2	30	2	0	0	0	0	0	4	3	1	135
20 - 28	5	5	0	0	0	0	13	0	0	0	0	0	0	0	0	0	23
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	73	16	14	9	25	100	67	32	34	17	11	16	26	43	48	672

Total Number of Valid Hours: 672

Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Millennium (AMS 12)**







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

**Wind Direction (WD) - deg**  
**Millennium - February 2015**

Direction of Maximum Speed: 10 deg on Feb 19 22:00 Direction of Maximum Daily Speed Average: 3.4 deg on Feb 20	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0
Direction of Minimum Speed: 63 deg on Feb 27 13:00 Direction of Minimum Daily Speed Average: 1.2 deg on Feb 25	Percent Operational Time: 100.0
Monthly Average Direction: 305.9 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-Feb	152	155	162	168	173	147	189	224	229	342	336	294	268	264	296	274	13	33	41	224	215	213	251	229	218.1																							
2-Feb	208	214	205	209	207	213	200	218	198	240	276	1	333	295	332	15	65	332	311	234	220	267	263	268	249.6																							
3-Feb	252	282	8	333	359	6	357	2	320	354	5	360	2	2	38	117	128	144	137	154	162	157	153	151	24.1																							
4-Feb	147	152	163	148	160	199	159	167	140	170	212	228	282	291	311	12	10	336	359	3	8	5	355	350	356.8																							
5-Feb	355	344	348	329	331	1	11	231	225	237	269	114	134	93	16	35	24	29	29	32	32	38	29	6	13.6																							
6-Feb	10	11	20	27	21	23	17	14	11	10	20	48	79	74	57	67	71	69	82	93	113	114	118	118	45.8																							
7-Feb	120	128	131	130	136	132	130	131	136	136	132	133	130	127	127	127	138	132	141	127	114	31	17	14	128.4																							
8-Feb	7	0	358	7	14	18	19	18	356	301	275	171	122	60	74	50	42	22	4	350	346	351	348	331	11.8																							
9-Feb	306	350	359	336	351	342	353	329	351	325	313	303	310	310	314	345	336	326	348	342	305	314	313	312	331.1																							
10-Feb	314	342	352	4	7	7	1	325	326	321	323	312	321	342	7	358	357	13	25	19	16	21	22	30	359.0																							
11-Feb	354	258	223	208	205	138	165	201	166	164	161	208	201	153	140	147	143	140	141	141	144	144	146	153	153.9																							
12-Feb	163	157	148	146	159	175	201	211	216	192	205	316	338	9	11	5	9	10	12	9	16	15	10	2	12.4																							
13-Feb	14	17	8	6	4	18	9	10	15	23	37	46	99	123	126	130	122	123	131	132	132	133	136	142	81.3																							
14-Feb	138	136	132	142	142	143	141	141	141	138	141	143	151	153	161	170	161	193	359	12	8	2	359	8	132.2																							
15-Feb	15	28	31	42	22	29	19	17	8	7	8	358	4	3	5	10	10	13	354	1	357	353	2	13	11.1																							
16-Feb	7	4	8	14	18	7	358	336	312	332	355	288	276	301	332	19	139	149	140	326	337	293	295	198	352.8																							
17-Feb	184	225	282	252	274	223	210	222	188	141	205	190	158	166	143	147	151	145	130	127	123	131	136	124	155.9																							
18-Feb	126	138	142	143	145	150	139	142	130	130	127	125	123	114	132	147	142	139	140	140	140	145	148	151	136.3																							
19-Feb	147	160	176	199	196	194	177	192	187	157	183	184	15	287	314	301	328	353	359	357	6	10	3	9	357.7																							
20-Feb	12	3	0	356	358	360	359	0	4	9	17	21	4	2	0	1	2	4	13	354	5	360	5	323	3.4																							
21-Feb	326	349	345	335	355	357	314	327	315	313	291	70	140	136	128	127	122	127	143	149	154	142	145	148	122.8																							
22-Feb	144	147	153	157	159	157	153	173	172	182	173	181	177	192	179	177	184	186	174	159	172	189	295	303	176.5																							
23-Feb	311	306	300	298	308	314	316	325	331	2	311	348	12	2	5	6	10	13	13	15	27	48	51	61	355.0																							
24-Feb	83	101	116	113	105	114	107	102	88	68	53	52	61	58	344	35	9	5	2	2	360	359	358	335	36.7																							
25-Feb	318	333	353	360	306	316	335	334	330	290	348	81	352	330	341	42	111	146	150	135	135	148	143	188	353.5																							
26-Feb	148	153	144	157	152	175	213	212	206	151	139	150	163	175	188	291	239	240	338	353	3	11	16	6	165.0																							
27-Feb	3	4	14	12	16	13	26	30	28	148	133	128	63	109	124	119	131	199	196	178	168	161	203	239	39.6																							
28-Feb	277	276	260	246	244	268	289	282	281	299	313	315	313	319	341	347	292	343	3	359	355	350	356	22	315.5																							
Diurnal Average																									40.8	38.0	41.5	44.0	31.0	30.4	34.0	19.7	46.8	33.7	31.5	45.2	34.7	25.2	49.3	48.3	56.4	46.1	41.8	37.4	36.5	33.9	29.8	25.9

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



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

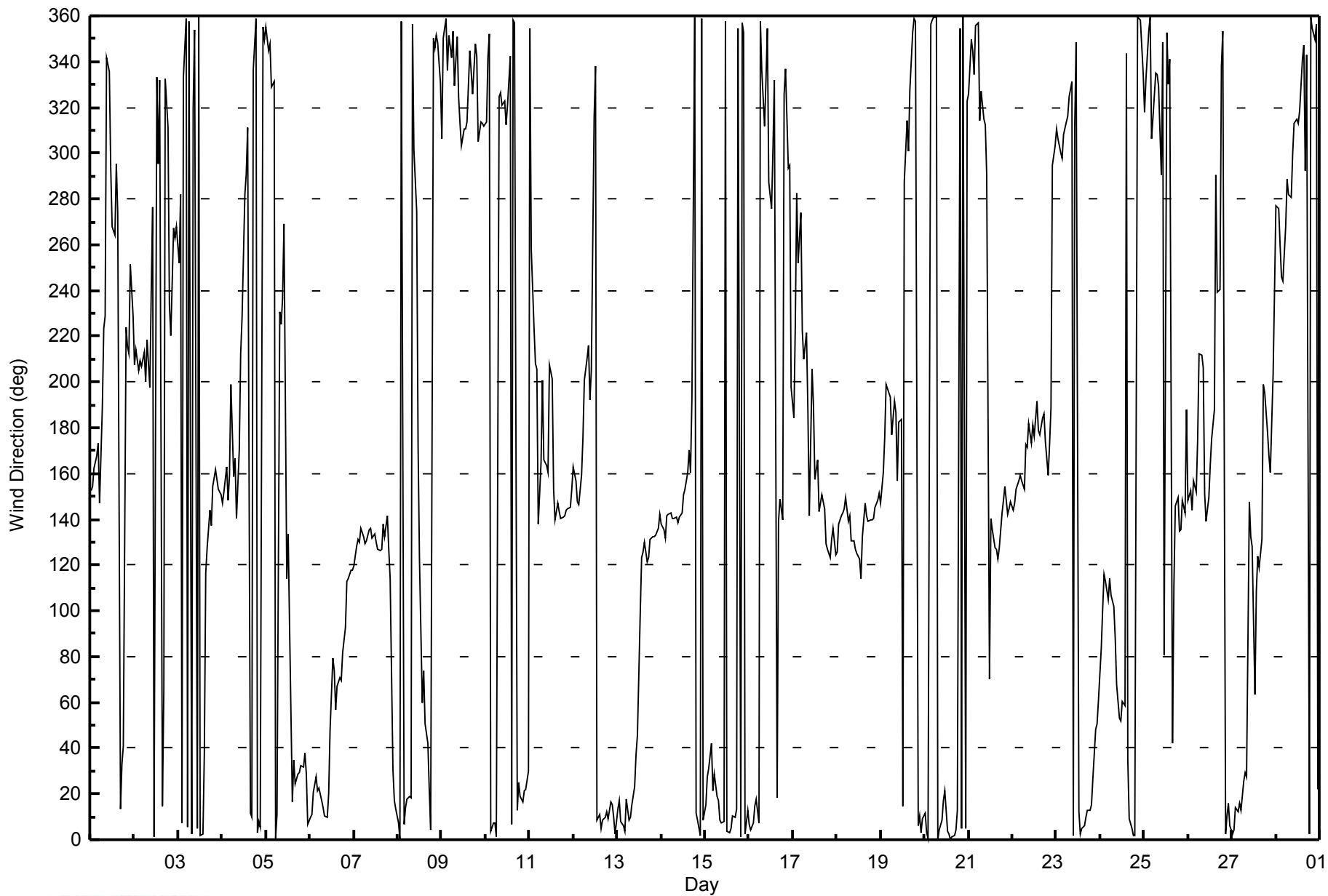
**Wind Direction (WD) - deg**  
**Millennium - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 107 deg on Feb 27 13:00																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0						
Minimum Value: 8 deg on Feb 11 00:00																									
Percentiles: P <sub>1</sub> = 10 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 19 Q <sub>3</sub> = 27 P <sub>90</sub> = 37 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-Feb	11	10	11	14	28	32	27	63	65	61	39	28	22	27	34	34	40	11	46	11	13	12	27	24	65
2-Feb	15	18	23	15	11	62	19	54	27	44	30	22	33	38	37	27	64	52	27	25	20	20	21	20	64
3-Feb	24	38	20	24	16	12	19	14	27	23	13	17	13	33	74	23	17	11	11	8	10	13	13	13	74
4-Feb	13	14	12	14	35	17	34	16	17	57	24	44	38	28	34	14	11	27	31	16	18	18	19	28	57
5-Feb	18	22	31	30	33	19	86	17	12	21	57	67	59	82	57	36	14	12	14	12	11	10	12	20	86
6-Feb	12	12	13	12	13	13	12	13	11	10	13	23	30	27	15	24	21	20	30	35	29	27	23	24	35
7-Feb	21	21	19	19	18	18	19	19	18	18	19	19	18	18	17	17	18	20	20	21	31	19	14	15	31
8-Feb	23	24	24	17	11	13	14	13	19	29	33	61	32	26	26	24	17	10	18	15	16	12	15	32	61
9-Feb	21	23	21	25	20	21	18	20	22	31	28	34	34	31	24	24	26	24	18	26	28	20	28	37	37
10-Feb	25	28	24	17	15	15	18	24	27	31	30	32	34	31	13	17	17	15	12	12	12	12	12	8	34
11-Feb	48	25	11	19	11	30	37	15	23	29	33	16	21	21	17	19	19	18	17	17	17	17	17	20	48
12-Feb	19	19	16	15	19	25	16	15	13	37	75	40	35	11	12	13	12	12	10	12	16	14	15	17	75
13-Feb	13	14	15	14	15	14	14	13	14	17	13	35	39	31	27	17	19	19	18	18	20	19	19	18	39
14-Feb	19	18	19	19	18	18	18	18	17	17	17	18	18	18	20	17	20	18	80	12	15	16	17	11	80
15-Feb	12	16	16	9	19	13	15	15	13	13	14	16	15	13	16	13	12	10	21	17	17	24	25	14	25
16-Feb	13	15	14	11	15	13	22	34	28	46	28	53	47	38	35	39	19	10	21	89	31	17	28	34	89
17-Feb	25	71	67	17	13	44	12	25	36	31	32	34	22	28	24	24	19	14	14	14	14	17	19	17	71
18-Feb	16	18	16	20	20	17	17	17	16	18	17	17	21	23	24	23	18	17	17	16	15	17	16	16	24
19-Feb	17	17	18	17	16	18	14	14	19	28	23	22	82	38	32	31	36	21	18	18	15	14	17	16	82
20-Feb	13	18	18	20	19	17	18	19	17	12	15	17	13	14	14	14	16	13	12	22	15	18	41	22	41
21-Feb	25	30	33	32	25	31	18	22	22	25	46	75	39	29	19	13	14	13	11	12	10	13	13	14	75
22-Feb	13	13	12	13	13	13	11	19	18	30	25	14	18	19	19	14	20	18	14	18	25	64	30	26	64
23-Feb	32	24	24	21	27	28	30	31	32	14	31	41	14	15	14	15	13	13	14	13	16	12	12	20	41
24-Feb	37	28	26	22	26	25	26	30	32	22	15	12	28	44	55	15	14	15	15	17	17	19	21	27	55
25-Feb	26	24	20	22	19	17	18	25	34	40	68	80	70	46	106	37	28	12	10	10	11	11	17	20	106
26-Feb	11	16	11	12	16	18	15	9	16	23	16	18	19	17	40	67	26	24	29	20	14	12	13	16	67
27-Feb	17	18	12	14	13	12	13	13	20	83	39	35	107	33	18	21	12	29	14	17	15	16	16	23	107
28-Feb	21	20	29	21	20	21	23	25	22	26	28	31	31	41	34	29	36	57	17	20	20	22	21	21	57
	48	71	67	32	35	62	86	63	65	83	75	80	107	82	106	67	64	57	80	89	31	64	41	37	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Millennium - February 2015**



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 16, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:30
Barometric Pressure	724 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107924		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0-5 volts	DACS channel #	1

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-665	-665
Analyzer Range (mv)	1000	1000	Lamp voltage	794	794
Calculated slope	1.001503	1.002122	Chamber temp.	44.9	44.9
Calculated intercept	0.252846	-0.204137	Pressure (mmHg)	707.3	707.3
Analyzer Background	9.3	9.3	Flow (lpm)	0.434	0.434
	1.217	1.217	Intensity	91	91

Analyzer make	43i Thermo	Analyzer serial #	1118148499
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.0	-0.1	NA
as found span	6000	94.1	801.4	798.7	1.003
calibrator zero	6000	0.0	0.0	0.3	NA
high point	6000	94.1	801.4	800.2	1.002
second point	6000	47.1	401.1	399.8	1.003
third point	6000	23.5	200.1	200.2	1.000
calibrator zero	6000	0.0	0.0	0.4	NA
as left zero	6000	0.0	0.0	0.4	NA
as left span	6000	94.1	801.4	798.6	1.004
Average Correction Factor					1.002

Corrected As found	798.8	Previous response	800.0	% change	0.1%
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#### Notes:

Filter changed, No adjustments or maintenance done

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

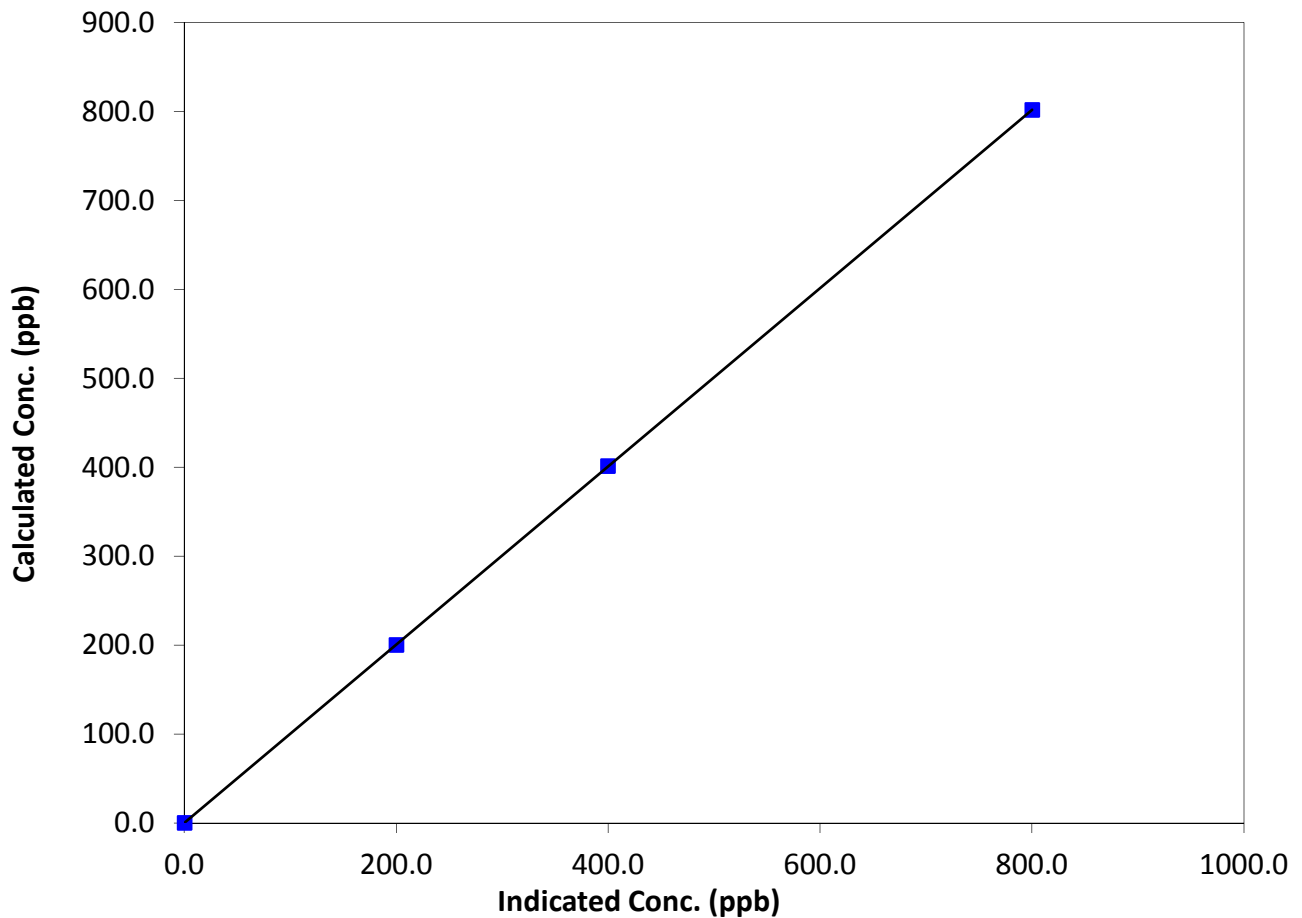
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 16, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:55	End Time (MST)	12:30
Analyzer make	43i Thermo	Analyzer serial #	1118148499

### Calibration Data

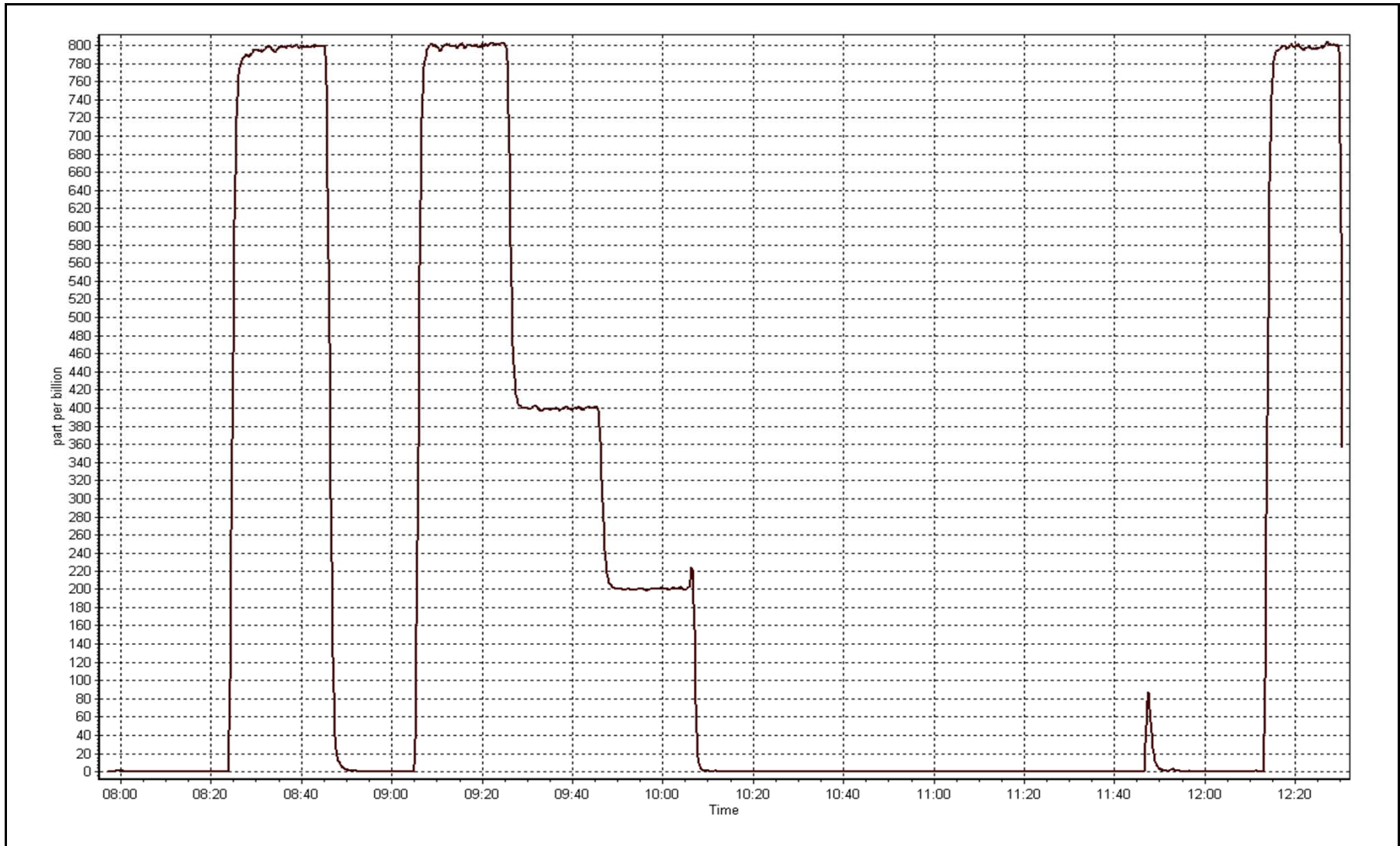
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999998
801.4	800.2	1.0015		
401.1	399.8	1.0033	Slope	1.002122
200.1	200.2	0.9997		
			Intercept	-0.204137

**SO<sub>2</sub> Calibration Curve**



SO2 Calibration Plot

Date: February 18, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 21, 2015
Station Name	Millenium Mine	Station Number	Ams 12
Reason:	Routine		
Start Time (MST)	7:30	End Time (MST)	9:52
Barometric Pressure	727 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11091107
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL84557	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0-5 volts	DACS channel #	2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-597	-597
Analyzer Range (input)	100	100	Lamp voltage	893	893
Calculated slope	0.983947	0.997141	Chamber temp.	44	44
Calculated intercept	0.001926	0.255606	Pressure	681.1	681.1
Analyzer Background	18.9	18.9	Flow	0.601	0.601
Analyzer Coefficient	0.640	0.64	Intensity	46600	46600
			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	-0.3	NA
as found span	5000	38.5	80.1	80.0	1.001
SO2 scrubber check	6000	47.1	401.1	0.9	NA
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	38.5	80.1	80.0	1.001
second point	5000	19.2	39.9	39.9	1.001
third point	5000	9.6	20.0	19.8	1.010
calibrator zero	6000	0.0	0.0	0.0	NA
as left zero	6000	0.0	0.0	0.0	NA
as left span	5000	38.5	80.1	80.2	0.999
Average Correction Factor					1.004

Corrected As found	80.3	Previous response	81.4	% change	1.3%
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#### Notes:

Filter changed out, scrubber checked before as founds. No adjustments or maintenance done.

Calibration Performed By:

Melissa Lemay





# Wood Buffalo Environmental Association

## TRS Calibration Summary

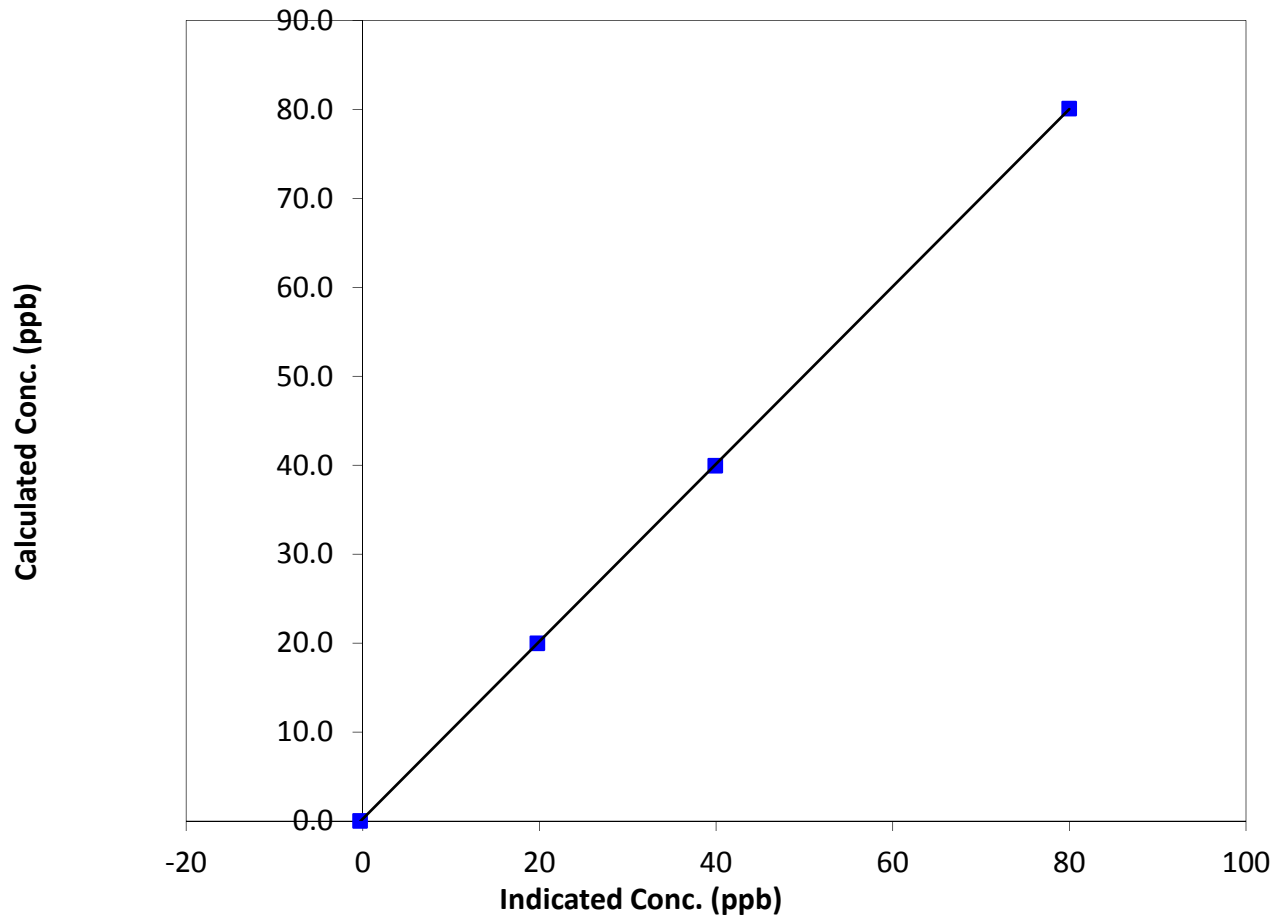
### Station Information

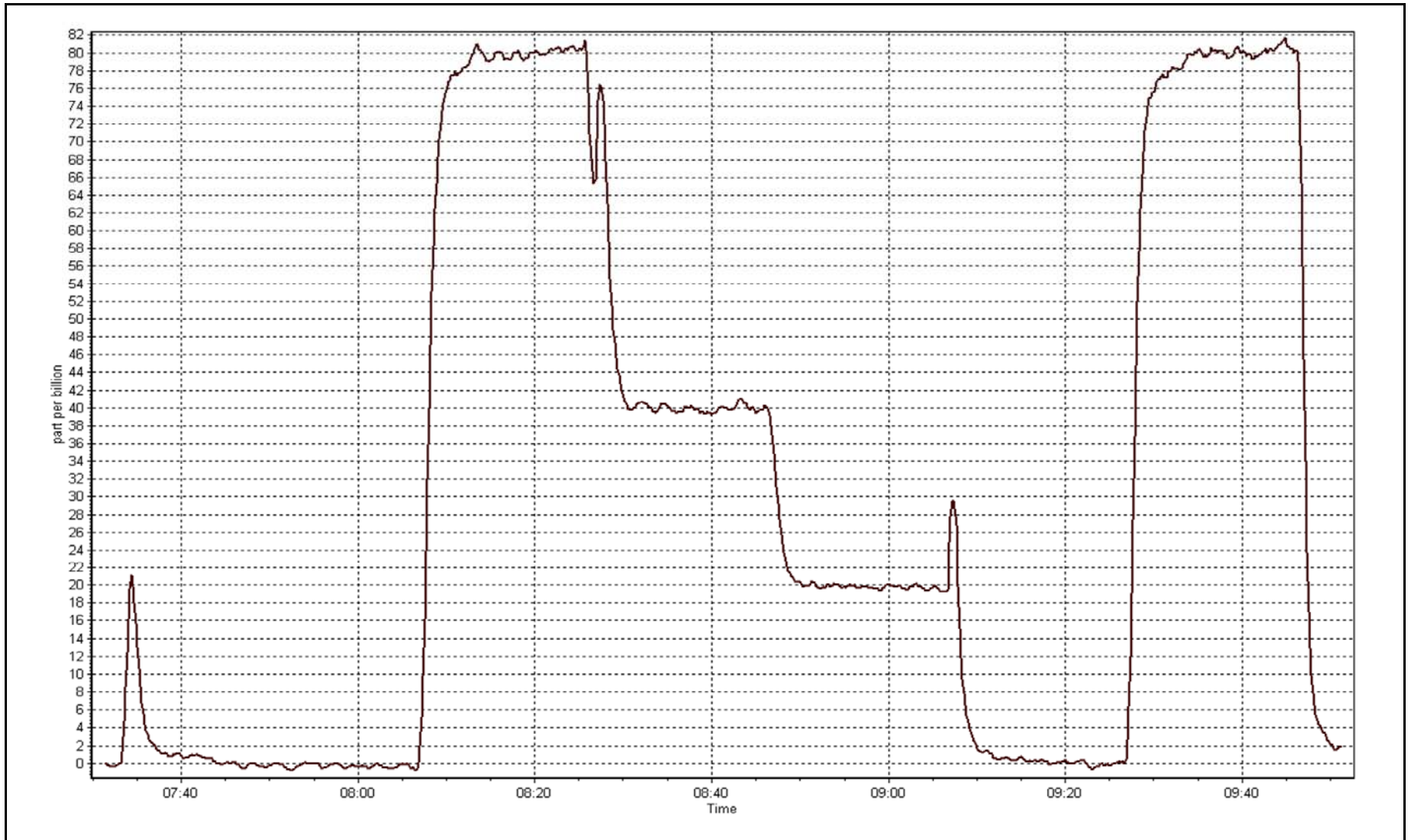
Calibration Date	February 19, 2015	Previous Calibration	January 21, 2015
Station Name	Millenium Mine	Station Number	Ams 12
Start Time (MST)	7:30	End Time (MST)	9:52
Analyzer make	TEI 43C	Analyzer serial #	0509110887

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999995
80.1	80.0	1.0010		
39.9	39.9	1.0009	Slope	0.997141
20.0	19.8	1.0100		
			Intercept	0.255606

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Wednesday, February 18, 2015	Previous Calibration	Thursday, January 29, 2015
Station Name	Millennium	Station Number	AMS 12
Reason:	Routine		
Start Time (MST)	7:55	End Time (MST)	12:30
Barometric Pressure	na mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11091107
Gas Cert Reference	LL107924	Cal Gas Expiry Date	5/29/2014
CH4 Cal Gas Conc.	510.0 ppm	CH4 Equiv Conc.	1079.3 ppm
C3H8 Cal Gas Conc.	207.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2374
DACS voltage range	0 - 5 volts	DACS channel #	3

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	11.7	11.7
Analyzer Range (mv)	25	25	Air or Bypass press	42.9	42.9
Calculated slope	0.997343	1.011519	Fuel Pressure	19.3	19.3
Calculated intercept	0.016045	0.012146		3.76	3.76
				2.08	2.08

Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	6000	0.0	0.00	-0.04	N/A
as found span	6000	94.1	16.93	16.72	1.012
calibrator zero	6000	0.0	0.00	-0.02	N/A
high point	6000	94.1	16.93	16.72	1.012
second point	6000	47.1	8.47	8.36	1.013
third point	6000	23.5	4.23	4.18	1.011
calibrator zero	6000	0.0	0.00	0.00	N/A
as left zero	6000	0.0	0.00	0.00	N/A
as left span	6000	94.1	16.93	16.87	1.003
Average Correction Factor					1.012

Corrected As found	16.76	Previous response	16.96	% change	1.2%
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#### Notes:

Filter changed out, No maintenance or adjustments done

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## THC Calibration Summary

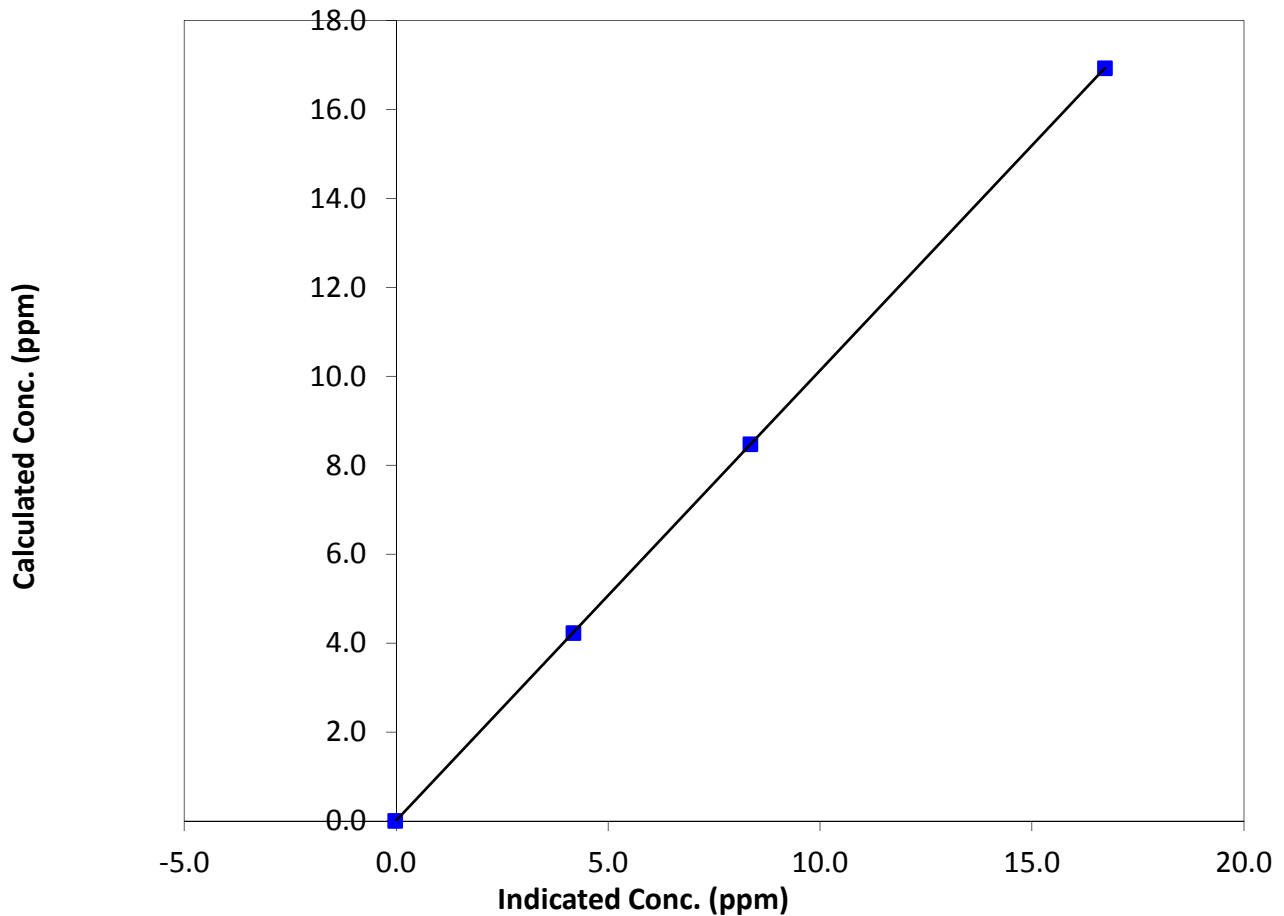
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 29, 2015
Station Name	Millennium	Station Number	AMS 12
Start Time (MST)	7:55	End Time (MST)	12:30
Analyzer make	Thermo 51i-LT	Analyzer serial #	1317958296

### Calibration Data

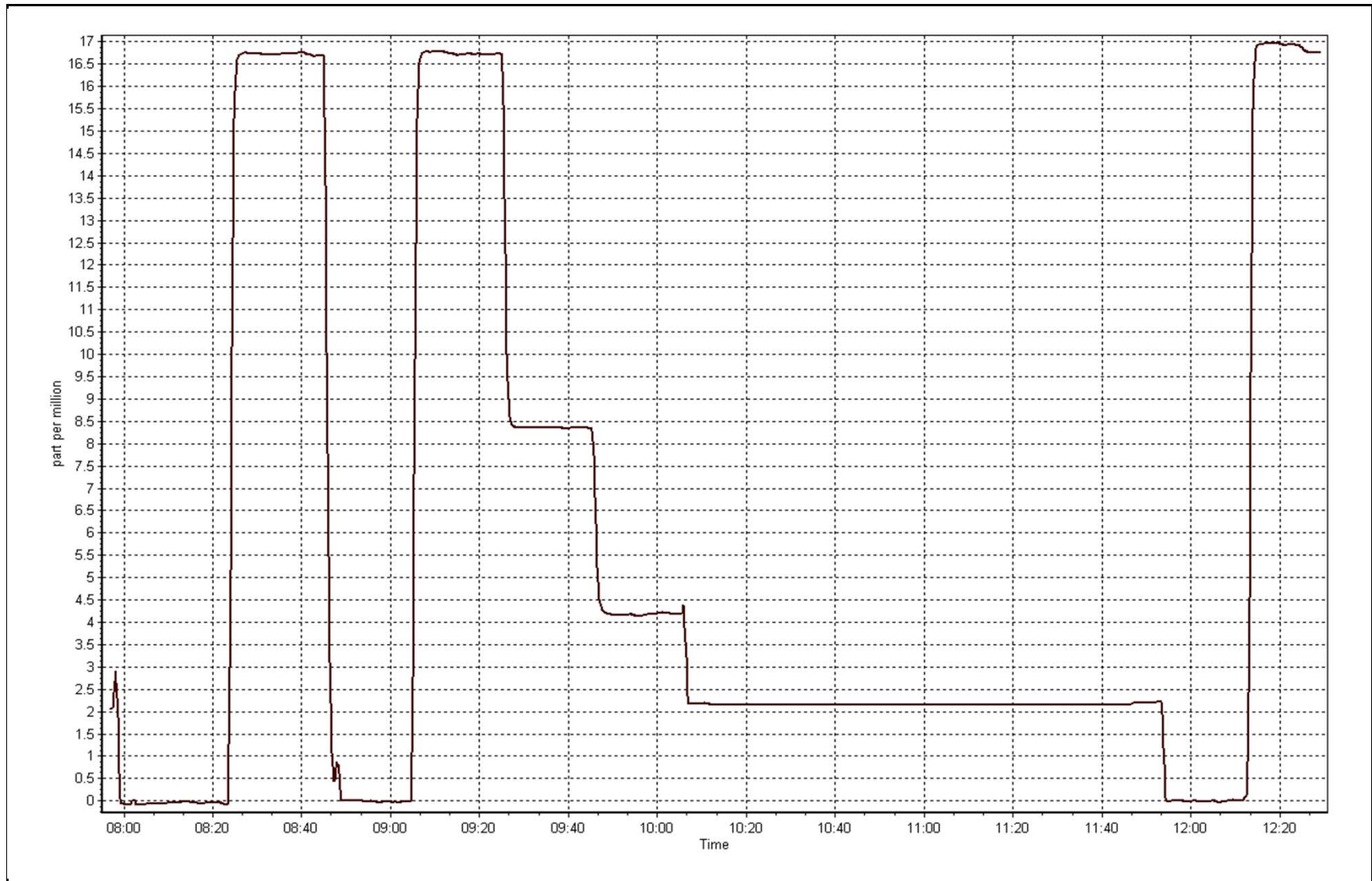
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.02	N/A	Correlation Coefficient	0.999998
16.93	16.72	1.0123		
8.47	8.36	1.0134	Slope	1.011519
4.23	4.18	1.0113		
			Intercept	0.012146

**THC Calibration Curve**



THC Calibration Plot

Date: February 18, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 29, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	7:55	End Time (MST)	12:30
Barometric Pressure	724 mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	11091107
NO Cal Gas Conc	51 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	51 ppm	Cal Gas Serial #	LL107924

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. \_\_\_\_\_

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.006256	1.006337	1.003330
	Data Offset	0.504364	0.300834	0.147277
After	Data Slope	1.002298	1.003162	1.003689
	Data Offset	-0.112335	-0.213180	0.039397
Channel #		7	6	5
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model API T200      Analyzer serial # 723

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	1.148	ppb	1.147	ppb
NOX coefficient	1.141	ppb	1.140	ppb
NO2 coefficient		ppb		ppb
NO bkgrnd	0.5		-0.1	
NOX bkgrnd	1.6		0.5	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.3	Deg C	316.3	Deg C
PMT Temp	6.9	Deg C	6.9	Deg C
O3 flow	87.0	ccm	87.0	ccm
R Cell Press	2.9	mmHg	2.9	mmHg
Sample Flow	504-499	ccm	504-499	ccm

**Notes:**

Filter changed, No maintenance Done, Span adjusted



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 18, 2015

Station Number:

AMS 12

### 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 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
as found zero	6000	0.0	0.0	0.0	0.0	-1.3	-0.8	-0.5	N/A	N/A
as found span	6000	94.1	799.9	799.9	0.0	796.0	795.0	1.0	1.0048	1.0061
calibrator zero	6000	0.0	0.0	0.0	0.0	0.2	0.3	0.2	N/A	N/A
high point	6000	94.1	799.9	799.9	0.0	798.0	797.6	0.4	1.0023	1.0028
second point	6000	47.1	400.4	400.4	0.0	400.0	399.2	0.8	1.0009	1.0029
third point	6000	23.5	199.8	199.8	0.0	199.0	199.3	-0.3	1.0038	1.0023
calibrator zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.1	0.2	-0.1	N/A	N/A
as left span	6000	94.1	799.9	490.0	309.9	788.9	492.0	296.8	1.0139	0.9959
Average Correction Factor									1.0023	1.0027

Corrected As found

NO<sub>x</sub>= 797.3

NO= 795.8

Percent Change

NO<sub>x</sub>= -0.4%

NO= -0.2%

Previous Response

NO<sub>x</sub>= 794.4

NO= 794.5

### GPT Calibration Data

Dilution Flow

6000

ccm

Source Gas Flow

94.10

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			0.2			N/A	
1st NO <sub>2</sub> (300)	N/A	490.0	306.9	796.2	490.0	306.2	0.9891	1.0000	1.0023	99.8%
2nd NO <sub>2</sub> (200)	N/A	594.0	202.9	795.5	594.0	201.4	0.9899	1.0000	1.0074	99.3%
3rd NO <sub>2</sub> (100)	N/A	696.5	100.4	796.5	696.5	100.0	0.9887	1.0000	1.0040	99.6%
4th NO <sub>2</sub> (0)	796.9	N/A	0.4	797.3	796.9	0.4	0.9877	1.0000	N/A	N/A
Average Correction Factor							0.9889	1.0000	1.0046	99.5%

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

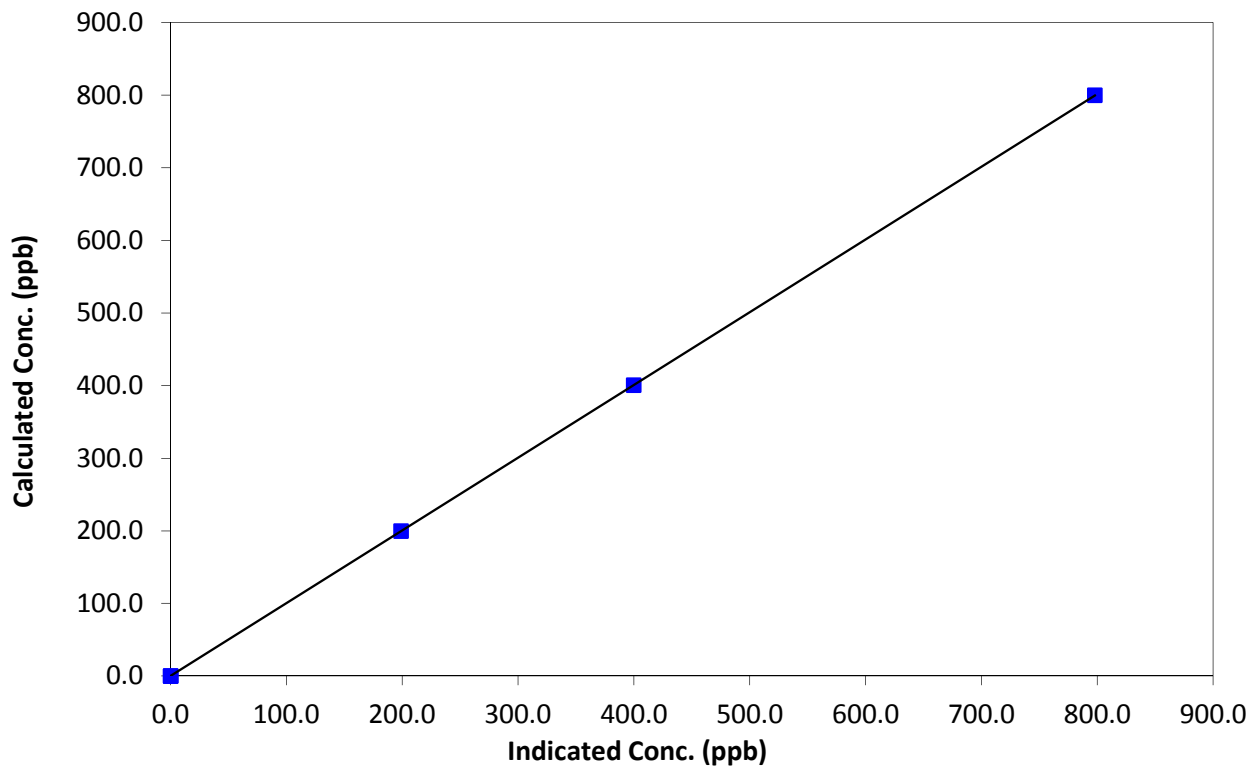
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 29, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:55	End Time (MST)	12:30
Analyzer make	API T200	Analyzer serial #	723

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999999
799.9	798.0	1.0023		
400.4	400.0	1.0009	Slope	1.002298
199.8	199.0	1.0038		
0.0	0.1	0.0000	Intercept	-0.112335

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







# Wood Buffalo Environmental Association

## NO Calibration Summary

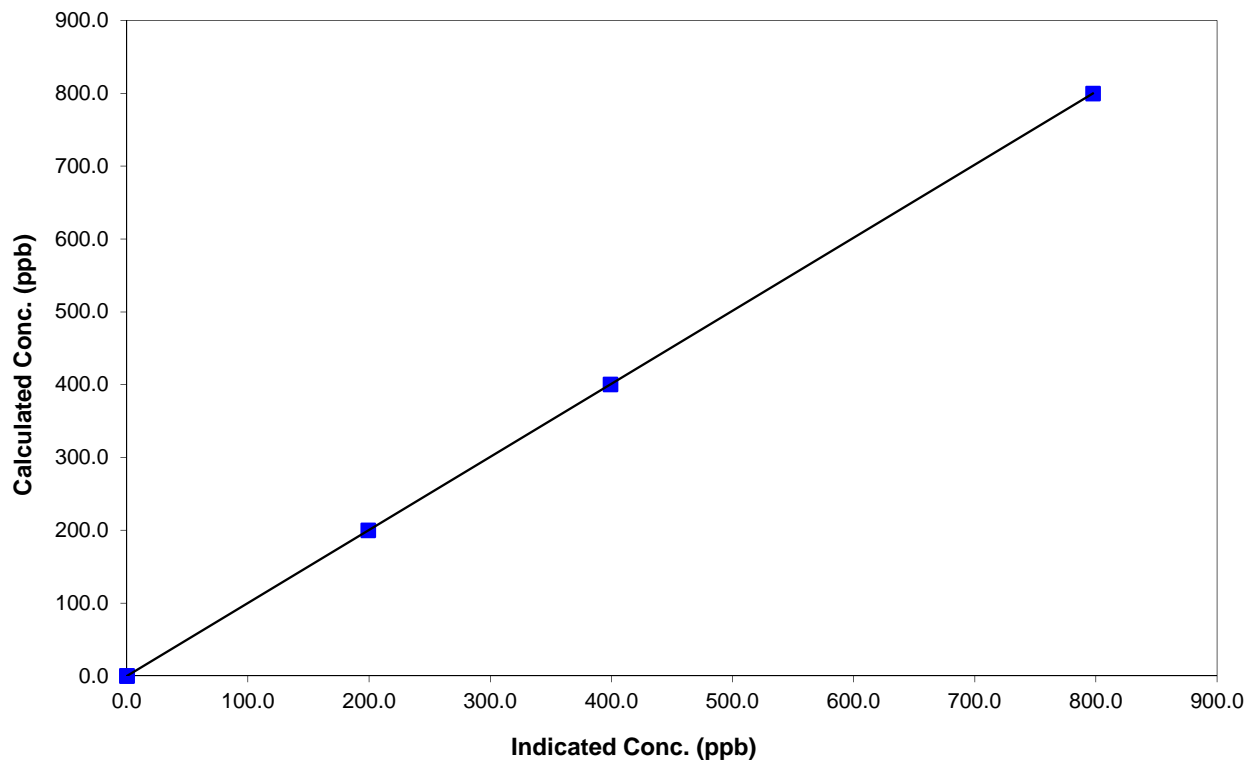
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 29, 2015
Station Name	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:55	End Time (MST)	12:30
Analyzer make	API T200	Analyzer serial #	723

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	1.000000
799.9	797.6	1.0028		
400.4	399.2	1.0029	Slope	1.003162
199.8	199.3	1.0023		
0.0	0.2	0.0000	Intercept	-0.213180

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

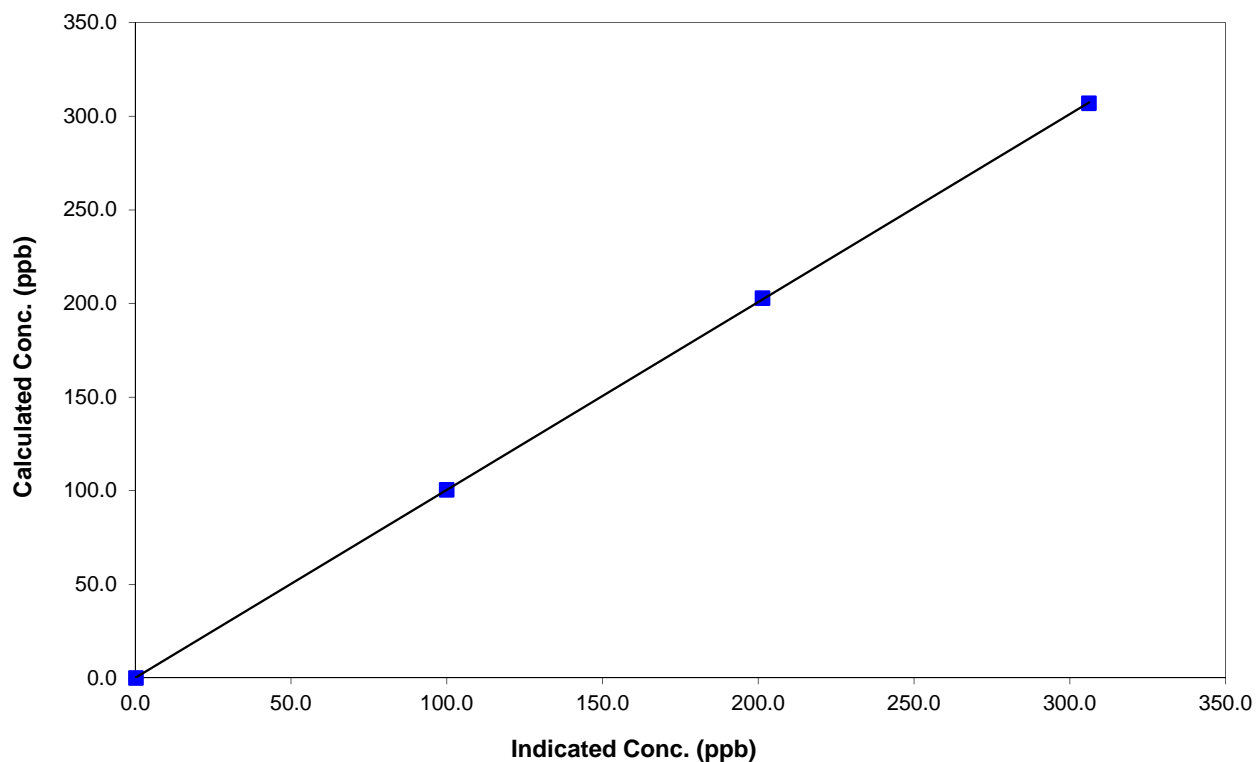
### Station Information

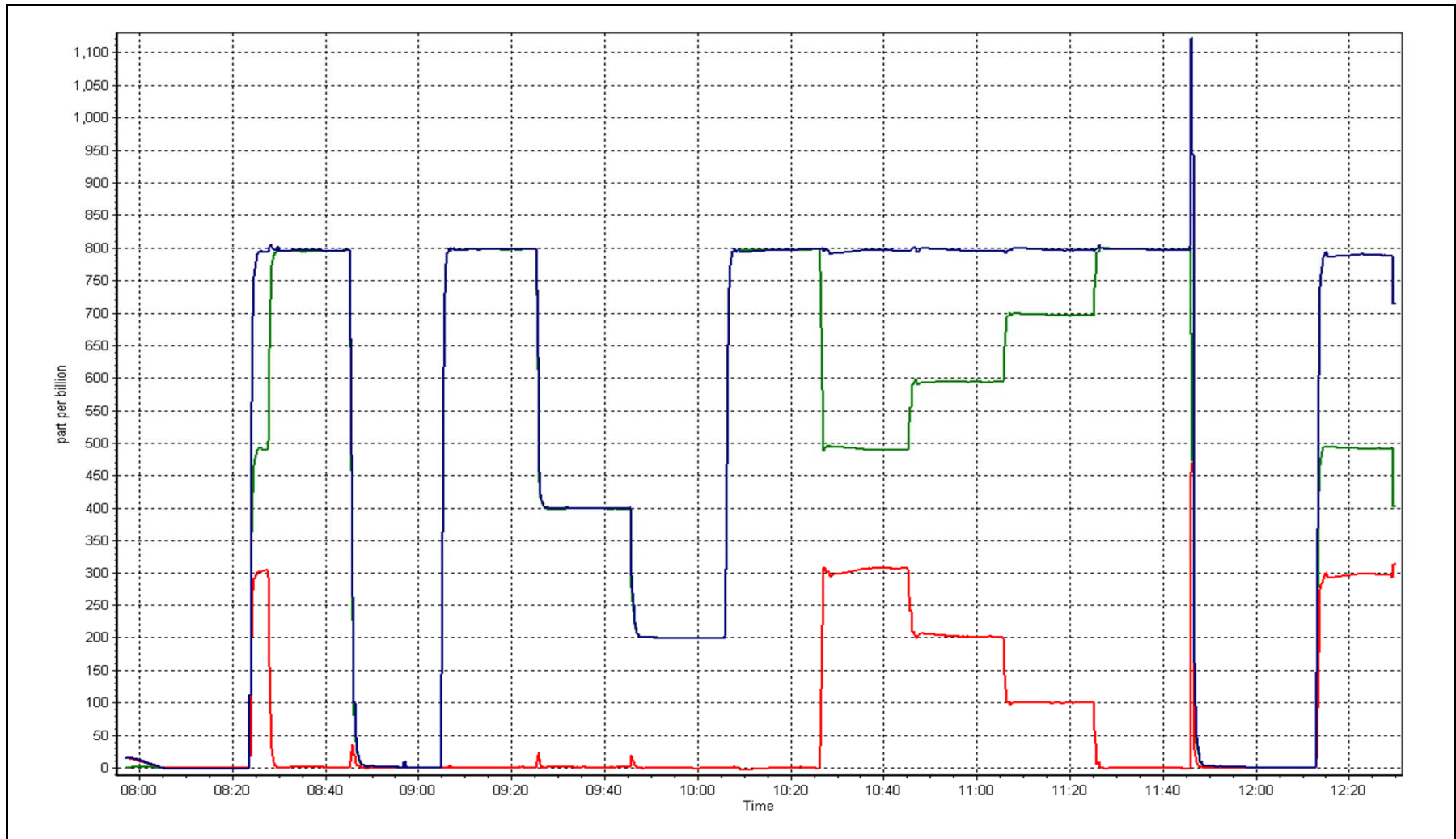
Calibration Date	February 18, 2015	Previous Calibration	January 29, 2015
Station Number	Millenium Mine	Station Number	AMS 12
Start Time (MST)	7:55	End Time (MST)	12:30
Analyzer make	API T200	Analyzer serial #	723

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999985
306.9	306.2	1.0023		
202.9	201.4	1.0074	Slope	1.003689
100.4	100.0	1.0040		
			Intercept	0.039397

### 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**  
**FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
 FEBRUARY 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	637	35	35	100.00	13	0	2	0
TRS(ppb) Average	641	31	31	100.00	2	0	1	0
THC(ppm) Average	638	34	34	100.00	3.6	-	2.6	-
O3(ppb) Average	640	32	32	100.00	37	0	32	-
NO2(ppb) Average	598	40	74	94.94	34	0	18	-
NO(ppb) Average	598	40	74	94.94	95	-	24	-
NOX(ppb) Average	598	40	74	94.94	126	-	41	-
PM2.5(ug/m3) Average	670	0	2	99.70	19.6	-	8.5	0
Temperature 2 m (C) Average	672	0	0	100.00	1.3	-	-2.8	-
Relative Humidity (%) Average	672	0	0	100.00	92	-	-	-
Wind Speed 10 m (km/h) Average	614	0	58	91.37	15	-	-	-
Wind Direction 10 m (deg) Average	614	0	58	91.37	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FORT MCKAY SOUTH (AMS 13)  
 FEBRUARY 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	637	0.9	1	-	0	0	0	1	1	2	13
TRS(ppb) Average	641	0.3	0	-	0	0	0	0	0	1	2
THC(ppm) Average	638	2.29	0.2	-	2	2.1	2.1	2.2	2.4	2.6	3.6
O3(ppb) Average	640	18.8	9	-	0	4	12	20	26	30	37
NO2(ppb) Average	598	10.4	7	-	0	3	5	8	14	22	34
NO(ppb) Average	598	3.6	9	-	0	0	0	0	3	10	95
NOX(ppb) Average	598	14	15	-	0	3	6	10	17	30	126
PM2.5(ug/m3) Average	670	4.59	2.8	-	0.1	1.7	2.9	4	5.6	8.1	19.6
Temperature 2 m (C) Average	672	-18.26	8.6	-	-39.7	-30	-24.4	-18.6	-12.1	-7	1.3
Relative Humidity (%) Average	672	74.2	7	-	48	65	71	75	79	81	92
Wind Speed 10 m (km/h) Average	614	5.4	3	-	0	2	3	5	8	10	15
Wind Direction 10 m (deg) Average	614	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION -FORT McKAY SOUTH (AMS 13)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
NO2, NO, NOX	23 Feb 2015 02:00	24 Feb 2015 11:00	34	Loose sample line - exceeds 10% allowance for span target
PM2.5	19 Feb 2015 12:00	19 Feb 2015 13:00	2	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	01 Feb 2015 01:00	03 Feb 2015 10:00	58	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: 672
Maximum Value: 13 ppb on Feb 22 14:00	Maximum Daily Average: 2.4 ppb on Feb 26
Minimum Value: 0 ppb on Feb 3 06:00	Hours of Data: 637
Maximum Diurnal Average: 1.7 ppb at hour 14	Hours of Missing Data: 35
Monthly Average: 0.9 ppb	Hours of Calibration: 35
Minimum Daily Average: 0.4 ppb on Feb 16	Percent Operational Time: 100.0
Minimum Diurnal Average: 0.5 ppb at hour 7	
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	

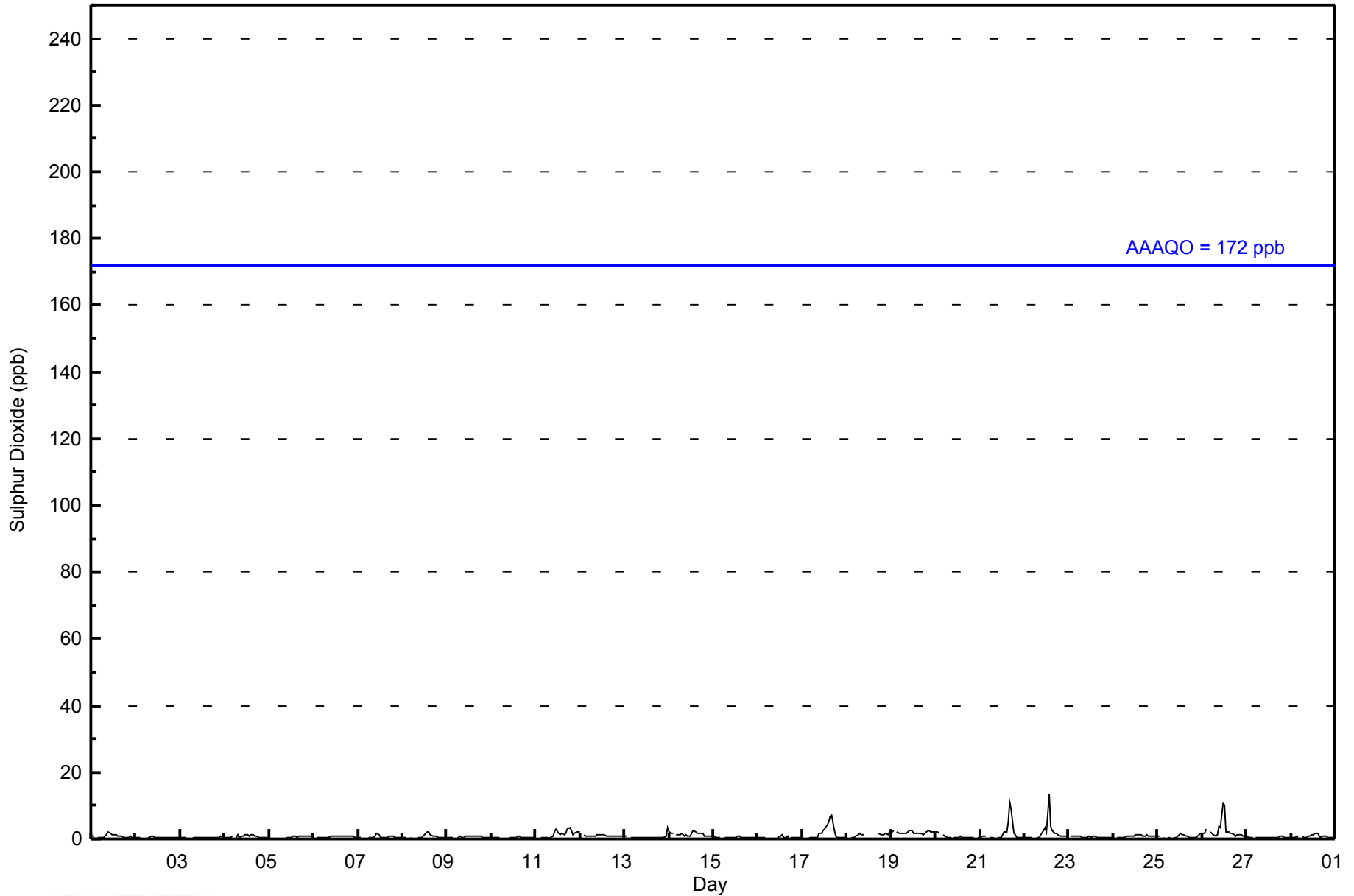
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	1	Z	1	0	0	1	1	1	2	2	1	1	1	1	1	1	1	0	1	1	1	1	1	0.9	2
2-Feb	1	1	1	Z	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
3-Feb	0	0	0	1	Z	0	0	0	0	0	0	1	1	1	0	1	1	0	0	0	0	1	1	1	0.4	1
4-Feb	1	1	1	1	1	Z	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0.8	1
5-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.4	1
6-Feb	1	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1
7-Feb	1	1	Z	0	0	0	0	0	0	1	2	1	1	0	0	0	0	1	1	1	1	1	1	1	0.6	2
8-Feb	1	1	1	Z	0	0	0	0	0	0	1	1	1	2	2	1	1	1	1	1	0	1	1	0	0.7	2
9-Feb	0	0	1	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0.6	1
10-Feb	0	0	1	0	0	Z	0	0	0	0	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0.4	1
11-Feb	Z	0	0	0	0	0	0	0	0	1	2	3	2	1	2	1	2	3	3	3	1	2	2	2	1.4	3
12-Feb	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-Feb	1	1	Z	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	4	0.6	4
14-Feb	2	2	2	Z	1	1	1	2	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1.4	2
15-Feb	1	1	1	0	Z	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	0.6	1
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	1	0	0	0	1	1	0	0	0.4	1
17-Feb	Z	0	0	0	0	0	0	0	1	2	2	3	3	4	5	7	7	3	1	1	1	1	1	1	1.8	7
18-Feb	0	Z	0	0	1	1	1	2	1	1	C	C	C	C	C	C	C	2	1	1	1	2	1	2	--	2
19-Feb	2	2	Z	2	2	2	2	2	2	2	3	3	2	2	2	2	2	1	2	2	2	2	2	2	1.9	3
20-Feb	2	2	2	Z	1	1	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0.6	2
21-Feb	0	1	1	1	Z	0	0	0	0	0	0	0	1	2	2	5	11	9	2	1	1	1	1	1	1.8	11
22-Feb	0	0	0	0	0	Z	0	0	1	1	2	3	2	13	4	2	2	2	1	1	1	1	1	1	1.8	13
23-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0.6	1
24-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
25-Feb	1	1	Z	0	0	0	0	0	0	1	1	1	2	1	1	1	1	0	0	0	0	1	1	2	0.7	2
26-Feb	2	2	3	Z	2	2	1	1	1	4	3	10	10	2	2	2	2	1	1	1	1	1	1	1	2.4	10
27-Feb	1	1	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.5	1
28-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	0.8	2
	0.9	0.8	0.7	0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.9	1.1	1.4	1.5	1.7	1.3	1.3	1.5	1.2	0.9	0.8	0.7	0.7	0.8	0.9	Diurnal Average
	2	2	3	2	2	2	2	2	2	2	4	3	10	10	13	5	7	11	9	3	3	2	2	2	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  
Fort McKay South - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	635	99.69	99.69
11 - 20	2	0.31	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: 637

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Fort McKay South - February 2015**

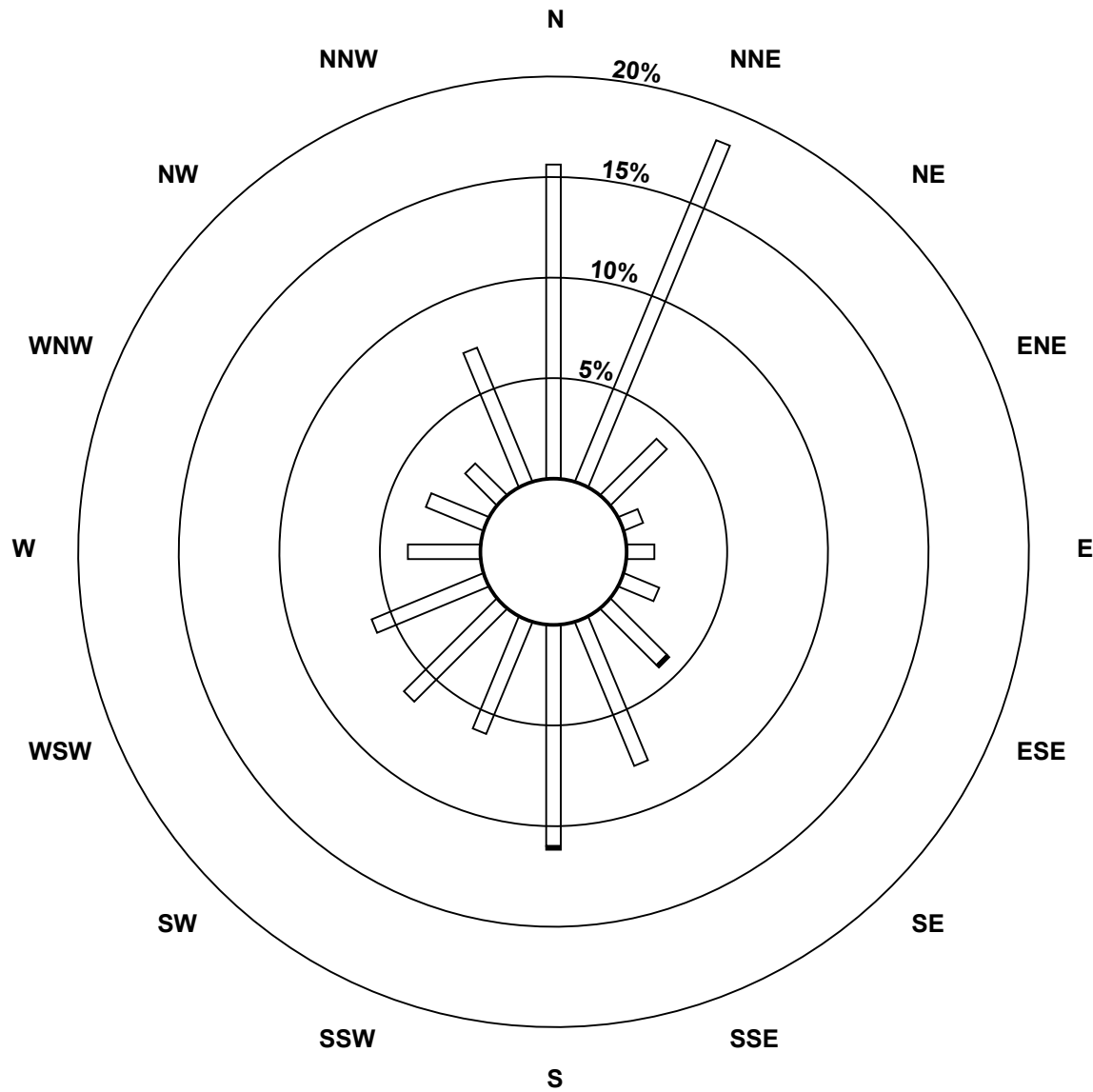
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	91	107	23	6	8	11	23	45	64	35	38	35	21	18	13	42	580
11 - 20	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	91	107	23	6	8	11	24	45	65	35	38	35	21	18	13	42	582

Total Number of Valid Hours: 582

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)



Classes (ppb)

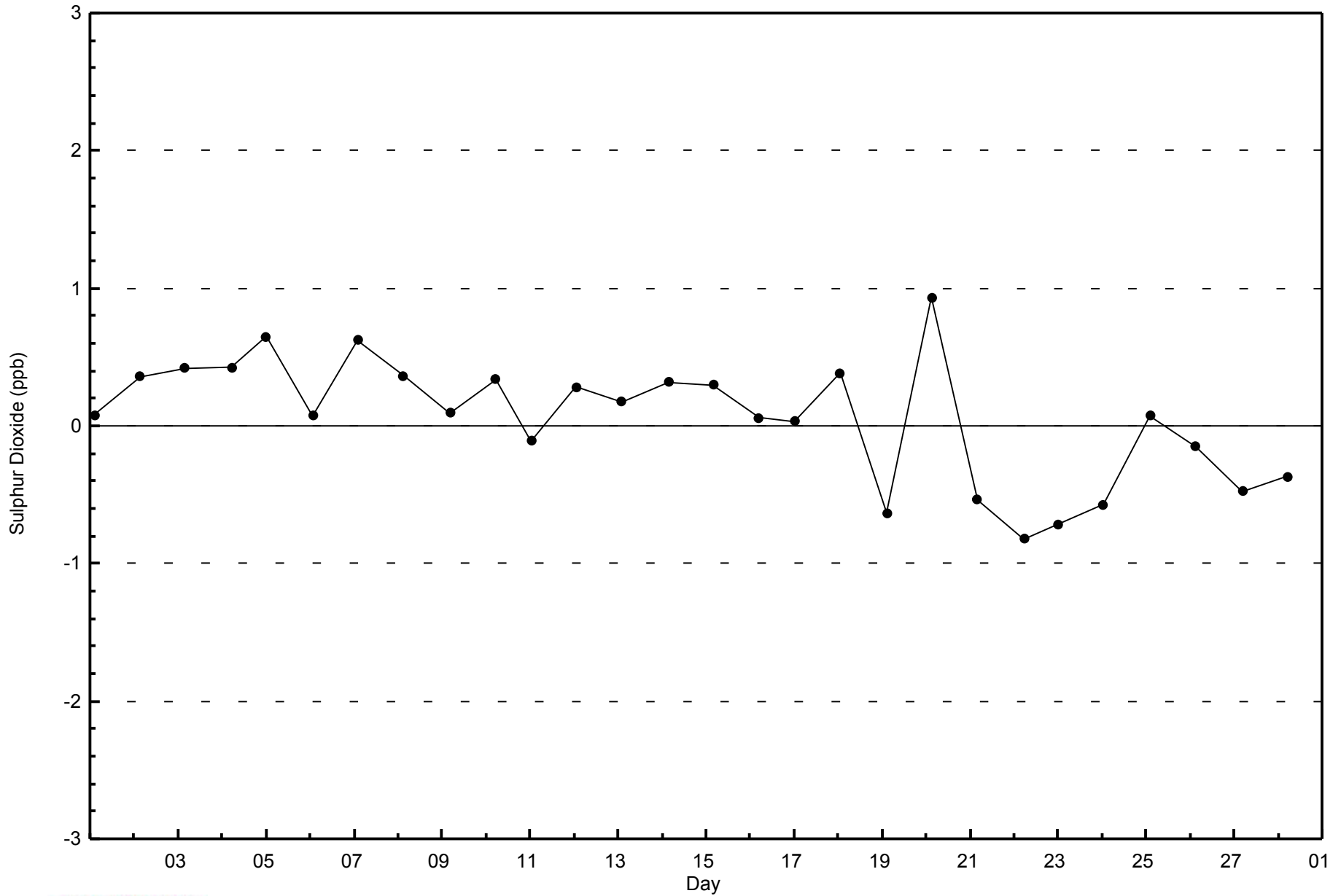


Total Number of Valid Hours: 582



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - February 2015

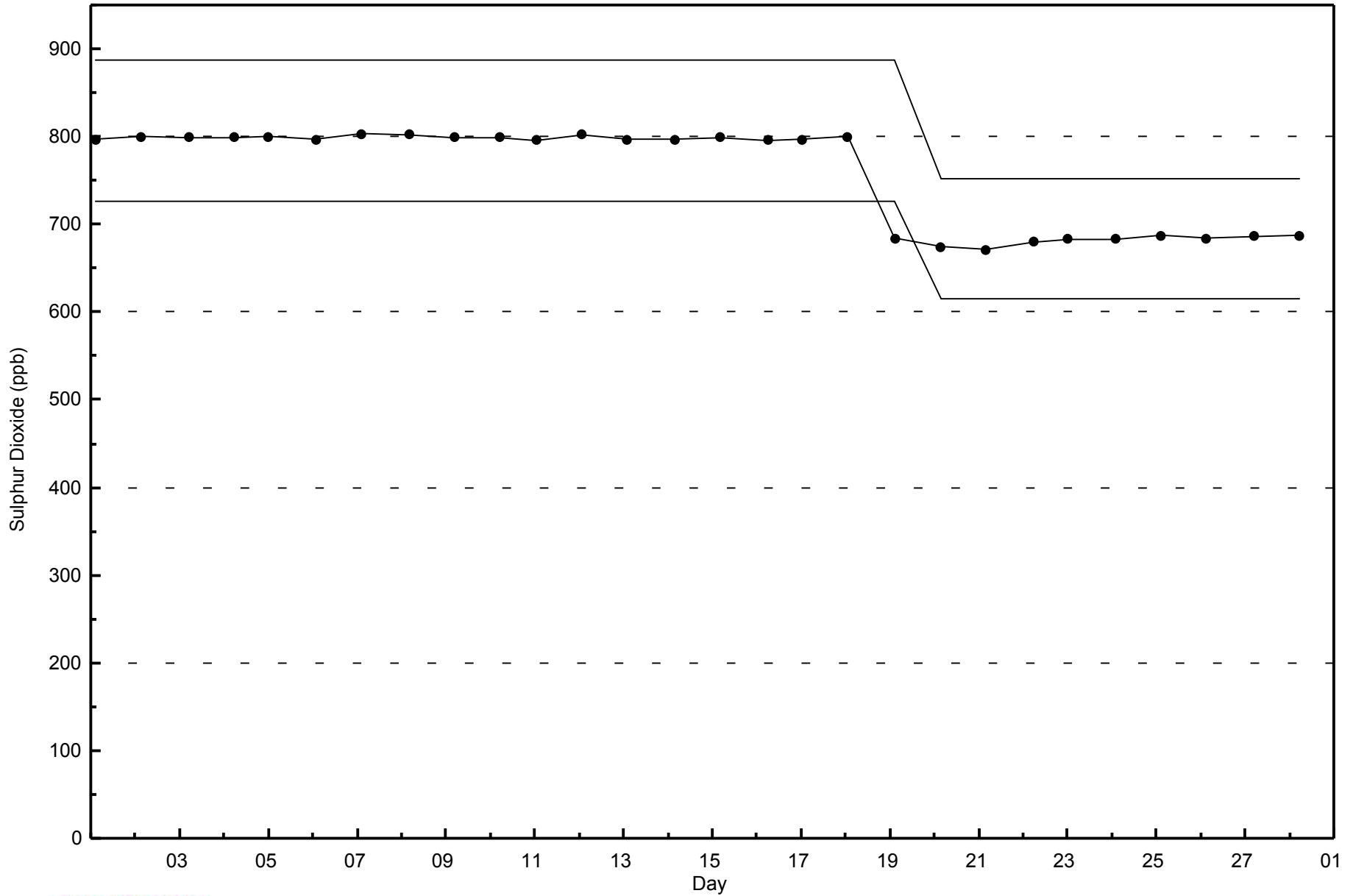






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Fort McKay South - February 2015



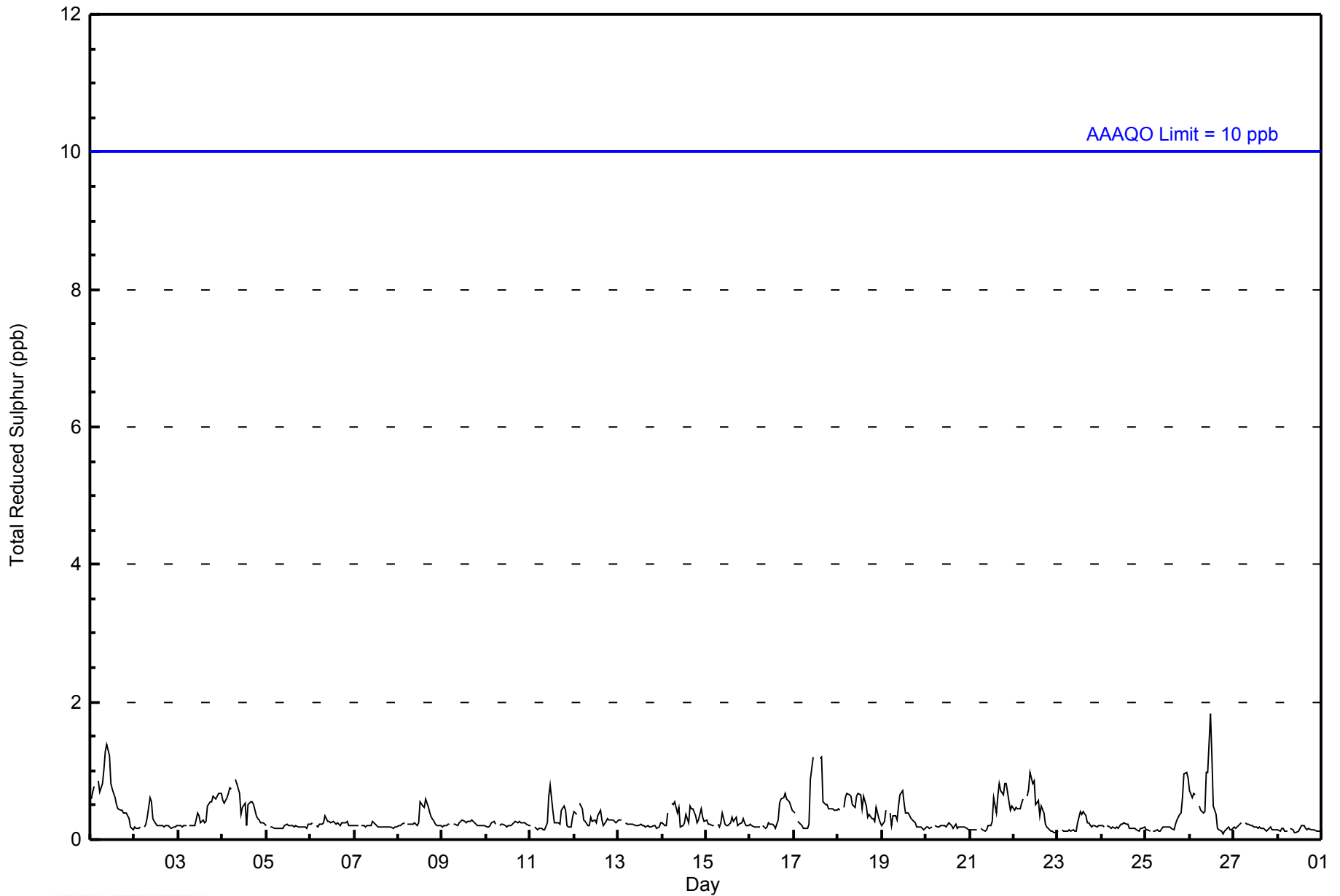


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672										Daily Average	Daily Maximum					
Maximum Value: 2 ppb on Feb 26 12:00										Maximum Daily Average: 0.7 ppb on Feb 1																
Minimum Value: 0 ppb on Feb 26 19:00										Minimum Daily Average: 0.1 ppb on Feb 28										Hours of Data: 641						
Maximum Diurnal Average: 0.4 ppb at hour 12										Minimum Diurnal Average: 0.3 ppb at hour 24										Hours of Missing Data: 31						
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> =1										Hours of Calibration: 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-Feb	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.7	1
2-Feb	0	0	0	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
3-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.4	1	
4-Feb	1	1	1	1	1	1	Z	1	1	1	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0.5	1
5-Feb	0	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
6-Feb	0	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
7-Feb	0	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
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0.3	1
9-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
10-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Feb	0	Z	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Feb	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
13-Feb	0	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
14-Feb	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
15-Feb	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0.3	1
17-Feb	0	Z	0	0	0	0	0	0	0	1	1	C	C	C	1	1	1	1	1	0	0	0	0	0	0.5	1
18-Feb	0	0	Z	0	1	1	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0.5	1
19-Feb	0	0	0	Z	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1
20-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	0.4	1
22-Feb	0	0	0	0	1	1	Z	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
23-Feb	0	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
24-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
25-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.3	1
26-Feb	1	1	1	1	Z	0	0	0	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0.5	2
27-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
28-Feb	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
0.3																								Diurnal Average		
1																								Diurnal Maximum		
Z - zerospan C - Calibration																										
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb 24-hr 3 ppb																										



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	641	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: 641

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - February 2015**

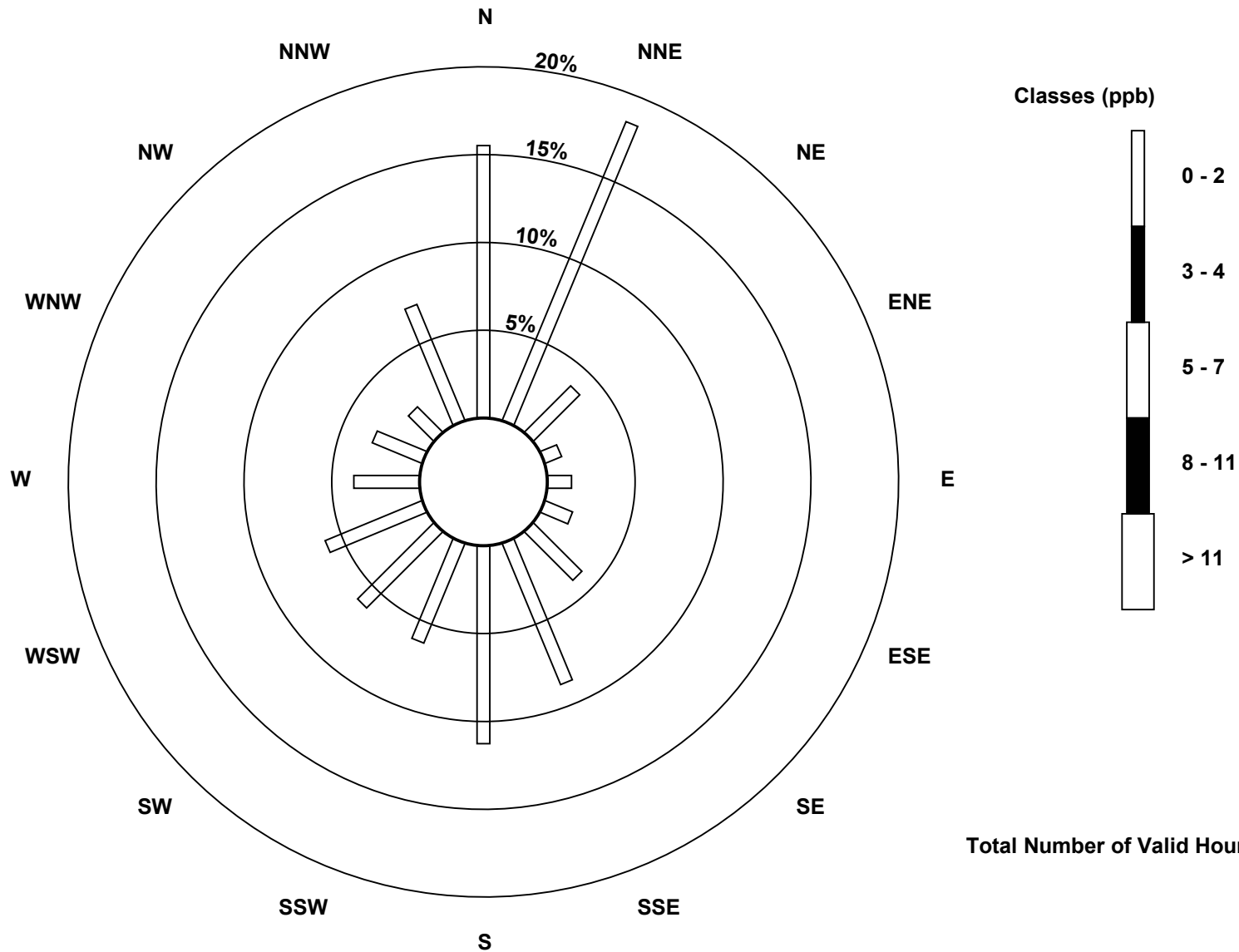
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	91	108	22	6	8	10	23	51	66	36	36	35	22	18	12	42	586
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	91	108	22	6	8	10	23	51	66	36	36	35	22	18	12	42	586

Total Number of Valid Hours: 586

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Total Reduced Sulphur (TRS) - ppb  
Fort McKay South (AMS 13)

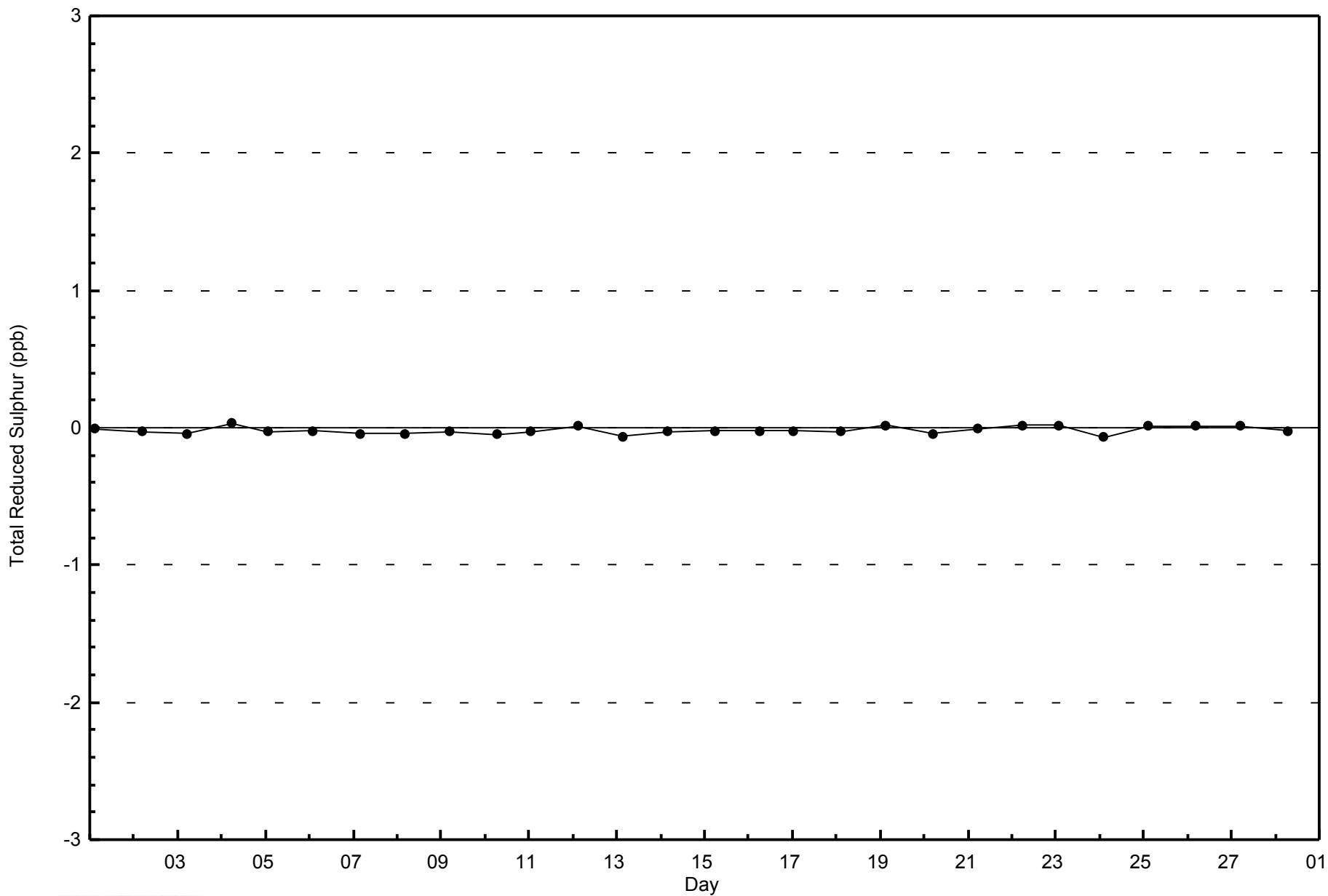


Total Number of Valid Hours: 586



WBEA  
Zero Responses

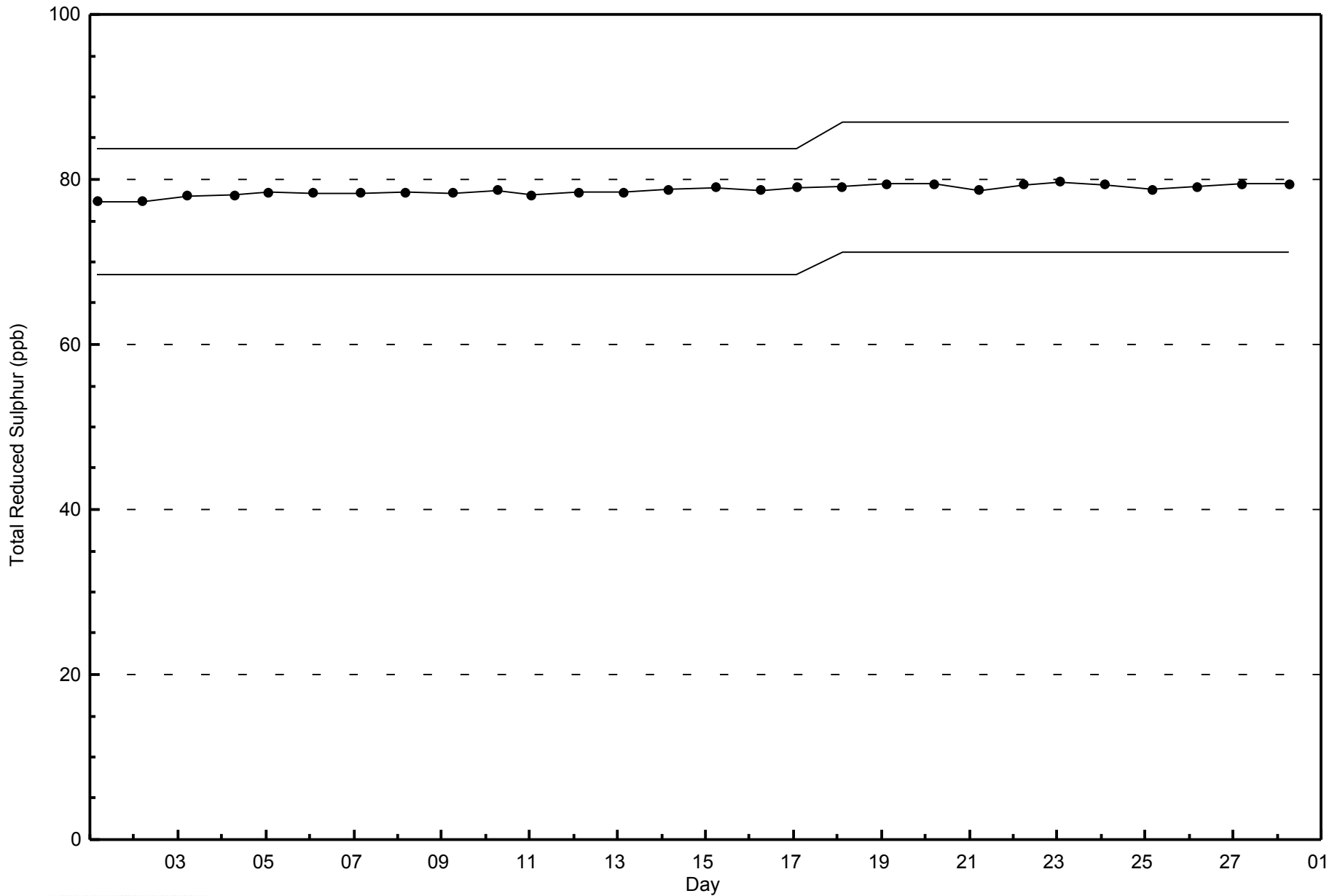
Total Reduced Sulphur (TRS) - ppb  
Fort McKay South - February 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Fort McKay South - February 2015**





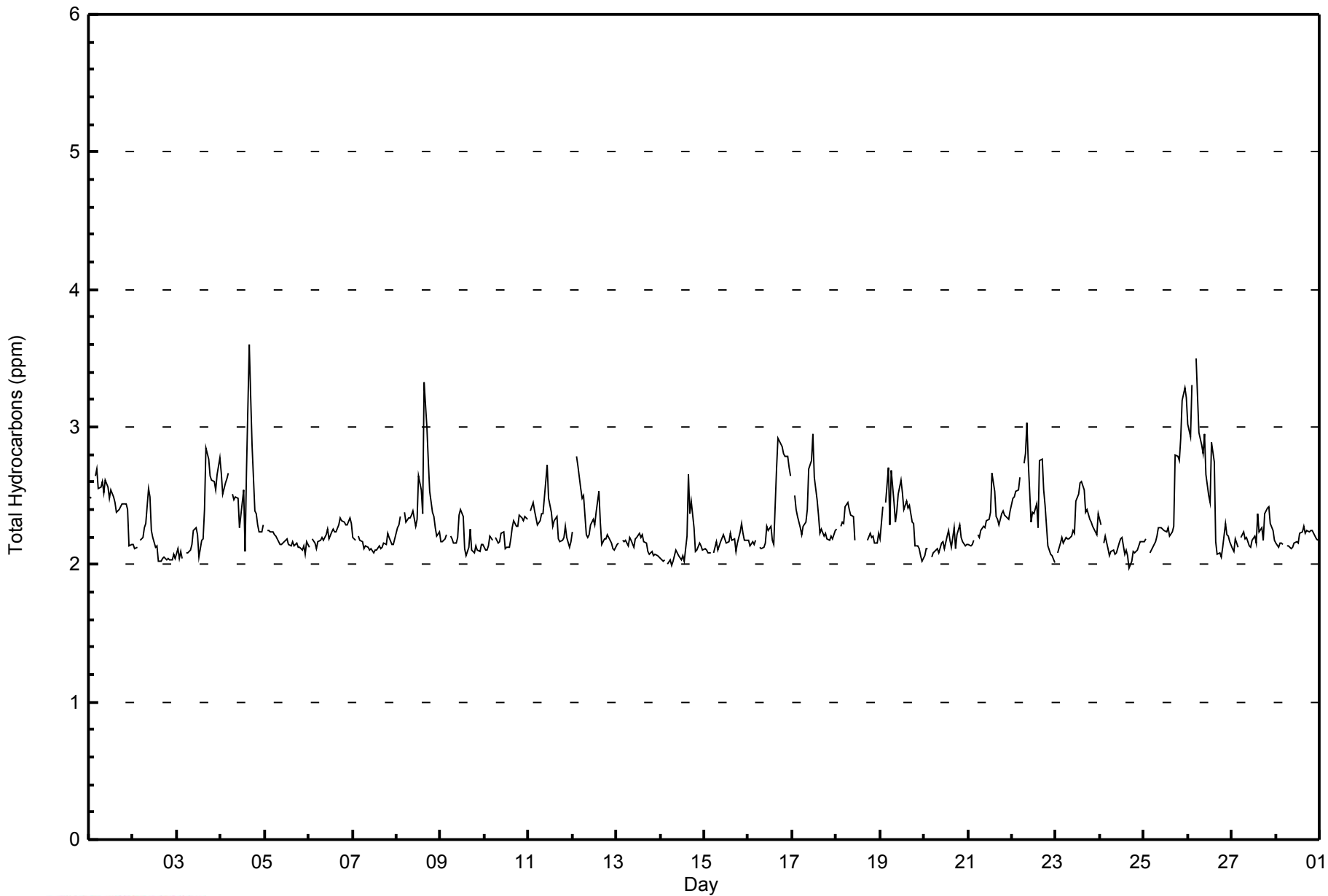


Maximum Value: 3.6 ppm on Feb 4 16:00		Maximum Daily Average: 2.6 ppm on Feb 26		Hours in Service: 672																							
Minimum Value: 2.0 ppm on Feb 24 17:00		Minimum Daily Average: 2.1 ppm on Feb 24		Hours of Data: 638																							
Maximum Diurnal Average: 2.4 ppm at hour 16		Minimum Diurnal Average: 2.2 ppm at hour 1		Hours of Missing Data: 34																							
Monthly Average: 2.29 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> = 2.4 P <sub>90</sub> = 2.6 P <sub>99</sub> = 3.2		Hours of Calibration: 34																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	2.5	2.5	Z	2.6	2.7	2.6	2.6	2.6	2.5	2.6	2.6	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.1	2.1	2.5	2.7	
2-Feb	2.1	2.1	2.1	Z	2.2	2.2	2.3	2.3	2.5	2.5	2.3	2.2	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.0	2.2	2.5	
3-Feb	2.1	2.0	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.1	2.2	2.2	2.4	2.8	2.8	2.6	2.6	2.6	2.5	2.7	2.8	2.3	2.8	
4-Feb	2.7	2.5	2.6	2.6	2.7	Z	2.5	2.5	2.5	2.3	2.4	2.5	2.1	2.7	3.6	3.2	2.9	2.4	2.4	2.3	2.2	2.2	2.3	2.5	2.5	3.6	
5-Feb	Z	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	
6-Feb	2.1	Z	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.3	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	
7-Feb	2.2	2.2	Z	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.2	
8-Feb	2.3	2.3	2.4	Z	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.6	2.5	2.4	3.3	3.0	2.8	2.5	2.4	2.3	2.3	2.2	2.2	2.4	3.3	
9-Feb	2.2	2.2	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.1	2.1	2.1	2.3	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4	
10-Feb	2.1	2.1	2.1	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.4	2.3	2.2	2.4	
11-Feb	Z	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.6	2.7	2.5	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.1	2.2	2.3	2.7	
12-Feb	2.2	Z	2.8	2.7	2.6	2.5	2.5	2.2	2.2	2.2	2.3	2.3	2.3	2.4	2.5	2.3	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.8	
13-Feb	2.1	2.2	Z	2.2	2.2	2.2	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.2	
14-Feb	2.0	2.0	2.0	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.0	2.2	2.7	2.4	2.5	2.3	2.1	2.1	2.2	2.1	2.1	2.1	2.7	
15-Feb	2.1	2.1	2.1	2.1	Z	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.3	
16-Feb	2.2	2.1	2.2	2.1	2.2	Z	2.1	2.1	2.1	2.2	2.3	2.3	2.3	2.2	2.1	2.7	2.9	2.9	2.9	2.8	2.8	2.8	2.7	2.6	2.4	2.9	
17-Feb	Z	2.5	2.4	2.4	2.3	2.2	2.3	2.3	2.4	2.7	2.8	2.9	2.6	2.5	2.4	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.9	
18-Feb	2.3	Z	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.4	2.2	C	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.2	--	2.5	
19-Feb	2.2	2.4	Z	2.4	2.7	2.3	2.7	2.5	2.3	2.4	2.5	2.6	2.5	2.4	2.5	2.4	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.0	2.4	2.7	
20-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.3	2.1	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.3	
21-Feb	2.1	2.1	2.1	2.2	Z	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.7	2.5	2.3	2.3	2.3	2.4	2.4	2.4	2.3	2.3	2.4	2.3	2.7	
22-Feb	2.5	2.5	2.5	2.5	2.6	Z	2.7	2.8	3.0	2.7	2.3	2.4	2.4	2.4	2.3	2.8	2.8	2.5	2.4	2.1	2.1	2.1	2.1	2.0	2.5	3.0	
23-Feb	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.5	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.4	2.3	2.6	
24-Feb	2.3	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.3	
25-Feb	2.2	2.2	Z	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.8	2.8	2.8	2.8	2.9	3.2	3.3	3.2	3.3	
26-Feb	3.0	2.9	3.3	Z	3.5	3.2	3.0	2.9	2.8	2.9	2.7	2.5	2.5	2.9	2.7	2.2	2.1	2.1	2.1	2.1	2.3	2.2	2.2	2.2	2.6	3.5	
27-Feb	2.1	2.1	2.2	2.1	Z	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.4	2.2	2.3	2.2	2.4	2.4	2.4	2.3	2.3	2.2	2.2	2.4	
28-Feb	2.2	2.1	2.2	2.2	2.1	Z	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	
		2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	Diurnal Average	
		3.0	2.9	3.3	2.7	3.5	3.2	3.0	2.9	3.0	2.9	2.8	2.9	2.6	2.9	2.7	3.6	3.2	2.9	2.9	2.8	2.9	3.2	3.3	3.2	Diurnal Maximum	
Z - zerospan		C - Calibration																									



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	24	3.76	3.76
2.1 - 3.0	605	94.83	98.59
3.1 - 10.0	9	1.41	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - February 2015**

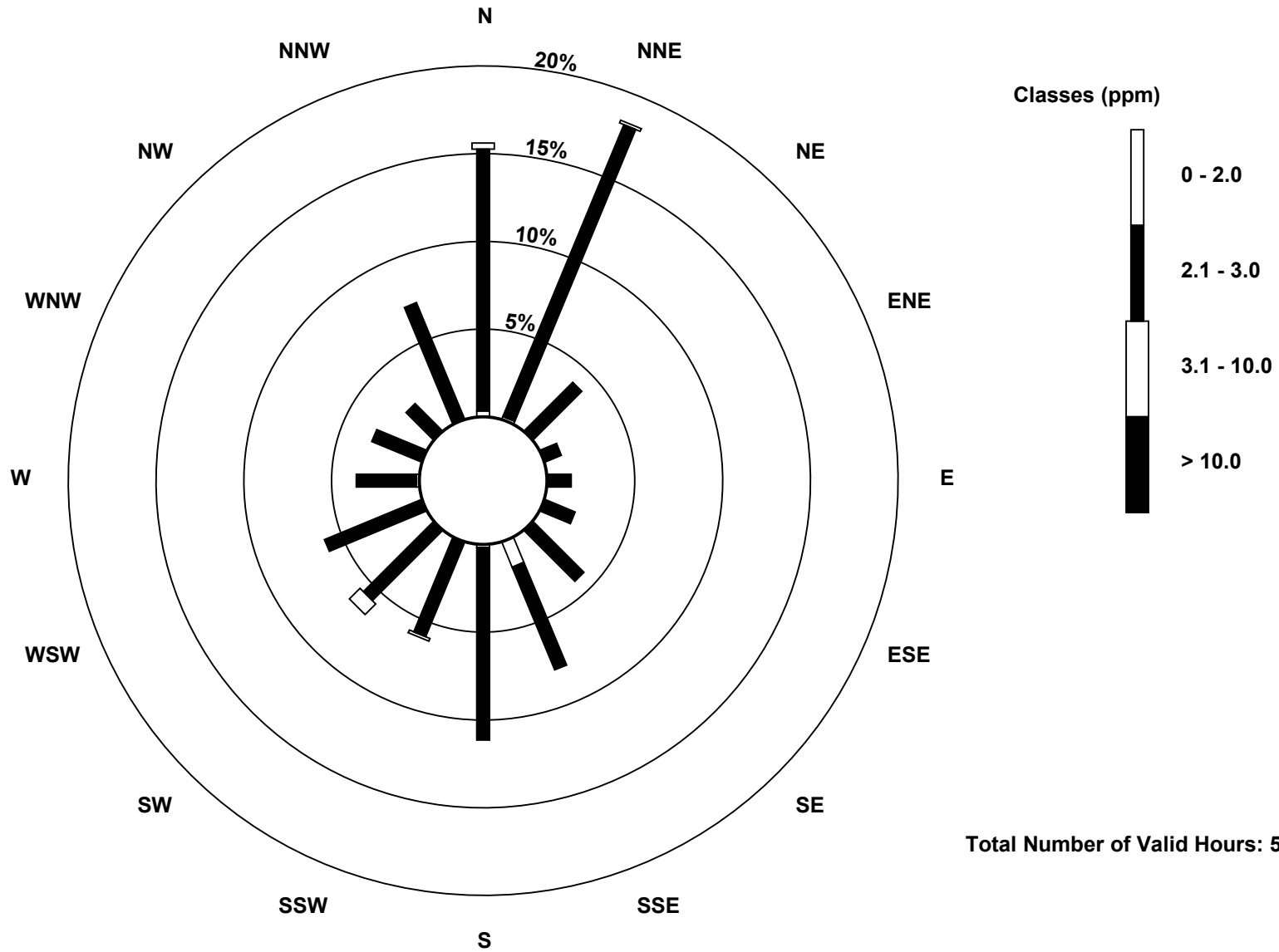
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	2	1	0	0	0	0	0	9	1	0	0	0	1	0	0	0	14
2.1 - 3.0	87	105	23	6	8	11	24	37	64	34	33	35	20	18	13	42	560
3.1 - 10.0	2	1	0	0	0	0	0	0	0	1	5	0	0	0	0	0	9
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	91	107	23	6	8	11	24	46	65	35	38	35	21	18	13	42	583

Total Number of Valid Hours: 583

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Total Hydrocarbons (THC) - ppm  
Fort McKay South (AMS 13)

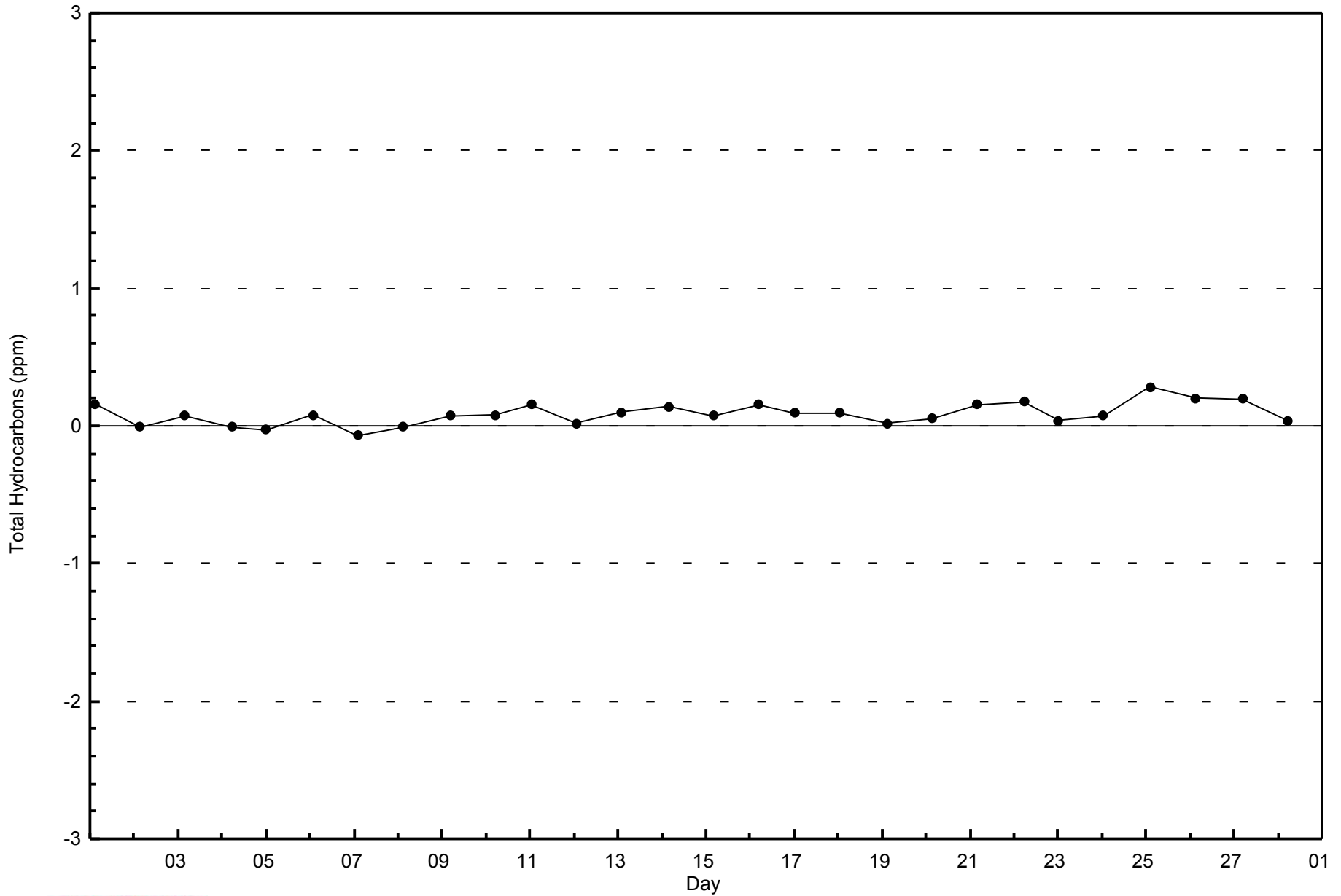


Total Number of Valid Hours: 583



WBEA  
Zero Responses

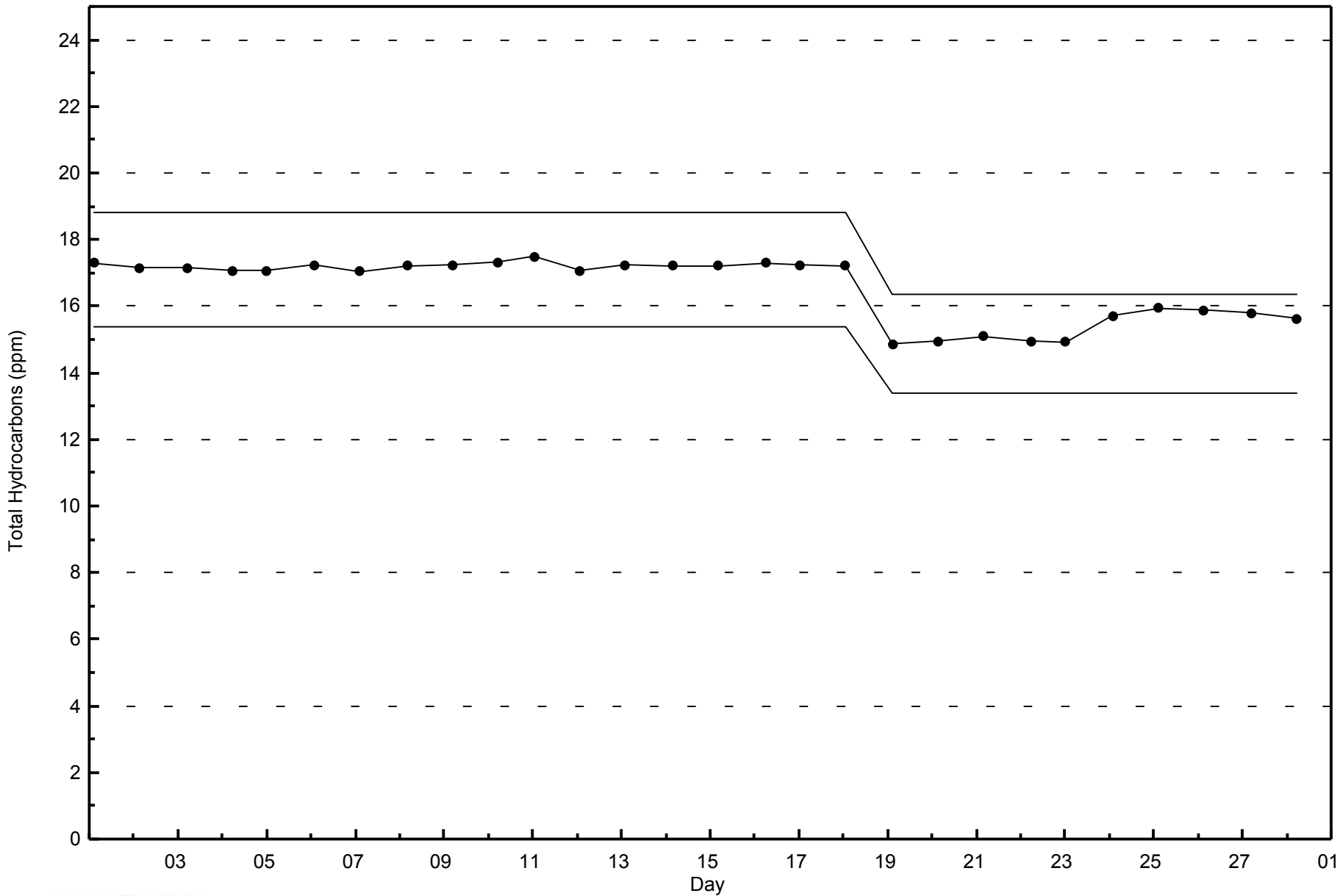
Total Hydrocarbons (THC) - ppm  
Fort McKay South - February 2015





**WBEA**  
**Span Responses**

**Total Hydrocarbons (THC) - ppm**  
**Fort McKay South - February 2015**





Summary of Hour Averages

Fort McKay South - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 37 ppb on Feb 28 17:00	Maximum Daily Average: 32.1 ppb on Feb 28		Hours of Data:	640
Minimum Value: 0 ppb on Feb 26 05:00	Minimum Daily Average: 7.6 ppb on Feb 17		Hours of Missing Data:	32
Maximum Diurnal Average: 25.5 ppb at hour 14	Minimum Diurnal Average: 16.2 ppb at hour 21		Hours of Calibration:	32
Monthly Average: 18.8 ppb	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 4 Q <sub>1</sub> = 12 Median = 20 Q <sub>3</sub> = 26 P <sub>90</sub> = 30 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-Feb	1	0	0	1	Z	1	1	1	2	5	7	13	16	18	18	15	7	4	2	1	1	5	28	31	7.8	31																								
2-Feb	27	21	21	17	25	Z	11	16	5	8	23	24	30	34	35	34	22	21	18	15	15	24	24	24	21.5	35																								
3-Feb	12	22	20	18	16	13	Z	5	4	15	23	29	29	28	28	28	19	14	9	1	1	1	1	1	14.6	29																								
4-Feb	3	6	6	4	1	1	1	Z	3	7	18	16	19	33	16	9	4	3	15	11	14	19	14	12	10.2	33																								
5-Feb	14	20	Z	21	17	15	14	15	17	15	14	19	24	27	28	26	30	27	26	30	29	26	21	25	21.8	30																								
6-Feb	27	27	28	Z	30	28	26	23	23	21	22	26	24	24	22	20	19	17	19	16	18	20	18	20	22.6	30																								
7-Feb	21	19	18	19	Z	15	22	26	26	27	25	25	26	27	26	25	24	19	14	11	9	10	13	12	20.0	27																								
8-Feb	11	8	6	9	20	Z	20	17	15	15	24	24	18	21	22	10	6	1	6	9	9	11	12	11	13.2	24																								
9-Feb	12	16	17	12	16	18	Z	18	18	15	13	11	14	17	15	12	11	15	20	23	21	20	16	16	15.9	23																								
10-Feb	20	20	20	22	23	22	18	Z	26	23	24	31	32	32	26	24	21	21	17	13	10	9	9	10	20.6	32																								
11-Feb	11	11	Z	9	10	12	11	9	9	7	7	13	20	23	25	25	27	24	29	30	31	32	31	29	18.9	32																								
12-Feb	26	23	19	Z	7	0	2	20	20	15	18	17	19	16	17	23	26	22	19	23	24	26	26	27	18.9	27																								
13-Feb	25	23	22	21	Z	22	24	22	22	27	26	25	24	24	24	23	18	28	30	30	30	29	27	24.8	30																									
14-Feb	28	27	28	28	33	Z	33	32	31	31	31	31	29	27	25	22	19	14	12	20	23	23	22	23	25.8	33																								
15-Feb	22	23	23	21	20	27	Z	28	27	22	23	24	25	25	21	25	24	26	20	12	9	18	23	24	22.3	28																								
16-Feb	26	20	19	17	17	18	23	Z	17	19	22	24	25	28	32	25	23	15	12	11	8	5	2	2	17.8	32																								
17-Feb	2	7	Z	10	12	12	7	2	3	4	5	7	10	17	16	18	14	7	4	4	3	3	3	1	7.6	18																								
18-Feb	1	1	0	Z	0	0	0	1	3	7	17	16	16	22	21	18	20	23	13	9	9	22	27	24	11.7	27																								
19-Feb	24	21	22	21	Z	20	17	15	14	15	C	C	C	C	16	10	8	9	12	21	23	24	27	29	18.2	29																								
20-Feb	27	27	28	28	29	Z	29	26	26	25	26	30	28	27	25	26	24	22	19	15	16	16	15	13	23.7	30																								
21-Feb	12	11	13	13	13	11	Z	10	10	12	18	27	28	29	27	24	16	5	0	0	1	4	8	9	13.1	29																								
22-Feb	8	8	11	10	10	9	8	Z	7	12	17	22	26	22	25	25	8	3	10	23	27	28	26	27	16.2	28																								
23-Feb	24	27	Z	24	29	30	32	35	36	36	36	31	29	24	23	28	29	29	32	32	32	33	33	26	30.1	36																								
24-Feb	28	27	23	Z	31	32	31	29	27	26	27	27	27	28	26	29	32	31	31	33	32	28	26	22	28.5	33																								
25-Feb	18	17	17	17	Z	15	14	13	14	13	17	24	26	26	26	28	25	20	13	9	3	0	0	0	15.4	28																								
26-Feb	0	0	0	0	0	Z	0	1	3	7	13	16	23	24	23	31	33	29	18	22	16	17	18	19	13.5	33																								
27-Feb	24	26	26	25	21	20	Z	16	20	27	28	29	28	30	31	30	24	20	6	1	2	7	12	21	20.6	31																								
28-Feb	25	28	30	30	31	34	34	Z	32	32	32	33	34	34	35	35	37	34	33	35	35	33	28	23	32.1	37																								
																								17.1	17.3	17.5	16.5	17.9	16.4	16.4	16.5	16.4	17.4	20.7	22.7	24.0	25.5	24.1	23.2	20.6	17.6	16.3	16.5	16.2	17.6	18.4	18.2	Diurnal Average		
																								28	28	30	30	33	34	34	35	36	36	36	33	34	34	35	35	35	37	34	33	35	35	33	33	31	Diurnal Maximum	

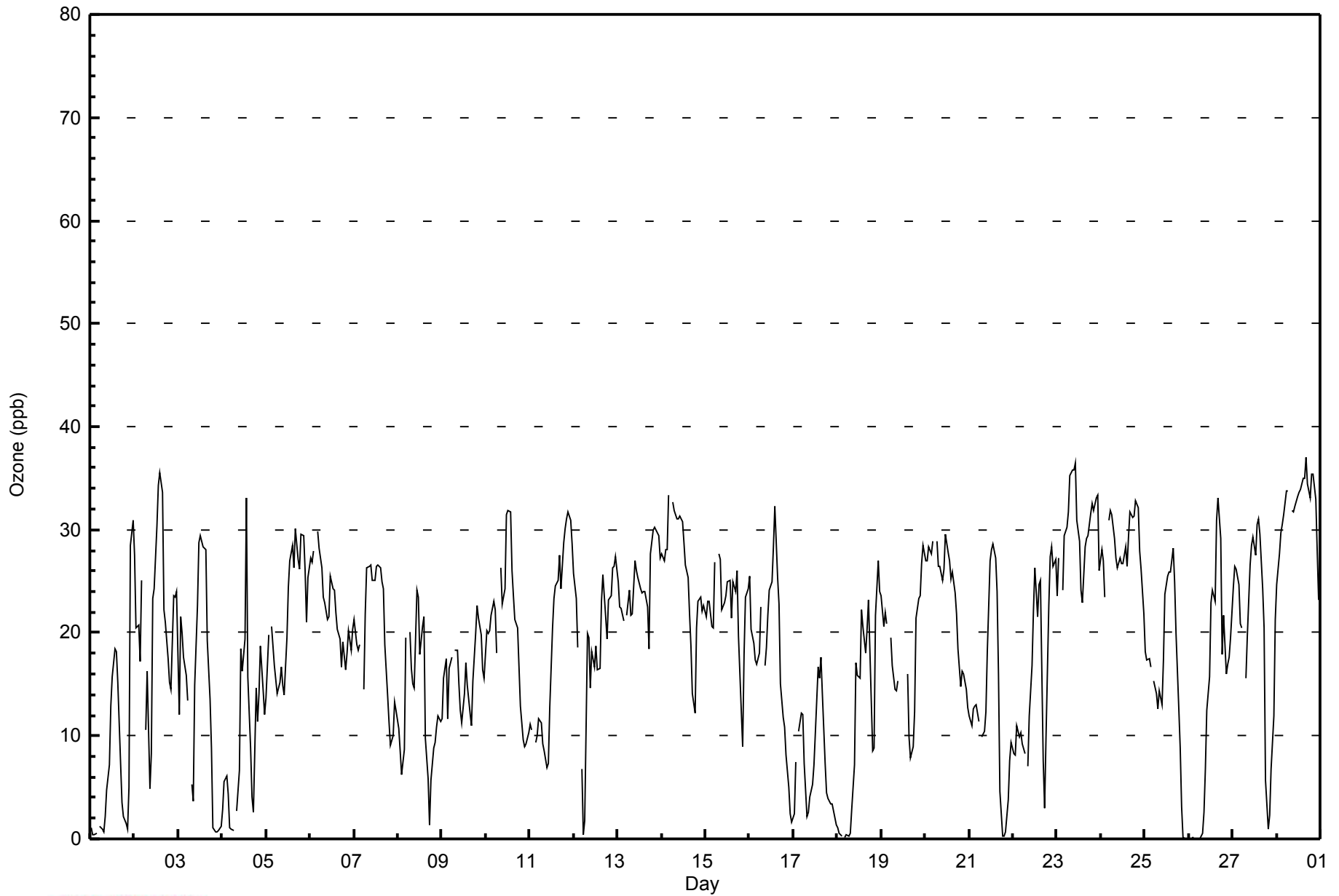
Z - zerospan      C - Calibration  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 82 ppb





**WBEA**  
**Hourly Averages**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - February 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	325	50.78	50.78
21 - 50	315	49.22	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Fort McKay South - February 2015**

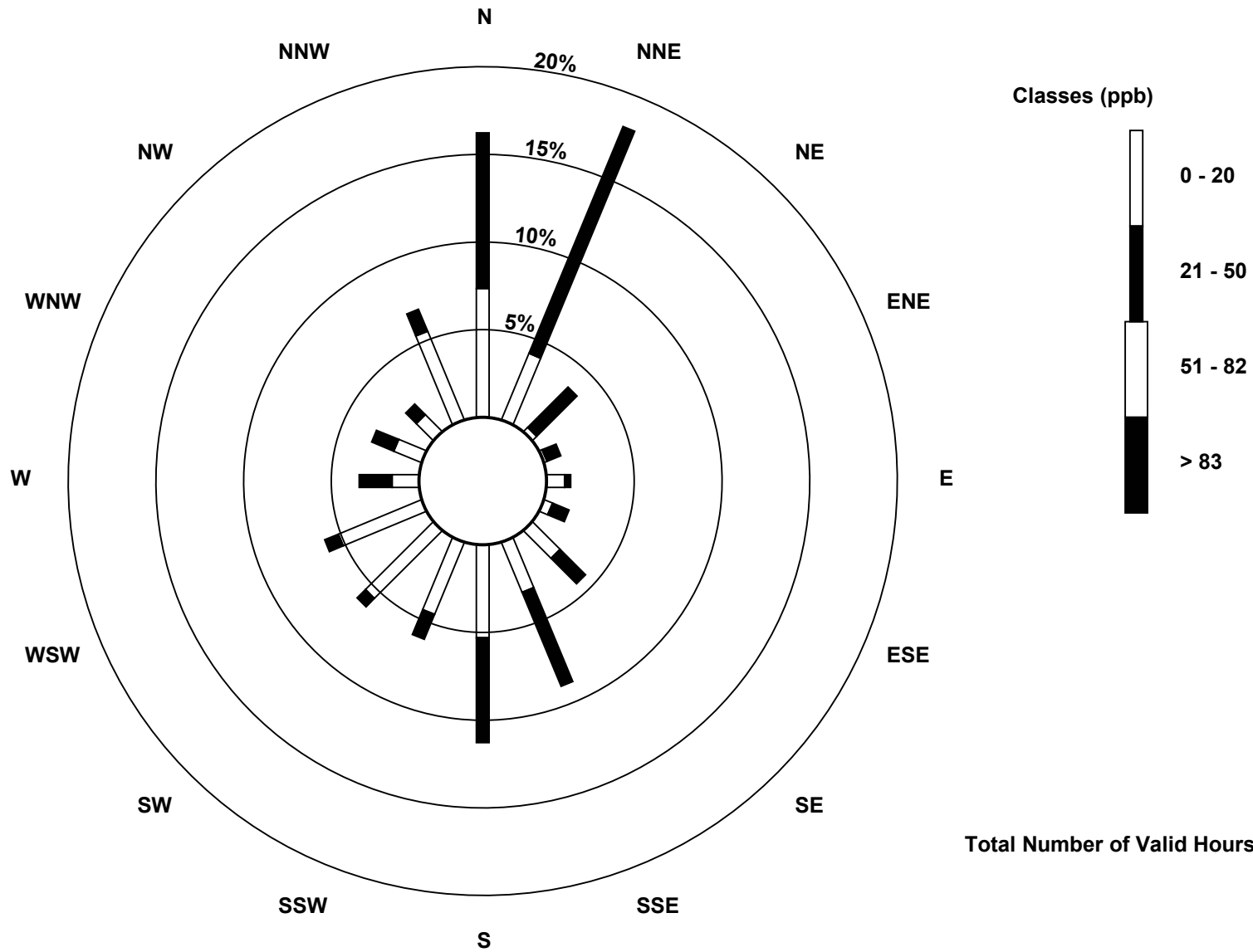
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	24	2	1	6	3	13	18	31	26	32	30	9	10	8	32	288
21 - 50	52	82	19	5	2	6	12	34	35	9	4	5	11	8	5	8	297
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	95	106	21	6	8	9	25	52	66	35	36	35	20	18	13	40	585

Total Number of Valid Hours: 585

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South (AMS 13)

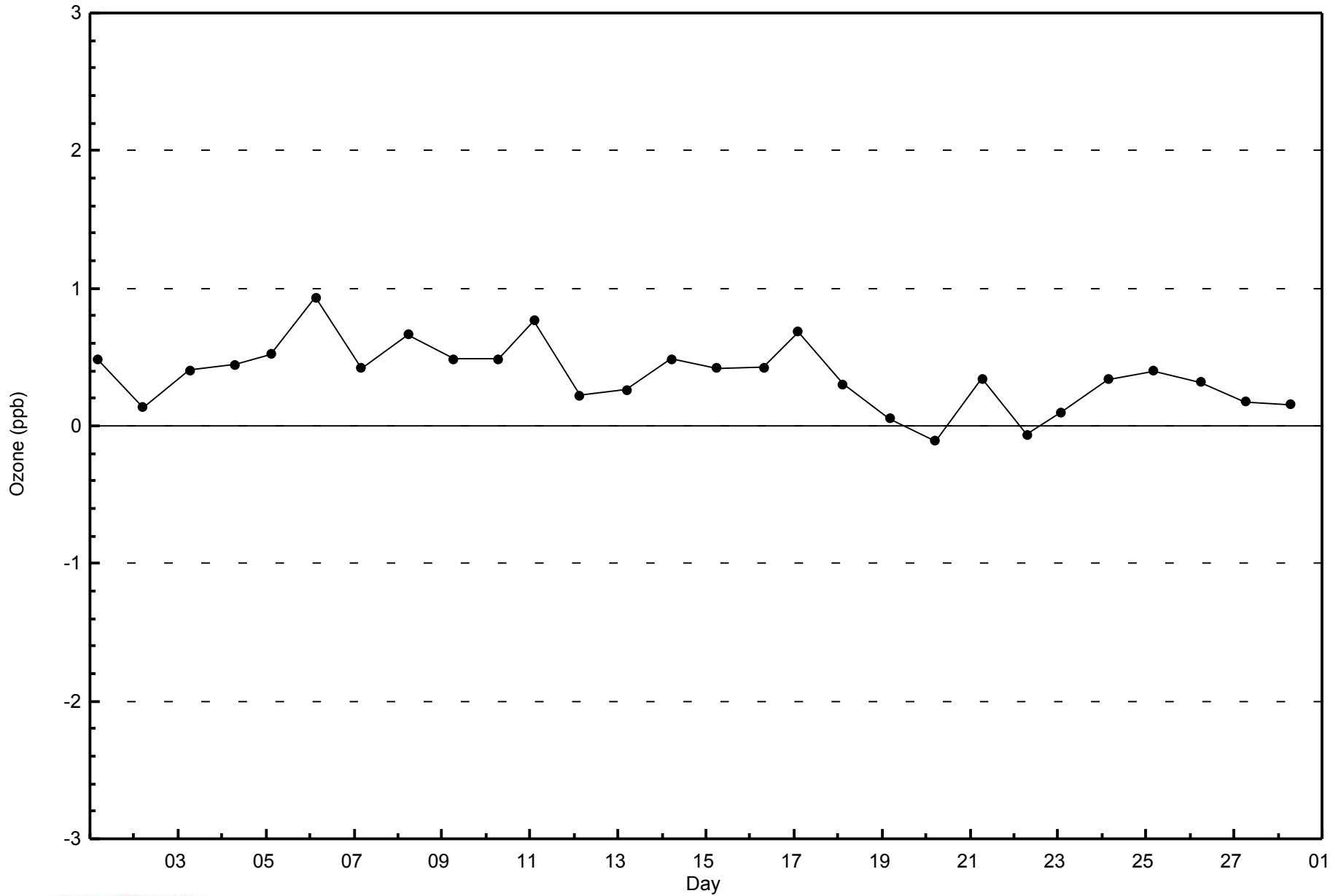


Total Number of Valid Hours: 585



WBEA  
Zero Responses

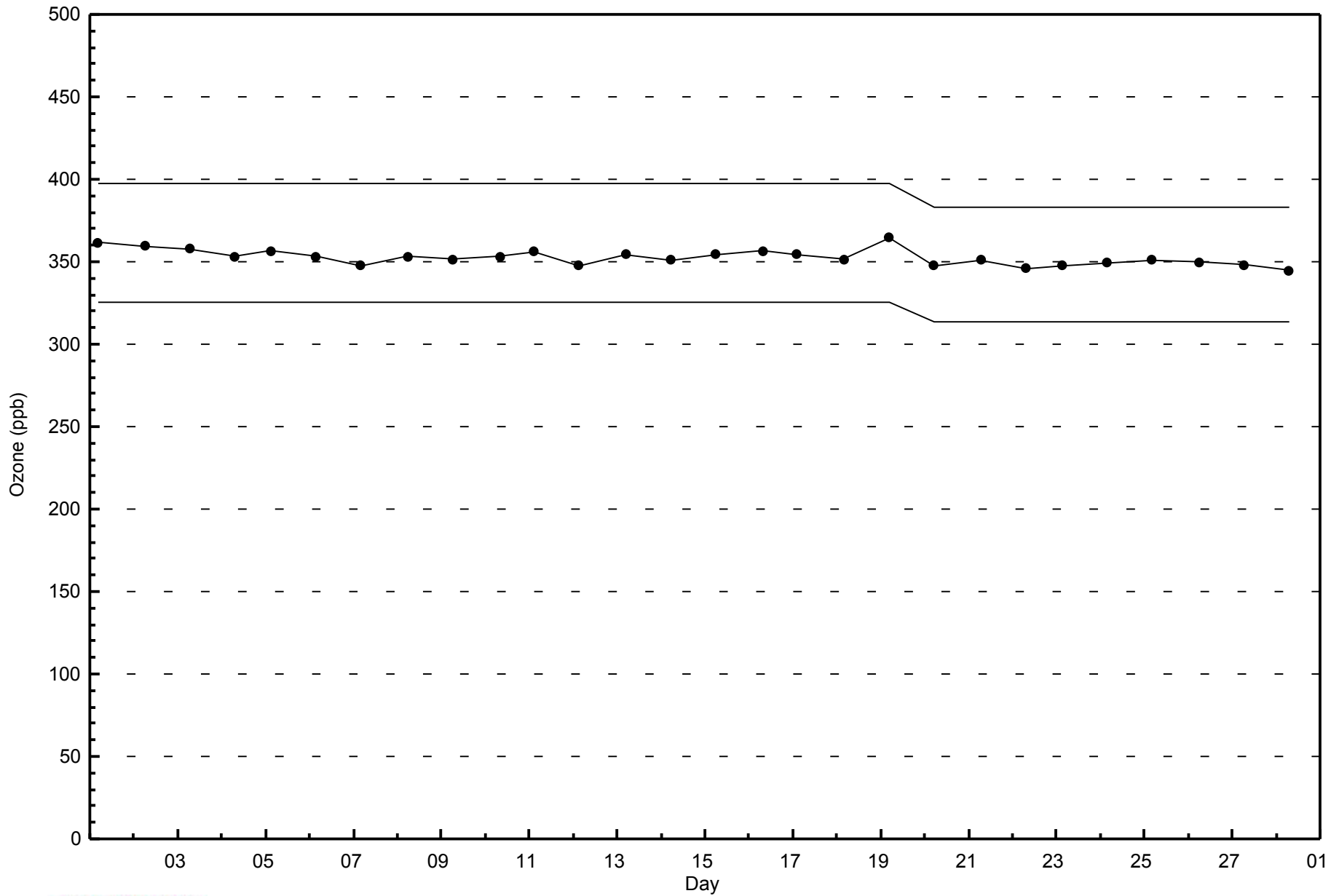
Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - February 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Fort McKay South - February 2015



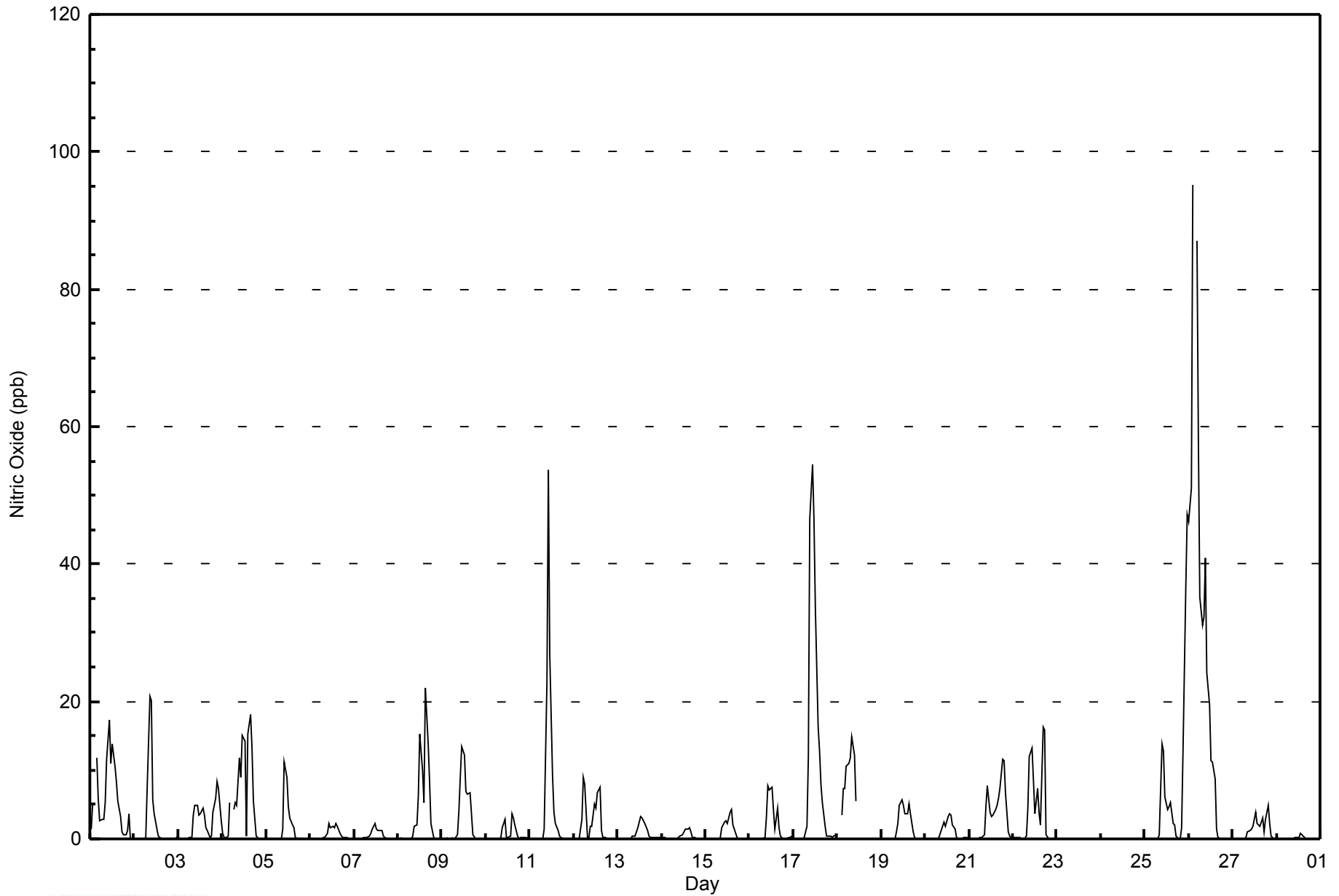


Maximum Value: 95 ppb on Feb 26 03:00		Maximum Daily Average: 24.1 ppb on Feb 26		Hours in Service: 672																						
Minimum Value: 0 ppb on Feb 2 18:00		Minimum Daily Average: 0.1 ppb on Feb 28		Hours of Data: 598																						
Maximum Diurnal Average: 10.0 ppb at hour 11		Minimum Diurnal Average: 0.7 ppb at hour 21		Hours of Missing Data: 74																						
Monthly Average: 3.6 ppb		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 3 P <sub>90</sub> = 10 P <sub>99</sub> = 50		Hours of Calibration: 40																						
				Percent Operational Time: 94.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	5	Z	12	6	3	3	3	5	12	17	11	14	11	8	6	3	1	1	1	1	4	0	0	5.5	17
2-Feb	0	0	0	Z	0	0	0	7	21	20	6	4	1	0	0	0	0	0	0	0	0	0	0	0	2.6	21
3-Feb	0	0	0	0	Z	0	0	0	3	5	5	3	4	4	4	2	1	0	0	4	6	8	7	3	2.6	8
4-Feb	1	0	0	0	5	Z	4	5	5	12	9	15	14	0	15	18	13	5	0	0	0	0	0	0	5.4	18
5-Feb	Z	0	0	0	0	0	0	0	0	1	11	9	5	3	2	2	0	0	0	0	0	0	0	0	1.5	11
6-Feb	0	Z	0	0	0	0	0	0	0	1	2	2	2	2	2	2	1	1	0	0	0	0	0	0	0.6	2
7-Feb	0	0	Z	0	0	0	0	0	0	1	1	2	2	1	1	1	0	0	0	0	0	0	0	0	0.5	2
8-Feb	0	0	0	Z	0	0	0	0	0	2	2	6	15	10	5	22	14	8	2	0	0	0	0	0	3.8	22
9-Feb	0	0	0	0	Z	0	0	0	1	4	9	13	12	7	7	7	4	1	0	0	0	0	0	0	2.8	13
10-Feb	0	0	0	0	0	Z	0	0	0	2	3	0	0	0	4	3	2	0	0	0	0	0	0	0	0.7	4
11-Feb	Z	0	0	0	0	0	0	0	1	23	54	27	9	4	2	1	0	0	0	0	0	0	0	0	5.3	54
12-Feb	0	Z	0	0	3	9	8	0	0	2	2	5	4	7	7	1	0	0	0	0	0	0	0	0	2.1	9
13-Feb	0	0	Z	0	0	0	0	0	0	0	1	2	3	3	3	2	1	0	0	0	0	0	0	0	0.8	3
14-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	2	1	0	0	0	0	0	0	0	0.4	2
15-Feb	0	0	0	0	Z	0	0	0	0	2	2	3	2	4	4	2	1	0	0	0	0	0	0	0	0.9	4
16-Feb	0	0	0	0	0	Z	0	0	0	3	8	7	7	4	1	4	2	0	0	0	0	0	0	0	1.7	8
17-Feb	Z	0	0	0	0	0	0	2	12	47	54	47	34	16	13	8	5	2	0	0	0	0	0	1	10.5	54
18-Feb	1	Z	3	7	7	11	11	12	15	12	5	C	C	C	C	C	C	C	0	0	0	0	0	0	--	15
19-Feb	0	0	Z	0	0	0	0	0	1	2	5	6	5	4	4	5	4	1	0	0	0	0	0	0	1.6	6
20-Feb	0	0	0	Z	0	0	0	0	1	2	2	2	3	4	4	2	1	0	0	0	0	0	0	0	0.9	4
21-Feb	0	0	0	0	Z	0	0	0	1	5	8	4	3	3	4	5	6	7	12	11	7	1	0	0	3.4	12
22-Feb	0	0	0	0	0	Z	0	0	4	12	13	9	4	7	4	2	16	16	1	0	0	0	0	0	3.9	16
23-Feb	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
24-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	0	0	0	0	0	0	0	--	0
25-Feb	0	0	Z	0	0	0	0	0	1	14	13	6	4	5	5	2	2	0	0	0	2	13	37	47	6.5	47
26-Feb	46	51	95	Z	87	58	35	31	32	41	24	19	11	11	9	1	0	0	0	0	0	0	0	0	24.1	95
27-Feb	0	0	0	0	Z	0	0	0	1	1	1	2	4	2	2	3	1	3	5	2	0	0	0	0	1.3	5
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1
2.2		2.5	4.7	1.0	5.2	3.9	2.4	2.4	4.1	8.7	10.0	8.2	6.6	4.6	4.5	4.1	3.3	1.8	0.7	0.8	0.7	1.0	1.7	1.9	Diurnal Average	
46		51	95	12	87	58	35	31	32	47	54	47	34	16	15	22	16	16	12	11	7	13	37	47	Diurnal Maximum	
Z - zerospan			C - Calibration				AF - Analyzer Failure																			



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - February 2015**







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

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	577	96.49	96.49
21 - 40	10	1.67	98.16
41 - 80	9	1.51	99.67
81 - 159	2	0.33	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 598

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Fort McKay South - February 2015**

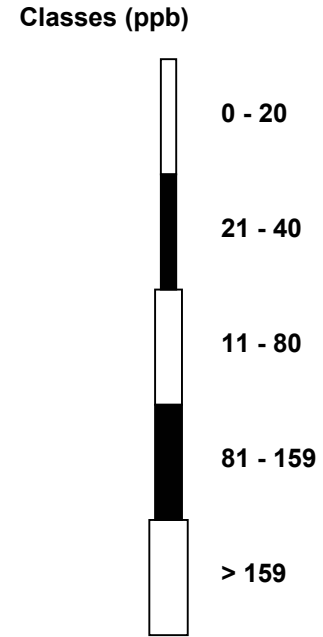
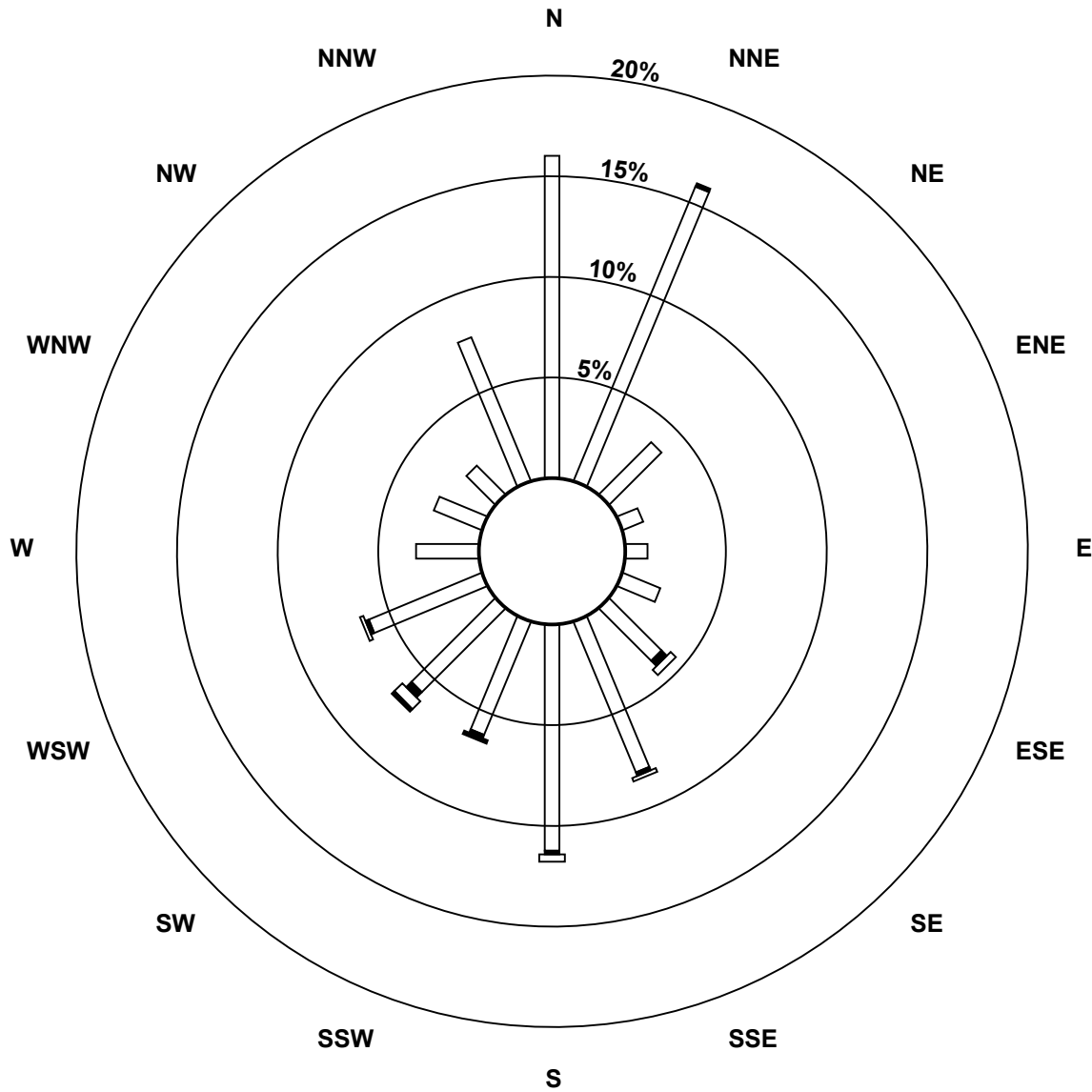
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	87	86	20	6	6	11	20	44	61	33	32	33	17	14	11	42	523
21 - 40	0	1	0	0	0	0	2	1	1	1	2	1	0	0	0	0	9
11 - 80	0	0	0	0	0	0	2	1	2	0	3	1	0	0	0	0	9
81 - 159	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	87	87	20	6	6	11	24	46	64	35	38	35	17	14	11	42	543

Total Number of Valid Hours: 543

Total Number of Hours: 672

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

**Nitric Oxide (NO) - ppb  
Fort McKay South (AMS 13)**

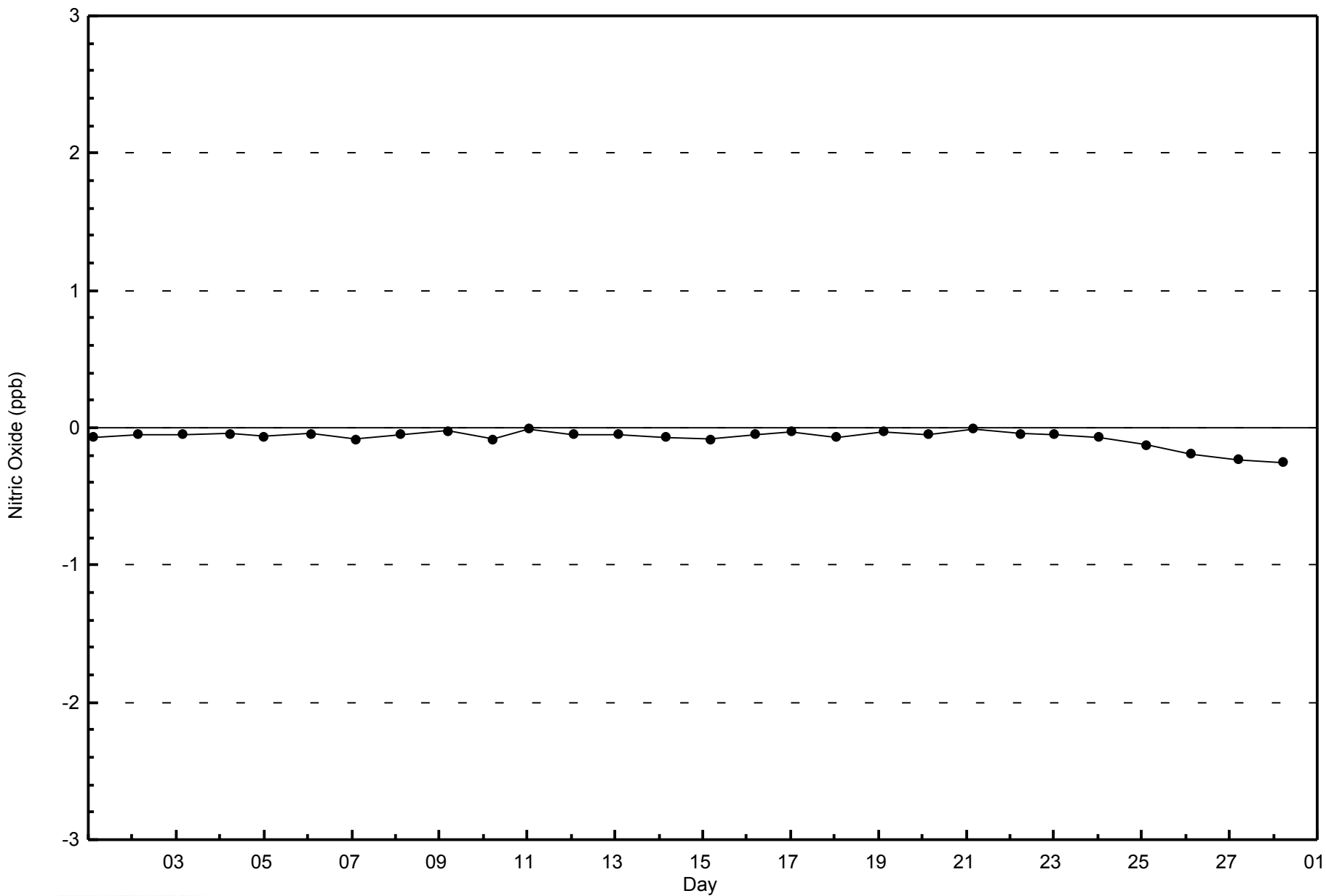


**Total Number of Valid Hours: 543**



WBEA  
Zero Responses

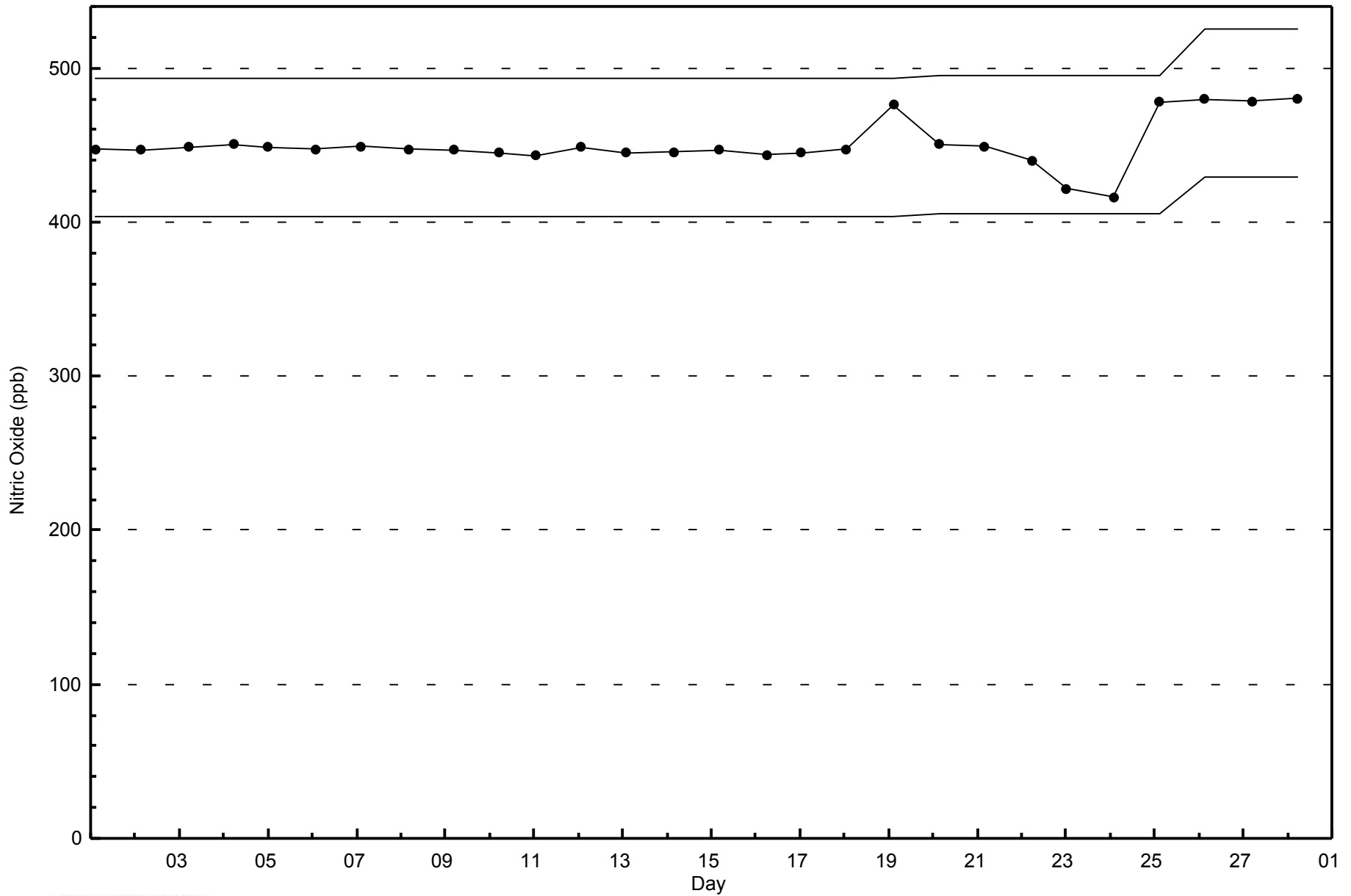
Nitric Oxide (NO) - ppb  
Fort McKay South - February 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Fort McKay South - February 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb

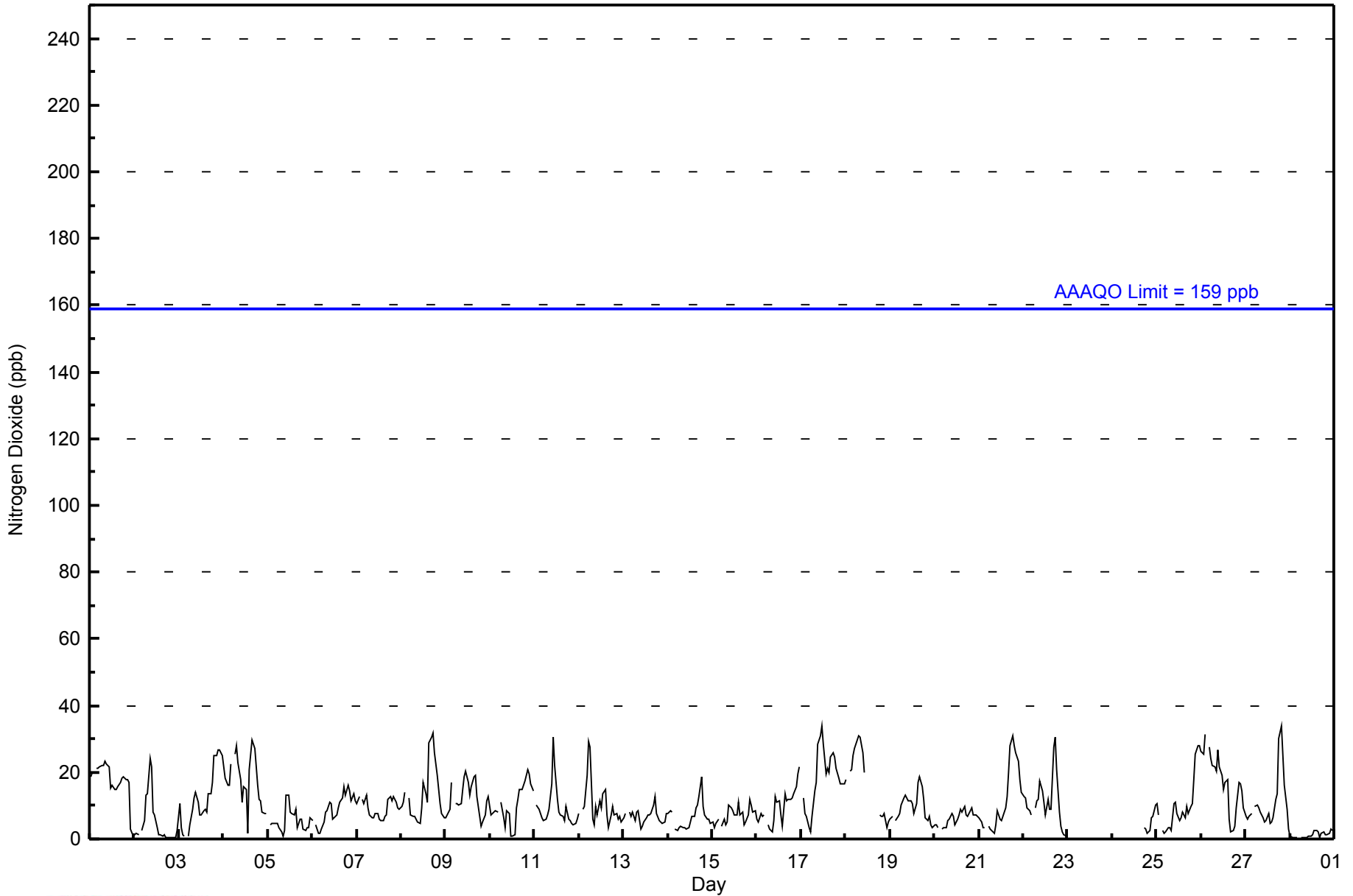
Fort McKay South - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																								
Maximum Value: 34 ppb on Feb 17 12:00										Maximum Daily Average: 18.1 ppb on Feb 17										Hours of Data: 598																														
Minimum Value: 0 ppb on Feb 28 07:00										Minimum Daily Average: 1.3 ppb on Feb 28										Hours of Missing Data: 74																														
Maximum Diurnal Average: 13.3 ppb at hour 18										Minimum Diurnal Average: 8.3 ppb at hour 14										Hours of Calibration: 40																														
Monthly Average: 10.4 ppb										Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 14 P <sub>90</sub> = 22 P <sub>99</sub> = 31										Percent Operational Time: 94.9																														
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																										
1-Feb	19	20	Z	21	21	22	22	22	23	22	22	15	16	15	15	16	17	18	19	18	18	17	3	1	17.4	23																								
2-Feb	1	2	1	Z	3	5	13	13	24	22	8	7	3	1	1	1	1	1	1	1	1	1	1	3	4.9	24																								
3-Feb	11	4	1	1	Z	1	4	9	12	14	11	7	7	9	8	14	14	17	25	25	27	27	25	12.2	27																									
4-Feb	22	18	16	16	23	Z	26	28	23	18	11	16	15	2	21	30	29	27	16	12	11	8	8	8	17.5	30																								
5-Feb	Z	4	5	5	5	5	4	2	1	2	13	13	8	8	7	9	3	6	6	3	3	4	4	7	5.4	13																								
6-Feb	6	Z	4	2	2	3	5	8	9	11	11	6	7	7	9	11	12	16	13	16	14	12	14	12	9.0	16																								
7-Feb	10	13	Z	12	11	13	9	7	6	6	8	8	6	5	6	7	7	12	13	12	13	11	9	9	9.2	13																								
8-Feb	10	11	14	Z	12	7	7	7	6	5	5	9	17	14	11	29	31	32	26	19	15	11	8	6	13.5	32																								
9-Feb	6	7	9	17	Z	11	10	10	10	15	19	20	17	13	16	19	19	13	7	4	5	7	12	13	12.1	20																								
10-Feb	7	8	8	8	8	Z	11	6	3	9	8	1	1	1	9	12	15	15	16	17	21	20	17	14	10.2	21																								
11-Feb	Z	10	9	8	6	5	6	7	9	17	31	22	12	8	7	7	6	10	6	5	5	4	5	6	9.1	31																								
12-Feb	8	Z	9	10	19	29	28	6	4	10	7	12	10	13	15	7	4	7	10	7	8	6	7	5	10.4	29																								
13-Feb	6	8	Z	8	7	8	6	8	8	3	4	5	7	7	7	8	10	13	8	6	5	5	5	8	6.8	13																								
14-Feb	8	8	8	Z	3	3	3	4	4	3	3	4	5	7	7	9	10	13	19	10	7	6	6	5	6.7	19																								
15-Feb	5	3	5	6	Z	4	6	4	5	10	10	9	7	7	11	7	8	4	5	7	12	10	8	8	7.1	12																								
16-Feb	6	5	8	7	7	Z	4	3	2	5	13	11	11	7	4	13	12	12	12	12	14	16	20	22	9.8	22																								
17-Feb	Z	12	8	7	3	2	7	14	17	28	31	34	29	19	21	20	25	26	24	21	18	17	16	17	18.1	34																								
18-Feb	18	Z	20	21	25	27	30	31	30	26	20	C	C	C	C	C	C	C	7	7	7	8	4	5	--	31																								
19-Feb	6	7	Z	6	7	8	10	12	13	12	11	11	11	8	10	17	19	16	12	7	6	7	4	3	9.6	19																								
20-Feb	4	4	3	Z	3	3	3	6	6	8	7	4	6	7	9	8	10	7	7	8	9	7	7	7	6.3	10																								
21-Feb	6	5	4	3	Z	4	3	3	2	4	8	6	6	7	9	13	20	28	31	28	26	23	18	14	11.7	31																								
22-Feb	13	12	9	8	7	Z	9	12	12	17	14	11	7	12	9	9	28	30	21	8	4	2	1	1	11.2	30																								
23-Feb	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--																								
24-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	C	3	3	2	3	6	7	10	--	--																							
25-Feb	11	7	Z	3	2	2	3	3	3	11	11	8	6	7	8	6	10	8	10	11	18	26	28	28	9.9	28																								
26-Feb	26	26	31	Z	28	24	22	22	20	27	22	19	15	17	18	6	2	2	4	10	17	16	14	9	17.3	31																								
27-Feb	7	6	7	8	Z	10	10	9	8	6	5	6	8	5	5	7	12	14	30	34	25	16	9	3	10.7	34																								
28-Feb	1	1	1	0	0	Z	0	0	0	1	1	1	1	3	2	2	0	2	2	1	1	2	3	3	1.3	3																								
																								9.4	8.7	8.6	8.4	9.6	9.3	10.1	9.9	10.1	12.0	12.0	10.6	9.4	8.3	9.9	11.2	12.8	13.3	12.6	11.5	11.4	10.8	9.6	9.2	Diurnal Average		
																								26	26	31	21	28	29	30	31	30	28	31	34	29	19	21	30	31	32	31	34	26	27	28	28	28	Diurnal Maximum	
Z - zerospan C - Calibration AF - Analyzer Failure																																																		
Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 159 ppb																																																		



WBEA  
Hourly Averages

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	525	87.79	87.79
21 - 40	73	12.21	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: 598

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Fort McKay South - February 2015**

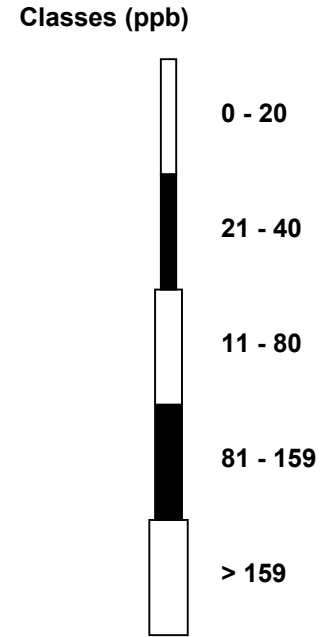
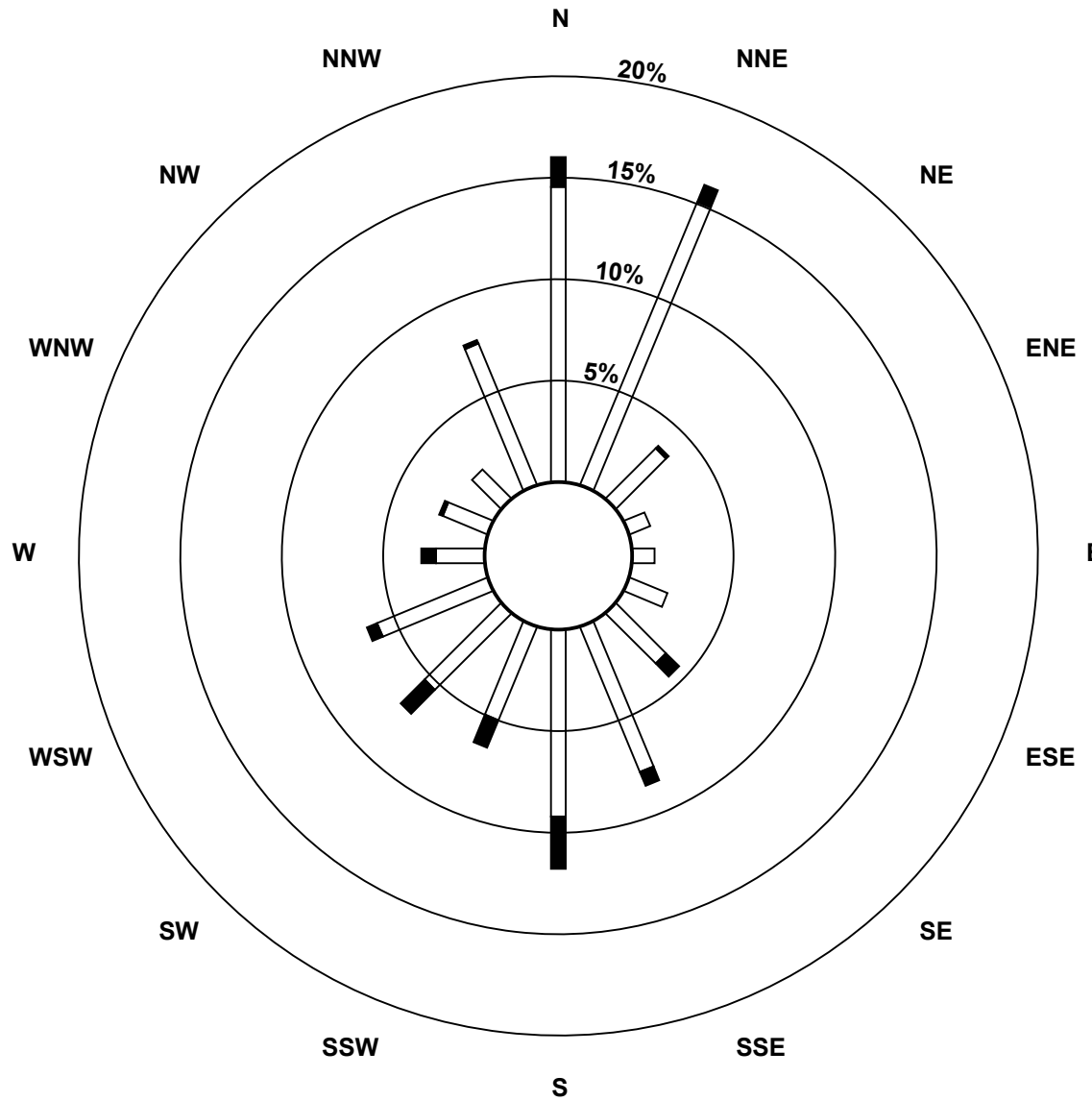
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	79	82	19	6	6	11	19	42	50	27	29	32	13	13	11	41	480
21 - 40	8	5	1	0	0	0	5	4	14	8	9	3	4	1	0	1	63
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	87	87	20	6	6	11	24	46	64	35	38	35	17	14	11	42	543

Total Number of Valid Hours: 543

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South (AMS 13)

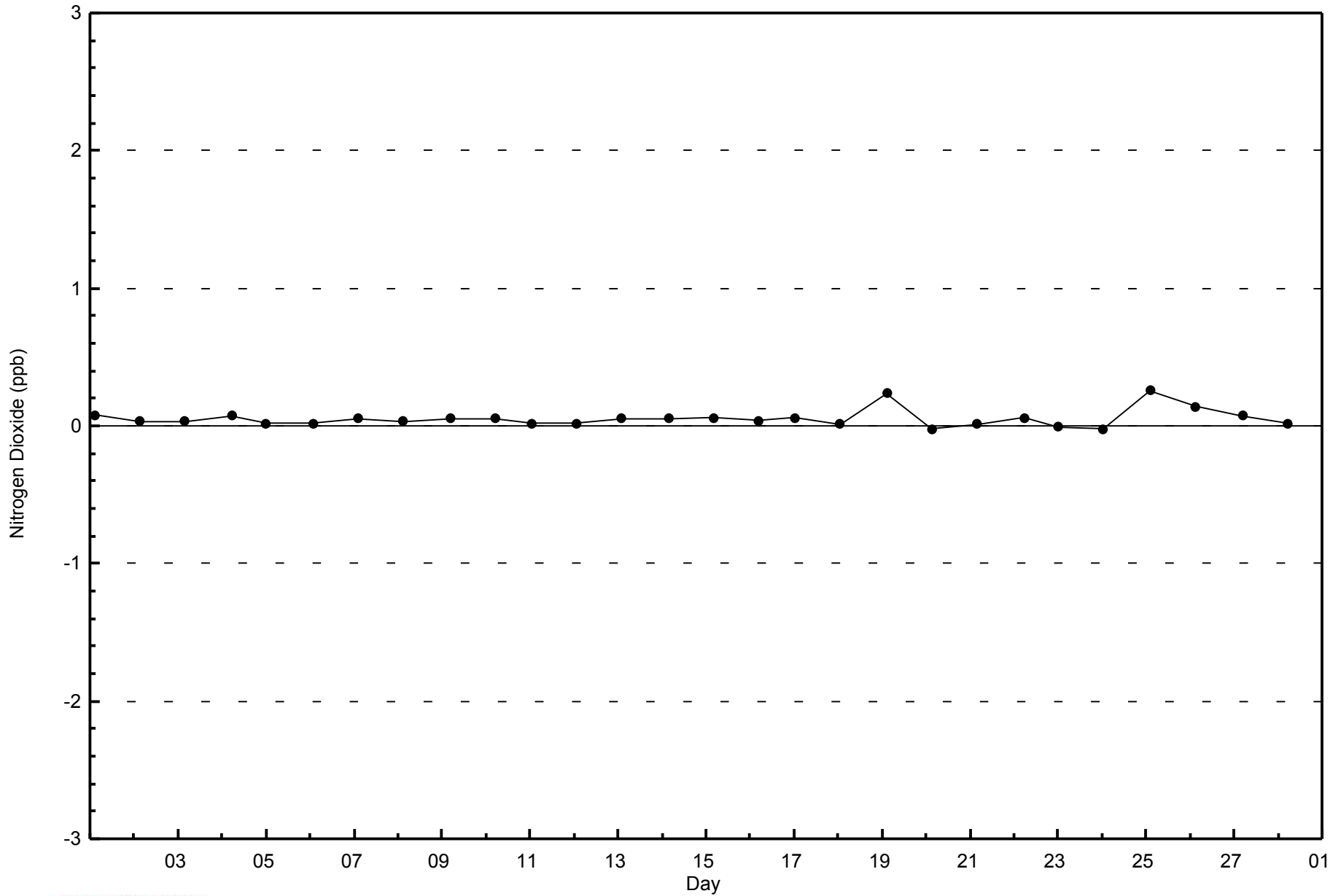


Total Number of Valid Hours: 543



WBEA  
Zero Responses

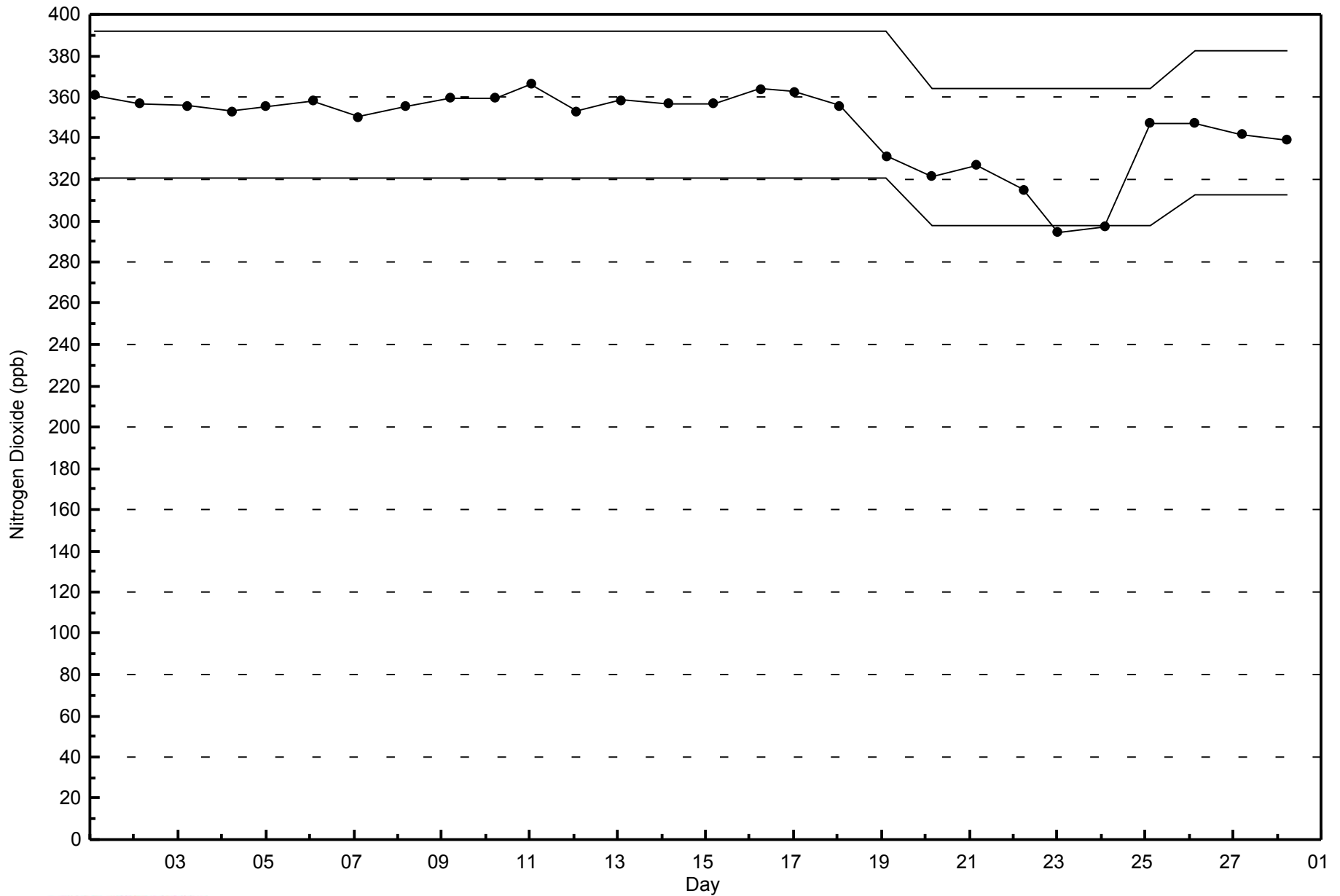
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Fort McKay South - February 2015





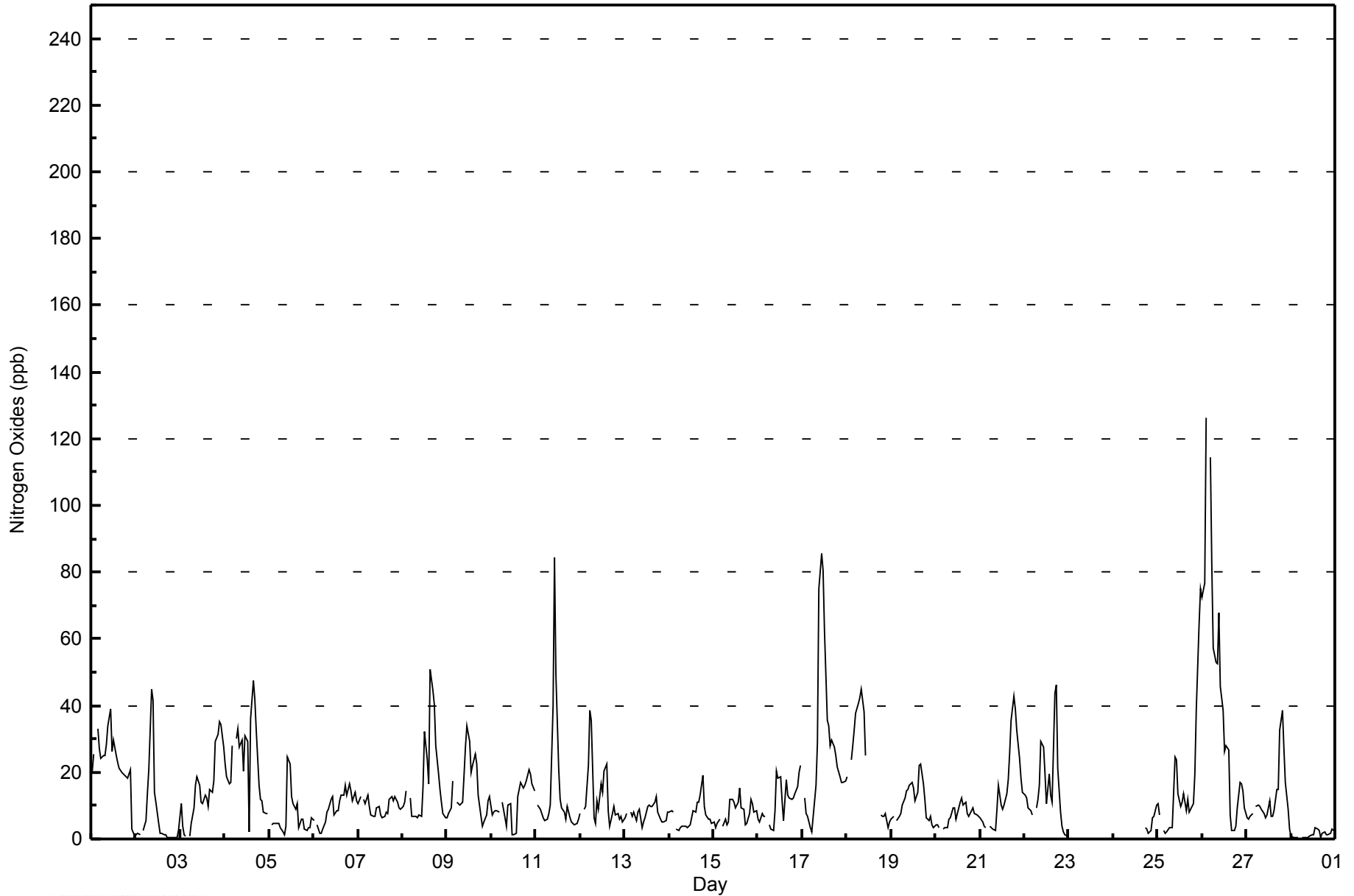
Maximum Value: 126 ppb on Feb 26 03:00																			Maximum Daily Average: 41.3 ppb on Feb 26																			Hours in Service: 672	
Minimum Value: 0 ppb on Feb 28 07:00																			Minimum Daily Average: 1.4 ppb on Feb 28																			Hours of Data: 598	
Maximum Diurnal Average: 22.0 ppb at hour 11																			Minimum Diurnal Average: 9.3 ppb at hour 4																			Hours of Missing Data: 74	
Monthly Average: 14.0 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 3 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 17 P <sub>90</sub> = 30 P <sub>99</sub> = 80																			Hours of Calibration: 40	
																																						Percent Operational Time: 94.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24															
1-Feb	20	25	Z	33	27	24	25	25	29	34	39	26	30	25	23	21	20	19	19	18	19	21	3	1	22.9	39													
2-Feb	1	1	1	Z	3	5	13	21	45	42	14	11	4	2	2	1	1	1	1	0	0	1	1	3	7.6	45													
3-Feb	11	4	1	1	Z	1	5	9	16	19	16	11	11	13	12	10	15	14	17	29	31	35	34	28	14.9	35													
4-Feb	23	19	16	17	28	Z	30	33	27	30	20	31	29	2	36	48	42	33	16	12	12	8	8	8	22.9	48													
5-Feb	Z	4	4	5	5	5	4	2	1	4	25	22	13	11	9	11	4	6	6	3	3	4	4	7	6.9	25													
6-Feb	6	Z	4	2	2	3	5	8	9	12	13	7	9	9	12	13	13	16	13	16	14	12	14	12	9.6	16													
7-Feb	10	13	Z	12	11	13	10	7	7	7	9	10	7	6	7	8	8	12	13	12	13	11	9	9	9.7	13													
8-Feb	10	11	14	Z	12	7	7	7	6	7	7	16	32	24	16	51	45	40	28	19	15	11	8	6	17.3	51													
9-Feb	6	7	9	17	Z	11	11	10	11	19	27	34	29	20	22	26	23	13	7	4	5	7	12	13	14.9	34													
10-Feb	7	8	8	8	8	Z	11	7	4	10	10	1	1	2	13	15	17	15	16	17	21	20	17	14	10.9	21													
11-Feb	Z	10	9	8	6	5	6	8	10	40	84	49	21	12	9	8	6	10	6	5	5	4	5	6	14.4	84													
12-Feb	8	Z	9	10	22	38	36	6	5	12	9	17	14	20	22	8	4	7	10	7	8	6	7	5	12.6	38													
13-Feb	6	8	Z	8	7	8	6	8	9	3	5	7	10	10	10	11	13	8	6	5	5	5	8	8	7.6	13													
14-Feb	8	9	8	Z	3	3	3	4	4	4	4	6	8	8	11	11	13	19	10	7	6	6	5	7	7.1	19													
15-Feb	5	3	5	6	Z	4	6	4	5	12	12	11	9	11	15	9	9	4	5	7	12	10	8	8	8.0	15													
16-Feb	6	5	7	7	7	Z	4	3	2	9	21	18	19	12	5	18	13	12	12	12	14	16	20	22	11.5	22													
17-Feb	Z	12	8	7	3	2	7	16	29	75	85	80	62	36	34	28	30	28	25	21	18	17	17	17	28.6	85													
18-Feb	18	Z	24	28	32	38	41	43	45	38	25	C	C	C	C	C	C	C	7	7	7	8	4	5	--	45													
19-Feb	6	7	Z	6	7	8	10	12	14	15	16	17	15	11	14	22	22	17	12	6	6	7	4	3	11.2	22													
20-Feb	4	4	3	Z	3	3	3	6	6	9	9	6	9	11	12	10	11	7	7	8	9	8	7	7	7.2	12													
21-Feb	6	5	4	3	Z	4	3	3	2	9	16	10	9	10	14	18	26	36	43	39	33	24	18	14	15.1	43													
22-Feb	13	12	9	8	7	Z	9	12	16	29	27	20	11	19	13	11	44	46	21	8	4	2	1	1	15.0	46													
23-Feb	Z	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--													
24-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	C	C	C	3	3	2	3	6	7	10	--	10												
25-Feb	11	7	Z	3	2	2	3	3	3	24	24	14	10	11	13	8	12	8	10	11	19	38	64	75	16.4	75													
26-Feb	72	77	126	Z	115	82	57	53	53	68	46	39	26	28	26	7	2	2	4	9	17	16	14	9	41.3	126													
27-Feb	7	6	7	8	Z	10	10	10	9	8	6	7	12	7	7	8	15	15	33	39	27	17	9	3	12.0	39													
28-Feb	1	1	0	0	0	Z	0	0	0	1	1	1	1	4	3	3	0	2	2	1	1	2	3	3	1.4	4													
																																						Diurnal Average	
																																						Diurnal Maximum	

Z - zerospan                      C - Calibration                      AF - Analyzer Failure



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - February 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	482	80.60	80.60
21 - 40	86	14.38	94.98
41 - 80	25	4.18	99.16
81 - 159	5	0.84	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 598

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Fort McKay South - February 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	74	77	19	6	2	8	13	37	48	23	29	32	13	13	11	40	445
21 - 40	8	9	1	0	4	3	7	7	12	9	3	1	3	1	0	2	70
11 - 80	5	1	0	0	0	0	3	2	3	2	4	2	1	0	0	0	23
81 - 159	0	0	0	0	0	0	1	0	1	1	2	0	0	0	0	0	5
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	87	87	20	6	6	11	24	46	64	35	38	35	17	14	11	42	543

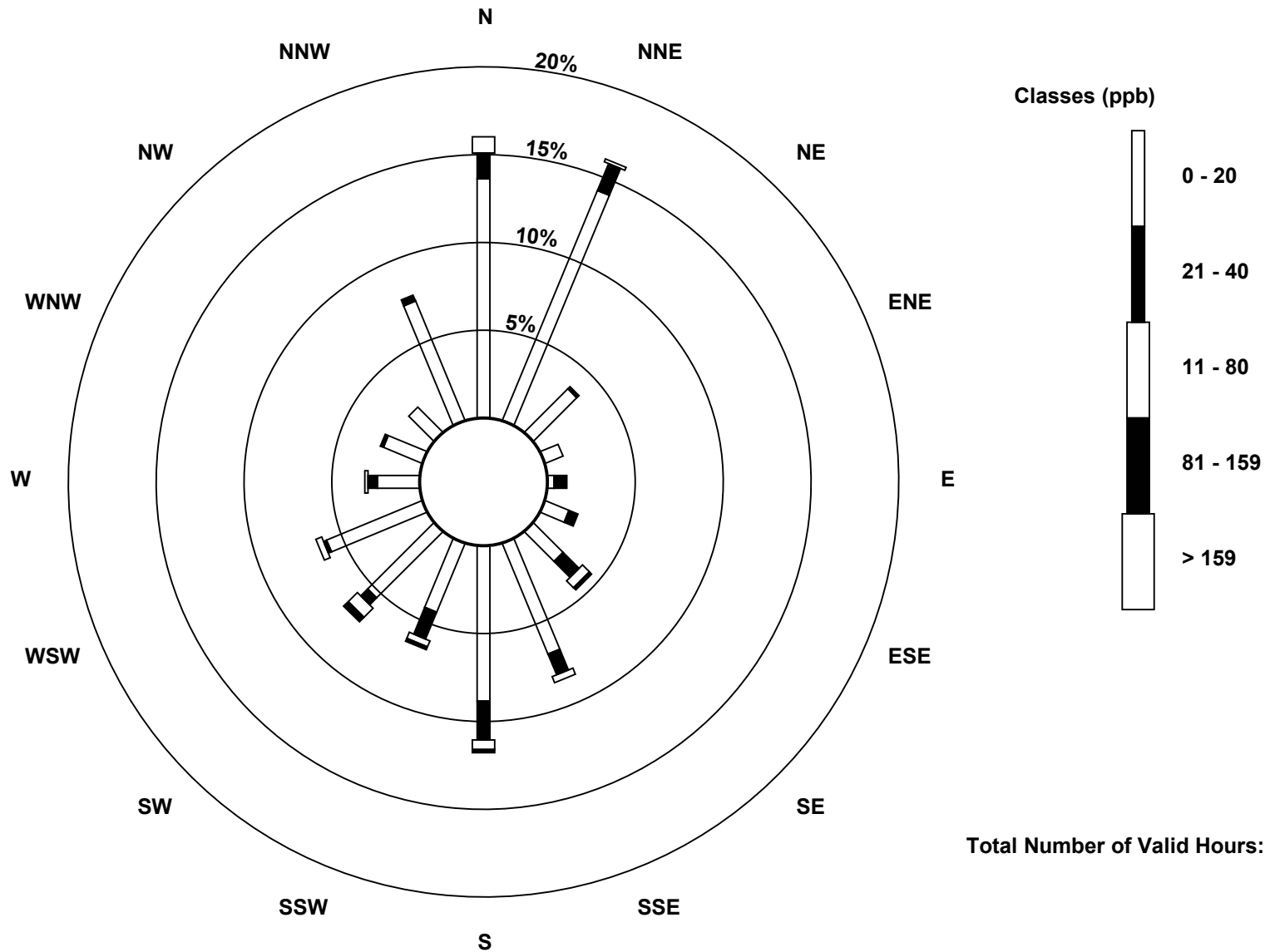
Total Number of Valid Hours: 543

Total Number of Hours: 672

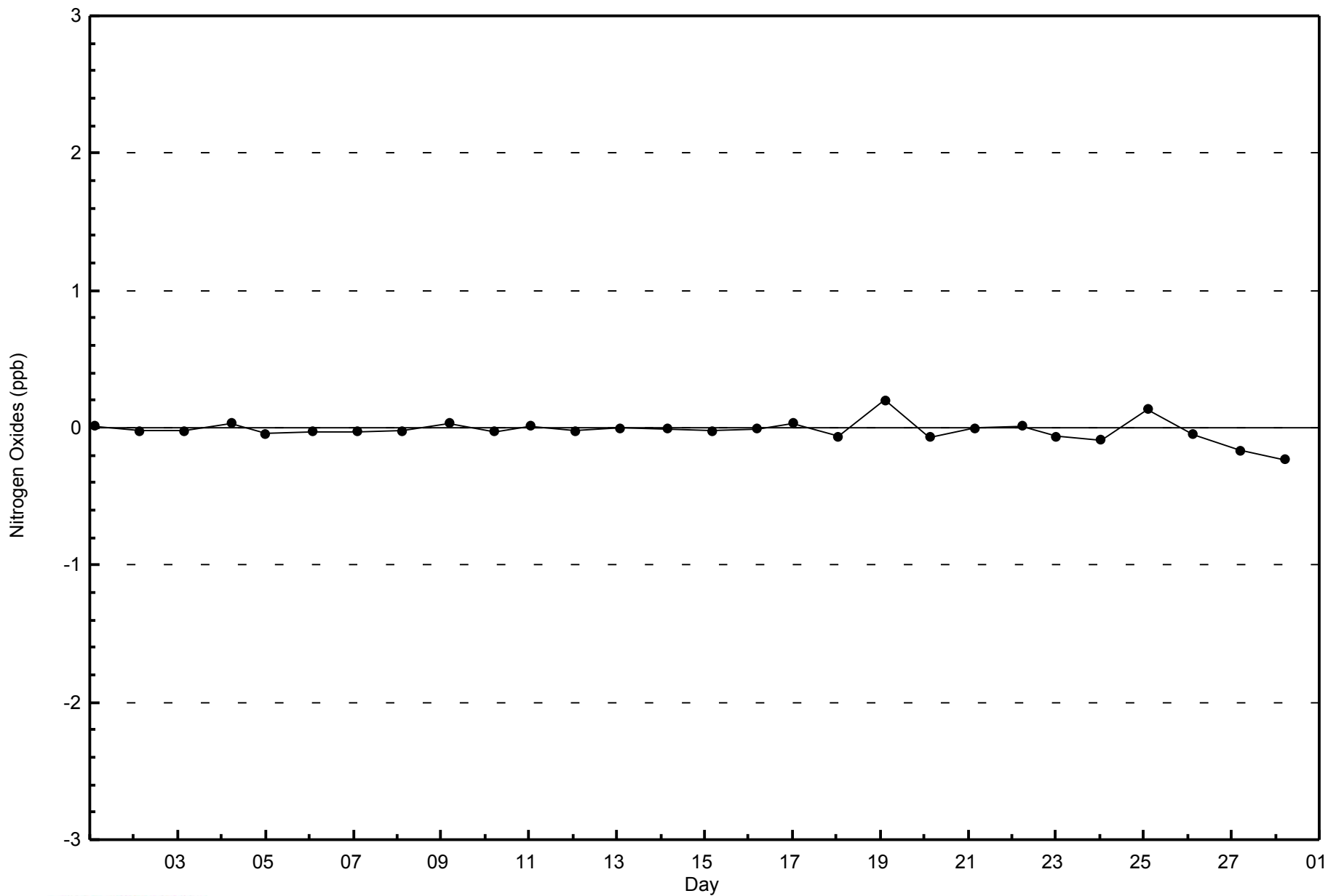


Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 Fort McKay South (AMS 13)



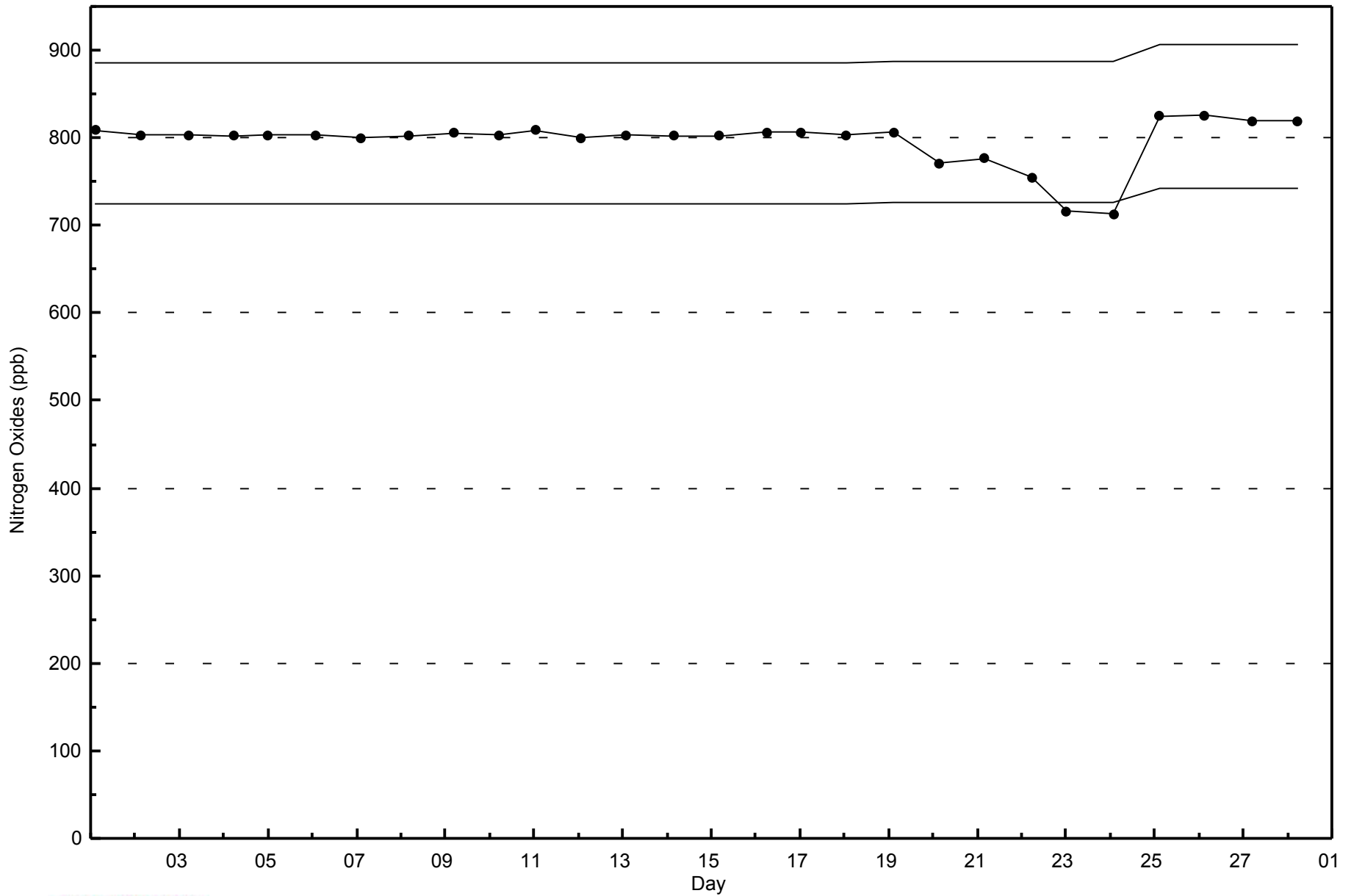
Total Number of Valid Hours: 543





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Fort McKay South - February 2015



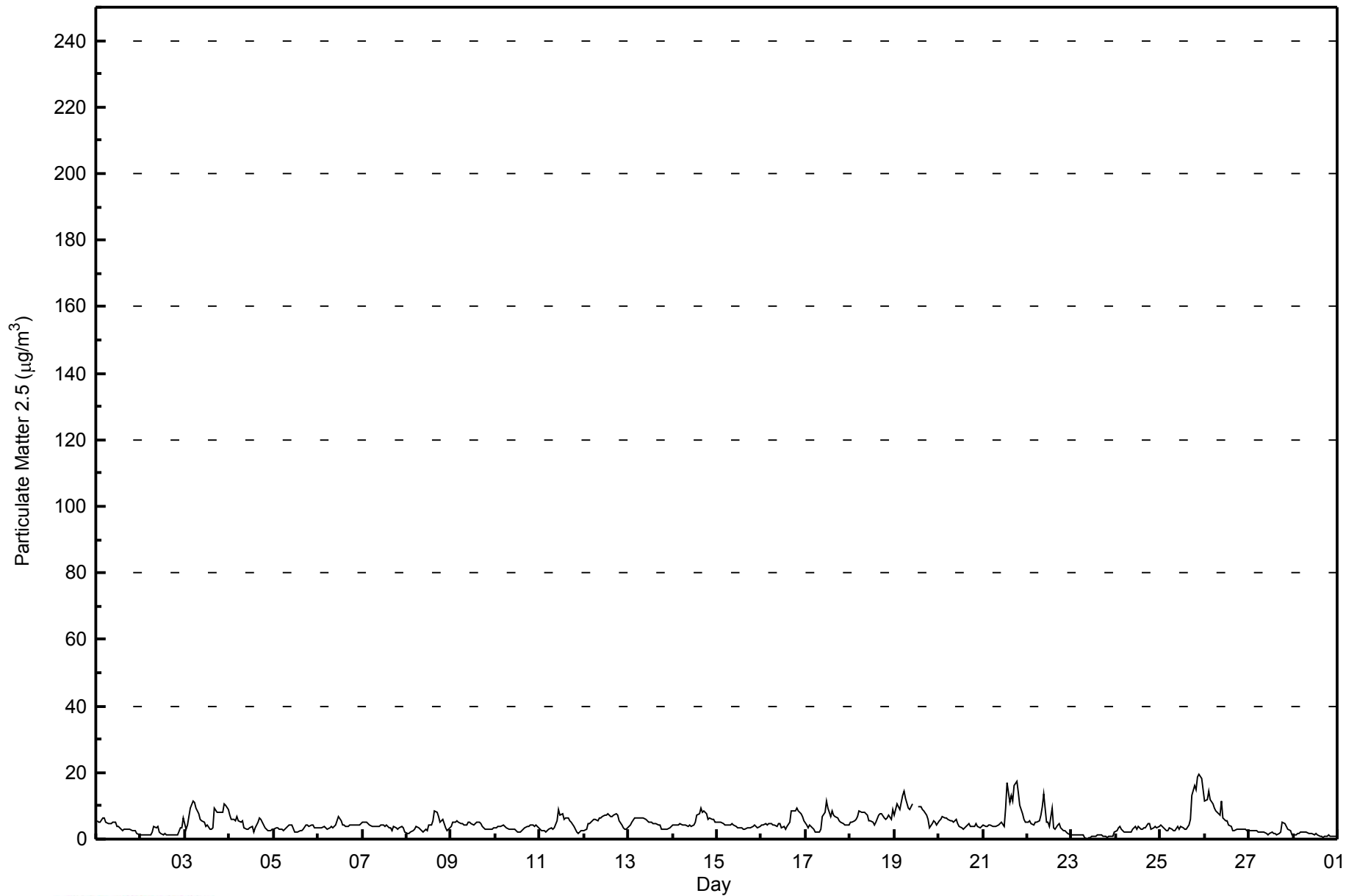


Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																																														
Maximum Value: 19.6 µg/m <sup>3</sup> on Feb 25 22:00		Maximum Daily Average: 8.5 µg/m <sup>3</sup> on Feb 19																																														
Minimum Value: 0.1 µg/m <sup>3</sup> on Feb 23 09:00		Hours of Data: 670																																														
Maximum Diurnal Average: 5.4 µg/m <sup>3</sup> at hour 18		Hours of Missing Data: 2																																														
Monthly Average: 4.59 µg/m <sup>3</sup>		Hours of Calibration: 0																																														
Minimum Daily Average: 1.0 µg/m <sup>3</sup> on Feb 23		Percent Operational Time: 99.7																																														
Minimum Diurnal Average: 4.0 µg/m <sup>3</sup> at hour 1		Percentiles: P <sub>1</sub> = 0.7 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.9 Median = 4.0 Q <sub>3</sub> = 5.6 P <sub>90</sub> = 8.1 P <sub>99</sub> = 15.9																																														
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-Feb	5.6	5.1	5.0	6.4	6.2	5.2	4.5	4.7	4.5	5.0	5.2	3.8	3.6	3.1	2.5	3.2	2.9	2.9	2.8	2.5	2.5	2.4	1.8	1.3	3.9	6.4																						
2-Feb	1.1	1.4	1.3	1.4	1.2	1.3	2.2	3.6	3.5	3.8	2.0	1.7	1.5	1.9	1.2	1.4	1.2	1.1	1.4	1.3	1.4	3.3	3.5	6.5	2.1	6.5																						
3-Feb	2.9	4.4	6.7	9.3	11.4	11.1	9.3	7.6	5.9	5.6	4.9	4.0	4.0	2.8	3.1	3.4	9.4	8.0	7.9	8.0	8.1	10.4	10.0	8.9	7.0	11.4																						
4-Feb	7.2	6.0	6.0	5.6	6.6	5.4	5.2	5.3	3.5	3.1	3.1	3.5	3.8	1.9	3.6	5.2	6.4	5.8	4.4	3.4	3.1	2.7	2.5	2.9	4.4	7.2																						
5-Feb	2.9	3.5	3.2	3.1	3.0	2.5	3.0	3.7	4.2	4.3	4.3	2.2	2.3	2.1	2.4	2.7	3.2	4.0	4.1	3.7	4.4	4.2	3.5	3.4	3.3	4.4																						
6-Feb	3.2	3.3	3.6	3.6	3.2	3.0	3.5	3.7	3.6	4.2	5.6	6.8	5.4	4.2	4.1	3.9	3.9	4.1	4.3	4.4	4.1	4.1	4.1	4.5	4.1	6.8																						
7-Feb	5.1	4.9	4.9	4.6	4.3	3.9	3.8	3.7	3.7	4.0	4.2	4.3	3.7	4.4	3.5	3.3	2.7	3.8	3.2	3.0	3.4	3.6	3.4	2.0	3.8	5.1																						
8-Feb	1.5	1.6	2.0	2.6	3.0	3.9	3.5	2.9	2.6	2.3	2.8	2.7	4.1	4.2	5.5	8.5	8.1	6.9	5.2	5.9	4.5	3.4	2.7	3.6	3.9	8.5																						
9-Feb	3.8	4.9	5.2	5.5	5.0	4.8	4.5	4.1	4.4	5.3	4.9	4.8	4.3	4.6	5.3	5.1	4.7	3.7	3.2	2.8	2.8	2.9	2.8	3.3	4.3	5.5																						
10-Feb	3.4	3.6	3.9	3.8	4.0	3.9	3.3	2.9	2.9	3.1	3.1	2.4	2.2	2.1	2.7	2.8	3.5	3.7	3.7	4.2	4.3	4.0	4.2	3.5	3.4	4.3																						
11-Feb	2.8	2.6	2.6	2.3	2.7	3.1	3.3	3.2	3.4	5.6	8.8	7.2	7.6	6.0	6.2	6.5	5.6	4.9	3.7	3.2	2.2	1.9	2.4	2.7	4.2	8.8																						
12-Feb	2.4	3.2	4.5	4.7	5.5	5.9	6.0	5.6	6.5	6.5	6.9	7.0	7.3	7.6	6.9	6.6	7.4	7.4	7.2	5.5	4.0	3.5	2.9	3.2	5.6	7.6																						
13-Feb	3.8	4.4	5.0	6.3	6.3	6.4	6.5	6.5	6.2	5.9	5.4	5.2	5.0	4.7	4.6	4.6	4.2	4.1	3.0	2.9	3.1	3.0	3.4	3.7	4.8	6.5																						
14-Feb	4.0	4.2	4.2	4.3	4.5	4.4	4.3	4.2	4.0	4.4	3.9	4.4	5.3	7.3	7.6	9.1	8.2	8.4	7.6	5.7	6.2	5.9	5.8	5.0	5.5	9.1																						
15-Feb	4.9	5.1	5.0	4.7	4.4	4.0	4.3	4.4	4.5	4.4	3.8	3.5	3.3	3.3	3.1	3.0	3.4	3.4	3.4	3.6	4.1	3.9	3.5	4.0	4.0	5.1																						
16-Feb	4.0	4.2	4.5	4.2	4.5	4.5	4.2	4.0	3.8	4.6	4.7	3.5	3.7	3.1	3.6	5.1	8.5	8.4	8.5	9.3	8.4	7.7	6.8	5.7	5.4	9.3																						
17-Feb	4.2	3.4	4.1	3.8	2.8	2.2	2.1	2.2	2.8	6.6	8.0	11.4	9.3	6.8	8.5	7.0	6.9	6.2	5.6	5.0	4.6	4.3	4.4	4.4	5.3	11.4																						
18-Feb	5.1	5.2	5.3	5.7	6.9	8.3	8.2	8.2	7.9	7.4	5.5	5.6	4.9	4.1	4.9	7.2	7.6	7.4	6.3	5.8	6.5	7.3	6.1	9.0	6.5	9.0																						
19-Feb	7.2	10.7	9.7	9.1	13.2	14.4	12.1	9.4	8.8	9.7	10.5	M	M	9.7	9.9	9.1	8.3	7.0	6.1	3.4	4.8	5.6	5.0	4.2	8.5	14.4																						
20-Feb	5.4	6.0	6.7	6.5	6.2	5.8	5.7	5.4	5.3	6.0	4.8	3.9	3.3	3.0	3.5	4.0	4.6	3.7	3.7	3.8	4.5	4.0	3.3	4.0	4.7	6.7																						
21-Feb	4.1	3.7	3.8	4.2	4.3	3.9	3.8	3.9	4.2	4.7	5.3	3.8	9.2	16.8	11.2	13.1	11.6	16.0	17.4	14.2	10.1	7.4	5.8	5.2	7.8	17.4																						
22-Feb	5.1	5.5	4.6	4.3	4.9	5.2	5.7	7.3	9.5	13.5	5.2	5.3	3.8	9.2	3.4	3.1	4.4	4.5	3.4	2.6	2.5	2.1	1.5	1.4	4.9	13.5																						
23-Feb	1.4	1.5	1.5	1.3	1.4	1.3	1.2	0.3	0.1	0.2	0.3	0.8	0.9	1.0	1.1	1.4	1.2	1.0	0.7	0.5	1.0	0.9	0.9	2.2	1.0	2.2																						
24-Feb	2.5	3.4	3.8	3.1	2.1	2.1	2.1	2.1	2.3	3.0	3.7	3.2	3.7	3.0	3.2	3.4	3.3	4.7	4.7	2.8	3.3	3.7	3.5	3.8	3.2	4.7																						
25-Feb	4.4	3.7	3.0	2.7	2.6	3.3	3.0	2.7	2.5	3.6	3.1	3.9	3.2	3.0	2.8	4.2	5.9	13.2	16.3	14.8	18.7	19.6	18.3	15.0	7.2	19.6																						
26-Feb	11.5	11.9	14.3	12.0	10.7	9.5	8.5	7.5	7.1	11.5	6.5	5.4	5.7	4.3	3.8	2.6	2.7	2.9	3.1	3.0	2.8	2.8	2.8	2.6	6.5	14.3																						
27-Feb	2.4	2.4	2.5	2.5	2.4	2.1	2.0	2.1	2.2	1.7	1.5	1.8	2.3	1.7	1.5	1.4	1.6	2.2	5.1	4.7	4.0	2.8	2.5	1.3	2.4	5.1																						
28-Feb	1.1	1.3	1.6	1.7	1.9	2.1	2.0	1.9	1.6	1.6	1.5	1.4	1.6	1.3	0.9	0.8	0.5	0.8	0.9	1.1	0.9	0.7	1.0	0.9	1.3	2.1																						
																								4.0	4.3	4.6	4.6	4.8	4.8	4.6	4.4	4.3	5.1	4.6	4.2	4.3	4.6	4.3	4.7	5.1	5.4	5.2	4.7	4.7	4.6	4.2	4.2	Diurnal Average
																								11.5	11.9	14.3	12.0	13.2	14.4	12.1	9.4	9.5	13.5	10.5	11.4	9.3	16.8	11.2	13.1	11.6	16.0	17.4	14.8	18.7	19.6	18.3	15.0	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>) -  $\mu\text{g}/\text{m}^3$**   
**Fort McKay South - February 2015**





**WBEA**

**Cumulative Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
Fort McKay South - February 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	480	71.64	71.64
6 - 15	164	24.48	96.12
16 - 25	7	1.04	97.16
26 - 80	0	0.00	97.16
> 81.0	0	0.00	97.16

Total Number of Valid Hours: 670

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

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

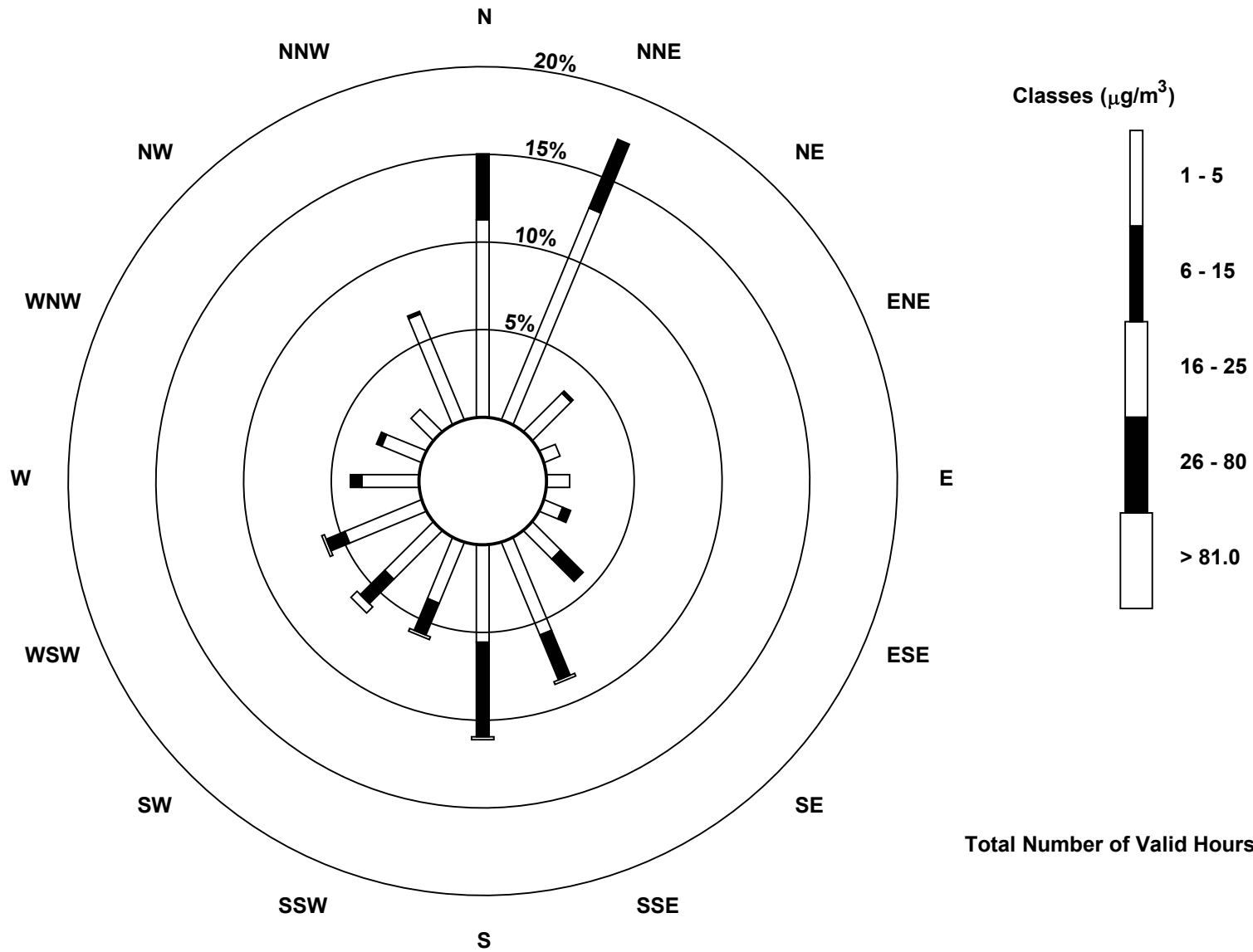
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	69	80	19	6	8	7	14	35	34	23	24	29	20	15	11	40	434
6 - 15	23	26	1	0	0	3	11	17	33	12	12	7	4	2	0	1	152
16 - 25	0	0	0	0	0	0	0	1	1	1	3	1	0	0	0	0	7
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	92	106	20	6	8	10	25	53	68	36	39	37	24	17	11	41	593

Total Number of Valid Hours: 612

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Fort McKay South (AMS 13)





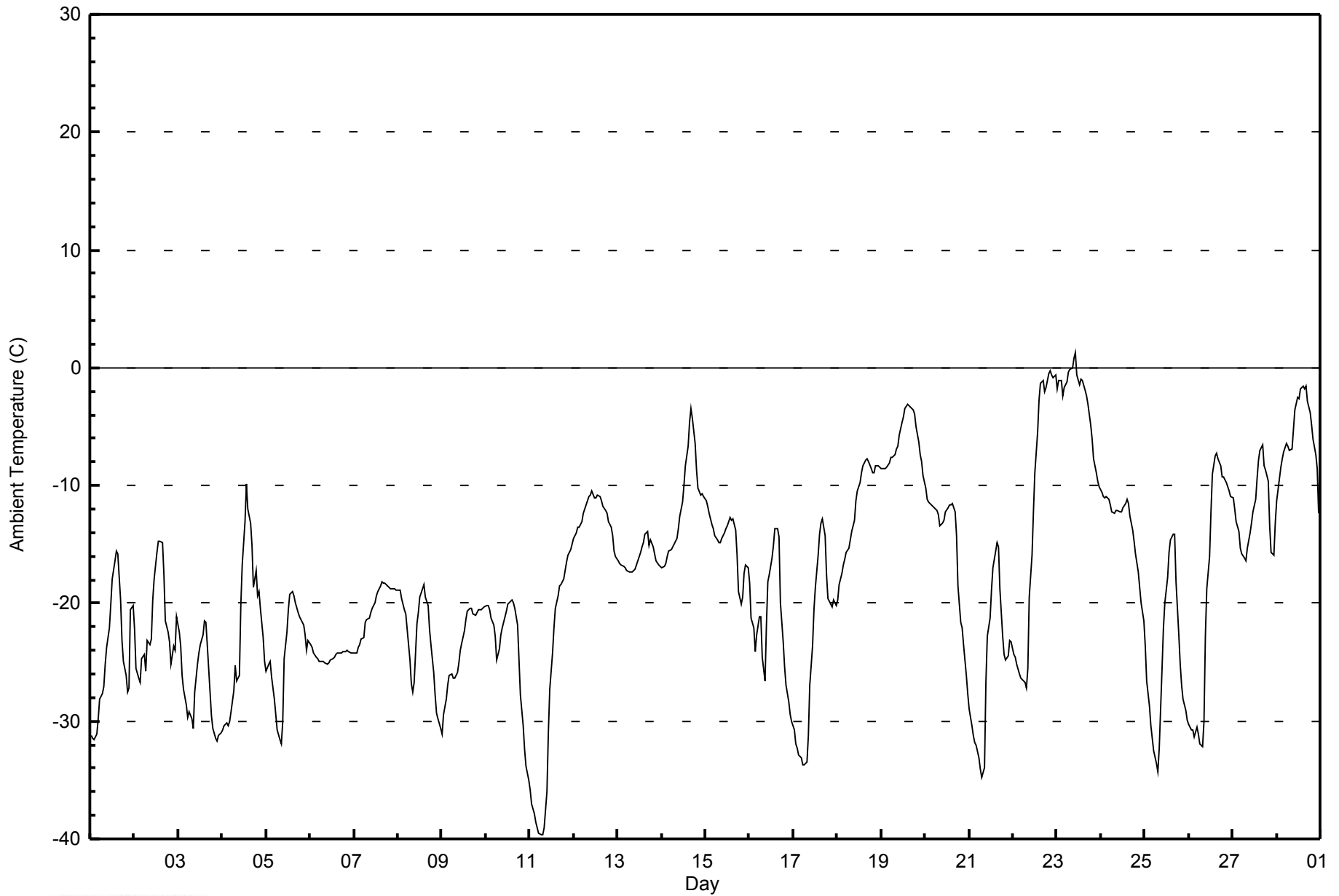


Maximum Value: 1.3 C on Feb 23 11:00		Maximum Daily Average: -2.8 C on Feb 23		Hours in Service: 672																						
Minimum Value: -39.7 C on Feb 11 07:00		Minimum Daily Average: -27.6 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.8 C at hour 16		Minimum Diurnal Average: -22.0 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -18.26 C		Percentiles: P <sub>1</sub> = -37.7 P <sub>10</sub> = -30.0 Q <sub>1</sub> = -24.4 Median = -18.6 Q <sub>3</sub> = -12.1 P <sub>90</sub> = -7.0 P <sub>99</sub> = -0.6		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-Feb	-31.2	-31.4	-31.5	-31.1	-29.8	-28.1	-27.7	-27.0	-25.1	-23.7	-22.1	-20.0	-17.9	-16.4	-15.6	-15.8	-19.7	-23.2	-24.9	-26.2	-27.5	-27.2	-20.6	-20.2	-24.3	-15.6
2-Feb	-22.2	-25.6	-26.3	-26.7	-24.7	-24.3	-25.7	-23.2	-23.5	-23.1	-19.7	-18.0	-15.7	-14.7	-14.8	-14.9	-17.5	-21.5	-22.4	-23.3	-25.2	-23.7	-24.0	-21.1	-21.7	-14.7
3-Feb	-22.4	-23.6	-26.1	-27.3	-28.6	-29.6	-29.3	-29.8	-30.7	-27.6	-25.2	-24.2	-23.5	-22.6	-21.4	-21.6	-23.5	-27.5	-29.6	-30.7	-31.4	-31.6	-31.3	-31.0	-27.1	-21.4
4-Feb	-30.7	-30.4	-30.2	-30.3	-30.0	-29.3	-27.4	-25.3	-26.6	-26.1	-20.2	-16.7	-13.1	-9.9	-12.1	-13.1	-15.1	-18.6	-17.2	-19.4	-19.0	-20.4	-22.9	-25.0	-22.0	-9.9
5-Feb	-25.7	-25.2	-24.9	-26.3	-28.1	-29.5	-30.7	-31.6	-31.9	-30.0	-24.7	-22.5	-20.6	-19.2	-19.0	-19.4	-20.0	-20.7	-21.2	-21.4	-21.9	-22.7	-24.0	-23.1	-24.3	-19.0
6-Feb	-23.5	-23.8	-24.2	-24.5	-24.7	-24.9	-24.9	-25.0	-25.0	-25.1	-25.1	-24.8	-24.6	-24.5	-24.3	-24.2	-24.2	-24.2	-24.1	-24.1	-24.0	-24.2	-24.2	-24.2	-24.4	-23.5
7-Feb	-24.2	-24.2	-23.8	-23.5	-23.0	-22.9	-21.7	-21.4	-21.3	-20.7	-20.4	-19.9	-19.4	-19.0	-18.5	-18.2	-18.2	-18.3	-18.5	-18.6	-18.7	-18.8	-18.8	-18.9	-20.5	-18.2
8-Feb	-18.8	-18.9	-19.6	-20.6	-20.9	-22.2	-24.8	-26.8	-27.6	-26.7	-21.7	-20.8	-19.5	-18.7	-18.4	-19.5	-20.2	-22.1	-23.5	-25.9	-27.8	-29.3	-29.8	-30.6	-23.1	-18.4
9-Feb	-31.1	-29.5	-28.1	-26.9	-26.1	-26.0	-26.4	-26.4	-25.9	-25.0	-24.0	-23.4	-22.3	-21.4	-20.7	-20.4	-20.4	-20.8	-21.0	-20.8	-20.5	-20.5	-20.5	-20.3	-23.7	-20.3
10-Feb	-20.1	-20.2	-20.5	-21.3	-21.9	-22.8	-24.8	-23.9	-22.6	-22.1	-21.1	-20.6	-20.1	-19.8	-19.7	-19.9	-20.4	-21.9	-24.8	-27.8	-30.4	-32.4	-33.9	-35.0	-23.7	-19.7
11-Feb	-35.9	-37.0	-37.8	-38.6	-39.0	-39.5	-39.7	-39.7	-39.0	-36.0	-31.0	-27.3	-24.2	-22.1	-20.4	-19.3	-18.5	-18.4	-17.9	-17.2	-16.5	-15.9	-15.4	-14.9	-27.6	-14.9
12-Feb	-14.4	-14.0	-13.6	-13.5	-13.0	-12.4	-12.0	-11.3	-10.9	-10.8	-10.4	-11.1	-11.0	-10.8	-11.0	-11.2	-11.7	-12.1	-12.4	-13.0	-13.5	-14.2	-15.6	-16.0	-12.5	-10.4
13-Feb	-16.4	-16.6	-16.7	-16.9	-17.0	-17.2	-17.4	-17.4	-17.3	-17.1	-16.7	-16.4	-15.7	-15.2	-14.9	-14.1	-13.9	-15.0	-14.6	-15.2	-15.8	-16.4	-16.7	-16.8	-16.1	-13.9
14-Feb	-16.9	-16.9	-16.6	-16.0	-15.5	-15.4	-15.3	-15.0	-14.5	-13.6	-12.6	-11.4	-10.0	-8.4	-6.6	-4.7	-3.5	-4.3	-6.4	-8.7	-10.3	-10.8	-10.7	-10.9	-11.5	-3.5
15-Feb	-11.2	-11.7	-12.4	-13.4	-13.6	-14.2	-14.6	-14.9	-14.8	-14.5	-14.0	-13.6	-13.4	-12.7	-12.9	-12.8	-13.8	-15.9	-19.1	-20.1	-19.5	-17.5	-16.8	-16.9	-14.8	-11.2
16-Feb	-18.3	-21.3	-22.1	-24.1	-22.7	-21.2	-21.1	-24.6	-26.6	-21.9	-18.2	-17.6	-16.2	-15.1	-13.7	-13.6	-14.4	-19.9	-23.3	-25.4	-27.0	-28.4	-29.4	-30.0	-21.5	-13.6
17-Feb	-30.7	-31.9	-32.3	-32.8	-33.1	-33.7	-33.7	-33.5	-31.3	-27.0	-23.6	-20.6	-18.6	-15.9	-14.2	-13.2	-12.8	-14.2	-17.5	-19.6	-20.1	-20.3	-19.8	-20.2	-23.8	-12.8
18-Feb	-19.7	-18.4	-17.5	-16.7	-16.2	-15.7	-15.4	-14.6	-13.9	-13.0	-11.3	-10.4	-9.8	-8.9	-8.3	-7.9	-7.7	-8.0	-8.5	-8.9	-9.0	-8.4	-8.3	-8.5	-11.9	-7.7
19-Feb	-8.5	-8.6	-8.5	-8.5	-8.0	-7.7	-7.6	-7.4	-7.0	-6.6	-5.8	-4.6	-4.2	-3.4	-3.1	-3.2	-3.3	-3.5	-3.9	-5.0	-6.3	-7.3	-8.0	-9.1	-6.2	-3.1
20-Feb	-10.2	-11.2	-11.4	-11.6	-11.7	-11.9	-12.1	-12.5	-13.4	-13.1	-13.0	-12.3	-11.9	-11.7	-11.7	-11.5	-12.2	-14.2	-18.5	-21.6	-22.1	-23.5	-26.1	-27.6	-14.9	-10.2
21-Feb	-29.0	-30.3	-31.2	-31.8	-32.0	-33.1	-34.0	-34.8	-34.0	-26.7	-22.8	-21.3	-18.9	-17.0	-15.6	-14.9	-15.3	-18.8	-22.8	-24.4	-24.8	-24.4	-23.2	-23.3	-25.2	-14.9
22-Feb	-24.3	-24.5	-25.1	-26.0	-26.4	-26.5	-26.7	-27.2	-25.5	-19.4	-16.0	-12.2	-8.9	-5.5	-2.7	-1.4	-1.0	-2.1	-1.6	-0.5	-0.3	-0.6	-0.8	-0.6	-12.7	-0.3
23-Feb	-1.8	-1.1	-1.1	-2.4	-1.7	-1.3	-0.4	-0.1	0.0	0.8	1.3	-0.7	-1.4	-1.0	-1.1	-1.9	-2.4	-3.1	-4.9	-6.1	-7.8	-8.9	-9.6	-10.1	-2.8	1.3
24-Feb	-10.6	-10.9	-11.0	-11.0	-11.1	-11.6	-12.2	-12.3	-12.2	-12.1	-12.2	-12.3	-11.9	-11.5	-11.2	-11.6	-12.6	-13.7	-14.7	-15.8	-17.3	-18.7	-20.0	-21.5	-13.3	-10.6
25-Feb	-23.6	-26.6	-28.7	-30.4	-31.4	-32.6	-33.6	-34.3	-32.2	-25.6	-22.0	-20.0	-17.8	-15.6	-14.7	-14.2	-14.1	-18.1	-22.7	-25.2	-26.9	-28.1	-29.1	-29.9	-24.9	-14.1
26-Feb	-30.3	-30.7	-30.7	-31.4	-30.5	-31.1	-31.9	-32.1	-30.0	-22.8	-18.8	-16.0	-12.2	-9.1	-7.5	-7.3	-7.7	-8.3	-9.3	-9.3	-9.7	-10.1	-10.5	-10.9	-18.7	-7.3
27-Feb	-11.1	-11.9	-13.0	-13.9	-15.3	-15.8	-16.1	-16.4	-15.3	-14.0	-13.2	-12.3	-11.1	-9.4	-7.9	-7.0	-6.6	-8.4	-8.6	-9.6	-13.5	-15.7	-15.9	-13.1	-12.3	-6.6
28-Feb	-11.3	-9.4	-8.5	-7.8	-7.2	-6.4	-6.6	-7.0	-6.9	-5.2	-3.6	-2.6	-2.7	-1.8	-1.6	-1.8	-1.6	-2.8	-3.9	-4.9	-6.1	-7.4	-8.6	-12.4	-5.7	-1.6
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Fort McKay South - February 2015**





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

**Ambient Temperature (AT) - C**  
**Fort McKay South - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	297	44.20	44.20
-20 - 0	372	55.36	99.55
0 - 10	3	0.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

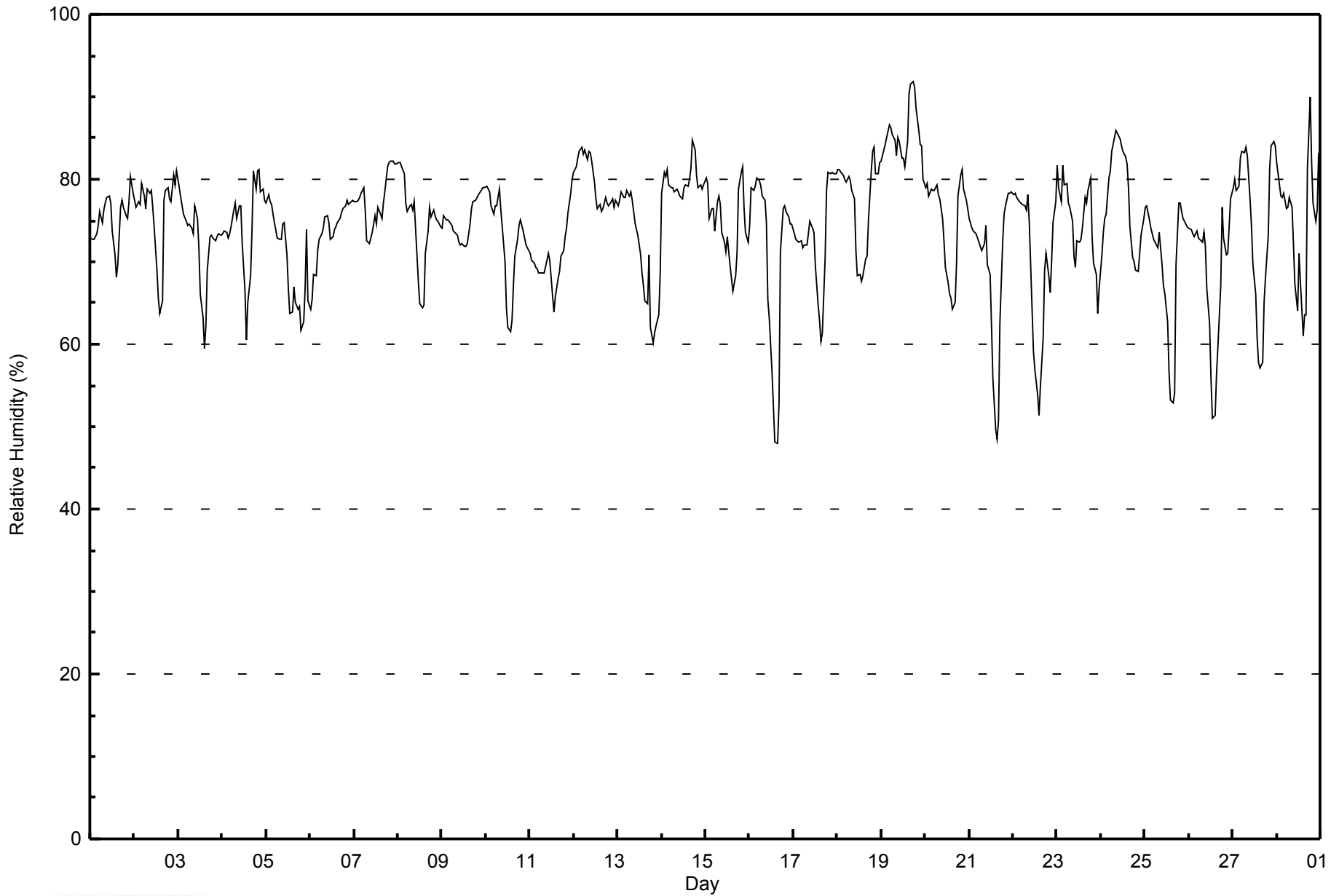


Maximum Value: 92 % on Feb 19 18:00																		Maximum Daily Average: 85.4 % on Feb 19						Hours in Service: 672																								
Minimum Value: 48 % on Feb 16 16:00																		Minimum Daily Average: 68.6 % on Feb 26						Hours of Data: 672																								
Maximum Diurnal Average: 77.1 % at hour 2																		Minimum Diurnal Average: 65.6 % at hour 15						Hours of Missing Data: 0																								
Monthly Average: 74.2 %																		Percentiles: P <sub>1</sub> = 51 P <sub>10</sub> = 65 Q <sub>1</sub> = 71 Median = 75 Q <sub>3</sub> = 79 P <sub>90</sub> = 81 P <sub>99</sub> = 86						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-Feb	73	73	73	73	74	76	75	76	77	78	78	77	74	71	68	70	77	77	77	76	75	77	80	78	75.1	80																						
2-Feb	77	77	77	77	79	78	77	79	78	79	77	74	69	66	64	65	77	79	79	78	77	80	79	81	76.0	81																						
3-Feb	79	78	77	76	75	74	75	74	73	77	75	72	66	63	60	62	69	73	73	73	73	73	73	73	72.3	79																						
4-Feb	73	74	73	73	73	74	76	77	75	77	77	72	66	61	65	68	74	81	79	81	81	78	79	77	74.4	81																						
5-Feb	77	78	77	77	75	74	73	73	73	75	75	71	67	64	64	67	65	64	65	62	63	67	74	65	70.1	78																						
6-Feb	64	65	69	68	71	73	73	74	75	76	75	73	73	74	74	75	75	76	76	77	77	77	77	77	73.6	77																						
7-Feb	77	77	78	78	78	79	76	73	72	73	74	76	75	77	76	75	77	79	82	82	82	82	82	82	77.5	82																						
8-Feb	82	82	82	81	77	76	77	77	76	77	71	68	65	64	65	71	74	77	76	76	76	75	75	74	74.7	82																						
9-Feb	74	76	75	75	75	74	74	73	73	72	72	72	72	72	72	74	76	77	78	78	78	79	79	79	75.0	79																						
10-Feb	79	79	78	77	76	77	77	79	76	74	70	64	62	62	63	67	71	73	74	75	74	73	72	71	72.6	79																						
11-Feb	71	70	70	69	69	69	69	69	69	70	71	70	66	64	66	68	69	71	71	73	74	76	78	80	70.5	80																						
12-Feb	81	82	83	83	84	83	84	82	83	83	82	80	78	76	77	76	77	78	77	77	77	78	77	77	79.7	84																						
13-Feb	77	77	78	78	78	79	78	79	78	75	74	73	71	69	67	65	65	71	62	60	61	62	64	69	71.2	79																						
14-Feb	78	81	80	81	79	79	79	79	79	78	78	79	79	80	81	85	84	80	79	79	79	79	79	79	79.7	85																						
15-Feb	80	79	75	76	76	74	77	78	77	74	72	71	73	69	68	66	68	71	79	81	81	76	74	72	74.6	81																						
16-Feb	74	79	79	79	80	80	79	78	77	75	65	63	57	52	48	48	53	71	76	77	76	75	75	75	70.5	80																						
17-Feb	73	73	73	72	73	72	72	72	73	75	74	74	70	65	63	60	61	70	79	81	81	81	81	81	72.8	81																						
18-Feb	81	81	81	80	80	80	80	80	79	78	71	68	68	68	68	70	71	75	81	83	84	81	81	82	77.1	84																						
19-Feb	82	84	84	85	87	86	85	85	83	85	84	83	83	81	85	90	92	92	91	89	86	84	84	80	85.4	92																						
20-Feb	79	80	78	79	79	79	79	78	78	75	72	69	67	66	66	64	65	70	78	81	81	79	77	76	74.8	81																						
21-Feb	75	74	74	73	73	72	72	71	72	74	70	69	62	56	50	48	51	63	72	76	77	78	78	78	69.2	78																						
22-Feb	78	78	78	77	77	77	77	76	78	75	64	59	57	54	51	55	61	69	71	68	66	70	75	77	69.6	78																						
23-Feb	82	79	77	82	79	79	77	77	75	71	69	72	72	73	74	78	77	79	80	73	70	68	64	67	74.8	82																						
24-Feb	71	74	75	76	80	81	83	85	86	86	85	84	83	83	82	79	74	70	70	69	69	71	73	75	77.7	86																						
25-Feb	77	77	75	74	73	73	72	72	74	70	67	66	63	57	53	53	54	70	77	77	76	75	75	74	69.7	77																						
26-Feb	74	74	73	73	74	73	73	72	74	72	67	63	56	51	51	56	60	67	77	73	71	71	74	78	68.6	78																						
27-Feb	79	80	79	79	83	83	83	84	83	78	74	70	66	61	58	57	58	65	68	73	81	84	85	84	74.8	85																						
28-Feb	82	79	78	78	78	76	77	78	77	72	67	64	71	67	61	64	64	81	90	82	77	75	76	83	74.9	90																						
																								76.8	77.1	76.7	76.8	77.0	76.8	76.7	76.7	76.5	75.8	73.3	71.2	68.9	66.5	65.6	66.9	69.1	74.0	76.5	76.1	75.9	75.9	76.4	76.7	Diurnal Average
																								82	84	84	85	87	86	85	85	86	86	85	84	83	83	85	90	92	92	91	89	86	84	85	84	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Fort McKay South - February 2015**





Maximum Speed: 15 km/h on Feb 23 19:00	Maximum Daily Speed Average: 8.6 km/h on Feb 6	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 12 09:00	Minimum Daily Speed Average: 1.0 km/h on Feb 16	Hours of Data: 614
Maximum Diurnal Speed Average: 2.3 km/h at hour 12	Minimum Diurnal Speed Average: 0.4 km/h at hour 9	Hours of Missing Data: 58
Monthly Average Velocity: 1.3 km/h 18.1 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 5 Q <sub>3</sub> = 8 P <sub>90</sub> = 10 P <sub>99</sub> = 14	Percent Operational Time: 91.4

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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	---
3-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	---	N5
4-Feb	S3	SW3	WSW3	SW3	SSW3	SSE2	NNE1	NNW2	SW1	SSE2	S5	ESE3	N3	NW6	NNE9	N6	N4	WNW4	NNW5	WNW2	NNE5	NNW1	SW1	WSW3	NW1.0	NNE9
5-Feb	WNW4	NW5	NW5	WNW3	WSW3	WSW2	SSW3	S2	W1	S0	E3	E3	ESE3	NE2	NNE5	NE5	ENE4	NE4	ENE5	NE4	NE3	N3	NNE8	NNE1.7	NNE8	
6-Feb	NNE9	NNE9	NE9	NE8	NE7	NNE9	NNE9	NNE8	NNE8	NNE9	NNE11	NNE11	NNE11	N10	N11	NNE10	N11	NNE11	NNE10	N9	NNW6	NNW6	NNW5	N5	NNE8.6	NNE11
7-Feb	N5	N5	NNW4	N4	NNW2	NNW2	SSE5	SSE7	SSE7	SSE8	SSE8	SE7	SE7	SE6	SE6	SE6	SE5	SE2	NNW1	NNW1	NNW2	NW2	SW1	SE2.0	SSE8	
8-Feb	N1	N2	NNW2	N5	NNE7	NNE5	NNW2	W2	WSW3	WSW1	S3	SSW4	SSE4	SE5	ESE5	NNE5	N5	N5	NNW4	NNW4	N3	NNW2	NNW3	N1.8	NNE7	
9-Feb	NW3	NNW4	NNE5	N5	N5	N6	NNW6	N6	N5	N5	N6	NNE7	NNE5	NNE6	NNE6	N7	N6	NNW6	NNW5	N4	N5	NNW4	N4	NNW4	N5.1	NNE7
10-Feb	NNW4	N5	N8	NNE9	N8	N5	NW2	WNW3	NW3	NNW3	N4	NNW9	NNW8	N7	NNE5	NNE6	NNE6	NNE7	N5	N4	W1	WNW2	WSW3	WSW3	N4.2	NNE9
11-Feb	WSW3	SW2	SW2	SW2	SSW2	SW1	SSW2	SSW2	SW2	S2	S4	SSE5	SSE6	SSE8	SSE8	S9	SSE11	SSE10	S11	S11	S11	S12	S10	S9	S5.7	S12
12-Feb	S6	SSE5	SSE2	S3	S4	SSE3	S3	SW3	SE0	NNE4	NNE6	N8	NNE7	NNE8	NNE9	NNE9	NNE9	NNE6	NNE8	NNE8	NNE8	NNE9	NNE10	NNE9	NNE3.8	NNE10
13-Feb	N10	N9	N9	N8	N8	NNE10	NNE9	NNE7	NNE8	NNE9	NNE10	NNE10	N10	N9	N6	NNW5	NNE4	E2	SSE8	SSE9	SE9	SSE10	SSE11	SSE11	NE4.5	SSE11
14-Feb	SSE9	SSE10	SSE11	SSE12	SSE12	SSE11	SSE12	SSE12	S10	S10	S12	SSE13	S11	S10	SSE8	S6	S6	N6	N11	NNE10	NNE9	NNE6	NNE3	NE3	SSE5.7	SSE13
15-Feb	NNE3	ENE4	NE5	NE3	NE3	NE6	NE5	NE6	NNE5	NNE6	NNE8	N8	NNE7	NNE7	NNE7	NNE9	NNE8	NNE5	WNW1	WNW1	NNW2	N5	N6	N8	NNE5.1	NNE9
16-Feb	N5	NNW3	NNW4	NNW3	NNW4	NW3	W3	W2	SW2	SE1	ESE3	S3	S3	SSE4	SSW5	SSE5	S3	WNW2	W2	WSW3	WSW3	SW2	WSW2	W1	WSW1.0	N5
17-Feb	SSW1	WSW1	W2	SW1	SW2	SW1	SSW1	S2	SSW2	S3	SE3	SE4	SE5	ESE5	SE4	SE5	SSE4	S1	W2	WSW2	SW2	W2	WSW1	SW1	S1.6	SE5
18-Feb	WNW1	NNE0	NNW1	NNE2	N1	NNE2	N2	N1	W0	NE3	SSE5	SSE5	SE4	SSE6	S5	SSE5	SSE3	S3	S1	WSW1	S3	S5	S4	S4	SSE1.7	SSE6
19-Feb	S4	S3	S4	S3	S5	S6	SSE4	S4	SSE3	ESE3	ESE3	ESE4	NE3	NNE4	NNE6	N6	N5	N4	N6	N9	N13	NNE14	NNE14	NNE15	NNE2.7	NNE15
20-Feb	NNE14	N12	N13	N11	N12	N12	N10	NNE9	NNE8	N9	N9	NNE8	NNE8	NNE7	NNE7	NNE6	NNE5	NNE5	N3	NNW3	NNW5	WNW1	WSW3	WSW3	N7.1	NNE14
21-Feb	WSW1	SSW2	WSW1	WSW4	WSW3	SW2	WSW2	SW1	W1	ENE1	E2	ENE4	S5	SSE5	SE5	SE6	SE6	S4	SSW3	S4	SSW4	SSW4	S4	SSW3	S2.3	SE6
22-Feb	SSW3	SSW4	S4	SSW3	SSW3	S4	S4	SSW3	S3	SSE3	SE5	SSE7	S10	S8	SSE7	S8	S8	S8	S7	SSW9	SW12	WSW6	WNW4	W7	S4.9	SW12
23-Feb	W6	WNW8	W7	W8	W9	W9	WNW8	WNW8	NW6	NNW5	NW7	NNE11	NNE9	NNE8	NNE8	NNE10	NNE10	NNE12	N15	NNE14	NNE11	NE10	NE7	NNE6	N5.9	N15
24-Feb	NNE7	NNE5	N4	NNE4	E4	E4	NE5	NNE5	NNE6	NNE8	NNE9	NNE11	NNE12	NNE11	NNE11	N12	N14	N12	N13	N13	N13	N11	N7	NNW5	NNE8.2	N14
25-Feb	NW3	WNW3	W2	WSW3	SW2	WSW2	WSW1	WSW2	S1	E2	E4	ESE4	SSE4	S4	ESE4	SE4	SSE4	SSW3	SW3	SW2	WSW3	SW3	SW3	SW3	SSW1.5	ESE4
26-Feb	SW3	WSW3	SSW3	SW2	SW2	SW3	WSW2	SW3	SSW2	SSE4	SE5	SE6	SE6	SSW7	SSW7	SW9	SW6	WNW1	N3	N6	N5	N5	NNW5	NNW3	SW1.5	SW9
27-Feb	N6	N8	N9	N7	N3	N4	WSW1	SW2	SSE2	SSE2	ESE3	SSW5	SSW4	SSW6	S7	S8	S8	SSW6	SSW6	S4	S2	SW2	SW2	SW5	SSW1.3	N9
28-Feb	WSW5	WSW5	WSW5	WSW5	W7	W11	W11	W9	W10	W8	WNW7	N4	NNE5	NE7	NE6	NNW4	NW7	N7	NNE6	N8	N8	N5	N4	NNW1	NW4.0	W11
NNW1.4NNW1.6 N1.7NNW1.3NNW1.0NNW1.1 NW0.8NNW0.6 NW0.4 NE1.1 ENE1.9 ENE2.3 ENE2.2 ENE1.7 ENE2.2 NE1.7 NE1.4NNE2.1 N2.3 N2.2 N2.0 N1.5 N1.3NNW1.2 NNE14 N12 N13 SSE12 SSE12 N12 SSE12 SSE12 W10 S10 S12 SSE13 NNE12 NNE11 N11 N12 N14 N12 N15 NNE14 N13 NNE14 NNE14 NNE15																								Diurnal Average	Diurnal Maximum	

AF - Analyzer Failure

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



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

**Wind Speed (WS) - km/h**  
**Fort McKay South - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 5 km/h on Feb 20 00:00	Hours in Service: 672 Hours of Data: 614 Hours of Missing Data: 58 Hours of Calibration: 0 Percent Operational Time: 91.4
Minimum Value: 1 km/h on Feb 4 03:00	
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> = 3 P <sub>99</sub> = 5	

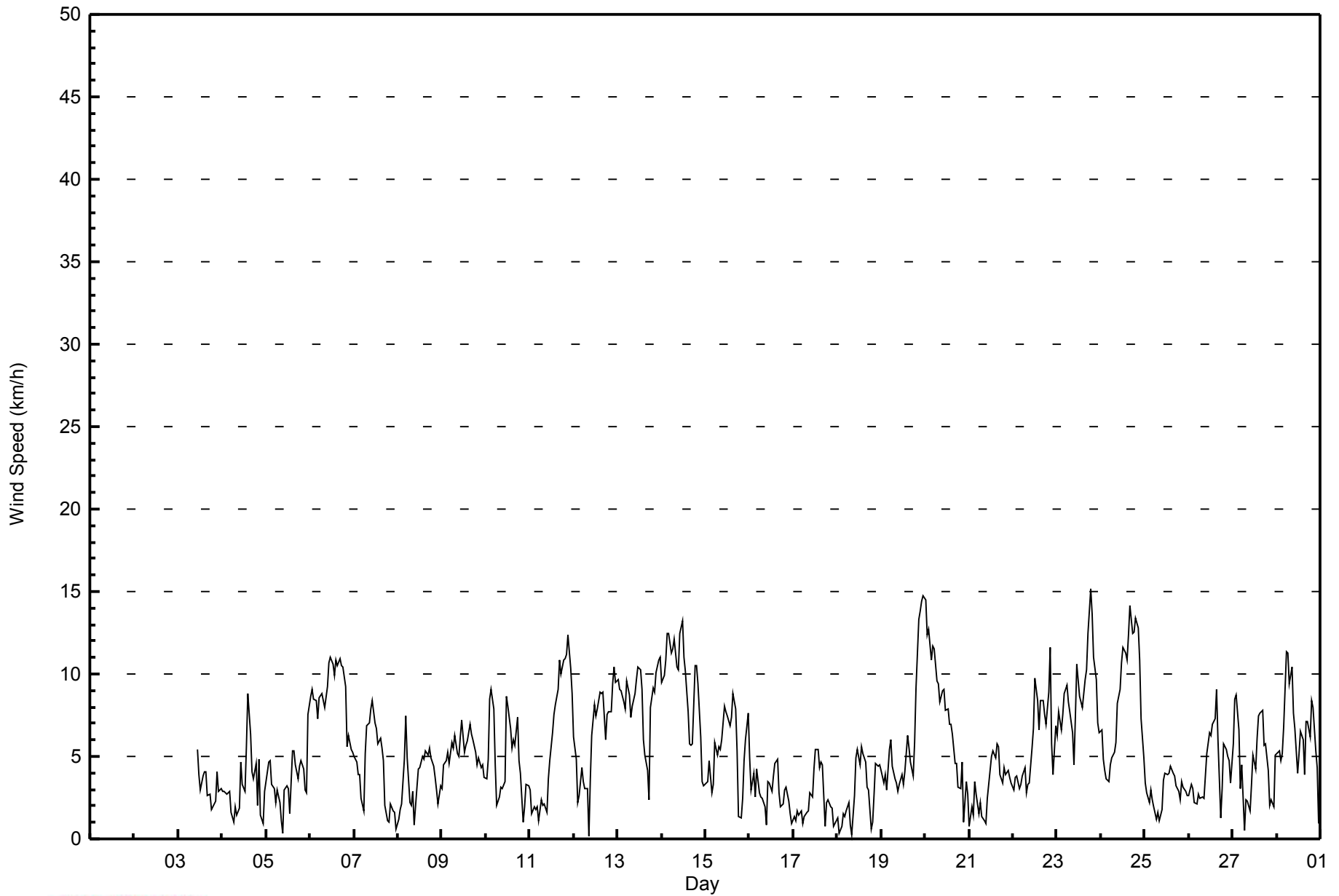
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF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

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Fort McKay South - February 2015**







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

**Wind Speed (WS) - km/h**  
**Fort McKay South - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	367	59.77	59.77
6 - 11	220	35.83	95.60
12 - 19	27	4.40	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: 614

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Fort McKay South - February 2015**

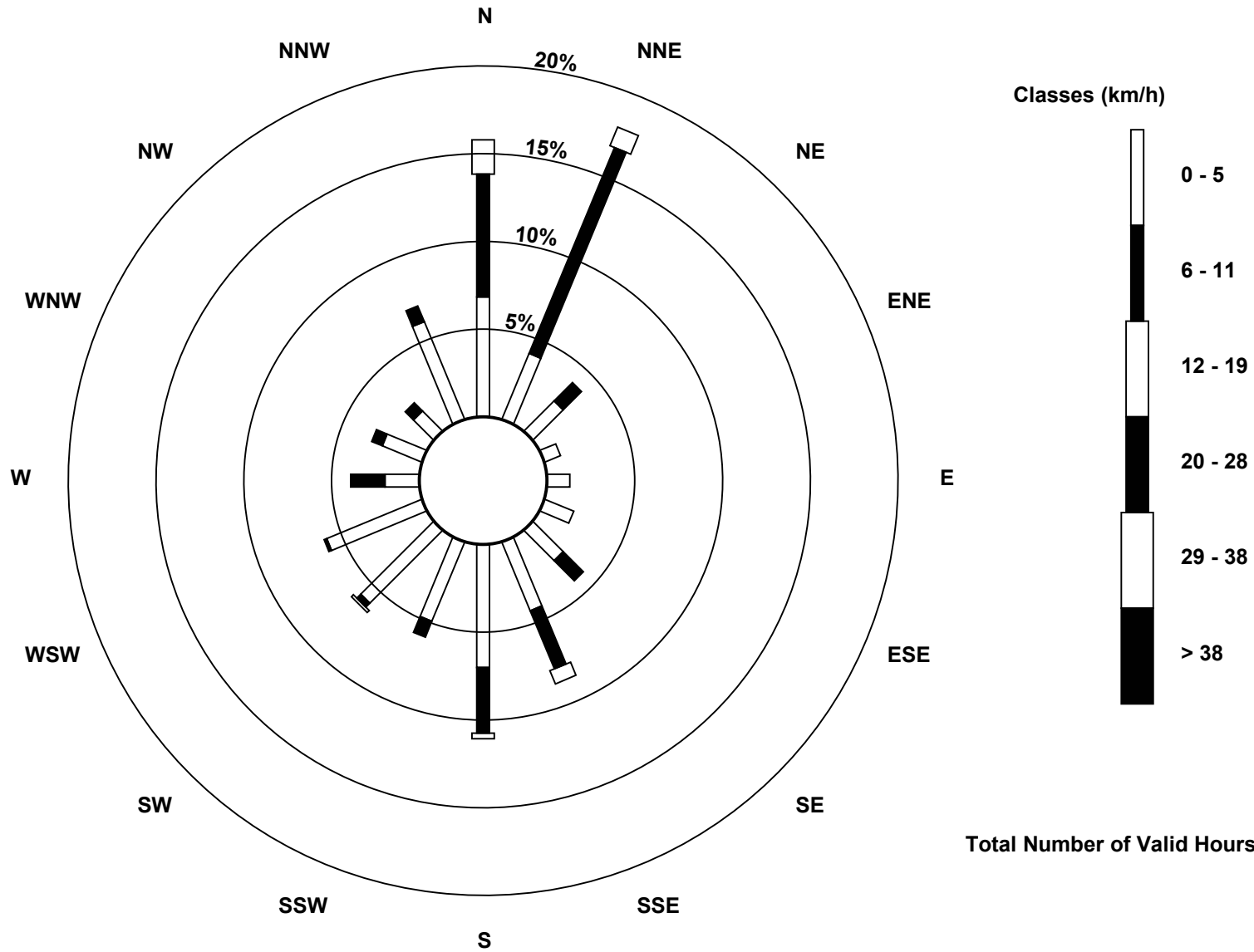
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	42	25	15	6	8	11	15	26	43	30	36	36	12	15	10	37	367
6 - 11	43	78	9	0	0	0	10	22	23	6	2	1	12	4	4	6	220
12 - 19	12	7	0	0	0	0	0	5	2	0	1	0	0	0	0	0	27
20 - 28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	97	110	24	6	8	11	25	53	68	36	39	37	24	19	14	43	614

Total Number of Valid Hours: 614

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Wind Speed (WS) - km/h  
Fort McKay South (AMS 13)



Total Number of Valid Hours: 614



**Wood Buffalo Environmental Association**

**Summary of Hour Averages**

**Wind Direction (WD) - deg**

**Fort McKay South - February 2015**

Direction of Maximum Speed: 11 deg on Feb 23 19:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 16.7 deg on Feb 6	Hours of Data: 614
Direction of Minimum Speed: 142 deg on Feb 12 09:00	Direction of Minimum Daily Speed Average: 1.0 deg on Feb 16
Direction of Minimum Speed: 142 deg on Feb 12 09:00	Hours of Missing Data: 58
Monthly Average Direction: 260.3 deg	Percent Operational Time: 91.4

Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
3-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
4-Feb	189	218	246	224	211	168	14	327	219	162	174	112	11	317	18	1	353	300	332	300	19	328	235	242	318.5
5-Feb	294	315	318	301	246	238	192	184	259	178	95	101	102	46	18	40	58	49	51	57	54	40	7	17	27.1
6-Feb	28	28	35	40	35	26	24	30	16	12	19	30	19	10	6	13	10	14	12	6	347	347	348	356	16.7
7-Feb	5	5	347	355	338	347	151	151	149	148	148	145	139	140	145	144	135	143	336	309	348	322	313	226	132.9
8-Feb	357	349	332	4	15	21	348	272	254	241	191	209	150	125	102	12	1	0	354	344	333	351	332	348	0.7
9-Feb	325	342	15	6	355	353	348	359	360	8	8	20	16	28	23	8	10	347	344	357	349	347	358	346	1.4
10-Feb	342	358	5	15	11	6	313	295	318	330	349	340	340	351	30	21	13	21	6	360	277	287	254	254	353.7
11-Feb	238	216	228	232	207	229	213	209	217	181	169	153	159	161	166	178	167	168	170	171	170	170	170	171	174.2
12-Feb	171	165	154	176	186	167	170	225	142	21	14	8	12	16	12	16	31	24	22	29	23	26	12	17	25.5
13-Feb	10	11	11	10	8	20	20	16	19	29	18	13	10	10	354	347	15	90	149	148	145	147	153	152	36.1
14-Feb	150	153	157	164	167	167	167	168	169	172	169	168	170	169	167	169	173	4	10	15	20	16	32	36	155.4
15-Feb	33	57	52	42	45	39	35	39	30	13	20	11	24	28	28	18	24	24	288	299	342	349	11	10	22.9
16-Feb	1	338	346	333	341	314	275	260	220	145	119	188	173	167	197	166	177	292	278	254	240	232	248	269	246.6
17-Feb	212	256	263	223	223	229	208	178	195	169	135	125	125	120	133	144	159	185	260	248	232	267	254	223	171.4
18-Feb	283	21	329	16	352	21	8	355	259	51	152	149	128	168	188	159	163	169	182	244	188	176	177	186	162.7
19-Feb	178	174	174	174	179	185	167	169	163	120	120	103	42	16	12	11	356	351	11	11	10	16	14	14	31.2
20-Feb	16	10	11	9	10	7	10	19	18	8	8	27	18	21	22	21	29	21	353	344	339	294	257	256	10.4
21-Feb	240	210	237	238	258	229	239	225	259	77	85	64	190	163	144	138	146	190	193	189	196	199	179	201	181.7
22-Feb	204	196	190	201	194	185	186	202	183	147	128	158	178	176	164	176	188	180	188	203	217	243	282	278	191.2
23-Feb	266	284	265	266	264	278	296	301	305	294	321	19	25	18	25	20	16	22	11	12	27	48	34	19	349.4
24-Feb	17	13	6	31	96	88	56	29	28	21	22	18	15	13	15	10	5	8	5	7	9	2	358	348	14.7
25-Feb	318	298	263	239	220	241	253	251	181	84	85	118	151	181	123	137	162	199	229	222	240	231	230	227	198.4
26-Feb	221	238	203	217	236	229	237	225	204	149	139	127	142	198	201	220	235	289	356	359	354	354	346	338	217.2
27-Feb	7	11	6	5	350	2	253	233	167	152	111	212	200	199	178	179	191	198	197	191	170	223	224	232	202.7
28-Feb	243	241	251	237	263	267	262	264	265	274	291	356	31	38	42	338	305	356	13	359	3	358	352	327	304.9
Diurnal Average																									
	348.7	346.7	351.0	345.8	327.4	339.9	315.4	303.3	313.7	41.9	59.6	59.7	65.3	65.0	62.9	47.4	37.3	15.2	6.3	4.0	3.8	5.0	355.5	341.1	

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



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

**Wind Direction (WD) - deg**  
**Fort McKay South - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 104 deg on Feb 12 09:00	Hours in Service: 672 Hours of Data: 614 Hours of Missing Data: 58 Hours of Calibration: 0 Percent Operational Time: 91.4
Minimum Value: 8 deg on Feb 22 07:00	
Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 19 Q <sub>1</sub> = 23 Median = 27 Q <sub>3</sub> = 35 P <sub>90</sub> = 55 P <sub>99</sub> = 88	

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-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
2-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--
3-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	28	60	79	49	48	33	32	19	48	37	27	12	12	15	79
4-Feb	16	22	30	27	60	57	83	44	51	59	27	42	70	45	23	19	25	23	24	64	22	58	81	21	83
5-Feb	22	19	21	39	21	40	18	61	61	78	17	28	42	77	30	35	30	33	32	33	32	28	21	26	78
6-Feb	24	24	24	31	25	24	24	28	22	21	22	25	24	24	23	23	22	21	22	22	44	28	35	25	44
7-Feb	24	35	26	21	27	40	36	32	32	28	34	32	32	36	33	32	29	38	50	30	23	31	27	92	92
8-Feb	63	31	24	21	20	20	28	31	18	89	50	46	50	49	33	19	18	15	19	15	13	17	35	15	89
9-Feb	15	18	21	20	26	23	24	26	22	33	26	19	27	26	21	23	19	26	26	25	26	29	26	27	33
10-Feb	36	28	23	23	21	20	42	28	35	43	76	29	37	33	31	28	22	20	15	17	72	34	13	10	76
11-Feb	21	48	43	28	38	59	28	37	34	45	33	43	34	31	31	25	27	27	26	26	25	25	25	25	59
12-Feb	24	22	37	34	24	22	31	46	104	30	26	24	22	27	22	22	25	27	26	26	25	25	23	25	104
13-Feb	22	25	23	24	25	24	23	23	25	27	26	23	26	24	33	28	27	59	28	31	34	29	29	31	59
14-Feb	31	30	30	28	29	27	27	27	26	24	27	25	26	25	27	25	23	81	23	22	22	23	31	31	81
15-Feb	32	37	29	30	30	29	30	26	32	24	26	27	26	34	29	25	25	25	46	63	41	24	25	23	63
16-Feb	31	35	28	29	17	38	43	43	34	70	41	63	76	64	59	38	44	53	27	36	24	21	74	95	95
17-Feb	78	80	77	65	51	69	40	60	26	25	46	26	26	29	38	34	29	84	21	49	47	35	72	58	84
18-Feb	56	93	70	53	51	45	53	78	99	34	34	31	48	30	35	33	30	27	53	57	30	24	19	18	99
19-Feb	21	18	22	18	23	21	24	26	28	38	36	32	52	39	23	21	25	21	21	21	23	22	23	25	52
20-Feb	22	22	23	23	23	23	21	24	23	23	24	34	30	34	30	29	25	17	21	18	14	83	11	22	83
21-Feb	57	46	62	12	19	29	28	38	64	64	54	45	50	33	44	32	27	19	16	13	15	15	12	24	64
22-Feb	20	14	11	22	23	12	8	22	15	29	24	32	26	29	33	24	18	17	19	21	19	48	61	23	61
23-Feb	19	25	20	17	19	24	32	33	29	37	35	32	27	26	25	25	24	28	25	26	28	34	28	23	37
24-Feb	24	28	26	41	37	31	28	23	25	22	24	22	22	22	23	23	24	24	21	24	23	22	22	22	41
25-Feb	50	39	38	25	24	33	40	55	70	36	31	50	52	51	49	59	37	23	13	26	11	18	24	25	70
26-Feb	27	22	21	33	35	27	22	35	22	28	31	26	36	32	29	27	30	74	23	20	20	25	25	23	74
27-Feb	23	22	24	24	23	29	90	31	30	88	50	46	60	43	31	25	24	16	16	17	30	38	60	21	90
28-Feb	17	20	29	30	32	24	23	23	23	31	35	50	49	39	30	58	36	32	23	24	22	22	27	78	78
	78	93	77	65	60	69	90	78	104	89	76	63	79	77	59	59	44	84	53	64	72	83	81	95	

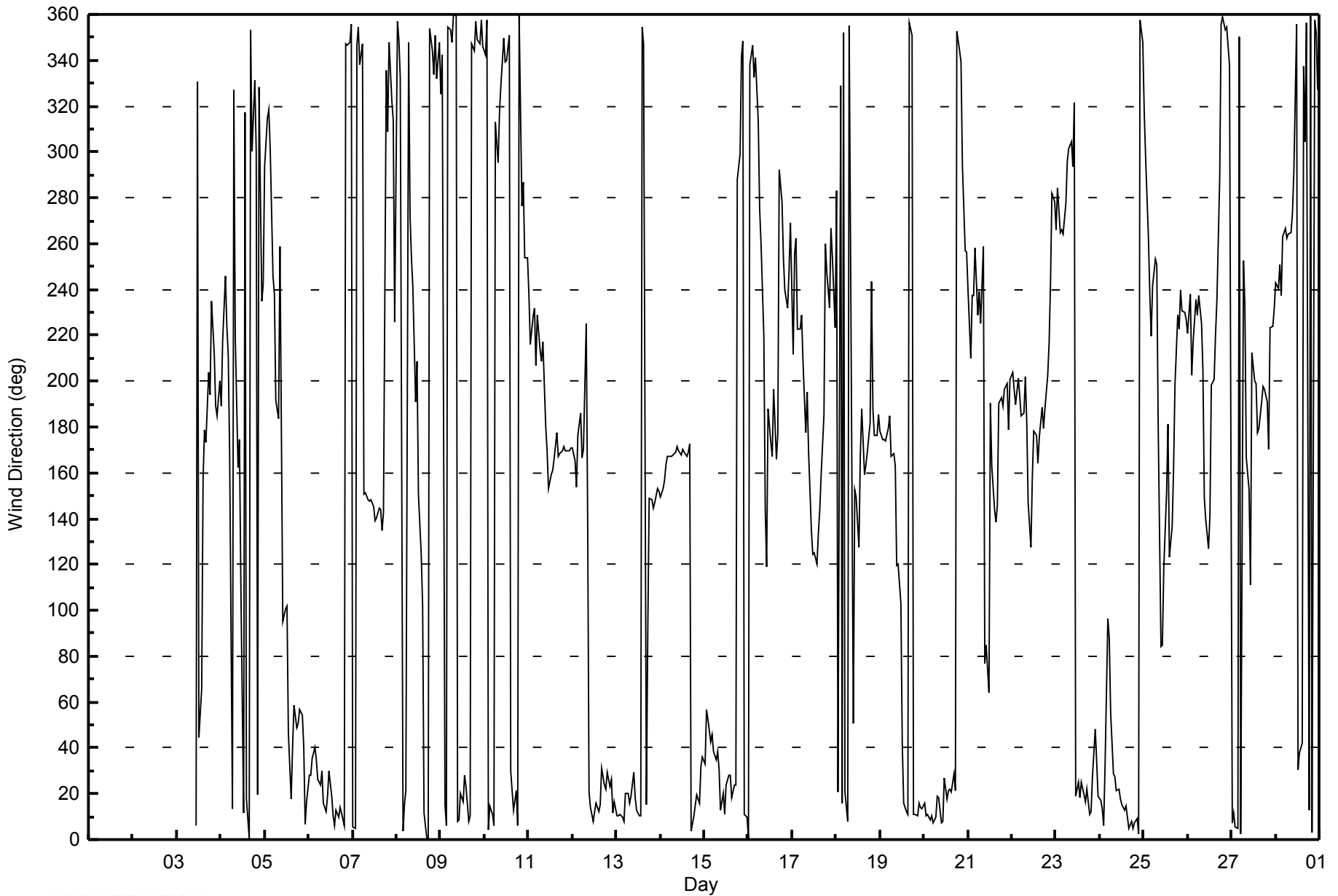
Diurnal Maximum

AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Fort McKay South - February 2015**





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	16:20
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	1377
Cal Gas Concentration	50 ppm	Cal Gas Expiry Date	9/26/2017
Gas Cert Reference	S980455A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	HVPS voltage	512	512
Analyzer Range (ppb)	1000	1000	Lamp voltage	2017	1980
Calculated slope	0.996974	0.998112	Chamber temp.	50.0	50.0
Calculated intercept	1.448323	1.259212	Pressure ("Hg)	26.5	26.3
Analyzer Background	24.2	24.2	Flow (lpm)	693	685
Analyzer Coefficient	1.655	1.757	Intensity	68	67

Analyzer make	API T100	Analyzer serial #	599
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	NA
as found span	5000	78.9	806.4	809.0	0.997
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	70.3	703.0	703.7	0.999
second point	5000	35.1	351.0	349.4	1.005
third point	5000	17.6	176.0	174.5	1.009
calibrator zero					
as left zero	5000	0.0	0.0	-0.2	NA
as left span	5000	78.9	789.0	695.7	NA
Average Correction Factor					1.004

Corrected As found	809.3	Previous response	807.4	% change	-0.2%
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#### Notes:

Cal gas changed after As Finds. Span adjusted, filter changed during As Lefts

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

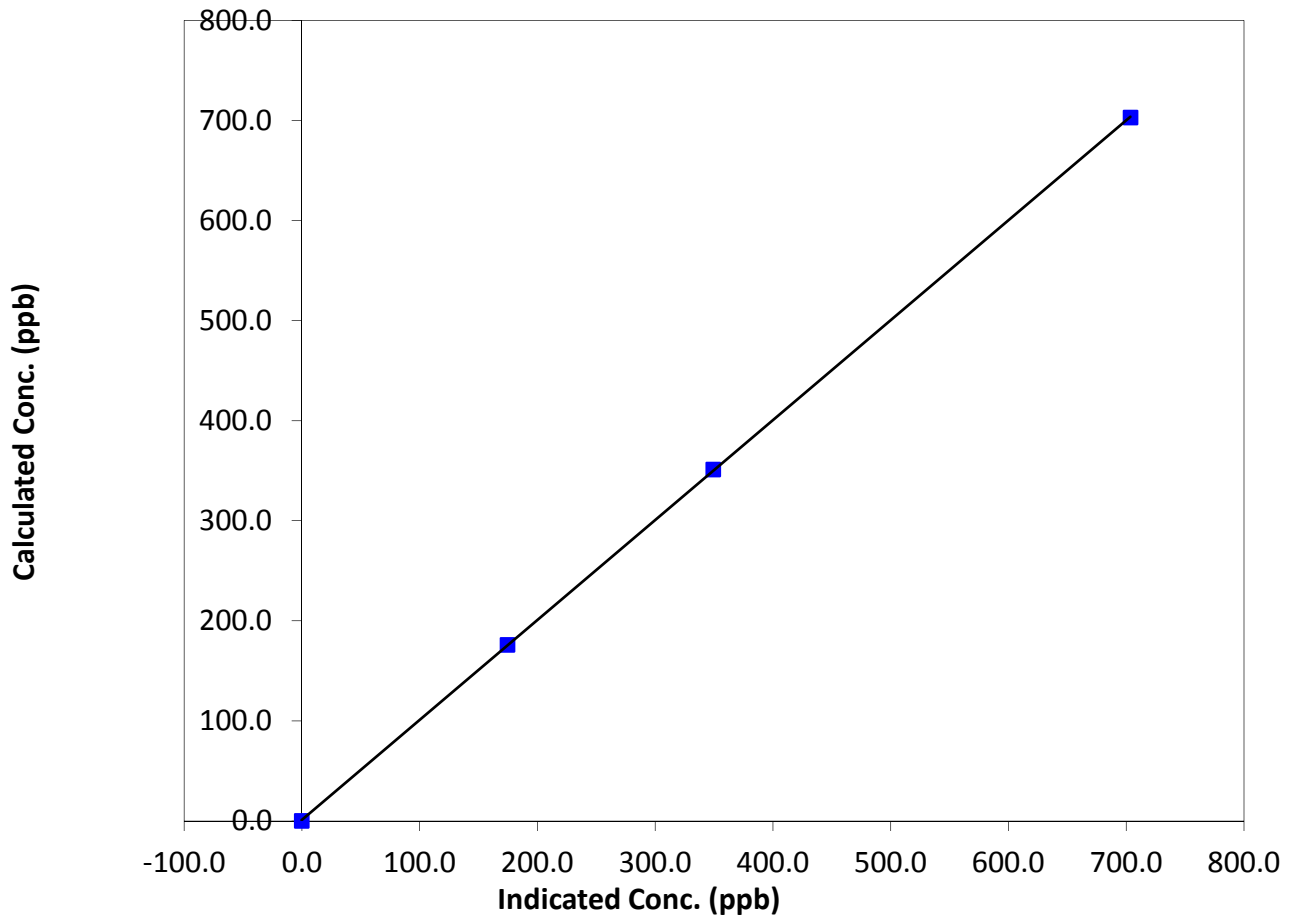
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:50	End Time (MST)	16:20
Analyzer make	API T100	Analyzer serial #	599

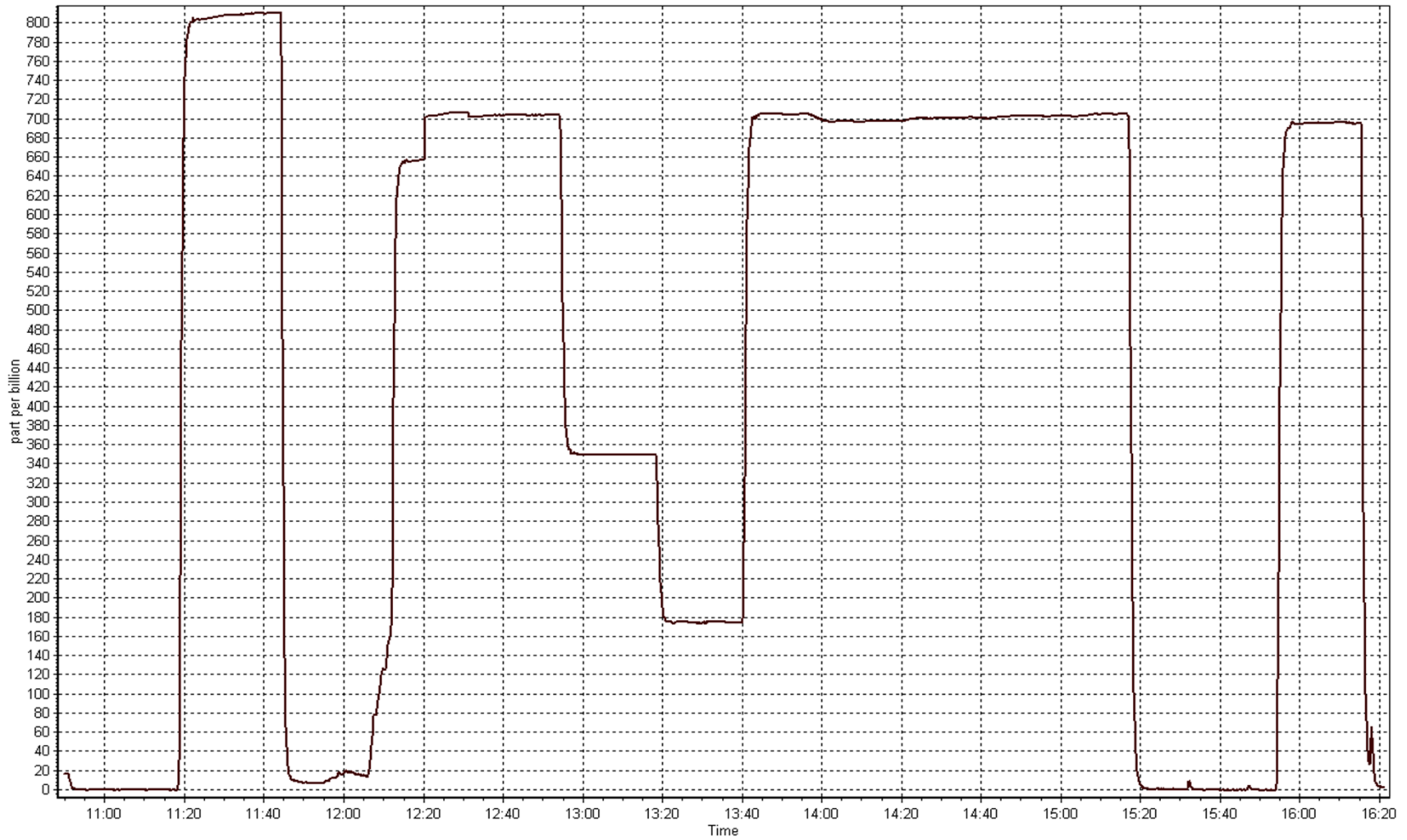
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999990
703.0	703.7	0.9990		
351.0	349.4	1.0047	Slope	0.998112
176.0	174.5	1.0087		
			Intercept	1.259212

**SO<sub>2</sub> Calibration Curve**









# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 17, 2015	Previous Calibration	January 21, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	11:20	End Time (MST)	13:55
Barometric Pressure	743 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	11041107
Cal Gas Concentration	5.07 ppm H2S	Cal Gas Expiry Date	5/30/2013
Gas Cert Reference	CC178364	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-727	-727
Analyzer Range (input)	100	100	Lamp voltage	1010	1010
Calculated slope	0.999582	1.000445	Chamber temp.	45	45
Calculated intercept	0.314987	0.195016	Pressure	683.2	695.6
Analyzer Background	1.84	1.82	Flow	0.442	0.447
Analyzer Coefficient	1.044	1.044	Intensity	90	90
			Converter temp.	800	800

Analyzer make/model	TEI 43i-TLE	Analyzer serial #	1218153359
Converter make/model	CDN-101	Converter serial #	456

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	NA
as found span	5000	78.9	80.0	79.9	1.002
SO2 scrubber check	5000	39.4	402.7	0.7	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	78.9	80.0	79.9	1.002
second point	5000	39.4	40.0	39.7	1.006
third point	5000	19.7	20.0	19.5	1.023
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	78.9	80.0	80.2	0.998
Average Correction Factor					1.010

Corrected As found      79.8      Previous response      79.7      % change      -0.1%

#### Notes:

As found zero used as calibrator zero. Scrubber check after third point, filter changed during as lefts

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

## TRS Calibration Summary

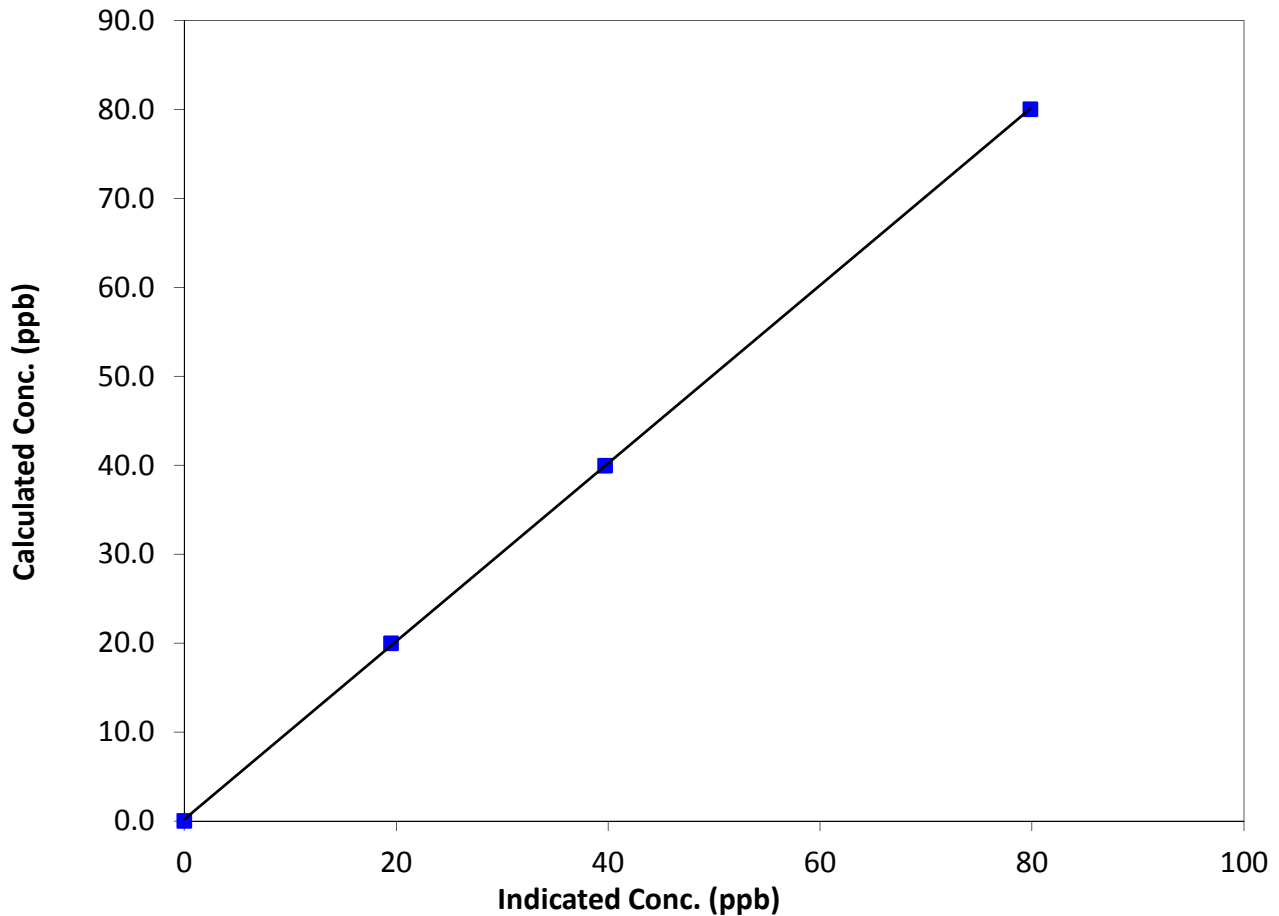
### Station Information

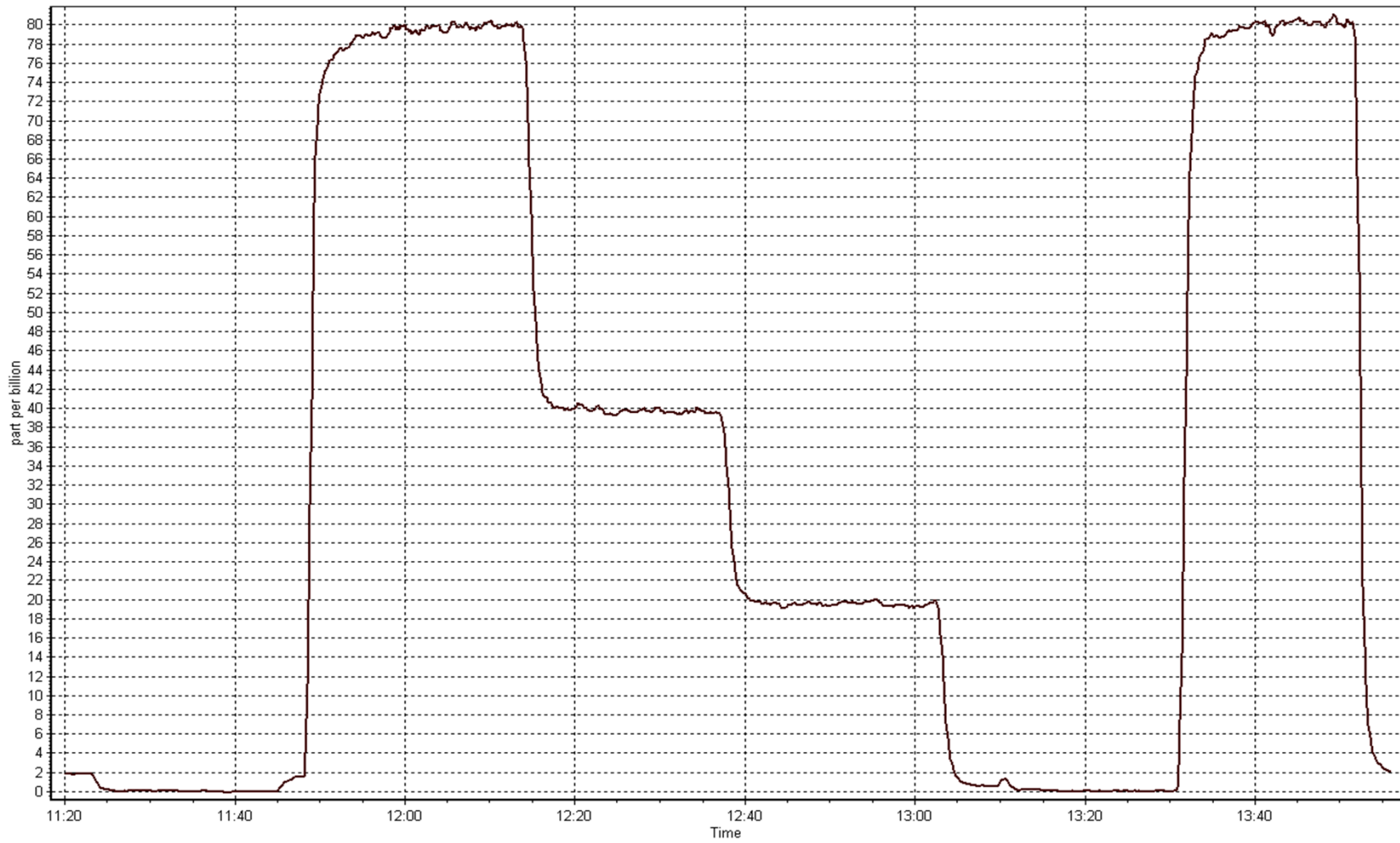
Calibration Date	February 17, 2015	Previous Calibration	January 21, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	11:20	End Time (MST)	13:55
Analyzer make	TEI 43i-TLE	Analyzer serial #	1218153359

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999968
80.0	79.9	1.0019		
40.0	39.7	1.0061	Slope	1.000445
20.0	19.5	1.0234		
			Intercept	0.195016

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Wednesday, February 18, 2015	Previous Calibration	Tuesday, January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	16:20
Barometric Pressure	729 mmHg	Station temp.	24 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
Gas Cert Reference	S980455A	Cal Gas Expiry Date	9/26/2017
CH4 Cal Gas Conc.	497 ppm	CH4 Equiv Conc.	1033.3 ppm
C3H8 Cal Gas Conc.	195 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.0	8.0
Analyzer Range (mv)	25	25	Air or Bypass press	42.4	42.4
Calculated slope	0.999996	0.997918	Fuel Pressure	22.6	22.6
Calculated intercept	-0.008073	0.030181	Flame Temp	161.3	161.0
BKG	2.3	2.28			
COEF	4.863	4.776			

Analyzer make: Thermo Model 51iLT      Analyzer serial #: 1236656114

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	N/A
as found span	5000	78.9	16.98	17.02	0.998
calibrator zero	5000	0.0	0.00	0.01	N/A
high point	5000	70.3	14.53	14.54	0.999
second point	5000	35.1	7.25	7.24	1.002
third point	5000	17.6	3.64	3.56	1.022
calibrator zero					
as left zero	5000	0.0	0.00	-0.02	N/A
as left span	5000	70.3	14.53	14.77	0.984
Average Correction Factor					1.008

Corrected As found: 17.01      Previous response: 16.99      % change: -0.1%

#### Notes:

Cal gas changed after As Finds. Span adjusted, filter changed during As Lefts

Calibration Performed By: Ryan Power



# Wood Buffalo Environmental Association

## THC Calibration Summary

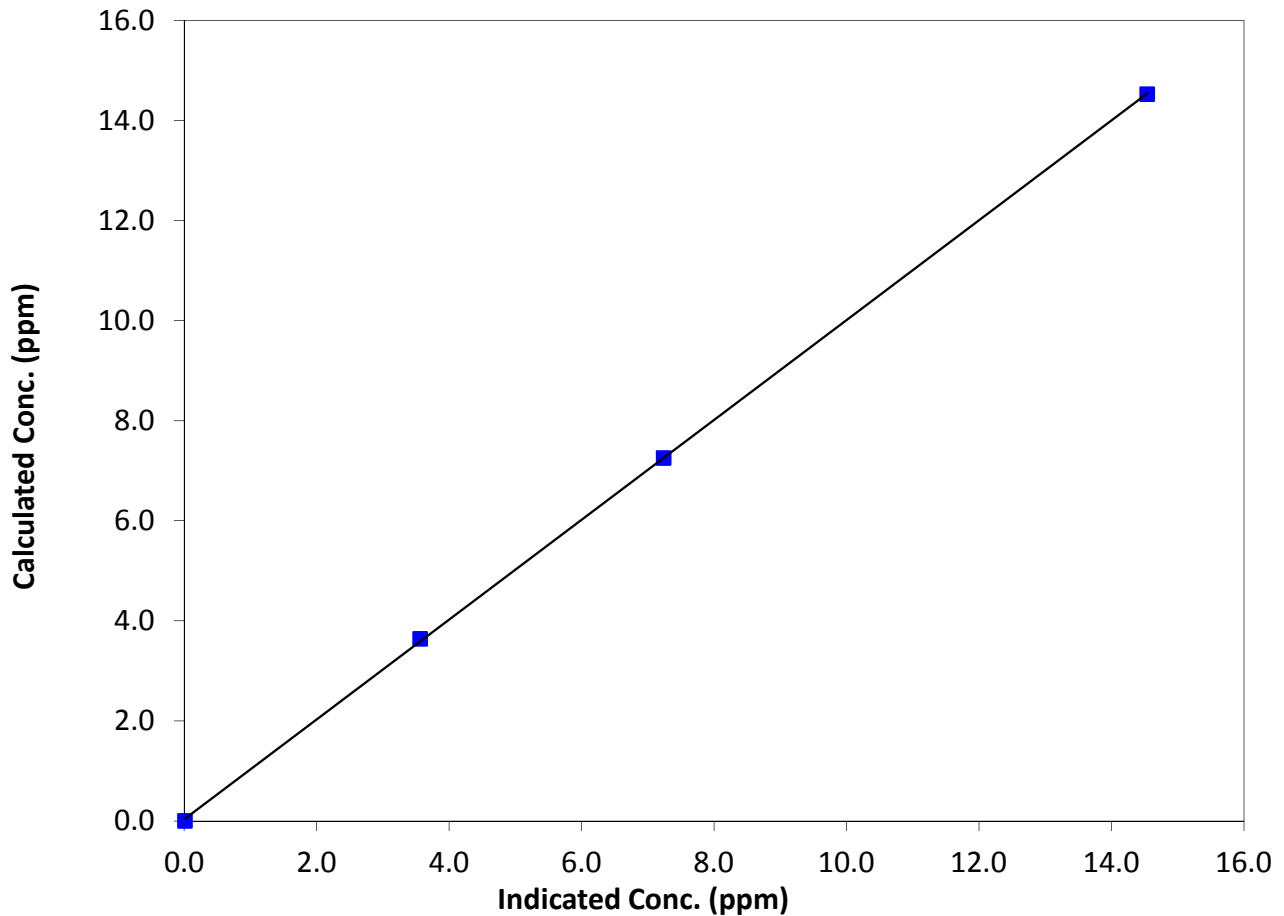
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:50	End Time (MST)	16:20
Analyzer make	Thermo Model 51iLT	Analyzer serial #	1236656114

### Calibration Data

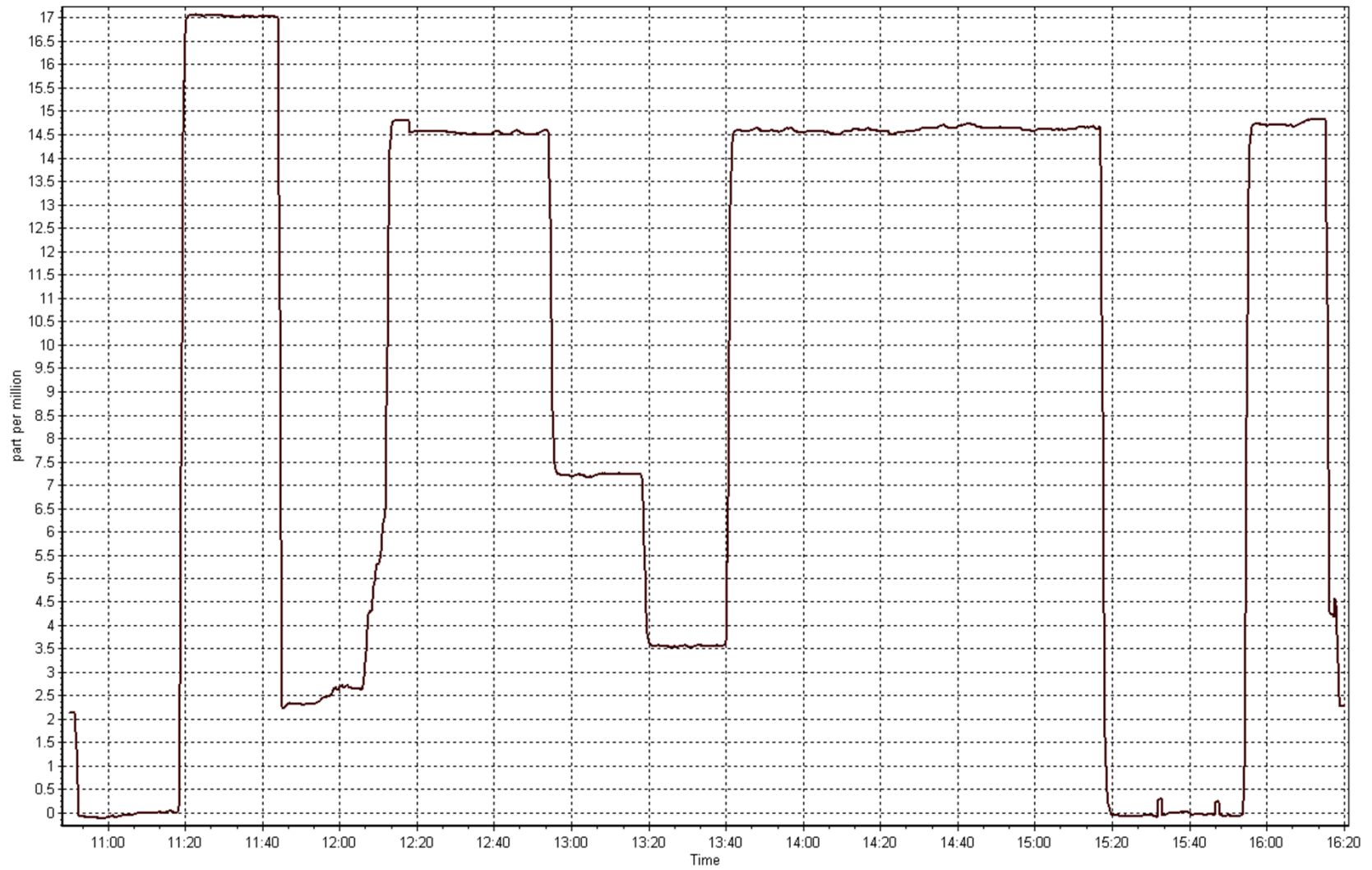
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.01	N/A	Correlation Coefficient	0.999959
14.53	14.54	0.9991		
7.25	7.24	1.0019	Slope	0.997918
3.64	3.56	1.0216		
			Intercept	0.030181

### THC Calibration Curve



THC Calibration Plot

Date: February 18, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 19, 2015	Previous Calibration	January 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	13:28
Barometric Pressure	728 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11041107
NO2 calibration used	Thursday, February 19, 2015	Transfer Standard	??
DACS make/model	Campbell Scientific CR3000	DACS serial No.	1850
DACS voltage range	0-5v	DACS channel #	

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	26.6	25.6
Analyzer Range (input)	500	500	Lamp temp.	58.0	58.0
Calculated slope	1.003077	0.996651	Pressure ("Hg)	26.0	26.3
Calculated intercept	-0.338877	-0.634510	Flow cell A	727	738
Analyzer Background	-0.3	-0.1			
Analyzer Coefficient	1.061	0.997			

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	N/A
as found span	5000	0.903	321.8	349.7	0.920
calibrator zero	5000	0.000	0.0	-0.1	N/A
high point	5000	0.903	321.8	322.9	0.997
second point	5000	0.585	191.4	193.4	0.990
third point	5000	0.358	100.8	102.4	0.984
calibrator zero					
as left zero	5000	0.00	0.0	0.1	N/A
as left span	5000	0.903	357.0	337.0	N/A
Average Correction Factor					0.990

Corrected As found	349.4	Previous response	321.2	% change	-8.1%
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#### Notes:

Slight adjustment to zero, span with a bigger adjustment. New cal gas for NO calibration changed values accounting for large % change.

Calibration Performed By:

Ryan Power





# Wood Buffalo Environmental Association

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

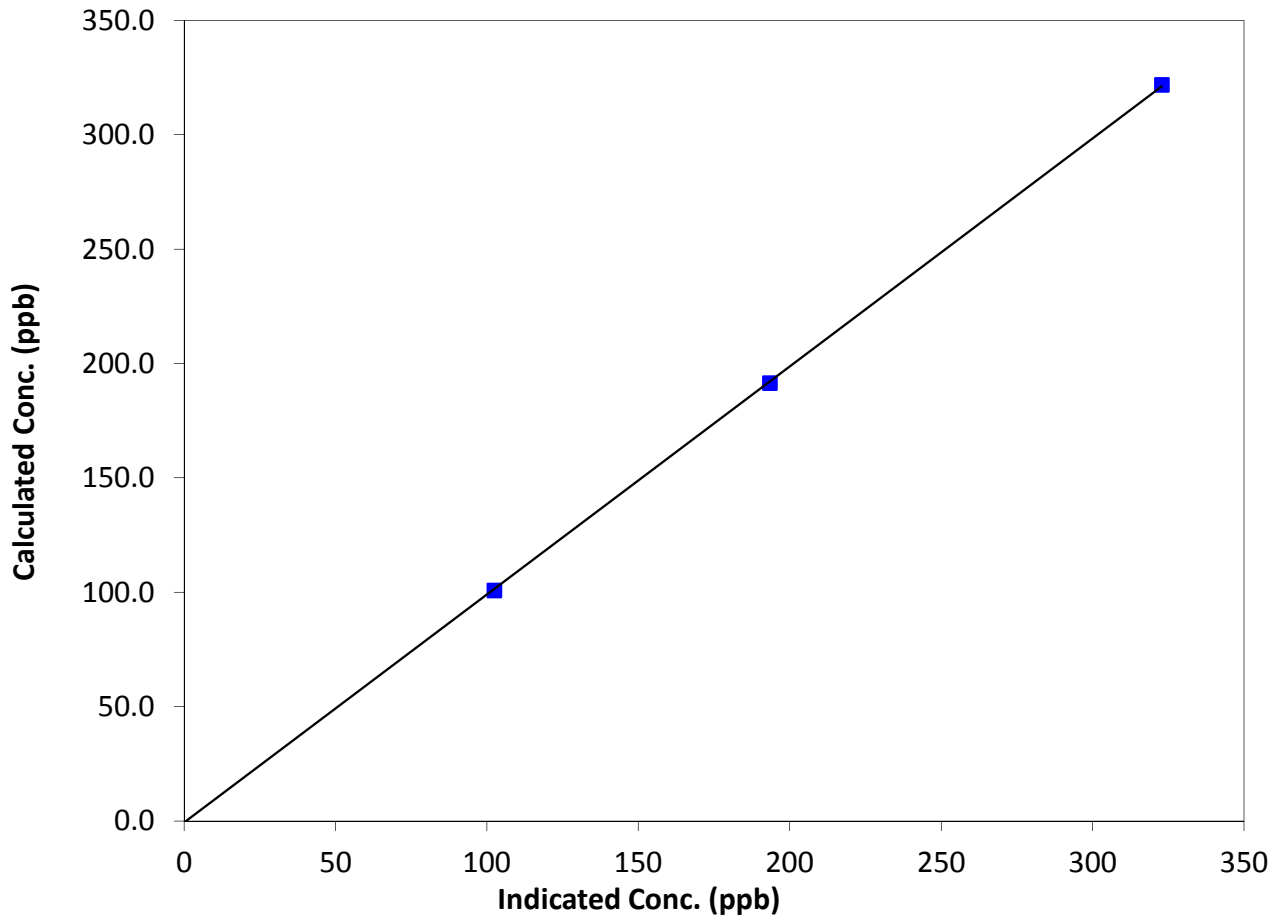
### Station Information

Calibration Date	Thursday, February 19, 2015	Previous Calibration	January 22, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:10	End Time (MST)	13:28
Analyzer make	API T400	Analyzer serial #	825

### Calibration Data

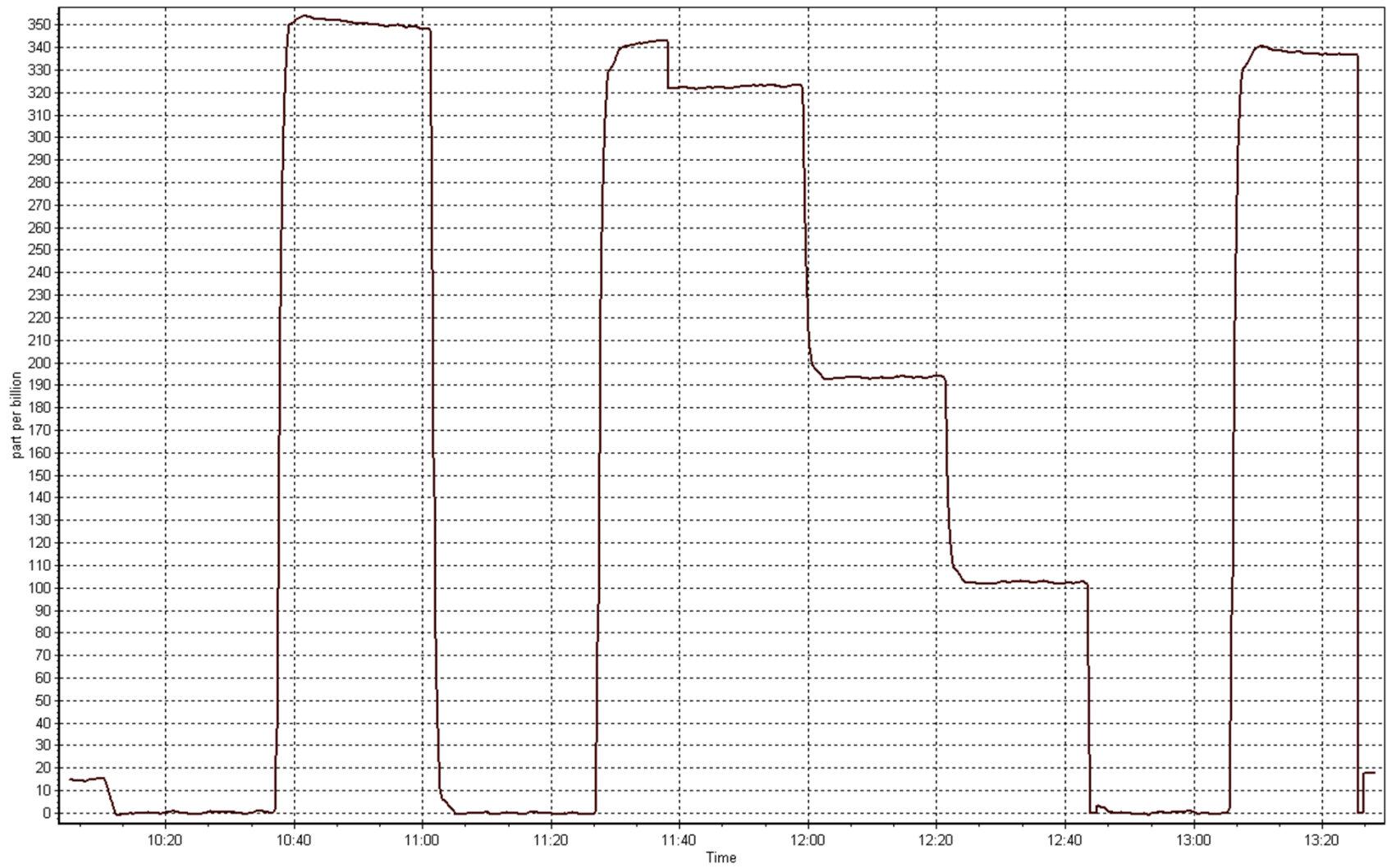
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999966
321.8	322.9	0.9967		
191.4	193.4	0.9896	Slope	0.996651
100.8	102.4	0.9842		
			Intercept	-0.634510

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: February 19, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:50	End Time (MST)	16:20
Barometric Pressure	729 mmHg	Station Temperature	24.0 Deg C
Calibrator	Sabio 4010	Serial Number	11041107
NO Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	September 26, 2017
NOx Cal Gas Conc	56.9 ppm	Cal Gas Serial #	S980455A

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 1850

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998710	1.000686	0.992827
	Data Offset	1.049003	0.955786	-0.631626
After	Data Slope	0.998498	0.999677	0.997091
	Data Offset	1.017311	0.960178	0.077691
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model Thermo 42i      Analyzer serial # 1410661329

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.830	ppb	0.757	ppb
NOX coefficient	1.001	ppb	0.998	ppb
NO2 coefficient	0.998	ppb	0.998	ppb
NO bkgrnd	7.2		6.5	
NOX bkgrnd	7.3		6.7	
Nt coefficient	na		na	
Chamber Temp	50.2	Deg C	50.2	Deg C
Moly Temp	323.0	Deg C	328.0	Deg C
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	192.9	mmHg	191.9	mmHg
Sample Flow	0.846	ccm	0.840	ccm

**Notes:**

Cal gas changed after As Founds. Span adjusted, filter changed during As Lefts



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 18, 2015

Station Number:

AMS 13

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as found span	5000	78.9	801.6	800.0	1.6	800.9	797.9	3.0	1.0009	1.0027
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
high point	5000	70.3	800.0	800.0	0.0	800.8	799.9	0.9	0.9990	1.0002
second point	5000	35.1	399.4	399.4	0.0	398.1	397.8	0.4	1.0033	1.0042
third point	5000	17.6	200.3	200.3	0.0	198.9	198.8	0.2	1.0069	1.0077
calibrator zero	5000	0.0	0.0	0.0	0.0					
as left zero	5000	0.0	0.0	0.0	0.0	0.1	0.0	0.0	N/A	N/A
as left span	5000	78.9	897.9	478.9	419.0	808.3	478.0	330.3	1.1109	1.0019
Average Correction Factor									1.0031	1.0040

Corrected As found

NO<sub>x</sub>= 801.0

NO= 798.0

Percent Change

NO<sub>x</sub>= 0.1%

NO= 0.1%

Previous Response

NO<sub>x</sub>= 801.6

NO= 798.5

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

70.30

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			N/A	
1st NO <sub>2</sub> (350)	N/A	478.9	321.8	801.7	478.9	322.8	0.9841	1.0000	0.9971	100.3%
2nd NO <sub>2</sub> (200)	N/A	609.3	191.4	801.1	609.3	191.8	0.9848	1.0000	0.9982	100.2%
3rd NO <sub>2</sub> (100)	N/A	699.9	100.8	800.9	699.9	101.0	0.9851	1.0000	0.9982	100.2%
4th NO <sub>2</sub> (0)	800.7	N/A	0.7	801.4	800.7	0.7	0.9844	1.0000	N/A	N/A
Average Correction Factor							0.9846	1.0000	0.9978	100.2%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

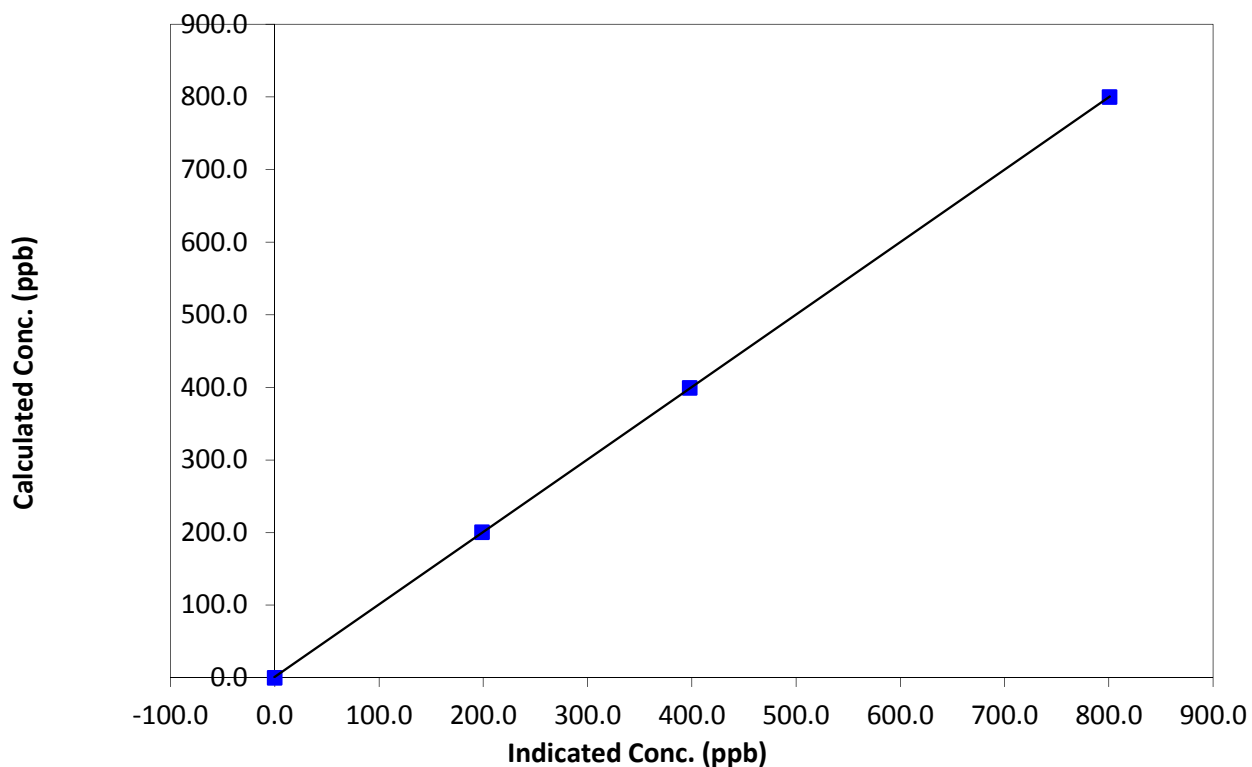
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:50	End Time (MST)	16:20
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999993
800.0	800.8	0.9990		
399.4	398.1	1.0033	Slope	0.998498
200.3	198.9	1.0069		
0.0			Intercept	1.017311

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

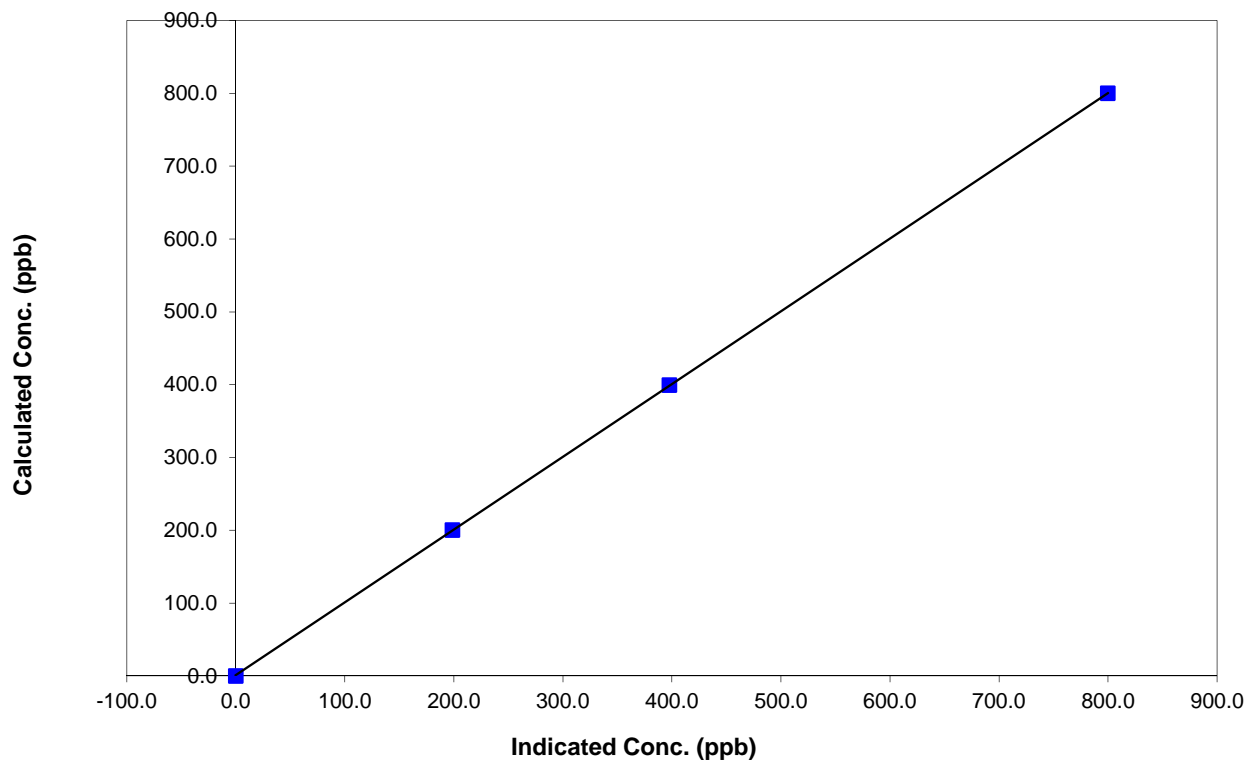
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:50	End Time (MST)	16:20
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
800.0	799.9	1.0002		
399.4	397.8	1.0042	Slope	0.999677
200.3	198.8	1.0077		
0.0			Intercept	0.960178

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

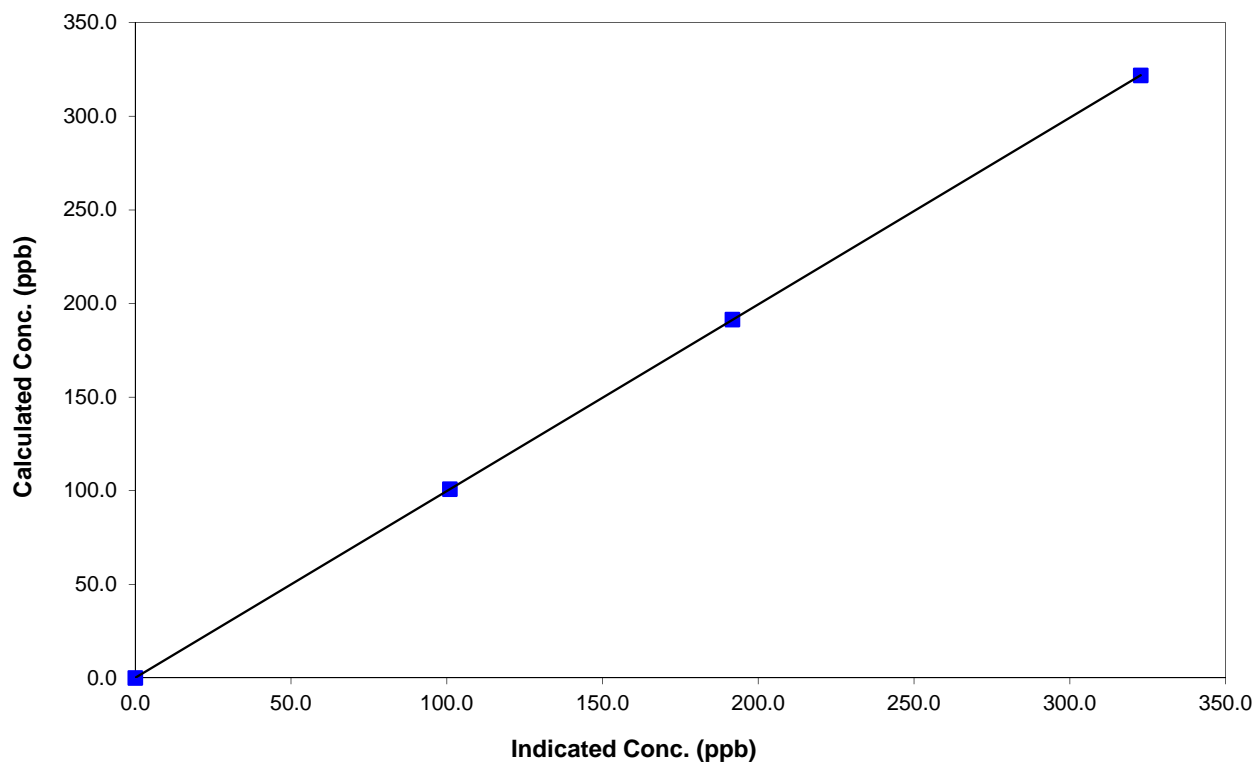
### Station Information

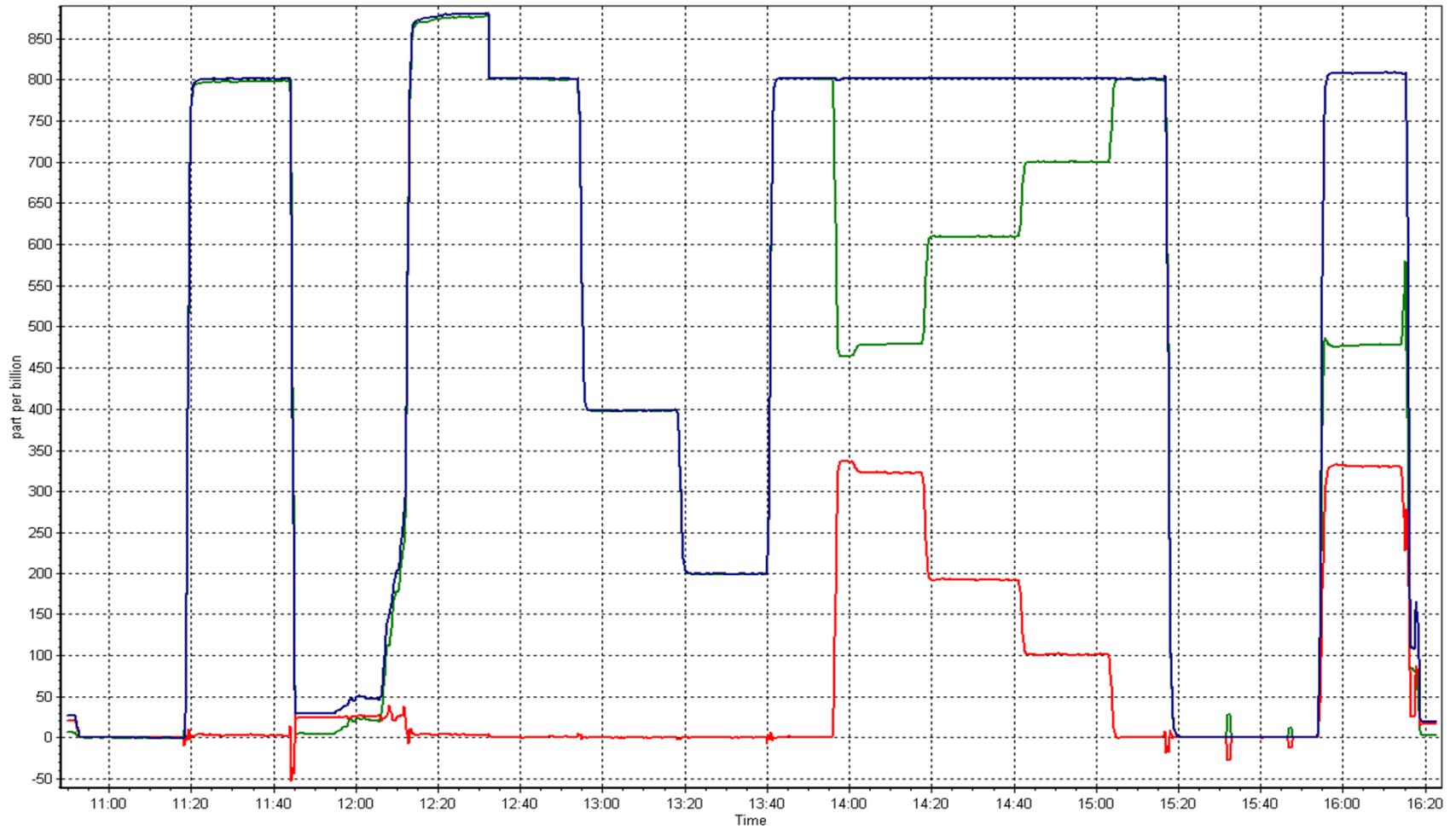
Calibration Date	February 18, 2015	Previous Calibration	January 20, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:50	End Time (MST)	16:20
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999999
321.8	322.8	0.9971		
191.4	191.8	0.9982	Slope	0.997091
100.8	101.0	0.9982		
			Intercept	0.077691

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









# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Reason:	Routine		
Start Time (MST)	10:25	End Time (MST)	16:30
Barometric Pressure	729 mmHg	Station Temperature	24.0 Deg C
Calibrator	Sabio 4010	Serial Number	11041107
NO Cal Gas Conc	56.9 ppm	Cal Gas Expiry Date	September 26, 2017
NOx Cal Gas Conc	56.9 ppm	Cal Gas Serial #	S980455A

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 1850

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998498	0.999677	0.997091
	Data Offset	1.017311	0.960178	0.077691
After	Data Slope	0.998199	0.999546	0.994980
	Data Offset	1.196872	1.170764	-1.770788
Channel #		3	2	1
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model Thermo 42i      Analyzer serial # 1410661329

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.757	ppb	0.713	ppb
NOx coefficient	0.998	ppb	0.999	ppb
NO2 coefficient	0.998	ppb	0.998	ppb
NO bkgrnd	6.5		6.3	
NOx bkgrnd	6.7		6.4	
Nt coefficient	na		na	
Chamber Temp	50.2	Deg C	50.5	Deg C
Moly Temp	328.0	Deg C	325.5	Deg C
PMT Temp	-3.0	Deg C	-2.8	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	191.9	mmHg	180.0	mmHg
Sample Flow	0.840	ccm	0.911	ccm

**Notes:**

Pump change after As Found. Found damaged line to pump, causing span drop over the past few nights.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 24, 2015

Station Number:

AMS 13

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.1	-0.1	N/A	N/A
as found span	5000	78.9	801.6	800.0	1.6	713.2	712.1	1.2	1.1239	1.1235
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
high point	5000	70.3	800.0	800.0	0.0	800.9	799.9	1.0	0.9990	1.0002
second point	5000	35.1	399.4	399.4	0.0	398.2	397.6	0.7	1.0030	1.0047
third point	5000	17.6	200.3	200.3	0.0	198.5	198.4	0.1	1.0090	1.0097
calibrator zero	5000	0.0	0.0	0.0	0.0					
as left zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as left span	5000	78.9	897.9	477.6	420.3	825.4	481.1	344.3	1.0878	0.9926
Average Correction Factor									1.0036	1.0049

Corrected As found

NO<sub>x</sub>= 713.4

NO= 712.1

Percent Change

NO<sub>x</sub>= 12.4%

NO= 12.2%

Previous Response

NO<sub>x</sub>= 801.8

NO= 799.3

### GPT Calibration Data

Dilution Flow

5000

ccm

Source Gas Flow

70.30

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			N/A	
1st NO <sub>2</sub> (350)	N/A	477.6	324.3	804.2	477.6	326.7	0.9810	1.0000	0.9929	100.7%
2nd NO <sub>2</sub> (200)	N/A	610.2	191.7	805.3	610.2	195.1	0.9797	1.0000	0.9827	101.8%
3rd NO <sub>2</sub> (100)	N/A	703.3	98.6	806.4	703.3	103.2	0.9783	1.0000	0.9559	104.6%
4th NO <sub>2</sub> (0)	801.9	N/A	1.2	803.1	801.9	1.2	0.9824	1.0000	N/A	N/A
Average Correction Factor							0.9803	1.0000	0.9772	102.4%

Calibration Performed By:

Ryan Power



# Wood Buffalo Environmental Association

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

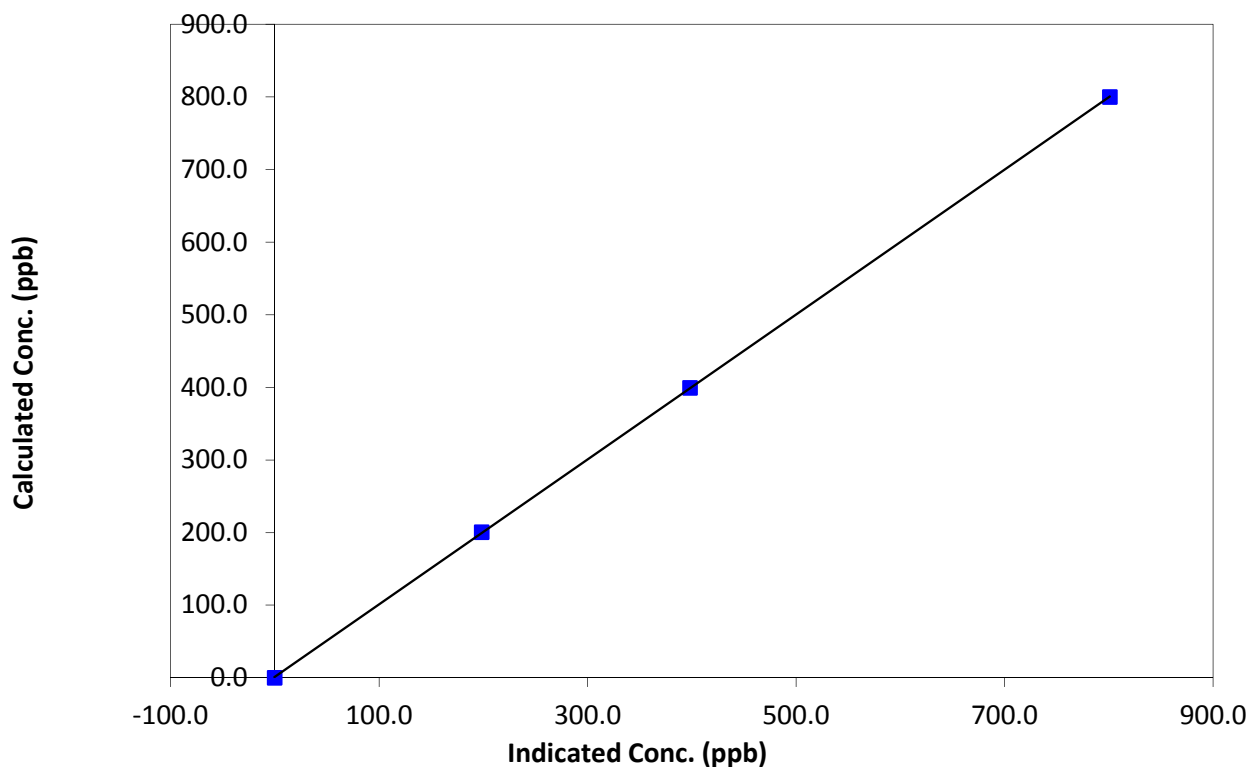
### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:25	End Time (MST)	16:30
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999992
800.0	800.9	0.9990		
399.4	398.2	1.0030	Slope	0.998199
200.3	198.5	1.0090		
0.0			Intercept	1.196872

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

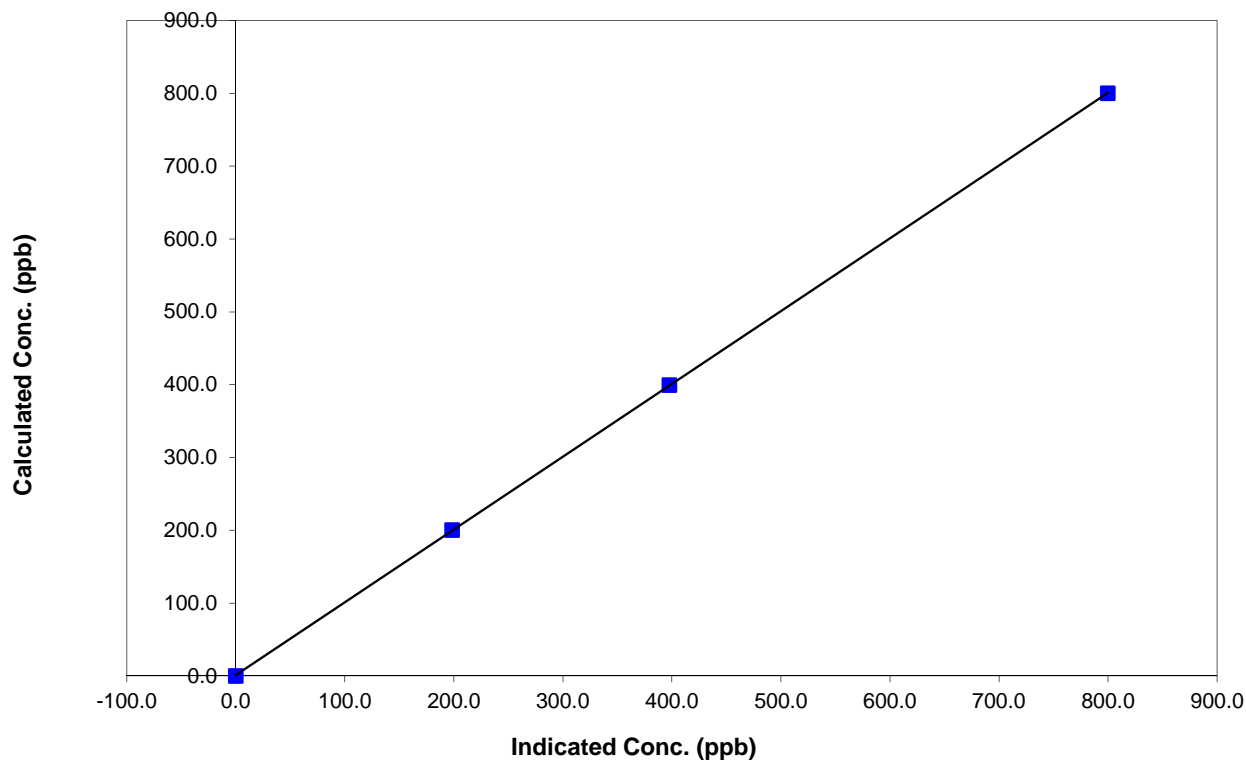
### Station Information

Calibration Date	February 24, 2015	Previous Calibration	February 18, 2015
Station Name	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:25	End Time (MST)	16:30
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999991
800.0	799.9	1.0002		
399.4	397.6	1.0047	Slope	0.999546
200.3	198.4	1.0097		
			Intercept	1.170764

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

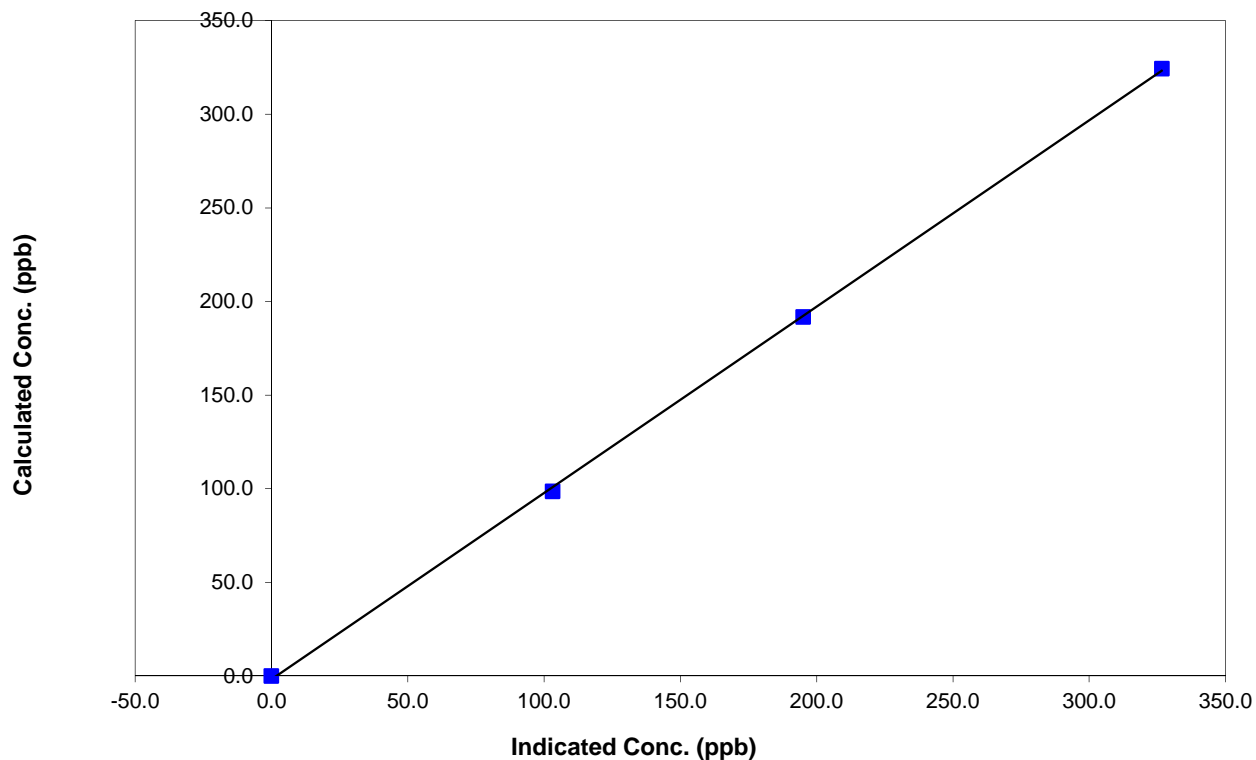
### Station Information

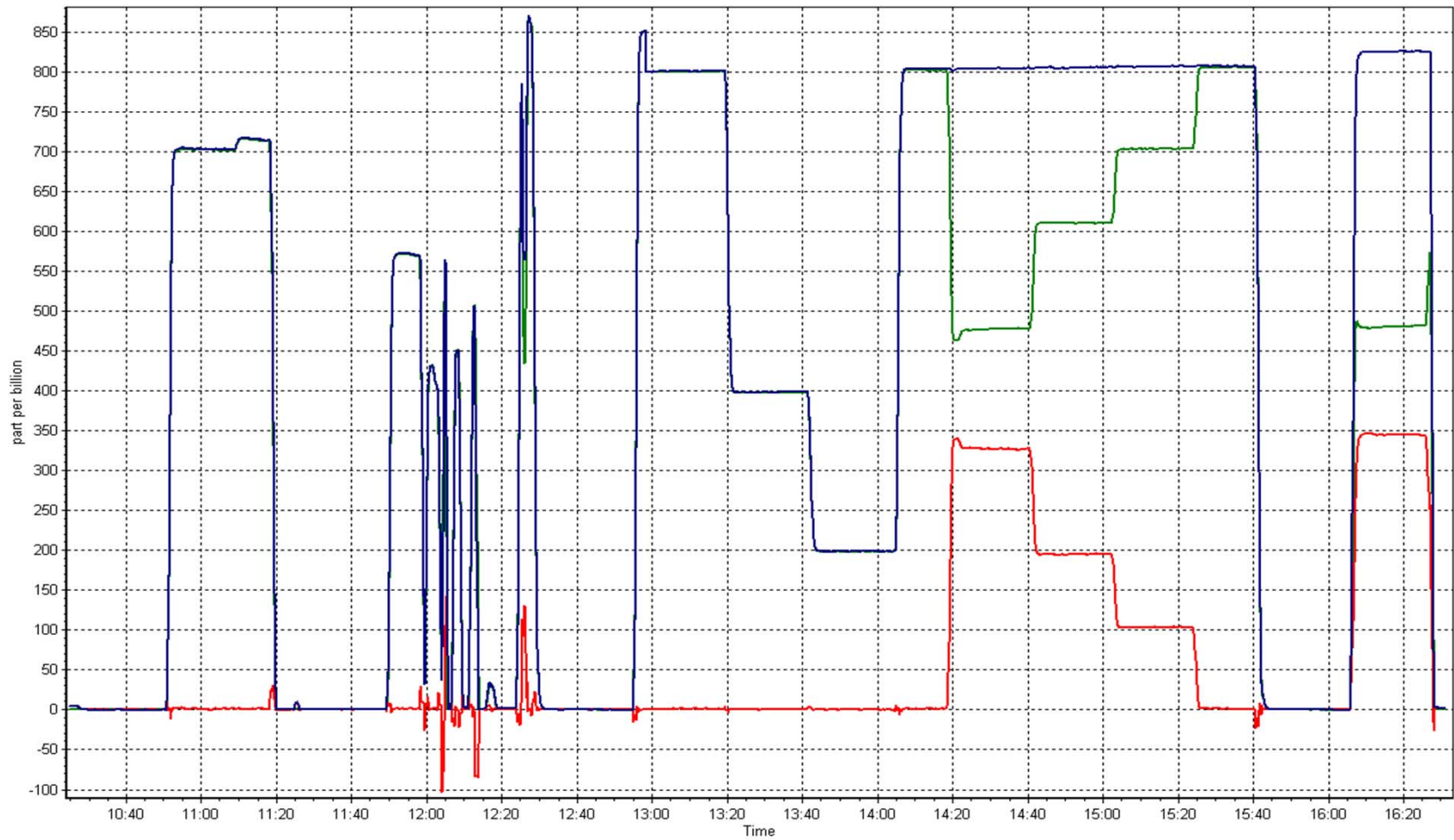
Calibration Date	February 24, 2015	Previous Calibration	February 18, 2015
Station Number	Fort McKay South	Station Number	AMS 13
Start Time (MST)	10:25	End Time (MST)	16:30
Analyzer make	Thermo 42i	Analyzer serial #	1410661329

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999826
324.3	326.7	0.9929		
191.7	195.1	0.9827	Slope	0.994980
98.6	103.2	0.9559		
			Intercept	-1.770788

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 14  
ANZAC  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
 FEBRUARY 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	612	34	60	96.13	12	0	2	0
TRS(ppb) Average	641	31	31	100.00	2	0	0	0
THC(ppm) Average	635	33	37	99.40	2.5	-	2.1	-
NMHC(ppm) Average	635	33	37	99.40	0.165	-	0.035	-
CH4(ppm) Average	635	33	37	99.40	2.5	-	2.1	-
NO2(ppb) Average	639	33	33	100.00	27	0	9	-
NO(ppb) Average	639	33	33	100.00	48	-	4	-
NOX(ppb) Average	639	33	33	100.00	62	-	12	-
O3(ppb) Average	640	32	32	100.00	45	0	40	-
PM2.5(ug/m3) Average	671	0	1	99.85	19.4	-	7.8	0
Temperature 2 m (C) Average	672	0	0	100.00	2.8	-	-2	-
Relative Humidity (%) Average	672	0	0	100.00	94	-	88	-
Surface Wetness (% of range) Average	672	0	0	100.00	35	-	3	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	21	-	13	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-
Precipitation (mm) Total	672	0	0	100.00	1.5	-	6.9	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
 FEBRUARY 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	612	0.9	1	-	0	0	0	0	1	2	12
TRS(ppb) Average	641	0.3	0	-	0	0	0	0	0	0	2
THC(ppm) Average	635	1.9	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.5
NMHC (ppm) Average	635	0.003	0.013	-	0	0	0	0	0	0	0.165
CH4(ppm) Average	635	1.89	0.1	-	1.8	1.8	1.9	1.9	1.9	2	2.5
NO2(ppb) Average	639	4.2	4	-	0	0	1	3	6	9	27
NO(ppb) Average	639	0.9	3	-	0	0	0	0	1	2	48
NOX(ppb) Average	639	5.1	6	-	0	0	1	3	7	11	62
O3(ppb) Average	640	30.8	7	-	2	21	27	32	36	39	45
PM2.5(ug/m3) Average	671	3.97	2.5	-	0.7	1.7	2.3	3.3	4.8	6.9	19.4
Temperature 2 m (C) Average	672	-16.21	7.2	-	-35.8	-24.5	-21.4	-17.1	-11.5	-6.4	2.8
Relative Humidity (%) Average	672	76.2	9	-	37	65	72	78	81	85	94
Surface Wetness (% of range) Average	672	0.1	2	-	0	0	0	0	0	0	35
Wind Speed 20 m (km/h) Average	672	8.5	4	-	0	4	6	8	11	13	21
Wind Direction 20 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	672	-	-	13.97	0	0	0	0	0	0	1.5

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - ANZAC (AMS 14)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Feb 2015 03:00	28 Feb 2015 06:00	26	Stabilization after daily span
CH4, NMHC, THC	09 Feb 2015 14:00	09 Feb 2015 14:00	1	Maintenance - replace hydrogen cylinder
CH4, NMHC, THC	17 Feb 2015 07:00	17 Feb 2015 07:00	1	Intermittent unstable operation - excessive baseline drift
CH4, NMHC, THC	26 Feb 2015 11:00	26 Feb 2015 12:00	2	Maintenance - replace nitrogen cylinder
PM2.5	05 Feb 2015 13:00	05 Feb 2015 13:00	1	Maintenance - Flow and zero check, sample head cleaning

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Summary of Hour Averages

Anzac - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 12 ppb on Feb 15 17:00	Maximum Daily Average: 1.9 ppb on Feb 21
Minimum Value: 0 ppb on Feb 5 09:00	Hours of Data: 612
Maximum Diurnal Average: 2.0 ppb at hour 17	Hours of Missing Data: 60
Monthly Average: 0.9 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.1 ppb on Feb 24	Percent Operational Time: 96.1
Minimum Diurnal Average: 0.3 ppb at hour 2	
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> =7	

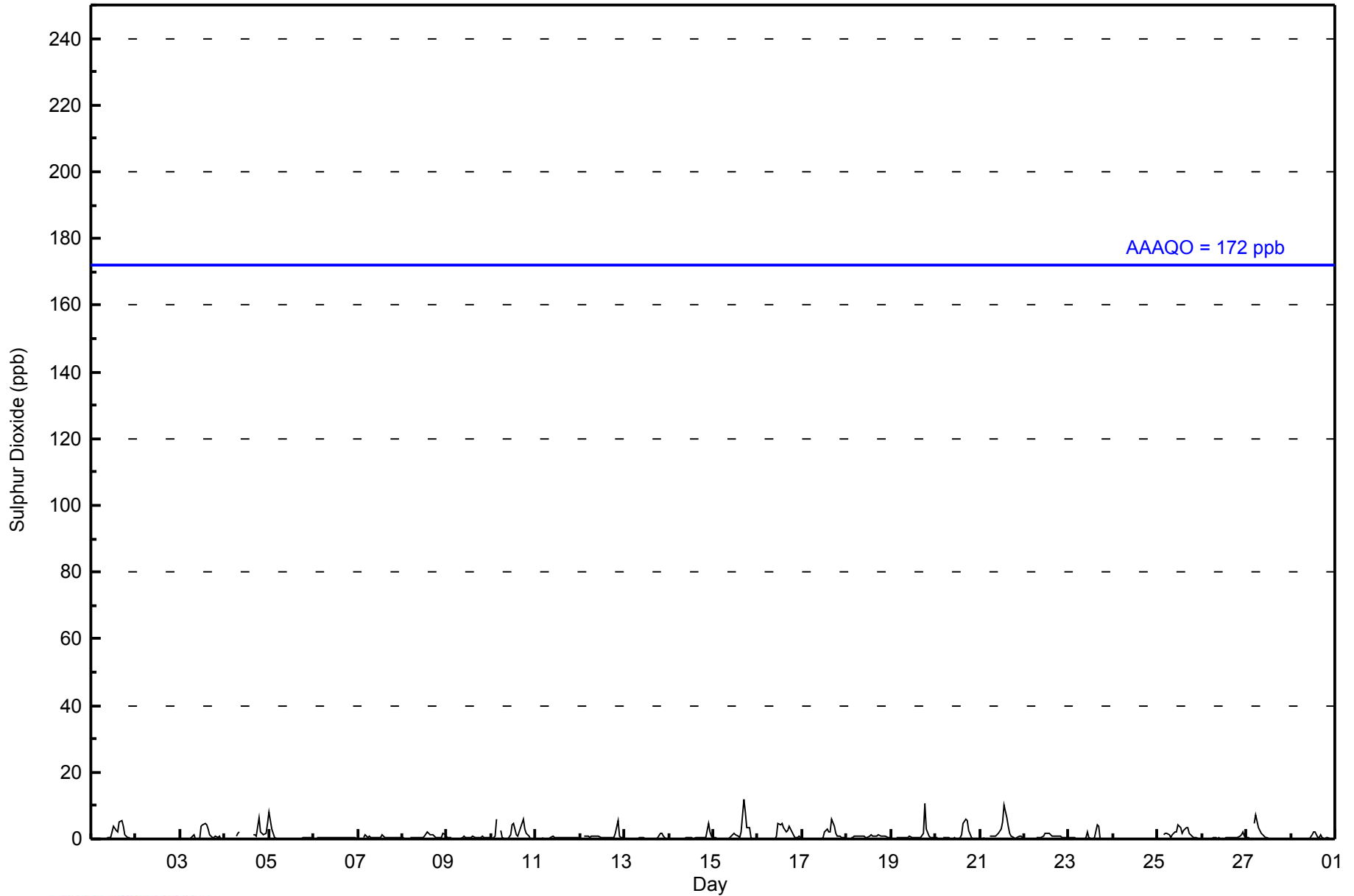
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	Z	RE	0	0	0	0	0	0	0	0	2	4	3	2	5	6	4	1	1	0	0	0	0	1.4	6
2-Feb	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
3-Feb	0	0	0	Z	RE	0	0	1	0	0	0	4	4	4	4	3	1	0	0	1	1	1	0	0	1.2	4
4-Feb	0	0	0	0	Z	RE	1	2	2	C	C	C	C	C	C	1	1	1	6	2	2	1	2	5	--	6
5-Feb	8	3	2	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.7	8
6-Feb	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
7-Feb	0	Z	RE	1	1	1	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0.5	1
8-Feb	0	0	Z	RE	0	0	0	0	0	0	0	0	1	2	2	1	1	1	0	0	0	0	2	1	0.7	2
9-Feb	0	0	0	Z	RE	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0.4	1
10-Feb	0	0	1	6	Z	3	0	0	0	0	1	4	5	1	1	2	4	6	3	2	1	0	0	0	1.7	6
11-Feb	0	0	0	0	0	Z	RE	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
12-Feb	Z	RE	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2	5	1	0	0	0.8	5
13-Feb	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0.3	2
14-Feb	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	1	0.5	5
15-Feb	0	0	0	Z	RE	0	0	0	0	0	1	2	1	1	0	2	12	8	3	3	0	0	0	0	1.7	12
16-Feb	0	0	0	0	Z	RE	0	0	0	0	1	5	4	5	3	2	3	4	2	1	0	1	1	0	1.5	5
17-Feb	0	0	0	0	0	Z	RE	0	0	0	0	0	2	3	2	2	6	4	2	1	1	0	1	1	1.1	6
18-Feb	Z	RE	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0.8	1
19-Feb	0	Z	RE	0	0	0	0	0	0	1	1	1	1	1	1	0	0	2	11	3	1	1	0	0	1.1	11
20-Feb	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	1	5	6	6	3	0	0	0	0	0	1.1	6
21-Feb	0	0	0	Z	RE	1	1	1	1	1	2	3	5	10	6	4	2	1	1	0	1	1	1	0	1.9	10
22-Feb	0	0	0	0	Z	RE	0	0	0	1	1	2	2	2	1	1	1	1	1	1	1	1	0	0	0.7	2
23-Feb	0	0	0	0	0	Z	RE	0	0	1	2	0	0	0	0	4	4	0	0	0	0	0	0	0	0.6	4
24-Feb	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
25-Feb	0	Z	RE	1	2	2	1	1	1	1	2	2	4	3	2	2	3	3	2	1	0	0	0	0	1.6	4
26-Feb	0	0	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	1	0.4	2
27-Feb	0	0	0	Z	5	7	3	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.0	7
28-Feb	0	0	0	0	Z	RE	0	0	0	0	0	1	2	2	1	0	1	0	0	0	0	0	0	0	0.5	2
	0.5	0.3	0.3	0.6	0.6	0.8	0.5	0.4	0.4	0.5	0.6	1.2	1.4	1.5	1.2	1.5	2.0	1.5	1.4	0.8	0.7	0.6	0.5	0.5		Diurnal Average
	8	3	2	6	5	7	3	2	2	2	2	5	5	10	6	5	12	8	11	3	5	5	2	5		Diurnal Maximum

Z - zerospan      C - Calibration      RE - Recovery  
 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 - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	610	99.67	99.67
11 - 20	2	0.33	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: 612

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Anzac - February 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	45	15	11	13	24	51	62	37	23	22	16	10	17	83	65	116	610
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	15	11	13	24	51	62	37	23	22	16	10	17	83	66	117	612

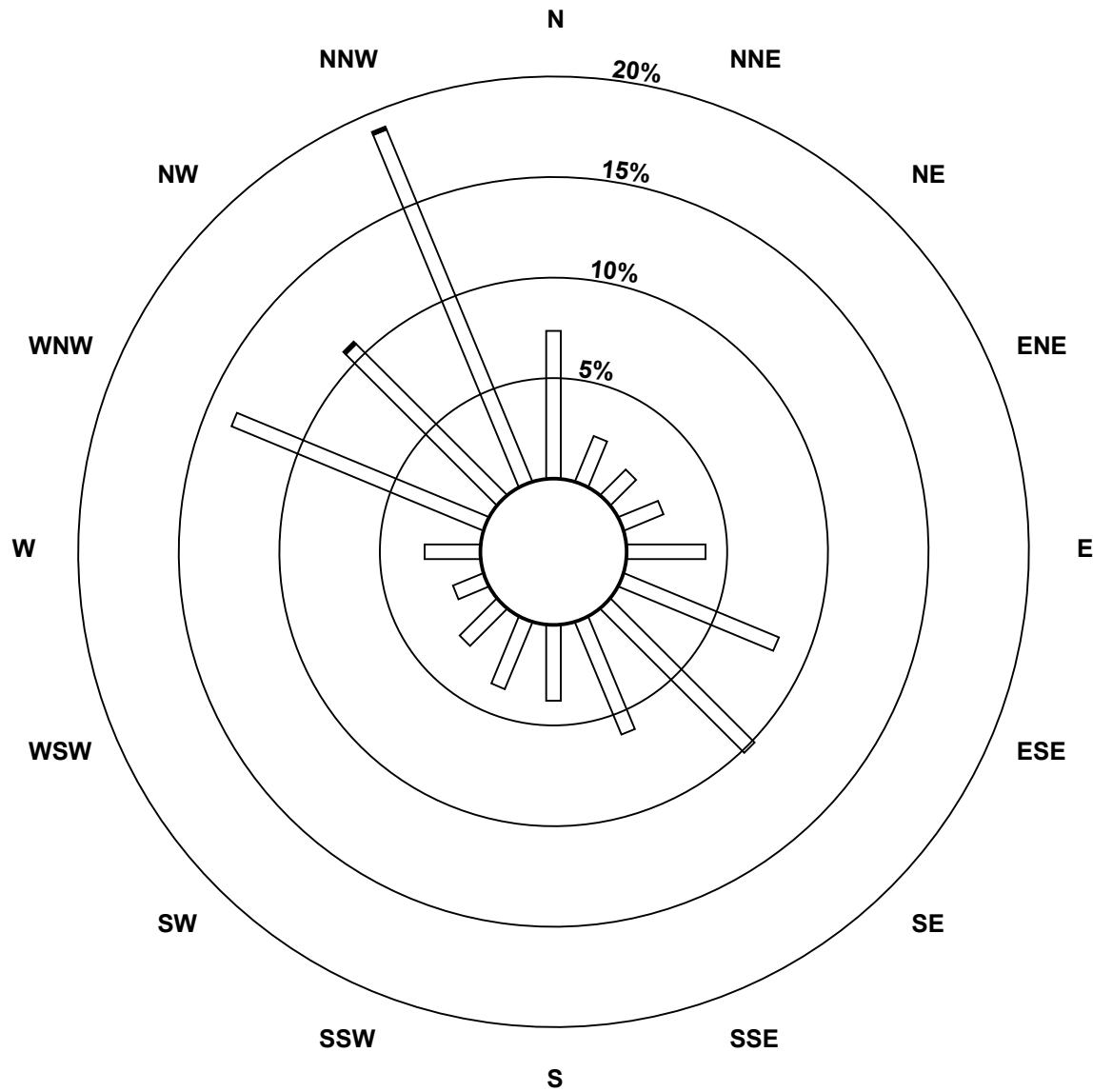
Total Number of Valid Hours: 612

Total Number of Hours: 672

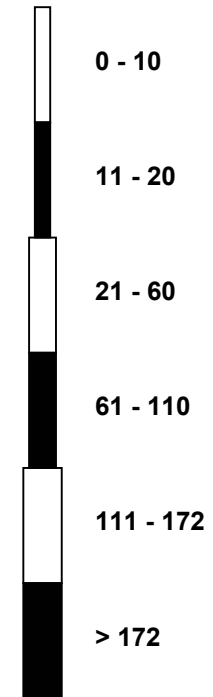


**Wood Buffalo Environmental Association  
Wind Rose Feb 2015**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac (AMS 14)**



Classes (ppb)

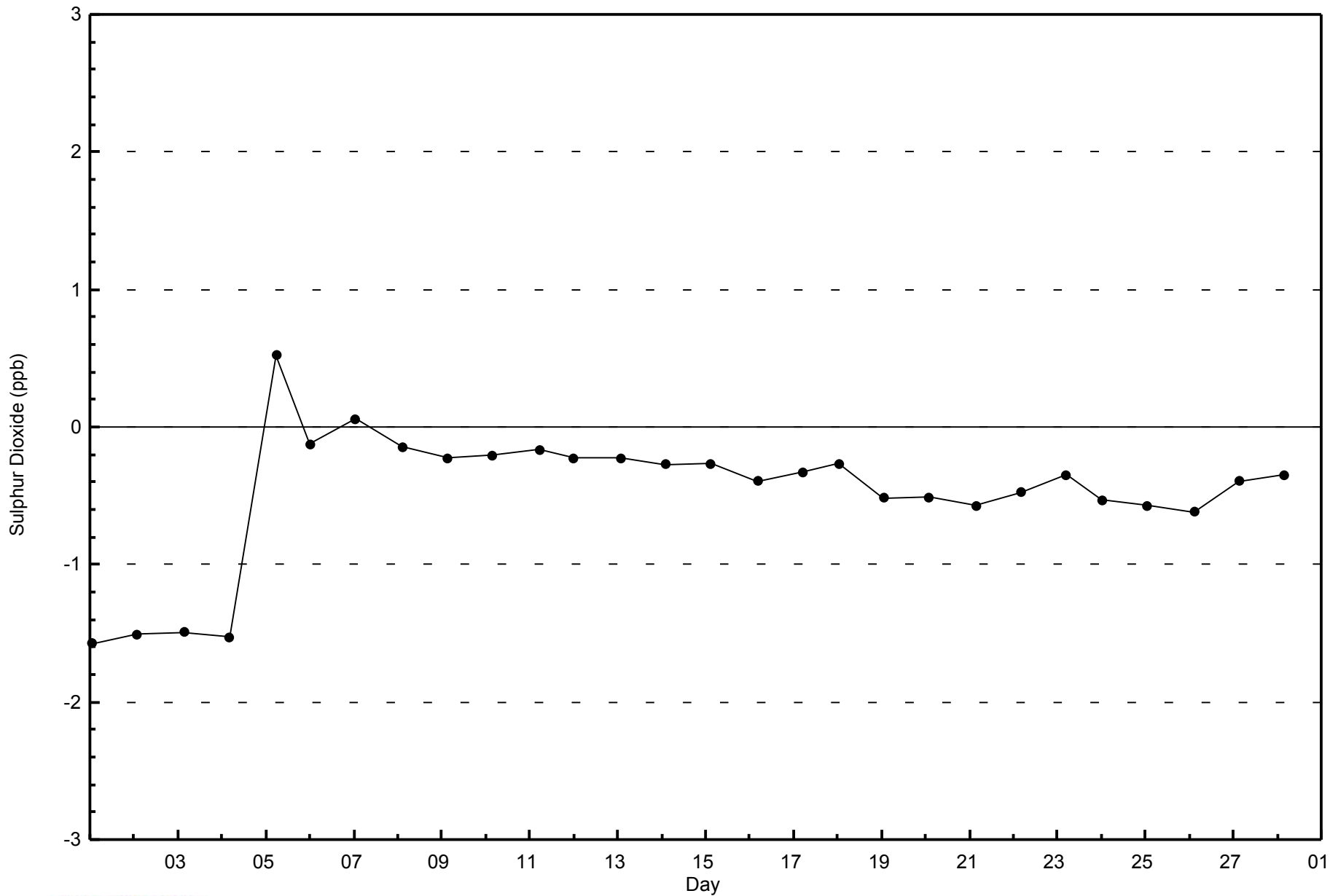


**Total Number of Valid Hours: 612**



WBEA  
Zero Responses

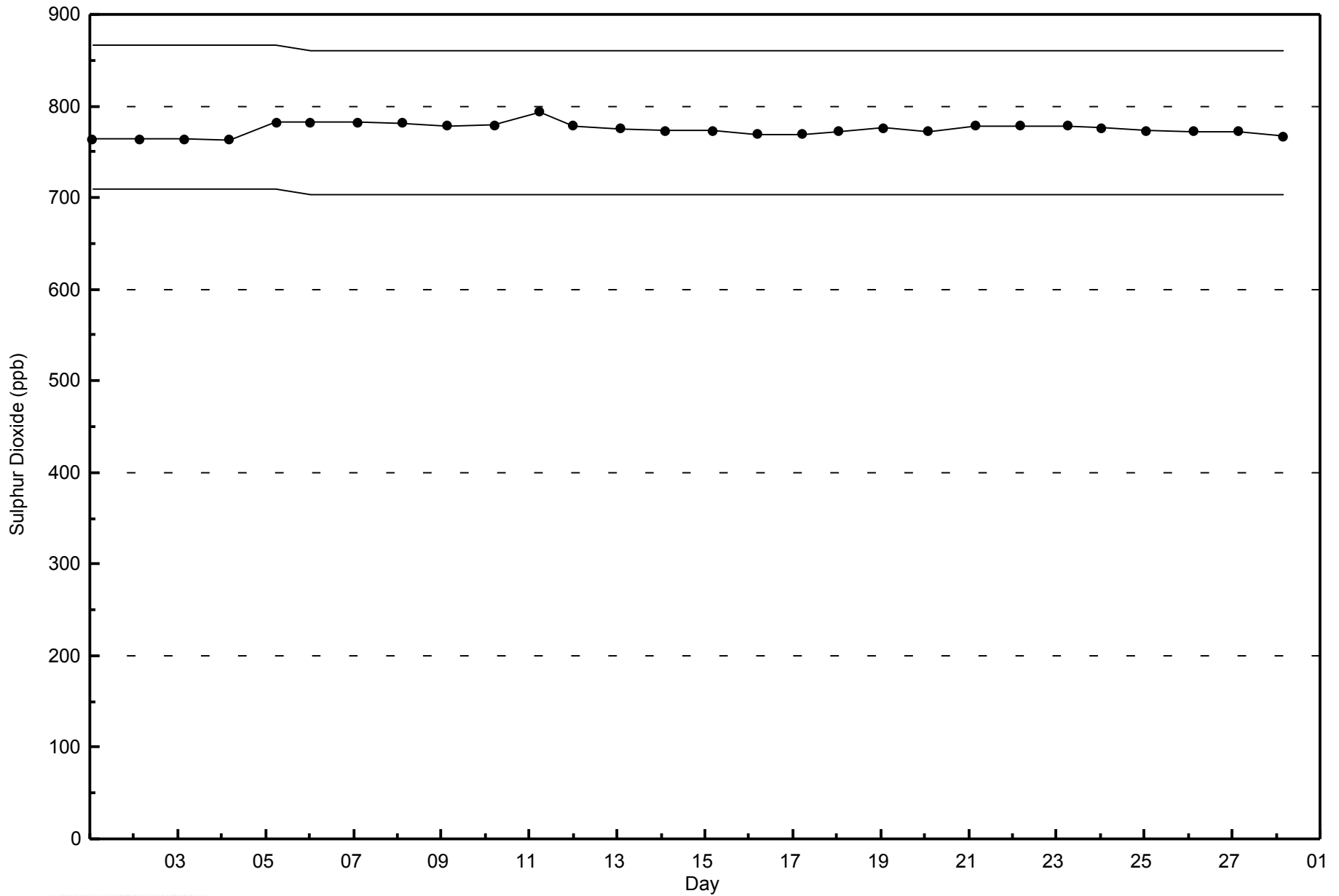
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Anzac - February 2015





Summary of Hour Averages

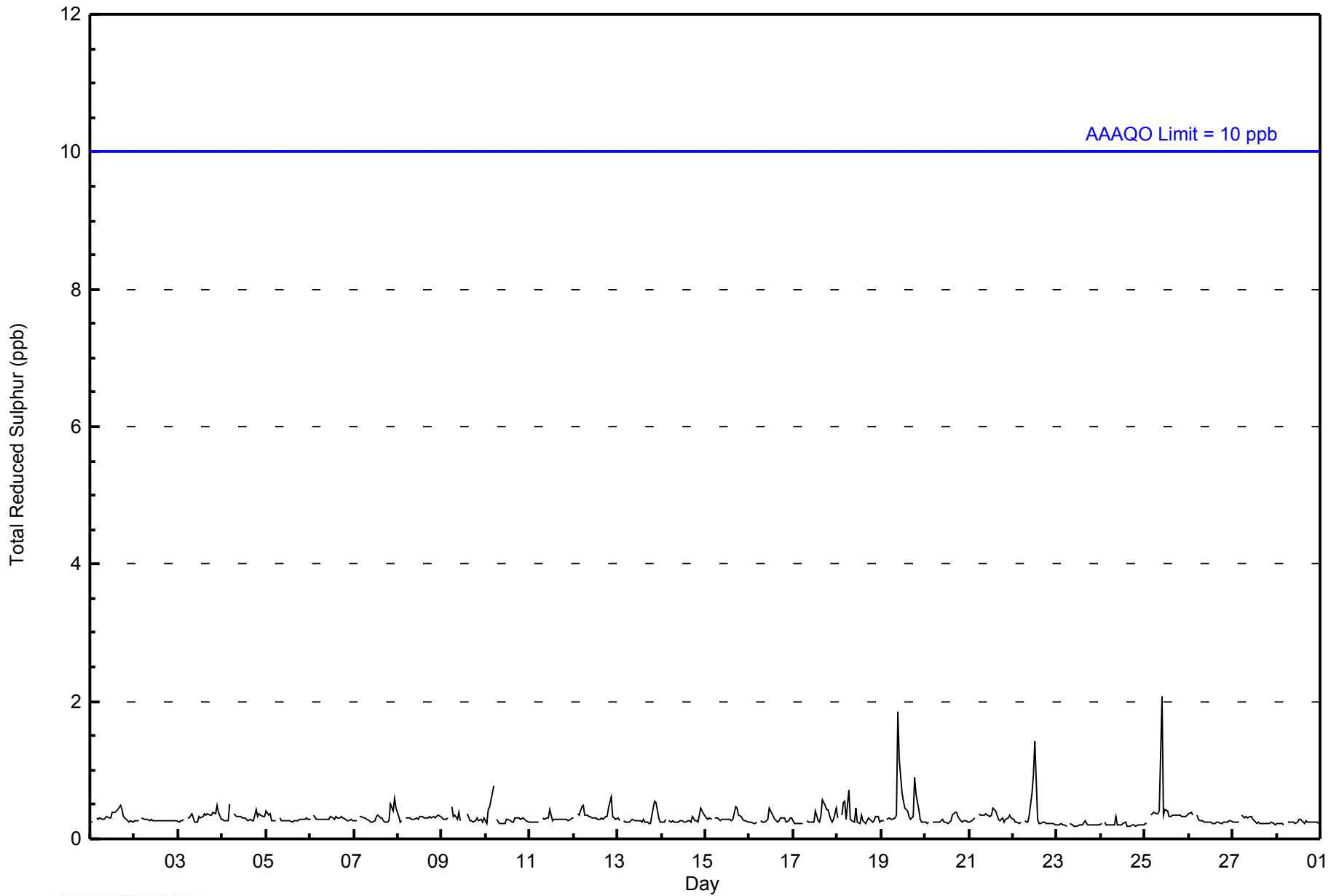
Anzac - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																			
Maximum Value: 2 ppb on Feb 25 10:00										Maximum Daily Average: 0.5 ppb on Feb 19										Hours of Data: 641									
Minimum Value: 0 ppb on Feb 23 11:00										Minimum Daily Average: 0.2 ppb on Feb 23										Hours of Missing Data: 31									
Maximum Diurnal Average: 0.4 ppb at hour 10										Minimum Diurnal Average: 0.3 ppb at hour 2										Hours of Calibration: 31									
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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
3-Feb	0	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-Feb	0	0	0	0	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
5-Feb	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-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0.3	1			
8-Feb	0	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			
9-Feb	0	0	0	0	Z	0	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0.3	0			
10-Feb	0	0	0	1	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
11-Feb	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			
12-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1			
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0.3	1			
14-Feb	0	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-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
17-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0.3	1			
18-Feb	0	Z	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
19-Feb	0	0	Z	0	0	0	0	0	0	2	1	1	1	0	0	0	0	0	0	1	1	0	0	0	0.5	2			
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
22-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1			
23-Feb	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-Feb	0	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-Feb	0	0	Z	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	2			
26-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0			
28-Feb	0	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			
	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	Diurnal Average				
	0	0	0	1	1	0	1	0	0	2	1	1	1	0	0	0	0	0	0	1	0	1	1	1	1	1	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**  
**Anzac - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	641	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: 641

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - February 2015**

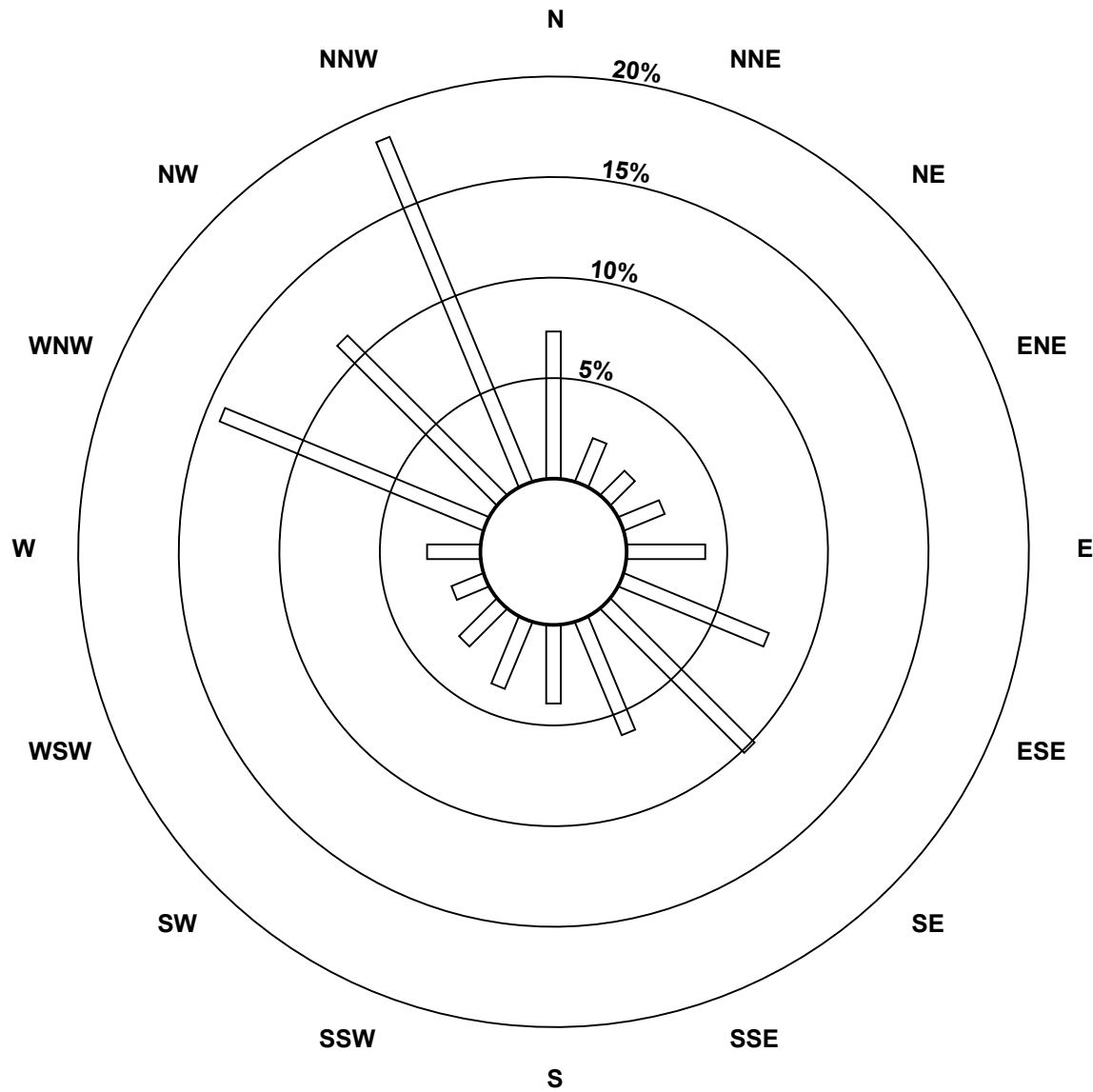
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	47	15	11	14	25	50	65	39	25	23	17	11	17	91	72	119	641
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	15	11	14	25	50	65	39	25	23	17	11	17	91	72	119	641

Total Number of Valid Hours: 641

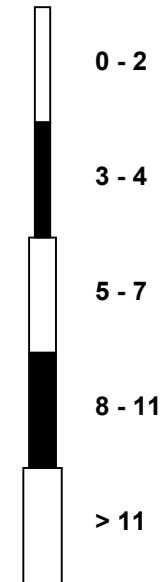
Total Number of Hours: 672

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

**Total Reduced Sulphur (TRS) - ppb  
Anzac (AMS 14)**



**Classes (ppb)**



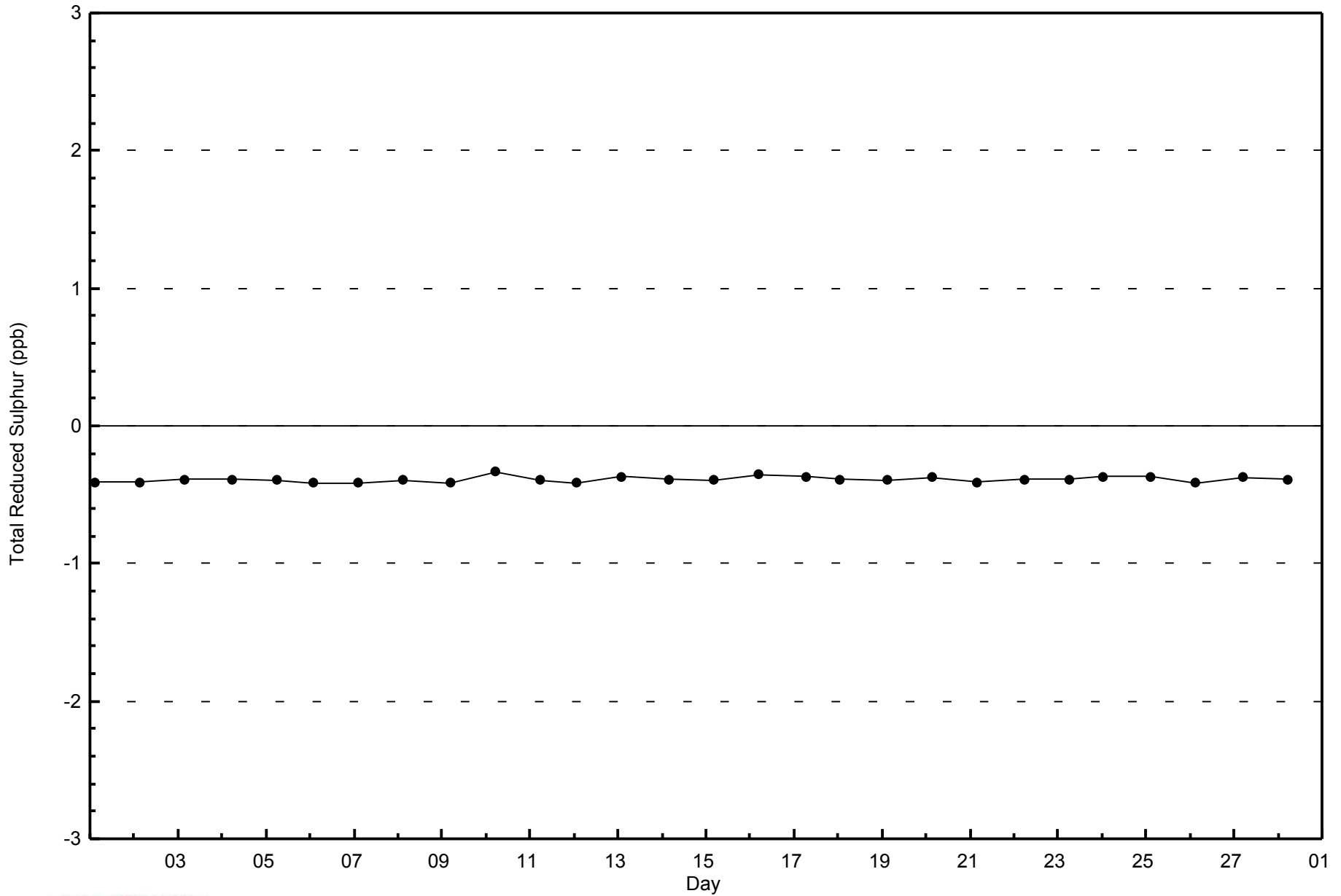
**Total Number of Valid Hours: 641**





WBEA  
Zero Responses

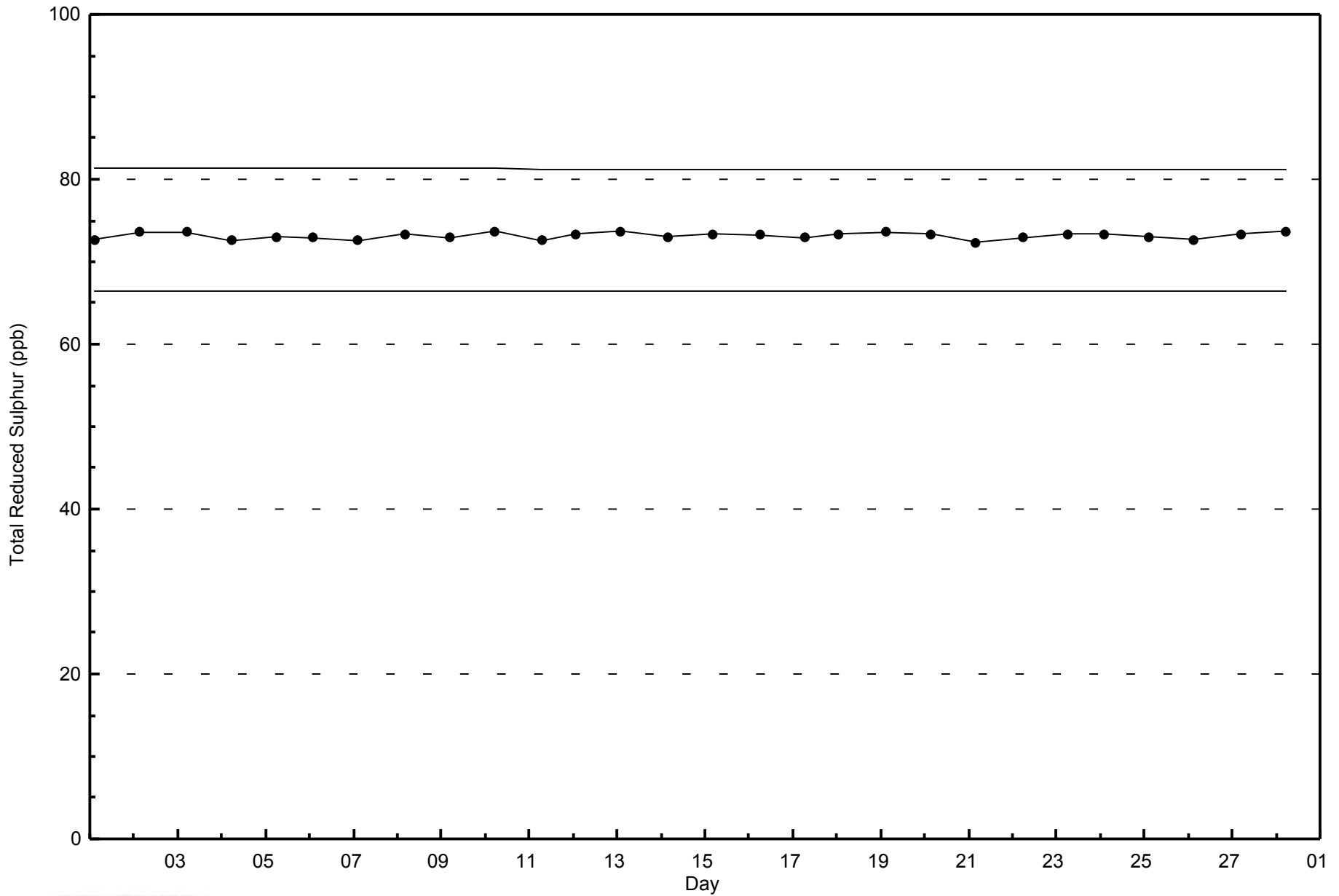
Total Reduced Sulphur (TRS) - ppb  
Anzac - February 2015





**WBEA**  
**Span Responses**

**Total Reduced Sulphur (TRS) - ppb**  
**Anzac - February 2015**



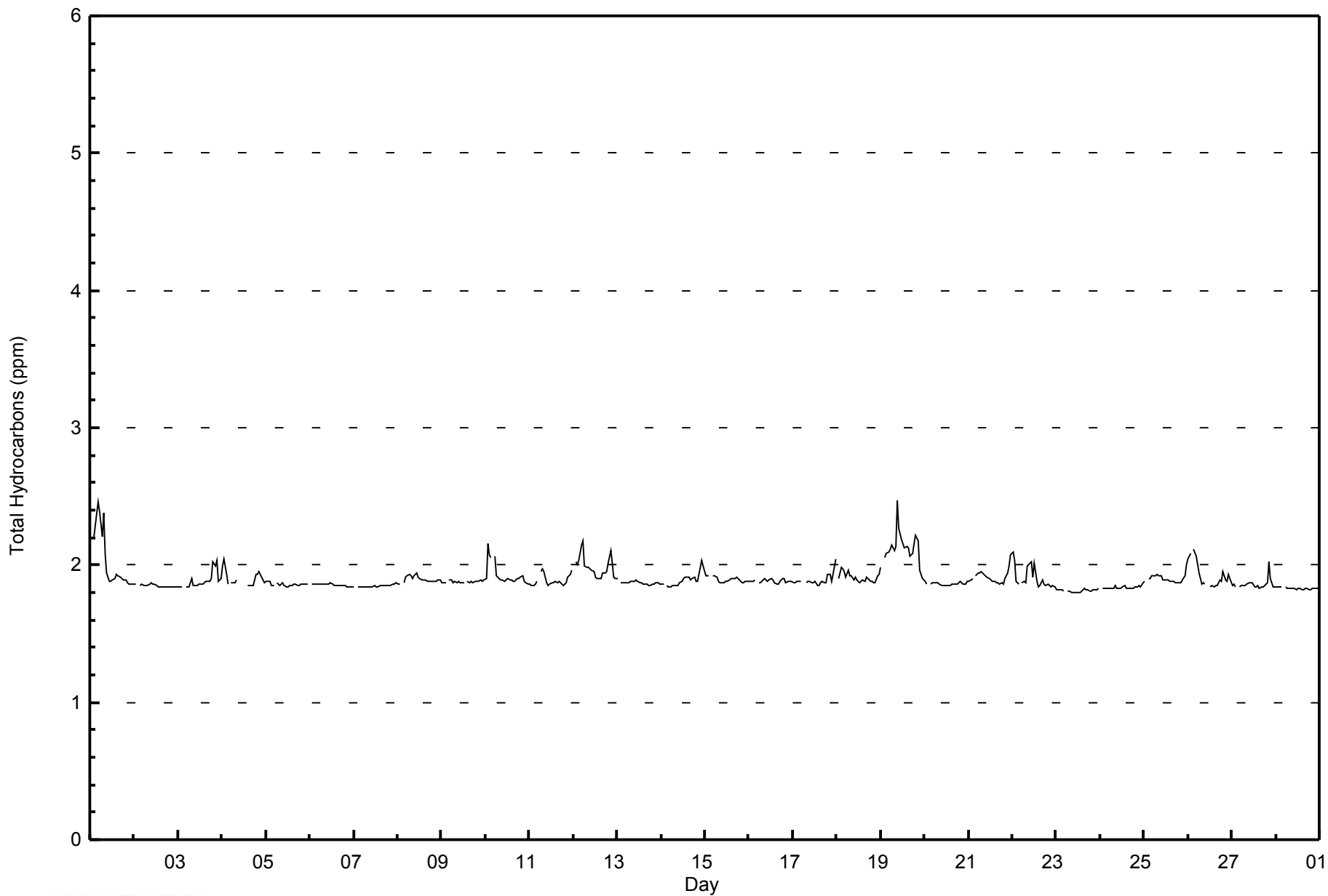


Maximum Value: 2.5 ppm on Feb 19 10:00																				Maximum Daily Average: 2.1 ppm on Feb 19					Hours in Service: 672	
Minimum Value: 1.8 ppm on Feb 23 11:00																				Minimum Daily Average: 1.8 ppm on Feb 23					Hours of Data: 635	
Maximum Diurnal Average: 1.9 ppm at hour 6																				Minimum Diurnal Average: 1.9 ppm at hour 16					Hours of Missing Data: 37	
Monthly Average: 1.90 ppm																				Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.2					Hours of Calibration: 33	
																									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-Feb	1.9	Z	2.2	2.4	2.5	2.4	2.2	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5
2-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
3-Feb	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0
4-Feb	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	C	C	C	C	1.9	1.8	1.8	1.8	1.9	1.9	2.0	1.9	1.9	1.9	1.9	2.0
5-Feb	1.9	1.9	1.9	1.8	1.8	Z	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
6-Feb	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	1.8	1.8	1.8	1.8	1.8	1.9	1.9
7-Feb	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
9-Feb	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	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
10-Feb	1.9	2.2	2.1	2.1	Z	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	1.9	1.9	2.2
11-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
12-Feb	Z	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.1	2.0	1.9	1.9	2.2
13-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
14-Feb	1.9	1.9	Z	1.9	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0
15-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
16-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
17-Feb	1.9	1.9	1.9	1.9	1.9	Z	UO	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
18-Feb	Z	1.9	2.0	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
19-Feb	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.5	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.0	1.9	1.9	2.1	2.5
20-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	1.9	2.1
22-Feb	2.1	2.0	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	1.9	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	2.1
23-Feb	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
24-Feb	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	1.9	1.8
25-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	2.0
26-Feb	2.0	2.1	Z	2.1	2.1	2.0	1.9	1.9	1.9	1.9	M	M	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.1
27-Feb	1.9	1.9	1.8	Z	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.8	1.8	1.9	2.0
28-Feb	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
																								Diurnal Average		
																								Diurnal Maximum		
																								1.9		
																								2.1		
Z - zerospan																										
C - Calibration																										
M - Maintenance																										
UO - Unstable Operation																										



WBEA  
Hourly Averages

Total Hydrocarbons (THC) - ppm  
Anzac - February 2015





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

**Total Hydrocarbons (THC) - ppm**  
**Anzac - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	597	94.02	94.02
2.1 - 3.0	38	5.98	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 635

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Anzac - February 2015**

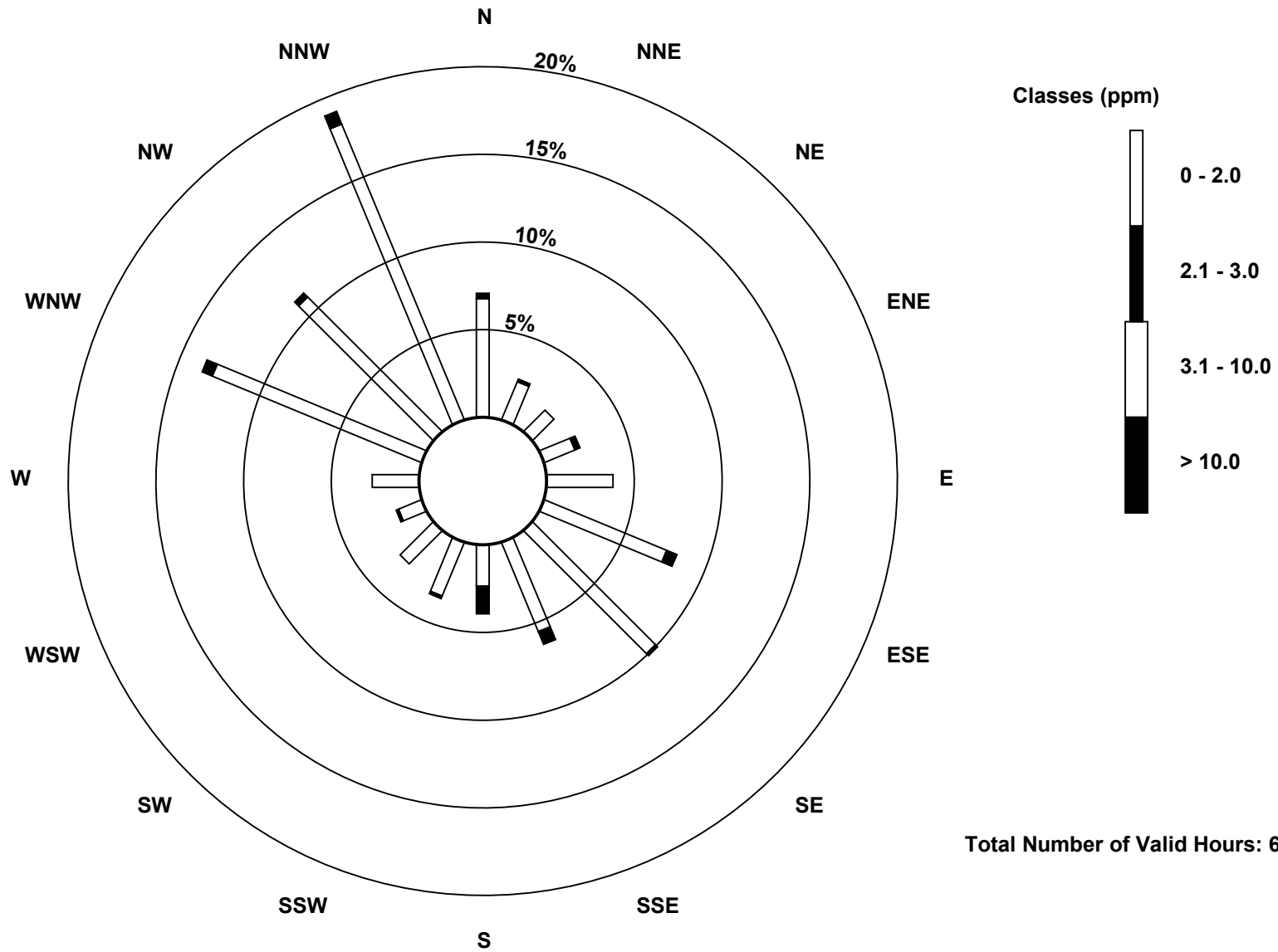
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	15	11	12	24	48	63	35	15	21	17	9	17	82	69	116	597
2.1 - 3.0	2	1	0	2	0	4	1	5	10	1	0	1	0	4	2	5	38
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	16	11	14	24	52	64	40	25	22	17	10	17	86	71	121	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

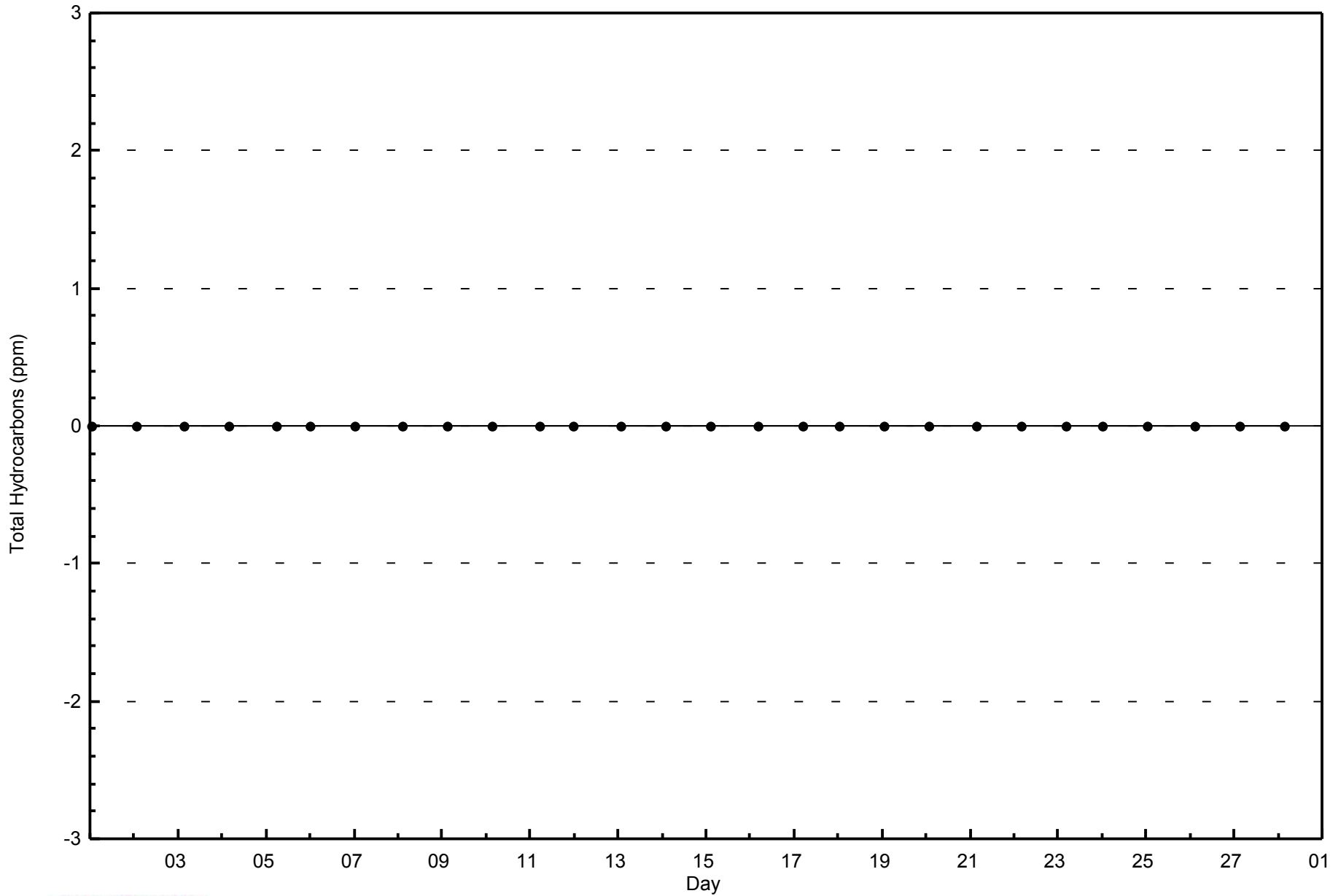
Total Hydrocarbons (THC) - ppm  
Anzac (AMS 14)





WBEA  
Zero Responses

Total Hydrocarbons (THC) - ppm  
Anzac - February 2015

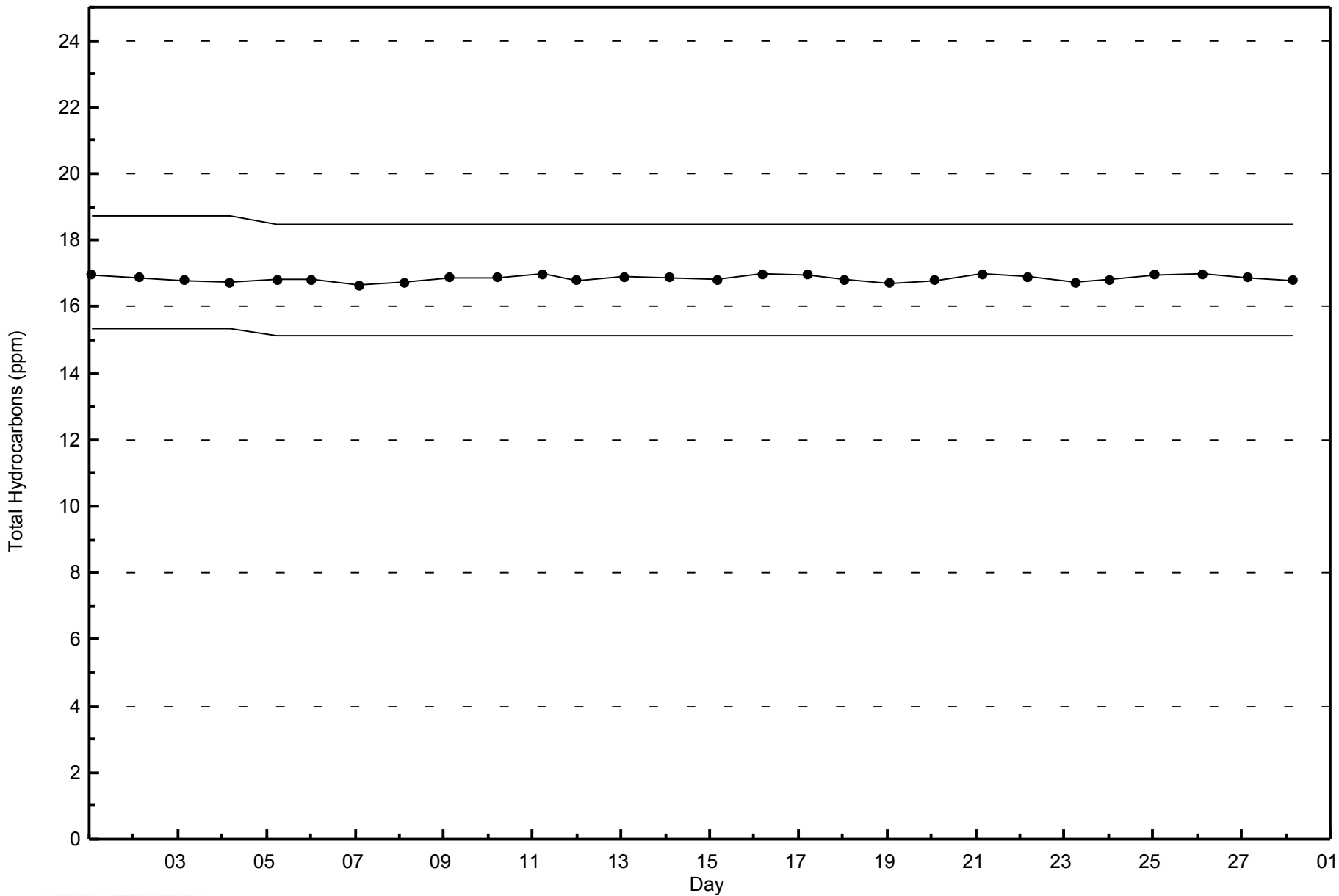






WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Anzac - February 2015





Summary of Hour Averages

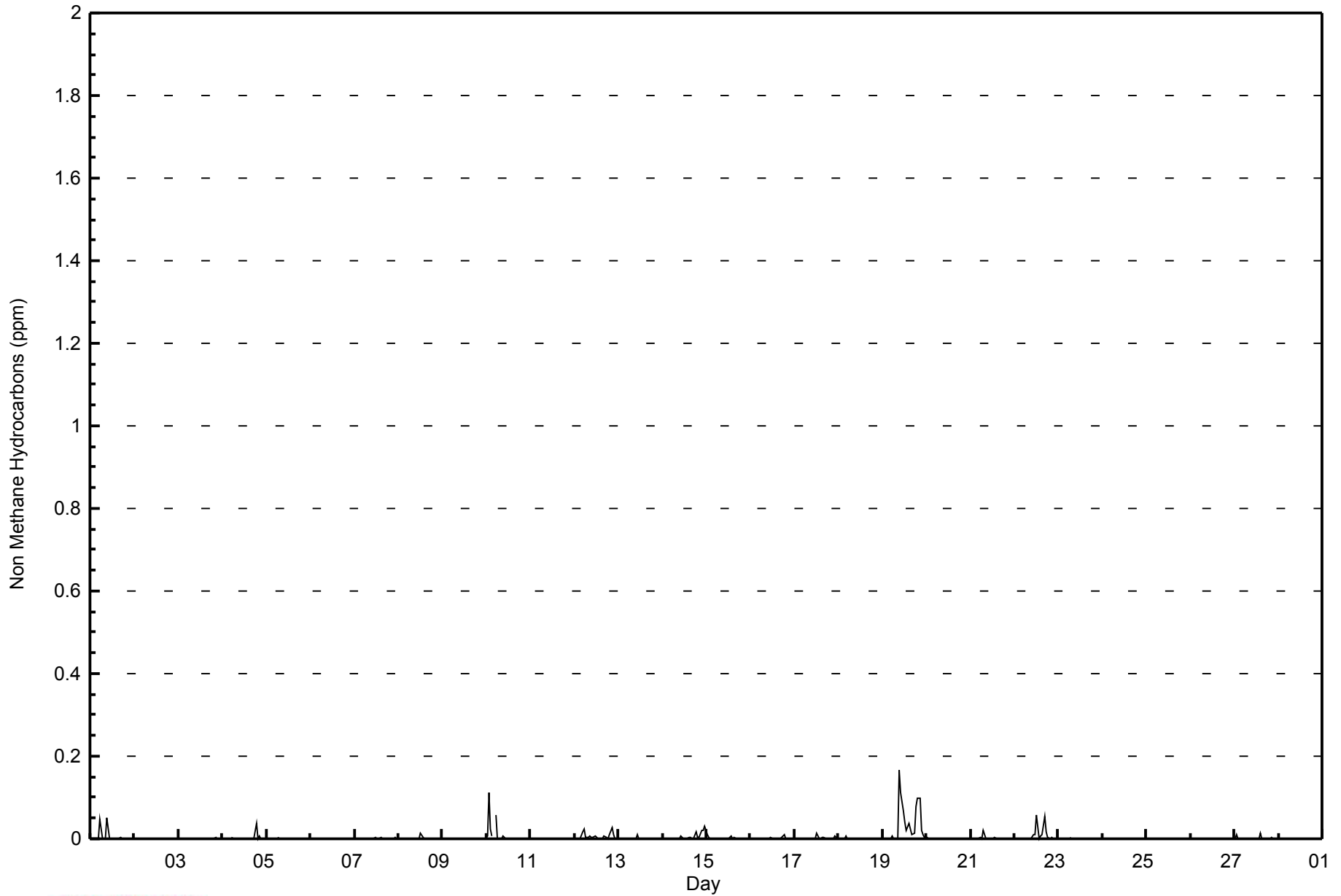
Anzac - February 2015

Maximum Value: 0.165 ppm on Feb 19 10:00		Maximum Daily Average: 0.035 ppm on Feb 19		Hours in Service:	672																						
Minimum Value: 0.000 ppm on Feb 1 01:00		Minimum Daily Average: 0.000 ppm on Feb 2		Hours of Data:	635																						
Maximum Diurnal Average: 0.009 ppm at hour 10		Minimum Diurnal Average: 0.000 ppm at hour 9		Hours of Missing Data:	37																						
Monthly Average: 0.003 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:	33																						
				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-Feb	0.000	Z	0.000	0.000	0.000	0.047	0.000	0.000	0.000	0.052	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.052	
2-Feb	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
3-Feb	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	0.001	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.003
4-Feb	0.000	0.000	0.000	0.000	Z	0.002	0.000	0.000	0.000	0.001	C	C	C	C	C	0.000	0.000	0.000	0.000	0.036	0.002	0.007	0.000	0.000	0.000	0.003	0.036
5-Feb	0.000	0.000	0.000	0.000	0.000	Z	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	
6-Feb	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-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000	0.002	0.002
8-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.012	0.012
9-Feb	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	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
10-Feb	0.007	0.111	0.025	0.008	Z	0.056	0.000	0.000	0.001	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	0.009	0.111	
11-Feb	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
12-Feb	Z	0.000	0.001	0.001	0.019	0.024	0.005	0.004	0.007	0.003	0.004	0.006	0.004	0.001	0.000	0.001	0.006	0.005	0.001	0.011	0.029	0.009	0.001	0.000	0.006	0.029	
13-Feb	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.011	
14-Feb	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.002	0.004	0.000	0.000	0.017	0.004	0.002	0.022	0.020	0.029	0.005	0.029	
15-Feb	0.010	0.003	0.001	Z	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.010	
16-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.002	0.011	0.000	0.000	0.000	0.000	0.001	0.011	0.011	
17-Feb	0.000	0.000	0.000	0.000	0.000	Z	UO	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.001	0.014	
18-Feb	Z	0.000	0.001	0.000	0.007	0.000	0.001	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	0.007	
19-Feb	0.001	Z	0.000	0.000	0.000	0.006	0.000	0.002	0.002	0.165	0.112	0.067	0.041	0.020	0.038	0.023	0.010	0.013	0.077	0.099	0.098	0.020	0.009	0.002	0.035	0.165	
20-Feb	0.002	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	0.002	
21-Feb	0.000	0.000	0.000	Z	0.000	0.003	0.001	0.021	0.000	0.000	0.001	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	0.001	0.021	
22-Feb	0.000	0.000	0.000	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.012	0.011	0.058	0.000	0.005	0.009	0.055	0.017	0.005	0.001	0.002	0.000	0.000	0.000	0.008	0.058	
23-Feb	0.000	0.000	0.000	0.000	0.000	Z	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	0.005	
24-Feb	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
25-Feb	0.000	Z	0.000	0.001	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.002	
26-Feb	0.001	0.000	Z	0.000	0.000	0.000	0.000	0.000	0.000	0.000	M	M	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.001	
27-Feb	0.000	0.010	0.000	Z	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	0.003	0.000	0.000	0.001	0.013	
28-Feb	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	
		0.001	0.005	0.001	0.000	0.001	0.006	0.001	0.001	0.000	0.009	0.006	0.003	0.005	0.001	0.002	0.002	0.003	0.001	0.005	0.004	0.005	0.002	0.001	0.001	Diurnal Average	
		0.010	0.111	0.025	0.008	0.019	0.056	0.005	0.021	0.007	0.165	0.112	0.067	0.058	0.020	0.038	0.023	0.055	0.017	0.077	0.099	0.098	0.022	0.020	0.029	Diurnal Maximum	
Z - zerospan		C - Calibration					M - Maintenance					UO - Unstable Operation															



WBEA  
Hourly Averages

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - February 2015





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

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.005	581	91.50	91.50
0.006 - 0.05	45	7.09	98.58
0.06 - 0.1	8	1.26	99.84
> 0.1	1	0.16	100.00

Total Number of Valid Hours: 635

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Non Methane Hydrocarbons (NMHC) - ppm**  
**Anzac - February 2015**

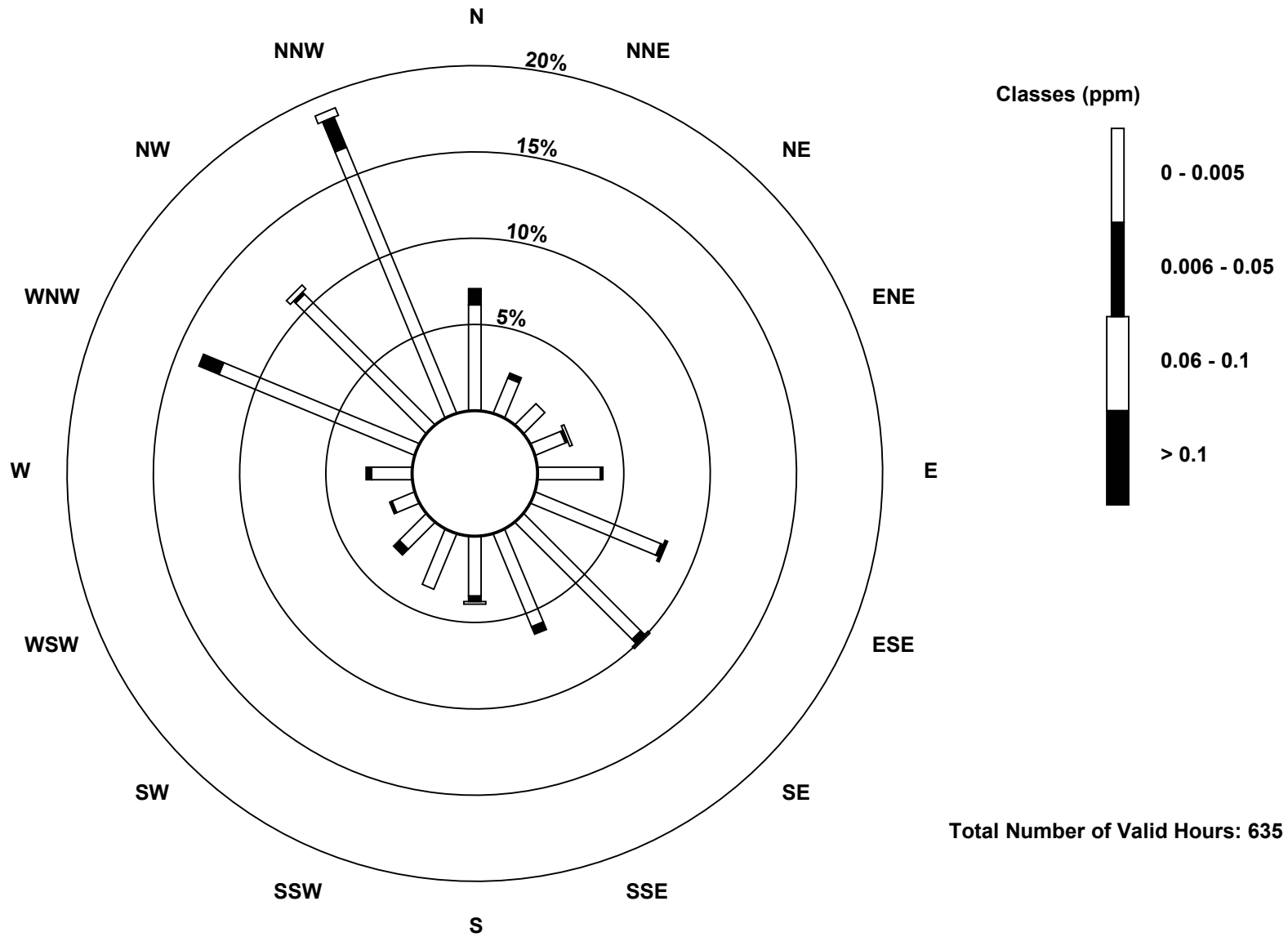
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 0.005	39	14	11	12	23	50	61	37	22	22	14	9	15	78	68	106	581
0.006 - 0.05	6	2	0	1	1	1	2	3	2	0	3	1	2	8	1	12	45
0.06 - 0.1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	2	3	8
> 0.1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
<b>Totals</b>	45	16	11	14	24	52	64	40	25	22	17	10	17	86	71	121	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

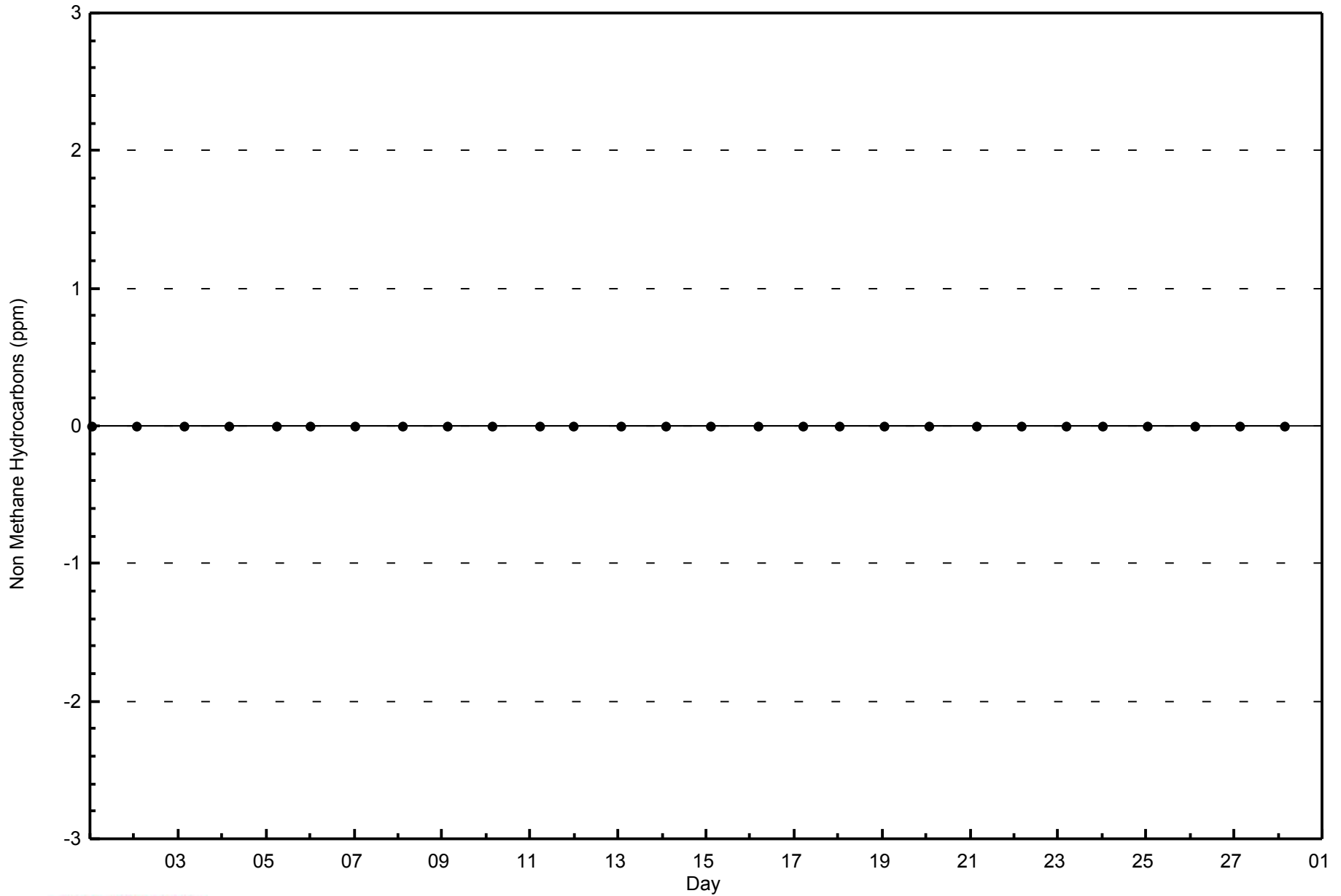
Non Methane Hydrocarbons (NMHC) - ppm  
Anzac (AMS 14)





WBEA  
Zero Responses

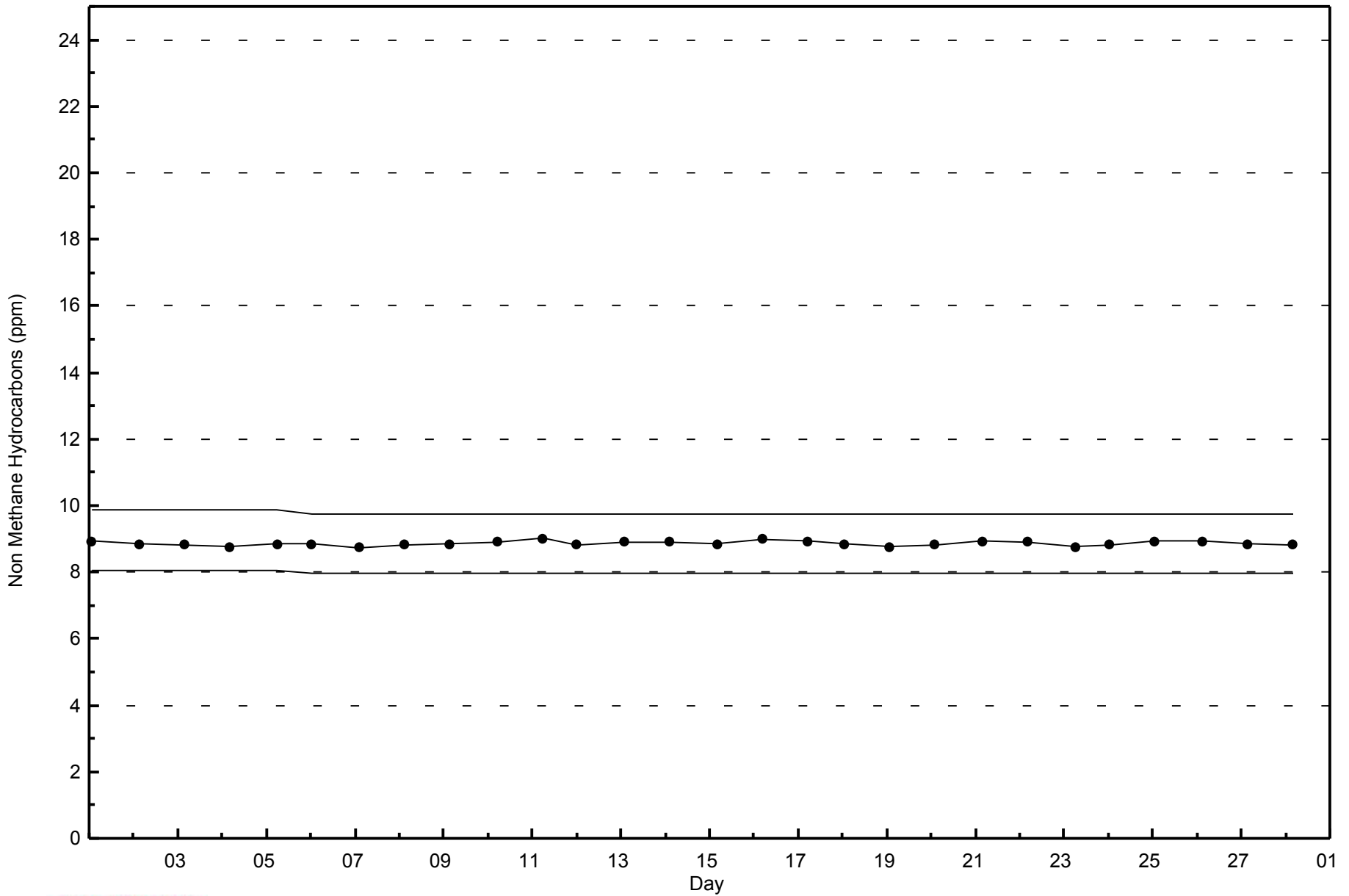
Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - February 2015





WBEA  
Span Responses

Non Methane Hydrocarbons (NMHC) - ppm  
Anzac - February 2015





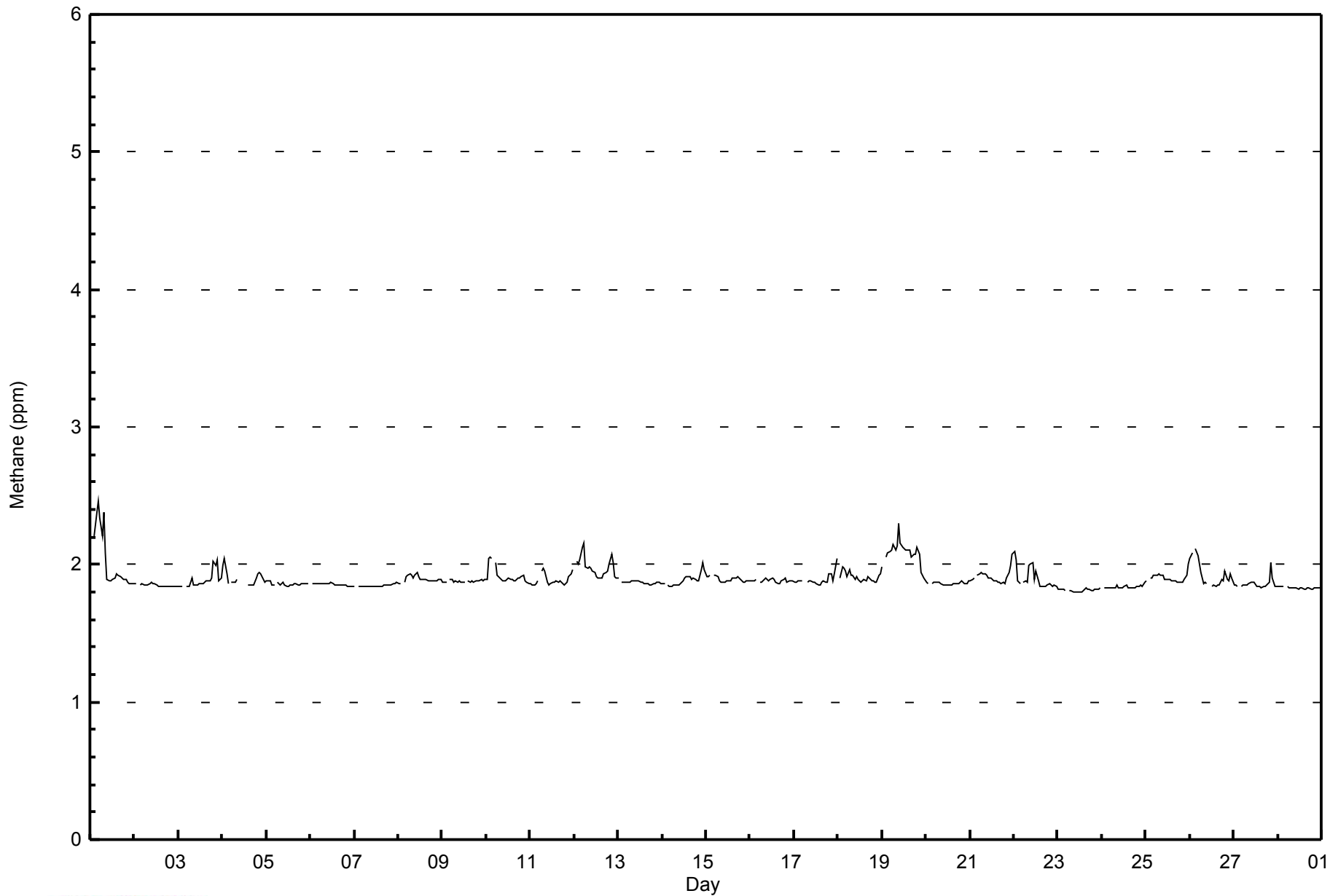


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0														Hours in Service: 672												
Maximum Value: 2.5 ppm on Feb 1 05:00														Maximum Daily Average: 2.1 ppm on Feb 19										Hours of Data: 635		
Minimum Value: 1.8 ppm on Feb 23 11:00														Minimum Daily Average: 1.8 ppm on Feb 23										Hours of Missing Data: 37		
Maximum Diurnal Average: 1.9 ppm at hour 5														Minimum Diurnal Average: 1.9 ppm at hour 16										Hours of Calibration: 33		
Monthly Average: 1.89 ppm														Percentiles: P <sub>1</sub> = 1.8 P <sub>10</sub> = 1.8 Q <sub>1</sub> = 1.9 Median = 1.9 Q <sub>3</sub> = 1.9 P <sub>90</sub> = 2.0 P <sub>99</sub> = 2.1										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-Feb	1.9	Z	2.2	2.4	2.5	2.3	2.2	2.4	2.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.5
2-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9
3-Feb	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	1.9	1.9	2.0
4-Feb	2.0	2.0	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	C	C	C	C	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
5-Feb	1.9	1.9	1.9	1.8	1.8	Z	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
6-Feb	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	1.8	1.8	1.8	1.8	1.8	1.9
7-Feb	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
8-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
9-Feb	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	M	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
10-Feb	1.9	2.0	2.0	2.0	Z	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
11-Feb	1.9	1.9	1.9	1.9	1.9	Z	1.9	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0
12-Feb	Z	2.0	2.0	2.0	2.1	2.2	2.0	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.1	2.0	1.9	1.9	1.9	2.2
13-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
14-Feb	1.9	1.9	Z	1.9	1.8	1.8	1.9	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0
15-Feb	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
16-Feb	1.9	1.9	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
17-Feb	1.9	1.9	1.9	1.9	1.9	Z	UO	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
18-Feb	Z	1.9	2.0	2.0	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0
19-Feb	2.0	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	1.9	1.9	1.9	1.9	2.3
20-Feb	1.9	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
21-Feb	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	2.0	2.1	1.9	2.1
22-Feb	2.1	2.0	1.9	1.9	Z	1.9	1.9	1.9	2.0	2.0	2.0	1.9	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.8	1.8	1.9	2.1
23-Feb	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
24-Feb	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	1.9
25-Feb	1.9	Z	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	1.9	2.0
26-Feb	2.0	2.1	Z	2.1	2.1	2.0	1.9	1.9	1.9	1.9	M	M	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.1
27-Feb	1.9	1.9	1.8	Z	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.9	2.0	1.9	1.8	1.8	1.9	2.0
28-Feb	1.8	1.8	1.8	1.8	Z	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
																								Diurnal Average		
																								Diurnal Maximum		
1.9 1.9																										
2.1 2.1 2.2 2.4 2.5 2.3 2.2 2.4 2.1 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 2.0 2.0 2.1																										
Z - zerospan			C - Calibration					M - Maintenance					UO - Unstable Operation													



WBEA  
Hourly Averages

Methane (CH<sub>4</sub>) - ppm  
Anzac - February 2015





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

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	601	94.65	94.65
2.1 - 3.0	34	5.35	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 635

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Methane (CH<sub>4</sub>) - ppm**  
**Anzac - February 2015**

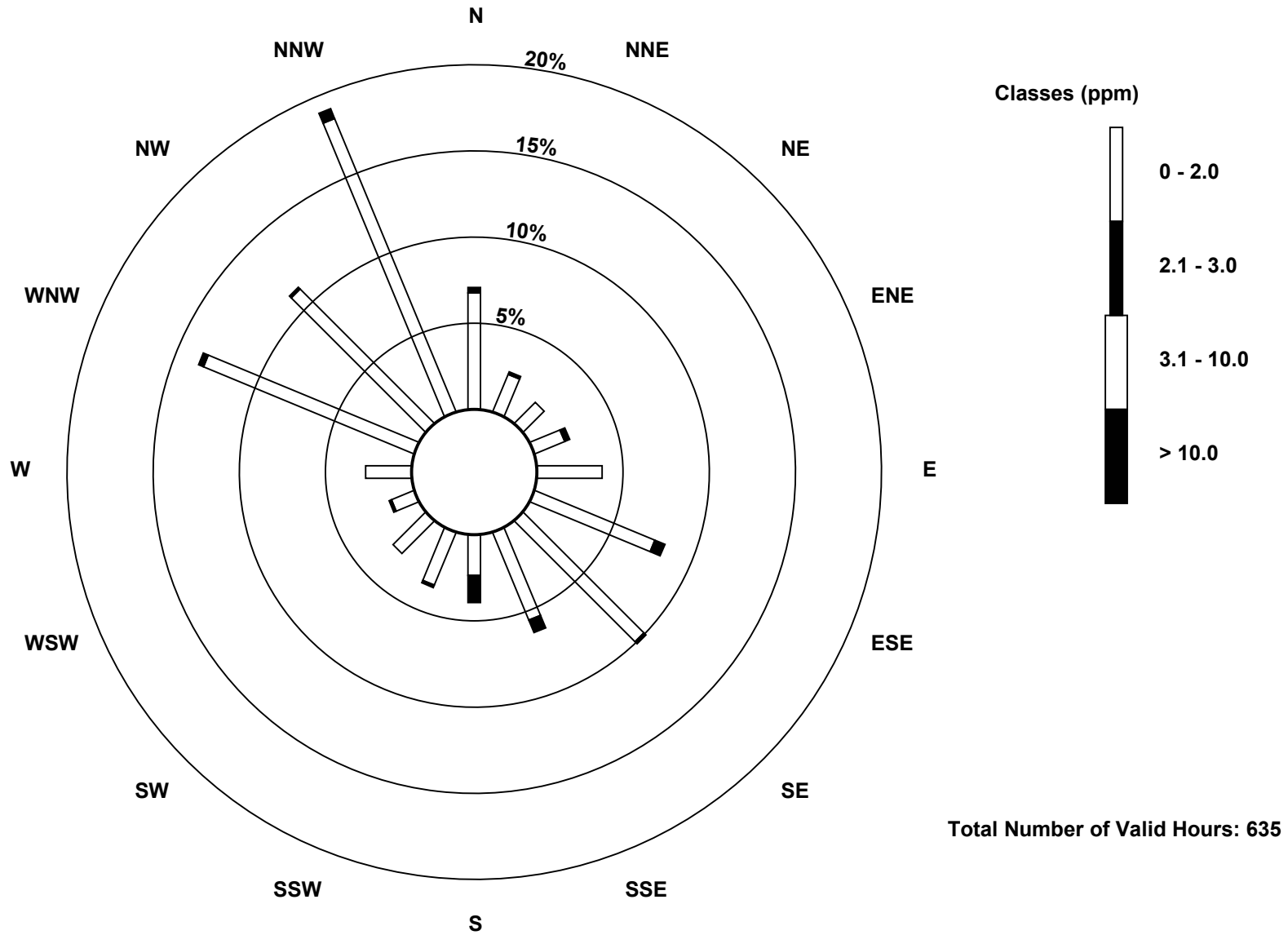
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	43	15	11	12	24	48	63	35	15	21	17	9	17	84	70	117	601
2.1 - 3.0	2	1	0	2	0	4	1	5	10	1	0	1	0	2	1	4	34
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	16	11	14	24	52	64	40	25	22	17	10	17	86	71	121	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

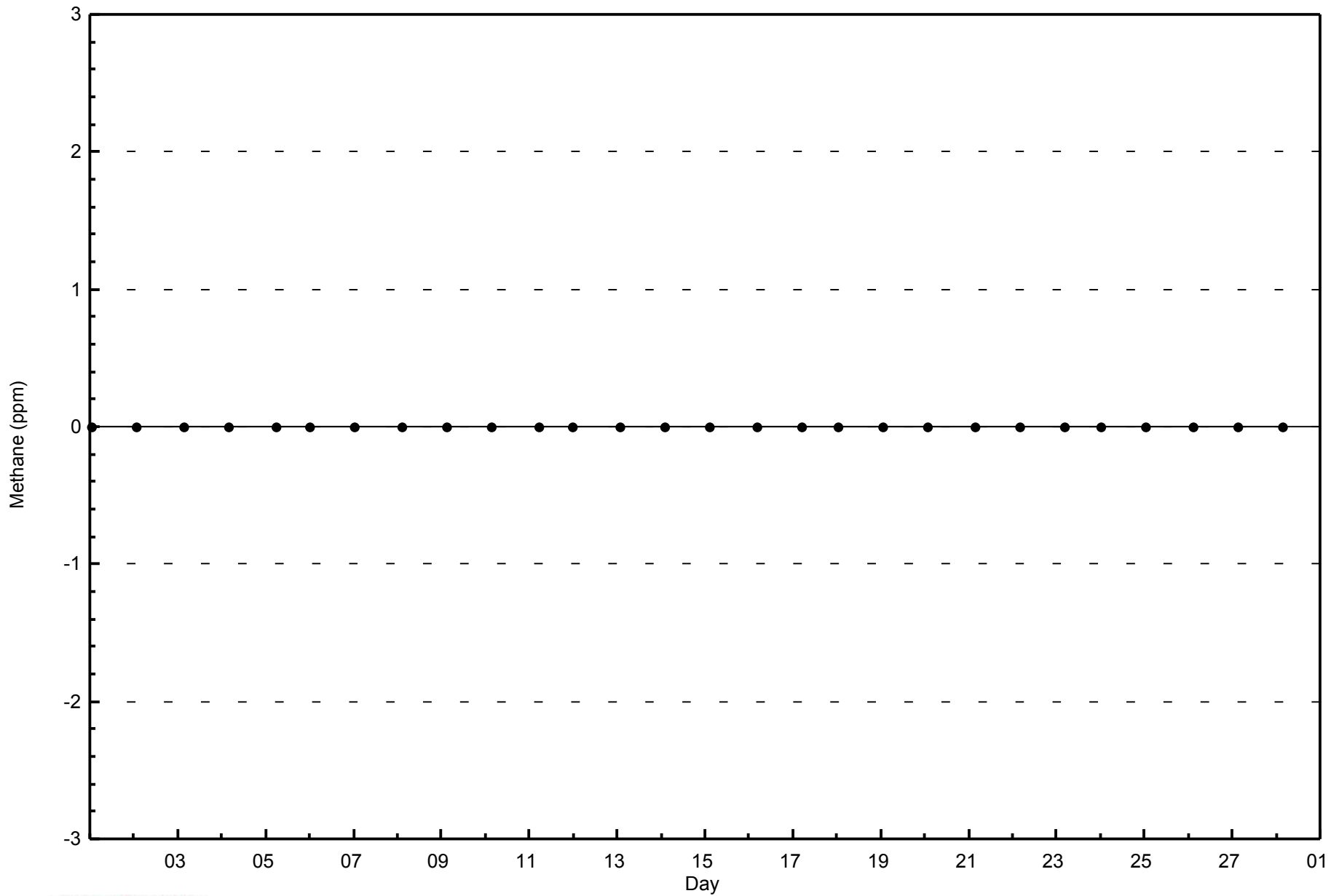
Methane (CH<sub>4</sub>) - ppm  
Anzac (AMS 14)





WBEA  
Zero Responses

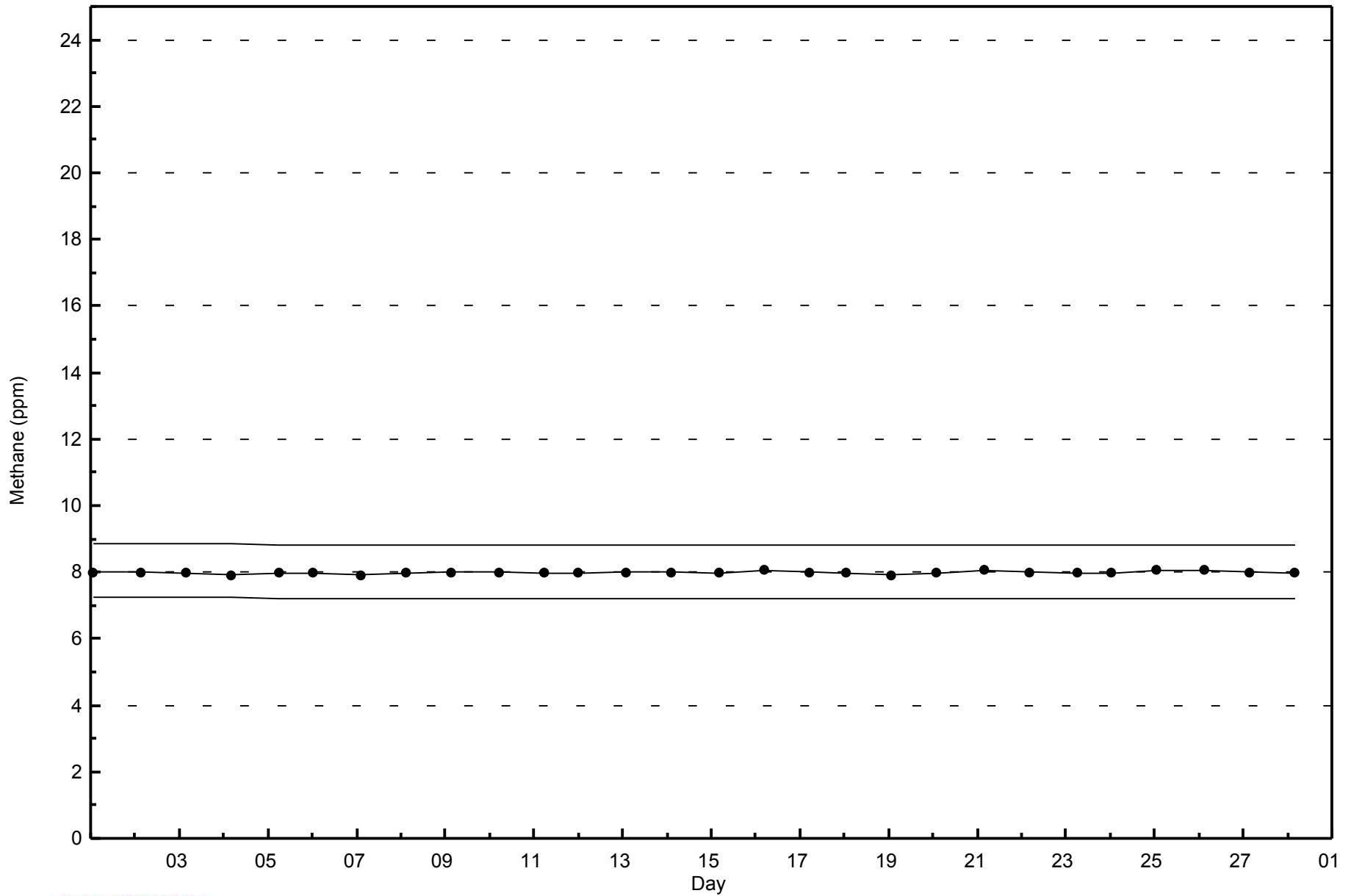
Methane (CH<sub>4</sub>) - ppm  
Anzac - February 2015





WBEA  
Span Responses

Methane (CH<sub>4</sub>) - ppm  
Anzac - February 2015





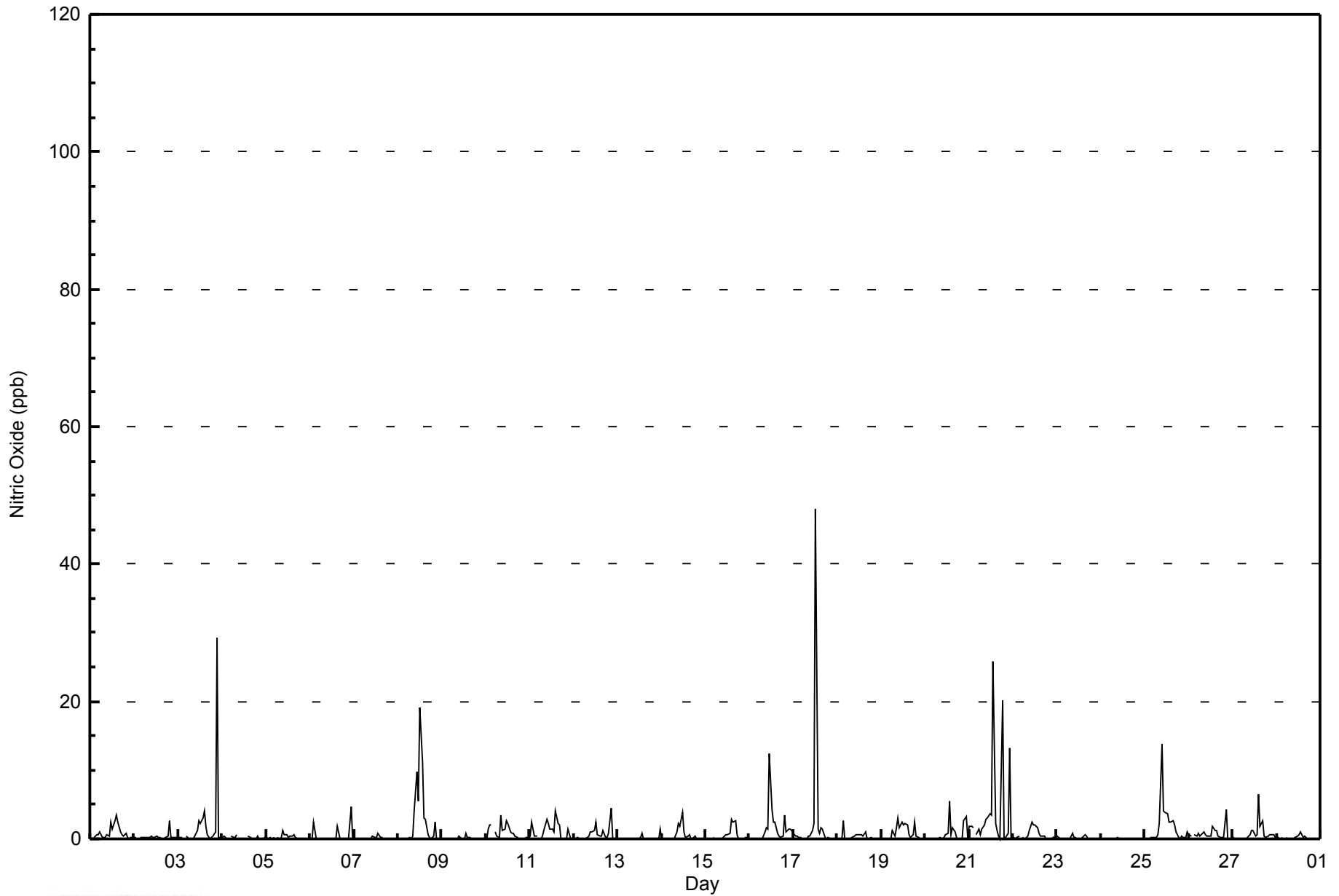
Maximum Value: 48 ppb on Feb 17 13:00														Maximum Daily Average: 3.9 ppb on Feb 21														Hours in Service: 672	
Minimum Value: 0 ppb on Feb 5 19:00														Minimum Daily Average: 0.0 ppb on Feb 24														Hours of Data: 639	
Maximum Diurnal Average: 3.6 ppb at hour 13														Minimum Diurnal Average: 0.1 ppb at hour 5														Hours of Missing Data: 33	
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> =9														Hours of Calibration: 33	
																												Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
1-Feb	1	Z	0	1	1	1	0	0	0	1	0	2	2	3	3	3	1	1	0	1	0	0	0	0	0.9	3			
2-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0.3	3			
3-Feb	0	0	0	Z	0	0	0	0	0	0	1	3	2	3	4	2	1	0	0	0	1	29	0	0	2.1	29			
4-Feb	0	0	0	0	Z	0	0	0	1	C	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	1			
5-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0.2	1			
6-Feb	Z	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	5	0	0.4	5			
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.1	1			
8-Feb	0	0	Z	0	0	0	0	0	0	4	10	6	19	11	3	3	1	0	0	0	2	0	0	0	2.6	19			
9-Feb	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			
10-Feb	0	1	2	2	Z	1	0	0	3	1	1	3	2	1	1	1	0	0	0	0	0	0	0	0	1.0	3			
11-Feb	0	2	0	1	0	Z	0	1	1	3	2	2	1	1	4	2	2	0	0	0	0	1	0	0	1.1	4			
12-Feb	Z	0	0	0	0	0	0	0	0	1	1	1	2	1	1	0	1	0	0	1	4	0	0	0	0.7	4			
13-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0.1	1			
14-Feb	0	0	Z	0	0	0	0	0	1	2	2	4	1	0	0	1	0	0	0	0	0	0	0	0	0.5	4			
15-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	3	2	3	1	0	0	0	0	0	0	0.5	3			
16-Feb	0	0	0	0	Z	0	0	0	1	2	1	12	4	2	3	1	0	0	0	3	1	2	1	1	1.6	12			
17-Feb	1	0	0	0	0	Z	0	0	0	0	1	2	48	1	1	2	1	0	0	0	0	0	0	0	2.6	48			
18-Feb	Z	0	0	3	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0.3	3			
19-Feb	0	Z	0	0	0	0	1	0	2	3	2	3	2	2	2	1	0	1	3	0	0	0	0	0	0.9	3			
20-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	6	1	2	1	0	0	0	0	3	3	0	0.7	6			
21-Feb	2	2	2	Z	1	1	1	1	2	3	3	4	3	26	2	1	0	0	20	0	0	1	13	0	3.9	26			
22-Feb	0	0	0	0	Z	0	0	0	0	1	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0.6	2			
23-Feb	0	0	0	0	0	Z	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0.1	1			
24-Feb	Z	0	0	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-Feb	0	Z	0	0	0	0	0	1	2	14	4	4	4	2	2	3	2	1	0	0	0	0	0	1	1.8	14			
26-Feb	1	0	Z	1	0	1	0	1	1	1	0	0	0	2	1	1	0	0	0	0	4	0	0	0	0.7	4			
27-Feb	0	0	0	Z	0	0	0	0	0	1	1	1	0	1	7	2	3	0	0	0	1	1	1	0	0.8	7			
28-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0.2	1			
																												Diurnal Average	
0.3														0.3														0.2	
2														2														1	
																												Diurnal Maximum	
Z - zerospan														C - Calibration															





**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Anzac - February 2015**





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

**Nitric Oxide (NO) - ppb**  
**Anzac - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	636	99.53	99.53
21 - 40	2	0.31	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Anzac - February 2015**

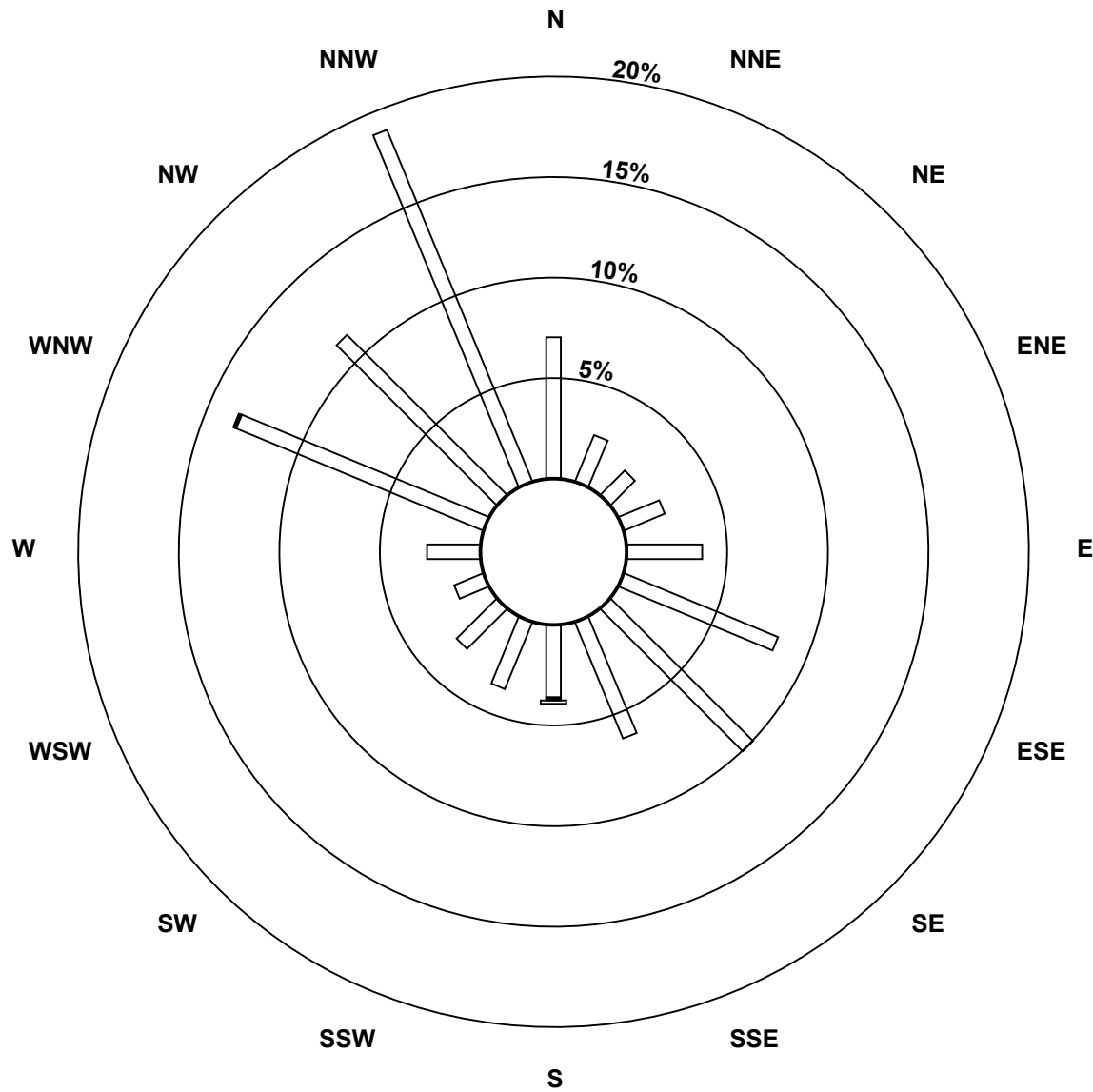
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	45	16	11	14	24	53	64	40	23	23	18	10	17	85	72	121	636
21 - 40	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
41 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	16	11	14	24	53	64	40	25	23	18	10	17	86	72	121	639

Total Number of Valid Hours: 639

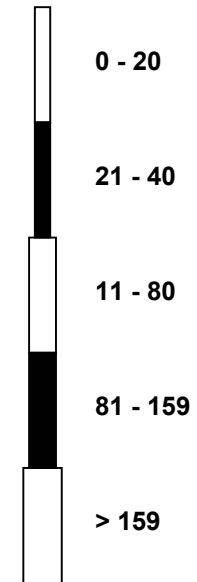
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitric Oxide (NO) - ppb  
Anzac (AMS 14)



Classes (ppb)

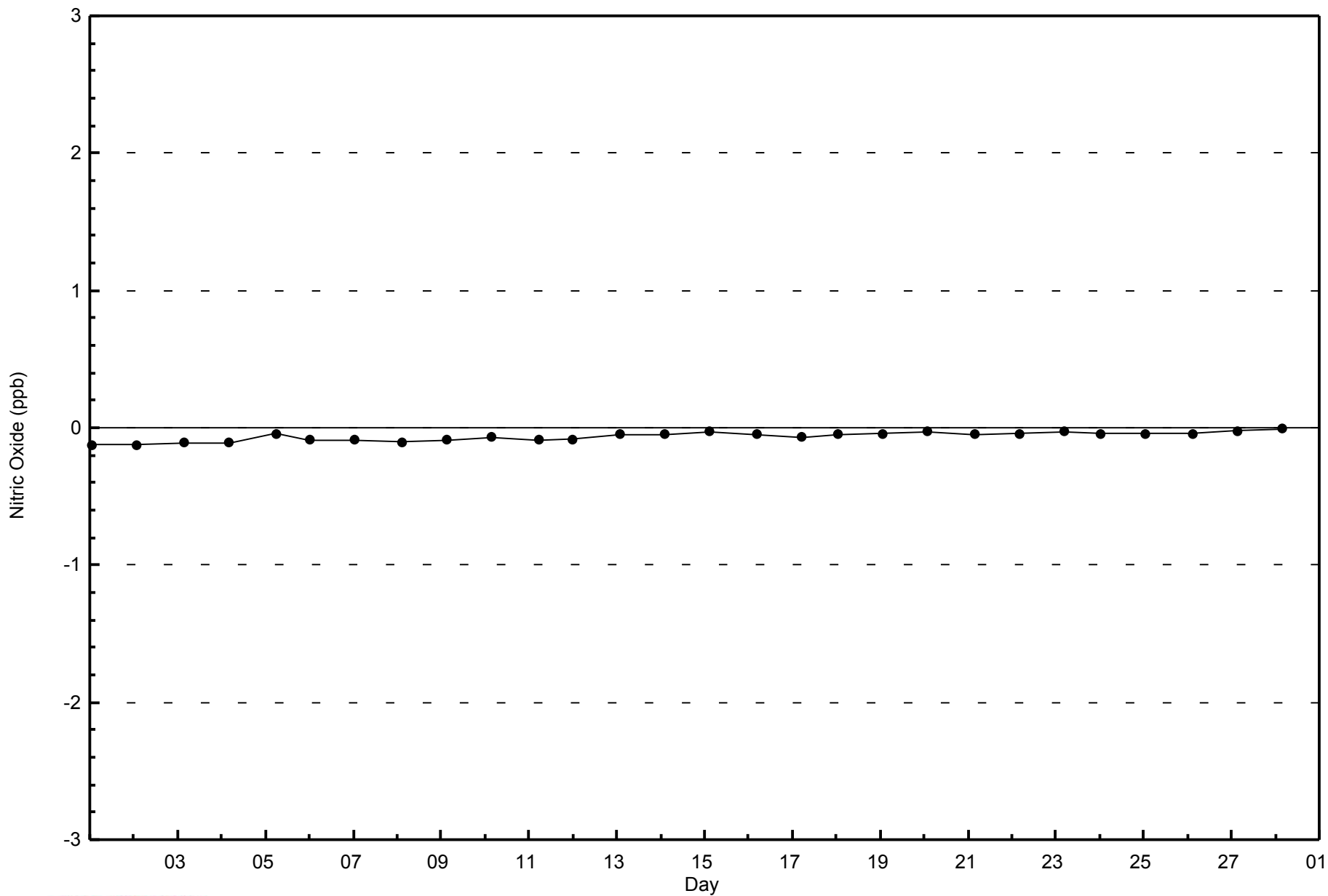


Total Number of Valid Hours: 639



WBEA  
Zero Responses

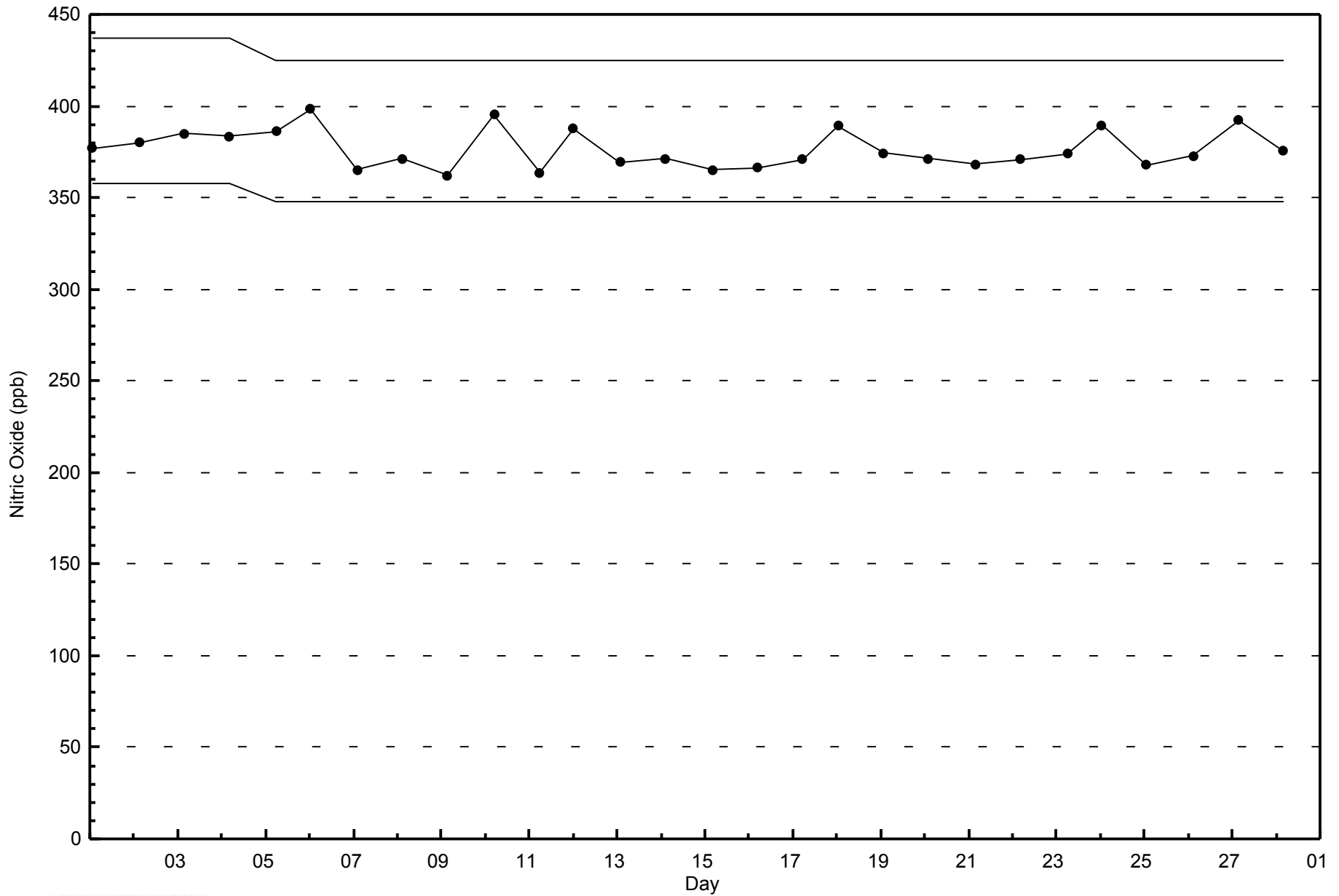
Nitric Oxide (NO) - ppb  
Anzac - February 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Anzac - February 2015





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 27 ppb on Feb 10 03:00	Maximum Daily Average: 9.1 ppb on Feb 10
Minimum Value: 0 ppb on Feb 23 23:00	Hours of Data: 639
Maximum Diurnal Average: 5.9 ppb at hour 20	Hours of Missing Data: 33
Monthly Average: 4.2 ppb	Hours of Calibration: 33
Minimum Daily Average: 0.4 ppb on Feb 6	Percent Operational Time: 100.0
Minimum Diurnal Average: 2.9 ppb at hour 15	
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> = 9 P <sub>99</sub> = 22	

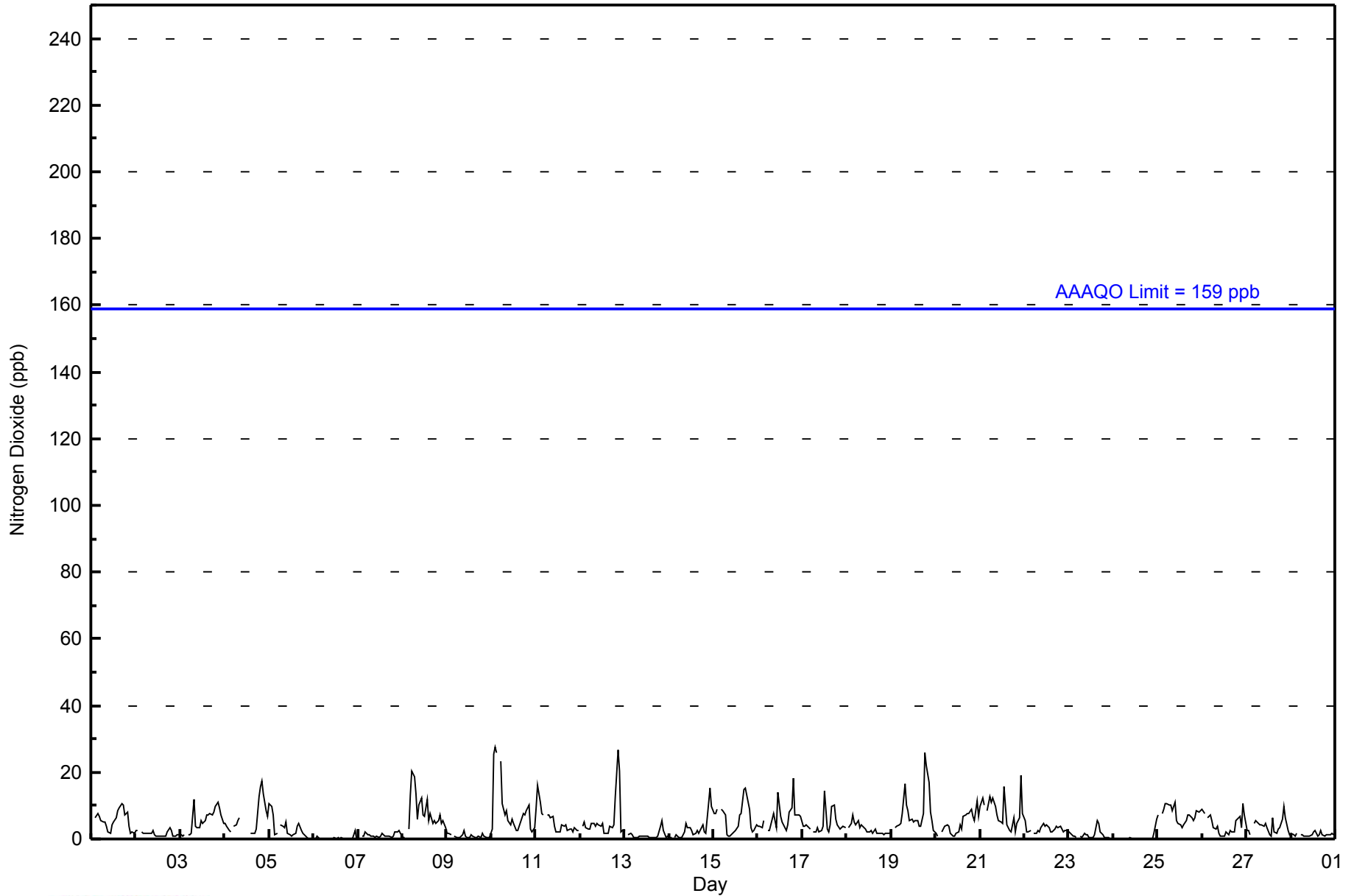
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	6	Z	6	8	7	5	5	5	4	2	2	4	5	7	8	9	11	10	7	8	4	2	2	2	5.6	11	
2-Feb	3	3	Z	2	2	2	2	2	2	3	1	1	1	1	1	1	1	2	3	3	1	1	1	1	1.6	3	
3-Feb	1	1	1	Z	1	1	2	12	4	3	4	6	5	5	7	7	8	7	8	10	11	9	7	5	5.4	12	
4-Feb	5	4	2	2	Z	4	4	6	6	C	C	C	C	C	2	2	2	3	13	16	17	13	8	7	6.4	17	
5-Feb	11	10	7	1	2	Z	4	4	3	5	2	1	1	1	2	2	4	5	3	2	1	1	0	0	3.0	11	
6-Feb	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0.4	3
7-Feb	0	Z	1	1	2	1	1	1	1	0	1	1	1	2	1	1	1	1	1	1	2	2	2	2	1.1	2	
8-Feb	1	0	Z	3	13	21	19	14	6	10	12	7	7	12	6	8	5	5	5	6	7	5	6	3	7.7	21	
9-Feb	2	2	1	Z	1	1	0	1	1	3	1	0	1	1	1	0	1	1	0	2	1	0	0	0	0.9	3	
10-Feb	3	25	27	26	Z	23	11	7	9	6	4	6	5	3	3	4	5	8	7	9	10	3	2	4	9.1	27	
11-Feb	10	16	11	8	7	Z	7	7	6	7	4	2	2	2	4	4	4	3	3	3	2	3	2	3	5.2	16	
12-Feb	Z	4	5	3	3	3	5	5	4	5	4	4	5	2	2	2	4	3	4	13	27	20	2	2	5.6	27	
13-Feb	3	Z	1	2	1	0	0	1	1	1	1	1	1	1	0	0	0	0	1	4	5	2	1	1	1.2	5	
14-Feb	0	0	Z	1	1	0	1	1	2	5	4	4	2	1	2	3	2	3	4	2	2	11	15	10	3.2	15	
15-Feb	8	8	9	Z	9	8	7	1	1	1	2	2	3	4	7	8	15	15	13	9	3	2	3	4	6.2	15	
16-Feb	4	4	3	5	Z	3	3	4	8	6	3	14	7	5	4	3	4	8	9	18	7	7	7	7	6.2	18	
17-Feb	4	4	4	4	3	Z	2	2	4	2	3	4	14	3	2	4	10	10	6	4	3	4	4	4	4.5	14	
18-Feb	Z	4	5	7	5	4	5	4	4	4	3	2	2	2	3	2	2	2	2	1	2	2	2	2	3.0	7	
19-Feb	2	Z	3	4	4	5	8	17	10	8	6	6	5	6	5	4	4	8	26	22	17	8	6	3	8.1	26	
20-Feb	2	1	Z	2	3	4	4	4	2	1	1	2	2	4	3	7	7	8	8	9	7	5	12	7	4.4	12	
21-Feb	10	12	10	Z	8	13	11	12	10	7	5	5	5	16	4	4	2	2	7	2	5	7	19	8	8.0	19	
22-Feb	6	2	2	3	Z	2	2	2	2	3	5	4	4	4	2	2	3	4	4	4	3	2	3	2	3.0	6	
23-Feb	2	2	1	1	1	Z	1	1	2	1	1	1	0	1	1	5	5	2	1	1	1	0	0	0	1.3	5	
24-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0.5	6
25-Feb	7	Z	8	9	11	11	10	10	9	11	6	5	4	3	4	5	7	7	6	6	7	8	8	8	7.4	11	
26-Feb	9	8	Z	6	7	5	3	3	4	2	1	1	1	2	1	2	2	2	6	6	7	4	11	7	4.3	11	
27-Feb	3	2	1	Z	5	6	5	4	4	4	5	3	1	1	7	2	2	3	4	6	10	6	2	1	3.7	10	
28-Feb	2	1	1	2	Z	1	1	1	1	1	1	1	2	3	1	1	3	1	1	1	1	1	2	1	1.3	3	
	4.2	4.9	4.9	4.3	4.2	5.1	4.4	4.6	3.9	3.7	2.9	3.2	3.1	3.3	2.9	3.4	4.0	4.4	5.3	5.9	5.8	4.6	4.7	3.6		Diurnal Average	
	11	25	27	26	13	23	19	17	10	11	12	14	14	16	8	9	15	15	26	22	27	20	19	10		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  
Anzac - February 2015







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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	631	98.75	98.75
21 - 40	8	1.25	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Anzac - February 2015**

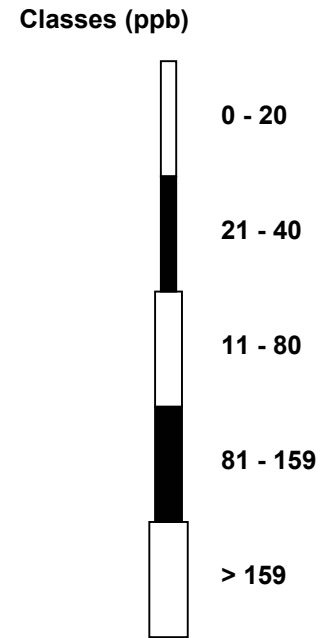
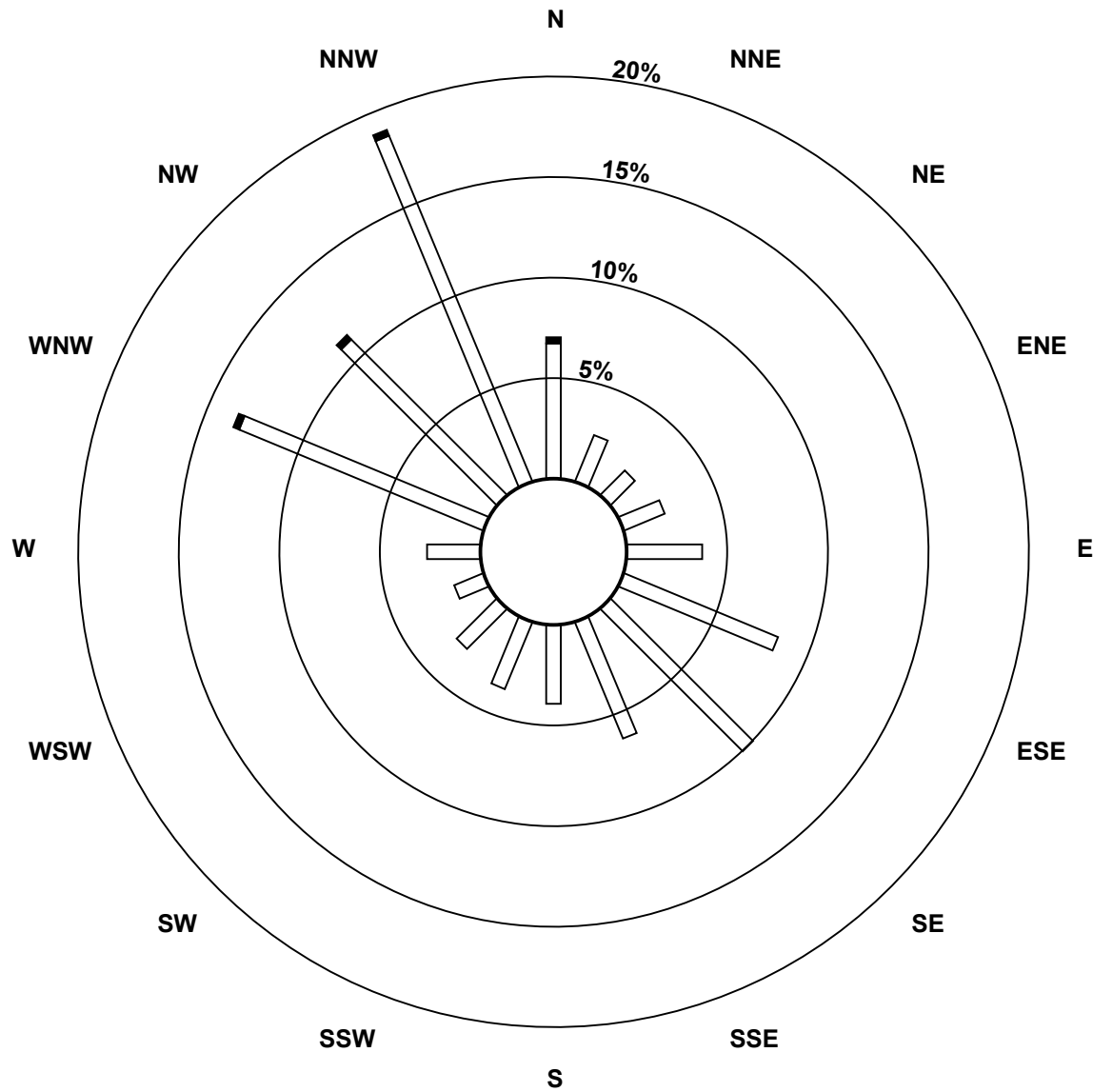
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	16	11	14	24	53	64	40	25	23	18	10	17	84	70	119	631
21 - 40	2	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	8
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	16	11	14	24	53	64	40	25	23	18	10	17	86	72	121	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac (AMS 14)**

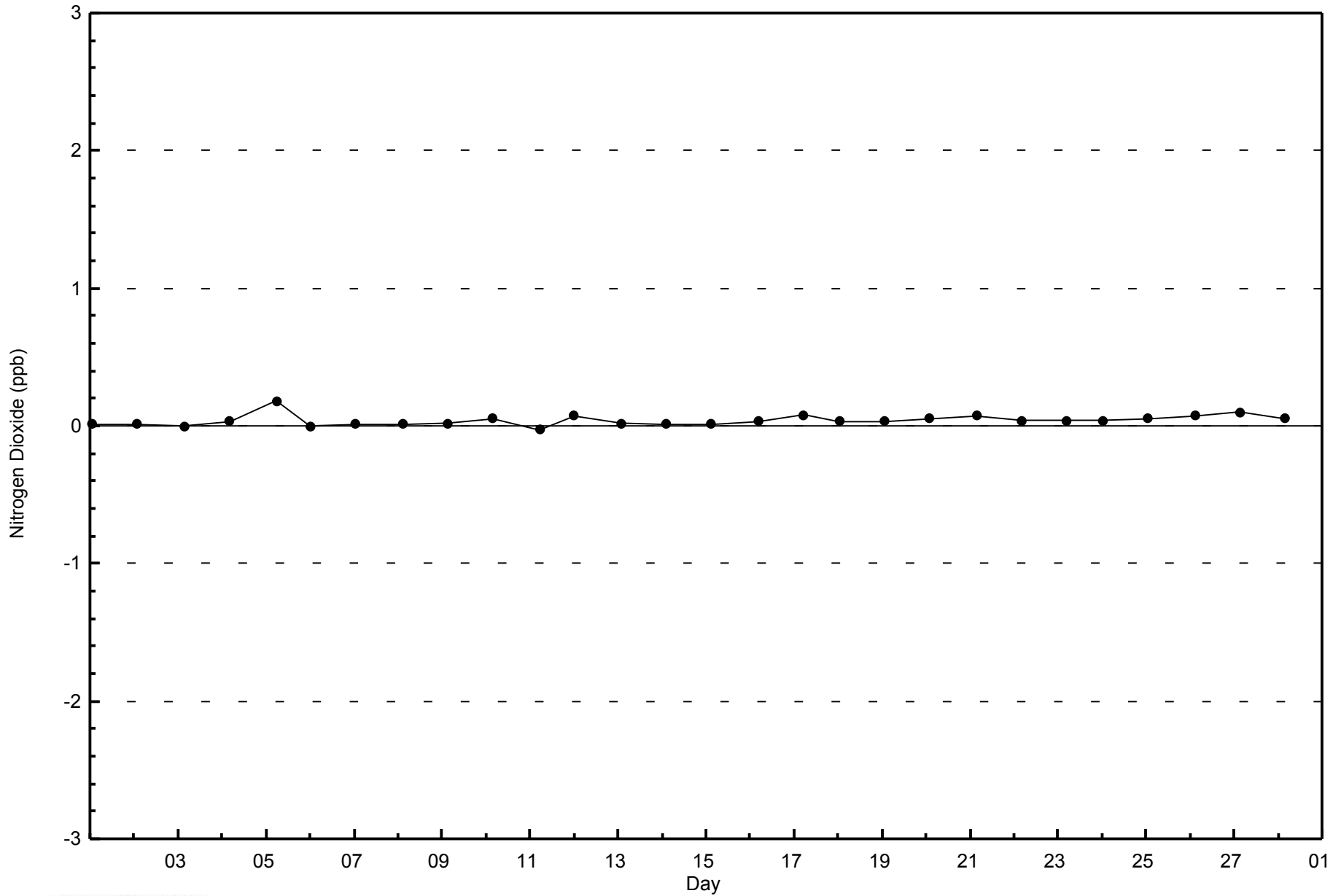


**Total Number of Valid Hours: 639**



WBEA  
Zero Responses

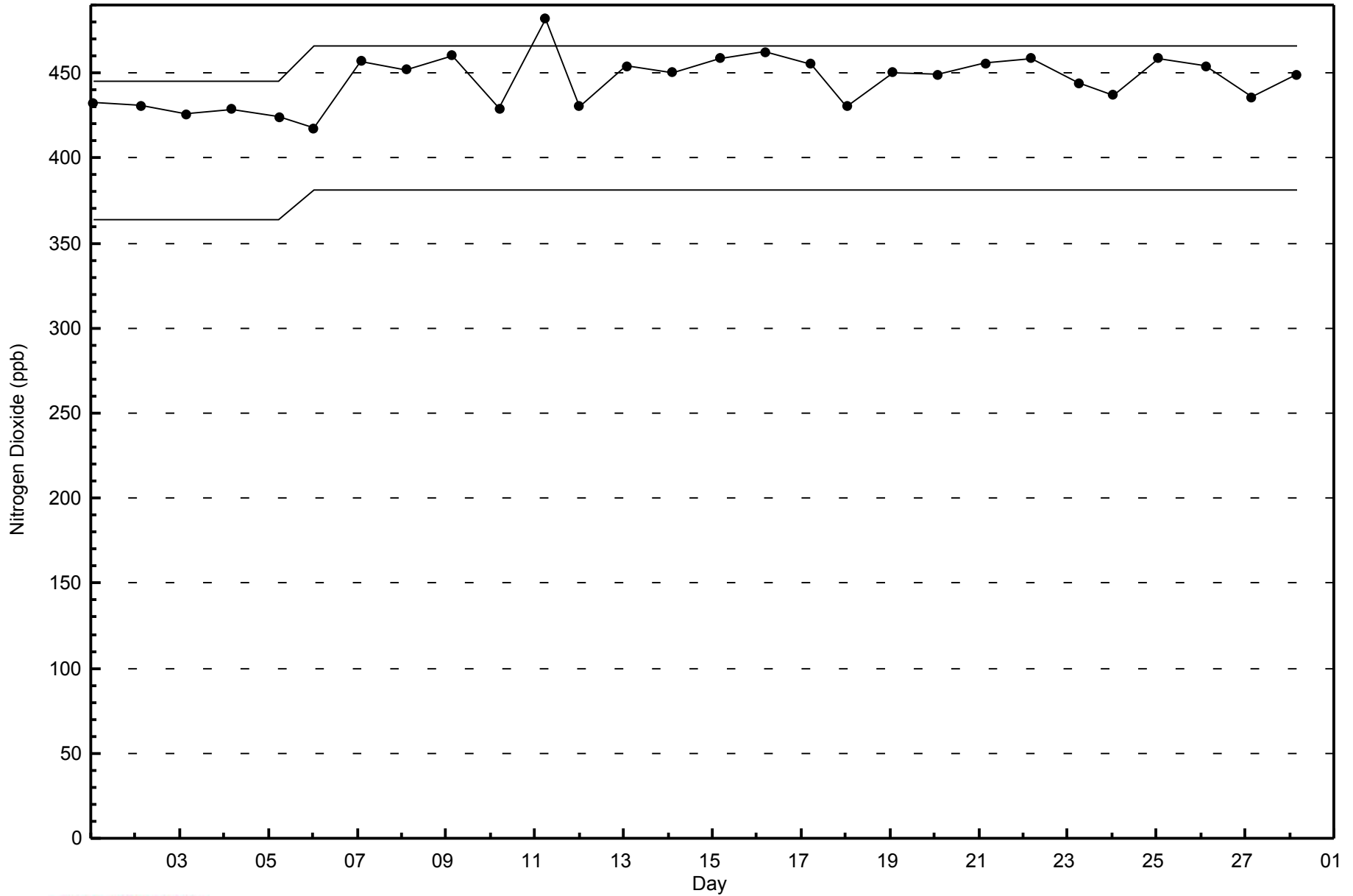
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Anzac - February 2015



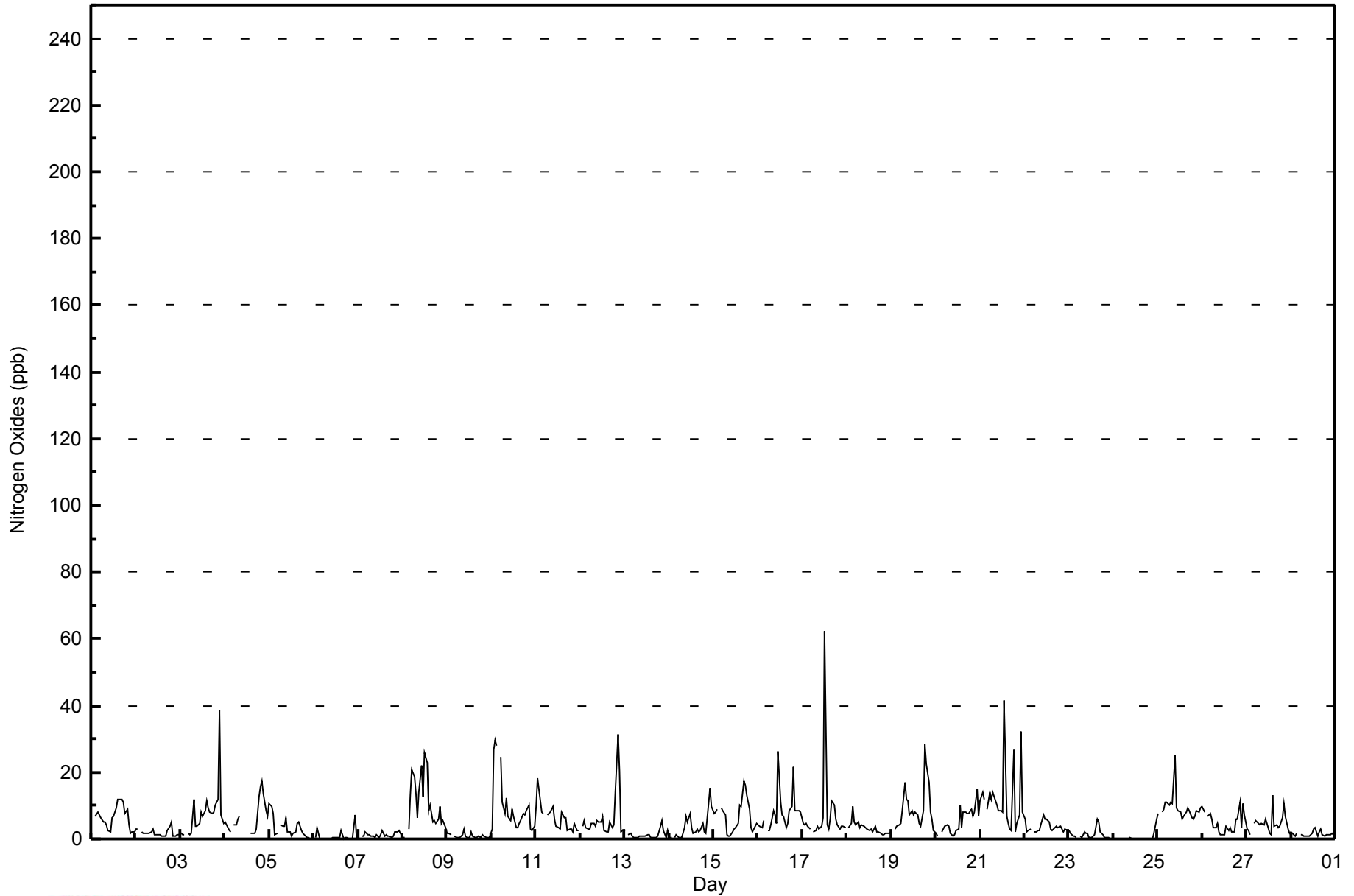


Maximum Value: 62 ppb on Feb 17 13:00																		Maximum Daily Average: 11.8 ppb on Feb 21						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 24 18:00																		Minimum Daily Average: 0.5 ppb on Feb 24						Hours of Data: 639		
Maximum Diurnal Average: 6.8 ppb at hour 13																		Minimum Diurnal Average: 3.8 ppb at hour 24						Hours of Missing Data: 33		
Monthly Average: 5.1 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> = 11 P <sub>99</sub> = 28						Hours of Calibration: 33		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	7	Z	7	8	7	6	5	5	4	3	2	6	7	9	12	12	12	11	7	9	4	2	2	2	6.5	12
2-Feb	3	3	Z	2	2	2	2	2	2	3	1	1	1	1	1	1	1	2	4	5	1	1	1	1	1.9	5
3-Feb	2	1	1	Z	2	1	2	12	4	4	5	8	7	8	11	9	8	7	8	10	12	38	7	5	7.5	38
4-Feb	5	4	2	2	Z	4	4	6	7	C	C	C	C	C	2	2	2	3	13	16	17	13	8	7	6.5	17
5-Feb	11	10	8	1	2	Z	4	4	4	6	2	2	1	2	2	5	5	2	2	1	1	0	0	0	3.2	11
6-Feb	Z	0	3	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	7	0	0.8	7
7-Feb	0	Z	1	1	2	1	1	1	1	0	1	1	1	3	1	1	1	1	1	1	2	2	2	2	1.2	3
8-Feb	0	0	Z	3	13	21	19	14	6	14	22	13	26	23	9	10	5	6	5	6	10	5	6	3	10.3	26
9-Feb	2	2	1	Z	1	0	0	0	1	3	1	0	0	2	1	1	1	1	0	1	1	0	0	0	0.9	3
10-Feb	3	27	30	28	Z	24	11	7	12	7	6	9	7	3	3	5	6	8	7	9	10	3	2	4	10.0	30
11-Feb	10	18	11	8	8	Z	7	7	8	10	6	4	3	3	8	6	6	3	3	3	2	5	2	3	6.3	18
12-Feb	Z	4	5	3	3	3	5	5	4	6	5	5	7	3	2	2	5	3	4	14	31	20	2	2	6.3	31
13-Feb	3	Z	1	2	1	0	0	1	1	1	1	1	1	1	0	0	0	0	1	4	5	2	0	2	1.3	5
14-Feb	0	0	Z	0	1	0	1	0	3	7	5	8	4	2	2	3	2	3	5	2	2	11	15	10	3.7	15
15-Feb	8	8	9	Z	9	8	7	1	1	1	2	3	3	5	10	10	17	16	13	9	3	2	3	5	6.7	17
16-Feb	4	4	3	5	Z	3	3	4	9	7	5	26	11	7	7	3	5	8	10	22	8	8	8	8	7.8	26
17-Feb	5	4	5	4	3	Z	2	2	4	3	4	6	62	4	3	6	11	10	6	4	3	4	4	4	7.1	62
18-Feb	Z	4	5	10	5	4	5	4	4	4	3	3	3	3	2	4	2	2	2	1	1	2	2	2	3.3	10
19-Feb	2	Z	3	4	4	5	9	17	12	11	7	8	7	8	7	5	4	8	28	22	17	8	6	3	9.0	28
20-Feb	2	1	Z	2	3	4	4	4	2	1	1	3	3	10	3	8	8	8	8	9	7	8	15	7	5.2	15
21-Feb	12	14	12	Z	9	14	12	14	12	10	8	9	8	42	7	5	3	2	27	2	5	7	32	8	11.8	42
22-Feb	6	2	2	3	Z	2	2	3	2	4	7	6	6	5	3	2	3	4	3	4	3	2	3	3	3.6	7
23-Feb	3	2	1	1	1	Z	1	1	2	2	0	0	1	1	6	5	2	1	1	1	0	0	0	0	1.4	6
24-Feb	Z	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	6	0.5	6
25-Feb	7	Z	8	9	11	11	10	11	11	25	9	8	8	6	7	8	9	8	6	6	7	9	8	9	9.2	25
26-Feb	10	8	Z	7	8	6	4	4	5	2	1	1	1	4	3	4	2	2	6	6	11	3	10	7	5.0	11
27-Feb	3	2	1	Z	5	6	5	4	4	4	6	5	2	1	13	4	4	3	4	6	10	7	3	2	4.6	13
28-Feb	2	1	1	2	Z	1	1	1	1	1	1	2	3	3	1	2	3	1	1	1	1	1	2	1	1.5	3
																		Diurnal Average						Diurnal Maximum		
																		12						10		
Z - zerospan																		C - Calibration								



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac - February 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	620	97.03	97.03
21 - 40	17	2.66	99.69
41 - 80	2	0.31	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Anzac - February 2015**

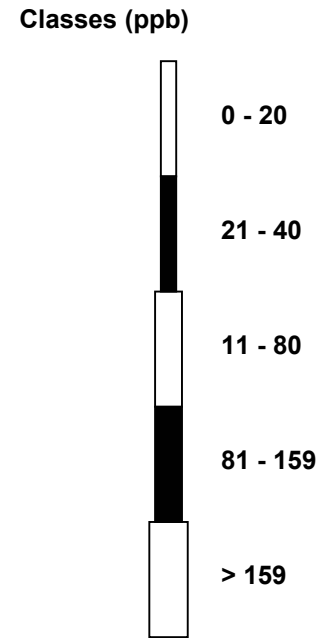
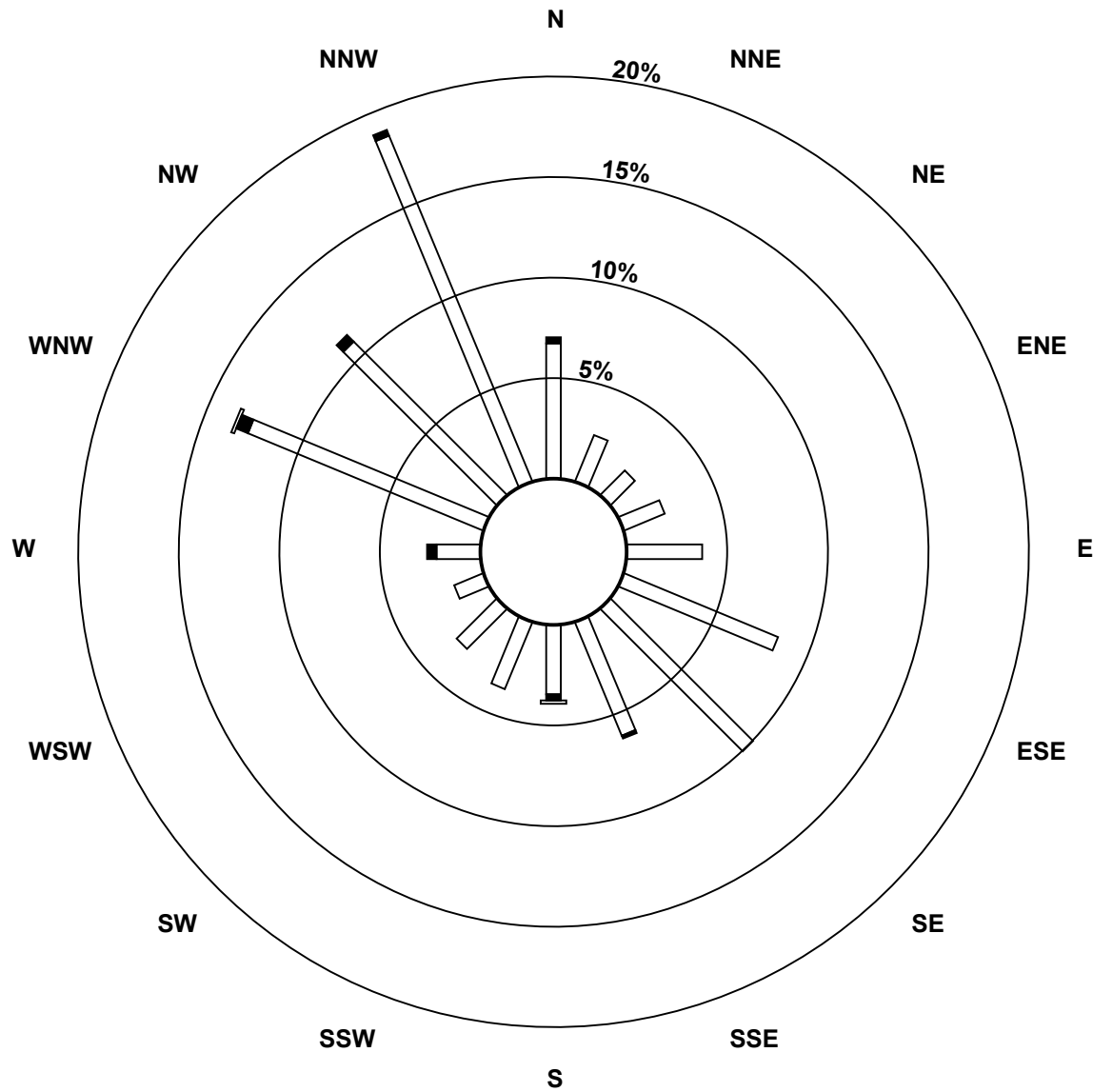
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	43	16	11	14	24	53	64	39	22	23	18	10	14	81	69	119	620
21 - 40	2	0	0	0	0	0	0	1	2	0	0	0	3	4	3	2	17
41 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	45	16	11	14	24	53	64	40	25	23	18	10	17	86	72	121	639

Total Number of Valid Hours: 639

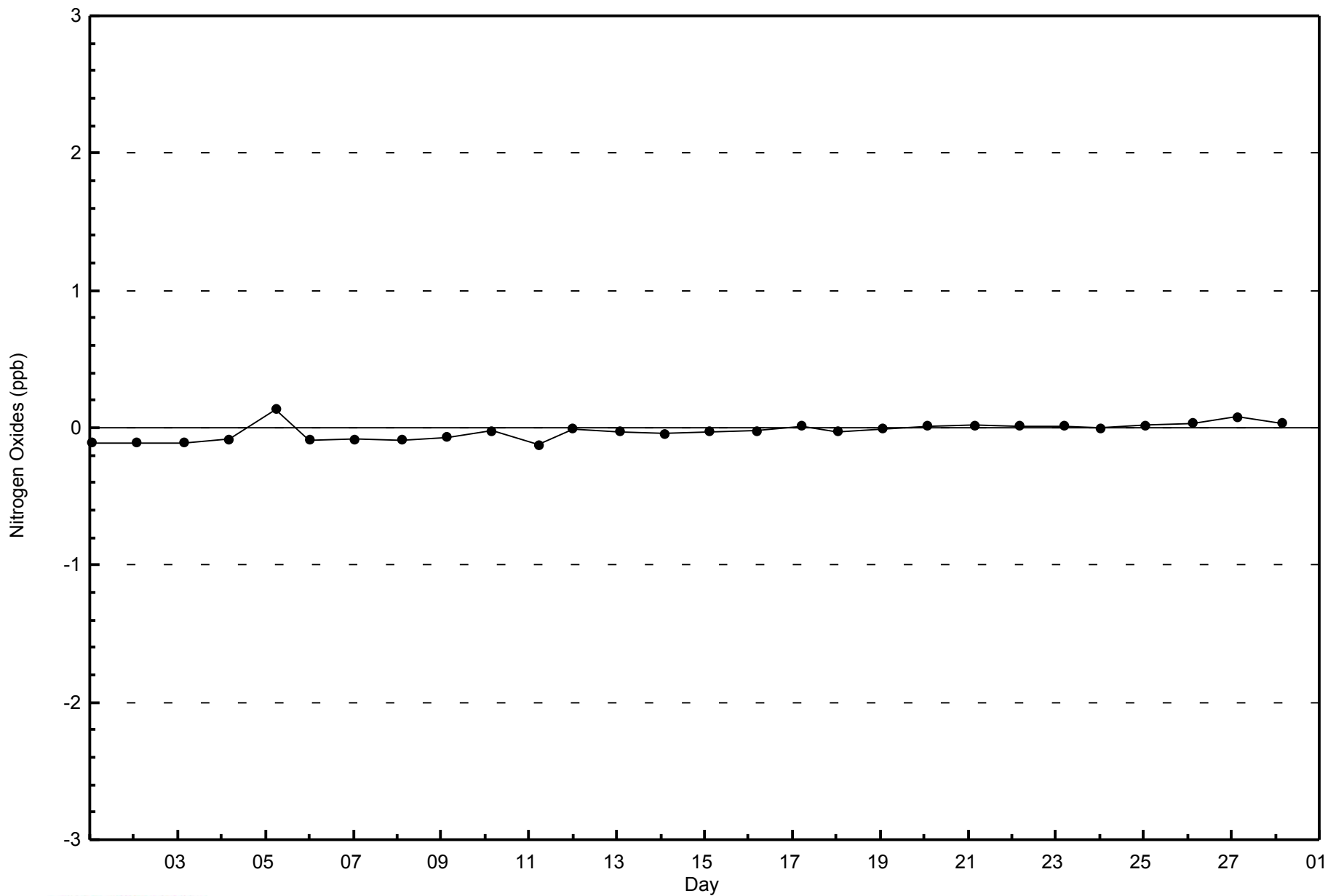
Total Number of Hours: 672

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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac (AMS 14)**



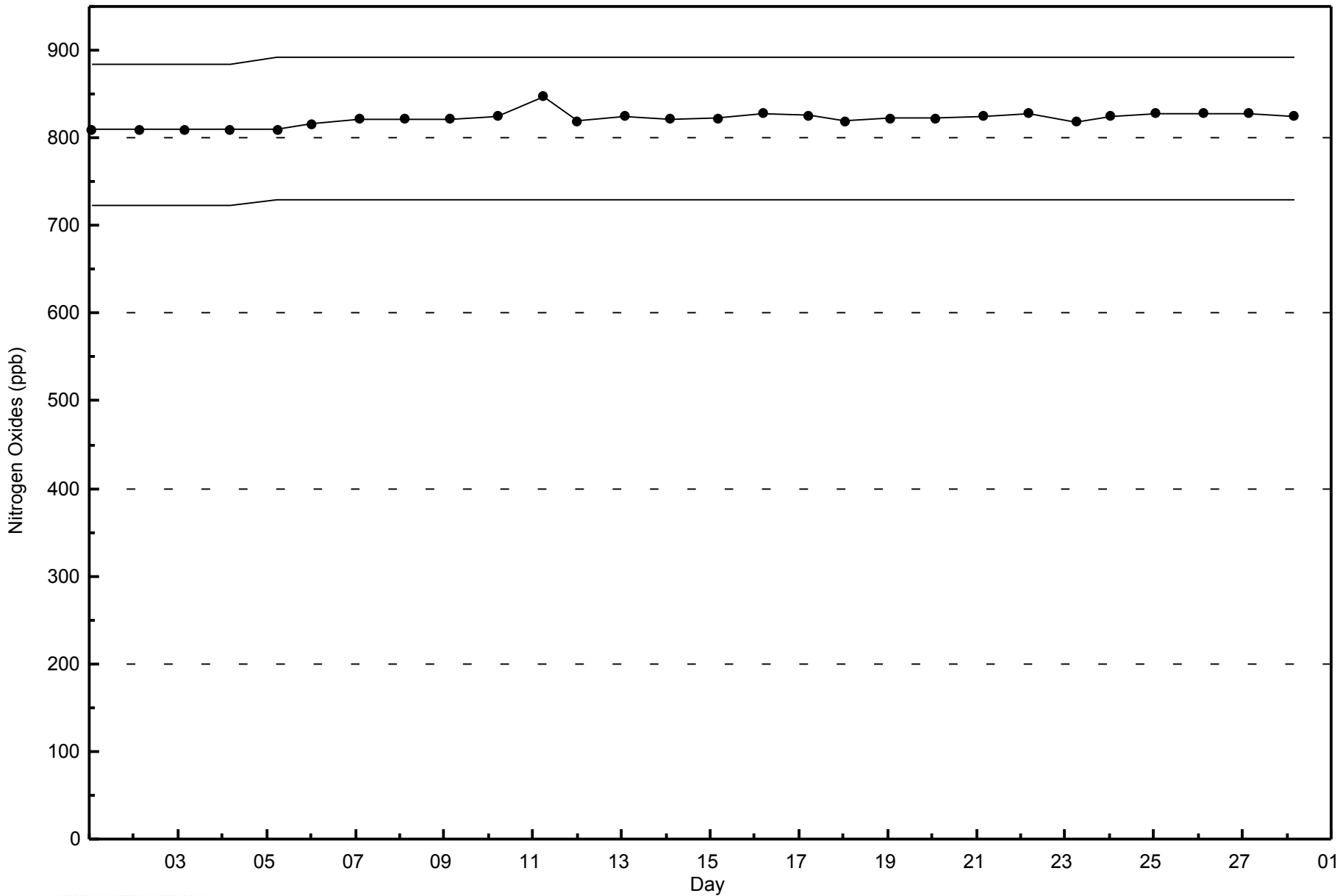
**Total Number of Valid Hours: 639**





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Anzac - February 2015





Wood Buffalo Environmental Association

Summary of Hour Averages

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

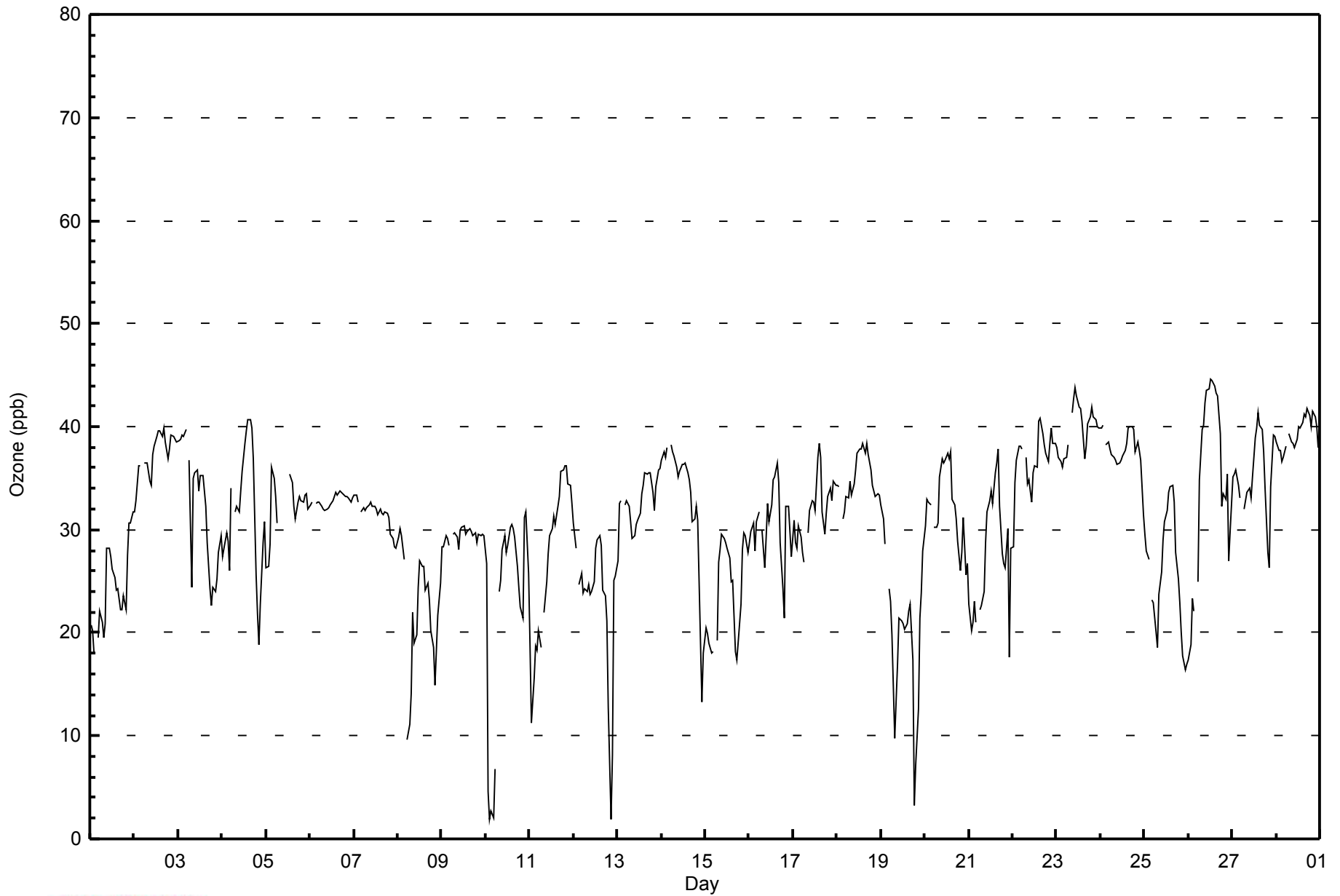
Anzac - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 45 ppb on Feb 26 13:00										Maximum Daily Average: 39.7 ppb on Feb 23										Hours of Data: 640						
Minimum Value: 2 ppb on Feb 10 03:00										Minimum Daily Average: 20.1 ppb on Feb 19										Hours of Missing Data: 32						
Maximum Diurnal Average: 34.5 ppb at hour 15										Minimum Diurnal Average: 28.4 ppb at hour 5										Hours of Calibration: 32						
Monthly Average: 30.8 ppb										Percentiles: P <sub>1</sub> = 7 P <sub>10</sub> = 21 Q <sub>1</sub> = 27 Median = 32 Q <sub>3</sub> = 36 P <sub>90</sub> = 39 P <sub>99</sub> = 43										Percent Operational Time: 100.0						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	21	20	18	Z	19	22	21	20	21	28	28	27	26	25	24	24	22	22	24	22	27	31	31	32	24.2	32
2-Feb	32	33	36	Z	36	36	36	37	35	34	37	38	39	40	40	39	40	38	37	38	39	39	39	38	37.3	40
3-Feb	39	39	39	39	40	Z	37	24	35	36	36	34	35	35	34	32	29	24	23	24	24	25	28	29	32.2	40
4-Feb	27	28	30	29	26	34	Z	32	32	32	34	36	38	40	41	40	37	26	22	19	23	29	31	31.5	41	
5-Feb	26	26	29	36	35	33	31	Z	25	C	C	C	C	35	35	32	31	33	33	33	33	33	32	31.8	36	
6-Feb	32	33	Z	33	33	33	32	32	32	32	32	32	33	33	34	33	34	34	33	33	33	33	33	33	32.8	34
7-Feb	33	33	33	Z	32	32	32	32	32	33	32	32	32	31	32	32	31	32	32	31	30	29	28	28	31.5	33
8-Feb	29	30	29	27	Z	10	11	14	22	19	20	24	27	26	26	24	25	23	20	19	15	18	22	25	22.0	30
9-Feb	28	28	29	29	28	Z	30	30	29	28	30	30	30	30	30	30	30	29	30	29	30	29	30	29	29.4	30
10-Feb	27	5	2	3	2	7	Z	24	25	28	29	28	29	30	30	30	29	26	24	22	21	31	32	26	22.2	32
11-Feb	19	11	16	19	18	20	19	Z	22	25	28	29	30	31	30	32	33	36	36	36	36	34	34	33	27.3	36
12-Feb	31	28	Z	25	26	24	24	24	25	24	24	25	28	29	29	29	24	24	21	13	2	8	25	25	23.3	31
13-Feb	27	33	33	Z	32	33	32	31	29	29	30	31	32	34	34	35	35	36	35	34	32	34	36	36	32.8	36
14-Feb	37	37	37	38	Z	38	38	37	36	35	36	36	36	36	35	34	31	31	32	31	19	13	18	18	32.9	38
15-Feb	20	20	19	18	18	Z	19	27	28	30	29	29	28	27	25	25	18	17	19	23	28	30	29	28	24.1	30
16-Feb	29	30	31	28	31	32	Z	30	26	29	32	31	32	35	35	36	35	29	24	21	32	32	30	27	30.3	36
17-Feb	31	29	28	30	29	28	27	Z	30	32	33	33	32	37	38	37	32	30	32	33	34	33	35	34	32.0	38
18-Feb	34	34	Z	31	32	33	33	35	33	35	36	37	38	38	38	37	38	37	36	34	34	33	33	33	35.0	38
19-Feb	32	31	29	Z	24	23	20	10	13	17	21	21	21	20	21	22	23	17	3	7	13	21	24	28	20.1	32
20-Feb	30	33	33	32	Z	30	30	31	35	37	36	37	37	37	38	33	32	31	29	26	28	31	26	27	32.1	38
21-Feb	23	20	21	23	21	Z	22	23	24	29	32	33	34	33	36	36	38	32	28	27	26	30	18	28	27.6	38
22-Feb	28	35	37	38	38	38	Z	37	34	35	33	36	36	36	41	41	39	38	37	37	38	40	38	38	36.9	41
23-Feb	38	37	37	36	37	37	38	Z	41	43	44	43	42	41	37	38	40	41	42	41	41	40	40	40	39.7	44
24-Feb	40	40	Z	38	39	38	37	37	37	36	36	37	37	38	38	40	40	40	40	38	39	38	37	31	37.8	40
25-Feb	30	28	27	Z	23	23	20	19	24	26	29	31	32	34	34	34	33	28	25	23	20	18	16	17	25.8	34
26-Feb	17	19	23	22	Z	25	35	40	40	42	43	44	45	45	44	43	43	39	32	33	33	35	27	30	34.8	45
27-Feb	35	35	36	34	33	Z	32	33	34	34	33	35	39	40	41	40	40	38	34	28	26	34	39	39	35.3	41
28-Feb	39	38	38	37	37	38	Z	39	39	38	38	39	40	40	40	41	41	42	41	40	41	41	40	38	39.3	42
29.8 29.1 28.7 29.6 28.4 29.0 28.5 29.0 30.0 31.3 32.3 32.9 33.6 34.2 34.5 34.0 33.1 31.5 29.5 28.6 28.8 30.2 30.1 30.5																								Diurnal Average		
40 40 39 39 40 38 38 40 41 43 44 44 45 45 44 43 43 42 41 42 41 41 40 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**  
**Anzac - February 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	60	9.38	9.38
21 - 50	580	90.63	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 640

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Anzac - February 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	0	0	1	2	3	0	4	7	4	0	3	1	5	8	15	60
21 - 50	36	15	11	13	23	50	66	34	18	19	18	7	16	86	64	104	580
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>	<b>43</b>	<b>15</b>	<b>11</b>	<b>14</b>	<b>25</b>	<b>53</b>	<b>66</b>	<b>38</b>	<b>25</b>	<b>23</b>	<b>18</b>	<b>10</b>	<b>17</b>	<b>91</b>	<b>72</b>	<b>119</b>	<b>640</b>

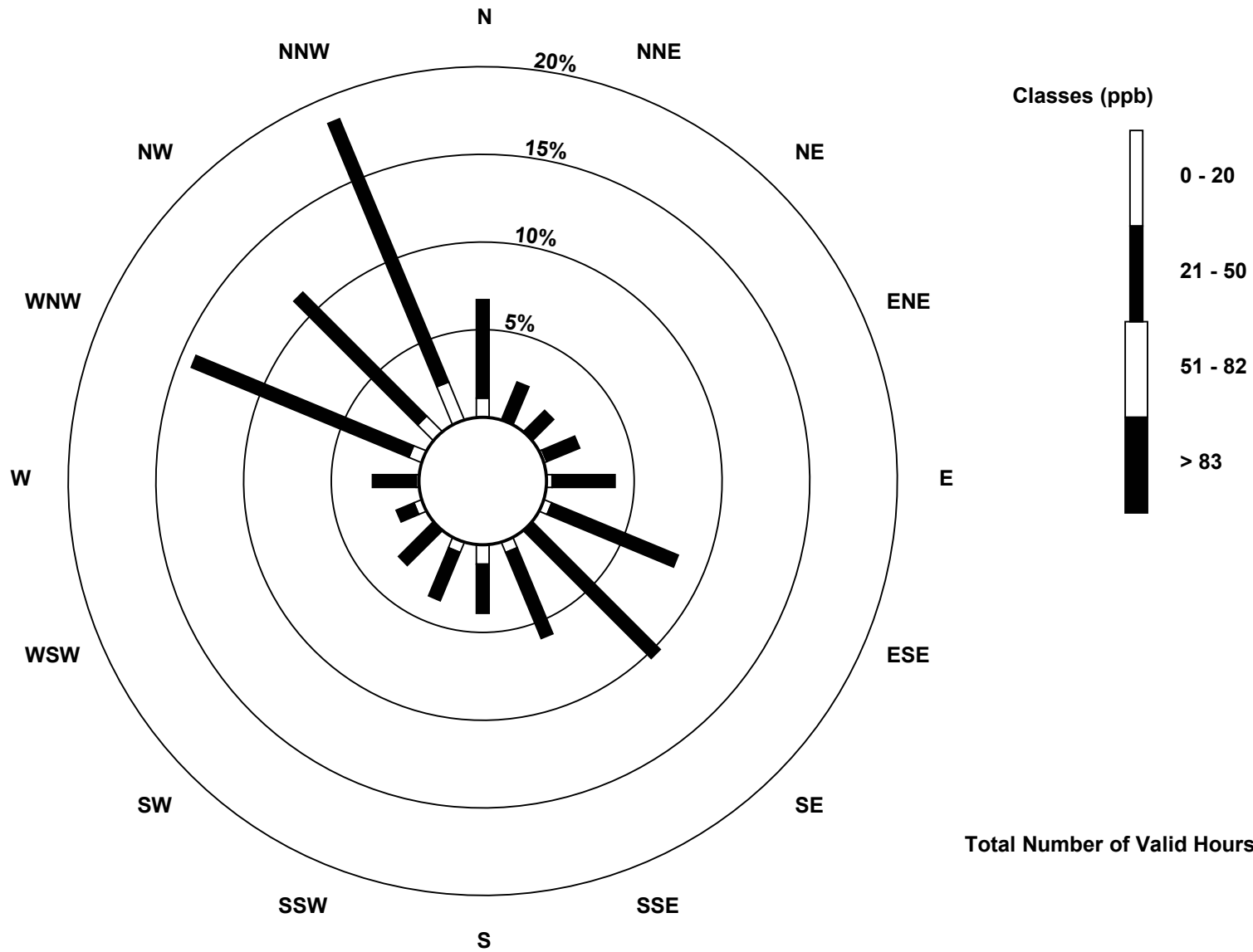
Total Number of Valid Hours: 640

Total Number of Hours: 672



Wood Buffalo Environmental Association  
Wind Rose Feb 2015

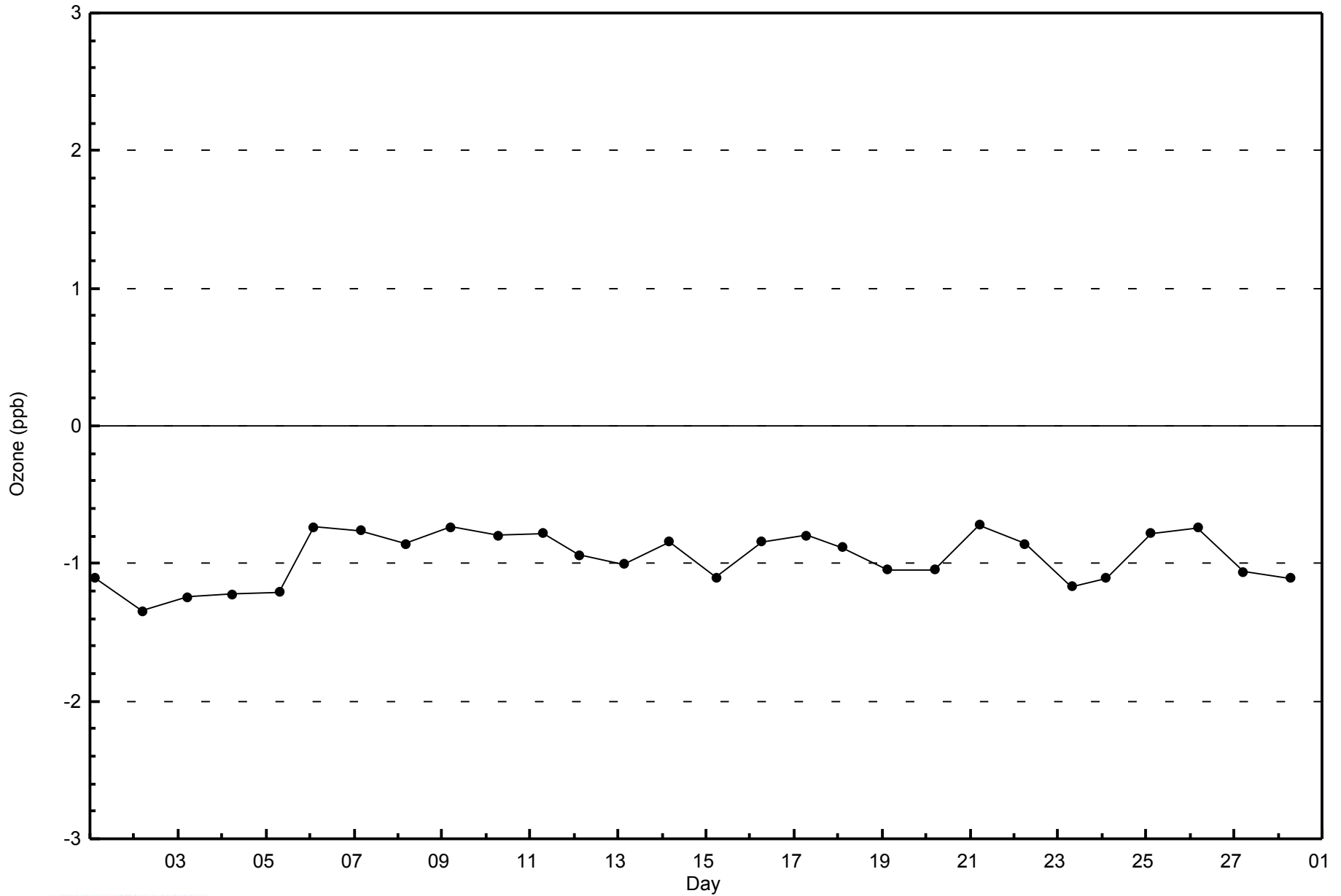
Ozone (O<sub>3</sub>) - ppb  
Anzac (AMS 14)





WBEA  
Zero Responses

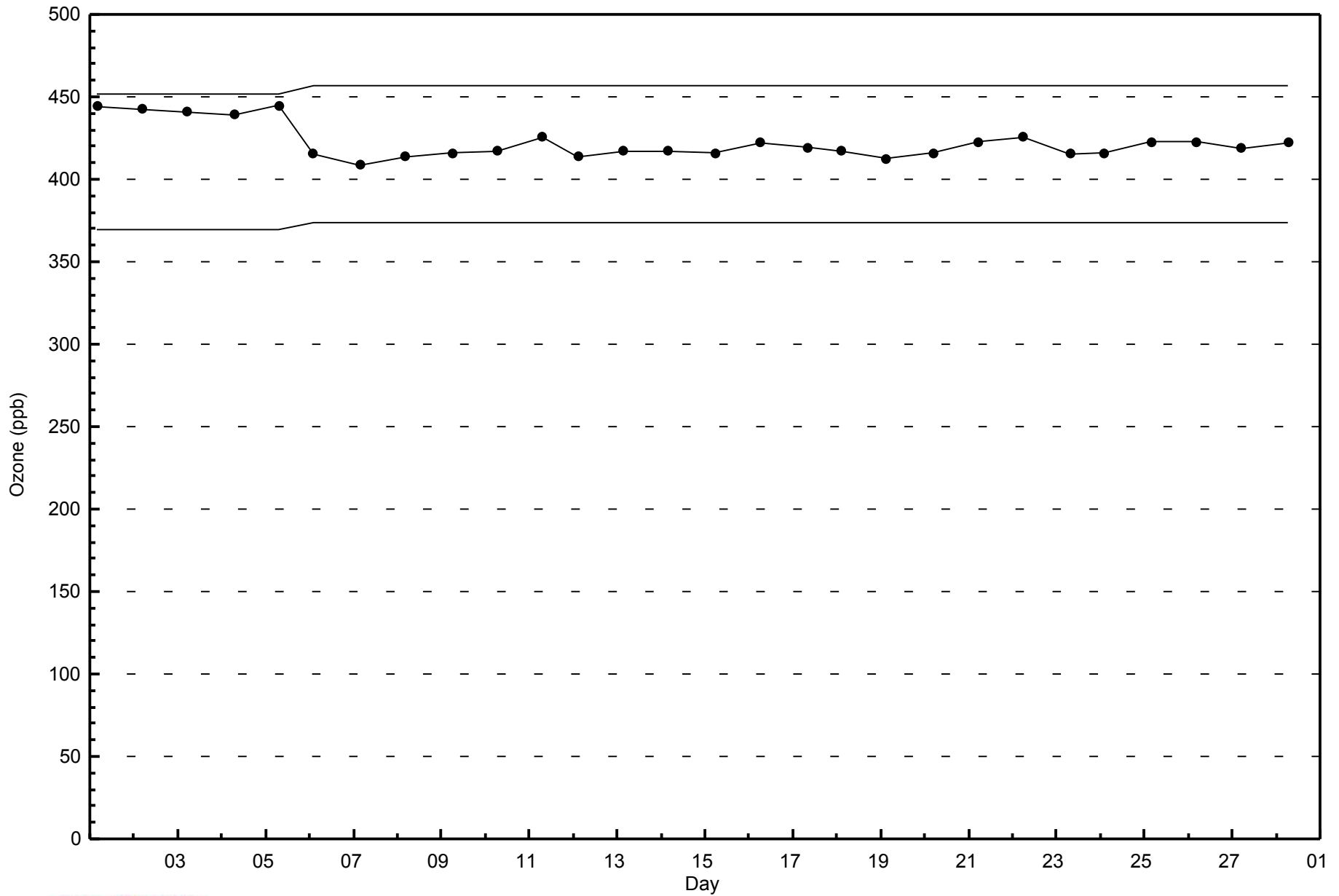
Ozone (O<sub>3</sub>) - ppb  
Anzac - February 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Anzac - February 2015





Summary of Hour Averages

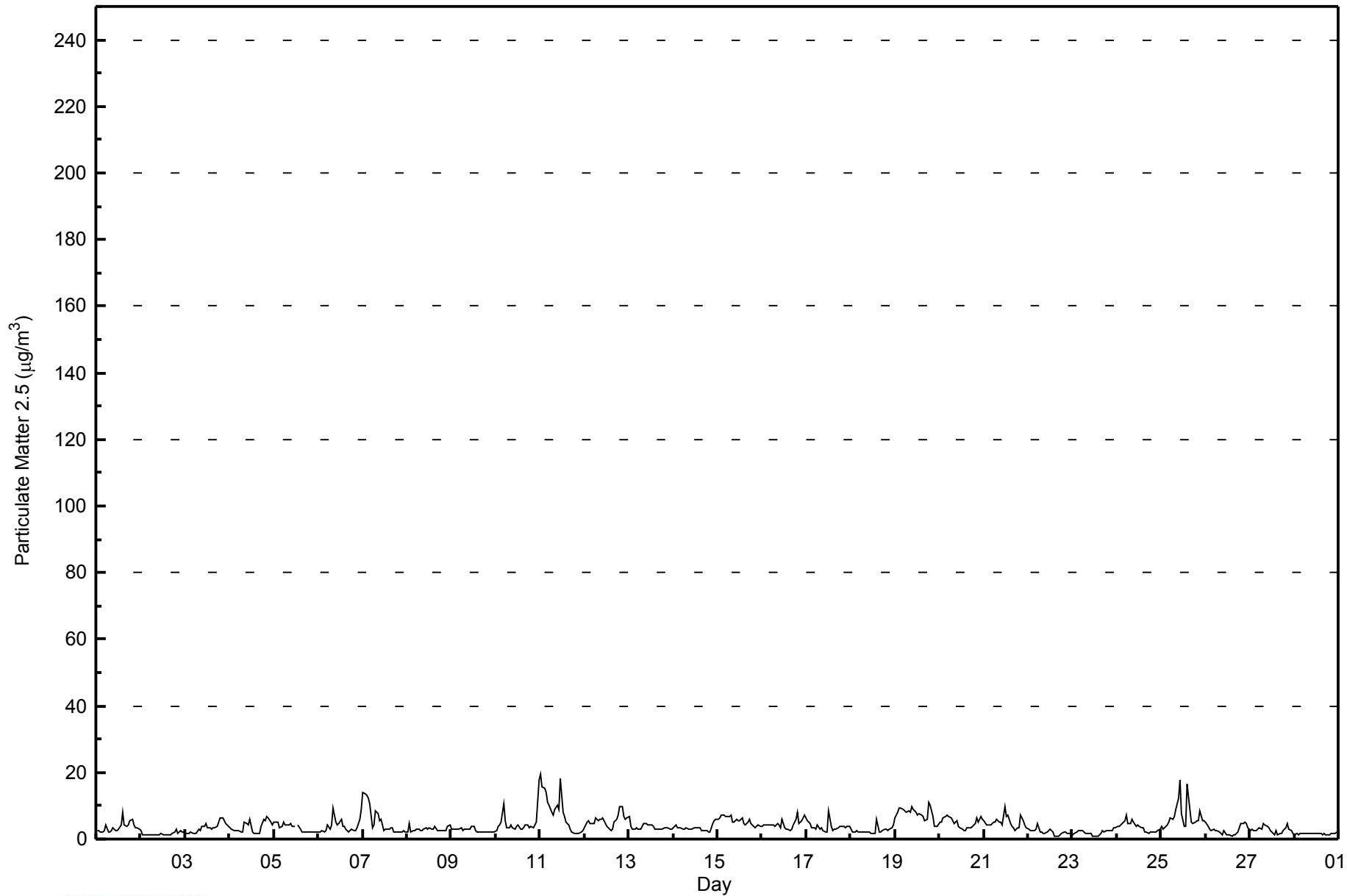
Anzac - February 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																								
Maximum Value: 19.4 µg/m <sup>3</sup> on Feb 11 01:00		Maximum Daily Average: 7.8 µg/m <sup>3</sup> on Feb 11																								
Minimum Value: 0.7 µg/m <sup>3</sup> on Feb 23 13:00		Hours of Data: 671																								
Maximum Diurnal Average: 4.6 µg/m <sup>3</sup> at hour 1		Hours of Missing Data: 1																								
Monthly Average: 3.97 µg/m <sup>3</sup>		Hours of Calibration: 0																								
Minimum Daily Average: 1.6 µg/m <sup>3</sup> on Feb 2		Percent Operational Time: 99.9																								
Minimum Diurnal Average: 2.9 µg/m <sup>3</sup> at hour 17		Percentiles: P <sub>1</sub> = 1.0 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.3 Median = 3.3 Q <sub>3</sub> = 4.8 P <sub>90</sub> = 6.9 P <sub>99</sub> = 15.4																								
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-Feb	2.7	2.5	2.1	2.2	2.3	4.4	2.0	2.0	2.4	3.2	2.4	2.5	2.9	4.4	8.1	4.2	3.7	4.3	5.6	6.1	4.4	3.6	3.6	3.0	3.5	8.1
2-Feb	2.5	1.3	1.2	1.1	1.1	1.3	1.4	1.4	1.1	1.1	1.1	1.6	1.2	1.2	1.2	1.2	1.3	1.9	2.2	2.9	1.8	2.5	2.2	2.0	1.6	2.9
3-Feb	1.9	1.8	1.7	1.9	1.7	1.6	1.8	2.8	2.7	4.0	3.7	4.5	3.3	3.4	2.9	3.4	3.3	3.7	4.9	6.4	6.3	5.6	4.8	3.9	3.4	6.4
4-Feb	3.3	3.0	2.7	2.6	2.6	2.7	2.0	2.1	4.9	4.7	4.3	5.9	2.1	1.7	1.6	1.5	1.7	4.0	5.8	5.7	6.8	6.6	5.0	4.3	3.7	6.8
5-Feb	5.1	4.9	5.3	3.6	3.9	4.9	4.4	4.0	4.4	4.5	3.8	3.9	M	4.2	2.9	1.9	1.9	2.0	2.2	2.3	2.2	2.2	2.1	2.1	3.4	5.3
6-Feb	2.1	2.2	2.5	2.2	2.7	4.1	3.0	4.3	9.4	5.0	4.3	4.8	5.9	3.9	3.9	3.0	2.2	2.4	3.0	2.7	2.7	3.5	5.9	9.0	3.9	9.4
7-Feb	14.0	13.6	13.0	12.4	10.6	3.6	4.1	8.5	7.4	5.6	5.8	2.6	2.8	3.0	2.9	3.4	3.5	2.2	2.2	2.1	2.2	2.1	2.4	2.2	5.5	14.0
8-Feb	2.0	4.6	2.2	2.4	2.7	2.8	2.9	2.7	2.4	2.8	3.3	2.8	3.5	3.1	3.2	3.7	2.7	2.5	2.4	2.5	2.4	2.7	3.9	4.2	2.9	4.6
9-Feb	3.0	2.9	2.8	2.8	3.1	3.3	2.7	2.8	2.9	2.9	3.0	3.8	4.0	2.7	2.2	2.1	2.3	2.2	2.1	1.9	2.2	2.2	2.0	2.0	2.7	4.0
10-Feb	2.4	3.7	4.1	4.9	10.7	5.5	3.5	3.3	4.3	3.3	3.1	4.0	4.3	3.1	3.1	3.4	4.2	4.4	3.5	3.7	3.5	4.4	5.0	18.0	4.7	18.0
11-Feb	19.4	15.5	15.4	14.2	11.2	10.2	8.1	7.2	8.8	10.1	8.8	18.2	8.2	6.7	5.1	4.1	2.8	2.3	1.8	1.5	1.6	1.8	2.0	2.6	7.8	19.4
12-Feb	3.3	4.9	5.4	4.7	4.5	4.7	6.2	5.7	6.0	6.1	6.3	4.8	3.8	3.3	2.4	3.0	5.1	6.1	7.0	9.7	9.7	6.9	6.0	6.6	5.5	9.7
13-Feb	7.0	3.9	3.1	3.2	3.2	2.8	3.0	3.7	4.7	4.6	4.4	4.2	4.3	3.7	2.9	2.8	2.9	3.0	2.9	3.2	3.4	3.4	3.1	3.1	3.6	7.0
14-Feb	3.3	4.4	3.6	3.3	3.5	2.9	3.2	3.2	3.0	2.9	3.2	3.6	3.5	3.3	2.6	2.7	2.7	2.4	2.3	2.2	4.7	5.7	6.1	6.1	3.4	6.1
15-Feb	6.0	6.3	7.1	7.0	6.6	6.7	6.9	7.0	5.3	5.0	5.8	5.7	5.6	6.2	4.7	4.2	5.1	6.0	4.7	3.8	3.5	3.8	4.0	3.7	5.4	7.1
16-Feb	3.9	4.1	4.3	4.4	4.1	4.3	4.1	3.9	4.6	4.0	3.3	6.0	3.5	3.0	2.9	2.6	3.1	4.3	5.9	8.0	4.8	5.6	6.5	7.0	4.5	8.0
17-Feb	5.6	5.0	4.5	3.6	3.6	3.0	4.3	3.1	3.3	2.4	2.2	2.2	8.4	3.8	2.7	2.8	3.2	3.4	3.7	3.9	3.9	3.6	3.8	3.8	3.7	8.4
18-Feb	2.9	2.1	2.1	2.3	2.3	2.1	2.1	2.3	2.0	2.0	2.1	1.7	1.7	1.7	5.8	2.1	2.2	2.7	2.8	2.8	2.7	3.0	3.4	4.3	2.6	5.8
19-Feb	6.2	8.1	9.2	9.5	8.8	8.3	8.2	8.5	8.1	9.7	8.9	8.0	7.3	7.4	7.0	6.8	5.5	6.0	11.0	10.2	6.9	3.8	3.7	3.8	7.5	11.0
20-Feb	5.1	5.1	6.4	6.7	7.4	6.7	6.2	5.5	4.6	5.4	4.0	3.6	3.0	2.6	2.5	3.5	3.5	3.2	3.7	4.5	6.2	5.2	6.7	5.8	4.9	7.4
21-Feb	5.7	4.4	4.2	4.2	4.2	5.0	5.1	5.7	5.0	5.2	4.3	9.7	6.7	7.0	4.7	3.8	3.3	2.6	3.6	3.4	7.4	5.6	4.4	3.5	5.0	9.7
22-Feb	3.0	2.7	2.5	2.6	3.0	4.5	2.1	2.1	1.8	1.8	1.9	2.6	3.0	1.9	0.9	0.9	1.0	1.1	1.6	2.0	2.0	1.6	1.6	1.7	2.1	4.5
23-Feb	1.5	1.7	2.2	2.6	2.4	2.4	2.1	1.7	1.7	1.5	1.8	0.8	0.7	0.7	0.8	1.9	2.5	2.2	2.6	2.5	2.4	2.7	3.3	3.4	2.0	3.4
24-Feb	3.8	3.8	4.4	4.5	5.3	7.2	4.6	4.7	6.1	4.9	4.0	4.2	3.8	3.3	3.3	2.2	2.0	1.8	2.0	2.1	2.3	2.3	2.6	2.9	3.7	7.2
25-Feb	4.0	3.1	3.9	4.0	5.1	6.2	6.1	7.0	8.9	12.2	18.0	7.7	3.9	3.7	16.4	8.9	5.3	4.8	5.1	5.4	5.5	8.3	5.7	5.3	6.9	18.0
26-Feb	5.0	3.8	3.2	2.7	2.8	2.4	2.3	2.2	1.8	1.5	2.7	1.1	1.3	1.1	1.1	1.3	1.4	2.0	3.2	4.7	4.5	5.3	4.8	3.6	2.7	5.3
27-Feb	2.7	2.9	2.5	2.6	3.0	3.5	3.2	4.5	4.2	3.6	3.2	2.6	1.9	1.4	2.5	1.3	1.5	1.6	2.5	3.6	4.9	2.8	2.5	1.9	2.8	4.9
28-Feb	1.4	1.5	1.5	1.5	1.6	1.6	1.7	1.9	1.8	1.8	1.7	1.7	1.8	1.9	1.5	1.3	1.6	1.3	1.1	1.4	1.6	1.8	1.9	2.1	1.6	2.1
4.6 4.4 4.4 4.3 4.4 4.2 3.8 4.1 4.4 4.4 4.3 4.4 3.8 3.3 3.7 3.0 2.9 3.1 3.6 4.0 3.9 3.8 3.9 4.3																								Diurnal Average		
19.4 15.5 15.4 14.2 11.2 10.2 8.2 8.5 9.4 12.2 18.0 18.2 8.4 7.4 16.4 8.9 5.5 6.1 11.0 10.2 9.7 8.3 6.7 18.0																								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>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - February 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	539	80.33	80.33
6 - 15	120	17.88	98.21
16 - 25	6	0.89	99.11
26 - 80	0	0.00	99.11
> 81.0	0	0.00	99.11

Total Number of Valid Hours: 671

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Anzac - February 2015**

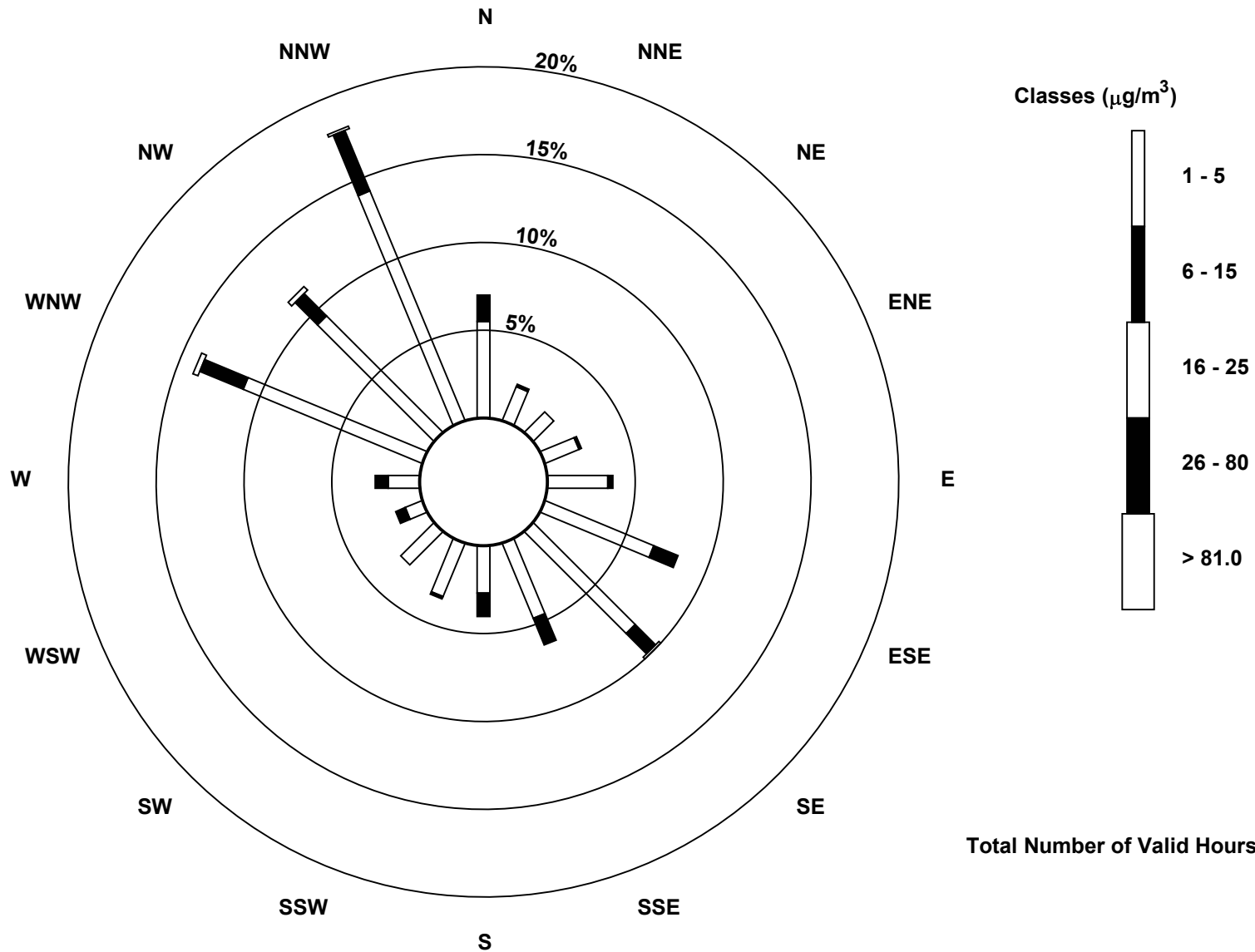
Concentration Ranges ( $\mu\text{g}/\text{m}^3$ )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	37	14	11	14	23	45	55	31	18	22	18	7	12	74	63	95	539
6 - 15	10	1	0	1	2	10	11	11	9	1	0	4	5	18	12	25	120
16 - 25	0	0	0	0	0	0	1	0	0	0	0	0	0	2	2	1	6
26 - 80	0	0	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>	47	15	11	15	25	55	67	42	27	23	18	11	17	94	77	121	665

Total Number of Valid Hours: 671

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
 Anzac (AMS 14)



Total Number of Valid Hours: 671



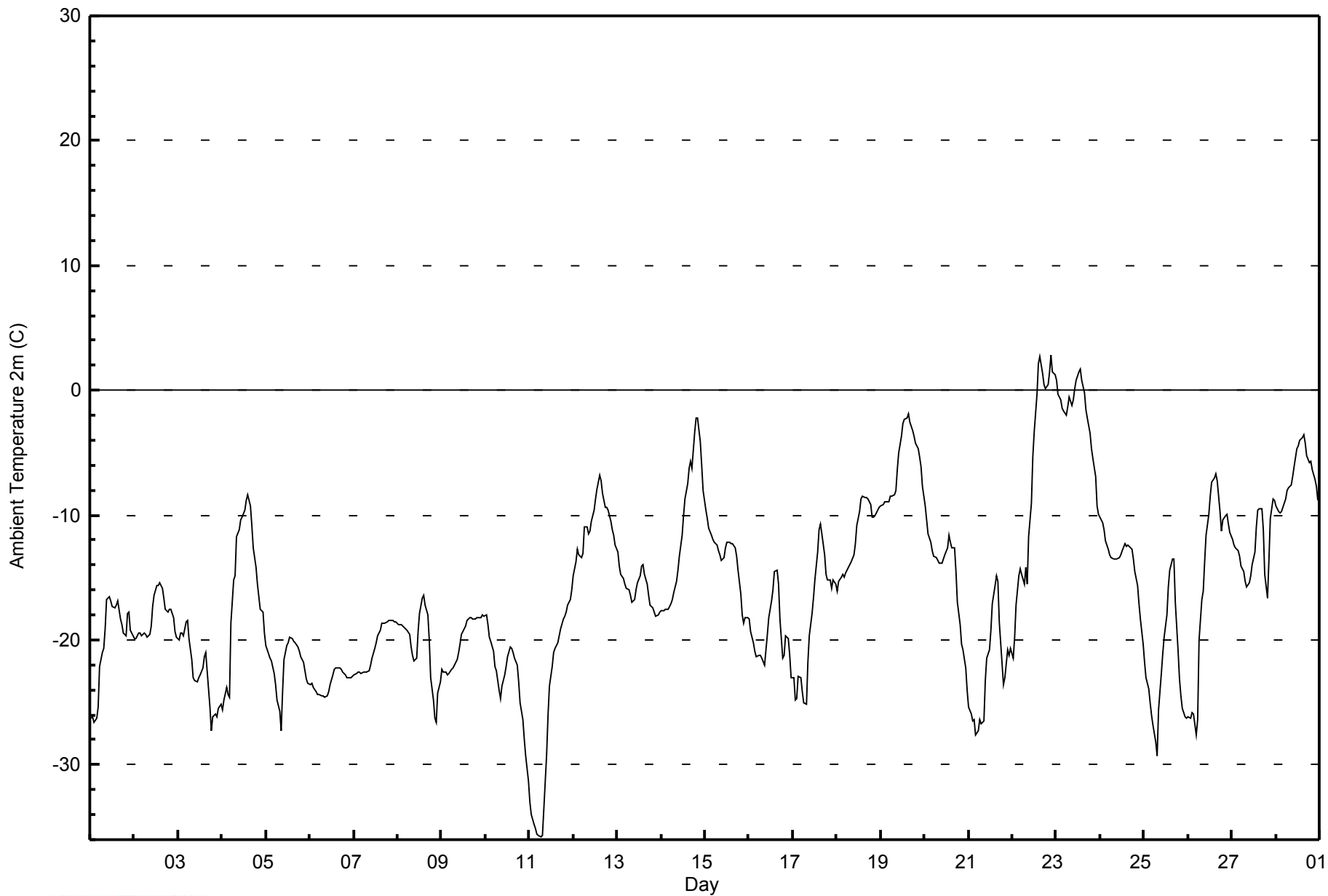


Maximum Value: 2.8 C on Feb 22 22:00		Maximum Daily Average: -2.0 C on Feb 23		Hours in Service: 672																						
Minimum Value: -35.8 C on Feb 11 07:00		Minimum Daily Average: -25.8 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -12.4 C at hour 16		Minimum Diurnal Average: -18.9 C at hour 5		Hours of Missing Data: 0																						
Monthly Average: -16.21 C		Percentiles: P <sub>1</sub> = -34.0 P <sub>10</sub> = -24.5 Q <sub>1</sub> = -21.4 Median = -17.1 Q <sub>3</sub> = -11.5 P <sub>90</sub> = -6.4 P <sub>99</sub> = 1.5		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-Feb	-26.2	-26.1	-26.6	-26.3	-25.3	-22.1	-21.1	-20.7	-19.1	-16.8	-16.5	-16.9	-17.3	-17.4	-17.2	-16.8	-18.3	-18.8	-19.5	-19.6	-17.9	-17.8	-19.2	-19.6	-20.1	-16.5
2-Feb	-19.9	-19.8	-19.5	-19.4	-19.7	-19.5	-19.6	-19.7	-19.6	-18.8	-17.3	-16.4	-15.7	-15.6	-15.5	-15.9	-16.6	-17.5	-17.7	-17.6	-17.6	-18.2	-19.3	-19.8	-18.2	-15.5
3-Feb	-20.0	-19.4	-19.4	-19.7	-18.5	-18.4	-19.9	-21.6	-23.0	-23.3	-23.3	-23.0	-22.8	-22.2	-21.4	-21.0	-22.5	-25.4	-27.2	-26.1	-25.9	-26.2	-25.5	-25.2	-22.5	-18.4
4-Feb	-25.6	-24.8	-23.9	-24.4	-24.6	-18.6	-15.2	-14.9	-11.7	-11.2	-10.4	-10.2	-9.6	-8.8	-8.3	-9.3	-10.9	-12.7	-14.2	-15.5	-16.5	-17.6	-17.8	-19.4	-15.7	-8.3
5-Feb	-20.5	-21.2	-21.4	-21.6	-22.7	-23.6	-24.8	-25.7	-27.3	-24.2	-21.6	-20.5	-20.2	-19.8	-19.9	-20.1	-20.2	-20.5	-20.9	-21.4	-21.8	-22.5	-23.1	-23.5	-22.0	-19.8
6-Feb	-23.5	-23.4	-23.8	-24.2	-24.3	-24.4	-24.4	-24.5	-24.6	-24.5	-24.2	-23.6	-22.8	-22.4	-22.3	-22.2	-22.3	-22.4	-22.5	-22.8	-23.0	-23.0	-23.0	-22.9	-23.4	-22.2
7-Feb	-22.8	-22.7	-22.6	-22.6	-22.7	-22.6	-22.5	-22.6	-22.5	-22.0	-21.5	-20.7	-20.2	-19.7	-19.2	-18.7	-18.6	-18.7	-18.6	-18.5	-18.4	-18.5	-18.5	-18.6	-20.6	-18.4
8-Feb	-18.8	-18.8	-18.8	-19.0	-19.1	-19.2	-19.5	-20.6	-21.3	-21.6	-21.4	-19.3	-17.8	-16.6	-16.4	-17.2	-18.0	-20.0	-23.0	-24.8	-26.2	-26.6	-24.3	-23.3	-20.5	-16.4
9-Feb	-22.4	-22.6	-22.6	-22.9	-22.7	-22.4	-22.2	-22.1	-21.5	-21.0	-20.3	-19.5	-19.1	-18.8	-18.5	-18.2	-18.2	-18.3	-18.3	-18.2	-18.2	-18.2	-18.0	-18.1	-20.1	-18.0
10-Feb	-18.0	-18.7	-19.8	-20.1	-20.9	-22.1	-22.5	-24.0	-24.7	-23.7	-22.9	-22.2	-21.4	-20.6	-20.7	-21.0	-21.4	-22.0	-23.4	-25.1	-26.4	-27.9	-29.3	-31.3	-22.9	-18.0
11-Feb	-33.0	-34.0	-34.8	-35.1	-35.6	-35.7	-35.8	-35.7	-33.6	-29.2	-26.1	-23.7	-22.2	-21.0	-20.7	-20.3	-19.6	-19.1	-18.3	-18.1	-17.8	-17.3	-16.7	-15.9	-25.8	-15.9
12-Feb	-14.9	-13.7	-12.8	-13.2	-13.4	-13.1	-10.9	-11.0	-11.5	-11.3	-10.5	-9.7	-8.7	-7.9	-6.8	-7.2	-8.2	-9.3	-9.4	-9.6	-10.4	-11.1	-11.6	-12.3	-10.8	-6.8
13-Feb	-13.0	-14.1	-14.8	-15.1	-15.5	-15.9	-16.0	-16.4	-16.9	-16.7	-15.9	-15.4	-14.9	-14.1	-13.9	-14.7	-15.5	-16.4	-17.2	-17.4	-17.7	-18.1	-18.0	-17.8	-15.9	-13.0
14-Feb	-17.7	-17.6	-17.6	-17.5	-17.5	-17.1	-16.8	-16.2	-15.3	-14.4	-13.3	-11.6	-10.0	-8.8	-7.4	-6.3	-5.7	-6.2	-3.3	-2.3	-2.2	-4.1	-6.0	-8.0	-11.0	-2.2
15-Feb	-9.6	-10.3	-11.0	-11.6	-12.0	-12.1	-12.4	-12.8	-13.2	-13.7	-13.4	-12.6	-12.2	-12.1	-12.2	-12.2	-12.7	-13.3	-14.4	-16.3	-18.0	-18.6	-18.2	-18.2	-13.5	-9.6
16-Feb	-18.4	-19.3	-20.2	-20.9	-21.3	-21.3	-21.5	-22.0	-20.8	-19.5	-18.2	-16.9	-16.0	-14.6	-14.5	-15.5	-18.4	-21.5	-21.3	-19.7	-19.9	-21.2	-23.0	-19.5	-14.5	
17-Feb	-23.0	-24.8	-24.7	-22.9	-23.1	-24.1	-25.0	-25.1	-21.8	-19.6	-17.9	-16.7	-15.2	-13.0	-11.2	-10.8	-11.5	-13.2	-14.7	-15.2	-15.2	-15.8	-15.2	-15.6	-18.1	-10.8
18-Feb	-16.0	-15.3	-14.9	-14.7	-14.9	-14.7	-14.2	-13.9	-13.7	-13.2	-12.3	-10.8	-9.7	-8.8	-8.5	-8.6	-8.6	-8.7	-9.2	-10.1	-10.2	-10.0	-9.6	-9.4	-11.7	-8.5
19-Feb	-9.2	-9.1	-8.9	-9.0	-8.9	-8.5	-8.5	-8.4	-8.0	-6.3	-5.0	-3.7	-2.7	-2.3	-2.2	-1.9	-2.6	-3.2	-3.7	-4.2	-4.6	-5.4	-6.1	-7.7	-5.8	-1.9
20-Feb	-9.3	-10.4	-11.4	-12.2	-12.8	-13.2	-13.4	-13.6	-13.8	-13.9	-13.6	-13.2	-12.6	-11.6	-12.1	-12.7	-12.6	-14.6	-17.0	-18.8	-20.3	-20.8	-22.2	-24.1	-14.6	-9.3
21-Feb	-25.3	-26.0	-26.5	-26.4	-27.6	-27.3	-26.4	-26.7	-26.5	-23.3	-21.4	-20.8	-19.2	-17.1	-15.7	-14.9	-15.3	-18.6	-21.9	-23.6	-23.0	-20.8	-21.3	-20.7	-22.3	-14.9
22-Feb	-21.4	-19.8	-17.2	-14.8	-14.3	-14.8	-15.5	-14.2	-15.5	-11.7	-9.1	-5.4	-3.4	-0.3	2.2	2.7	1.4	0.4	0.1	0.5	1.5	2.8	1.5	1.2	-6.8	2.8
23-Feb	0.8	-0.3	-0.8	-1.4	-1.7	-1.9	-1.4	-0.6	-1.2	-0.8	0.1	0.8	1.5	1.7	0.8	-0.2	-1.5	-2.3	-3.4	-4.7	-5.4	-6.9	-9.2	-9.9	-2.0	1.7
24-Feb	-10.4	-10.6	-11.2	-12.1	-12.7	-13.1	-13.4	-13.6	-13.5	-13.5	-13.2	-12.8	-12.3	-12.5	-12.4	-12.5	-12.8	-13.5	-14.6	-15.6	-17.1	-18.4	-20.3	-13.6	-10.4	
25-Feb	-21.8	-23.0	-23.9	-25.1	-26.0	-26.8	-28.1	-29.3	-25.6	-22.7	-21.2	-19.7	-18.0	-15.8	-14.4	-13.5	-13.5	-17.0	-20.9	-23.1	-24.5	-25.5	-26.2	-26.3	-22.2	-13.5
26-Feb	-26.2	-26.2	-25.9	-25.9	-27.6	-26.4	-20.0	-16.7	-16.1	-13.8	-11.6	-9.9	-8.5	-7.4	-7.0	-6.7	-7.3	-9.7	-11.3	-10.3	-10.0	-10.0	-10.7	-11.3	-14.9	-6.7
27-Feb	-12.0	-12.4	-12.7	-12.8	-13.3	-14.0	-14.6	-15.3	-15.7	-15.5	-14.9	-14.0	-13.0	-10.9	-9.6	-9.5	-9.5	-11.1	-14.8	-16.6	-13.6	-10.3	-8.7	-8.8	-12.7	-8.7
28-Feb	-9.3	-9.7	-9.9	-9.7	-9.3	-8.7	-8.0	-7.8	-7.6	-6.9	-6.2	-4.6	-4.5	-4.0	-3.8	-3.6	-4.2	-5.2	-5.8	-5.7	-6.4	-7.1	-7.6	-8.8	-6.9	-3.6
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - February 2015**





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

**Ambient Temperature 2m (AT 2m) - C**  
**Anzac - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	216	32.14	32.14
-20 - 0	440	65.48	97.62
0 - 10	16	2.38	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

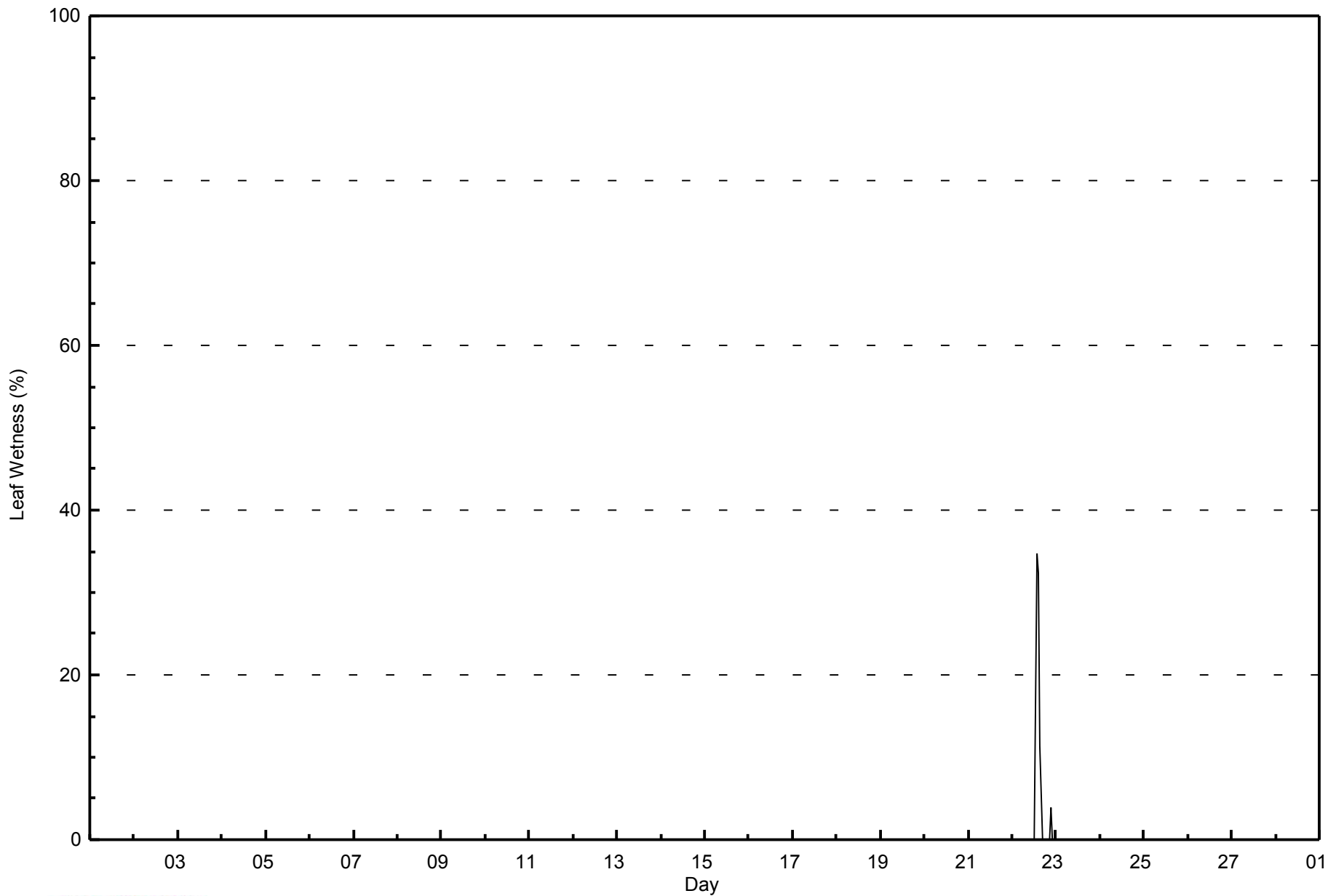


Maximum Value: 35 % on Feb 22 14:00														Maximum Daily Average: 3.4 % on Feb 22														Hours in Service: 672	
Minimum Value: 0 % on Feb 1 01:00														Minimum Daily Average: 0.0 % on Feb 1														Hours of Data: 672	
Maximum Diurnal Average: 1.2 % at hour 14														Minimum Diurnal Average: 0.0 % at hour 1														Hours of Missing Data: 0	
Monthly Average: 0.1 %														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														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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	35	32	11	0	0	0	0	0	0	4	0	0	3.4	35		
23-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	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-Feb	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0		
														0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.2 1.2 0.4 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0														Diurnal Average	
														0 0 0 0 0 0 0 0 0 0 0 0 0 35 32 11 0 0 0 0 0 4 0 0														Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Leaf Wetness (SW) - %**  
**Anzac - February 2015**





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

**Leaf Wetness (SW) - %**  
**Anzac - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 0.3	668	99.40	99.40
0.4 - 0.5	0	0.00	99.40
0.6 - 0.7	0	0.00	99.40
0.8 - 1.4	0	0.00	99.40
1.5 - 10	1	0.15	99.55
> 10	3	0.45	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

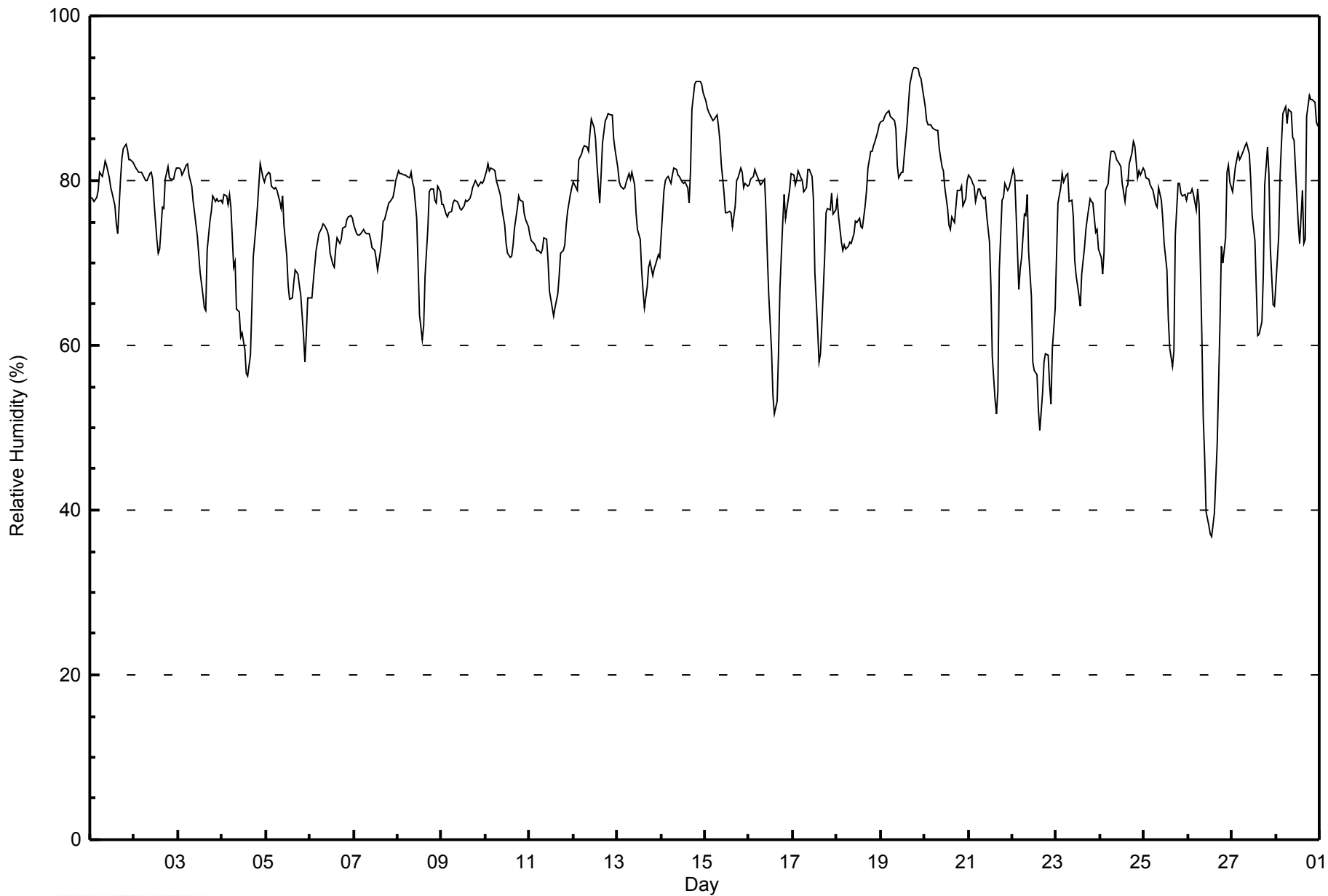


Maximum Value: 94 % on Feb 19 20:00														Maximum Daily Average: 88.1 % on Feb 19														Hours in Service: 672																				
Minimum Value: 37 % on Feb 26 14:00														Minimum Daily Average: 62.9 % on Feb 26														Hours of Data: 672																				
Maximum Diurnal Average: 79.8 % at hour 6														Minimum Diurnal Average: 67.4 % at hour 15														Hours of Missing Data: 0																				
Monthly Average: 76.2 %														Percentiles: P <sub>1</sub> = 47 P <sub>10</sub> = 65 Q <sub>1</sub> = 72 Median = 78 Q <sub>3</sub> = 81 P <sub>90</sub> = 85 P <sub>99</sub> = 92														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-Feb	78	78	77	78	79	81	81	81	82	82	80	79	78	77	75	74	80	83	84	84	84	83	82	82	80.1	84																						
2-Feb	82	82	81	81	81	80	80	80	81	81	80	77	73	71	72	77	77	80	82	80	80	80	81	82	79.2	82																						
3-Feb	82	81	81	81	82	82	81	79	77	76	73	71	69	66	64	64	71	75	76	78	77	78	77	78	75.9	82																						
4-Feb	77	78	78	77	78	77	69	70	64	64	61	61	59	57	56	59	65	71	75	77	79	82	80	80	70.7	82																						
5-Feb	81	81	81	79	79	79	79	77	77	78	75	71	67	66	66	68	69	69	67	66	61	58	61	66	71.7	81																						
6-Feb	66	66	68	72	73	74	74	75	75	74	73	71	70	70	72	73	72	73	74	74	75	76	76	75	72.5	76																						
7-Feb	75	74	73	73	74	74	74	74	74	73	72	72	71	69	71	73	75	75	77	77	77	78	79	80	74.2	80																						
8-Feb	81	81	81	81	81	80	80	81	80	79	75	70	64	61	62	69	74	79	79	79	78	77	79	79	76.2	81																						
9-Feb	77	77	76	76	76	76	77	78	78	77	77	76	77	78	77	78	78	79	80	80	79	80	80	80	77.8	80																						
10-Feb	81	82	81	82	81	81	80	79	78	77	75	72	71	71	71	72	74	77	78	78	78	76	75	74	76.8	82																						
11-Feb	73	73	72	72	72	71	71	72	73	73	70	67	65	63	65	66	68	71	71	72	75	76	78	79	71.3	79																						
12-Feb	80	79	79	83	83	84	84	84	84	86	88	86	85	82	77	81	85	87	88	88	88	88	85	84	84.0	88																						
13-Feb	82	80	79	79	79	80	81	80	81	80	76	74	73	69	67	65	67	70	70	68	69	70	71	71	74.2	82																						
14-Feb	73	79	80	80	80	80	81	82	81	81	80	80	80	79	77	81	89	92	92	92	92	92	91	91	83.0	92																						
15-Feb	90	89	88	88	87	87	88	87	85	82	79	76	76	76	74	77	80	80	80	82	81	79	80	79	81.9	90																						
16-Feb	79	80	81	81	81	80	80	80	80	76	71	66	59	54	52	53	59	67	75	78	75	78	79	81	72.7	81																						
17-Feb	81	79	80	81	80	80	79	79	81	81	81	81	78	69	62	58	59	63	71	76	77	76	78	76	75.1	81																						
18-Feb	78	76	73	72	72	72	72	72	72	74	75	75	75	74	74	77	79	81	84	84	84	85	86	87	77.2	87																						
19-Feb	87	87	88	88	89	88	88	87	86	82	80	81	81	83	87	89	92	93	94	94	93	93	92	91	88.1	94																						
20-Feb	89	87	87	87	86	86	86	86	84	82	81	79	77	75	74	76	75	77	79	79	79	77	78	80	81.1	89																						
21-Feb	81	80	80	79	77	79	79	78	78	78	76	73	67	59	53	52	55	69	78	78	80	79	79	80	73.6	81																						
22-Feb	81	81	76	67	69	71	76	76	78	71	66	58	57	56	52	50	54	58	59	59	55	53	60	64	64.5	81																						
23-Feb	71	77	79	81	80	81	81	78	78	76	70	68	66	65	69	72	74	75	78	77	77	74	74	72	74.7	81																						
24-Feb	71	69	71	79	80	82	84	84	83	83	82	82	80	77	79	80	82	83	85	84	80	81	81	82	80.1	85																						
25-Feb	81	80	80	80	79	79	77	77	79	78	75	72	69	63	60	58	59	73	80	80	78	78	78	78	74.6	81																						
26-Feb	79	79	79	78	76	79	77	61	51	46	40	38	37	37	40	44	48	63	72	70	73	81	82	80	62.9	82																						
27-Feb	79	80	82	83	82	83	84	84	85	83	80	76	73	67	61	61	63	69	79	84	81	72	65	65	75.9	85																						
28-Feb	67	73	81	85	88	89	87	89	88	85	85	78	75	72	79	72	73	88	90	90	90	89	87	87	82.8	90																						
																								78.6	78.8	79.0	79.3	79.5	79.8	79.6	78.9	78.4	77.0	74.9	72.4	70.1	67.8	67.4	68.3	71.1	75.9	78.6	78.9	78.5	78.2	78.4	78.6	Diurnal Average
																								90	89	88	88	89	89	88	89	88	86	88	86	85	83	87	89	92	93	94	94	93	93	92	91	Diurnal Maximum



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Anzac - February 2015**







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

**Relative Humidity (RH) - %**  
**Anzac - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	5	0.74	0.74
40 - 60	35	5.21	5.95
60 - 80	407	60.57	66.52
80 - 100	225	33.48	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 21 km/h on Feb 14 00:00	Maximum Daily Speed Average: 11.6 km/h on Feb 23	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 21 18:00	Minimum Daily Speed Average: 1.2 km/h on Feb 17	Hours of Data: 672
Maximum Diurnal Speed Average: 2.2 km/h at hour 11	Minimum Diurnal Speed Average: 0.5 km/h at hour 19	Hours of Missing Data: 0
Monthly Average Velocity: 1.2 km/h 319.8 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 13 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-Feb	SSW6	SSW5	S6	S6	SSW6	S4	S4	SSE3	WNW4WNW12	NW11	NNW10	NNW10	NNW9	NW7	NW9	NW7	WNW7	WNW7	WNW5	WNW6	WNW6	WNW7	WNW8	WNW4.3	WNW12		
2-Feb	W8	WNW9	WNW9	WNW8	WNW9	WNW9WNW10	WNW10	WNW9WNW11	WNW11	NW11	NW11	NW11WNW10	NNW7	NW7	WNW5	WNW6	NW8	WNW9WNW10	WNW9	WNW9	WNW9	WNW9	WNW9	WNW8.8	NW11		
3-Feb	WNW8	WNW9	WNW9	WNW8	WNW8	NW8	NNW8	N11	N11	NNW10	NNW12	NNW12	NNW12	NNW11	NW9	NW7	N3	SE2	SSE4	S8	S7	S8	SSW8	SSW7	WNW4.7	NNW12	
4-Feb	S5	S7	S6	SSE5	SSE5	SW10	WSW8	SSW6	SW12WSW11	WNW14	WNW15	WNW15	WNW14	NW13	NNW12	NNW11	NNW8	NNW12	NNW10	NNW10	NW9	NNW11	NNW10	WNW6.0	WNW15		
5-Feb	NNW8	NNW8	WNW8	NW9	NW6	NW6	NW5	NW5	NNW4	NNW4	N5	N4	NNE6	NNE4	NNE6	N6	NNE5	NNE5	NNE6	NNE6	NE8	NE9	NE5	ENE3	N4.7	NW9	
6-Feb	ENE5	ENE6	ENE8	ENE9	E9	E10	E10	E10	E9	E9	E11	ESE12	ESE14	ESE14	ESE13	ESE13	ESE15	ESE14	ESE12	ESE13	ESE13	ESE11	ESE13	ESE12	E10.7	ESE15	
7-Feb	ESE14	ESE16	SE15	SE14	SE13	SE14	SE13	SE13	SE13	SE13	SSE13	SE13	SE13	SE12	SE10	SE10	SE8	SE10	SE8	SE8	ESE6	SE4	ESE2	NNW3	SE10.5	ESE16	
8-Feb	N5	NNW5	NW5	NNW6	NNW5	N5	N6	NNW4	NNW4	NNW4	W4	NNW3	W2	W4	WSW4	NW2	NNE4	NE2	E2	S1	ENE1	E6	E7	ESE8	N2.1	ESE8	
9-Feb	SE8	ESE6	ESE8	ESE7	ESE6	ESE7	ESE7	ESE7	SE8	ESE7	ESE8	ESE9	ESE9	ESE7	ESE7	E7	SE8	ESE6	ESE6	ESE5	E3	E2	E2	N2	ESE6.3	ESE9	
10-Feb	N3	NNW5	WNW6	WNW6	NW9	NW9	NW7	NW9	NW8	NNW9	NNW10	NW9	NW9	NNW11	NNW10	NNW9	N8	N6	N4	N7	N6	N6	NNW4	NNW4	NNW7.0	NNW11	
11-Feb	NW4	NW3	WNW2	WSW1	WSW2	S2	SSE3	SSE6	SSE8	SSE9	SSE9	SE11	SE13	SE12	SE14	SSE16	SSE15	SSE13	SSE16	SSE15	SSE13	SSE13	SSE12	SSE9	SSE8.2	SSE16	
12-Feb	S6	SSW8	SW3	ENE4	ENE4	NNE2	WNW9WNW10	WNW10	W9	WNW8	WNW8	WNW7	NNW9	NNW8	N7	NNE6	N4	NNW2	N5	N6	N6	N4	N7	NW4.0	WNW10		
13-Feb	N7	N7	NNE7	N7	N7	NNE7	NE7	NE7	NE8	ENE10	E9	E9	E11	ESE13	ESE14	ESE15	ESE15	ESE15	SE15	SE18	SE19	SE20	SE20	SE21	ESE8.8	SE21	
14-Feb	SE20	SE19	SE17	SSE18	SSE17	SE14	SE14	SSE15	SSE15	SSE15	SSE12	S13	S12	S14	SSW11	SSW7	E4	SE0WNW12	WNW14	NW12	NNW12	NNW10	NNW7	SSE7.0	SE20		
15-Feb	NNW6	NW6	NW5	N6	NNW4	N5	N5	N5	NNE6	N8	NNW6	NNW7	NNW7	NNW9	NW8	NNW10	NNW8	NNW9	NNW9	N8	NNW7	NNW8	NNW7	NNW6.9	NNW10		
16-Feb	NNW8	NNW9	NNW10	NNW8	NNW9	NNW9	NNW9	NW9	NW7	NNW10	NNW11	NW7	NW9	NNW12	NW9WNW10	NNW7	N5	NW6	WNW7	NW9	NW8	NW6	WNW7	NW8.2	NNW12		
17-Feb	WNW6	WNW6	WNW7	WNW7	WNW7	WNW7	NW6	NW6	NW7	NW4	WSW2	SW5	S3	ENE1	SE2	SE5	SE6	ESE6	SE8	SE9	SSE8	SSE9	SE9	SE9	SSW1.2	SE9	
18-Feb	SE10	SE11	SSE11	SE10	SE12	SE12	SE12	SE12	SE11	SE11	SE10	SE10	SE10	SE11	SSE9	SSE9	SE9	SE8	ESE8	ESE8	ESE5	ESE7	SE7	SSE8	SE9.5	SE12	
19-Feb	SE7	SE6	SSE5	SSE5	SE4	SSE3	S5	ESE2	ESE2	ESE1	ENE3	S1	ESE3	WSW3	WNW3	NNW4	N7	NNW7	NW7	NNW9	NNW9	NNW10	NNW10	NNW12	NNW1.5	NNW12	
20-Feb	NNW12	NNW12	NNW12	NNW11	NNW12	NNW12	NNW10	NNW10	N11	N9	N9	NNW9	NNW8	NNW8	NNW11	NNW9	NNW9	NNW8	NNW7	NNW7	NNW8	NNW7	NNW6	NW5	NNW9.2	NNW12	
21-Feb	NW6	NW6	NW7	NW6	NW6	WNW6	WNW6	W5	WNW5	NW6	NW6	WSW7	W9	WNW8	WNW7	WNW6	WNW5	NW0	SSE5	SSE7	SSE8	S9	S8	S7	W3.7	W9	
22-Feb	S6	SSW10	SW12	SW13	SW15	SW10	SSW10	SSW10	SSW9	SSE4	SE7	SE8	SSE10	SSW13	SW12	SW12	SW15	SW15	SW13	WSW12	WNW17	WNW15	NW15	SW9.0	WNW17		
23-Feb	NW13	NW12	NW12	WNW14	NW15	NW15	NW15	NW18	NW16	NNW15	NNW15	NW15	NNW16	NNW14	NNW15	NNW14	N13	N11	N10	N11	NNE9	NE11	NE11	ENE10	NNW11.6	NW18	
24-Feb	E9	ESE9	ESE11	ESE10	ESE12	ESE10	ESE11	ESE11	E11	E11	E11	E11	E12	E10	ENE10	ENE10	NE7	NE7	NNE5	N6	NNE7	N7	NNW7	NNW8	E7.2	E12	
25-Feb	NW7	NW8	NW7	NW6	WNW6	WNW6	WNW5	WNW5	WNW6	WNW6	WNW7	W7	W7	WNW7	WNW6	W5	W2	W1	ENE1	SE2	SSE4	S3	SSW5	SSW4	WNW3.8	NW8	
26-Feb	S4	SSE8	SSE7	S5	S7	SSW7	SSW10	SSW11	SSW10	SSW11	SSW12	SW11	SSW11	SSW9	SW13	SW13	SW11	SW6	W4	WNW5	NW7	NNW9	NNW8	N8	SW6.0	SW13	
27-Feb	N9	N7	NNW5	NNW9	N10	NNW10	NNW11	NNW9	NNW10	NNW10	NW8	NW8	WNW9	WNW9	WNW10	WNW11	WNW10	W5	WSW4	WSW5	W6	W7	W8	WNW11	NW7.1	WNW11	
28-Feb	WNW12	WNW11	WNW11	WNW11	WNW11	WNW11	WNW11	WNW13	WNW14	WNW14	WNW13	NW11	NNW14	NNW14	NNW11	NW11	NW10	NNW12	NW8	WNW8	NNW10	NNW10	NNW7	NNW8	NNW5	NW10.2	NNW14
NW0.9WNW1.1 W1.2WNW1.2WNW1.3WNW1.6 NW1.5 NW1.5 NW1.4 NW1.6 NW2.2 NW1.8NNW1.3 NW1.7 NW2.0 NW1.7 N1.7NNE0.8 N0.5NNW0.5 N1.2 N1.5 N1.2NNW1.3																								Diurnal Average			
SE20 SE19 SE17 SSE18 SSE17 NW15 NW15 NW18 NW16NNW15NNW15 NW15NNW16 ESE14NNW15 SSE16 SSE15 SW15 SSE16 SE18 SE19 SE20 SE20 SE21																								Diurnal Maximum			

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

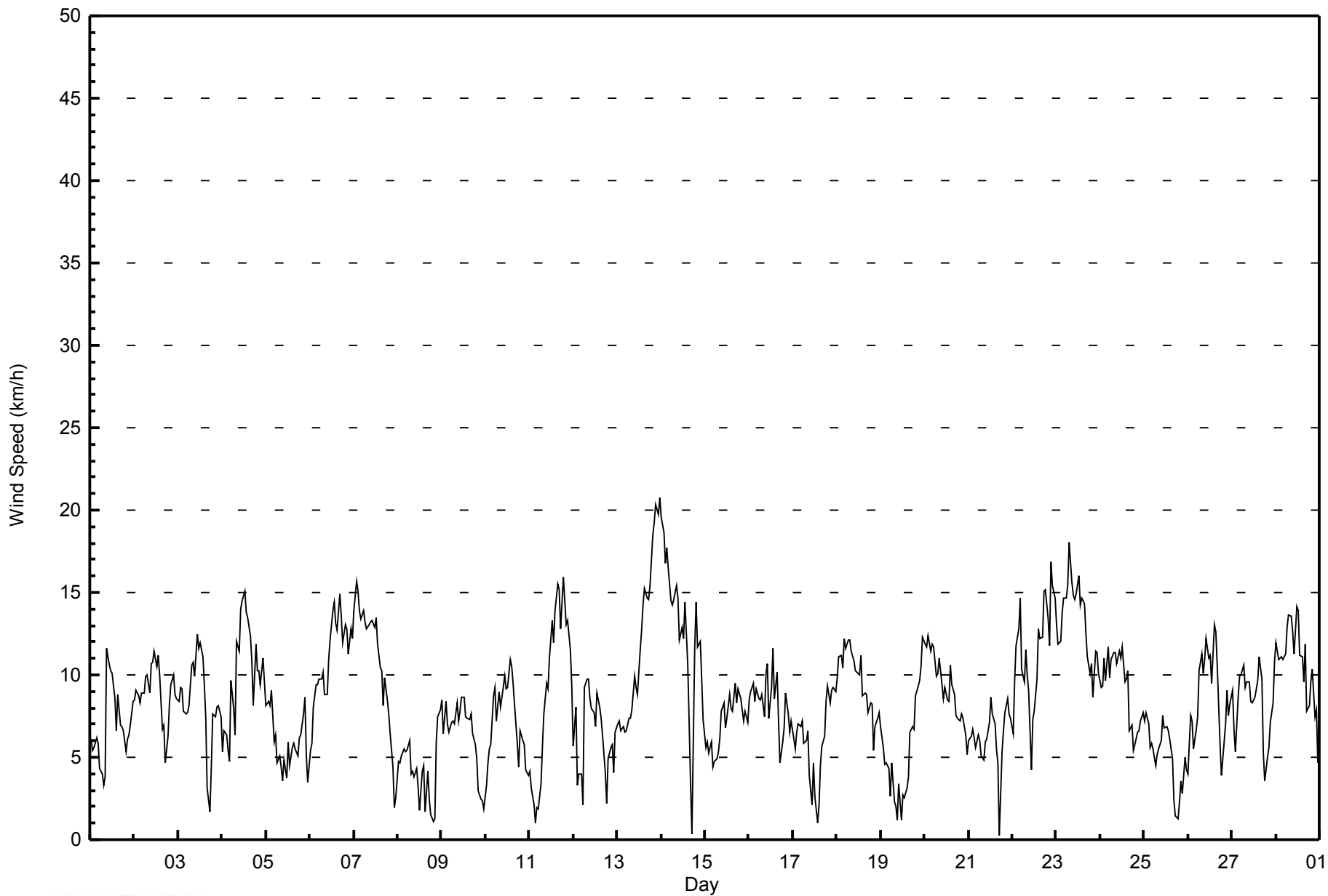


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 14 00:00																	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 1 km/h on Feb 11 00:00																									
Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 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-Feb	1	1	1	1	1	1	1	1	3	4	4	3	3	3	2	3	2	2	2	1	2	2	2	2	4
2-Feb	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	2	2	2	2	3	3	3	3	3	4
3-Feb	3	3	3	3	3	3	2	3	3	3	4	4	3	3	3	3	2	1	2	2	1	2	2	2	4
4-Feb	1	2	2	2	2	6	4	3	6	4	5	5	5	5	5	4	3	2	3	3	3	3	3	3	6
5-Feb	3	2	3	3	2	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	3	3	2	2	3
6-Feb	2	2	3	3	3	3	3	3	3	3	4	4	5	5	5	4	5	5	4	5	4	4	4	4	5
7-Feb	5	5	5	4	4	4	4	4	4	4	4	4	4	4	3	3	2	3	2	2	2	1	2	2	5
8-Feb	1	2	2	2	2	2	2	1	1	1	1	1	1	1	2	1	2	1	1	1	2	1	2	2	2
9-Feb	2	2	3	3	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2	2	1	1	1	1	3
10-Feb	2	2	2	2	2	3	3	3	2	3	3	3	3	3	3	3	2	1	1	1	1	1	2	1	3
11-Feb	1	1	1	1	2	1	1	1	2	2	2	3	4	4	4	5	4	4	4	4	4	4	3	3	5
12-Feb	2	3	3	1	2	2	3	3	3	3	3	3	3	3	2	2	2	1	1	2	2	2	2	2	3
13-Feb	2	2	2	2	2	2	3	3	2	3	3	3	4	4	4	5	4	4	5	5	6	6	6	6	6
14-Feb	6	5	5	5	5	4	4	4	4	4	3	4	4	5	4	3	1	2	4	5	4	3	3	2	6
15-Feb	2	2	2	2	2	1	1	2	2	2	2	2	2	3	2	3	3	2	3	2	2	3	2	2	3
16-Feb	3	3	3	2	3	3	3	3	2	3	3	3	4	3	3	4	2	1	1	2	2	2	2	2	4
17-Feb	2	2	2	2	2	2	1	2	2	1	1	2	1	1	1	2	1	2	2	2	2	2	2	2	2
18-Feb	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	3
19-Feb	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3	3	3	3	3
20-Feb	4	3	4	3	3	4	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	1	4
21-Feb	1	1	2	2	1	2	2	2	2	2	2	2	3	3	3	2	2	1	1	2	2	2	1	1	3
22-Feb	1	3	3	4	4	4	2	3	2	2	1	2	2	3	4	4	4	5	4	4	4	6	6	5	6
23-Feb	4	4	4	5	5	5	5	6	6	5	5	5	6	5	5	5	4	3	4	3	5	4	3	6	
24-Feb	3	3	4	3	4	3	3	4	4	3	3	4	4	3	3	3	3	2	2	2	3	3	2	3	4
25-Feb	2	2	2	1	2	2	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2
26-Feb	1	2	1	2	1	2	3	3	3	3	4	4	3	3	4	3	3	2	2	1	3	3	3	3	4
27-Feb	3	2	1	3	3	3	3	3	3	3	3	3	3	3	3	4	4	2	1	1	1	2	3	4	4
28-Feb	5	4	4	4	4	4	5	5	5	4	4	4	5	4	4	3	4	3	3	3	3	2	2	1	5
																	Diurnal Maximum								



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Anzac - February 2015**





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

**Wind Speed (WS) - km/h**  
**Anzac - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	130	19.35	19.35
6 - 11	409	60.86	80.21
12 - 19	129	19.20	99.40
20 - 28	4	0.60	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Anzac - February 2015**

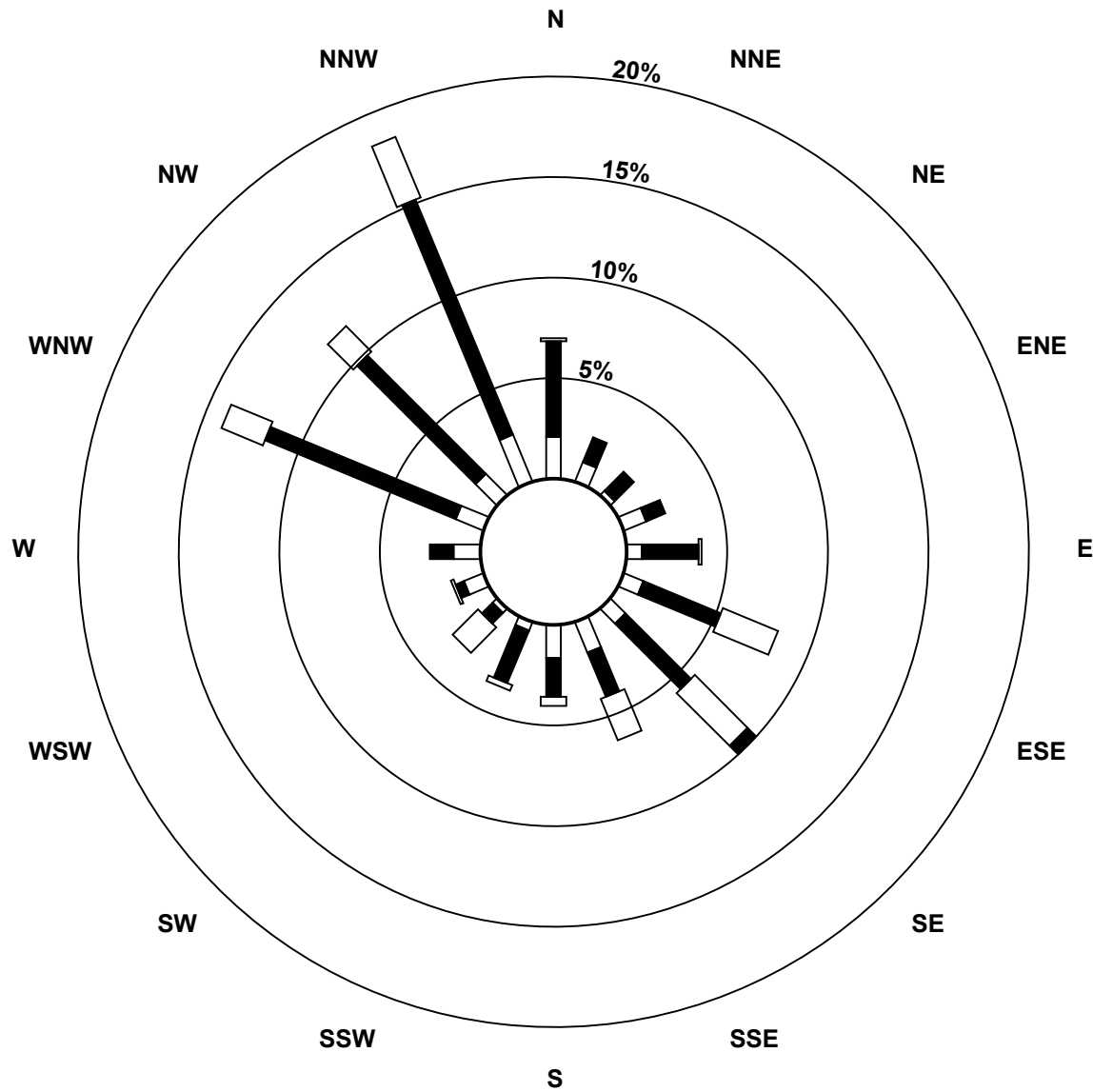
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	14	7	2	8	5	7	7	11	11	3	2	7	9	10	10	17	130
6 - 11	32	9	9	7	19	28	31	16	13	19	5	3	8	69	56	85	409
12 - 19	1	0	0	0	1	20	25	15	3	2	12	1	0	15	12	22	129
20 - 28	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	47	16	11	15	25	55	67	42	27	24	19	11	17	94	78	124	672

Total Number of Valid Hours: 672

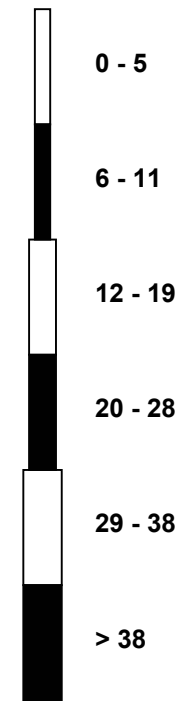
Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Anzac (AMS 14)**



**Classes (km/h)**



**Total Number of Valid Hours: 672**



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

**Wind Direction (WD) - deg**  
**Anzac - February 2015**

Direction of Maximum Speed: 143 deg on Feb 14 00:00																						Hours in Service: 672			
Direction of Maximum Daily Speed Average: 335.5 deg on Feb 23																						Hours of Data: 672			
Direction of Minimum Speed: 307 deg on Feb 21 18:00											Direction of Minimum Daily Speed Average: 1.2 deg on Feb 17											Hours of Missing Data: 0			
Monthly Average Direction: 313.2 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-Feb	207	204	184	181	195	184	173	168	286	299	311	330	337	335	309	323	316	288	303	299	298	299	286	282	289.3
2-Feb	272	284	291	294	297	285	287	285	303	288	293	305	310	313	301	327	313	287	289	307	304	303	300	298	297.4
3-Feb	296	295	291	288	292	309	347	356	354	343	336	337	333	328	326	314	355	128	164	171	174	181	192	196	312.0
4-Feb	182	178	176	165	159	236	237	204	221	237	289	293	300	303	316	332	328	342	347	336	337	326	340	330	295.1
5-Feb	327	327	296	307	305	321	305	310	346	344	352	356	23	12	19	5	16	14	16	29	42	49	51	63	354.2
6-Feb	68	70	67	75	84	90	81	81	87	92	93	108	110	112	106	109	103	106	105	115	113	116	113	114	99.8
7-Feb	119	122	129	130	140	140	137	140	140	144	147	142	139	138	137	131	130	145	142	133	123	139	121	346	135.4
8-Feb	349	345	325	334	339	351	356	348	343	331	270	333	273	264	258	325	20	43	89	174	70	84	93	112	354.5
9-Feb	124	121	121	109	104	113	108	112	129	123	106	117	114	116	104	98	124	120	117	115	98	82	88	2	113.0
10-Feb	350	329	290	302	325	322	318	321	322	330	332	324	321	330	338	348	355	1	352	350	360	357	348	331	333.0
11-Feb	310	316	301	250	249	185	160	154	158	158	148	135	135	145	144	159	152	153	154	153	153	161	157	163	154.0
12-Feb	169	211	233	67	64	17	299	299	292	280	296	298	292	327	348	3	27	8	341	350	349	354	11	358	322.8
13-Feb	4	358	16	5	0	21	49	48	53	76	89	88	99	105	107	118	119	119	124	138	136	139	141	143	105.5
14-Feb	143	143	142	149	151	144	144	149	159	160	160	171	179	184	194	198	83	145	286	296	311	344	345	342	163.1
15-Feb	333	319	322	353	340	354	355	1	343	351	341	337	336	340	326	308	334	343	344	342	352	340	330	327	338.5
16-Feb	333	327	336	331	334	330	327	323	317	331	329	306	322	327	310	302	335	349	318	299	308	313	307	303	321.8
17-Feb	299	296	290	298	300	301	320	305	309	320	258	236	191	78	124	137	140	114	125	144	150	154	144	146	203.3
18-Feb	146	146	148	134	140	141	136	143	145	141	137	140	137	132	149	152	138	133	123	115	104	115	143	147	138.2
19-Feb	144	141	148	149	146	156	180	111	118	115	71	179	109	254	288	340	349	328	320	330	331	339	334	340	343.6
20-Feb	340	339	334	333	335	333	332	338	357	360	349	335	336	332	335	331	332	334	337	344	340	344	335	321	337.9
21-Feb	310	306	307	307	308	303	293	278	292	307	311	257	264	282	287	294	294	307	168	165	166	173	180	185	268.5
22-Feb	180	203	217	226	224	216	213	217	194	195	151	133	146	158	207	218	224	226	232	226	242	283	295	304	222.4
23-Feb	316	310	312	301	308	309	319	325	324	327	327	324	330	328	338	342	349	357	10	6	13	37	52	62	335.5
24-Feb	99	113	109	117	119	108	109	107	96	95	80	83	96	97	72	68	50	39	23	10	19	356	347	333	81.9
25-Feb	315	322	319	307	301	295	303	297	296	294	284	277	264	285	289	272	280	259	66	139	159	187	192	194	285.5
26-Feb	186	162	166	171	189	204	213	211	203	204	207	217	210	210	227	221	217	225	274	286	321	333	340	357	218.8
27-Feb	7	358	339	333	349	342	336	338	337	336	320	306	302	297	296	298	294	275	254	240	261	271	281	288	313.5
28-Feb	286	295	294	291	289	288	300	303	300	301	304	328	339	329	323	324	328	311	294	333	344	329	337	345	311.9
317.4	286.9	279.1	295.3	292.6	297.5	306.3	308.5	305.9	305.9	322.0	312.9	327.4	320.8	311.7	322.3	3.2	33.2	356.0	339.6	356.5	352.4	349.1	329.0		
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**

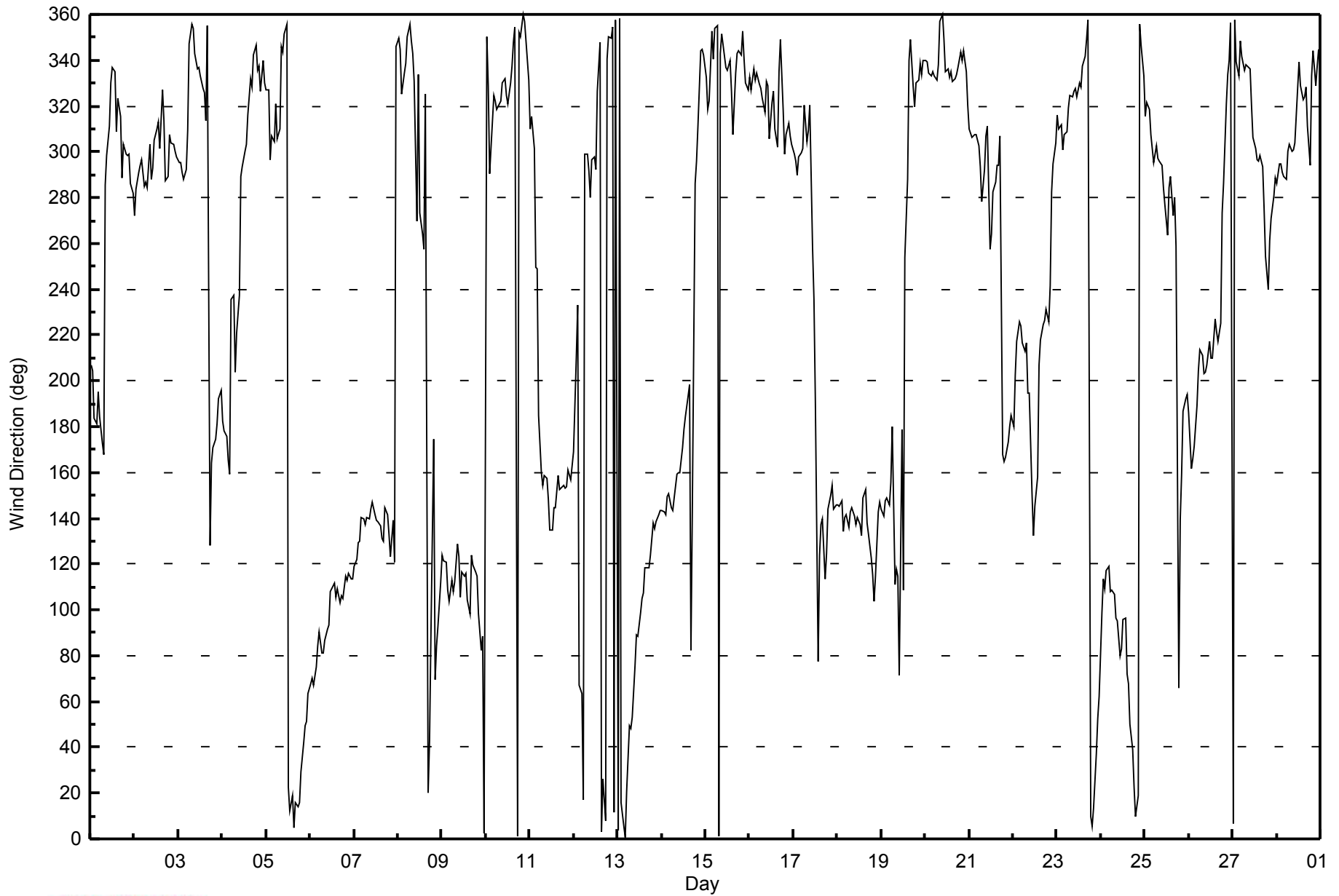
**Anzac - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 89 deg on Feb 17 14:00																			Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0							
Minimum Value: 9 deg on Feb 22 01:00																										
Percentiles: P <sub>1</sub> = 11 P <sub>10</sub> = 15 Q <sub>1</sub> = 17 Median = 21 Q <sub>3</sub> = 24 P <sub>90</sub> = 31 P <sub>99</sub> = 66																										
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-Feb	14	13	10	13	18	20	12	19	52	25	24	19	18	17	24	20	18	21	19	20	25	26	22	21	52	
2-Feb	20	24	24	24	24	21	23	27	26	27	27	25	26	25	26	21	23	23	24	23	23	21	23	22	27	
3-Feb	24	24	26	24	30	26	16	15	16	18	17	19	19	19	20	24	37	16	16	13	12	12	12	17	37	
4-Feb	14	18	17	21	46	55	38	34	25	31	30	27	23	24	23	18	16	18	16	16	15	17	17	17	55	
5-Feb	18	15	23	18	23	22	26	18	17	21	21	48	59	31	37	27	25	21	19	18	21	21	20	25	20	59
6-Feb	19	21	20	20	20	23	21	22	22	23	24	25	24	24	24	24	24	25	24	24	24	21	22	22	25	
7-Feb	21	21	20	21	20	20	20	22	22	22	23	24	22	24	23	24	24	20	22	22	18	23	63	59	63	
8-Feb	18	30	19	18	21	18	16	12	17	34	31	53	76	42	33	57	17	26	29	59	42	12	14	19	76	
9-Feb	18	24	23	27	24	23	23	26	18	21	23	21	23	23	24	23	21	22	26	23	29	32	31	58	58	
10-Feb	59	30	29	24	16	18	21	17	17	19	18	21	23	20	19	17	15	14	11	16	12	13	20	17	59	
11-Feb	19	17	23	57	37	35	11	13	14	14	19	20	20	20	21	19	19	21	17	18	19	21	19	17	57	
12-Feb	38	25	70	23	28	60	24	25	24	23	28	27	31	29	20	19	23	23	46	19	17	19	30	17	70	
13-Feb	17	18	22	20	18	21	22	22	21	21	26	27	24	26	24	21	20	20	20	21	22	21	21	20	27	
14-Feb	20	20	20	19	20	21	21	20	18	18	19	18	19	23	24	31	51	86	27	26	25	16	16	16	86	
15-Feb	22	19	19	18	33	22	16	17	21	19	17	20	23	18	21	28	18	16	16	16	15	17	17	18	33	
16-Feb	15	16	15	15	16	18	17	16	17	19	20	32	26	20	27	26	20	16	15	17	17	20	16	18	32	
17-Feb	23	20	20	19	18	17	16	18	22	24	56	21	64	89	61	40	22	15	14	15	15	14	16	17	89	
18-Feb	14	15	14	18	17	17	17	17	18	20	20	21	23	20	25	24	20	19	23	21	22	19	21	18	25	
19-Feb	20	22	25	26	23	27	20	44	43	50	26	77	43	67	38	33	20	17	16	16	16	17	17	17	77	
20-Feb	17	15	15	17	16	15	17	16	16	19	20	18	23	23	18	17	17	14	14	11	14	13	14	16	23	
21-Feb	15	14	15	16	15	17	21	22	23	24	34	32	34	35	37	37	27	86	11	13	13	11	9	11	86	
22-Feb	9	17	14	15	16	19	15	16	18	15	43	17	20	24	21	21	18	17	16	16	30	29	27	24	43	
23-Feb	19	20	21	24	22	21	19	17	19	19	21	21	20	20	17	18	17	18	22	19	21	24	19	21	24	
24-Feb	26	23	25	22	21	24	23	24	23	24	20	21	24	30	21	21	25	21	20	16	20	15	17	17	30	
25-Feb	19	16	16	18	16	20	19	21	27	22	21	29	32	41	39	37	50	45	50	18	9	27	17	17	50	
26-Feb	29	13	13	14	16	15	17	23	24	20	18	25	23	30	20	19	19	17	33	30	19	16	17	20	33	
27-Feb	17	16	17	17	16	17	16	17	18	18	24	29	27	27	27	23	25	25	23	11	20	22	25	23	29	
28-Feb	24	26	25	26	27	26	25	23	24	23	25	19	19	21	19	22	18	25	26	17	19	17	19	14	27	
	59	30	70	57	46	60	38	44	52	50	56	77	76	89	61	57	51	86	50	59	42	32	63	59		
Diurnal Maximum																										



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Anzac - February 2015**



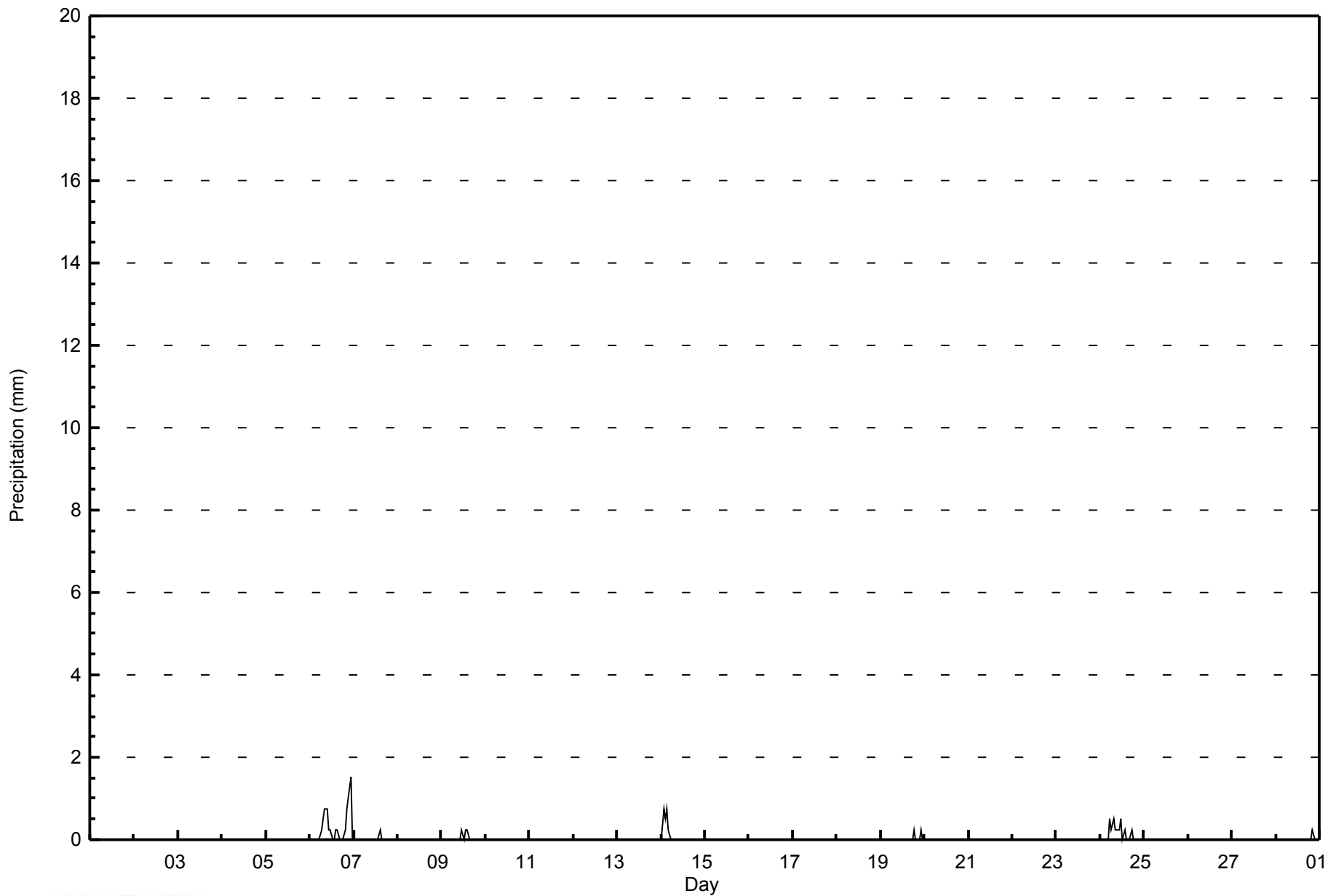


Maximum Value: 1.5 mm on Feb 6 23:00		Maximum Daily Total: 6.9 mm on Feb 6		Hours in Service: 672																								
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 672																								
Maximum Diurnal Total: 1.8 mm at hour 23		Minimum Diurnal Total: 0.0 mm at hour 1		Hours of Missing Data: 0																								
Monthly Total: 13.97 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> = 0.8		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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.8	0.8	0.3	0.3	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.3	0.8	1.0	1.5	0.0	0.0	6.9	1.5	
7-Feb	0.0	0.0	0.0	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	0.3	0.3	
8-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.3	
10-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.8	0.5	0.8	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	0.8	
15-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.0	0.5	0.3	0.3	
20-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.5	0.3	0.5	0.3	0.3	0.5	0.0	0.3	0.0	0.0	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.5	
25-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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	0.3	0.3	0.3	0.3
																								Diurnal Average				
																								Diurnal Maximum				



Wood Buffalo Environmental Association  
Hourly Averages

Precipitation (PC) - mm  
Anzac - February 2015





# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 7, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:48
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
Cal Gas Concentration	51 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL107928		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	NA	DACS channel #	NA

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	HVPS voltage	524	524
Analyzer Range (mv)	1000	1000	Lamp voltage	3773	3773
Calculated slope	0.992660	0.996764	Chamber temp.	30.8	30.8
Calculated intercept	-0.669367	0.014231	Pressure (mmHg)	25.0	25.0
Analyzer Background	23.1	20.2	Flow (lpm)	658	658
Analyzer Coefficient	0.990	1.014			

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	-1.5	NA
as found span	5000	78.3	798.7	780.7	1.023
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	78.3	798.7	801.7	0.996
second point	5000	39.1	398.8	399.0	1.000
third point	5000	19.6	199.9	200.9	0.995
calibrator zero	5000	0.0	0.0	0.3	NA
as left zero	5000	0.0	0.0	0.3	NA
as left span	5000	78.3	798.7	790.2	1.011
Average Correction Factor					0.997

Corrected As found	782.2	Previous response	805.2	% change	2.9%
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#### Notes:

Filter changed out, no maintenance done, zero and span adjusted

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

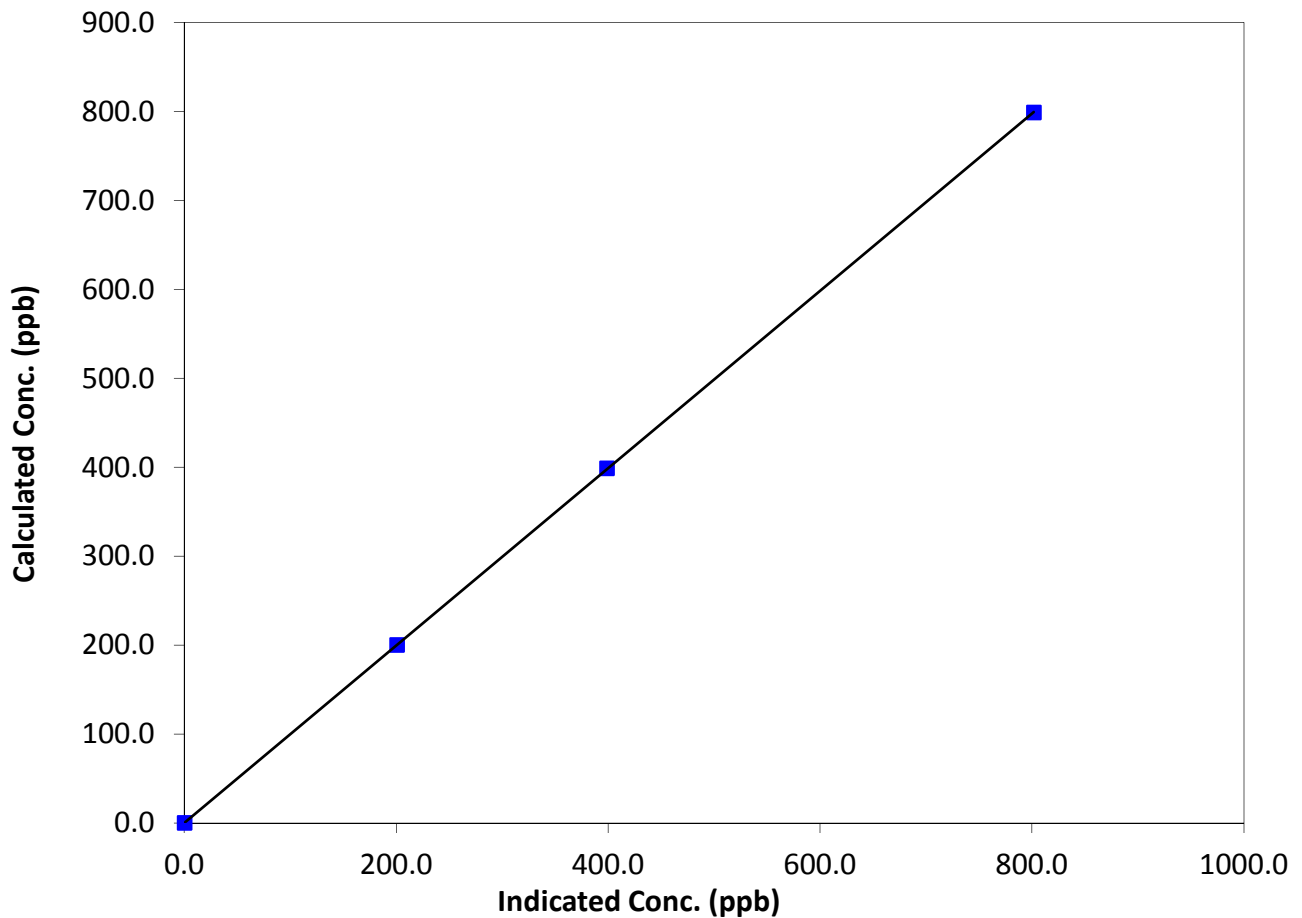
### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 7, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	13:48
Analyzer make	API T100	Analyzer serial #	723

### Calibration Data

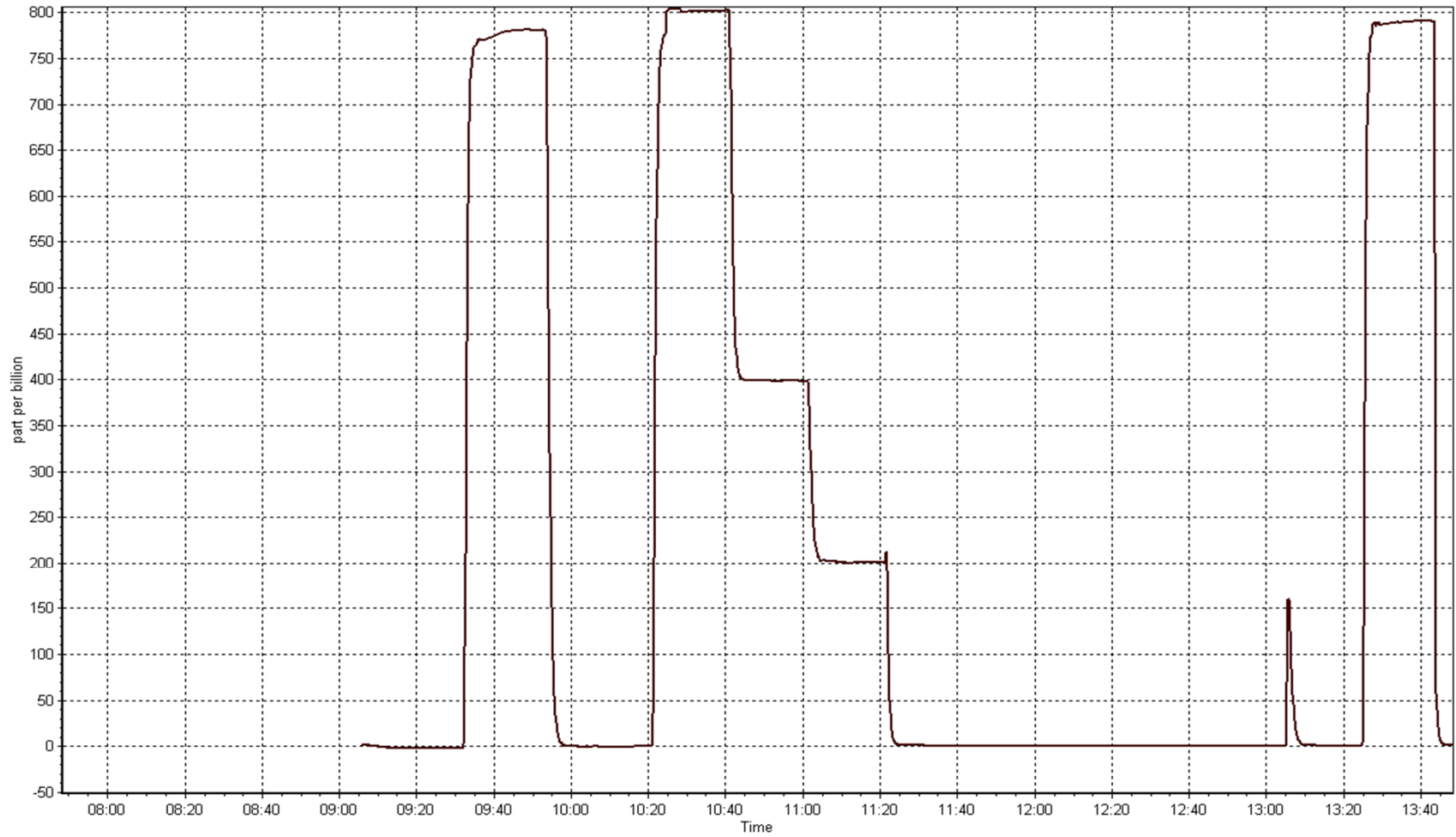
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999995
798.7	801.7	0.9962		
398.8	399.0	0.9995	Slope	0.996764
199.9	200.9	0.9951		
			Intercept	0.014231

### SO<sub>2</sub> Calibration Curve



SO2 Calibration Plot

Date: February 4, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 9, 2015	Previous Calibration	January 6, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	10:50	End Time (MST)	13:18
Barometric Pressure	732 mmHg	Station temp.	22
Calibrator Make/Model	Sabio 4010	Serial number	8400311
Cal Gas Concentration	9.6 ppm H2S	Cal Gas Expiry Date	2/22/2016
Gas Cert Reference	LL82745	SO2 gas conc.	51.0 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	0-5 volts	DACS channel #	2

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-731	-731
Analyzer Range (input)	100	100	Lamp voltage	1004	1004
Calculated slope	1.013178	1.013736	Chamber temp.	44.9	44.9
Calculated intercept	-0.118954	0.047429	Pressure	666.5	666.5
Analyzer Background	1.97	1.97	Flow	0.391	0.391
Analyzer Coefficient	1.094	1.094	Intensity	99	99
			Converter temp.	800	800

Analyzer make/model	43i-TL	Analyzer serial #	1300156232
Converter make/model	CDN-101	Converter serial #	510

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	39.1	75.1	73.7	1.019
SO2 scrubber check	5000	39.1	398.8	-0.1	NA
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	39.1	75.1	73.7	1.019
second point	5000	20.8	39.9	39.8	1.003
third point	5000	10.4	20.0	19.9	1.004
calibrator zero	5000	0.0	0.0	-0.3	NA
as left zero	5000	0.0	0.0	-0.3	NA
as left span	5000	39.1	75.1	73.3	1.024
Average Correction Factor					1.009

Corrected As found	74.1	Previous response	74.2	% change	0.1%
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#### Notes:

scrubber checked before as founds, filter change out, No maintenance or adjustments made

Calibration Performed By:

Melissa Lemay





# Wood Buffalo Environmental Association

## TRS Calibration Summary

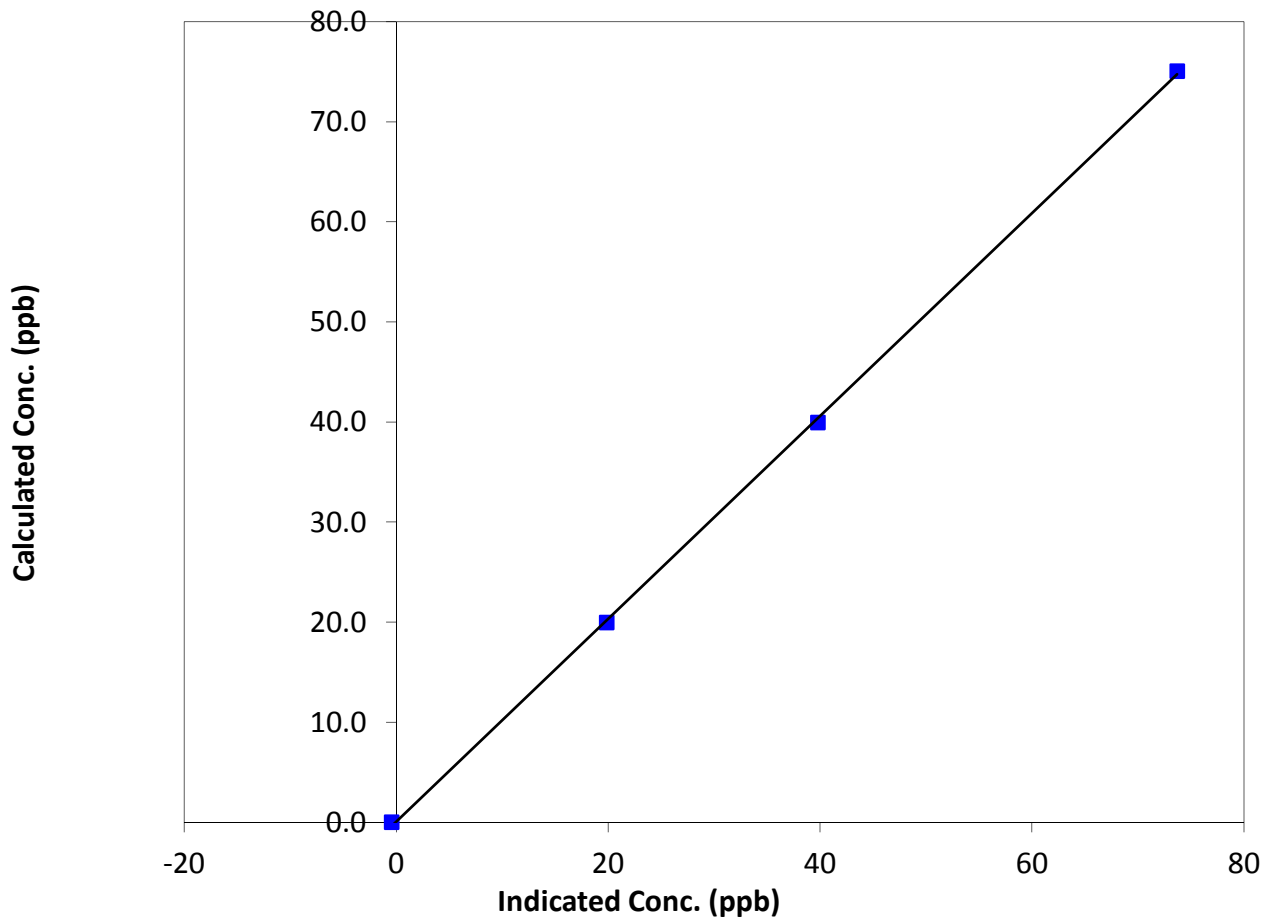
### Station Information

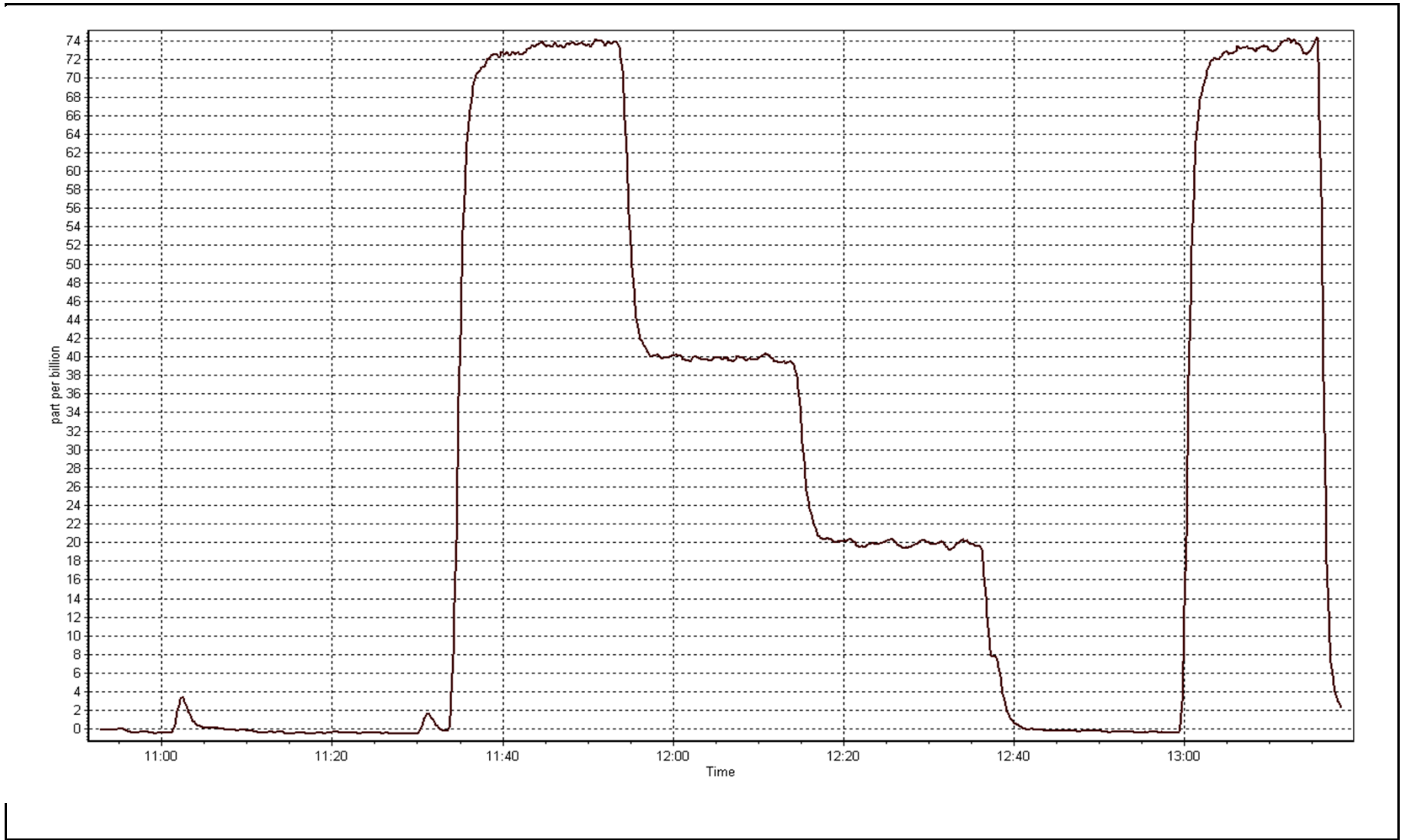
Calibration Date	February 9, 2015	Previous Calibration	January 6, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	10:50	End Time (MST)	13:18
Analyzer make	43i-TL	Analyzer serial #	1300156232

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999836
75.1	73.7	1.0186		
39.9	39.8	1.0034	Slope	1.013736
20.0	19.9	1.0044		
			Intercept	0.047429

**TRS Calibration Curve**







# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### Station Information

Calibration Date	Wednesday, February 04, 2015	Prev Calibration	Tuesday, January 06, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:48
Barometric Pressure	n/a mmHg	Station temp.	21 Deg C
Calibrator Model	Sabio 4010	Serial Number	8400311
Gas Cert Reference	LL107928	Cal Gas Expiry Date	Thursday, May 29, 2014
CH4 Cal Gas Conc.	505.0 ppm	CH4 Equiv Conc.	1066.0 ppm
C3H8 Cal Gas Conc.	204.0 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372

### Analyzer Information

	Before	After		Before	After
THC Range (ppm)	50	50	Internal Temp	35.4	35.4
THC Range (input)	50	50	Flame Temp	405.0	405.0
NMHC Range (ppm)	50	50	Carrier Pressure	31.8	31.8
NMHC Range (input)	50	50	Fuel Pressure	41.4	41.4
THC Calc slope	0.983935	1.004727	Air Pressure	32.5	32.5
THC Calc intercept	0.025898	0.020338			
NMHC Calc slope	0.972478	1.008465			
NMHC Calc intercept	0.003994	-0.001923			

Analyzer make TEC 55i Analyzer serial # 1218153355

### THC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.00	N/A
as found span	5000	78.3	16.69	16.62	1.004
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	16.69	16.62	1.004
second point	5000	39.1	8.34	8.22	1.014
third point	5000	19.6	4.18	4.15	1.007
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	16.69	16.63	1.004
Average Correction Factor					1.008

Corrected As found 16.62 Previous response 16.94 % change 1.9%

**Notes:**

Filter changed out, no adjustments or maintenance done

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

## THC / NMHC Calibration Report

### NMHC Calibration Data

Set Point	Dilution air flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration NMHC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0	0.00	0.00	N/A
as found span	5000	78.3	8.79	8.72	1.007
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	8.79	8.72	1.007
second point	5000	39.1	4.39	4.33	1.013
third point	5000	19.6	2.20	2.20	1.000
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	8.79	8.73	1.006
Average Correction Factor					1.007

Corrected As found      8.72      Previous response      9.03      % change      3.6%

### 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	N/A
as found span	5000	78.3	7.91	7.91	1.000
calibrator zero	5000	0.0	0.00	0.00	N/A
high point	5000	78.3	7.91	7.91	1.000
second point	5000	39.1	3.95	3.89	1.015
third point	5000	19.6	1.98	1.96	1.010
calibrator zero	5000	0.0	0.00	0.00	N/A
as left zero	5000	0.0	0.00	0.00	N/A
as left span	5000	78.3	7.91	7.90	1.001
Average Correction Factor					1.008

Corrected As found      7.91      Previous response      7.91      % change      0.0%



# Wood Buffalo Environmental Association

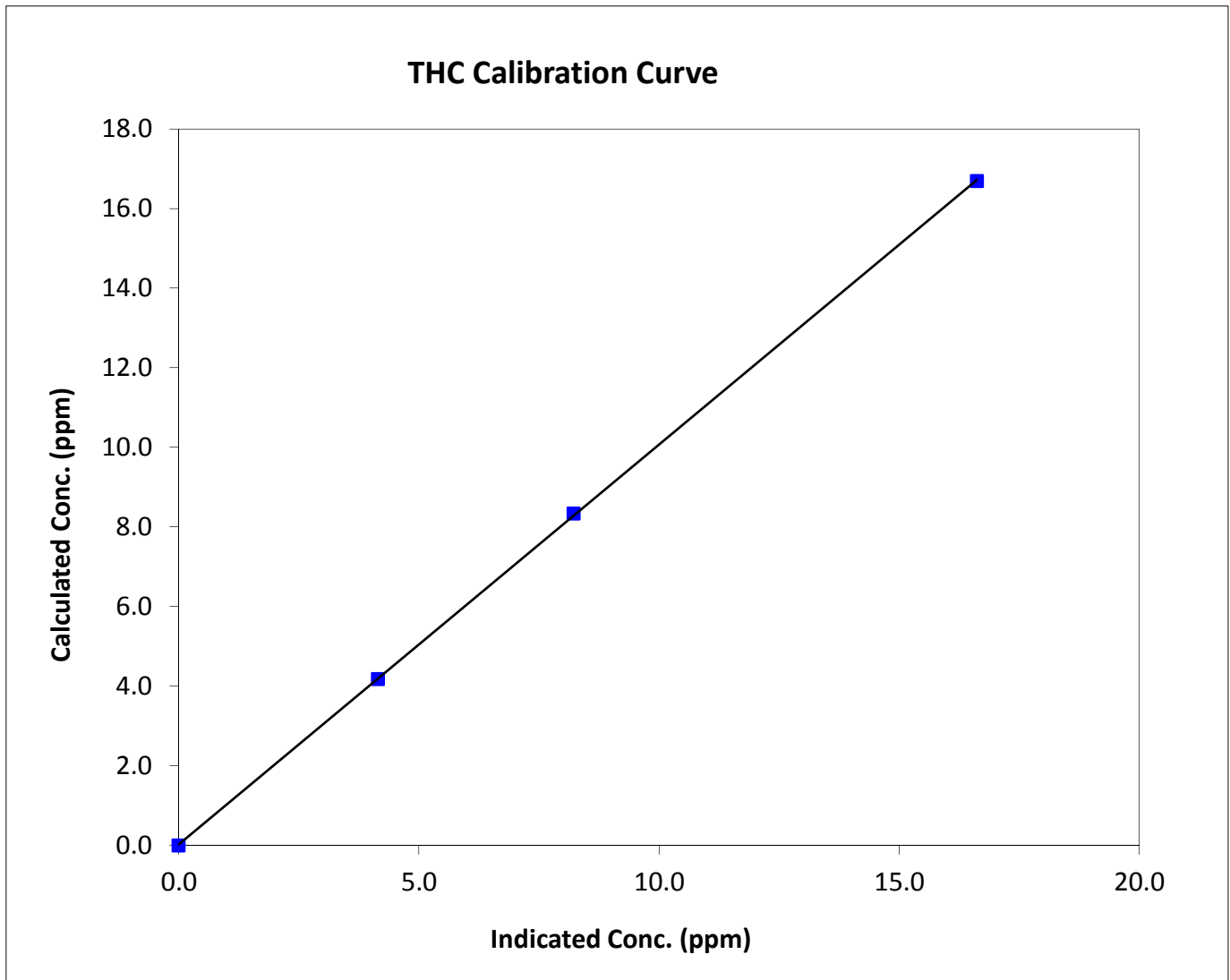
## THC Calibration Summary

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 6, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	13:48
Analyzer make	TEC 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999971
16.69	16.62	1.0044		
8.34	8.22	1.0141	Slope	1.004727
4.18	4.15	1.0069		
			Intercept	0.020338





# Wood Buffalo Environmental Association

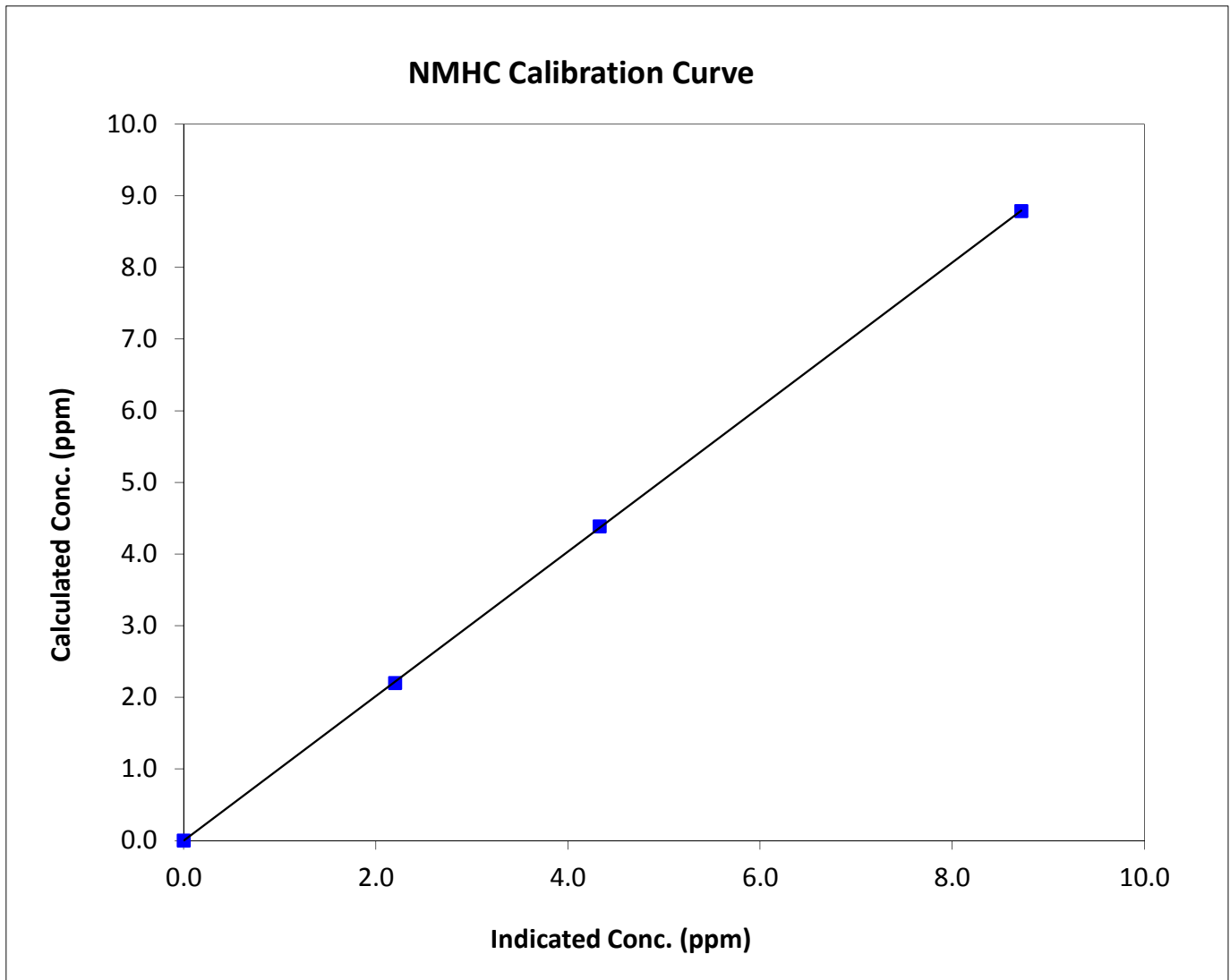
## NMHC Calibration Summary

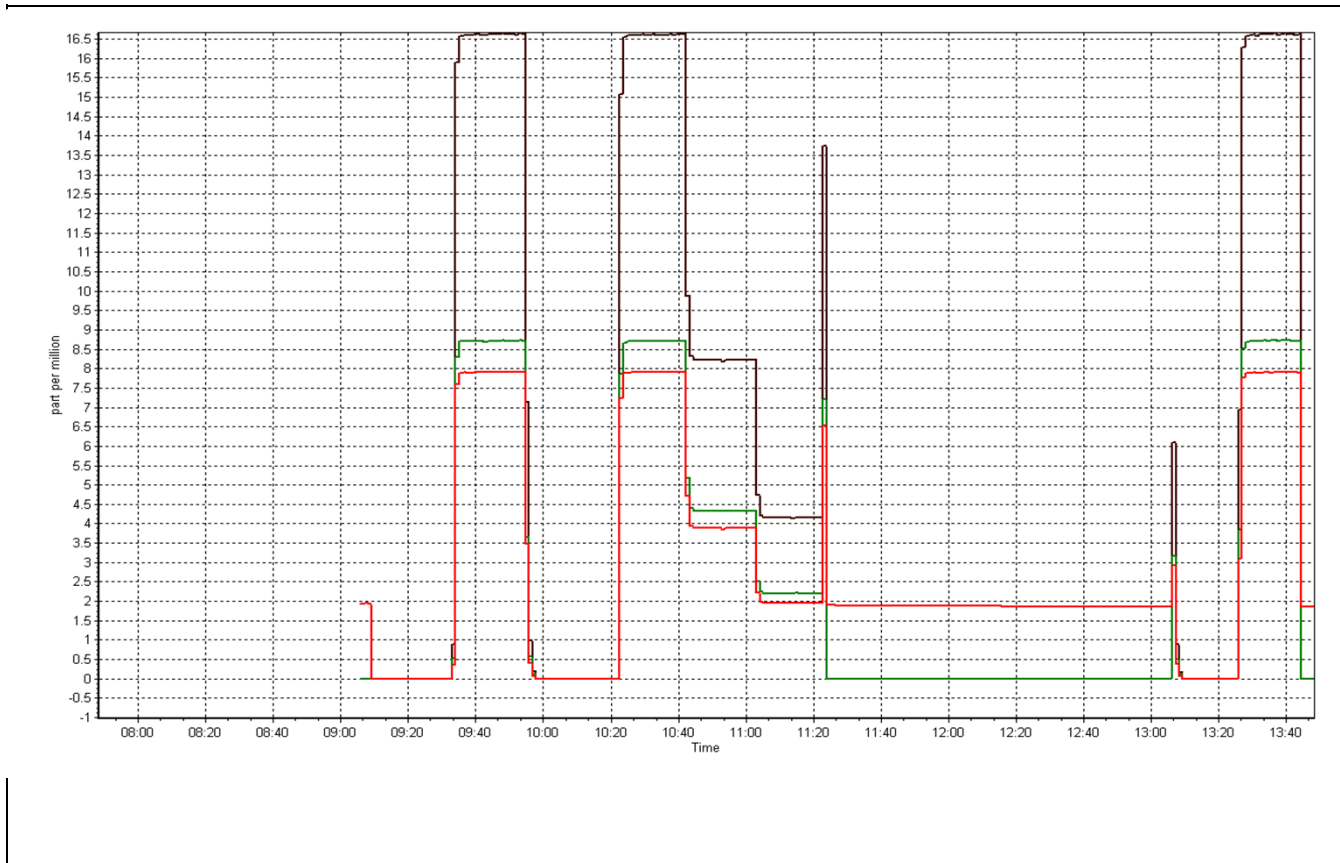
### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 6, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	13:48
Analyzer make	TEC 55i	Analyzer serial #	1218153355

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.00	N/A	Correlation Coefficient	0.999980
8.79	8.72	1.0075		
4.39	4.33	1.0132	Slope	1.008465
2.20	2.20	0.9996		
			Intercept	-0.001923







# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 5, 2015	Previous Calibration	January 9, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:25	End Time (MST)	12:25
Barometric Pressure	732 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	8400311
NO2 calibration used	Wednesday, February 04, 2015	Transfer Standard	
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2372
DACS voltage range	5000	DACS channel #	7 & 8

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Bench temp.	26.0	26.0
Analyzer Range (input)	500	500	Lamp temp.	53.8	53.8
Calculated slope	1.000744	1.003282	Pressure	663.4	663.4
Calculated intercept	0.761411	0.172969	Flow cell A	0.705	0.705
Analyzer Background	0.3	0	Flow cell B	0.710	0.710
Analyzer Coefficient	1.099	1.025	Cell A Intensity	136868	136868
			Cell B Intensity	142853	142853

Analyzer make 49i Analyzer serial # 1426262596

### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mA)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.00	0.0	-1.0	N/A
as found span	5000	1.19	414.1	441.8	0.937
calibrator zero	5000	0.00	0.0	0.1	N/A
high point	5000	1.19	414.1	413.0	1.003
second point	5000	0.85	284.1	282.5	1.006
third point	5000	0.50	148.7	147.8	1.006
calibrator zero	5000	0.00	0.0	-0.2	N/A
as left zero	5000	0.00	0.0	-0.2	N/A
as left span	5000	1.19	414.1	414.2	1.000
Average Correction Factor					1.005

Corrected As found 442.8 Previous response 413.0 % change -6.7%

#### Notes:

Calibration Performed By:

Melissa Lemay





# Wood Buffalo Environmental Association

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

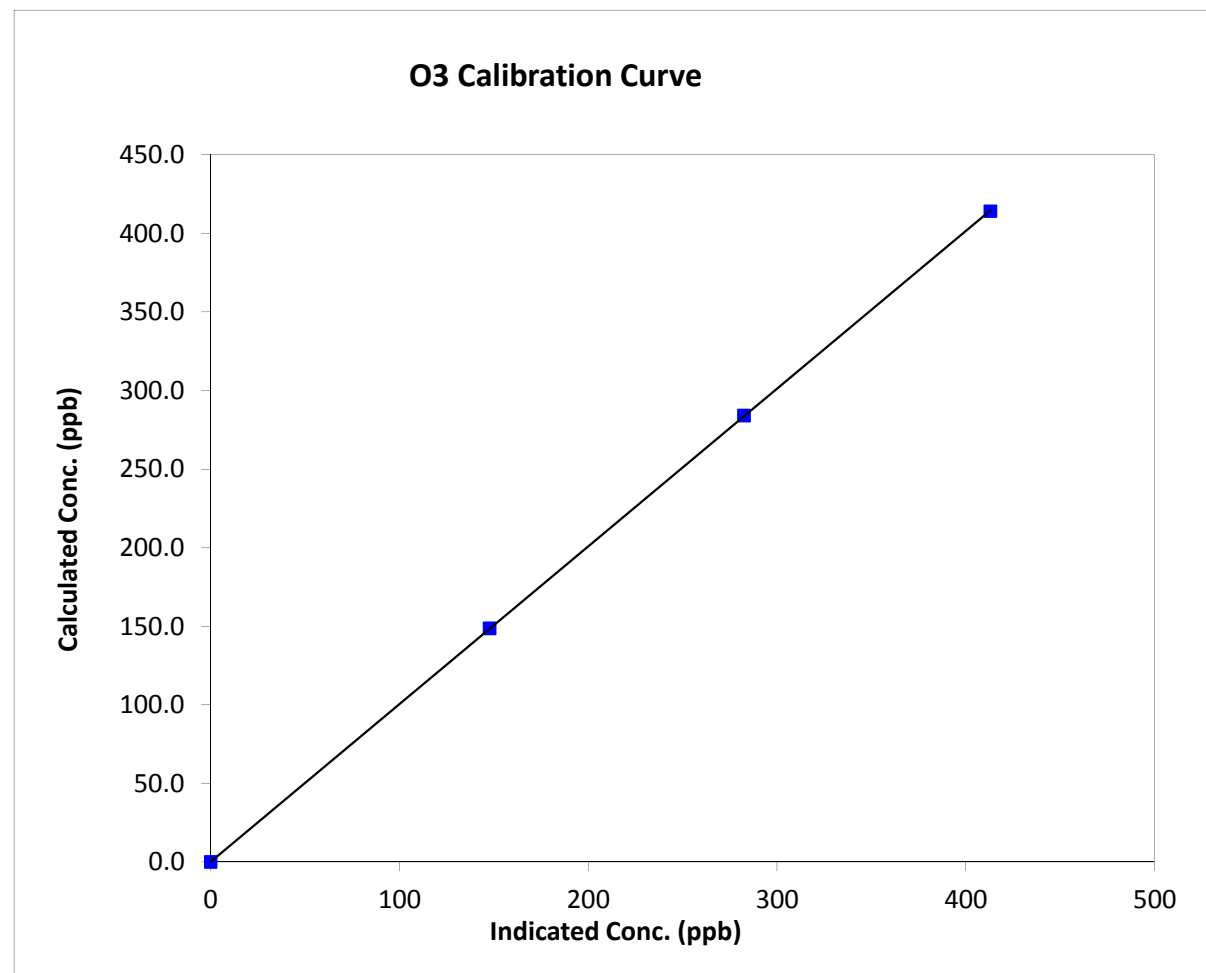
### Station Information

Calibration Date	Thursday, February 05, 2015	Previous Calibration	January 9, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:25	End Time (MST)	12:25
Analyzer make	49i	Analyzer serial #	1426262596

### Calibration Data

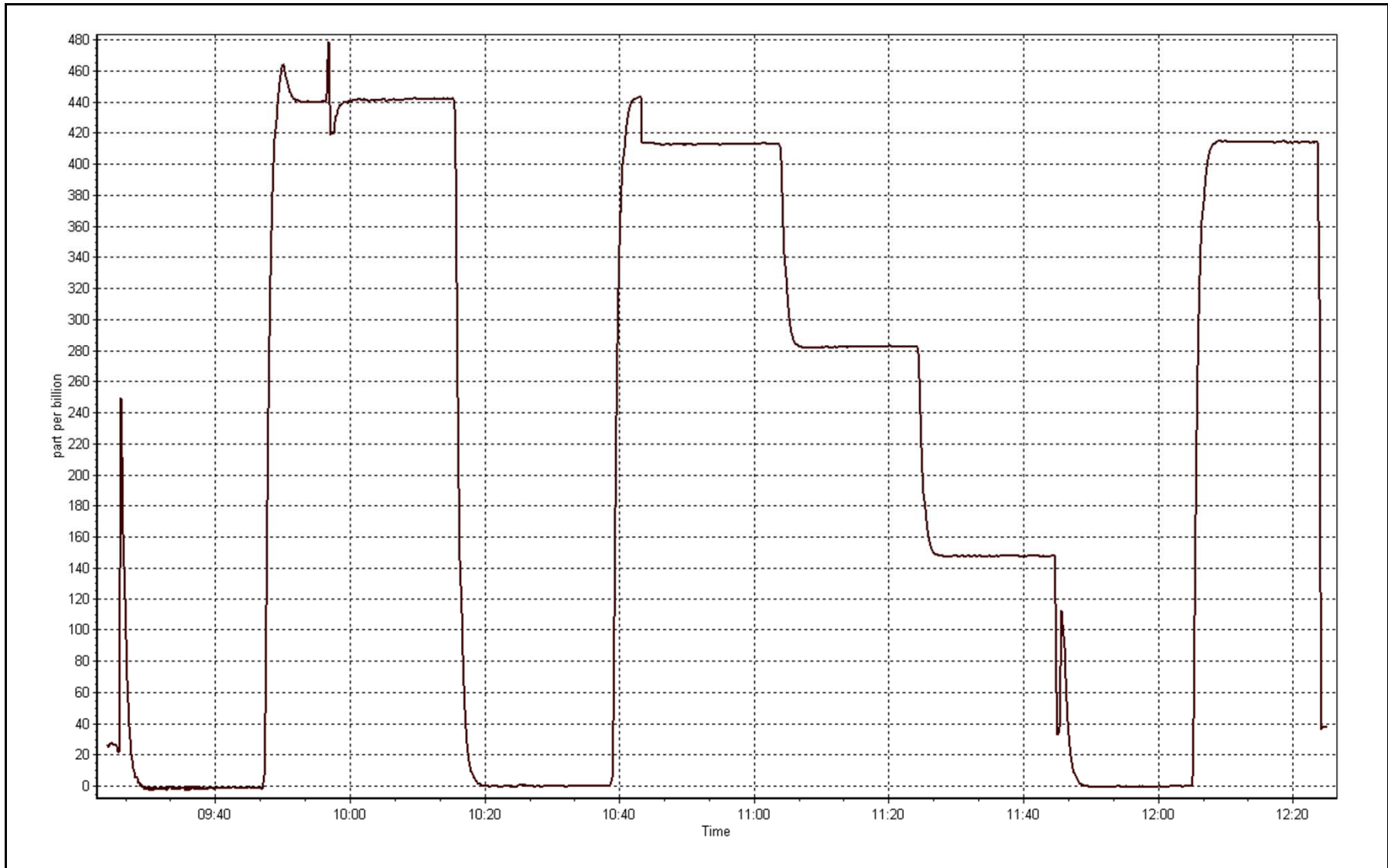
Calculated concentration (ppb) (C <sub>c</sub> )	Indicated concentration (ppb) (I <sub>c</sub> )	Correction factor (C <sub>c</sub> /I <sub>c</sub> )	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999994
414.1	413.0	1.0027		
284.1	282.5	1.0057	Slope	1.003282
148.7	147.8	1.0061		
			Intercept	0.172969

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: February 5, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 8, 2015
Station Name	Anzac	Station Number	AMS 14
Reason:	Routine		
Start Time (MST)	9:05	End Time (MST)	13:48
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	8400311
NO Cal Gas Conc	51.1 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	51.2 ppm	Cal Gas Serial #	LL107928

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. \_\_\_\_\_

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	1.002395	0.999852	0.998453
	Data Offset	0.240309	0.247461	0.011491
After	Data Slope	0.992019	0.989513	1.002551
	Data Offset	0.253187	0.328360	0.018814
Channel #		6	5	4
Voltage Range		0 - 5V	0 - 5V	0 - 5V

### Analyzer Information

Analyzer make/model 42i      Analyzer serial # 1426262592

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.740	ppb	0.740	ppb
NOX coefficient	1.000	ppb	1.000	ppb
NO2 coefficient	0.997	ppb	0.997	ppb
NO bkgrnd	3.0		3.0	
NOX bkgrnd	3.1		3.1	
Nt coefficient	n/a		n/a	
Chamber Temp	49.9	Deg C	49.9	Deg C
Moly Temp	324.5	Deg C	324.5	Deg C
PMT Temp	-2.8	Deg C	-2.8	Deg C
O3 flow	Ok	ccm	Ok	ccm
R Cell Press	158.8	mmHg	158.8	mmHg
Sample Flow	0.840	ccm	0.840	ccm

**Notes:**

filter changed, no adjustments or maintenance done



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 4, 2015

Station Number:

AMS 14

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
as found span	5000	78.3	801.8	800.2	1.6	808.5	809.0	-0.5	0.9917	0.9892
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	N/A	N/A
high point	5000	78.3	801.8	800.2	1.6	808.5	809.0	-0.5	0.9917	0.9892
second point	5000	39.1	400.4	399.6	0.8	402.2	402.2	0.1	0.9955	0.9935
third point	5000	19.6	200.7	200.3	0.4	202.3	202.2	0.0	0.9921	0.9907
calibrator zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
as left zero	5000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A
as left span	5000	78.3	801.8	394.2	407.6	806.9	395.5	411.3	0.9937	0.9967
Average Correction Factor									0.9931	0.9911

Corrected As found NO<sub>x</sub>= 808.6 NO= 809.1 Percent Change NO<sub>x</sub>= -1.1% NO= -1.1%  
 Previous Response NO<sub>x</sub>= 799.6 NO= 800.1

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 78.30 ccm

O3 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			N/A	
1st NO <sub>2</sub> (300)	N/A	394.2	414.1	807.2	394.2	413.0	0.9780	1.0000	1.0027	99.7%
2nd NO <sub>2</sub> (200)	N/A	524.2	284.1	807.6	524.2	283.4	0.9775	1.0000	1.0025	99.8%
3rd NO <sub>2</sub> (100)	N/A	659.6	148.7	807.9	659.6	148.3	0.9771	1.0000	1.0027	99.7%
4th NO <sub>2</sub> (0)	808.3	N/A	-0.9	807.4	808.3	-0.9	0.9777	1.0000	N/A	N/A
Average Correction Factor							0.9776	1.0000	1.0026	99.7%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

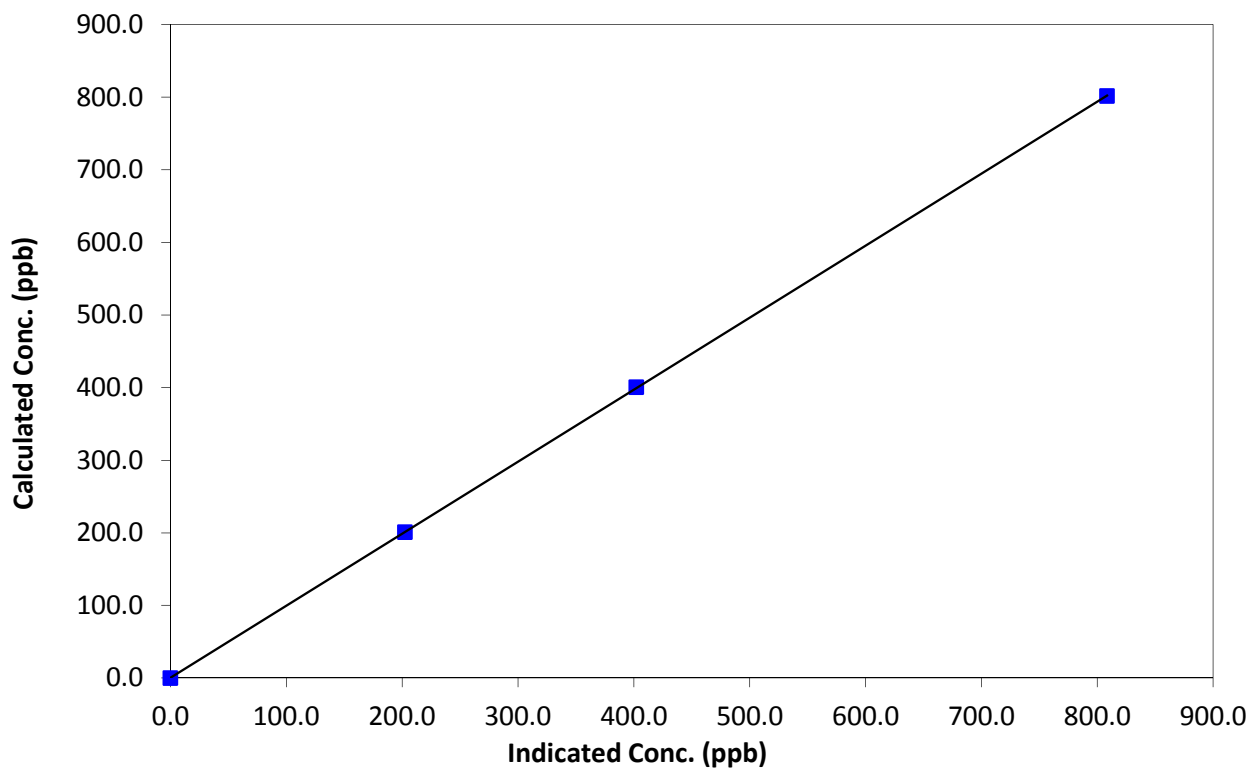
### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 8, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	13:48
Analyzer make	42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999996
801.8	808.5	0.9917		
400.4	402.2	0.9955	Slope	0.992019
200.7	202.3	0.9921		
0.0	0.0	#DIV/0!	Intercept	0.253187

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

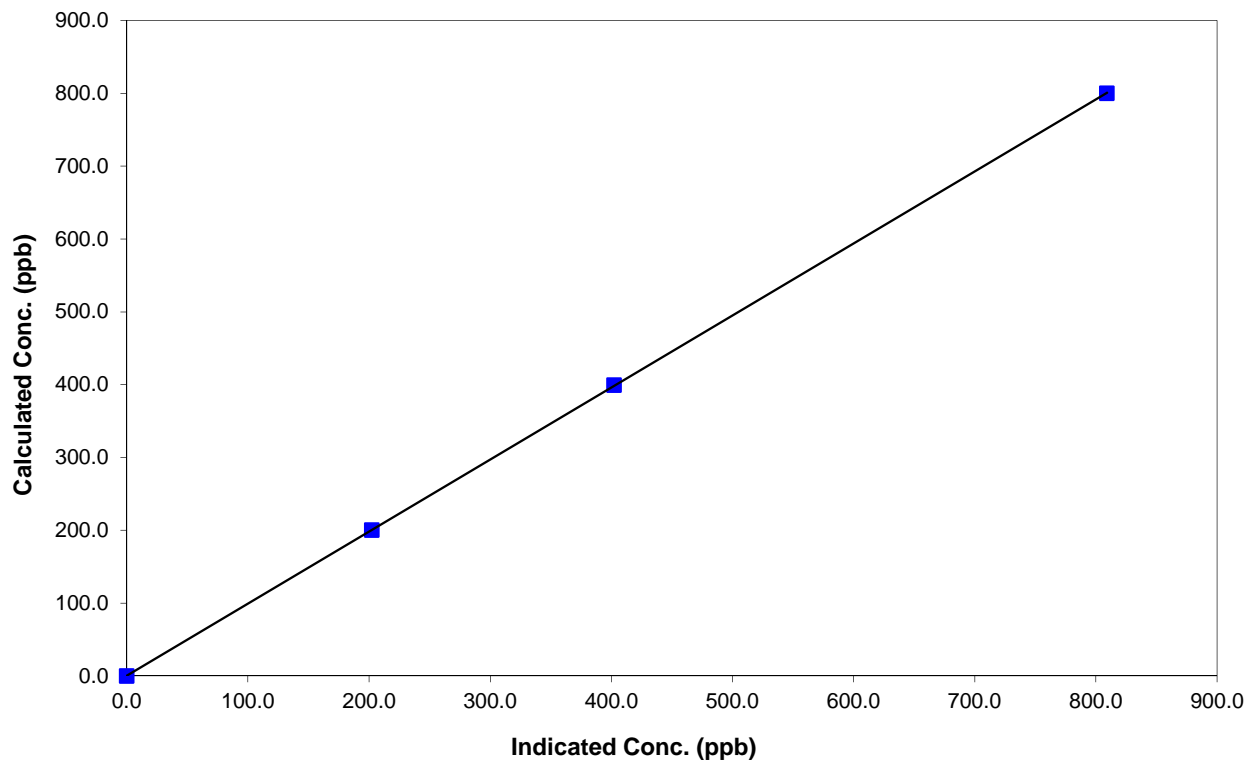
### Station Information

Calibration Date	February 4, 2015	Previous Calibration	January 8, 2015
Station Name	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	13:48
Analyzer make	42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999995
800.2	809.0	0.9892		
399.6	402.2	0.9935	Slope	0.989513
200.3	202.2	0.9907		
0.0	0.0	#DIV/0!	Intercept	0.328360

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

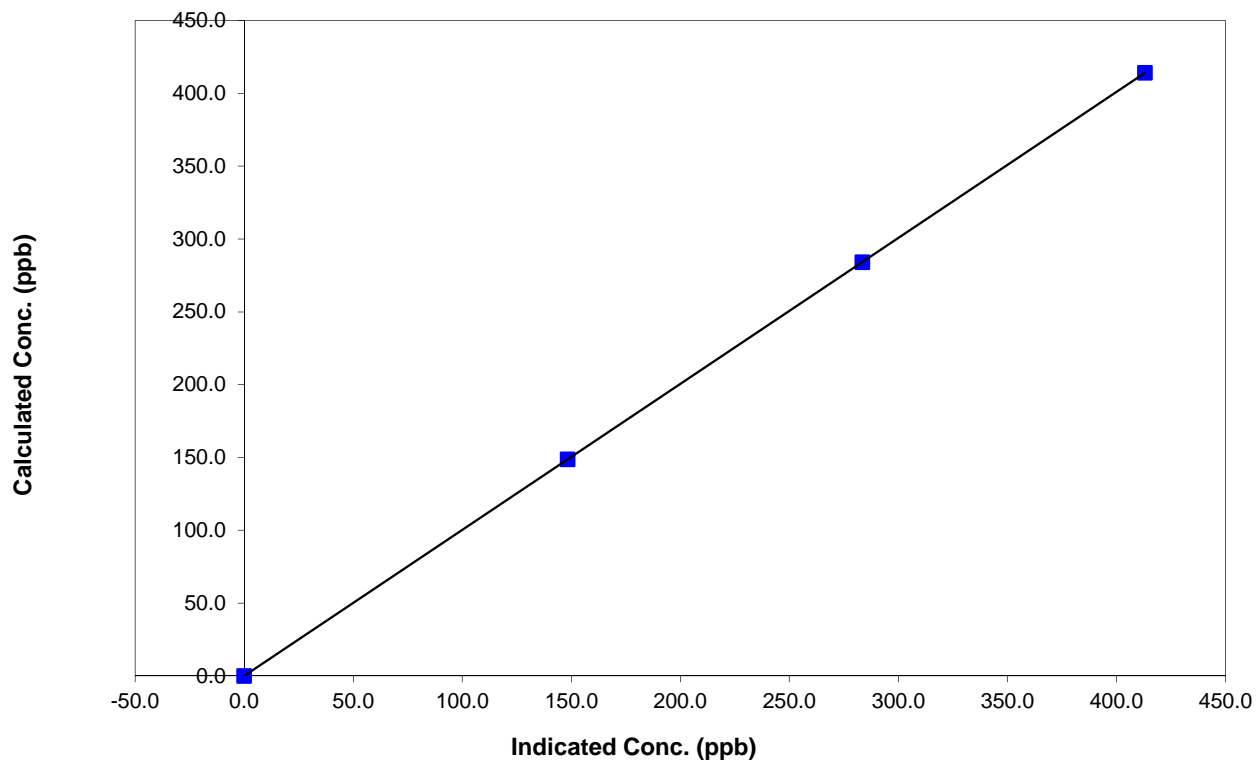
### Station Information

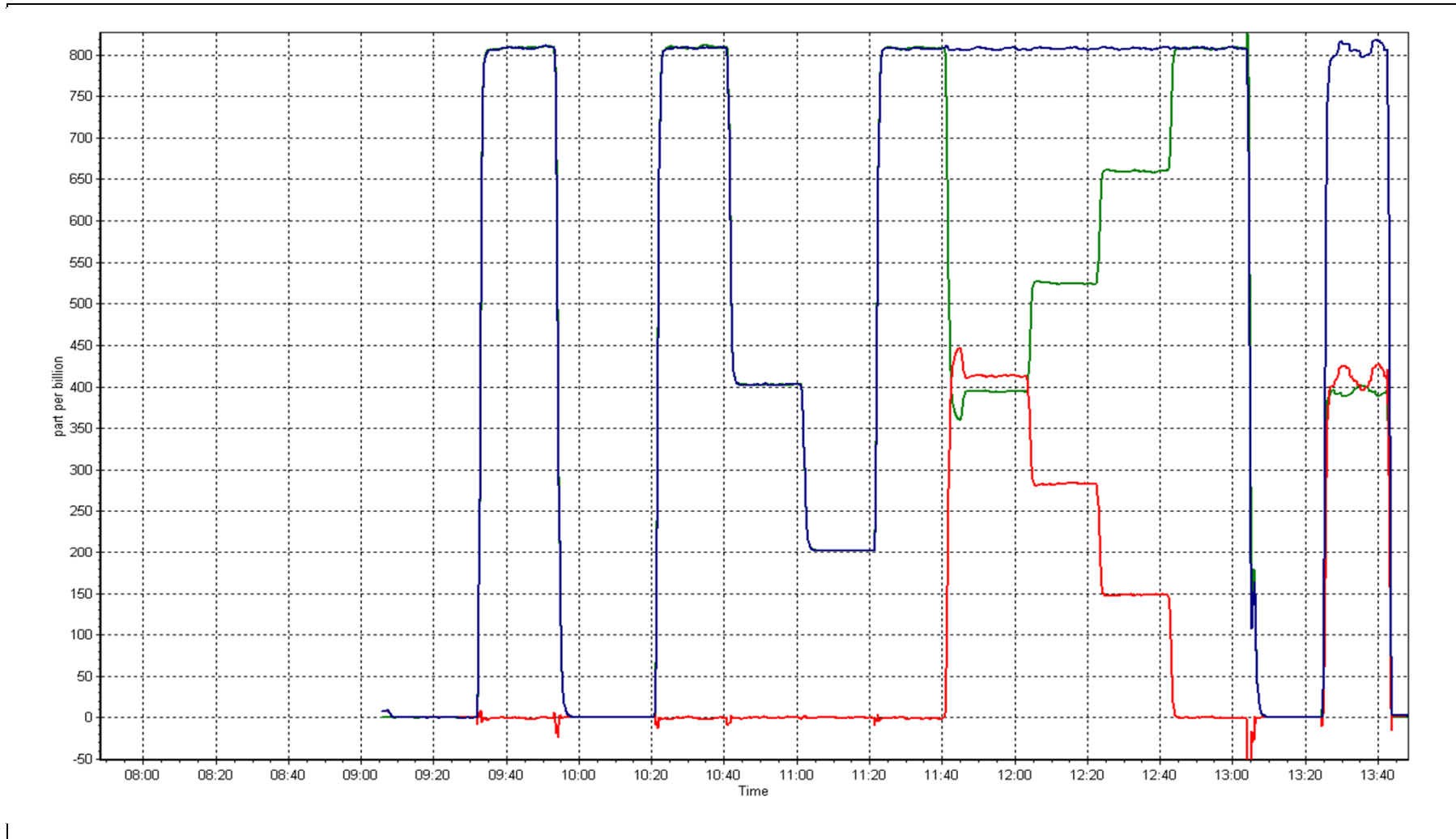
Calibration Date	February 4, 2015	Previous Calibration	January 8, 2015
Station Number	Anzac	Station Number	AMS 14
Start Time (MST)	9:05	End Time (MST)	13:48
Analyzer make	42i	Analyzer serial #	1426262592

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	1.000000
414.1	413.0	1.0027		
284.1	283.4	1.0025	Slope	1.002551
148.7	148.3	1.0027		
			Intercept	0.018814

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







**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 15  
CNRL HORIZON  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
 FEBRUARY 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	639	33	33	100.00	23	0	8	0
TRS (ppb) Average	640	32	32	100.00	2	0	1	0
THC (ppm) Average	638	33	34	99.85	5.2	-	2.7	-
NO2 (ppb) Average	639	33	33	100.00	44	0	25	-
NO (ppb) Average	639	33	33	100.00	78	-	14	-
NOX (ppb) Average	639	33	33	100.00	120	-	35	-
PM2.5 (ug/m3) Average	671	1	1	100.00	33.4	-	14.6	0
Temperature 2 m (C) Average	672	0	0	100.00	0.7	-	-3.1	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	20	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-
Precipitation (mm) Total	672	0	0	100.00	0.8	-	-	-
Relative Humidity (%) Average	672	0	0	100.00	92	-	-	-
Global Solar Radiation (W/m2) Average	672	0	0	100.00	509	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
 FEBRUARY 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	639	1	2	-	0	0	0	0	1	2	23
TRS (ppb) Average	640	0.3	0	-	0	0	0	0	0	0	2
THC (ppm) Average	638	2.26	0.3	-	2	2.1	2.1	2.2	2.3	2.5	5.2
NO2 (ppb) Average	639	9.2	10	-	0	1	2	5	14	26	44
NO (ppb) Average	639	2.9	8	-	0	0	0	0	2	8	78
NOX (ppb) Average	639	12.1	16	-	0	1	2	6	16	32	120
PM2.5 (ug/m3) Average	671	4.72	4	-	0.8	1.7	2.5	3.6	5.3	8.8	33.4
Temperature 2 m (C) Average	672	-17.73	7.7	-	-38.1	-26.8	-23.3	-18.3	-12.5	-7.5	0.7
Wind Speed 10 m (km/h) Average	672	7.9	4	-	1	3	5	8	10	13	20
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-
Precipitation (mm) Total	672	-	-	12.95	0	0	0	0	0	0	0.8
Relative Humidity (%) Average	672	72.4	8	-	46	60	68	74	78	81	92
Global Solar Radiation (W/m2) Average	672	62.7	109	-	0	0	0	0	98	213	509

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CNRL HORIZON (AMS 15)  
FEBRUARY2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
THC	10 Feb 2015 15:00	10 Feb 2015 15:00	1	Intermittent unstable operation - excessive baseline drift

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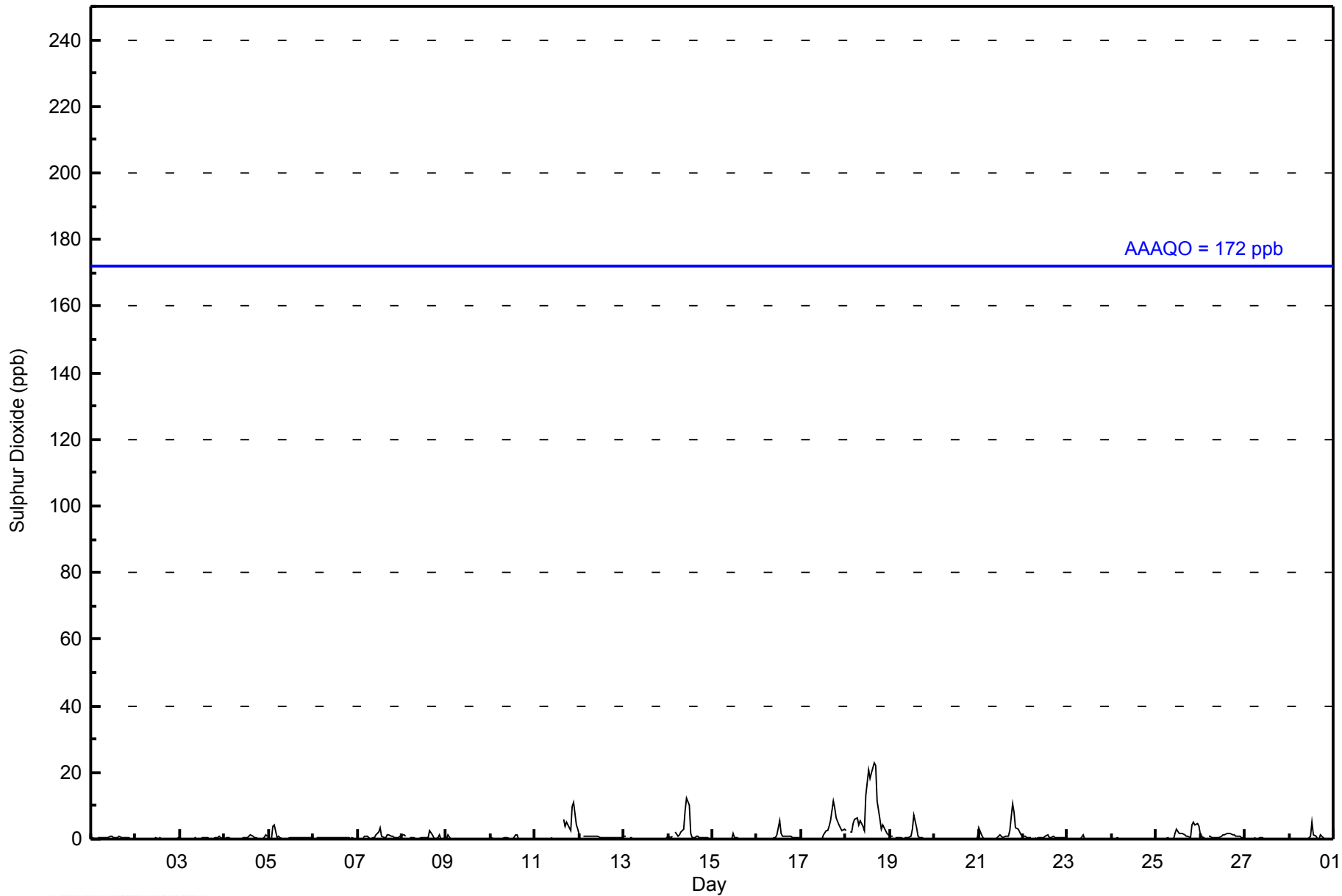


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																						
Maximum Value: 23 ppb on Feb 18 16:00										Maximum Daily Average: 8.2 ppb on Feb 18										Hours of Data: 639																												
Minimum Value: 0 ppb on Feb 2 00:00										Minimum Daily Average: 0.0 ppb on Feb 20										Hours of Missing Data: 33																												
Maximum Diurnal Average: 1.8 ppb at hour 13										Minimum Diurnal Average: 0.4 ppb at hour 2										Hours of Calibration: 33																												
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> =9										Percent Operational Time: 100.0																												
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	1	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1																						
2-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.2	1																						
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	0.4	1																						
5-Feb	Z	0	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.7	4																							
6-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																						
7-Feb	0	0	Z	1	1	1	0	0	0	0	1	2	3	1	0	0	1	1	1	1	1	0	0	1	0.8	3																						
8-Feb	1	1	1	Z	0	0	0	0	0	0	0	1	0	1	3	1	0	0	0	1	0	0	0	0.6	3																							
9-Feb	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1																							
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0.2	1																							
11-Feb	Z	0	0	0	0	0	0	0	0	0	C	C	C	C	C	6	4	5	4	2	10	11	4	3	2.8	11																						
12-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0.6	1																							
13-Feb	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																							
14-Feb	1	0	1	Z	2	1	1	2	3	9	12	10	1	0	1	1	1	0	0	0	0	0	0	2.1	12																							
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0.2	2																							
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	6	2	1	1	1	1	1	1	1	0	0	0.7	6																							
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	2	3	4	5	11	9	6	4	3	3	3	2.4	11																							
18-Feb	3	Z	2	2	5	6	6	4	5	4	3	13	21	18	20	23	22	11	6	3	4	3	2	1	8.2	23																						
19-Feb	1	1	Z	0	0	0	0	0	0	0	1	3	7	3	1	0	0	0	0	0	0	0	0	0.8	7																							
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0																							
21-Feb	3	1	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	2	11	8	4	3	2	1	1.9	11																						
22-Feb	1	1	1	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0.5	1																							
23-Feb	Z	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1																							
24-Feb	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-Feb	0	0	Z	0	0	0	0	0	0	0	2	3	2	2	2	1	1	1	0	4	5	4	5	4	1.5	5																						
26-Feb	1	1	0	Z	1	1	1	0	0	0	0	1	1	1	2	2	2	1	1	1	1	1	1	0	0.9	2																						
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0																							
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	5	1	1	0	0	1	0	0	0	0	0	0.4	5																							
																								0.6	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.6	0.8	1.5	1.8	1.6	1.4	1.7	1.6	1.4	1.3	1.1	1.2	1.1	0.8	0.6	Diurnal Average
																								3	1	4	4	5	6	6	4	5	9	12	13	21	18	20	23	22	11	11	8	10	11	5	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  
CNRL Horizon - February 2015







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	628	98.28	98.28
11 - 20	8	1.25	99.53
21 - 60	3	0.47	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**CNRL Horizon - February 2015**

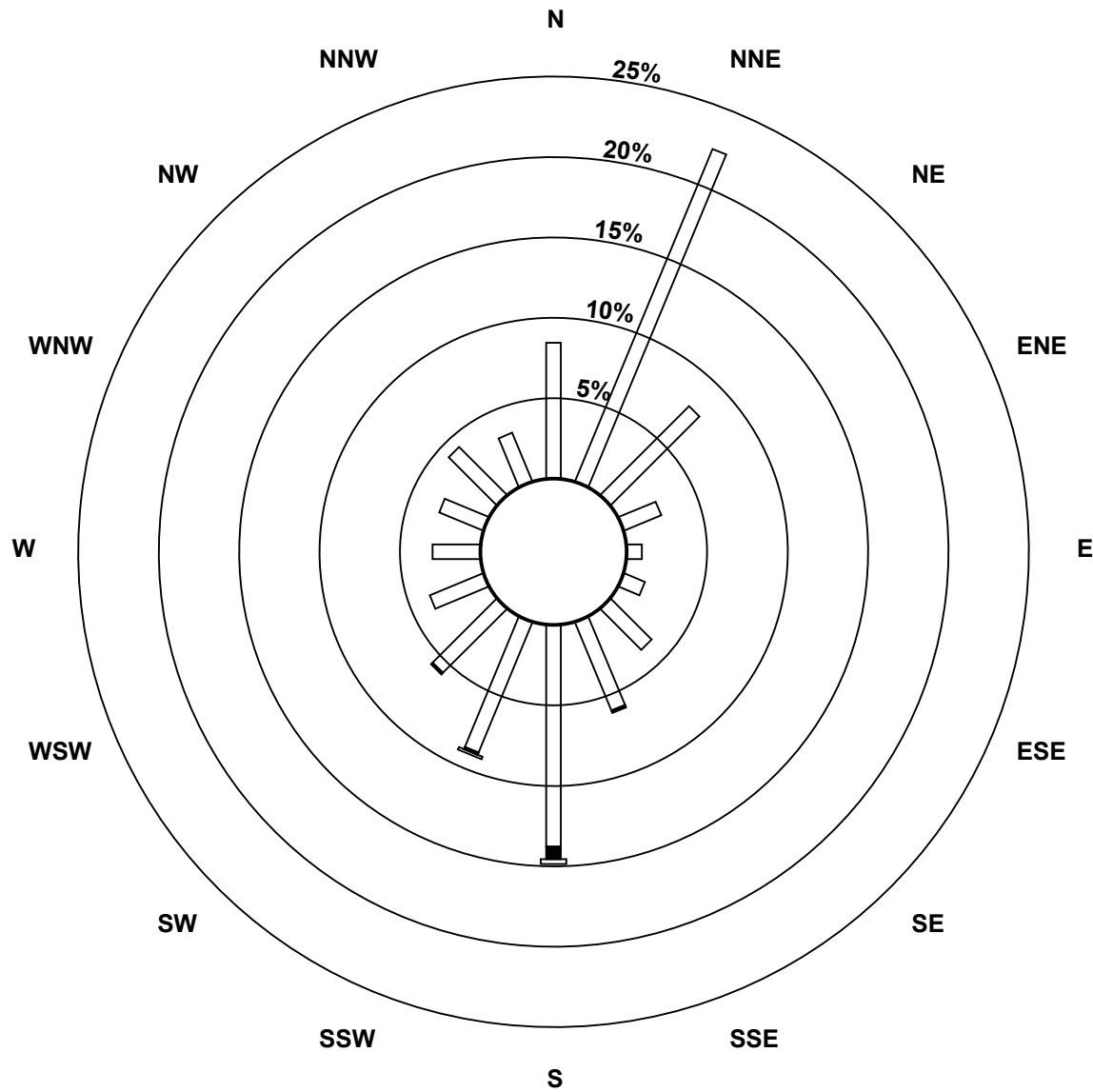
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	54	143	50	16	6	9	23	38	88	56	36	23	19	19	27	21	628
11 - 20	0	0	0	0	0	0	0	1	5	1	1	0	0	0	0	0	8
21 - 60	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	143	50	16	6	9	23	39	95	58	37	23	19	19	27	21	639

Total Number of Valid Hours: 639

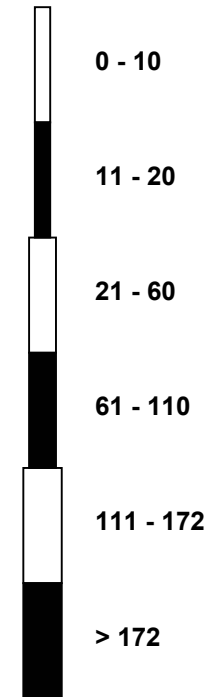
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)



Classes (ppb)

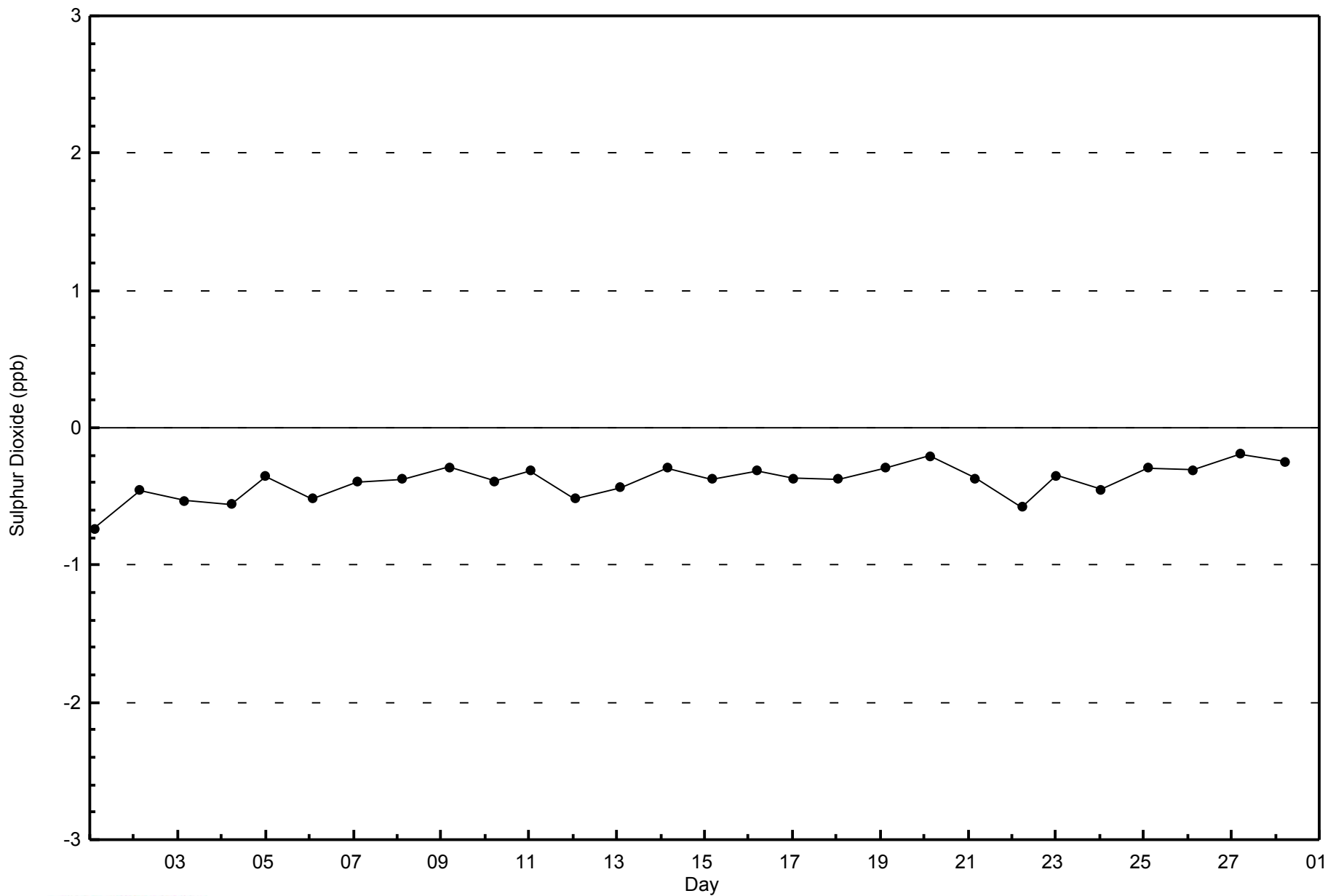


Total Number of Valid Hours: 639



WBEA  
Zero Responses

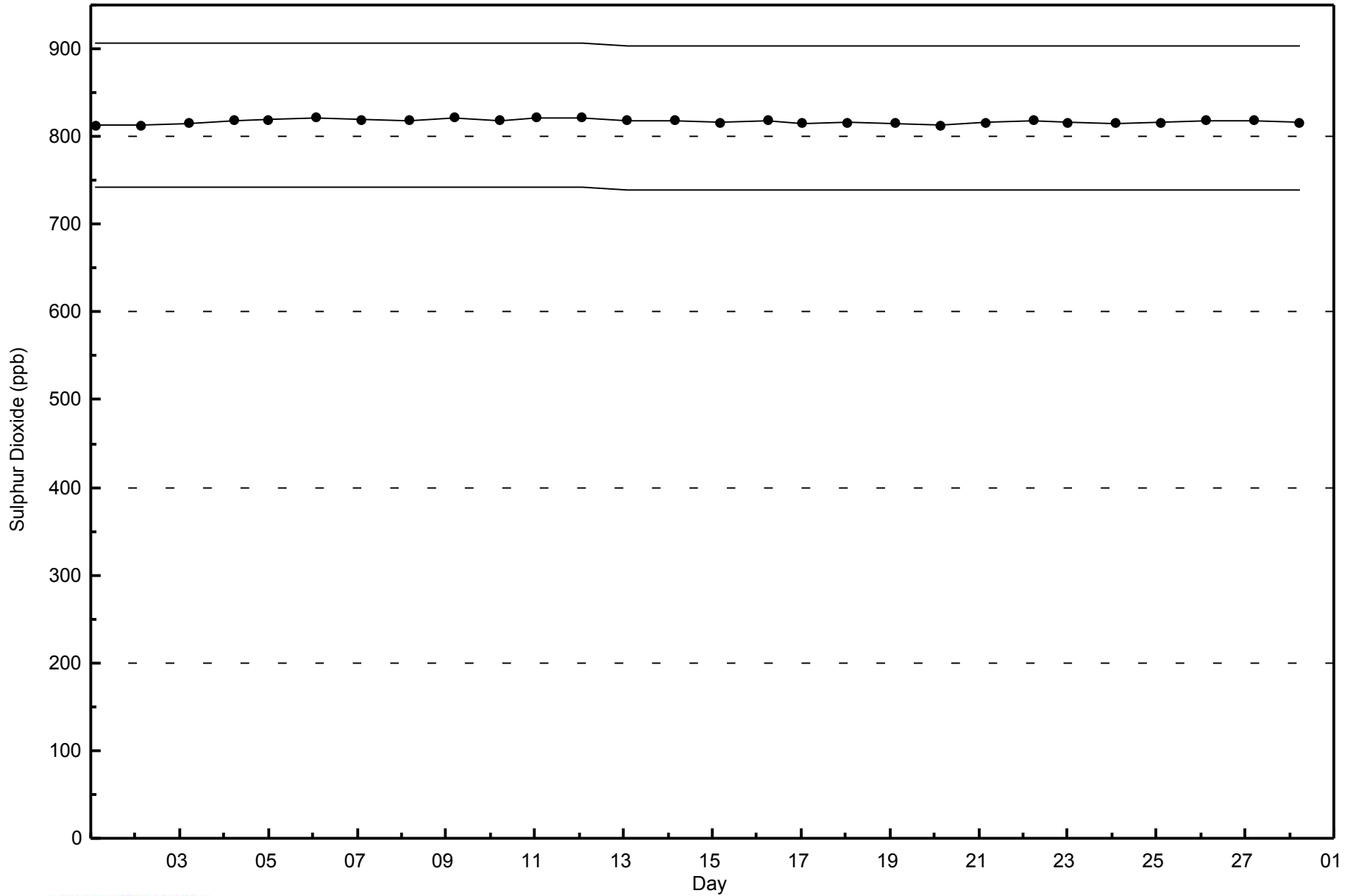
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
CNRL Horizon - February 2015



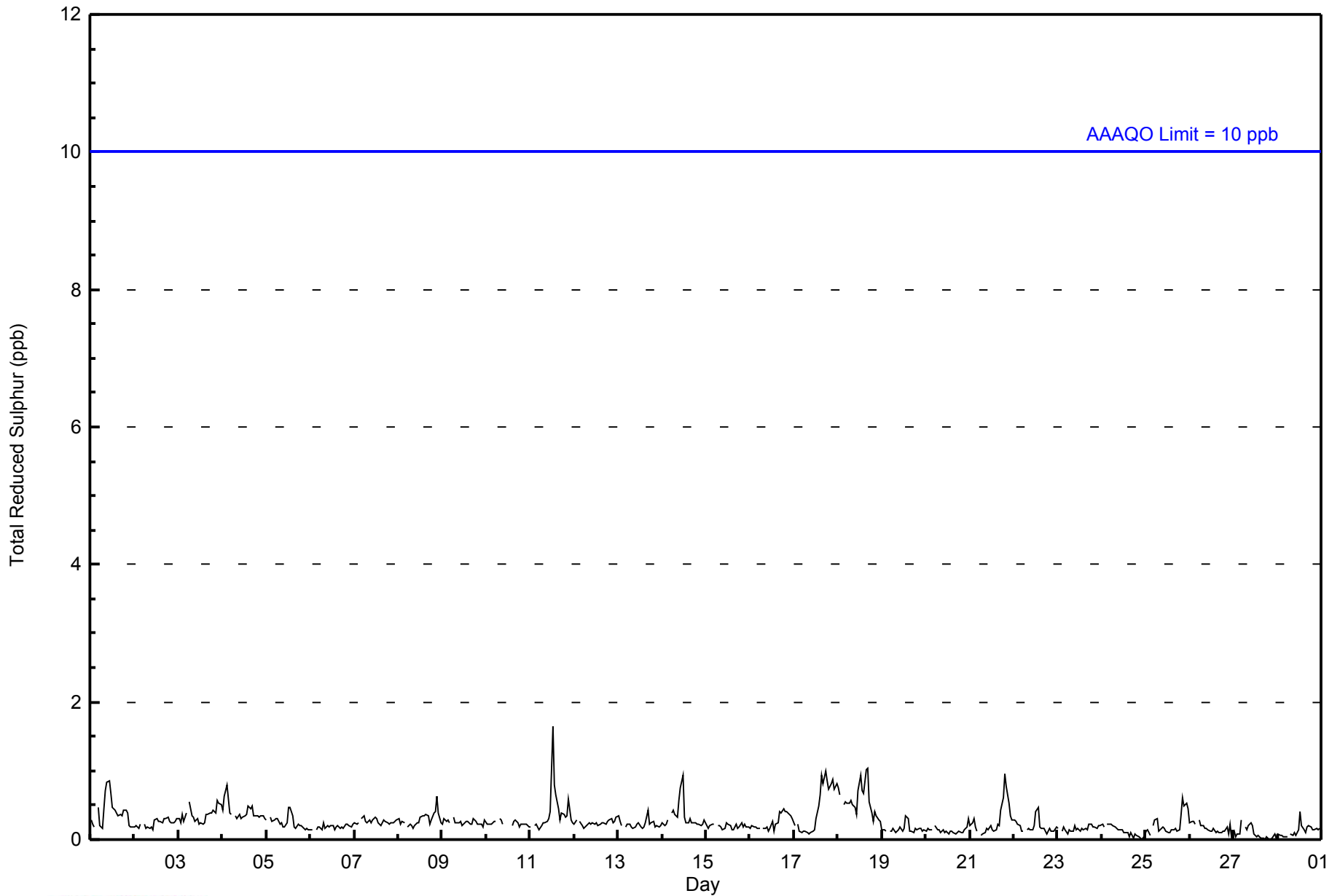


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 2 ppb on Feb 11 13:00										Maximum Daily Average: 0.6 ppb on Feb 18										Hours of Data: 640						
Minimum Value: 0 ppb on Feb 24 23:00										Minimum Daily Average: 0.1 ppb on Feb 27										Hours of Missing Data: 32						
Maximum Diurnal Average: 0.3 ppb at hour 13										Minimum Diurnal Average: 0.2 ppb at hour 8										Hours of Calibration: 32						
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-Feb	0	0	0	Z	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
2-Feb	0	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
3-Feb	0	0	0	0	0	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
4-Feb	0	1	1	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
5-Feb	0	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
6-Feb	0	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
7-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
8-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.3	1
9-Feb	0	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
10-Feb	0	0	0	0	0	0	Z	0	0	0	C	C	C	C	0	0	0	0	0	0	0	0	0	0	0.2	0
11-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	1	0	0	0.4	2
12-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
13-Feb	0	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
14-Feb	0	0	0	0	Z	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
15-Feb	0	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-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
17-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0.5	1
18-Feb	1	1	Z	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.6	1
19-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0
20-Feb	0	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
21-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0.3	1
22-Feb	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
23-Feb	0	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
24-Feb	0	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-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0.2	1
26-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
28-Feb	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		0.3		0.3		0.3		0.3	
	1		1		1		1		1		1		1		1		1		1		1		1		1	
																									Diurnal Average	
																									Diurnal Maximum	
	Z - zerospan		C - Calibration																							
	Alberta Ambient Air Quality Objectives (AAAQO):		1-hr 10 ppb		24-hr 3 ppb																					



**WBEA**  
**Hourly Averages**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - February 2015**





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

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	640	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: 640

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Total Reduced Sulphur (TRS) - ppb**  
**CNRL Horizon - February 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	53	142	49	17	6	9	23	39	98	60	37	22	19	19	26	21	640
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>	53	142	49	17	6	9	23	39	98	60	37	22	19	19	26	21	640

Total Number of Valid Hours: 640

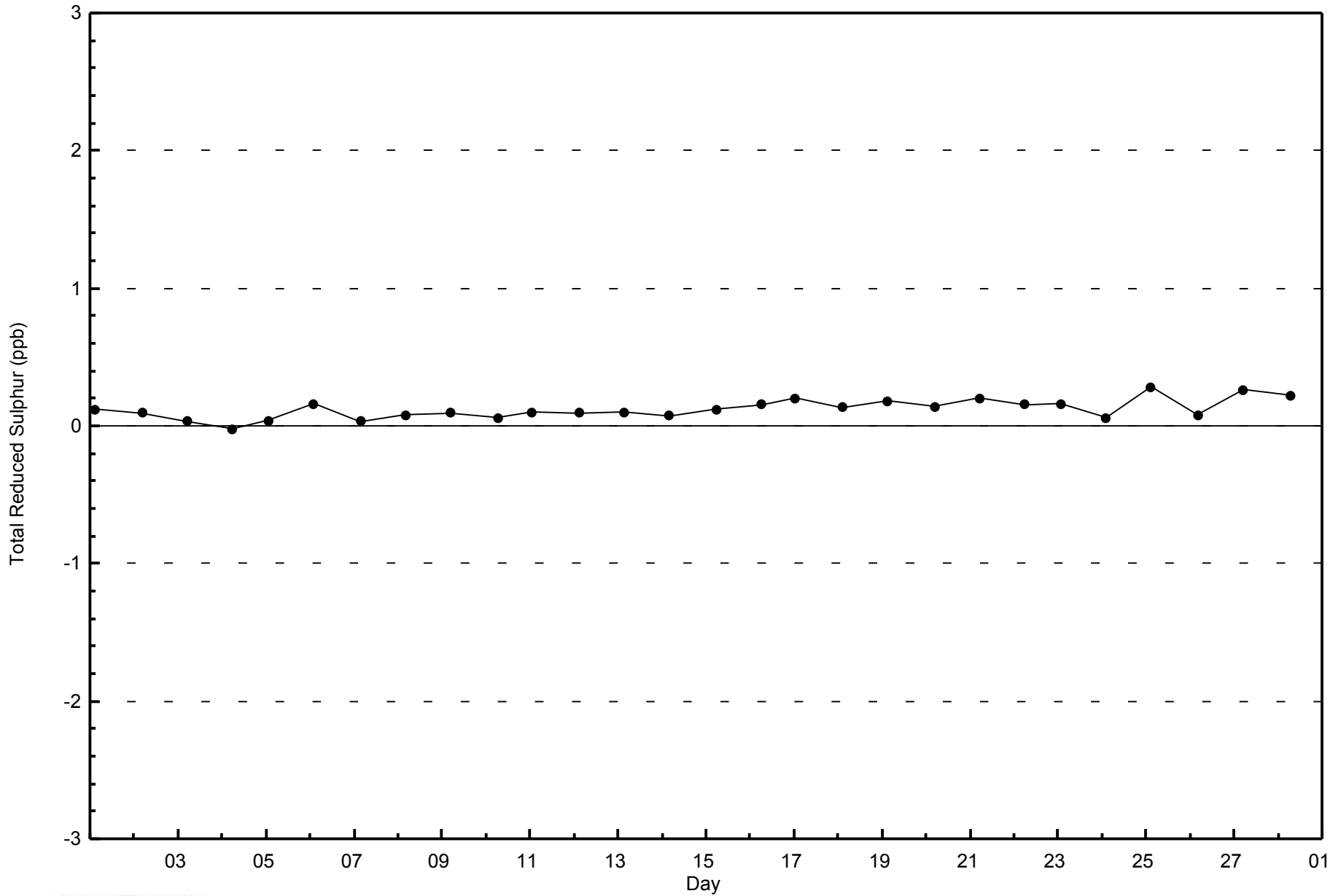
Total Number of Hours: 672





WBEA  
Zero Responses

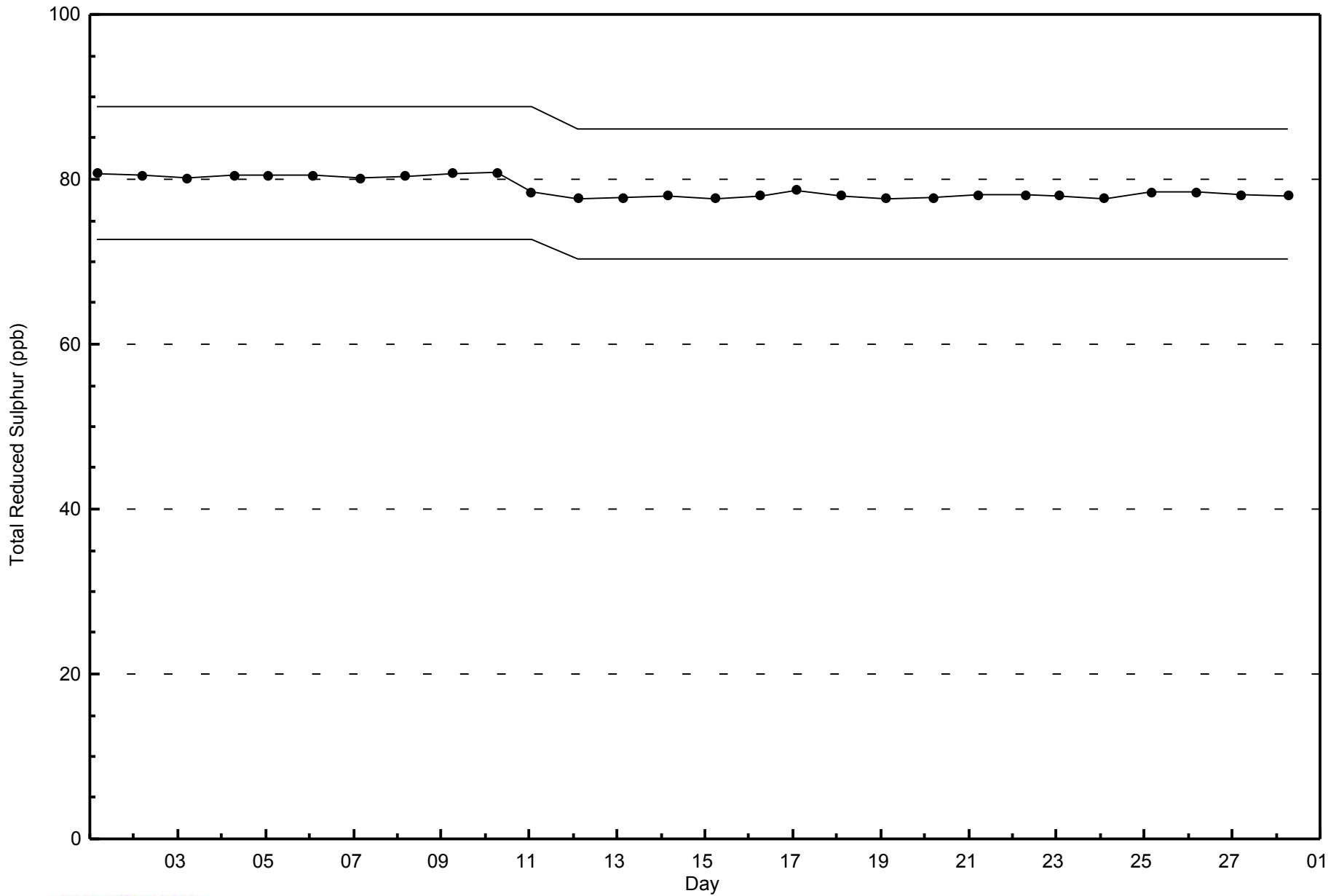
Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon - February 2015





WBEA  
Span Responses

Total Reduced Sulphur (TRS) - ppb  
CNRL Horizon - February 2015



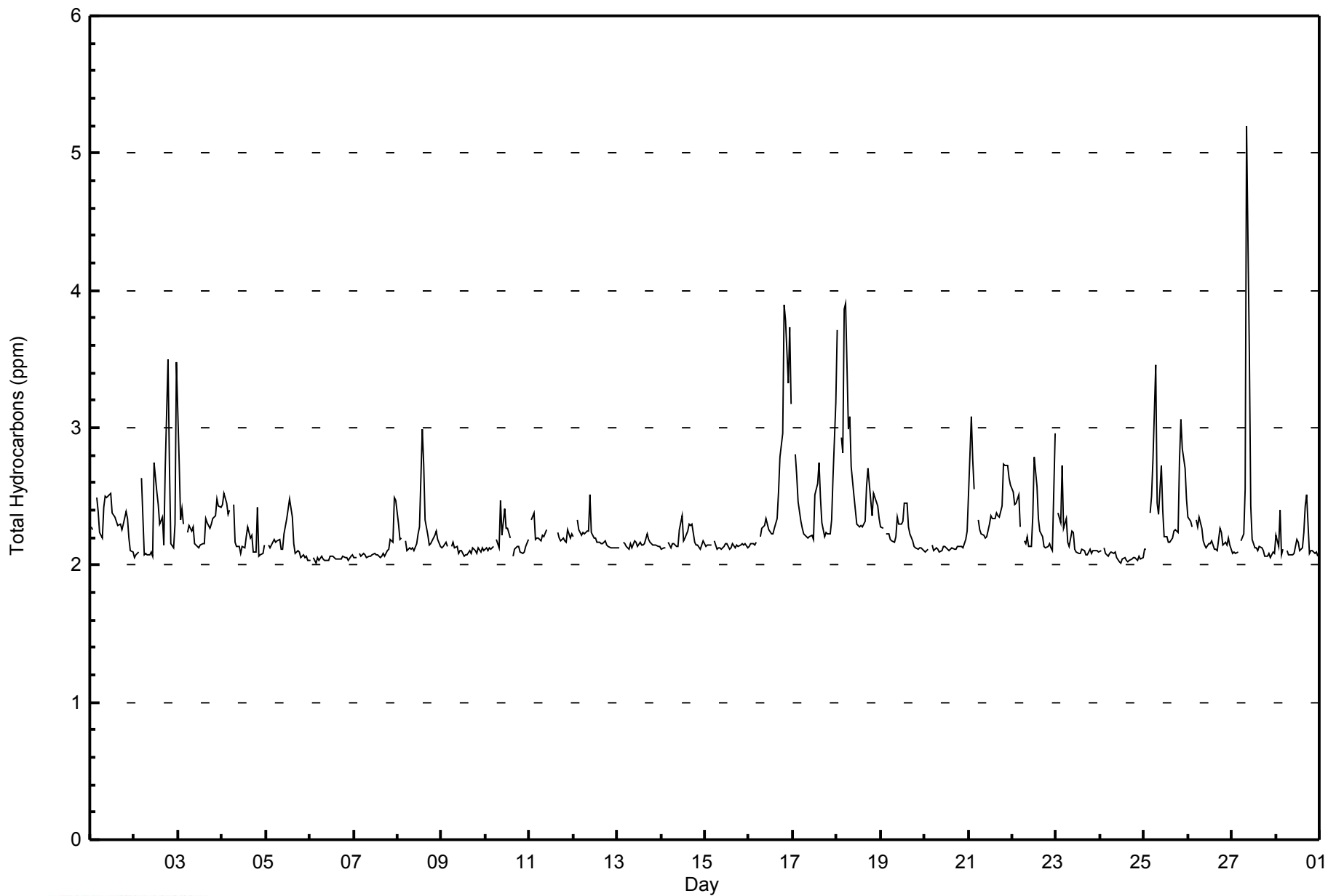


Maximum Value: 5.2 ppm on Feb 27 09:00																	Maximum Daily Average: 2.7 ppm on Feb 18										Hours in Service: 672	
Minimum Value: 2.0 ppm on Feb 24 12:00																	Minimum Daily Average: 2.0 ppm on Feb 6										Hours of Data: 638	
Maximum Diurnal Average: 2.3 ppm at hour 24																	Minimum Diurnal Average: 2.2 ppm at hour 11										Hours of Missing Data: 34	
Monthly Average: 2.26 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> = 2.5 P <sub>99</sub> = 3.7										Hours of Calibration: 33	
																											Percent Operational Time: 99.9	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1-Feb	2.3	2.3	Z	2.5	2.4	2.2	2.2	2.4	2.5	2.5	2.5	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.1	2.1	2.3	2.5		
2-Feb	2.1	2.1	2.1	Z	2.6	2.1	2.1	2.1	2.1	2.1	2.1	2.7	2.5	2.4	2.3	2.4	2.1	2.7	3.5	2.7	2.2	2.1	2.3	3.5	2.4	3.5		
3-Feb	2.7	2.3	2.4	2.3	Z	2.2	2.3	2.2	2.3	2.2	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.4	2.4	2.3	2.7		
4-Feb	2.4	2.5	2.4	2.4	2.4	Z	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.3	2.2	2.2	2.1	2.1	2.4	2.1	2.1	2.1	2.1	2.2	2.5		
5-Feb	Z	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.5	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.5		
6-Feb	2.0	Z	2.1	2.0	2.0	2.0	2.1	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	2.0	2.1	2.1	2.0	2.1		
7-Feb	2.1	2.0	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5	2.5	2.1	2.5		
8-Feb	2.3	2.2	2.2	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.3	3.0	2.7	2.3	2.2	2.1	2.2	2.2	2.2	2.2	2.2	2.1	2.2	3.0		
9-Feb	2.1	2.1	2.2	2.1	Z	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	2.2		
10-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.5	2.2	2.4	2.3	2.3	2.2	UO	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.5		
11-Feb	Z	2.3	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.3	C	C	C	C	C	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.4		
12-Feb	2.2	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.3	2.5	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5		
13-Feb	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2		
14-Feb	2.1	2.1	2.1	Z	2.2	2.1	2.2	2.2	2.1	2.1	2.3	2.4	2.2	2.2	2.2	2.3	2.3	2.3	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.4		
15-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.2		
16-Feb	2.1	2.2	2.2	2.1	2.2	Z	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.3	2.3	2.5	2.8	3.0	3.9	3.8	3.3	3.7	3.2	2.6	3.9		
17-Feb	Z	2.8	2.7	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.5	2.6	2.7	2.5	2.3	2.2	2.2	2.2	2.3	2.6	3.2	3.2	2.4	3.2		
18-Feb	3.7	Z	2.9	2.8	3.9	3.9	3.0	3.1	2.7	2.5	2.4	2.3	2.3	2.3	2.3	2.3	2.6	2.7	2.5	2.4	2.5	2.5	2.4	2.3	2.7	3.9		
19-Feb	2.3	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.4		
20-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.2		
21-Feb	2.5	3.1	2.8	2.6	Z	2.3	2.3	2.2	2.2	2.2	2.2	2.3	2.4	2.3	2.3	2.4	2.4	2.3	2.4	2.7	2.7	2.7	2.6	2.6	2.5	3.1		
22-Feb	2.5	2.4	2.4	2.5	2.3	Z	2.2	2.2	2.2	2.1	2.1	2.4	2.8	2.6	2.3	2.2	2.2	2.1	2.1	2.1	2.2	2.1	2.1	3.0	2.3	3.0		
23-Feb	Z	2.4	2.3	2.7	2.3	2.3	2.2	2.1	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	2.2	2.7		
24-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.0	2.1	2.1	2.1		
25-Feb	2.1	2.1	Z	2.4	2.5	2.8	3.5	2.5	2.4	2.7	2.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.8	3.1	2.8	2.7	2.5	2.5	3.5	
26-Feb	2.4	2.3	2.3	Z	2.3	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.3	2.2	2.1	2.2	2.1	2.2	2.1	2.2	2.4	
27-Feb	2.1	2.1	2.1	2.1	Z	2.2	2.2	2.6	5.2	3.5	2.4	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3	5.2		
28-Feb	2.2	2.1	2.4	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.4	2.5	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.5		
																								Diurnal Average				
																								Diurnal Maximum				
2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.2 2.3 2.3 2.2 2.2 2.2 2.3 2.2 2.2 2.2 2.2 2.2 2.2 2.3 2.3 2.2 2.3 2.3																								3.7 3.1 2.9 2.8 3.9 3.9 3.5 3.1 5.2 3.5 2.5 2.7 2.8 3.0 2.7 2.5 2.6 2.8 3.5 3.9 3.8 3.3 3.7 3.5				
Z - zerospan			C - Calibration					UO - Unstable Operation																				



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	25	3.92	3.92
2.1 - 3.0	596	93.42	97.34
3.1 - 10.0	17	2.66	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**CNRL Horizon - February 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	19	3	0	0	1	0	0	0	0	0	0	0	0	0	0	25
2.1 - 3.0	52	124	46	16	6	7	23	38	95	56	36	21	14	17	24	21	596
3.1 - 10.0	0	0	0	0	0	1	0	1	0	2	1	2	5	2	3	0	17
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	143	49	16	6	9	23	39	95	58	37	23	19	19	27	21	638

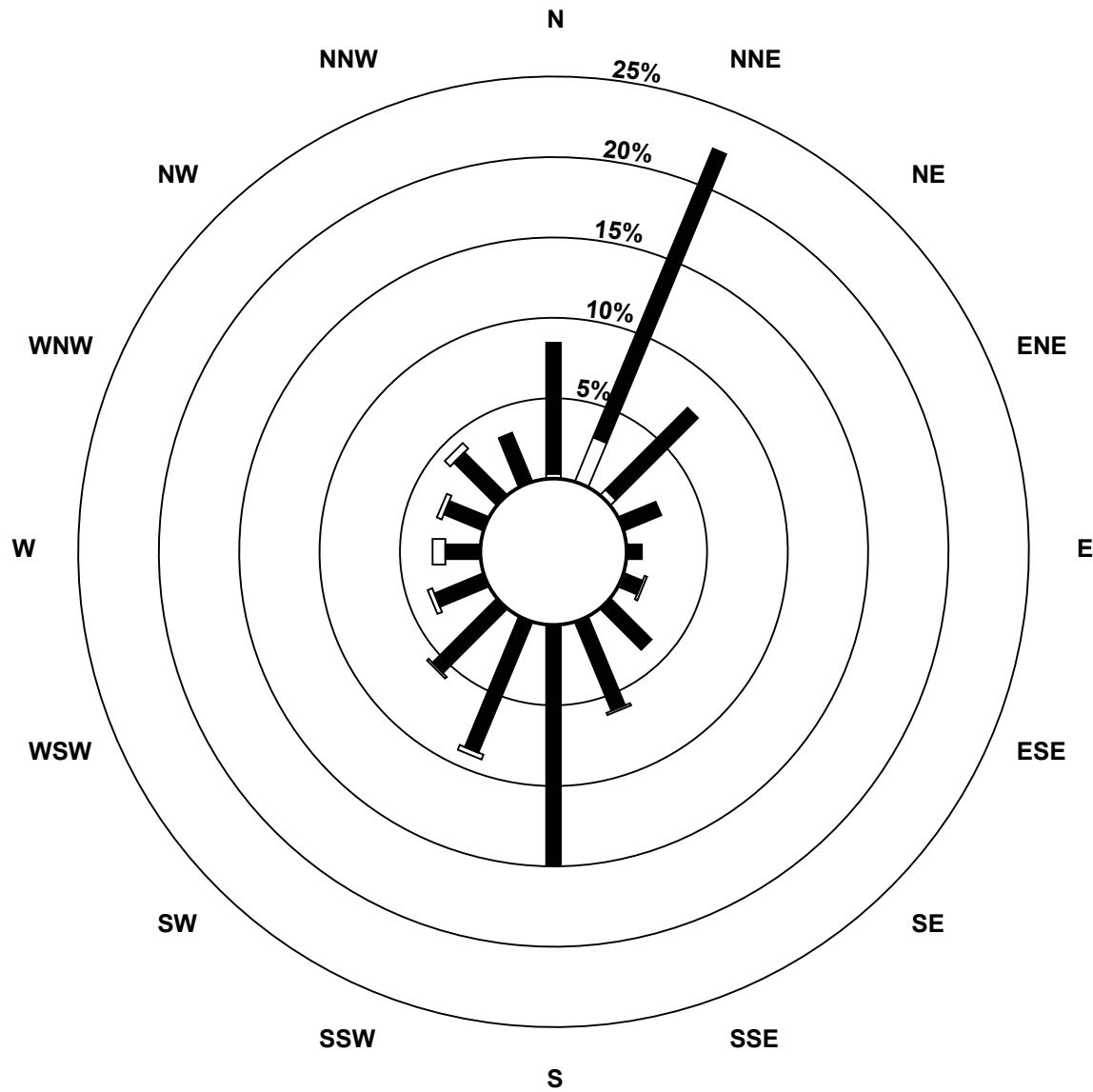
Total Number of Valid Hours: 638

Total Number of Hours: 672

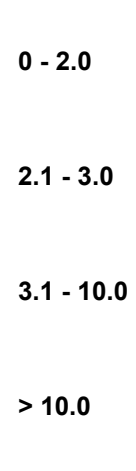


**Wood Buffalo Environmental Association  
Wind Rose Feb 2015**

**Total Hydrocarbons (THC) - ppm  
CNRL Horizon (AMS 15)**



Classes (ppm)

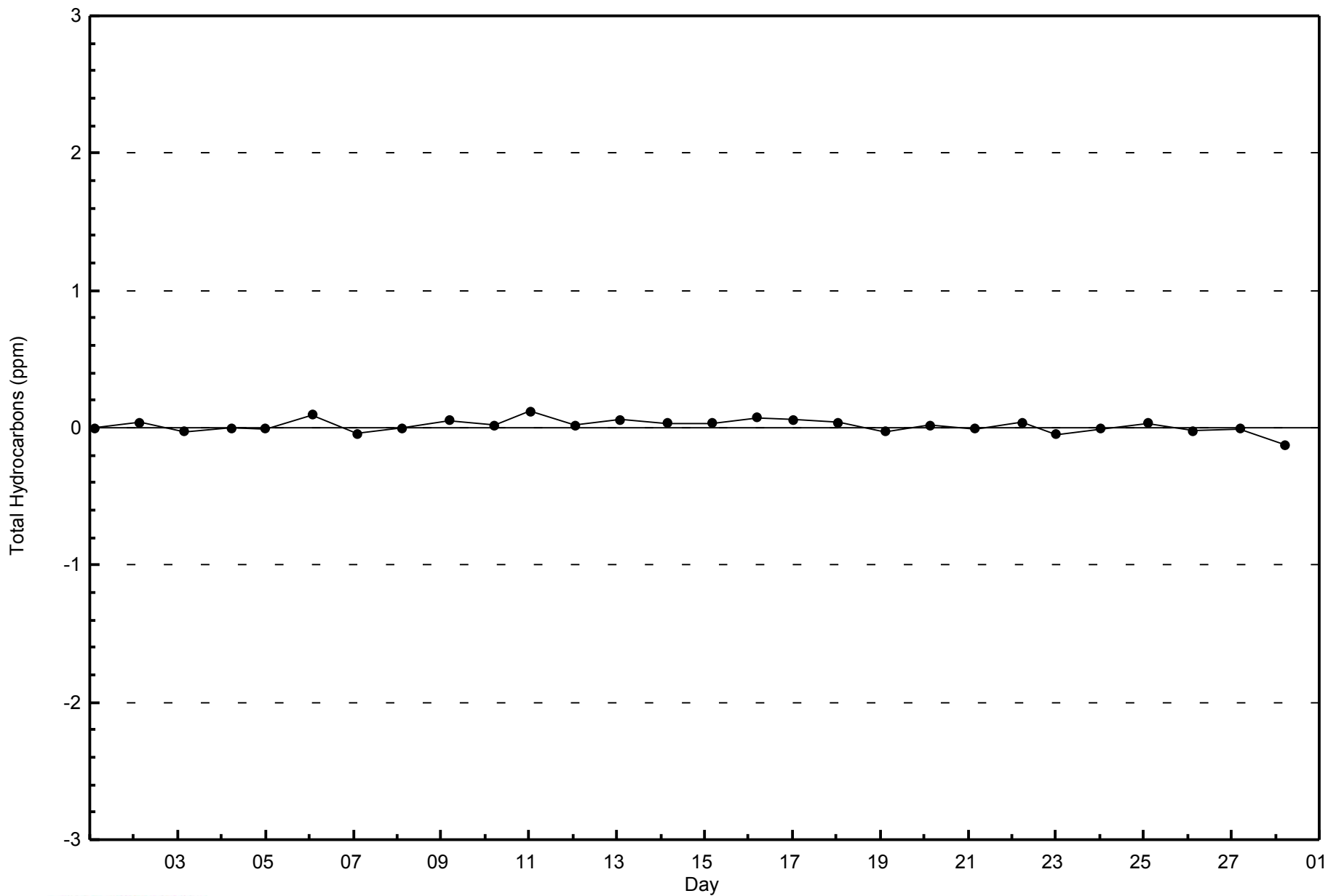


Total Number of Valid Hours: 638



WBEA  
Zero Responses

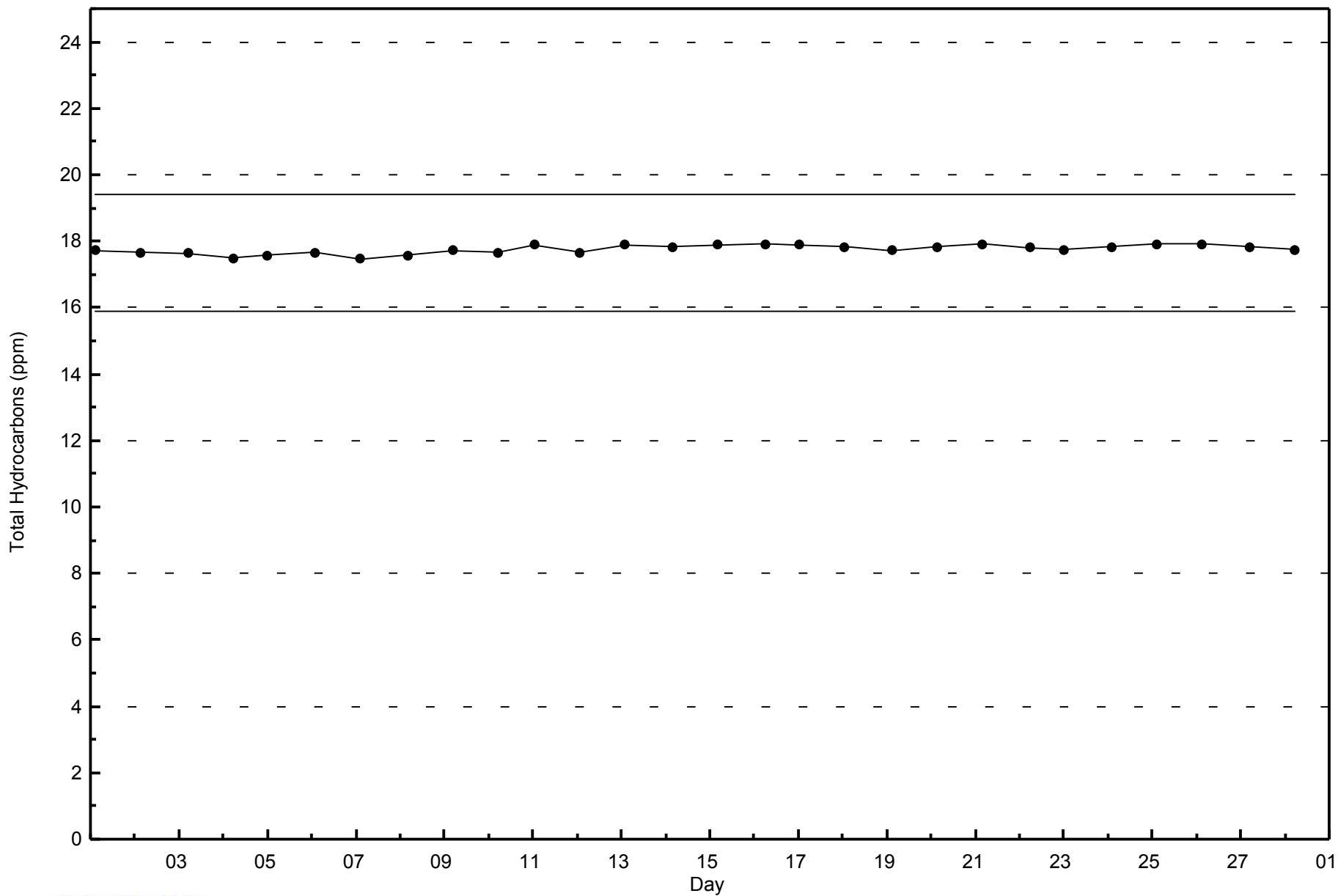
Total Hydrocarbons (THC) - ppm  
CNRL Horizon - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
CNRL Horizon - February 2015



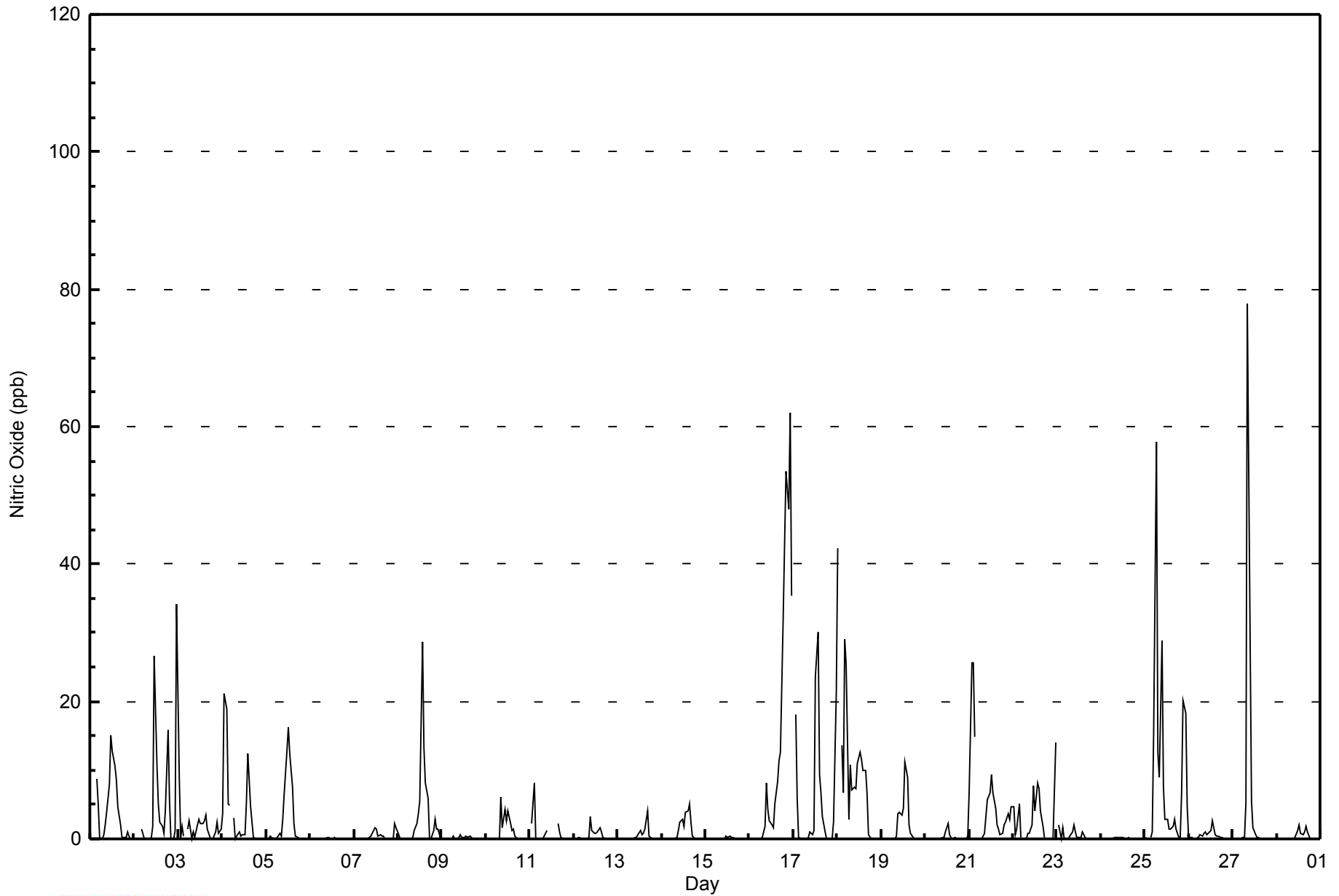


Maximum Value: 78 ppb on Feb 27 09:00																		Maximum Daily Average: 14.5 ppb on Feb 16						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 6 19:00																		Minimum Daily Average: 0.1 ppb on Feb 6						Hours of Data: 639		
Maximum Diurnal Average: 5.5 ppb at hour 14																		Minimum Diurnal Average: 0.8 ppb at hour 18						Hours of Missing Data: 33		
Monthly Average: 2.9 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> = 8 P <sub>99</sub> = 39						Hours of Calibration: 33		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	0	0	Z	9	5	0	0	1	2	4	8	15	13	11	9	5	2	0	0	0	1	0	0	0	3.7	15
2-Feb	0	0	0	Z	1	0	0	0	0	0	2	27	11	5	3	2	1	4	16	5	0	0	1	34	4.9	34
3-Feb	9	0	2	0	Z	1	3	0	1	0	2	3	2	2	3	3	1	0	0	0	1	2	1	1	1.7	9
4-Feb	4	21	19	5	5	Z	3	0	0	1	0	1	1	5	12	5	2	0	0	0	0	0	0	0	3.7	21
5-Feb	Z	0	0	0	0	0	0	1	0	3	7	13	16	12	7	2	0	0	0	0	0	0	0	0	2.8	16
6-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
7-Feb	0	0	Z	0	0	0	0	0	0	0	1	2	1	0	1	0	0	0	0	0	0	0	2	2	0.4	2
8-Feb	1	0	0	Z	0	0	0	0	0	1	2	4	6	29	13	8	6	0	0	1	3	1	1	0	3.3	29
9-Feb	0	0	0	0	Z	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	1
10-Feb	0	0	0	0	0	Z	0	0	6	2	4	3	4	2	1	1	0	0	0	0	0	0	0	0	1.1	6
11-Feb	Z	2	8	0	0	0	0	0	0	1	C	C	C	C	C	2	1	0	0	0	0	0	0	0	0.9	8
12-Feb	0	Z	0	0	0	0	0	0	0	3	1	1	1	1	2	1	0	0	0	0	0	0	0	0	0.5	3
13-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	4	0	0	0	0	0	0	0	0.5	4
14-Feb	0	0	0	Z	0	0	0	0	0	1	2	3	2	4	4	5	2	1	0	0	0	0	0	0	1.1	5
15-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	2	8	4	3	2	2	5	8	11	13	32	43	54	48	62	35	14.5	62
17-Feb	Z	18	6	0	0	0	0	0	0	1	1	1	24	30	9	7	3	1	0	0	0	0	2	22	5.5	30
18-Feb	42	Z	14	7	29	26	3	11	7	8	7	11	13	12	10	10	6	1	0	0	0	0	0	0	9.4	42
19-Feb	0	0	Z	0	0	0	0	0	0	4	4	3	4	11	9	2	1	0	0	0	0	0	0	0	1.7	11
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0.2	2
21-Feb	7	26	26	15	Z	0	0	0	1	3	6	7	9	7	4	2	1	1	1	2	2	4	3	5	5.7	26
22-Feb	5	1	1	5	0	Z	0	0	1	1	2	8	4	8	7	4	2	0	0	0	0	0	0	14	2.7	14
23-Feb	Z	2	0	2	0	0	0	0	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0.4	2
24-Feb	0	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-Feb	0	0	Z	0	1	16	58	13	9	29	8	3	3	1	1	2	3	1	0	0	7	20	18	5	8.6	58
26-Feb	0	0	0	Z	0	0	1	0	1	1	1	1	1	3	1	0	0	0	0	0	0	0	0	0	0.5	3
27-Feb	0	0	0	0	Z	0	0	5	78	29	5	2	1	0	0	0	0	0	0	0	0	0	0	0	5.3	78
28-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	2	1	1	1	2	1	0	0	0	0	0	0	0.4	2
																								Diurnal Average		
																								Diurnal Maximum		
2.8 3.0 3.3 1.9 1.8 1.9 2.4 1.1 4.0 3.7 2.6 4.1 4.6 5.5 3.9 2.6 1.9 0.8 1.8 1.9 2.4 2.7 3.3 4.2																										
42 26 26 15 29 26 58 13 78 29 8 27 24 30 13 10 11 13 32 43 54 48 62 35																										
Z - zerospan C - Calibration																										



**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - February 2015**





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

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	617	96.56	96.56
21 - 40	15	2.35	98.90
41 - 80	7	1.10	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**CNRL Horizon - February 2015**

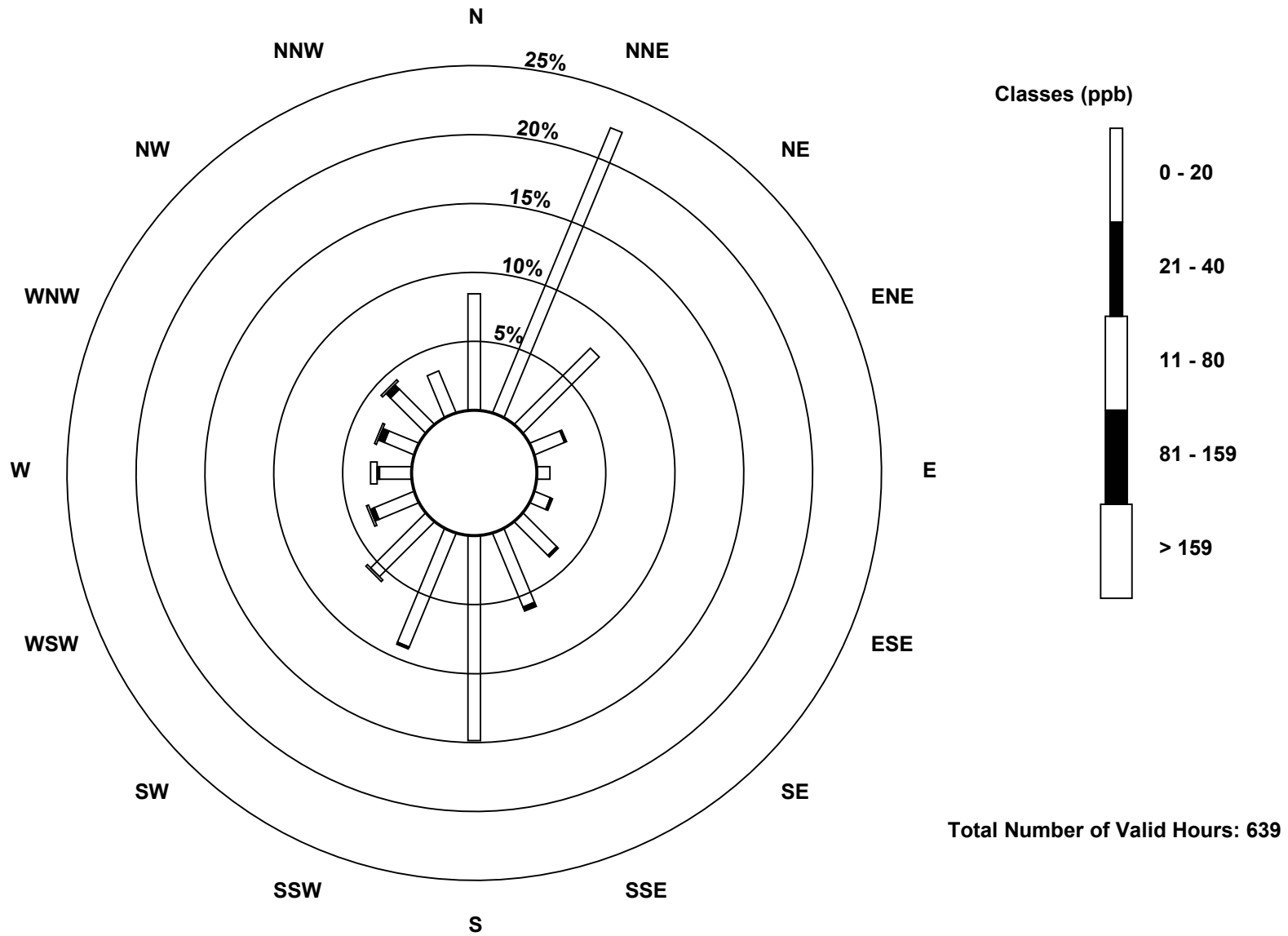
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	54	143	50	15	6	8	22	37	95	57	36	20	15	15	23	21	617
21 - 40	0	0	0	1	0	1	1	2	0	1	0	2	1	3	3	0	15
11 - 80	0	0	0	0	0	0	0	0	0	0	1	1	3	1	1	0	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	143	50	16	6	9	23	39	95	58	37	23	19	19	27	21	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

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

**Nitric Oxide (NO) - ppb  
CNRL Horizon (AMS 15)**

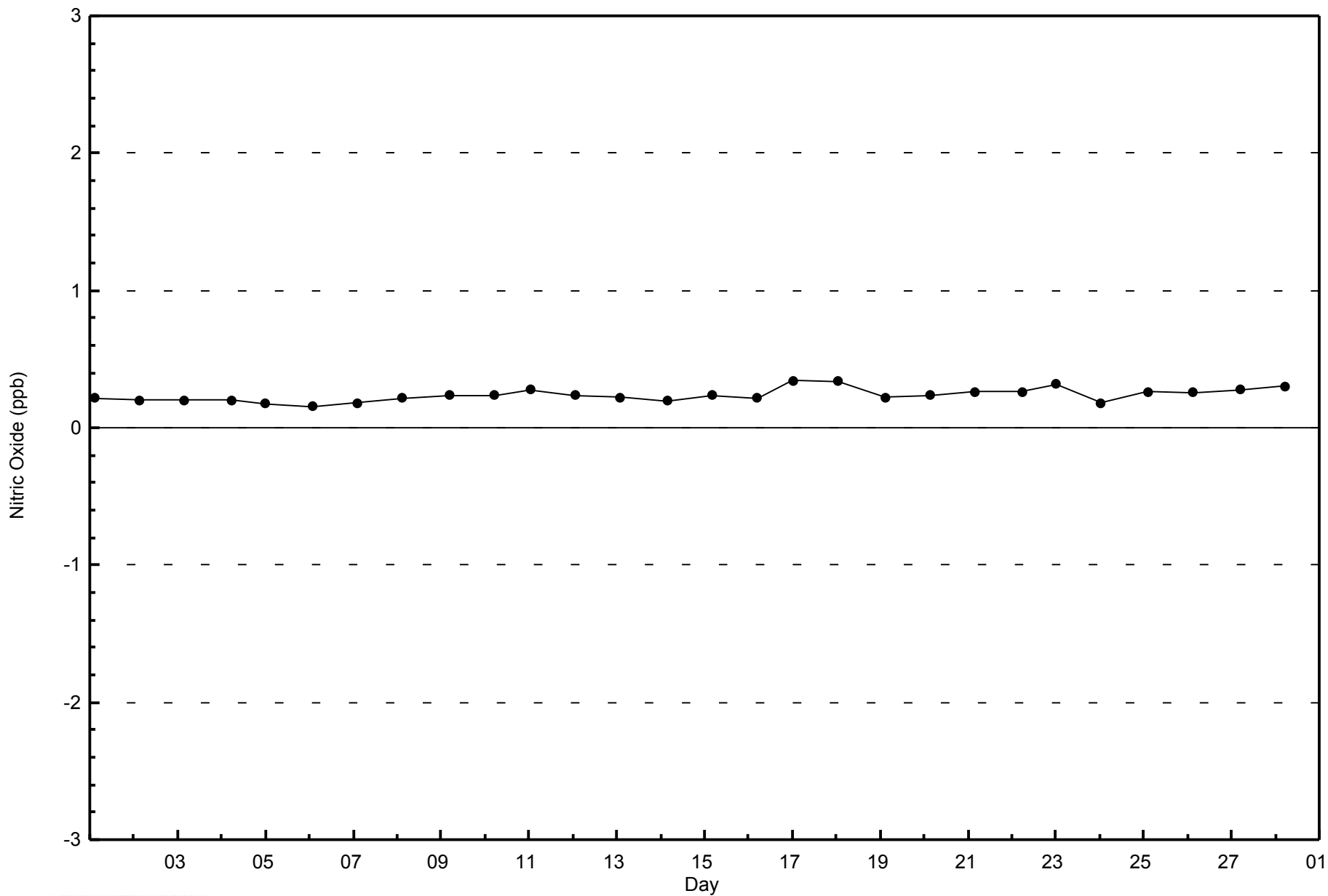






WBEA  
Zero Responses

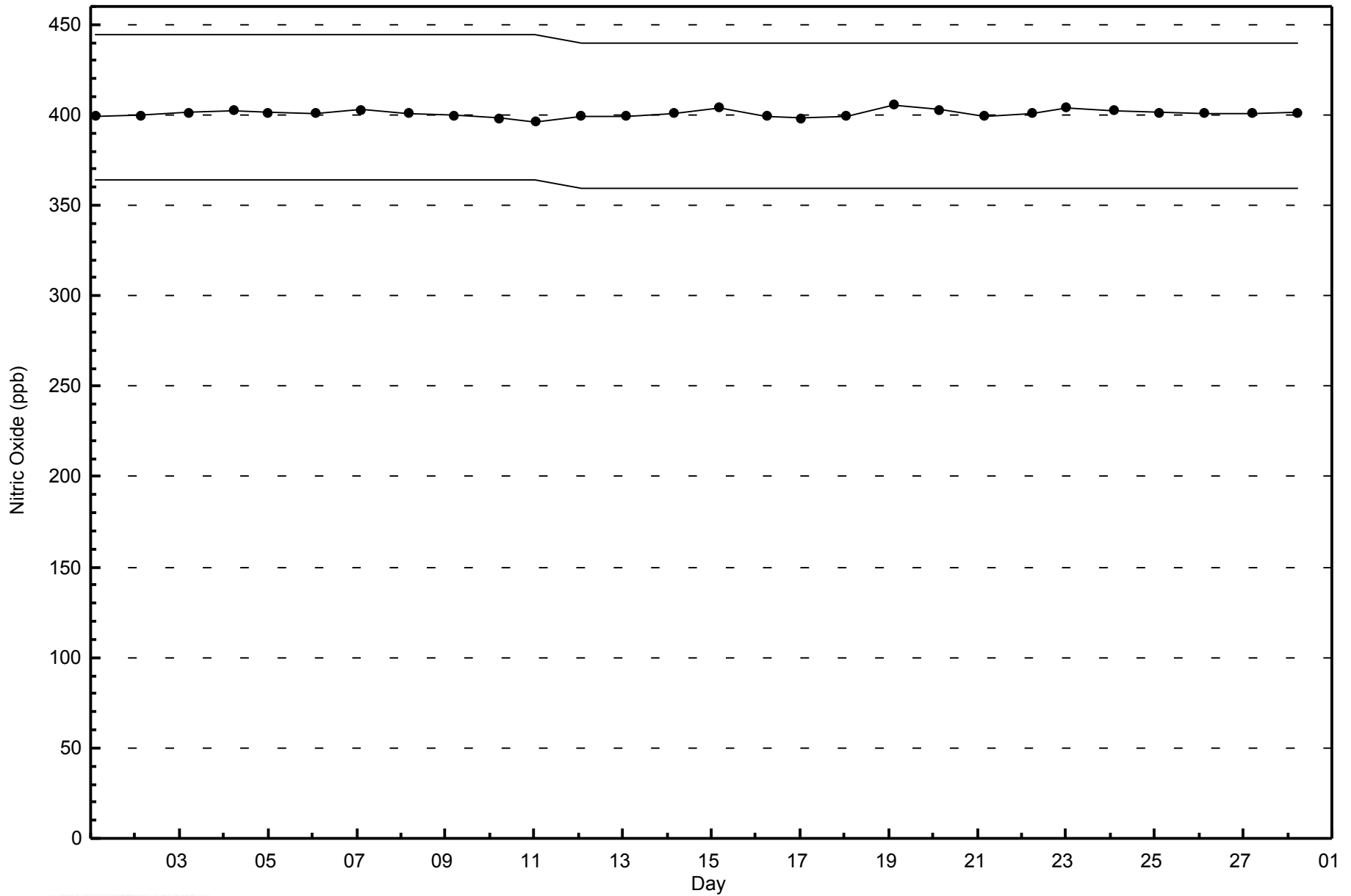
Nitric Oxide (NO) - ppb  
CNRL Horizon - February 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
CNRL Horizon - February 2015



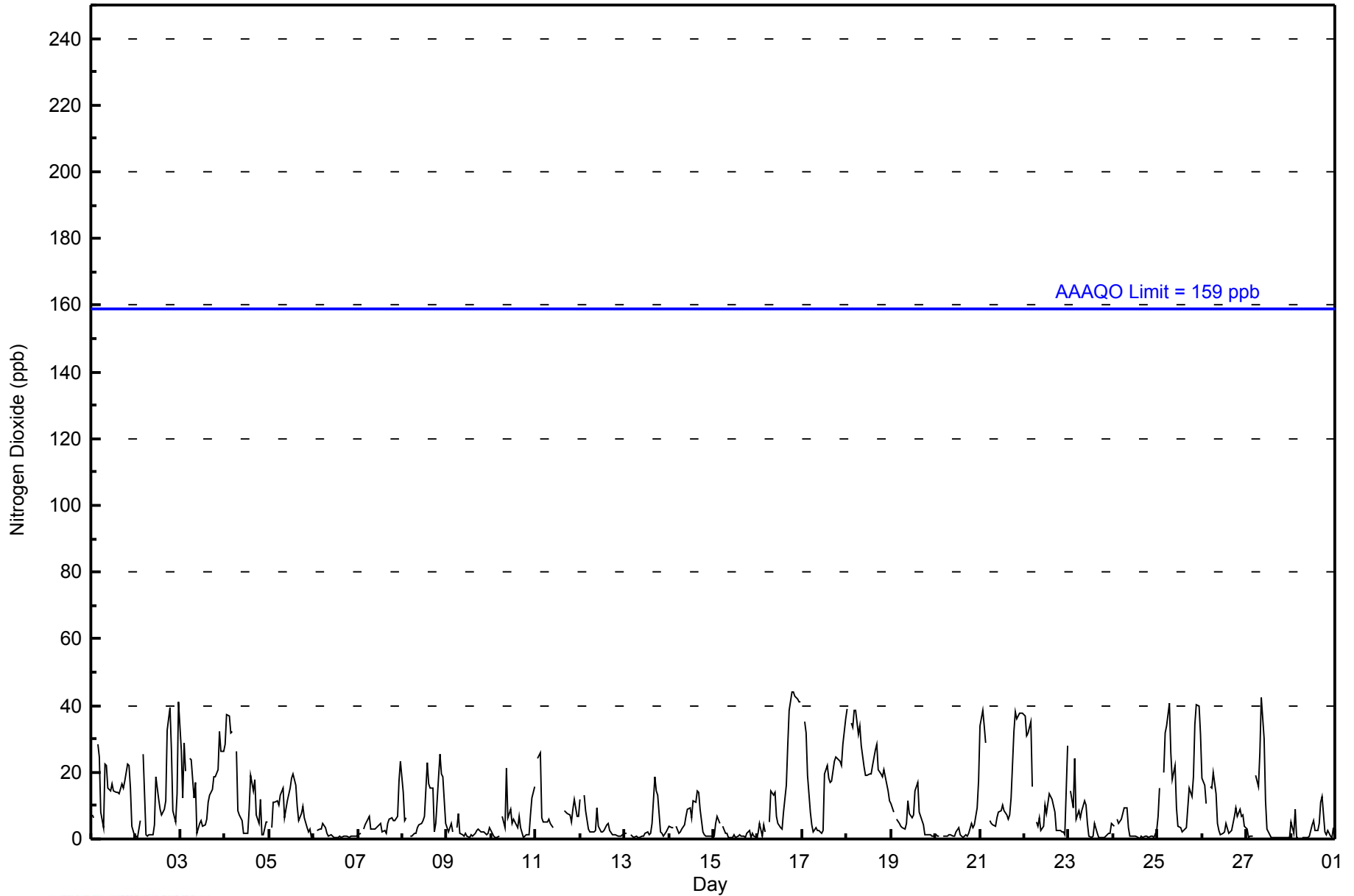


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 44 ppb on Feb 16 20:00										Maximum Daily Average: 25.2 ppb on Feb 18										Hours of Data: 639						
Minimum Value: 0 ppb on Feb 24 15:00										Minimum Daily Average: 1.4 ppb on Feb 6										Hours of Missing Data: 33						
Maximum Diurnal Average: 13.7 ppb at hour 3										Minimum Diurnal Average: 5.4 ppb at hour 11										Hours of Calibration: 33						
Monthly Average: 9.2 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> = 26 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-Feb	7	7	Z	29	25	8	4	22	22	15	14	17	14	14	14	14	17	15	17	23	22	15	4	1	14.7	29
2-Feb	1	1	6	Z	25	1	1	1	1	1	4	19	12	9	7	9	11	33	40	27	8	5	14	41	12.0	41
3-Feb	27	12	29	20	Z	24	24	12	17	2	5	6	4	4	6	11	13	15	19	19	21	32	26	26	16.2	32
4-Feb	28	37	37	32	32	Z	26	9	7	5	2	2	2	9	19	14	18	7	5	12	1	1	5	5	13.7	37
5-Feb	Z	3	11	11	11	10	13	15	6	9	11	15	18	19	16	10	5	8	10	6	4	2	3	1	9.5	19
6-Feb	1	Z	2	3	3	5	3	2	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1.4	5
7-Feb	1	2	Z	3	4	6	7	3	3	3	4	4	5	2	3	2	5	6	6	6	5	7	17	23	5.5	23
8-Feb	14	5	6	Z	1	1	2	2	3	4	5	5	7	23	16	15	15	2	5	19	25	20	19	5	9.5	25
9-Feb	3	2	5	2	Z	3	8	2	1	1	2	1	1	1	1	2	3	3	2	2	2	1	2	3	2.3	8
10-Feb	2	1	1	1	1	Z	7	4	21	6	9	5	6	4	4	7	4	0	1	1	1	7	12	16	5.1	21
11-Feb	Z	24	26	6	5	5	5	6	5	3	C	C	C	C	C	9	8	8	7	5	9	12	7	7	8.7	26
12-Feb	12	Z	13	8	3	2	2	2	2	10	4	2	2	3	4	5	3	1	1	1	1	1	1	1	3.6	13
13-Feb	2	2	Z	1	1	1	1	1	0	1	1	2	2	1	2	5	19	14	13	2	2	1	2	3	3.3	19
14-Feb	4	3	4	Z	4	2	2	3	4	7	9	9	6	12	11	15	14	9	2	1	1	1	1	1	5.4	15
15-Feb	1	5	7	5	Z	4	2	2	0	0	1	1	1	1	1	1	1	1	2	3	1	2	1	1	1.7	7
16-Feb	2	5	1	4	2	Z	5	14	13	14	7	5	4	3	8	16	28	39	44	44	43	42	41	41	18.4	44
17-Feb	Z	35	32	19	8	4	2	3	2	3	2	2	20	22	18	17	17	23	25	24	23	22	28	36	16.9	36
18-Feb	39	Z	35	34	39	39	31	34	28	22	19	19	20	20	22	27	29	21	20	19	21	19	15	12	25.2	39
19-Feb	10	8	Z	6	5	4	3	3	5	11	8	7	7	14	17	8	7	4	1	1	1	1	1	1	5.8	17
20-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	4	1	1	1	1	1	2	5	3	4	10	17	2.7	17
21-Feb	34	39	34	29	Z	6	5	4	4	6	8	8	10	9	7	6	7	12	32	38	36	38	38	38	19.5	39
22-Feb	37	31	32	35	16	Z	5	4	6	3	4	10	8	14	13	12	8	3	3	3	2	2	1	28	12.1	37
23-Feb	Z	15	10	24	6	8	7	9	11	10	5	1	1	1	5	2	0	0	1	1	1	2	2	5	5.3	24
24-Feb	4	Z	6	5	6	8	10	9	4	1	1	1	1	0	0	1	1	1	1	1	1	1	0	3	2.7	10
25-Feb	7	15	Z	20	32	34	41	26	18	22	9	4	4	2	3	3	9	15	13	19	34	40	40	31	19.1	41
26-Feb	18	16	11	Z	16	15	20	14	5	2	1	2	2	5	2	2	3	7	9	7	9	7	7	4	7.9	20
27-Feb	3	1	1	1	Z	19	16	26	42	30	11	3	1	1	0	0	0	1	1	0	0	0	0	0	6.9	42
28-Feb	5	2	9	0	0	Z	1	0	0	0	1	4	6	3	2	5	11	13	2	1	2	1	1	3	3.2	13
10.9 11.3 13.7 12.9 10.7 9.1 9.0 8.3 8.4 6.9 5.4 5.7 6.1 7.3 7.5 7.7 9.2 9.3 10.1 10.3 10.0 10.2 10.6 12.6																								Diurnal Average		
39 39 37 35 39 39 41 34 42 30 19 19 20 23 22 27 29 39 44 44 43 42 41 41																								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 - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	548	85.76	85.76
21 - 40	82	12.83	98.59
41 - 80	9	1.41	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**CNRL Horizon - February 2015**

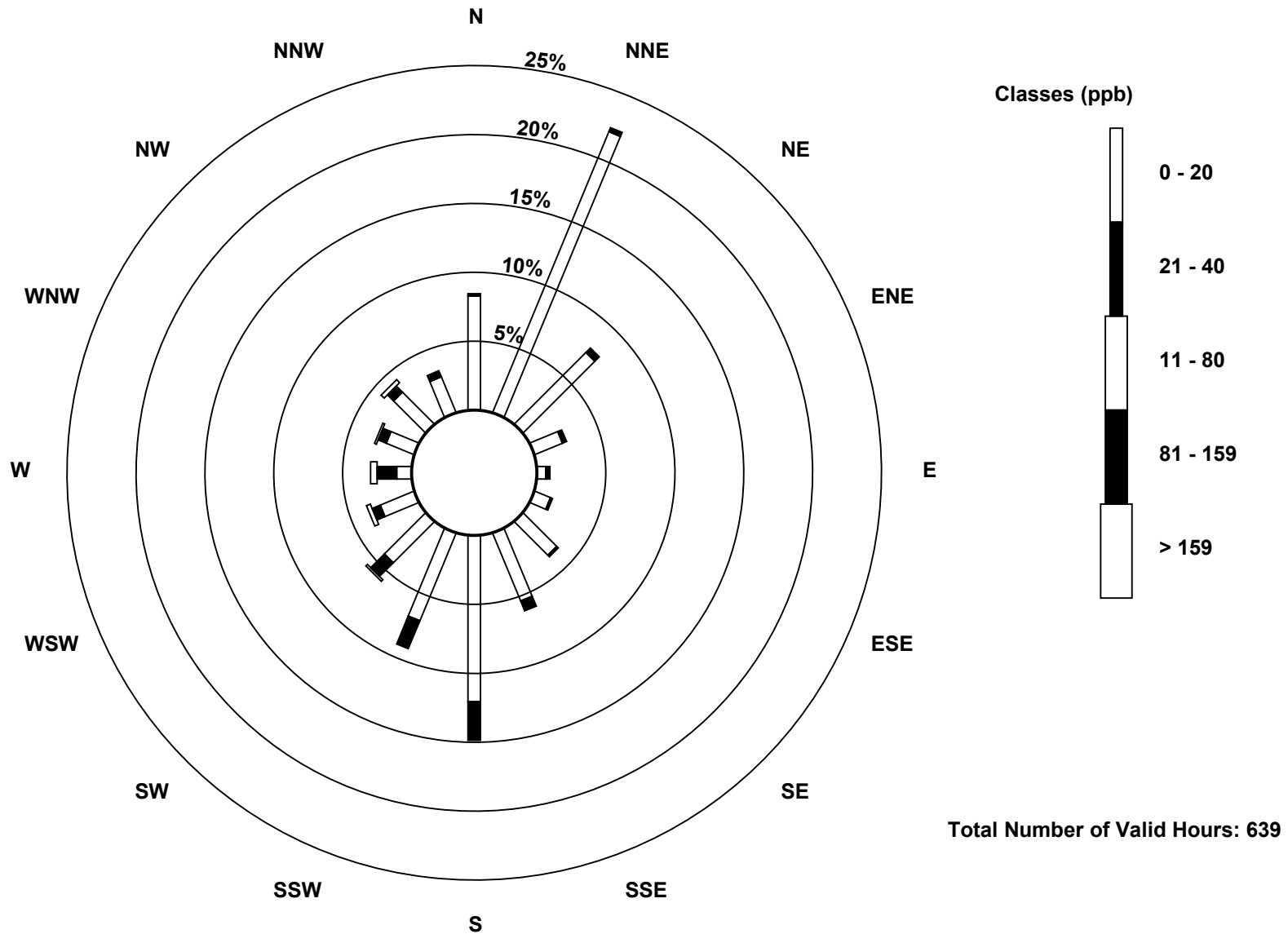
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	53	141	47	14	4	8	22	34	77	44	27	17	7	14	21	18	548
21 - 40	1	2	3	2	2	1	1	5	18	14	9	4	9	4	4	3	82
11 - 80	0	0	0	0	0	0	0	0	0	0	1	2	3	1	2	0	9
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	143	50	16	6	9	23	39	95	58	37	23	19	19	27	21	639

Total Number of Valid Hours: 639

Total Number of Hours: 672

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

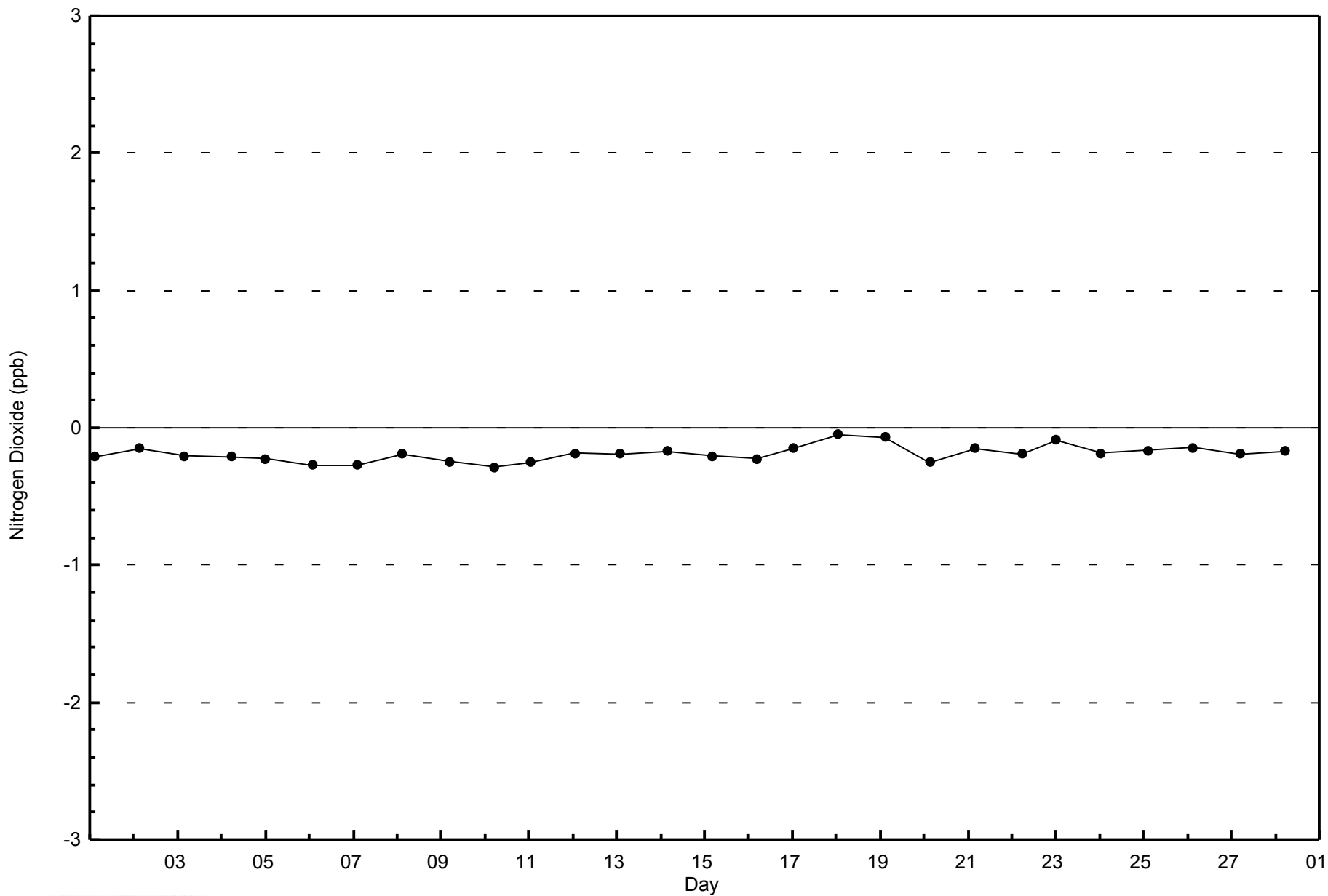
**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon (AMS 15)**





WBEA  
Zero Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - February 2015

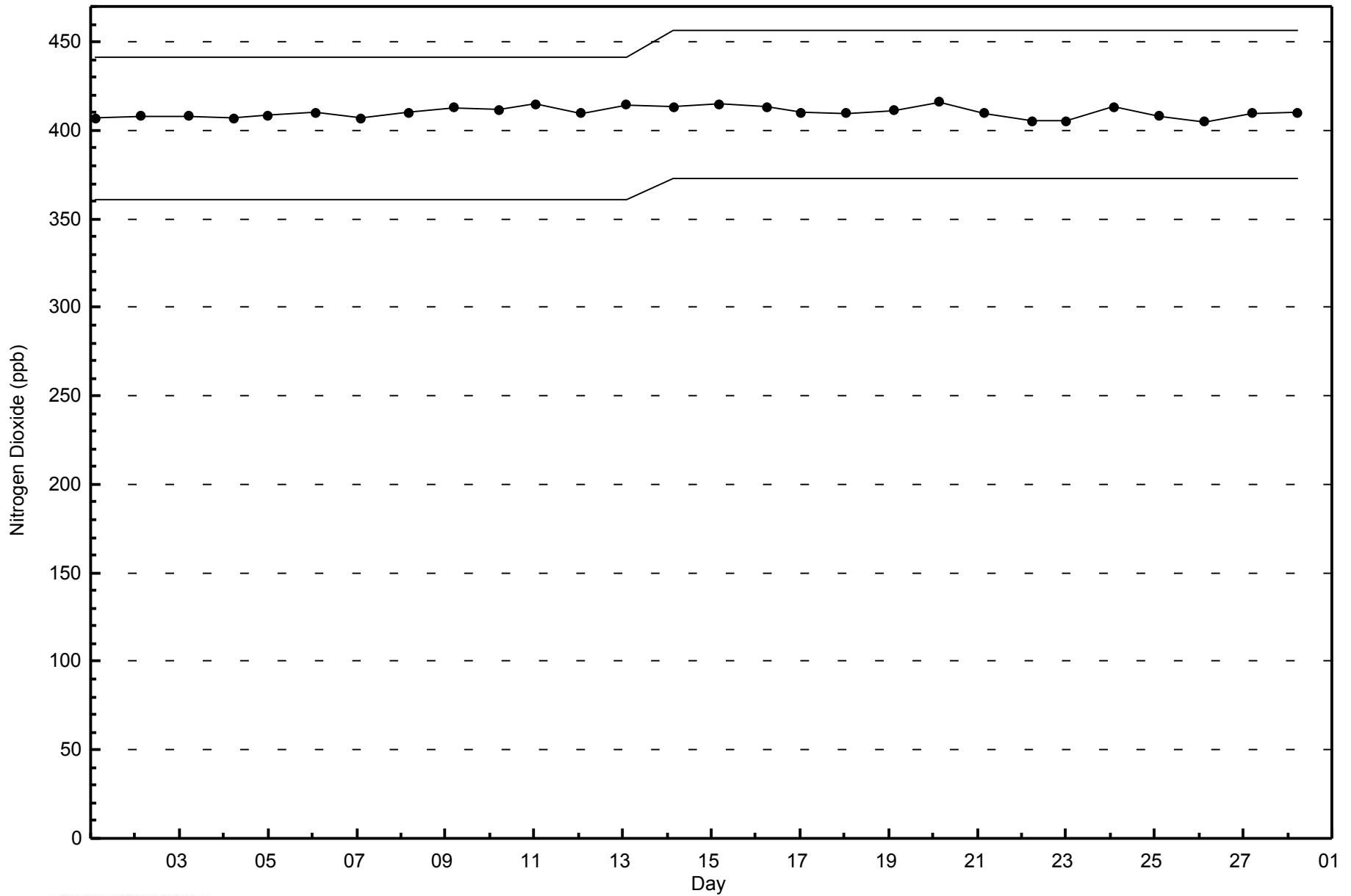






WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
CNRL Horizon - February 2015



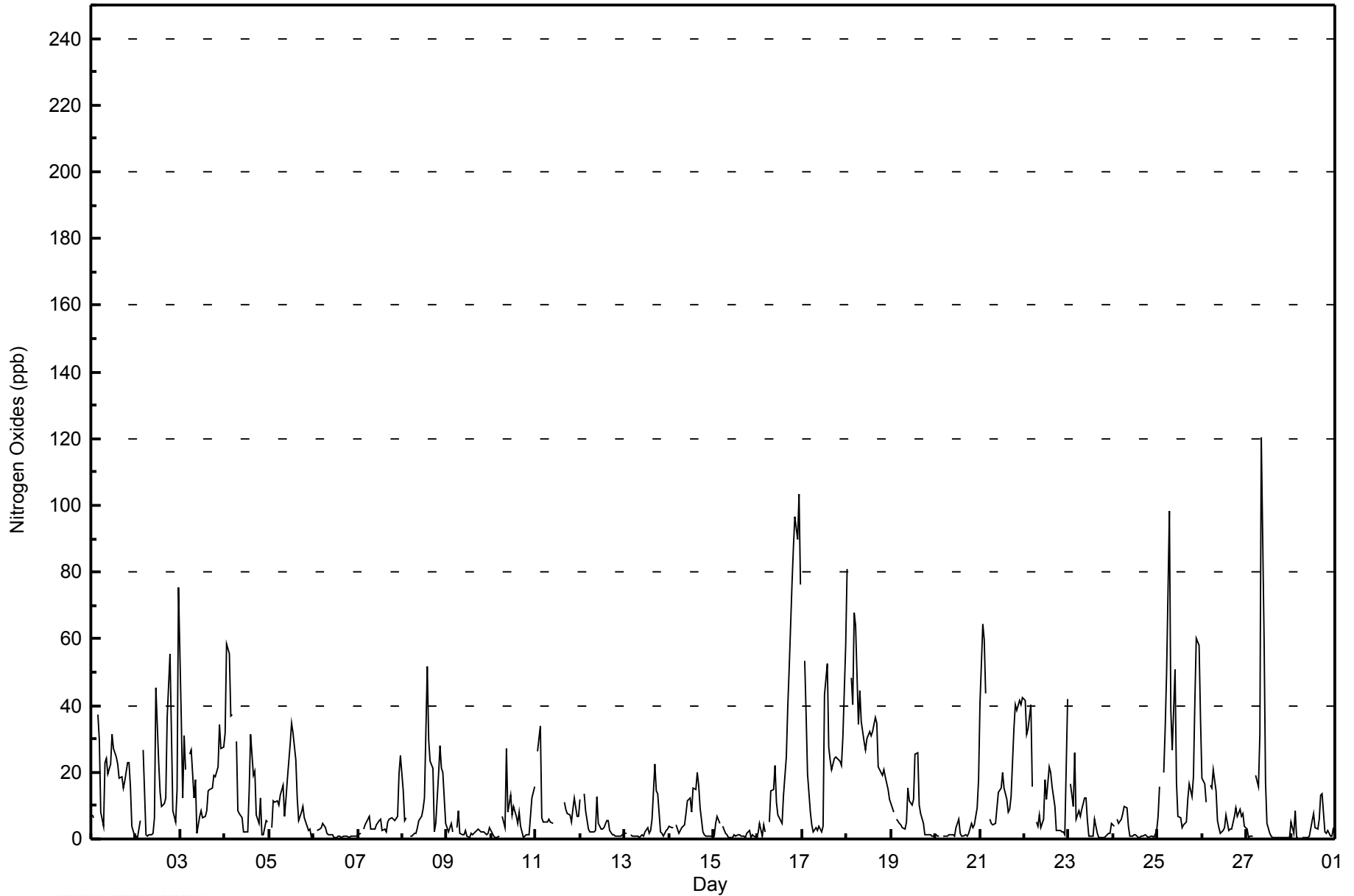


Maximum Value: 120 ppb on Feb 27 09:00																			Maximum Daily Average: 34.5 ppb on Feb 18						Hours in Service: 672	
Minimum Value: 0 ppb on Feb 27 22:00																			Minimum Daily Average: 1.4 ppb on Feb 6						Hours of Data: 639	
Maximum Diurnal Average: 17.0 ppb at hour 3																			Minimum Diurnal Average: 8.0 ppb at hour 11						Hours of Missing Data: 33	
Monthly Average: 12.1 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 6 Q <sub>3</sub> = 16 P <sub>90</sub> = 32 P <sub>99</sub> = 85						Hours of Calibration: 33	
																			Percent Operational Time: 100.0							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	7	7	Z	37	30	8	4	23	24	19	22	32	27	24	22	18	19	15	17	23	23	16	4	1	18.4	37
2-Feb	1	1	6	Z	27	1	1	1	1	1	6	45	23	14	10	11	12	37	55	32	8	5	15	75	16.9	75
3-Feb	36	12	31	21	Z	26	26	12	18	2	7	8	6	7	9	15	15	15	19	19	22	34	27	28	18.0	36
4-Feb	32	59	56	37	37	Z	29	9	8	6	2	2	14	32	19	20	7	5	12	1	1	5	5	17.4	59	
5-Feb	Z	3	12	11	12	10	13	16	7	12	18	28	35	32	24	12	6	8	10	6	4	2	3	1	12.3	35
6-Feb	1	Z	2	3	3	5	3	2	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1.4	5
7-Feb	1	2	Z	3	4	6	7	3	3	3	4	6	6	2	3	2	5	6	6	6	5	7	20	25	5.9	25
8-Feb	15	5	6	Z	1	1	1	2	4	6	7	9	12	52	30	23	21	2	5	20	28	21	20	5	12.8	52
9-Feb	3	2	5	2	Z	3	8	2	1	1	3	1	1	2	1	2	3	3	2	2	2	1	2	3	2.4	8
10-Feb	2	1	1	1	1	Z	7	4	27	8	13	7	10	7	5	8	4	0	1	1	1	7	12	16	6.2	27
11-Feb	Z	26	34	6	5	5	5	6	5	5	C	C	C	C	C	11	9	8	7	5	9	12	7	7	9.6	34
12-Feb	12	Z	13	8	3	2	2	2	2	13	5	3	3	4	6	6	3	1	1	1	1	1	1	1	4.1	13
13-Feb	2	2	Z	1	1	1	1	1	1	1	1	2	3	2	3	6	23	14	13	2	2	1	2	3	3.8	23
14-Feb	4	3	4	Z	4	2	2	3	4	8	11	12	8	15	15	20	16	9	2	1	1	1	1	1	6.5	20
15-Feb	1	5	7	5	Z	4	2	1	0	0	1	1	1	1	1	1	1	0	1	3	1	1	1	1	1.7	7
16-Feb	2	5	1	4	2	Z	5	14	15	22	11	7	5	5	13	25	39	51	76	87	97	90	103	76	32.9	103
17-Feb	Z	53	37	19	8	4	2	3	3	4	2	4	43	52	28	24	21	24	25	24	23	22	31	58	22.4	58
18-Feb	81	Z	48	40	68	64	34	45	35	29	27	30	32	31	32	36	35	21	20	19	21	19	15	12	34.5	81
19-Feb	11	8	Z	6	5	4	4	3	5	15	12	10	12	26	26	10	7	5	1	1	1	1	1	1	7.6	26
20-Feb	1	1	1	Z	1	1	1	1	1	1	1	3	6	2	1	1	1	1	2	5	3	4	9	18	2.9	18
21-Feb	41	64	60	44	Z	6	5	4	5	9	14	15	20	15	12	8	9	13	33	40	38	41	40	43	25.1	64
22-Feb	42	32	33	40	16	Z	5	4	7	3	6	18	12	22	20	16	10	3	3	3	2	2	1	42	14.8	42
23-Feb	Z	17	10	26	6	8	7	9	12	12	5	1	1	1	6	2	0	0	1	0	1	2	2	4	5.8	26
24-Feb	4	Z	6	5	6	8	10	9	4	1	1	1	0	0	1	1	1	1	1	1	1	1	0	3	2.8	10
25-Feb	7	16	Z	20	33	50	98	38	27	51	17	7	6	3	4	5	12	17	13	19	41	60	58	36	27.7	98
26-Feb	18	16	11	Z	16	15	21	14	5	3	2	3	3	7	3	3	3	7	9	7	9	7	7	4	8.4	21
27-Feb	3	1	1	1	Z	19	16	31	120	59	17	5	2	1	0	0	0	0	1	0	0	0	0	0	12.1	120
28-Feb	5	2	9	0	0	Z	0	0	0	0	1	5	8	3	3	6	13	13	2	2	2	1	1	3	3.5	13
																								Diurnal Average		
																								Diurnal Maximum		
13.7 14.2 17.0 14.8 12.5 11.0 11.4 9.4 12.4 10.6 8.0 9.9 10.7 12.8 11.4 10.4 11.0 10.2 11.8 12.2 12.5 12.9 13.9 16.8																										
81 64 60 44 68 64 98 45 120 59 27 45 43 52 32 36 39 51 76 87 97 90 103 76																										
Z - zerospan C - Calibration																										



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon - February 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	515	80.59	80.59
21 - 40	86	13.46	94.05
41 - 80	31	4.85	98.90
81 - 159	6	0.94	99.84
> 159	0	0.00	99.84

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**CNRL Horizon - February 2015**

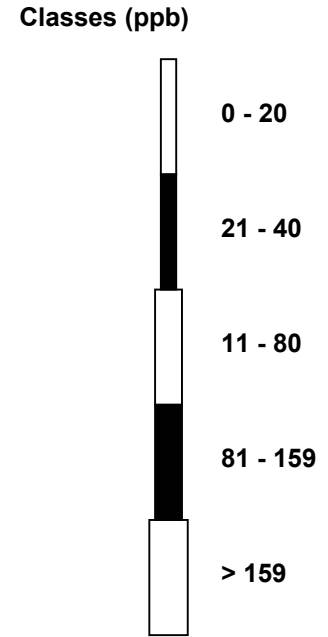
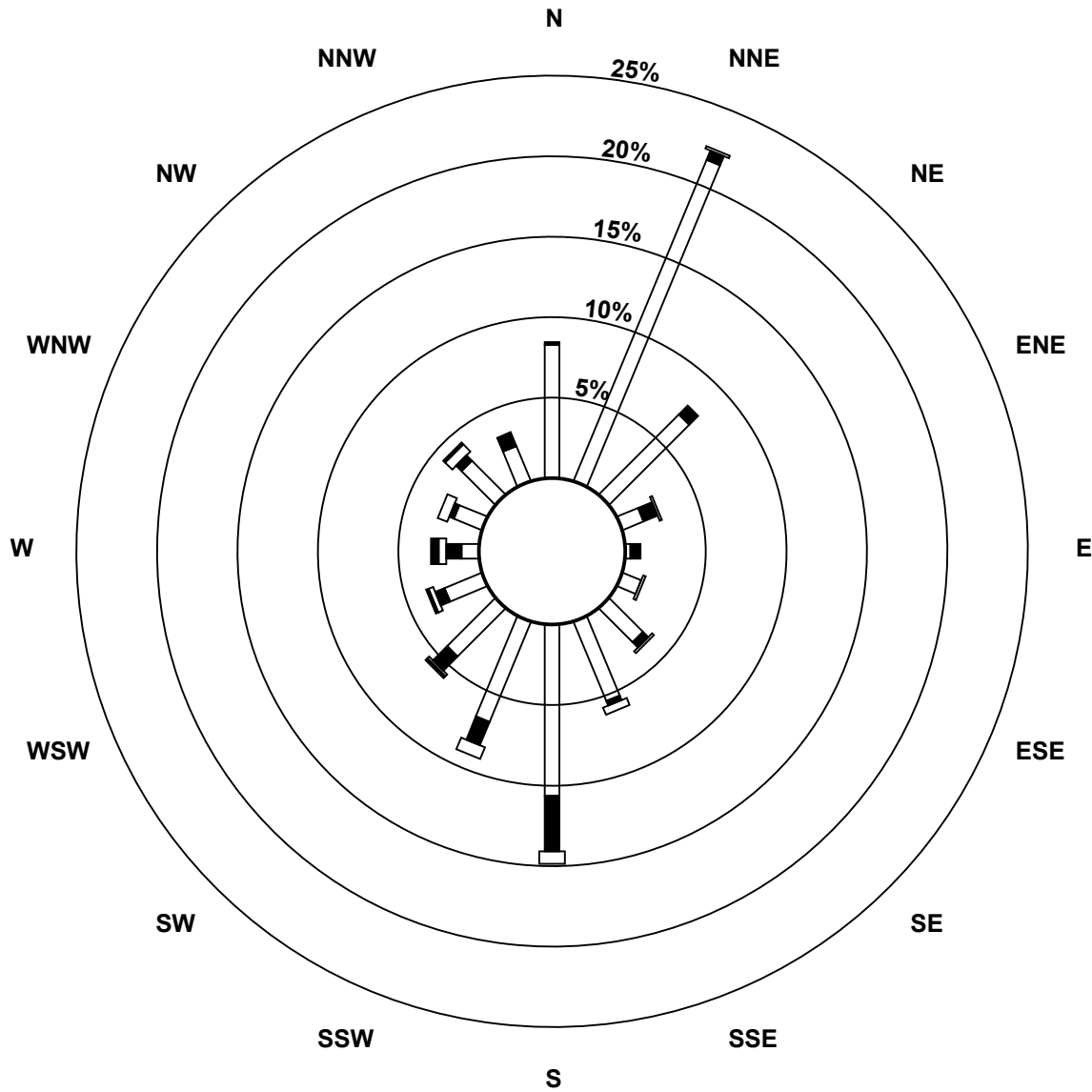
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	53	138	45	9	2	8	19	34	68	43	27	16	7	12	19	15	515
21 - 40	1	4	5	6	4	0	3	2	22	10	8	4	6	2	3	6	86
11 - 80	0	1	0	1	0	1	1	3	5	5	1	2	3	4	4	0	31
81 - 159	0	0	0	0	0	0	0	0	0	0	1	1	3	0	1	0	6
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	143	50	16	6	9	23	39	95	58	37	23	19	18	27	21	638

Total Number of Valid Hours: 639

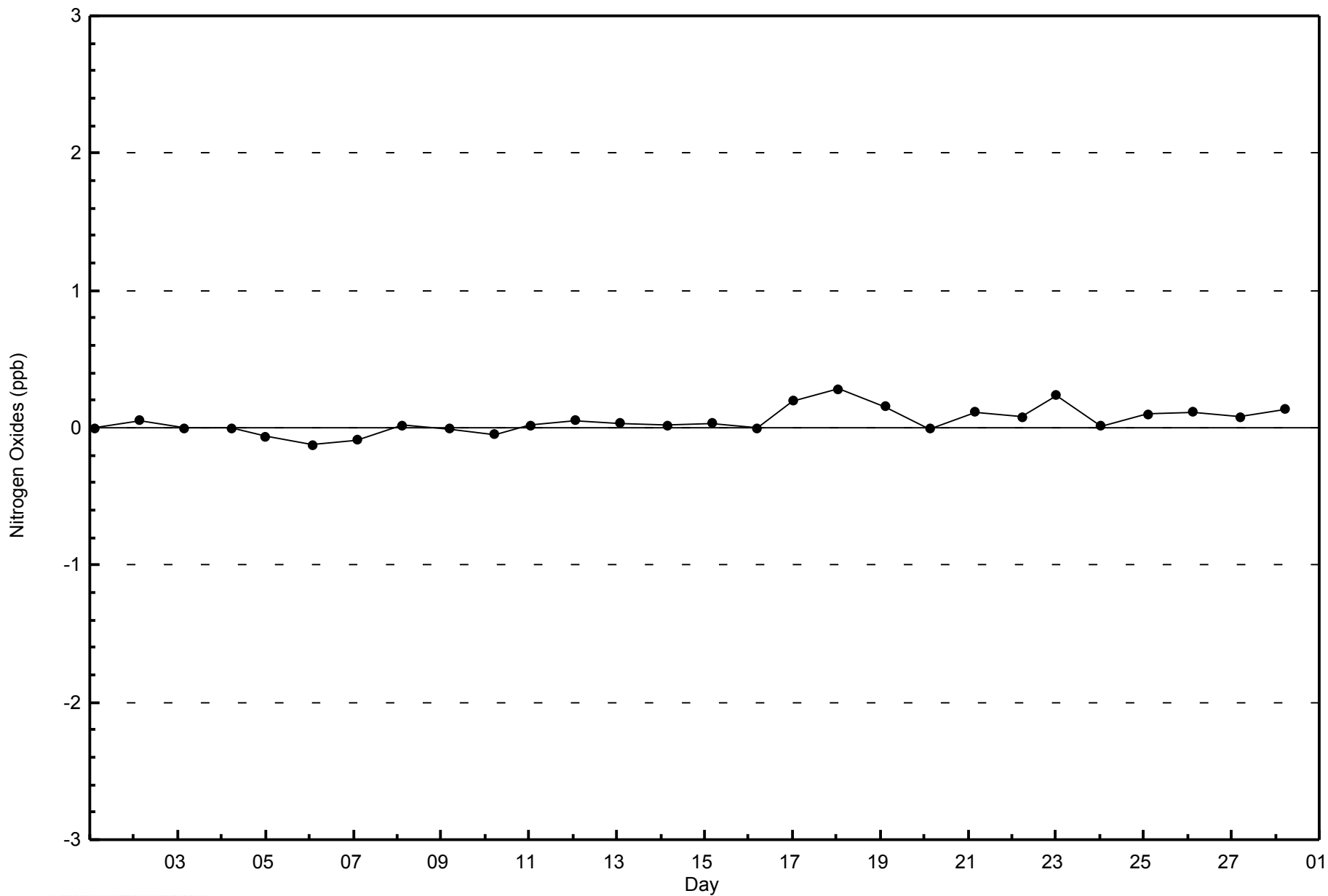
Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 CNRL Horizon (AMS 15)



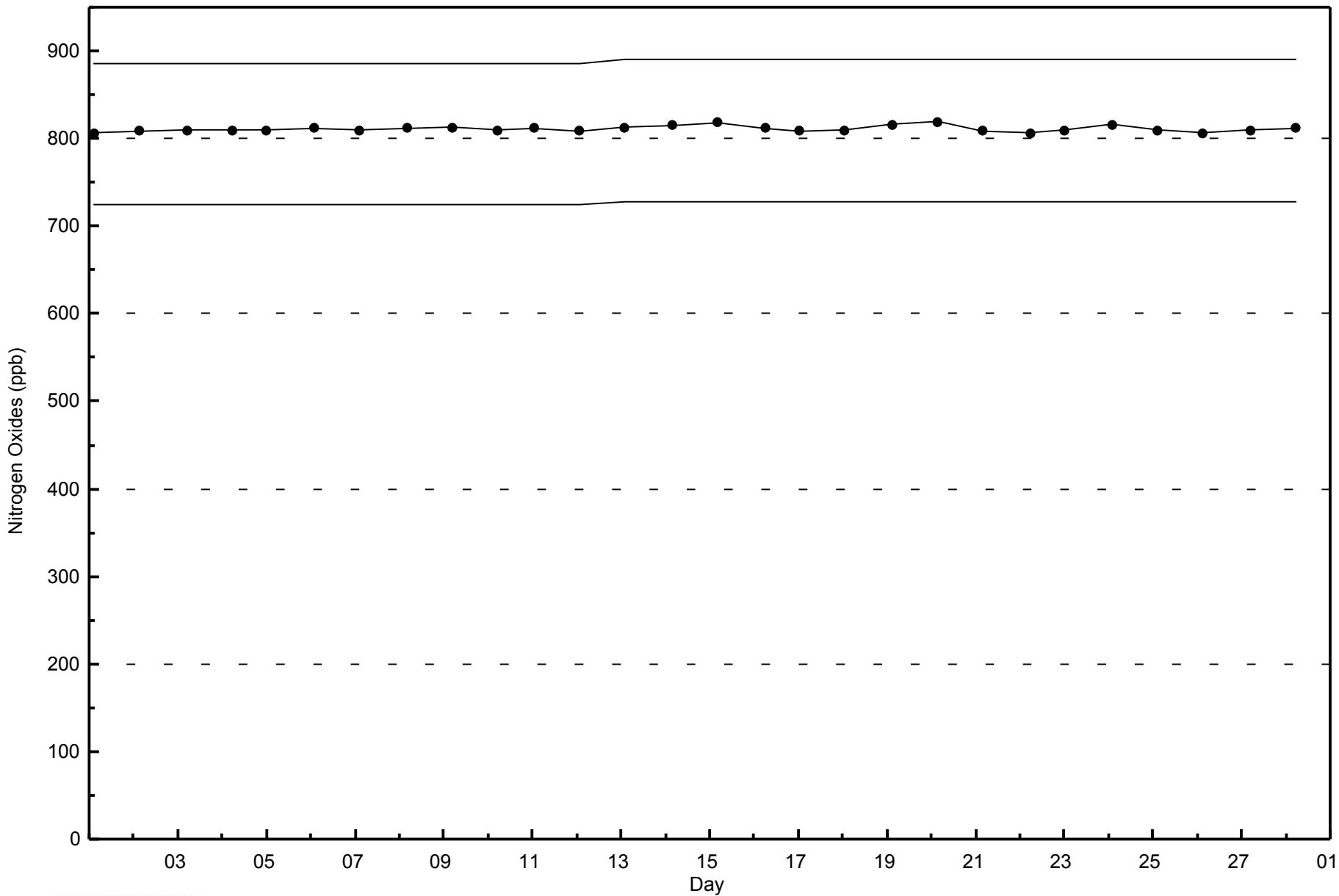
Total Number of Valid Hours: 639





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
CNRL Horizon - February 2015







Summary of Hour Averages

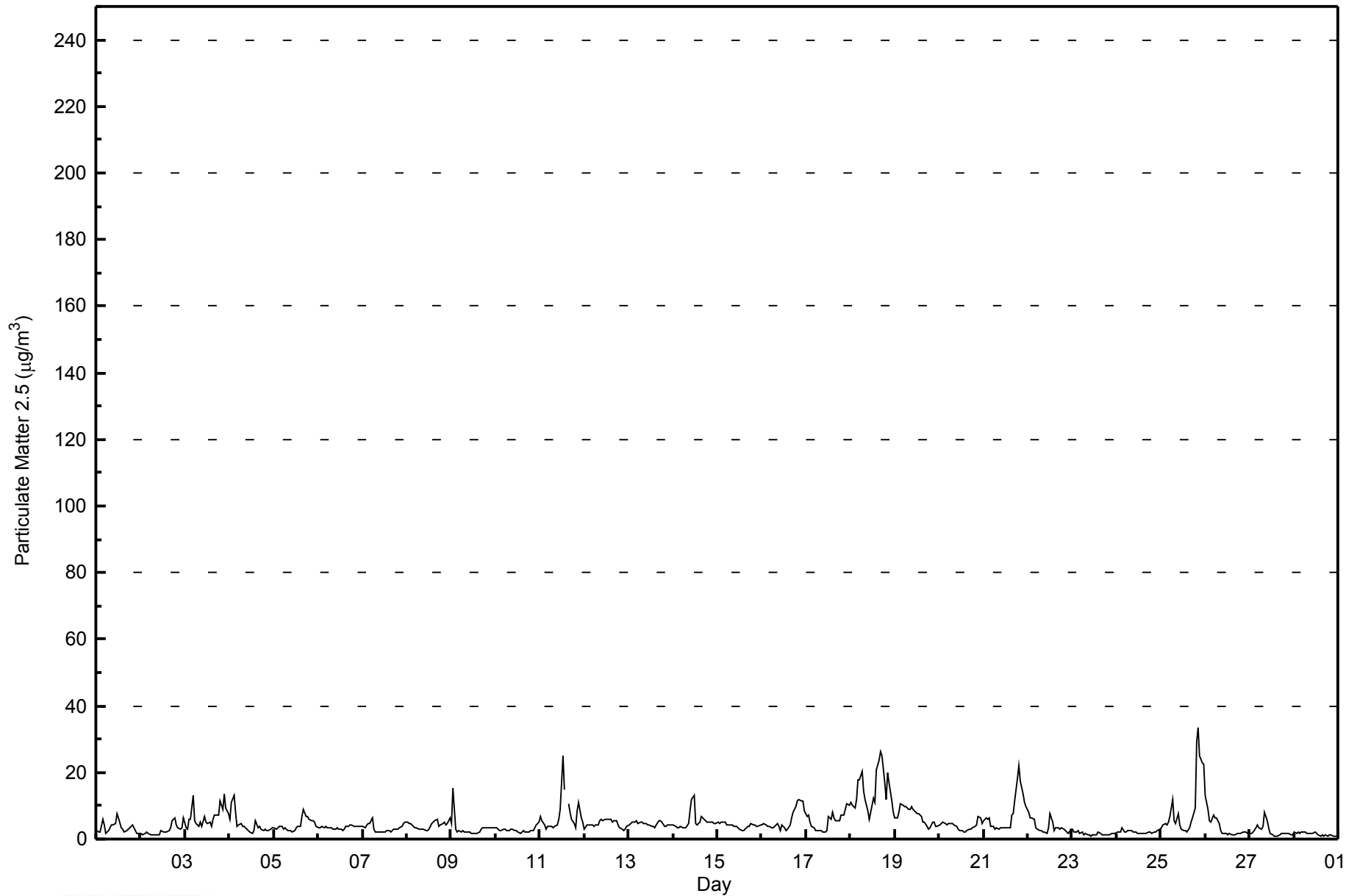
CNRL Horizon - February 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																								
Maximum Value: 33.4 µg/m <sup>3</sup> on Feb 25 21:00		Maximum Daily Average: 14.6 µg/m <sup>3</sup> on Feb 18																								
Minimum Value: 0.8 µg/m <sup>3</sup> on Feb 27 15:00		Hours of Data: 671																								
Maximum Diurnal Average: 6.3 µg/m <sup>3</sup> at hour 21		Hours of Missing Data: 1																								
Monthly Average: 4.72 µg/m <sup>3</sup>		Hours of Calibration: 1																								
Minimum Daily Average: 1.5 µg/m <sup>3</sup> on Feb 28		Percent Operational Time: 100.0																								
Minimum Diurnal Average: 3.7 µg/m <sup>3</sup> at hour 11		Percentiles: P <sub>1</sub> = 0.9 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.5 Median = 3.6 Q <sub>3</sub> = 5.3 P <sub>90</sub> = 8.8 P <sub>99</sub> = 23.6																								
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-Feb	2.5	2.2	2.1	6.0	4.3	1.8	2.3	3.5	4.1	4.4	4.8	7.8	6.4	3.4	3.1	2.2	2.5	3.0	3.6	4.0	3.4	2.4	1.7	1.5	3.5	7.8
2-Feb	1.5	1.4	1.8	2.2	1.9	1.4	1.3	1.2	1.3	1.2	1.4	2.6	2.2	2.0	2.0	2.6	3.5	5.5	6.5	4.3	3.3	2.8	3.2	6.3	2.6	6.5
3-Feb	3.4	2.8	6.0	6.0	13.0	5.4	4.5	3.9	4.9	3.9	6.7	5.1	4.7	4.9	3.8	5.9	7.2	7.3	7.4	11.5	9.0	13.4	9.5	7.8	6.6	13.4
4-Feb	5.7	10.9	13.0	7.9	3.8	4.4	4.8	3.6	3.6	2.9	2.4	2.1	1.6	2.6	5.5	3.5	3.7	2.9	2.6	3.2	2.5	2.5	2.9	3.5	4.3	13.0
5-Feb	3.5	2.8	3.4	3.9	3.8	3.0	3.3	2.5	2.3	2.5	2.3	2.7	3.6	3.8	3.6	6.9	8.9	6.9	6.6	5.8	5.5	5.4	5.1	3.9	4.3	8.9
6-Feb	3.5	3.6	3.8	3.6	3.7	3.5	3.3	3.4	3.0	3.0	3.2	2.9	2.8	2.7	3.0	3.6	4.0	4.1	4.2	4.0	3.6	3.8	3.9	3.8	3.5	4.2
7-Feb	3.6	3.2	4.3	4.6	4.5	6.4	2.9	2.3	2.1	2.1	2.1	2.2	2.3	2.5	2.5	2.1	2.4	2.8	2.9	3.1	3.2	3.7	4.8	5.1	3.2	6.4
8-Feb	5.1	4.6	4.6	4.0	3.5	3.3	3.2	3.0	3.0	2.9	2.6	2.6	2.9	4.7	4.9	5.4	5.7	4.0	4.3	4.8	5.2	4.3	4.7	6.6	4.2	6.6
9-Feb	4.8	15.2	3.1	2.3	2.4	2.3	2.3	2.2	2.0	2.1	2.0	1.8	1.7	1.8	1.8	2.2	3.0	3.3	3.3	3.4	3.5	3.4	3.3	3.2	3.2	15.2
10-Feb	3.3	3.0	2.7	2.6	2.8	3.1	2.7	2.7	2.8	3.0	2.6	2.6	2.2	1.8	2.0	2.4	2.2	2.1	2.1	2.6	2.5	3.4	4.2	5.2	2.8	5.2
11-Feb	6.6	5.5	4.1	3.1	3.6	3.7	4.0	3.4	3.9	4.2	6.1	8.9	24.9	14.9	C	10.6	8.0	5.9	4.8	3.4	8.7	11.1	6.5	5.3	7.0	24.9
12-Feb	3.0	4.2	4.4	4.4	4.2	4.0	4.1	4.4	5.6	6.0	5.5	6.1	5.9	5.8	5.9	5.1	5.4	5.4	4.4	3.5	2.9	2.4	2.9	3.7	4.6	6.1
13-Feb	4.2	4.6	5.2	5.3	5.4	4.9	5.0	5.1	4.9	4.7	4.3	4.2	3.9	3.8	3.3	4.2	5.6	5.3	4.9	3.7	3.9	4.0	4.1	4.2	4.5	5.6
14-Feb	4.1	3.8	3.6	3.4	3.6	3.4	3.3	3.6	4.5	8.5	11.8	13.3	4.8	4.4	5.0	6.7	6.5	5.8	5.2	4.9	5.0	5.0	4.8	4.8	5.4	13.3
15-Feb	5.0	4.8	5.0	5.0	4.9	4.2	4.3	4.4	4.4	3.8	3.6	3.3	2.9	2.4	2.5	2.8	3.6	3.9	4.5	4.1	4.2	4.0	3.8	4.2	4.0	5.0
16-Feb	4.4	4.6	4.0	3.8	3.6	3.5	3.4	3.8	4.5	3.7	2.7	4.4	3.2	2.6	3.0	4.4	6.3	7.9	9.9	11.5	11.7	11.4	11.5	8.6	5.8	11.7
17-Feb	6.9	7.2	5.1	3.8	3.3	2.7	2.6	2.5	2.4	2.2	2.1	2.7	6.8	6.1	7.9	6.5	5.4	5.4	5.7	7.3	7.3	8.8	10.4	10.3	5.5	10.4
18-Feb	10.8	10.2	9.4	12.1	17.9	17.9	20.1	14.4	11.8	8.5	6.0	8.1	12.5	11.0	20.8	23.9	26.1	25.0	17.0	11.8	19.7	16.8	11.6	7.9	14.6	26.1
19-Feb	6.3	6.3	8.1	10.8	10.3	9.7	9.8	9.0	9.1	9.6	8.7	7.9	7.7	7.5	6.7	4.9	5.1	4.0	3.2	3.3	5.1	5.0	3.9	3.7	6.9	10.8
20-Feb	4.1	4.7	5.2	4.8	4.4	4.7	4.6	4.6	4.3	3.7	3.0	2.6	2.5	2.2	2.0	2.4	3.1	3.1	3.5	3.7	4.4	6.8	6.2	4.5	4.0	6.8
21-Feb	5.4	6.2	5.8	6.4	3.8	3.6	3.2	3.5	3.2	3.6	3.6	3.3	3.4	3.3	3.4	7.3	7.7	11.6	18.4	22.0	17.3	13.5	11.0	9.8	7.5	22.0
22-Feb	7.9	6.2	6.2	5.8	3.5	2.8	2.5	2.4	2.3	1.9	1.9	3.2	7.6	5.1	2.7	3.5	3.3	3.2	3.2	2.9	2.4	2.1	1.7	3.1	3.6	7.9
23-Feb	3.0	2.3	2.0	2.5	1.8	2.0	1.1	1.9	1.5	1.1	1.0	1.4	1.4	1.4	2.0	1.7	1.2	1.4	1.3	1.4	1.6	1.5	1.7	1.6	1.6	3.0
24-Feb	2.0	2.2	2.2	3.4	2.2	2.3	2.4	2.7	2.7	2.3	1.9	1.7	1.7	1.6	1.6	1.6	1.9	2.1	2.1	1.8	2.1	2.2	2.5	2.8	2.2	3.4
25-Feb	3.4	4.3	4.6	4.3	4.9	6.6	12.0	5.3	4.5	7.6	4.2	2.9	2.7	2.7	2.1	3.4	4.9	6.4	9.1	29.3	33.4	25.2	23.1	22.5	9.6	33.4
26-Feb	13.2	9.1	5.5	5.2	7.0	6.4	6.4	4.5	2.7	1.9	1.5	1.5	1.5	1.6	1.1	1.1	1.3	1.5	1.7	1.7	2.0	2.1	2.0	1.9	3.5	13.2
27-Feb	1.8	1.8	2.1	3.2	4.3	3.3	3.0	3.8	7.9	5.5	3.3	1.6	1.1	0.9	0.8	0.9	1.3	1.8	1.6	1.7	1.6	1.5	1.4	1.4	2.4	7.9
28-Feb	2.0	1.7	2.2	1.9	2.2	2.1	1.9	1.8	1.8	1.7	1.7	2.2	1.7	1.1	1.0	1.2	1.0	1.3	1.0	1.3	1.1	0.9	1.0	1.0	1.5	2.2
4.7 5.0 4.6 4.7 4.8 4.4 4.4 3.9 4.0 3.9 3.7 4.0 4.5 3.9 3.9 4.6 5.0 5.1 5.2 5.9 6.3 6.0 5.5 5.3																								Diurnal Average		
13.2 15.2 13.0 12.1 17.9 17.9 20.1 14.4 11.8 9.6 11.8 13.3 24.9 14.9 20.8 23.9 26.1 25.0 18.4 29.3 33.4 25.2 23.1 22.5																								Diurnal Maximum		
C - Calibration																										
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 - February 2015





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**CNRL Horizon - February 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	510	76.01	76.01
6 - 15	134	19.97	95.98
16 - 25	16	2.38	98.36
26 - 80	3	0.45	98.81
> 81.0	0	0.00	98.81

Total Number of Valid Hours: 671

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**CNRL Horizon - February 2015**

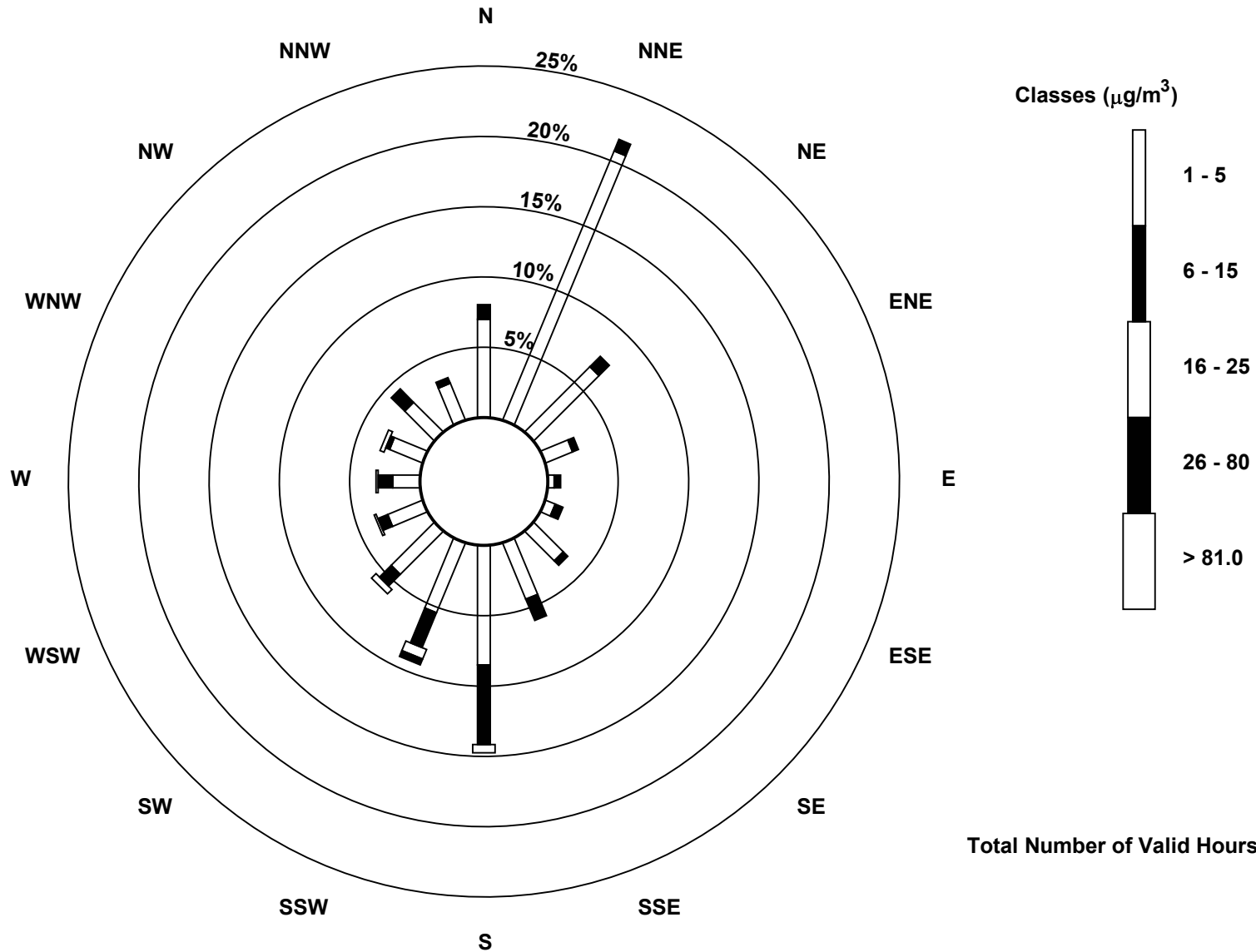
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	47	139	44	14	3	5	20	29	57	36	29	18	13	17	20	19	510
6 - 15	7	6	7	3	3	4	3	11	38	18	8	5	7	2	9	3	134
16 - 25	0	0	0	0	0	0	0	0	4	5	3	1	1	2	0	0	16
26 - 80	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	54	145	51	17	6	9	23	40	99	62	40	24	21	21	29	22	663

Total Number of Valid Hours: 671

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
CNRL Horizon (AMS 15)



Total Number of Valid Hours: 671



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

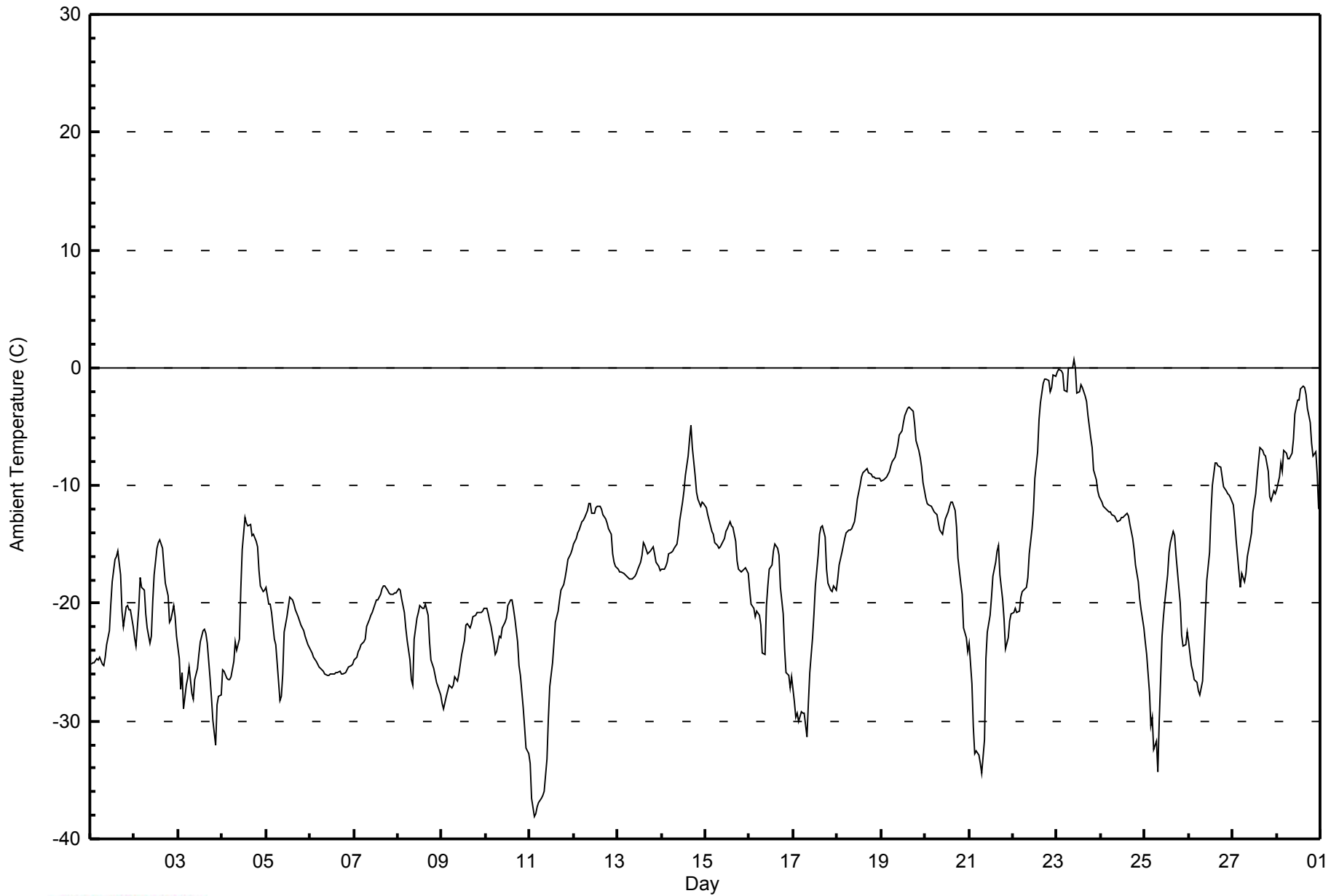
**Ambient Temperature (AT) - C**  
**CNRL Horizon - February 2015**

Maximum Value: 0.7 C on Feb 23 10:00		Maximum Daily Average: -3.1 C on Feb 23		Hours in Service: 672																						
Minimum Value: -38.1 C on Feb 11 03:00		Minimum Daily Average: -27.0 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.5 C at hour 16		Minimum Diurnal Average: -21.0 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -17.73 C		Percentiles: P <sub>1</sub> = -37.1 P <sub>10</sub> = -26.8 Q <sub>1</sub> = -23.3 Median = -18.3 Q <sub>3</sub> = -12.5 P <sub>90</sub> = -7.5 P <sub>99</sub> = -0.3		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-25.2	-25.0	-25.0	-24.7	-24.8	-24.6	-25.2	-25.3	-24.5	-23.5	-22.3	-20.1	-18.2	-16.3	-16.1	-15.6	-17.5	-20.6	-21.9	-20.3	-20.1	-20.5	-20.6	-22.0	-21.7	-15.6
2-Feb	-22.9	-23.6	-20.4	-17.8	-18.6	-18.8	-20.9	-22.1	-23.4	-22.8	-19.9	-17.6	-15.3	-14.9	-14.7	-15.3	-16.8	-18.3	-19.3	-21.6	-21.4	-20.2	-21.1	-22.8	-19.6	-14.7
3-Feb	-24.6	-27.3	-25.9	-29.0	-26.9	-26.4	-25.4	-27.7	-28.2	-26.5	-25.6	-24.3	-23.3	-22.3	-22.2	-22.6	-23.4	-26.4	-28.0	-29.9	-32.1	-28.6	-27.9	-27.8	-26.3	-22.2
4-Feb	-25.7	-25.7	-26.4	-26.5	-26.5	-26.3	-24.9	-23.3	-24.0	-23.0	-18.8	-15.4	-12.8	-13.2	-13.4	-13.3	-14.2	-14.1	-14.7	-15.2	-17.2	-18.6	-19.1	-18.9	-19.6	-12.8
5-Feb	-18.6	-20.1	-20.1	-20.8	-23.1	-23.5	-25.0	-28.2	-27.9	-26.0	-22.4	-21.1	-20.3	-19.5	-19.8	-20.1	-20.6	-21.1	-21.5	-21.8	-22.3	-22.8	-23.2	-23.5	-22.2	-18.6
6-Feb	-24.0	-24.2	-24.6	-24.9	-25.2	-25.4	-25.6	-25.8	-25.9	-26.1	-26.1	-26.0	-26.1	-26.0	-25.9	-25.8	-25.8	-25.9	-26.0	-25.8	-25.6	-25.4	-25.3	-25.1	-25.5	-24.0
7-Feb	-24.8	-24.6	-24.1	-23.8	-23.5	-23.2	-23.1	-22.0	-21.3	-21.0	-20.7	-20.1	-19.7	-19.8	-19.2	-18.7	-18.6	-18.6	-18.9	-19.2	-19.2	-19.3	-19.2	-19.2	-20.9	-18.6
8-Feb	-18.8	-18.8	-19.6	-20.8	-22.1	-23.2	-24.8	-26.5	-26.9	-23.0	-21.3	-20.8	-20.1	-20.4	-20.4	-20.0	-21.1	-23.3	-24.8	-25.6	-26.2	-26.8	-27.1	-27.8	-22.9	-18.8
9-Feb	-28.5	-28.9	-27.9	-27.4	-26.9	-27.2	-26.9	-26.3	-26.5	-26.0	-25.1	-24.3	-23.1	-21.8	-21.8	-22.1	-21.8	-21.1	-21.0	-20.8	-20.8	-20.8	-20.7	-20.5	-24.1	-20.5
10-Feb	-20.5	-20.9	-21.5	-22.0	-23.3	-24.4	-24.1	-22.8	-22.9	-22.1	-21.6	-21.2	-20.2	-19.7	-19.7	-20.5	-21.2	-23.3	-25.3	-26.1	-28.9	-30.5	-32.2	-32.8	-23.7	-19.7
11-Feb	-33.6	-36.5	-38.1	-37.9	-37.3	-36.9	-36.5	-36.3	-35.9	-33.2	-29.8	-27.0	-25.1	-23.3	-21.6	-20.6	-19.7	-18.9	-18.4	-17.8	-17.1	-16.3	-15.8	-15.4	-27.0	-15.4
12-Feb	-15.0	-14.5	-14.0	-13.8	-13.1	-12.9	-12.7	-12.1	-11.5	-11.5	-12.3	-12.4	-11.9	-11.8	-11.8	-12.0	-12.4	-12.8	-13.2	-13.7	-14.1	-15.8	-16.6	-16.9	-13.3	-11.5
13-Feb	-17.1	-17.3	-17.4	-17.4	-17.5	-17.8	-17.9	-18.0	-17.9	-17.7	-17.5	-17.1	-16.5	-16.0	-14.9	-15.0	-15.9	-15.6	-15.5	-15.2	-15.8	-16.6	-16.8	-17.2	-16.7	-14.9
14-Feb	-17.1	-17.1	-16.9	-16.5	-15.8	-15.6	-15.5	-15.4	-14.9	-14.2	-12.9	-11.4	-10.5	-9.1	-7.5	-6.1	-4.8	-6.8	-9.2	-10.6	-11.2	-11.7	-11.4	-11.5	-12.2	-4.8
15-Feb	-11.9	-12.5	-13.0	-13.9	-14.2	-14.8	-15.1	-15.3	-15.3	-15.0	-14.5	-13.9	-13.7	-13.1	-13.4	-13.6	-14.7	-16.4	-17.1	-17.3	-17.2	-17.0	-17.0	-17.5	-14.9	-11.9
16-Feb	-18.9	-20.0	-20.4	-21.2	-20.6	-21.0	-21.9	-24.2	-24.4	-20.2	-18.5	-17.1	-16.7	-15.6	-15.0	-15.4	-15.9	-18.7	-20.9	-23.9	-25.9	-26.2	-27.2	-26.2	-20.7	-15.0
17-Feb	-28.4	-29.6	-29.4	-30.1	-29.2	-29.4	-29.3	-31.3	-28.5	-25.9	-22.9	-20.9	-18.6	-15.9	-14.2	-13.5	-13.4	-14.4	-17.1	-18.3	-18.9	-19.0	-18.5	-18.9	-22.3	-13.4
18-Feb	-17.9	-16.8	-15.7	-15.1	-14.5	-14.0	-13.8	-13.8	-13.7	-13.0	-12.2	-11.1	-9.9	-9.2	-9.0	-8.7	-8.6	-8.9	-9.1	-9.2	-9.3	-9.4	-9.4	-9.4	-11.7	-8.6
19-Feb	-9.6	-9.6	-9.4	-9.3	-8.8	-8.3	-8.0	-7.7	-7.2	-6.5	-5.7	-5.4	-4.6	-4.0	-3.4	-3.4	-3.5	-3.7	-4.8	-6.1	-7.0	-7.6	-8.4	-9.8	-6.7	-3.4
20-Feb	-11.1	-11.6	-11.7	-11.7	-12.0	-12.2	-12.4	-13.2	-13.8	-14.1	-13.4	-12.8	-12.3	-11.8	-11.4	-11.4	-12.2	-13.5	-16.1	-18.3	-19.3	-22.1	-23.0	-24.2	-14.4	-11.1
21-Feb	-23.4	-26.9	-30.5	-32.7	-32.5	-32.9	-33.6	-34.5	-31.6	-24.7	-22.5	-21.0	-19.5	-17.7	-16.5	-15.6	-15.1	-17.6	-19.7	-21.3	-23.8	-22.9	-21.5	-20.9	-24.1	-15.1
22-Feb	-20.8	-20.5	-20.8	-20.7	-19.4	-19.0	-18.7	-18.6	-17.9	-15.8	-13.6	-12.1	-9.4	-7.1	-4.5	-3.0	-1.3	-1.0	-1.0	-1.1	-2.0	-1.7	-0.6	-0.7	-10.5	-0.6
23-Feb	-0.4	-0.1	-0.2	-0.5	-2.0	-2.0	0.0	0.0	0.0	0.7	0.0	-2.2	-2.0	-1.5	-1.7	-2.3	-2.8	-4.0	-5.9	-6.7	-8.7	-9.5	-10.4	-11.0	-3.1	0.7
24-Feb	-11.4	-11.7	-11.9	-12.1	-12.3	-12.2	-12.4	-12.6	-12.9	-13.0	-12.9	-12.7	-12.7	-12.5	-12.4	-12.6	-13.2	-14.5	-15.5	-16.7	-18.2	-19.6	-20.5	-22.1	-14.1	-11.4
25-Feb	-23.3	-24.4	-27.6	-30.3	-29.6	-32.4	-31.7	-34.3	-29.9	-22.8	-21.2	-19.8	-17.6	-15.7	-14.9	-14.0	-14.2	-16.0	-18.7	-19.9	-22.7	-23.6	-23.5	-22.4	-22.9	-14.0
26-Feb	-23.3	-25.3	-25.8	-26.5	-26.7	-27.4	-27.8	-26.6	-23.8	-20.9	-18.0	-15.7	-12.4	-10.0	-8.1	-8.1	-8.3	-8.4	-9.2	-10.1	-10.4	-10.7	-10.8	-11.0	-16.9	-8.1
27-Feb	-11.6	-13.0	-14.6	-17.4	-18.6	-17.5	-18.2	-17.4	-16.0	-14.7	-14.1	-12.2	-10.6	-9.2	-8.0	-6.8	-7.0	-7.4	-7.5	-8.8	-11.0	-11.3	-10.5	-10.7	-12.2	-6.8
28-Feb	-10.3	-9.2	-8.1	-8.8	-7.0	-7.2	-7.7	-7.8	-7.2	-6.0	-3.9	-2.7	-2.8	-1.8	-1.6	-1.7	-2.3	-3.4	-4.6	-6.4	-7.5	-7.2	-9.1	-12.0	-6.1	-1.6
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**CNRL Horizon - February 2015**





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

**Ambient Temperature (AT) - C**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	283	42.11	42.11
-20 - 0	386	57.44	99.55
0 - 10	3	0.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

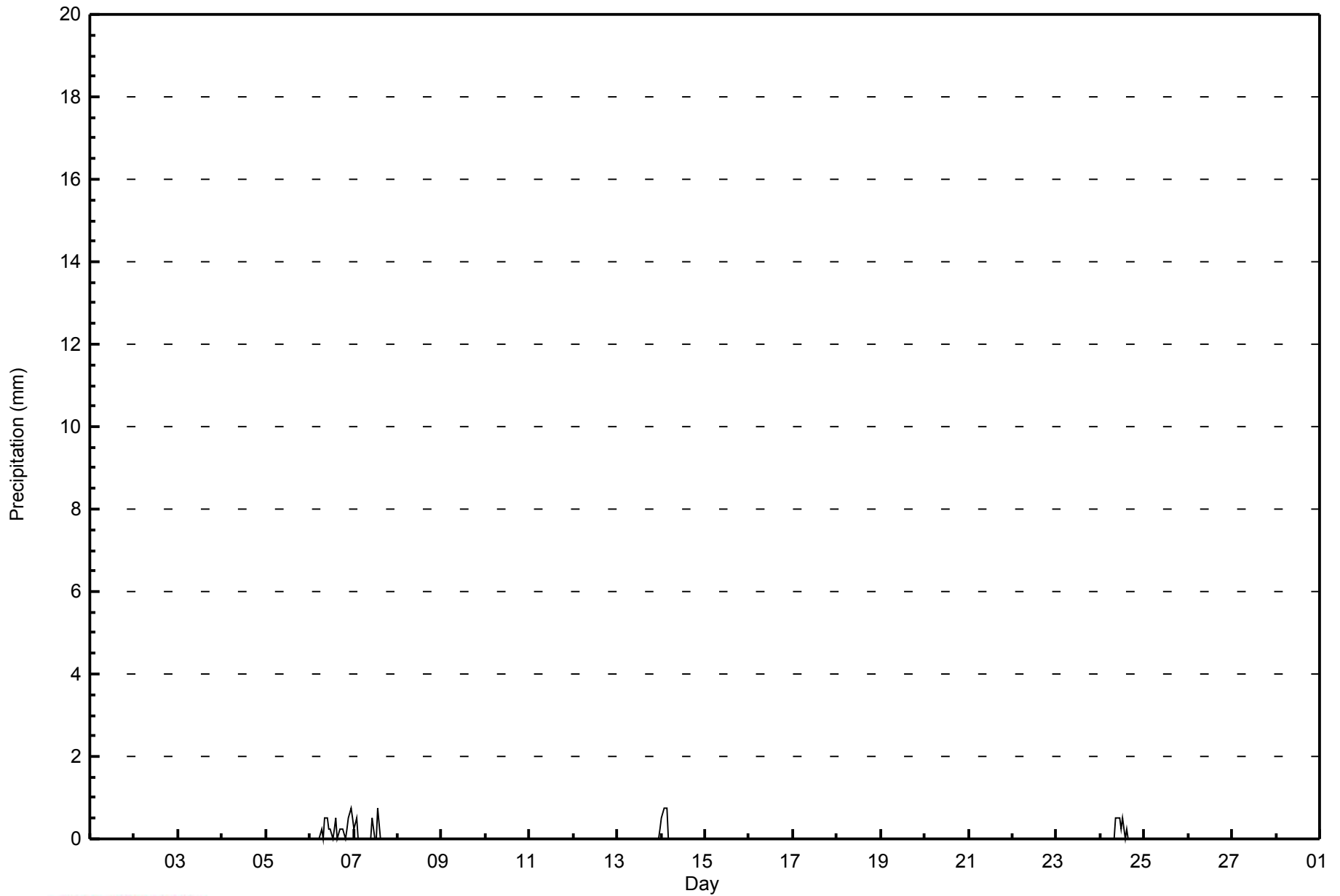
Total Number of Valid Hours: 672

Total Number of Hours: 672





Maximum Value: 0.8 mm on Feb 6 23:00		Maximum Daily Total: 5.3 mm on Feb 6		Hours in Service: 672																								
Minimum Value: 0.0 mm on Feb 1 01:00		Minimum Daily Total: 0.0 mm on Feb 1		Hours of Data: 672																								
Maximum Diurnal Total: 1.3 mm at hour 2		Minimum Diurnal Total: 0.0 mm at hour 5		Hours of Missing Data: 0																								
Monthly Total: 12.95 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> = 0.5		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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.5	0.5	0.3	0.3	0.0	0.3	0.5	0.0	0.3	0.3	0.3	0.0	0.3	0.5	0.8	0.5	0.0	0.0	5.3	0.8
7-Feb	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	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	2.0	0.8
8-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3	0.3
14-Feb	0.5	0.8	0.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.8
15-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.3	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.5
25-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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-Feb	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		0.8	1.3	0.8	0.8	0.0	0.0	0.3	0.0	1.0	1.0	1.3	0.5	0.5	1.0	0.8	0.0	0.3	0.3	0.3	0.0	0.3	0.5	0.8	0.8	Diurnal Average		
		0.5	0.8	0.8	0.8	0.0	0.0	0.3	0.0	0.5	0.5	0.5	0.3	0.5	0.8	0.5	0.0	0.3	0.3	0.3	0.0	0.3	0.5	0.8	0.5	Diurnal Maximum		



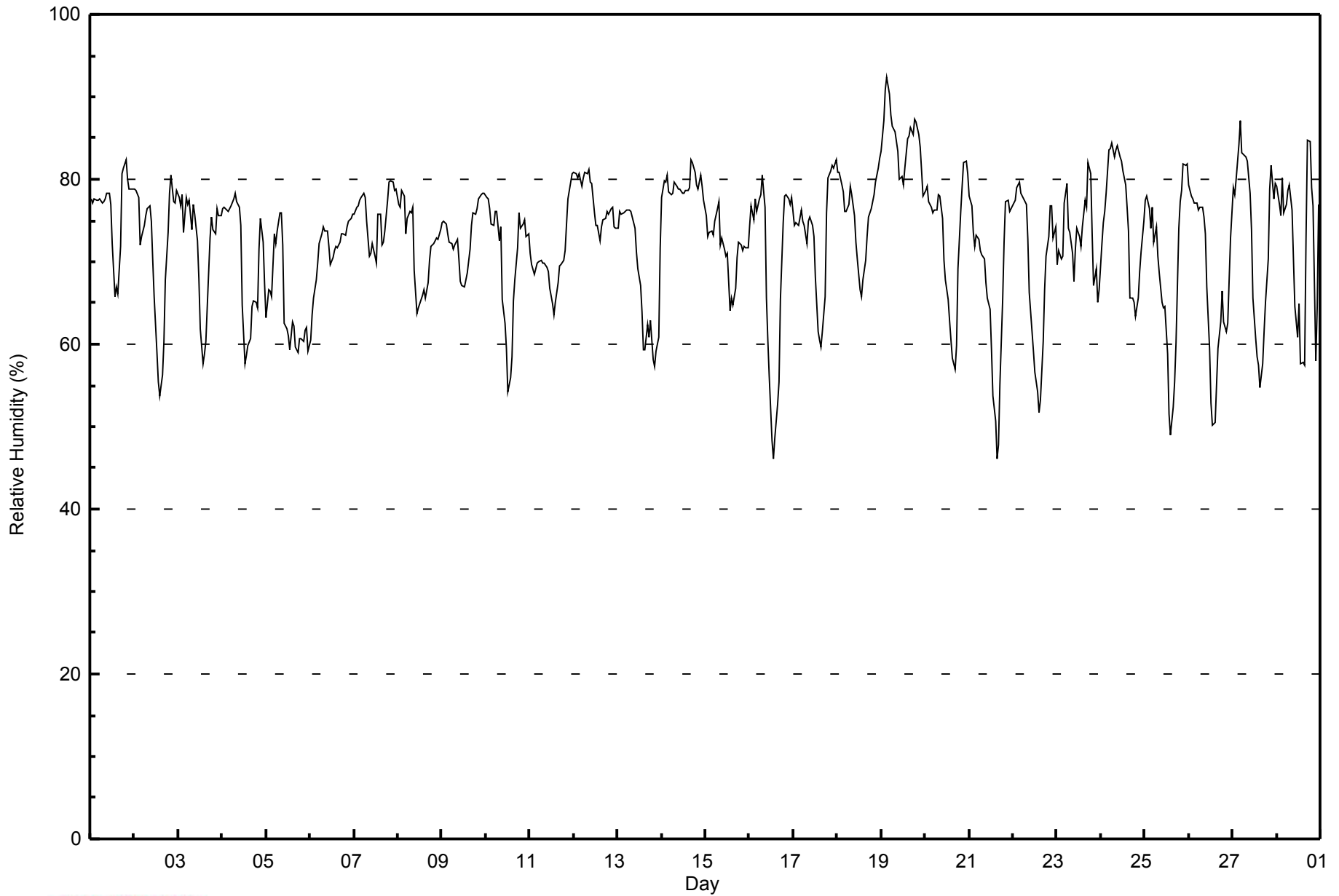


Maximum Value: 92 % on Feb 19 04:00														Maximum Daily Average: 84.9 % on Feb 19														Hours in Service: 672																					
Minimum Value: 46 % on Feb 21 16:00														Minimum Daily Average: 64.9 % on Feb 5														Hours of Data: 672																					
Maximum Diurnal Average: 76.8 % at hour 7														Minimum Diurnal Average: 63.3 % at hour 14														Hours of Missing Data: 0																					
Monthly Average: 72.4 %														Percentiles: P <sub>1</sub> = 50 P <sub>10</sub> = 60 Q <sub>1</sub> = 68 Median = 74 Q <sub>3</sub> = 78 P <sub>90</sub> = 81 P <sub>99</sub> = 87														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-Feb	78	77	78	78	77	78	77	77	78	78	78	77	72	66	67	66	72	81	81	82	80	79	79	79	76.4	82																							
2-Feb	79	79	78	72	73	74	76	77	77	75	70	66	59	55	54	56	60	68	74	78	81	77	77	79	71.4	81																							
3-Feb	78	77	78	73	78	77	78	74	77	76	73	68	62	58	59	60	65	73	75	74	73	77	76	76	72.2	78																							
4-Feb	76	77	76	76	76	77	78	78	77	77	74	65	58	59	60	61	64	65	65	64	72	75	72	67	70.4	78																							
5-Feb	63	67	67	66	73	72	74	76	76	72	63	62	61	59	63	62	60	59	61	61	60	62	62	59	64.9	76																							
6-Feb	60	64	66	68	70	72	73	74	74	74	72	70	71	71	72	72	72	73	73	73	74	75	75	76	71.4	76																							
7-Feb	76	77	77	78	78	78	78	75	71	71	72	71	70	76	76	72	72	74	78	80	80	80	79	79	75.6	80																							
8-Feb	77	77	79	78	73	75	76	76	77	69	64	64	65	66	67	66	68	70	72	72	73	73	73	74	71.7	79																							
9-Feb	75	75	75	73	72	72	72	72	73	70	68	67	67	68	69	72	74	76	76	76	78	78	78	78	73.1	78																							
10-Feb	78	78	76	75	74	76	76	73	74	65	63	59	54	56	58	65	68	72	76	74	75	75	73	73	70.3	78																							
11-Feb	71	70	68	69	70	70	70	70	70	69	69	67	65	64	65	67	70	70	70	71	74	78	80	81	70.3	81																							
12-Feb	81	81	80	81	79	80	81	81	81	80	79	76	74	74	73	74	75	75	76	76	76	77	74	74	77.5	81																							
13-Feb	74	76	76	76	76	76	76	76	75	74	71	69	67	64	59	59	62	61	63	58	57	59	61	72	68.3	76																							
14-Feb	78	80	80	81	78	78	78	80	79	79	79	78	78	79	79	82	82	81	79	79	81	79	78	78	79.3	82																							
15-Feb	76	73	74	74	73	75	76	77	72	73	72	71	71	64	66	65	67	71	72	72	71	72	72	72	71.6	77																							
16-Feb	74	77	75	78	76	78	78	81	77	66	60	56	48	46	49	53	55	65	75	78	78	78	77	78	69.0	81																							
17-Feb	74	75	75	74	76	75	74	72	75	75	74	73	68	61	60	60	61	66	76	80	81	82	81	82	73.1	82																							
18-Feb	81	81	79	78	76	76	77	79	78	76	72	70	67	66	68	70	73	75	76	77	78	80	81	83	75.8	83																							
19-Feb	83	87	91	92	90	88	86	86	85	83	80	80	79	81	85	85	86	85	87	87	85	84	81	78	84.9	92																							
20-Feb	79	79	77	77	76	76	76	78	78	75	70	68	65	63	60	58	57	60	69	76	79	82	82	81	72.6	82																							
21-Feb	78	77	74	72	73	73	71	71	70	67	66	64	59	54	51	46	48	55	65	72	77	77	76	76	67.2	78																							
22-Feb	77	77	79	80	78	78	77	77	73	66	62	59	57	54	52	53	60	67	71	73	77	77	73	74	69.6	80																							
23-Feb	70	71	70	71	77	79	74	74	71	68	72	74	73	72	74	78	77	82	81	73	67	69	65	67	72.8	82																							
24-Feb	72	75	76	78	84	84	84	83	84	84	83	82	81	79	77	74	66	66	65	63	66	69	71	75	75.8	84																							
25-Feb	77	78	77	74	77	72	74	71	69	65	64	65	59	52	49	52	55	60	74	77	79	82	82	82	69.4	82																							
26-Feb	79	78	78	77	77	76	77	77	75	73	67	60	53	50	51	55	59	63	67	63	61	62	68	73	67.4	79																							
27-Feb	79	78	80	84	87	83	83	83	82	78	74	66	61	58	57	55	58	61	65	70	79	82	78	79	73.4	87																							
28-Feb	79	77	76	80	76	77	79	79	76	70	65	61	65	58	58	57	73	85	85	79	77	58	65	77	72.1	85																							
																								75.8	76.2	76.1	76.1	76.7	76.7	76.8	76.6	75.8	73.2	70.5	68.1	65.3	63.3	63.4	64.0	66.4	70.0	73.2	73.6	74.6	74.9	74.6	75.7	Diurnal Average	
																								83	87	91	92	90	88	86	86	85	84	83	82	81	81	85	85	86	85	87	87	85	84	82	83	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**CNRL Horizon - February 2015**





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

**Relative Humidity (RH) - %**  
**CNRL Horizon - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	62	9.23	9.23
60 - 80	532	79.17	88.39
80 - 100	78	11.61	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

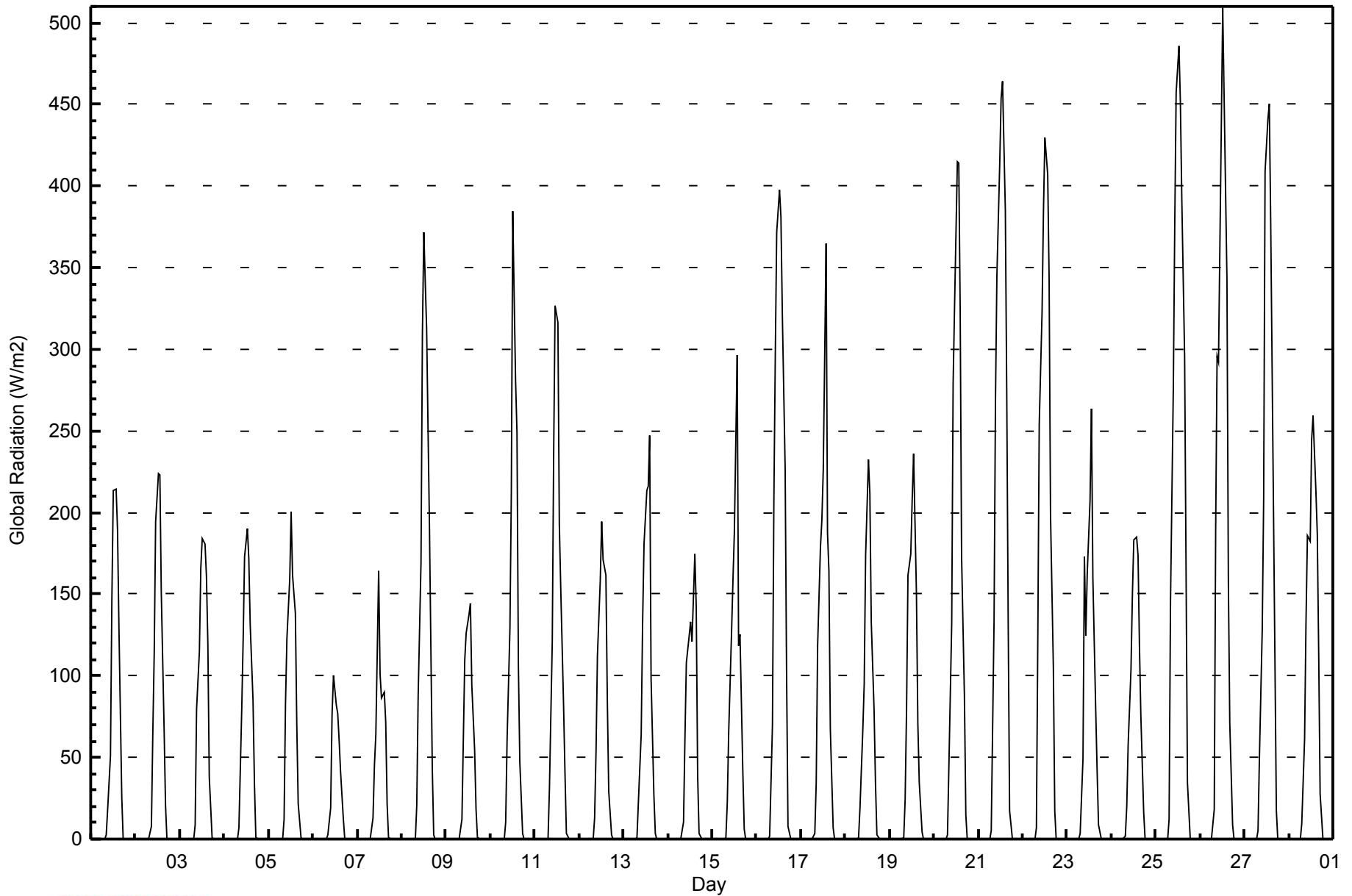


Maximum Value: 509 W/m2 on Feb 26 13:00																			Maximum Daily Average: 129.0 W/m2 on Feb 25						Hours in Service: 672																			
Minimum Value: 0 W/m2 on Feb 1 01:00																			Minimum Daily Average: 19.7 W/m2 on Feb 6						Hours of Data: 672																			
Maximum Diurnal Average: 270.3 W/m2 at hour 13																			Minimum Diurnal Average: 0.0 W/m2 at hour 1						Hours of Missing Data: 0																			
Monthly Average: 62.7 W/m2																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 0 Q <sub>3</sub> = 98 P <sub>90</sub> = 213 P <sub>99</sub> = 451						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-Feb	0	0	0	0	0	0	0	0	2	18	51	147	213	214	189	130	26	0	0	0	0	0	0	0	41.3	214																		
2-Feb	0	0	0	0	0	0	0	0	7	65	114	194	224	223	151	68	21	0	0	0	0	0	0	0	44.5	224																		
3-Feb	0	0	0	0	0	0	0	0	9	80	115	166	184	181	160	119	38	1	0	0	0	0	0	0	43.9	184																		
4-Feb	0	0	0	0	0	0	0	0	7	79	122	173	190	172	131	85	34	1	0	0	0	0	0	0	41.4	190																		
5-Feb	0	0	0	0	0	0	0	0	13	83	122	159	200	161	138	70	21	0	0	0	0	0	0	0	40.4	200																		
6-Feb	0	0	0	0	0	0	0	0	2	19	77	101	82	77	60	42	12	0	0	0	0	0	0	0	19.7	101																		
7-Feb	0	0	0	0	0	0	0	0	13	45	64	164	101	86	90	71	22	1	0	0	0	0	0	0	27.3	164																		
8-Feb	0	0	0	0	0	0	0	0	21	88	169	310	371	312	251	191	43	2	0	0	0	0	0	0	73.3	371																		
9-Feb	0	0	0	0	0	0	0	0	12	62	110	126	137	145	94	55	18	1	0	0	0	0	0	0	31.6	145																		
10-Feb	0	0	0	0	0	0	0	0	10	61	128	213	385	281	249	106	47	4	0	0	0	0	0	0	61.9	385																		
11-Feb	0	0	0	0	0	0	0	0	31	121	237	327	317	193	154	82	41	4	0	0	0	0	0	0	62.7	327																		
12-Feb	0	0	0	0	0	0	0	0	13	54	113	158	195	171	162	86	30	2	0	0	0	0	0	0	40.9	195																		
13-Feb	0	0	0	0	0	0	0	1	23	64	132	181	213	216	248	99	26	3	0	0	0	0	0	0	50.3	248																		
14-Feb	0	0	0	0	0	0	0	0	10	63	108	124	133	121	175	141	39	3	0	0	0	0	0	0	38.2	175																		
15-Feb	0	0	0	0	0	0	0	1	23	66	126	158	187	297	118	125	41	6	0	0	0	0	0	0	47.8	297																		
16-Feb	0	0	0	0	0	0	0	1	70	208	296	372	398	381	321	227	102	7	0	0	0	0	0	0	99.3	398																		
17-Feb	0	0	0	0	0	0	0	4	35	119	179	196	226	365	187	164	67	7	0	0	0	0	0	0	64.5	365																		
18-Feb	0	0	0	0	0	0	0	1	19	66	95	174	232	212	134	79	33	2	0	0	0	0	0	0	43.7	232																		
19-Feb	0	0	0	0	0	0	0	1	24	79	162	174	209	236	150	71	35	5	0	0	0	0	0	0	47.7	236																		
20-Feb	0	0	0	0	0	0	0	3	45	132	279	326	415	414	323	173	87	15	0	0	0	0	0	0	92.2	415																		
21-Feb	0	0	0	0	0	0	0	5	134	269	345	413	454	464	385	270	135	17	0	0	0	0	0	0	120.5	464																		
22-Feb	0	0	0	0	0	0	0	6	124	254	323	385	429	407	344	199	105	17	0	0	0	0	0	0	108.1	429																		
23-Feb	0	0	0	0	0	0	0	3	50	173	125	162	208	264	160	80	42	8	0	0	0	0	0	0	53.1	264																		
24-Feb	0	0	0	0	0	0	0	2	20	58	104	149	183	185	174	118	75	16	0	0	0	0	0	0	45.2	185																		
25-Feb	0	0	0	0	0	0	0	12	146	277	375	457	486	451	393	296	169	34	0	0	0	0	0	0	129.0	486																		
26-Feb	0	0	0	0	0	0	0	18	189	296	292	437	509	454	342	157	71	9	0	0	0	0	0	0	115.6	509																		
27-Feb	0	0	0	0	0	0	0	6	50	129	209	409	441	450	377	288	109	17	0	0	0	0	0	0	103.5	450																		
28-Feb	0	0	0	0	0	0	0	9	61	133	186	183	244	260	214	187	114	28	0	0	0	0	0	0	67.4	260																		
																			0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	41.5	112.9	169.9	233.5	270.3	264.0	209.7	135.0	57.2	7.6	0.0	0.0	0.0	0.0	0.0	0.0	Diurnal Average	
																			0	0	0	0	0	0	0	18	189	296	375	457	509	464	393	296	169	34	0	0	0	0	0	0	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Global Radiation (GR) - W/m<sup>2</sup>**  
**CNRL Horizon - February 2015**





Maximum Speed: 20 km/h on Feb 24 20:00	Maximum Daily Speed Average: 12.7 km/h on Feb 6	Hours in Service: 672
Minimum Speed Value: 1 km/h on Feb 17 22:00	Minimum Daily Speed Average: 0.4 km/h on Feb 16	Hours of Data: 672
Maximum Diurnal Speed Average: 3.5 km/h at hour 18	Minimum Diurnal Speed Average: 0.3 km/h at hour 4	Hours of Missing Data: 0
Monthly Average Velocity: 0.7 km/h 35.5 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 10 P <sub>90</sub> = 13 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-Feb	S10	S10	S12	S10	S11	S12	S4	SE3	NE1	NNE2	NNE1	S2	NW2	S5	E4	SSE3	SSE2	S1	SW6	WSW9	WSW10	WSW11	SW9	SSW10	SSW4.8	S12
2-Feb	SSW8	S8	W10	NNW12	W5	WSW9	WSW12	WSW12	SW5	SW5	WSW4	WNW2	WNW9	WNW9	WNW11	WNW10	NW9	W5	W6	SW6	SW8	WSW9	W5	NW4	W6.4	WSW12
3-Feb	SW5	NNW2	NNE4	SSW2	NNW4	NNW4	NNW6	NW3	N6	NNE8	NE6	ESE2	SE2	SSE4	SE6	ESE7	ESE5	ENE2	SSE1	SSW5	SSW8	S11	SSW10	S10	SSE1.2	S11
4-Feb	S10	SSE9	S9	S9	SSW10	S10	SSW8	S8	S7	S12	SSW14	SW11	SSW4	NE8	ENE6	NE2	NW5	NW11	NW11	NNW9	NNE8	NNE5	NNW6	NNW10	SSW2.4	SSW14
5-Feb	NW12	NW10	NNW12	NW8	NW5	NNW6	NW5	SW8	W3	S4	S3	NE4	E5	ENE5	ENE8	NE7	ENE6	NE6	NE5	ENE5	NE8	NNE6	NE7	NNE11	NNE3.4	NNW12
6-Feb	NNE12	NE11	NE10	NE12	NE11	NE10	NE10	NNE9	NNE9	NNE12	NNE14	NNE16	NNE15	NNE13	NNE16	NNE17	NNE17	NNE16	NNE16	NNE15	NNE14	NNE14	N12	NNE11	NNE12.7	NNE17
7-Feb	NNE9	N8	N7	N6	N5	NNE5	NNE3	ESE5	SE9	SE10	SE10	SSE12	SE9	ESE8	E5	SE7	SE5	SSE3	W1	NW2	NNW2	WNW2	WSW3	S3	ESE2.5	SSE12
8-Feb	N8	NNE9	NNE6	NNE9	NNE10	NE6	N4	WSW2	SSW5	SSW4	S5	SSE4	E4	ENE7	ENE8	NE8	NNE8	N9	N7	NNW6	NNW8	NNW7	N7	N9	NNE4.4	NNE10
9-Feb	N7	N7	N8	N9	N9	N9	N10	NNE7	NE5	NNE7	NNE8	NNE7	NNE4	NNE6	NNE8	NNE10	N9	N8	N8	N6	NNE7	NNE7	NNE5	N5	N7.1	NNE10
10-Feb	N6	NNE9	NNE10	NNE10	N7	NNW6	N7	N5	ENE1	NW9	NNW10	NNW10	NW9	NNW4	NE3	ENE5	NE8	NNE8	NNE8	NNE7	NE2	SSE3	S4	SSE4	N4.4	WNW10
11-Feb	SW3	WSW5	SW8	SW8	SW9	SSW9	SSW7	SSW9	SSW7	S7	S7	S9	S9	SSW8	S10	S11	S11	SSE12	S15	S16	S14	S14	S17	S13	S9.2	S17
12-Feb	S7	S7	S4	SSE7	SSW9	S6	SW7	SW8	SW6	NNW8	NNE11	N9	N6	NNE7	NE9	NE9	NNE9	NNE8	NNE10	NNE10	NNE12	NNE14	NNE15	NNE13	NNE3.8	NNE15
13-Feb	NNE13	NNE12	NNE12	NNE11	NNE8	NNE13	NNE12	NNE11	NNE12	NNE11	NNE11	NNE10	NNE10	N8	NNE8	NNW6	NNW6	ENE5	ESE6	SE12	SE13	SE13	SSE12	SSE12	NE6.4	SE13
14-Feb	SSE13	SSE14	SSE14	SSE14	SSE17	SSE17	SSE16	S14	S16	S16	S14	S14	S15	SSW10	S10	S9	WSW2	N14	NNE14	NNE11	NNE10	NNE6	NE4	NE6	SSE7.0	SSE17
15-Feb	NE6	NE5	NE5	ENE5	ENE6	NE8	NE6	NE8	NNE9	NNE6	NNE5	N5	NE6	NE7	NE9	NE11	NE9	NNE7	NNE7	NE7	NE7	NNE7	NNE9	NNE9	NE7.0	NE11
16-Feb	N7	NNE8	N7	NNE4	NNE5	W2	SW3	SSW5	SW6	NNW1	S4	SSW6	SSE5	SSE6	ESE6	ENE7	NE5	NNE4	WNW5	SW3	WSW5	W6	W4	WSW3	NW0.4	NNE8
17-Feb	SSW3	SW3	S4	SSW7	SSW7	SSW6	SW7	SSW5	S5	S5	S4	SSE5	SE5	SSE6	S5	SE4	SE5	SSE5	SSE3	SW2	SW2	NE1	E2	ESE3	S3.5	SSW7
18-Feb	WNW3	SW2	S1	W2	WNW2	W2	WNW1	SSE2	E2	N1	S2	S5	S4	S7	SSW7	S6	SSW6	SW4	WSW3	SW4	SW3	SSW4	SSW4	SSW5	SSW2.7	SSW7
19-Feb	S5	SSW5	SSW7	S10	S11	S10	S8	S7	SSE4	SSE4	E1	N4	NW4	NW5	NNE5	NNE7	NNE5	NNE8	NNE11	NNE12	NNE15	NNE15	NNE18	NNE18	NE2.4	NNE18
20-Feb	NNE17	NNE14	NNE14	N13	NNE15	NNE12	NNE11	NNE10	NNE12	NNE9	NNE7	ENE7	NE7	NNE7	NNE8	NE9	NE9	NNE10	NNE7	N7	N6	NW3	NW2	NW5	NNE8.7	NNE17
21-Feb	NW6	NW4	NW2	SSW4	SW7	SW6	SW5	SW5	SW4	SSW4	SSE4	SSE4	SE4	SE5	SE6	SE7	SSE8	SSE6	S7	SSW6	SW7	SSW8	SSW8	S10	SSW4.1	S10
22-Feb	S10	S10	S11	S12	S15	S15	S15	S16	S15	S13	SSE13	SSE15	S16	S13	S12	S11	S9	S9	S8	S9	SSW8	SW7	WSW10	NNW10	S10.8	S16
23-Feb	W8	W14	W9	W10	SW7	W7	NNW15	NNW11	NW7	WNW8	NNW10	NE12	NE7	NE6	ENE9	NE12	NNE12	NNE18	NNE19	NNE16	NE16	NE12	NE10	NE10	N6.8	NNE19
24-Feb	NE9	NE8	NNE6	NNE6	NNE6	NE7	NNE9	NNE10	NNE12	NE13	NNE13	NNE15	NNE15	NNE16	NNE17	N18	N17	N18	N20	NNE18	NNE11	NNE9	N8	NNE11.8	N20	
25-Feb	N8	NNW5	WNW4	NW2	NW4	W2	NW4	W3	WSW4	WSW1	SSE5	SE5	SSE4	SSE5	SE5	SE4	SE6	SSE8	SSW8	SSW6	SSW8	SSW8	S9	SSW10	SSW2.4	SSW10
26-Feb	SSW9	S8	SSW9	SSW9	SSW9	S9	S9	SSW10	S10	S11	S12	S12	S12	S12	SSW13	SW12	SSW7	WNW5	N9	N7	N5	N4	N5	N5	SSW5.7	SSW13
27-Feb	N7	NNE10	NNE7	NNW3	NW5	N3	SW3	W4	W3	SSW4	S6	S9	S8	S11	S12	S12	SSW11	SSW9	SSW8	SSW7	S8	SSW8	SSW9	SSW6	SSW4.0	S12
28-Feb	SW5	SW6	SW5	SSW7	WSW15	WSW14	WSW13	WSW11	WSW11	WSW9	SW6	WNW2	NNE7	NNE4	NNE5	WNW13	WNW13	NNW8	N10	N8	N8	N13	N6	NNE5	WNW4.5	WSW15
N1.2 N1.1 N0.9 W0.3 SW1.3 SW1.2WSW1.3 SW1.8SSW1.2 S0.6 SE1.0 SE1.7 ESE1.3 E1.5 ENE2.8 ENE2.5 NE2.3NNE3.5 NNE3.4 NNE2.4 NNE2.3 N1.4 N0.9 NNE1.4																								Diurnal Average		
NNE17 W14 SSE14 SSE14 SSE17 SSE17 SSE16 S16 S16 S16 S14 NNE16 S16 NNE15 NNE16 NNE17 NNE18 NNE18 NNE19 N20 NNE18 NNE15 NNE18 NNE18																								Diurnal Maximum		

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



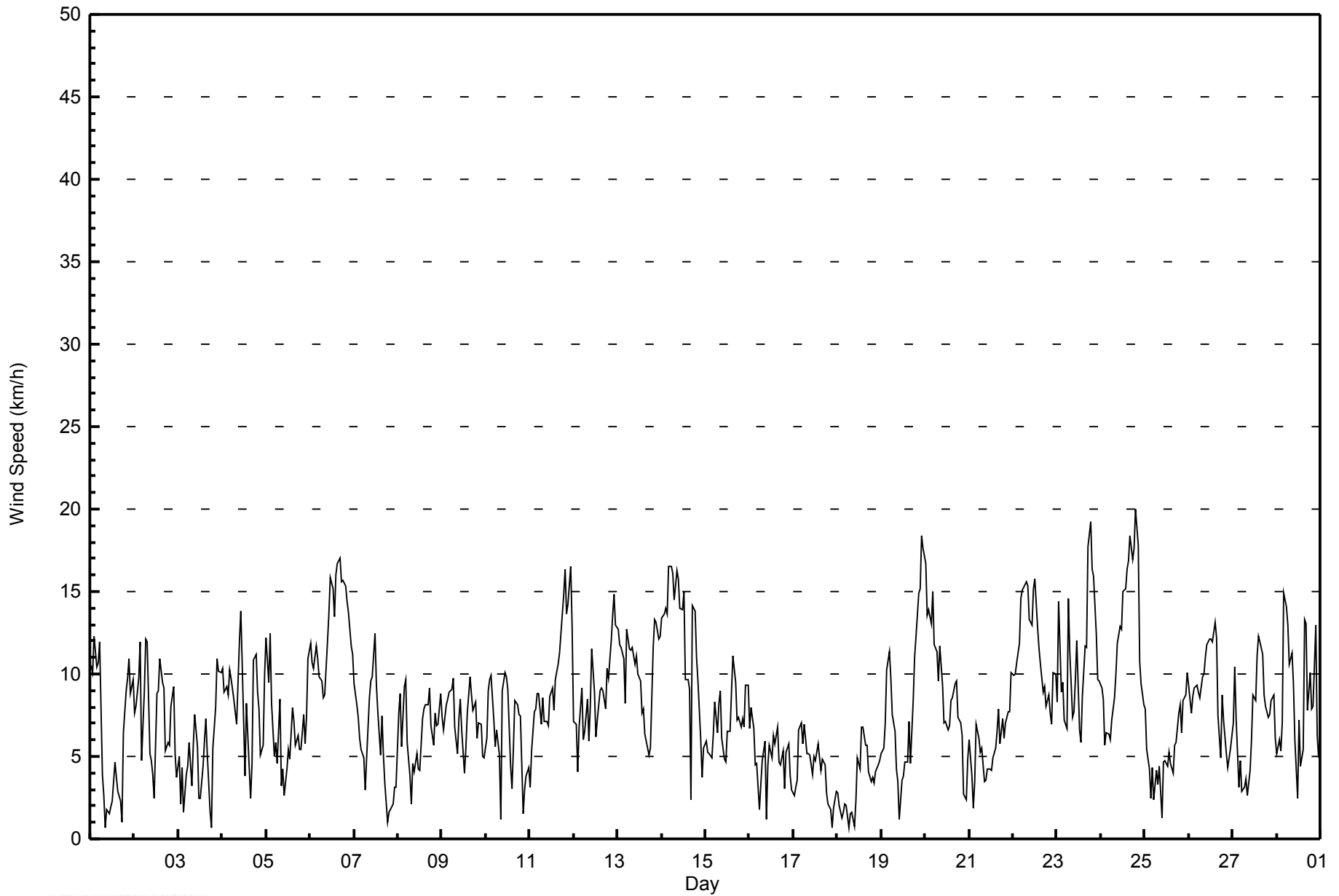


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 6 km/h on Feb 28 19:00														Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0											
Minimum Value: 0 km/h on Feb 17 20:00																									
Percentiles: 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> = 4 P <sub>99</sub> = 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-Feb	2	1	2	2	3	3	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	3
2-Feb	1	2	3	3	2	4	3	3	2	2	3	2	3	2	3	2	3	1	1	1	1	2	2	1	4
3-Feb	1	2	2	1	1	1	1	2	1	2	2	1	2	1	2	2	1	1	2	1	2	2	2	1	2
4-Feb	2	1	1	1	2	1	2	2	2	3	3	4	2	2	2	1	1	3	3	2	2	1	2	5	5
5-Feb	3	2	4	3	1	1	1	1	2	2	1	2	1	2	2	2	2	1	2	2	2	1	3	3	4
6-Feb	3	2	3	3	3	2	2	2	2	3	3	4	4	4	4	4	4	4	4	4	4	3	3	3	4
7-Feb	2	2	1	1	1	1	1	2	2	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	3
8-Feb	3	3	1	3	3	2	2	1	1	1	1	1	2	1	2	2	2	2	1	1	1	1	1	2	3
9-Feb	2	1	2	2	2	2	2	2	1	3	2	2	1	2	2	2	3	2	2	1	2	2	2	2	3
10-Feb	1	3	2	3	2	1	1	2	1	3	2	2	2	2	2	1	3	2	2	2	1	1	1	1	3
11-Feb	2	1	1	1	1	1	1	1	1	2	1	2	2	2	3	3	3	3	4	4	3	4	4	3	4
12-Feb	1	2	1	2	2	2	2	2	2	3	3	3	2	2	2	2	2	2	3	3	3	3	4	3	4
13-Feb	3	4	3	3	3	3	3	3	3	3	3	2	3	2	2	1	2	1	2	4	4	3	4	4	4
14-Feb	4	4	4	4	5	4	4	4	4	4	3	4	2	2	2	3	4	4	5	3	3	2	1	2	5
15-Feb	1	2	1	1	2	3	2	2	3	2	1	1	1	2	2	3	2	2	1	1	2	2	2	2	3
16-Feb	2	3	2	2	1	1	1	1	1	1	1	2	1	1	2	2	1	1	1	2	1	1	1	1	3
17-Feb	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	0	0	1	1	1	1	2
18-Feb	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2	1	1	2	1	1	1	1	1	1	2
19-Feb	1	1	2	3	2	2	2	1	1	1	1	1	1	1	1	2	1	3	3	3	4	4	5	4	5
20-Feb	4	3	4	4	4	3	3	3	4	3	2	2	2	2	2	2	2	2	1	1	1	1	0	2	4
21-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	2	2
22-Feb	1	1	1	2	3	3	2	3	3	3	3	3	3	3	3	2	2	2	2	2	2	3	2	2	3
23-Feb	2	4	3	3	2	3	4	2	3	2	3	3	2	2	2	3	3	5	5	5	4	3	2	2	5
24-Feb	2	2	2	1	1	1	2	2	2	3	3	3	4	4	4	4	5	4	5	5	5	3	2	2	5
25-Feb	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2
26-Feb	2	1	2	1	1	1	1	2	2	3	3	3	3	3	4	5	3	2	2	1	1	1	1	2	5
27-Feb	3	3	2	2	1	1	1	1	1	1	1	2	2	3	3	2	2	2	2	2	3	2	1	1	3
28-Feb	1	1	2	2	4	4	4	3	3	2	2	1	4	3	3	3	4	3	6	3	2	4	2	2	6
														Diurnal Maximum											



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - February 2015**





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

**Wind Speed (WS) - km/h**  
**CNRL Horizon - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	203	30.21	30.21
6 - 11	346	51.49	81.70
12 - 19	122	18.15	99.85
20 - 28	1	0.15	100.00
29 - 38	0	0.00	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**CNRL Horizon - February 2015**

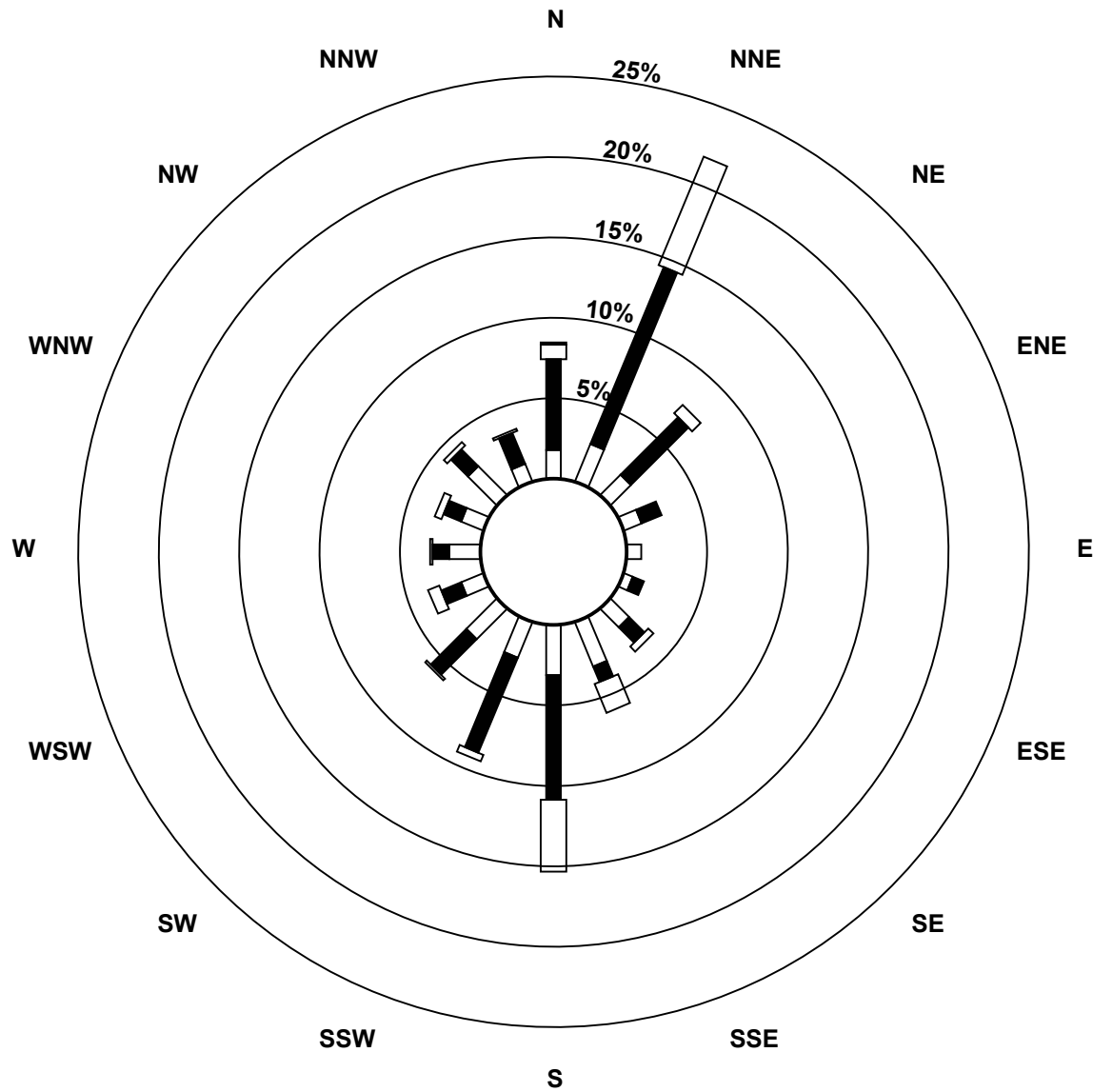
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	12	17	12	8	6	4	11	20	21	16	18	10	13	10	17	8	203
6 - 11	38	80	34	9	0	5	9	7	52	43	21	9	7	8	10	14	346
12 - 19	6	49	5	0	0	0	3	13	30	3	1	5	1	3	2	1	122
20 - 28	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
29 - 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	57	146	51	17	6	9	23	40	103	62	40	24	21	21	29	23	672

Total Number of Valid Hours: 672

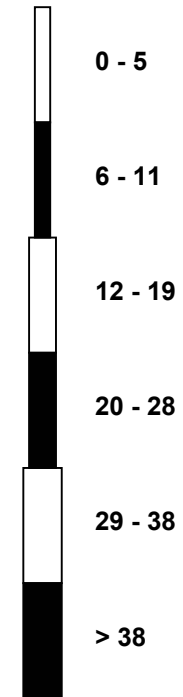
Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
CNRL Horizon (AMS 15)**



**Classes (km/h)**



**Total Number of Valid Hours: 672**



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

**Wind Direction (WD) - deg**  
**CNRL Horizon - February 2015**

Direction of Maximum Speed: 10 deg on Feb 24 20:00 Direction of Maximum Daily Speed Average: 23.1 deg on Feb 6	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0
Direction of Minimum Speed: 43 deg on Feb 17 22:00 Direction of Minimum Daily Speed Average: 0.4 deg on Feb 16	Percent Operational Time: 100.0
Monthly Average Direction: 234.2 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-Feb	180	172	183	178	179	185	172	125	43	25	15	189	311	191	91	163	152	189	221	238	253	247	222	192	196.0	
2-Feb	198	180	265	299	281	256	243	252	231	232	242	293	287	292	293	302	305	278	264	220	235	250	274	313	263.7	
3-Feb	225	329	15	209	333	340	347	324	1	32	38	110	137	153	130	119	112	62	168	195	209	191	192	176	155.5	
4-Feb	173	165	176	187	196	185	197	185	175	191	212	216	210	41	63	38	321	323	317	333	30	17	338	329	212.5	
5-Feb	319	308	347	323	304	327	305	220	268	181	175	51	97	64	71	53	77	51	55	62	43	32	36	29	14.9	
6-Feb	33	34	43	50	42	42	34	28	23	15	19	23	22	16	17	21	16	17	16	18	17	16	11	12	23.1	
7-Feb	15	8	10	11	7	25	30	119	141	141	144	149	133	121	83	132	142	158	275	319	336	285	249	188	104.3	
8-Feb	3	25	23	29	29	41	10	248	213	205	179	148	79	68	69	50	23	11	8	343	332	345	351	9	22.1	
9-Feb	4	356	4	4	3	4	356	20	44	18	12	25	24	16	26	16	6	360	3	11	21	14	13	7	10.8	
10-Feb	10	17	21	17	11	347	359	4	65	316	300	299	305	330	34	76	34	29	23	18	45	166	187	162	1.0	
11-Feb	226	256	225	220	221	211	192	208	195	187	179	173	172	192	171	183	171	165	170	172	173	172	179	184	185.7	
12-Feb	187	177	172	166	208	188	215	226	236	346	19	9	7	32	37	53	28	24	27	29	29	24	21	27	27.2	
13-Feb	23	25	25	27	19	23	24	20	26	29	26	28	28	360	19	345	347	76	120	133	136	136	147	150	45.4	
14-Feb	151	150	152	162	168	164	165	171	169	173	174	179	189	192	189	187	247	8	20	25	28	31	43	48	158.5	
15-Feb	39	44	50	66	64	41	42	35	26	33	31	1	35	44	42	39	38	32	27	26	36	19	22	15	34.8	
16-Feb	9	20	6	13	17	276	216	211	223	333	174	195	159	156	104	65	55	20	299	235	250	277	259	246	306.7	
17-Feb	206	230	173	203	206	211	219	207	190	180	177	166	135	162	172	131	144	165	149	218	233	43	91	104	180.9	
18-Feb	282	217	180	281	286	261	299	153	95	1	180	176	187	191	192	181	196	216	245	235	226	200	198	193	204.4	
19-Feb	188	192	196	191	185	181	180	170	156	165	81	352	324	324	29	25	13	17	28	27	22	20	18	21	37.0	
20-Feb	20	15	13	11	13	14	17	19	22	20	30	63	43	29	29	35	40	32	18	358	3	315	323	316	19.0	
21-Feb	317	318	324	213	215	216	228	218	214	199	164	161	136	137	132	124	155	165	188	211	220	207	202	186	192.1	
22-Feb	172	174	179	175	182	183	179	181	182	180	168	165	182	182	173	183	190	190	184	184	198	214	242	294	184.6	
23-Feb	280	268	281	272	225	263	314	311	325	300	342	37	39	41	59	35	29	24	16	20	40	42	34	41	359.4	
24-Feb	38	34	19	18	28	32	35	31	25	27	34	26	13	21	23	12	11	2	6	10	15	14	24	360	18.5	
25-Feb	353	338	300	325	311	268	318	263	251	244	164	140	159	157	140	127	126	133	165	196	211	196	189	199	192.6	
26-Feb	198	191	197	196	193	184	189	192	188	182	183	176	178	186	205	215	212	286	353	356	356	349	2	4	197.9	
27-Feb	11	19	26	339	319	351	221	266	270	201	174	179	178	175	175	180	192	209	202	197	182	203	211	209	195.5	
28-Feb	228	217	231	208	248	244	248	248	246	239	232	302	16	27	12	303	295	328	6	11	356	8	8	32	288.4	
	1.0	10.2	1.7	271.6	231.2	218.9	253.1	221.7	194.2	181.4	136.3	123.9	104.5	95.9	77.7	59.8	34.7	18.1	12.2	14.9	17.2	5.2	359.3	20.9		
Diurnal Average																										

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



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

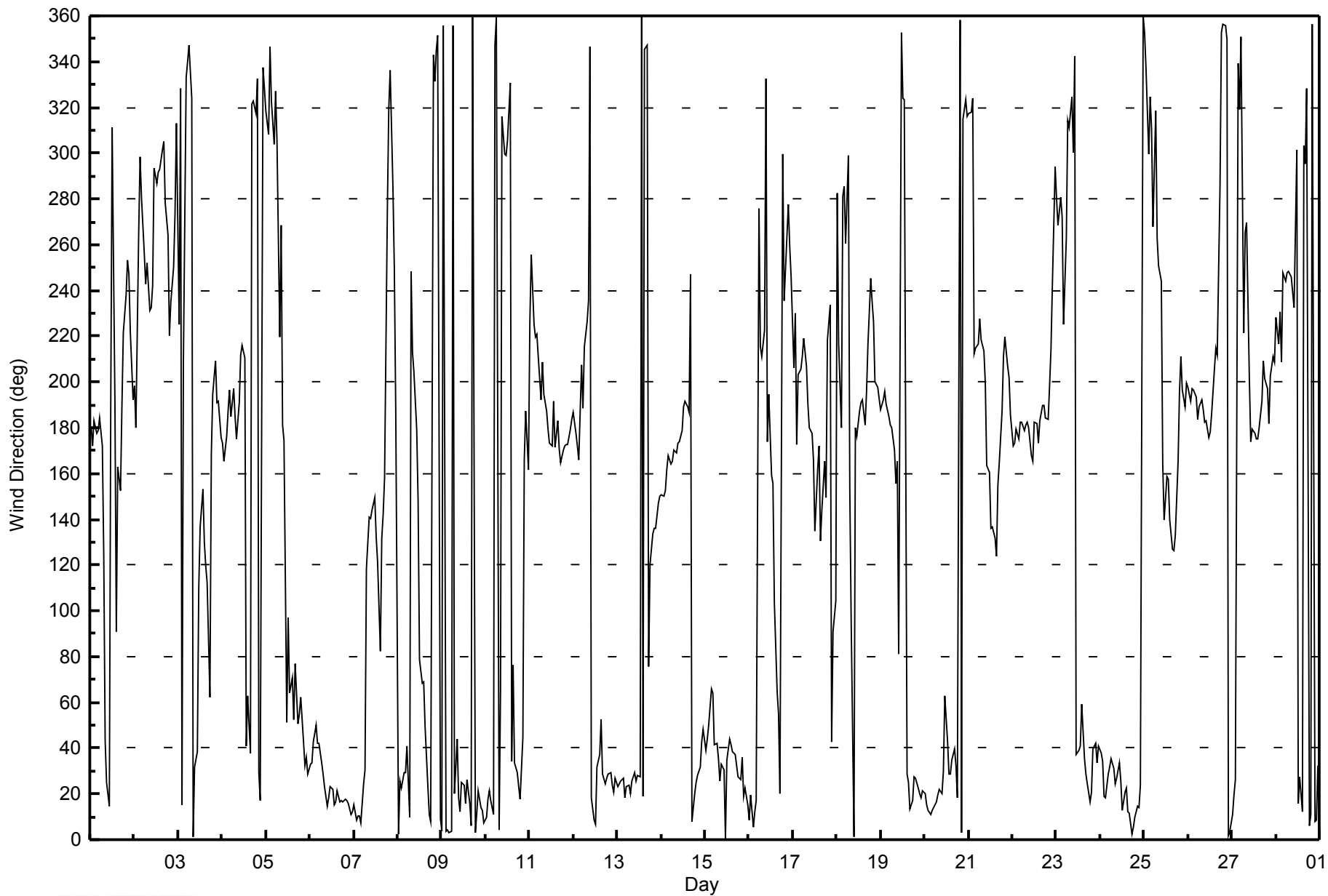
**Wind Direction (WD) - deg**  
**CNRL Horizon - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 98 deg on Feb 3 19:00 Minimum Value: 6 deg on Feb 11 06:00 Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 12 Q <sub>1</sub> = 15 Median = 18 Q <sub>3</sub> = 23 P <sub>90</sub> = 38 P <sub>99</sub> = 84																		Hours in Service: 672 Hours of Data: 672 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-Feb	12	10	11	11	14	13	52	38	87	49	76	62	59	27	45	33	25	61	12	15	13	13	20	13	87
2-Feb	15	15	30	19	51	35	15	15	34	24	71	74	24	19	17	17	11	16	18	22	20	12	54	40	74
3-Feb	15	67	14	43	15	14	17	38	22	19	29	67	70	29	23	18	15	43	98	15	11	11	10	9	98
4-Feb	13	10	12	11	13	13	15	15	18	16	15	24	82	23	26	45	22	14	14	28	14	19	22	18	82
5-Feb	16	14	15	20	16	20	42	12	78	38	38	33	34	50	18	20	22	13	14	17	14	13	16	17	78
6-Feb	15	17	17	15	16	15	16	17	18	17	18	18	19	19	17	18	16	18	17	18	17	16	17	16	19
7-Feb	15	15	15	14	13	15	42	24	18	20	20	21	23	19	35	23	24	20	54	39	50	20	20	36	54
8-Feb	28	16	16	15	16	19	22	45	14	19	18	34	48	19	18	17	20	14	13	11	13	10	13	13	48
9-Feb	12	11	14	16	16	16	17	19	14	19	18	19	26	21	21	17	16	16	16	16	19	17	30	22	30
10-Feb	19	19	18	18	13	11	15	20	88	32	14	14	22	33	61	23	18	14	11	14	58	24	18	18	88
11-Feb	26	16	8	9	7	6	11	12	13	17	16	17	18	21	18	17	17	15	15	16	14	15	14	15	26
12-Feb	16	14	15	21	19	28	18	18	30	31	18	19	22	27	20	22	20	17	16	17	17	18	18	18	31
13-Feb	18	19	19	17	21	18	18	19	19	20	18	20	21	19	26	18	21	31	18	20	20	20	19	20	31
14-Feb	18	18	18	17	16	16	16	15	15	15	15	18	16	19	17	23	75	19	18	17	16	20	20	17	75
15-Feb	18	20	18	20	19	17	17	18	17	21	28	35	22	29	18	17	18	12	12	13	18	17	17	16	35
16-Feb	26	29	16	32	21	60	36	14	9	85	33	28	53	21	44	21	24	26	19	36	14	13	21	14	85
17-Feb	27	45	36	12	9	10	7	13	14	18	38	21	32	31	30	30	28	13	12	41	29	88	54	45	88
18-Feb	30	60	78	37	44	31	75	37	68	85	52	38	36	27	22	24	21	24	13	12	16	14	16	14	85
19-Feb	13	16	15	17	14	12	13	14	18	31	91	25	31	22	30	19	19	18	18	17	17	17	17	18	91
20-Feb	17	18	18	19	17	19	19	18	19	21	28	32	33	25	21	17	14	14	16	12	14	26	21	14	33
21-Feb	12	15	49	17	8	10	8	10	19	30	24	34	49	32	29	21	16	16	12	12	9	9	11	12	49
22-Feb	9	11	8	9	12	11	12	12	13	14	15	13	16	17	16	14	19	16	12	12	22	35	13	22	35
23-Feb	20	17	21	20	22	30	14	15	30	28	36	18	22	27	23	17	18	18	18	21	15	17	18	14	36
24-Feb	14	16	19	16	15	14	13	15	17	16	15	19	17	18	17	18	18	18	18	18	17	17	17	15	19
25-Feb	10	16	13	51	18	41	25	20	19	72	30	37	41	29	39	45	20	11	10	11	11	13	9	12	72
26-Feb	10	10	13	12	10	8	9	12	13	14	14	16	17	19	23	21	26	35	32	14	17	16	21	19	35
27-Feb	19	17	15	42	21	20	67	15	36	34	20	18	29	16	17	15	16	17	17	17	20	12	16	12	67
28-Feb	22	11	42	29	19	19	18	17	17	16	26	71	58	64	51	20	22	35	24	17	18	21	17	46	71
	30	67	78	51	51	60	75	45	88	85	91	74	82	64	61	45	75	61	98	41	58	88	54	46	
	Diurnal Maximum																								



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**CNRL Horizon - February 2015**







# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL	Station Number	15
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:10
Barometric Pressure	745 mmHg	Station temp.	20 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Cal Gas Concentration	50.3 ppm	Cal Gas Expiry Date	11/6/2014
Gas Cert Reference	LL107945		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
DACS voltage range	ethernet connection	DACS channel #	192.168.1.43

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-622	-622
Analyzer Range (mv)	1000	1000	Lamp voltage	845	845
Calculated slope	1.001829	1.005666	Chamber temp.	44.9	45.1
Calculated intercept	1.134472	0.339146	Pressure (mmHg)	709.4	723.7
Analyzer Background	17.5	17.5	Flow (lpm)	0.428	0.437
Analyzer Coefficient	0.933	0.933	Intensity	91	91

Analyzer make 43i Analyzer serial # 10710321322

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.3	NA
as found span	5000	82.3	827.9	822.5	1.007
calibrator zero	5000	0.0	0.0	-0.3	NA
high point	5000	82.3	827.9	822.5	1.007
second point	5000	41.2	414.5	413.1	1.003
third point	5000	20.6	207.2	204.8	1.012
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	5000	82.3	827.9	829.0	0.999
Average Correction Factor					1.007

Corrected As found 822.8 Previous response 825.3 % change 0.3%

#### Notes:

No adjustment required.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

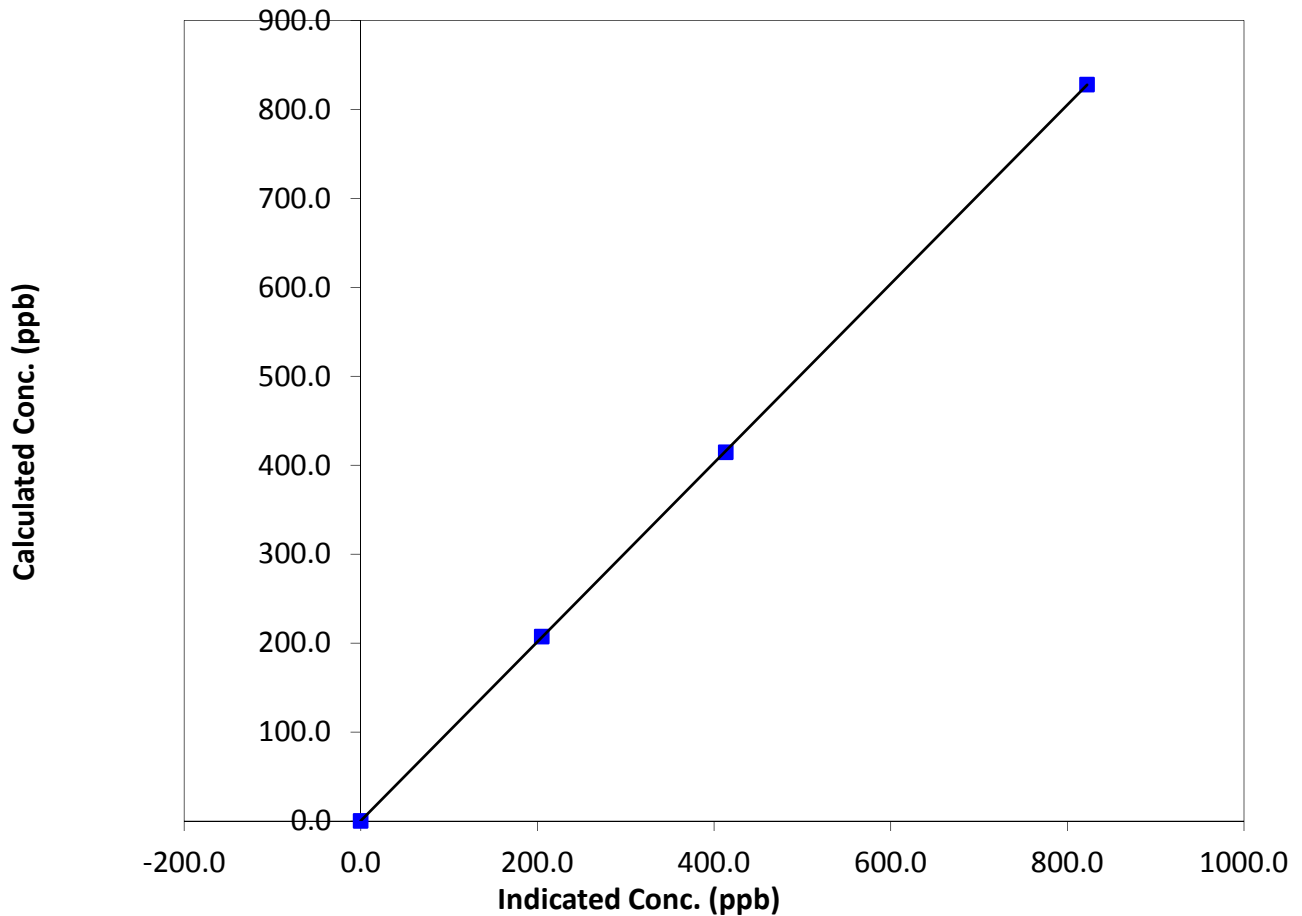
### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL	Station Number	15
Start Time (MST)	10:10	End Time (MST)	14:10
Analyzer make	43i	Analyzer serial #	10710321322

### Calibration Data

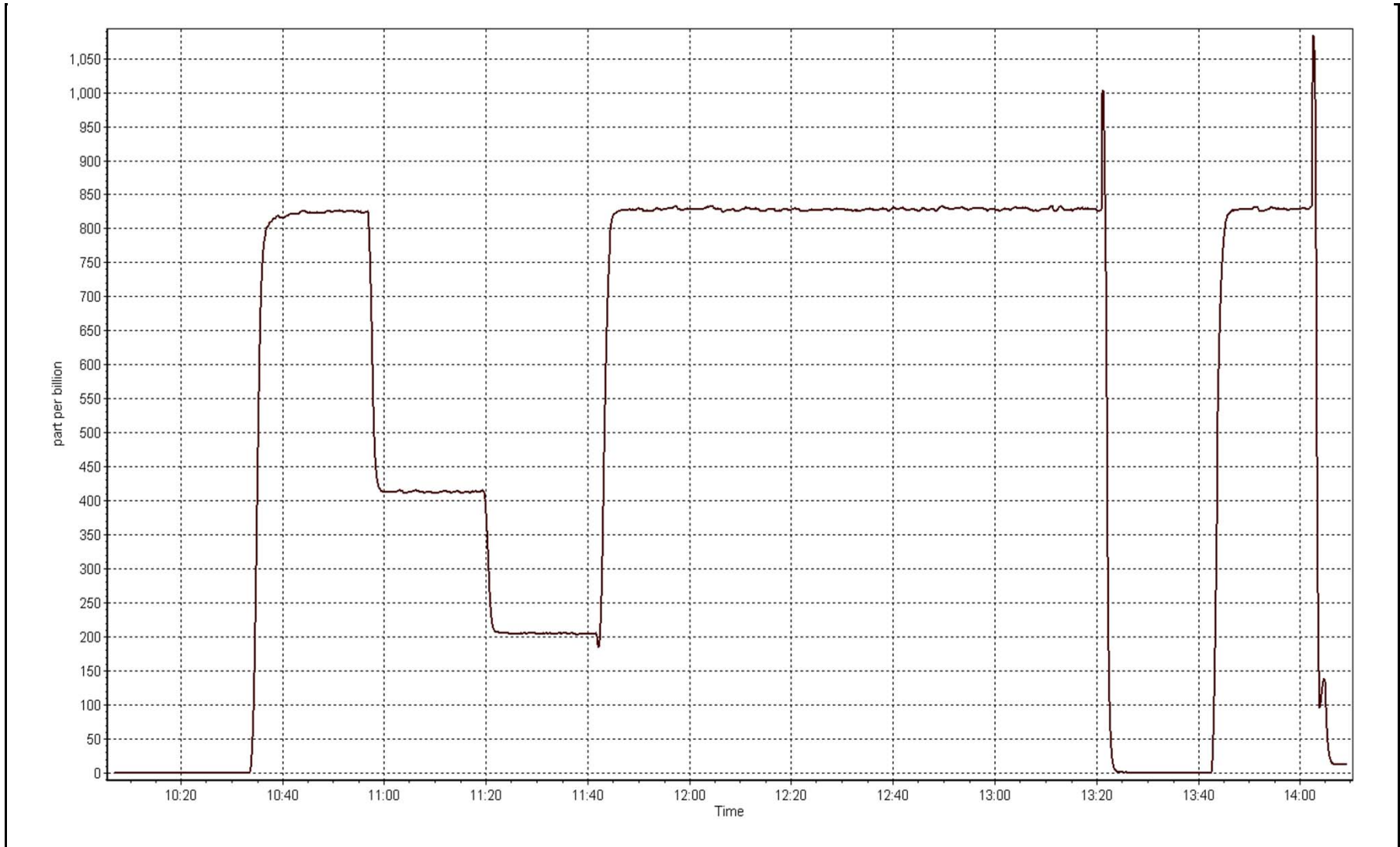
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999992
827.9	822.5	1.0066		
414.5	413.1	1.0032	Slope	1.005666
207.2	204.8	1.0119		
			Intercept	0.339146

**SO<sub>2</sub> Calibration Curve**



SO2 Calibration Plot

Date: February 11, 2015





# Wood Buffalo Environmental Association

## TRS Calibration Report

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	January 13, 2015
Station Name	CNRL Horizon	Station Number	15
Reason:	Routine		
Start Time (MST)	10:45	End Time (MST)	13:35
Barometric Pressure	n/a mmHg	Station temp.	25 Deg C
Calibrator Make/Model	Sabio 4010	Serial number	LL155297
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	5-30-2013
Gas Cert Reference	cc257967	SO2 gas conc.	50.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
DACS voltage range	Ethernet connection	DACS channel #	192.168.1.44

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-672	-672
Analyzer Range (input)	100	100	Lamp voltage	770	770
Calculated slope	0.986275	1.005657	Chamber temp.	45	45
Calculated intercept	0.008050	0.058943	Pressure	695.8	702.0
Analyzer Background	9.1	8.8	Flow	0.422	0.426
Analyzer Coefficient	0.918	0.889	Intensity	90	90
			Converter temp.	809	809

Analyzer make/model	TEI 431	Analyzer serial #	0710321323
Converter make/model	NOVA model CDN101	Converter serial #	363

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.0	NA
as found span	5000	38.5	80.1	81.7	0.980
SO2 scrubber check	5000	19.9	200.2	0.7	NA
calibrator zero	5000	0.0	0.0	0.0	NA
high point	5000	38.5	80.1	79.5	1.007
second point	5000	19.2	39.9	39.9	1.001
third point	6000	11.6	20.1	19.7	1.021
calibrator zero					
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	38.5	80.1	79.4	1.009
Average Correction Factor					1.010

Corrected As found	81.7	Previous response	81.2	% change	-0.7%
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#### Notes:

Adjusted span.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

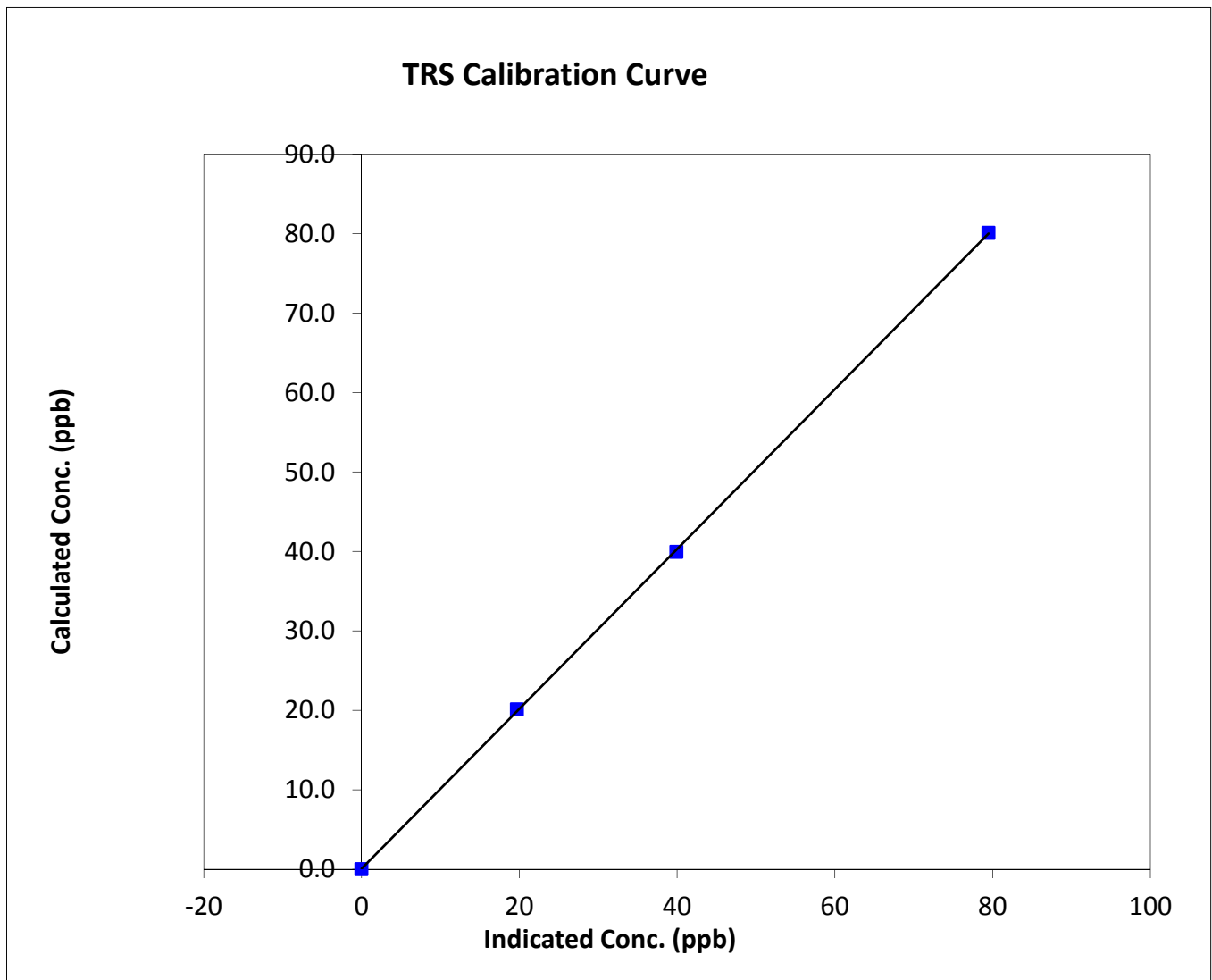
## TRS Calibration Summary

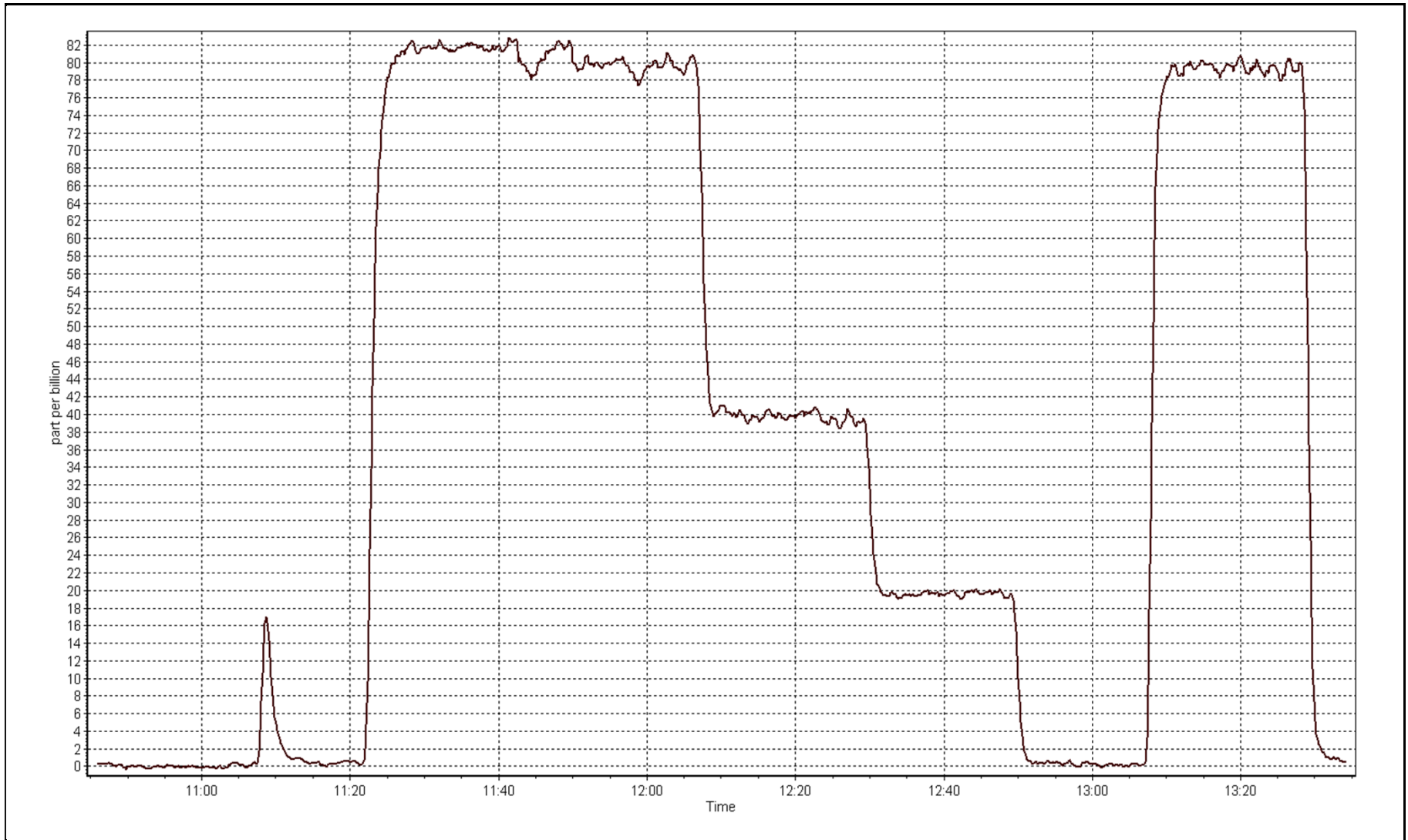
### Station Information

Calibration Date	February 10, 2015	Previous Calibration	January 13, 2015
Station Name	CNRL Horizon	Station Number	15
Start Time (MST)	10:45	End Time (MST)	13:35
Analyzer make	TEI 43I	Analyzer serial #	0710321323

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.0	N/A	Correlation Coefficient	0.999963
80.1	79.5	1.0073		
39.9	39.9	1.0007	Slope	1.005657
20.1	19.7	1.0206		
			Intercept	0.058943







# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:10
Barometric Pressure	745 mmHg	Station temp.	22 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	10880507
Gas Cert Reference	LL107945	Cal Gas Expiry Date	11/6/2014
CH4 Cal Gas Conc.	490.0 ppm	CH4 Equiv Conc.	1062.0 ppm
C3H8 Cal Gas Conc.	208 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2580
DACS voltage range	ethernet connection	DACS channel #	192.168.1.51

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.7	8.7
Analyzer Range (mv)	25	25	Air or Bypass press	37.2	37.3
Calculated slope	1.001157	0.987201	Fuel Pressure	26.3	26.3
Calculated intercept	-0.019652	-0.070671			

Analyzer make Thermo 51i Analyzer serial # 1327059295

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.05	N/A
as found span	5000	82.3	17.48	17.76	0.984
calibrator zero	5000	0.0	0.00	0.05	N/A
high point	5000	82.3	17.48	17.76	0.984
second point	5000	41.2	8.75	8.97	0.976
third point	5000	20.6	4.38	4.51	0.970
calibrator zero					
as left zero	5000	0.0	0.00	0.04	N/A
as left span	5000	82.3	17.48	17.79	0.983
Average Correction Factor					0.977

Corrected As found 17.71 Previous response 17.48 % change -1.3%

#### Notes:

no adjustments required.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## THC Calibration Summary

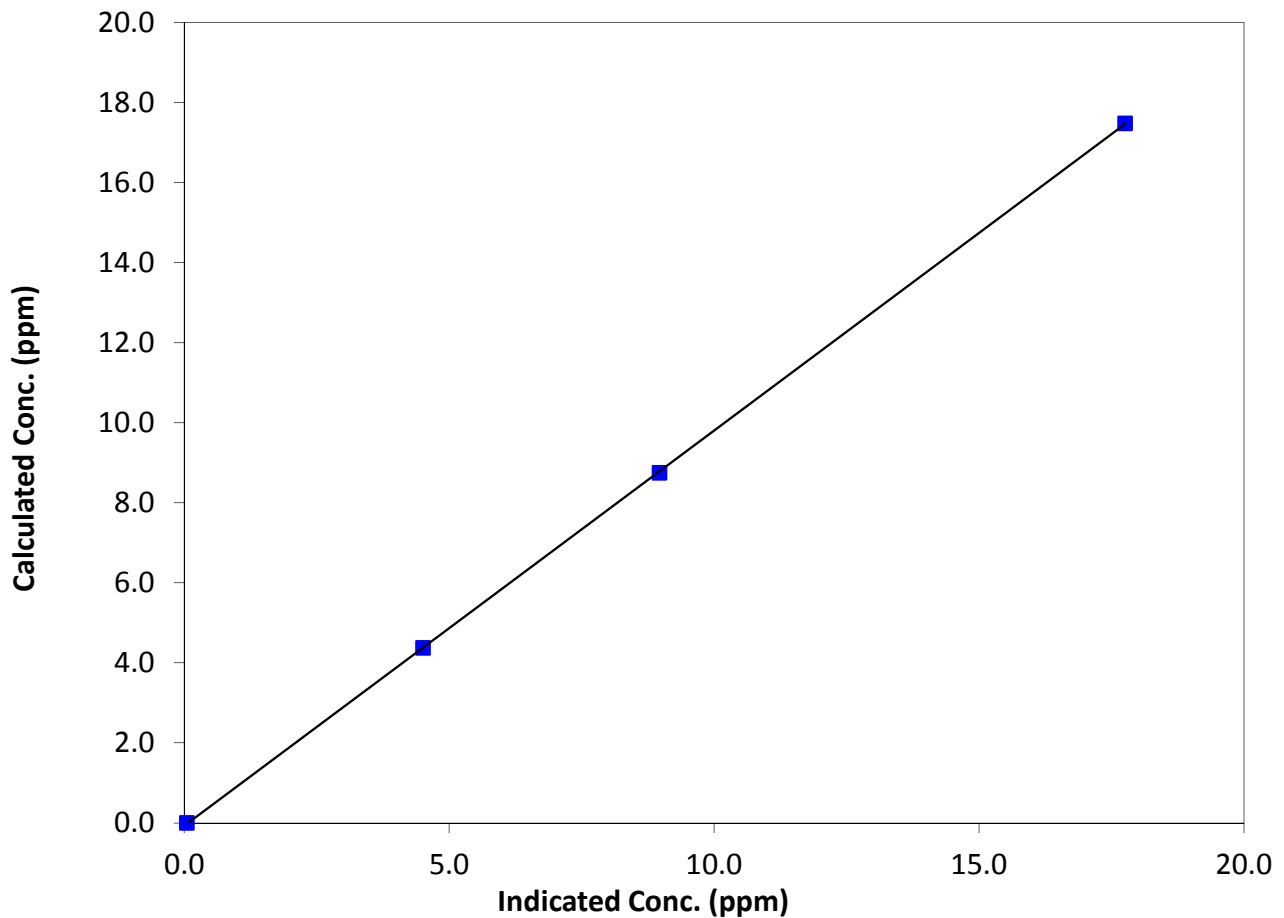
### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:10
Analyzer make	Thermo 51i	Analyzer serial #	1327059295

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.05	N/A	Correlation Coefficient	0.999988
17.48	17.76	0.9843		
8.75	8.97	0.9756	Slope	0.987201
4.38	4.51	0.9702		
			Intercept	-0.070671

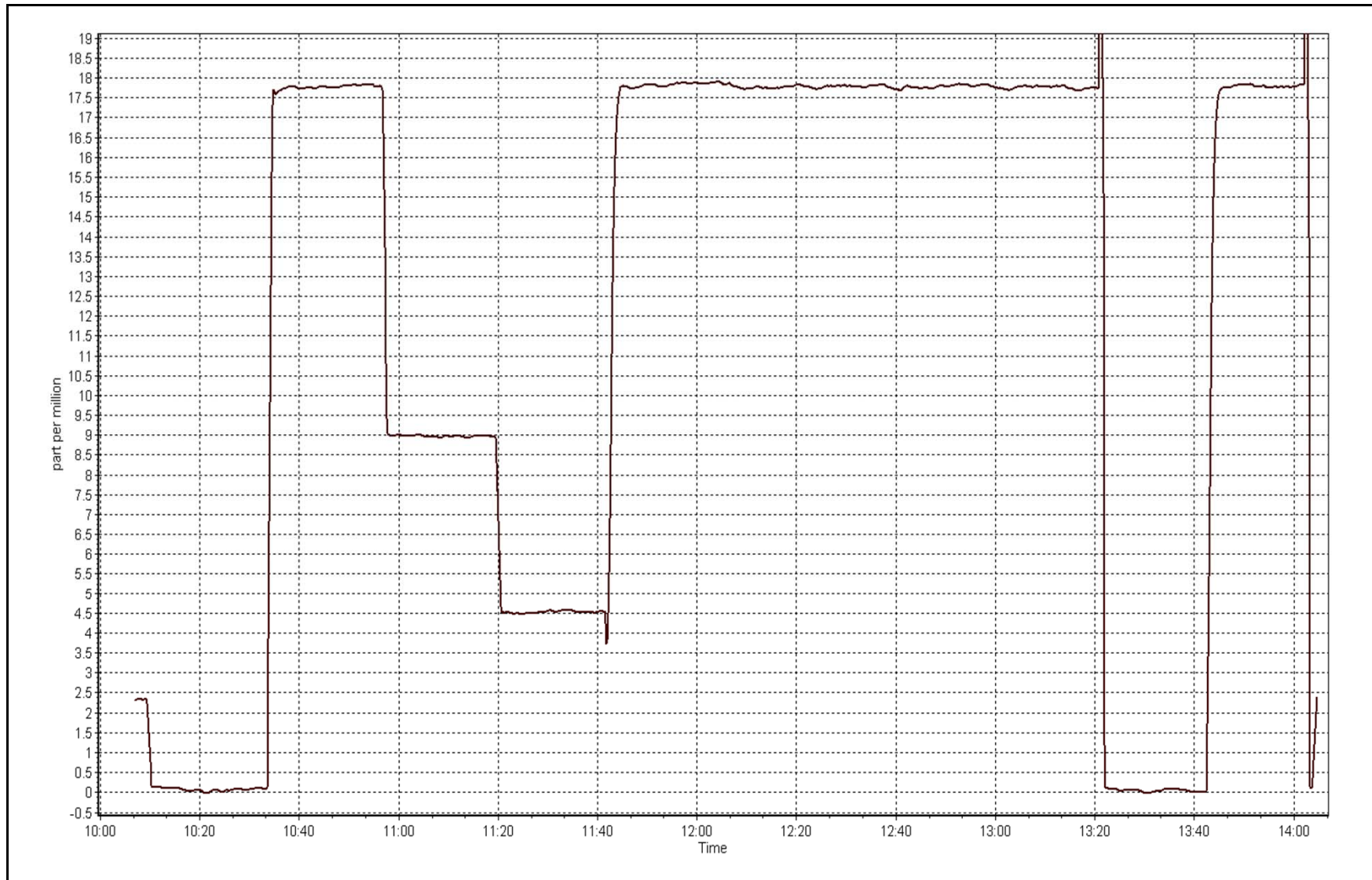
### THC Calibration Curve





THC Calibration Plot

Date: February 11, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Reason:	Routine		
Start Time (MST)	10:10	End Time (MST)	14:10
Barometric Pressure	745 mmHg	Station Temperature	22.0 Deg C
Calibrator	Sabio 4010	Serial Number	10880507
NO Cal Gas Conc	48.6 ppm	Cal Gas Expiry Date	November 6, 2014
NOx Cal Gas Conc	48.6 ppm	Cal Gas Serial #	LL107945

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 2632

Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.991465	0.993761	0.994629
	Data Offset	0.220430	0.162727	0.067304
After	Data Slope	0.983395	0.983646	0.990558
	Data Offset	0.782557	0.730198	-0.480559
Channel #		ethernet connection		
IP address		192.168.1.42		

### Analyzer Information

Analyzer make/model 42i      Analyzer serial # 710321429

Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.798	ppb	0.798	ppb
NOX coefficient	1.003	ppb	1.003	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	9.5		9.5	
NOX bkgrnd	9.9		9.9	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	325.5	Deg C	325.0	Deg C
PMT Temp	-3.0	Deg C	-3.0	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	166.5	mmHg	168.6	mmHg
Sample Flow	0.722	ccm	0.734	ccm

**Notes:**

No adjustments required.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 11, 2015

Station Number:

AMS 15

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.3	-0.3	N/A	N/A
as found span	5000	82.3	800.0	800.0	0.0	812.8	812.8	0.0	0.9842	0.9842
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.3	-0.3	N/A	N/A
high point	5000	82.3	800.0	800.0	0.0	812.8	812.8	0.0	0.9842	0.9842
second point	5000	41.2	400.5	400.5	0.0	406.8	406.5	0.3	0.9844	0.9852
third point	5000	20.6	200.2	200.2	0.0	201.6	201.4	0.2	0.9933	0.9941
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	2.0	2.2	-0.2	N/A	N/A
as left span	5000	82.3	800.0	398.0	402.0	808.2	396.7	411.5	0.9898	1.0033
Average Correction Factor									0.9873	0.9878

Corrected As found NO<sub>x</sub>= 812.8 NO= 812.6 Percent Change NO<sub>x</sub>= -0.8% NO= -1.0%  
 Previous Response NO<sub>x</sub>= 806.6 NO= 804.8

### 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 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			-0.3			N/A	
1st NO <sub>2</sub> (300)	N/A	398.0	410.1	811.9	398.0	413.9	0.9693	1.0000	0.9908	100.9%
2nd NO <sub>2</sub> (200)	N/A	532.7	275.4	811.5	532.7	278.9	0.9698	1.0000	0.9877	101.2%
3rd NO <sub>2</sub> (100)	N/A	667.0	141.1	811.0	667.0	144.0	0.9704	1.0000	0.9800	102.0%
4th NO <sub>2</sub> (0)	808.1	N/A	2.8	810.9	808.1	2.8	0.9706	1.0000	N/A	N/A
Average Correction Factor							0.9700	1.0000	0.9862	101.4%

Calibration Performed By: Michael Martineau



# Wood Buffalo Environmental Association

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

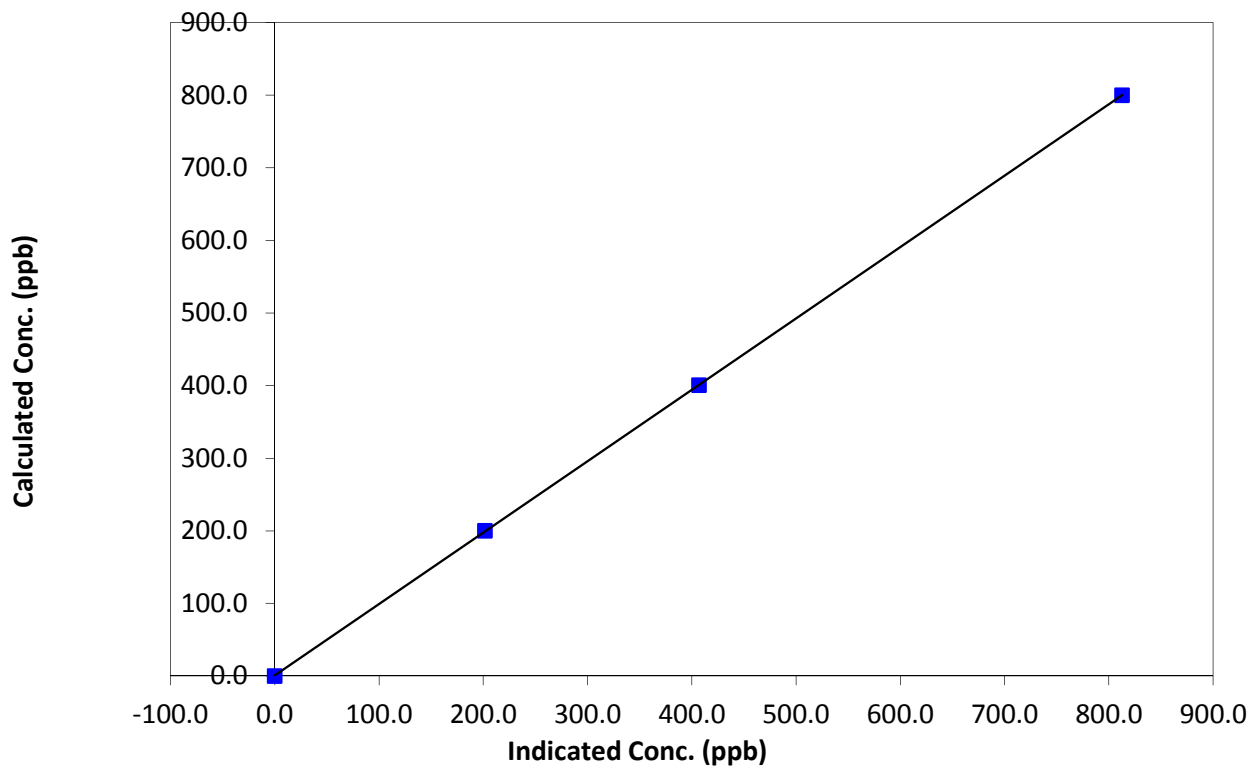
### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:10
Analyzer make	42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
800.0	812.8	0.9842		
400.5	406.8	0.9844	Slope	0.983395
200.2	201.6	0.9933		
			Intercept	0.782557

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

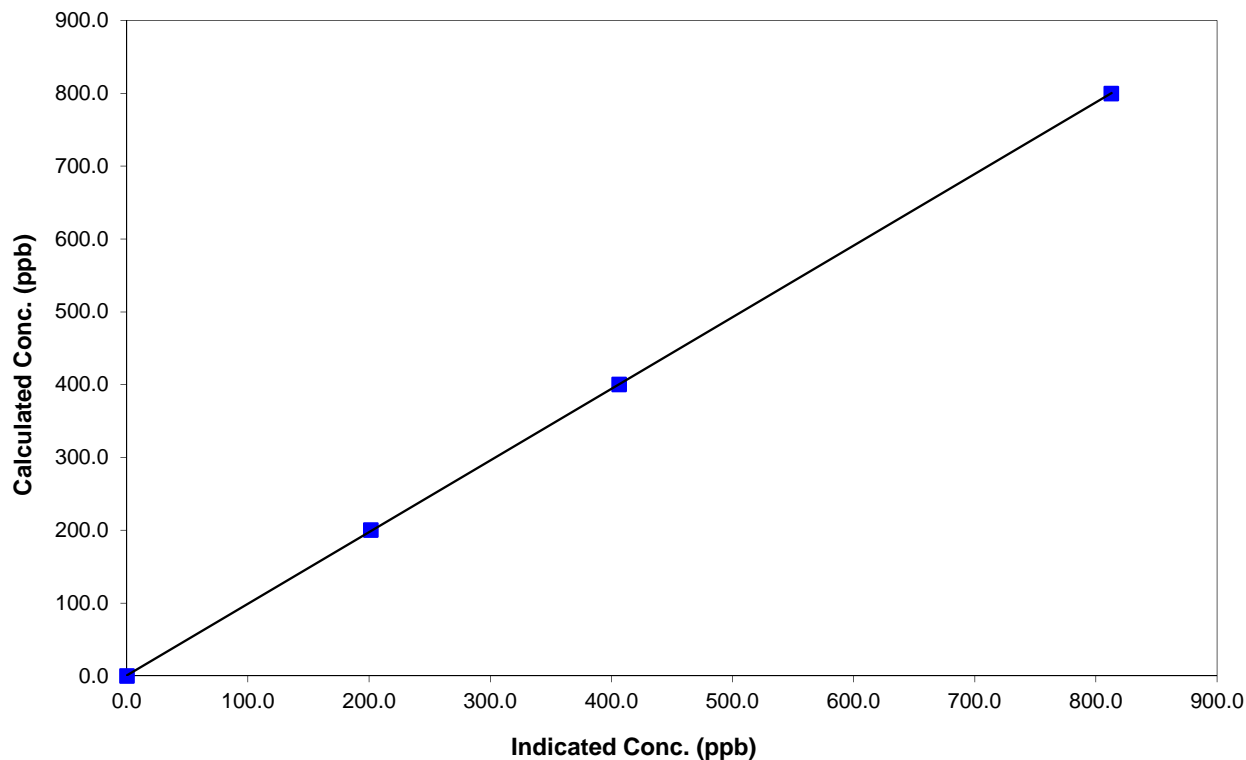
### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Name	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:10
Analyzer make	42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999992
800.0	812.8	0.9842		
400.5	406.5	0.9852	Slope	0.983646
200.2	201.4	0.9941		
			Intercept	0.730198

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

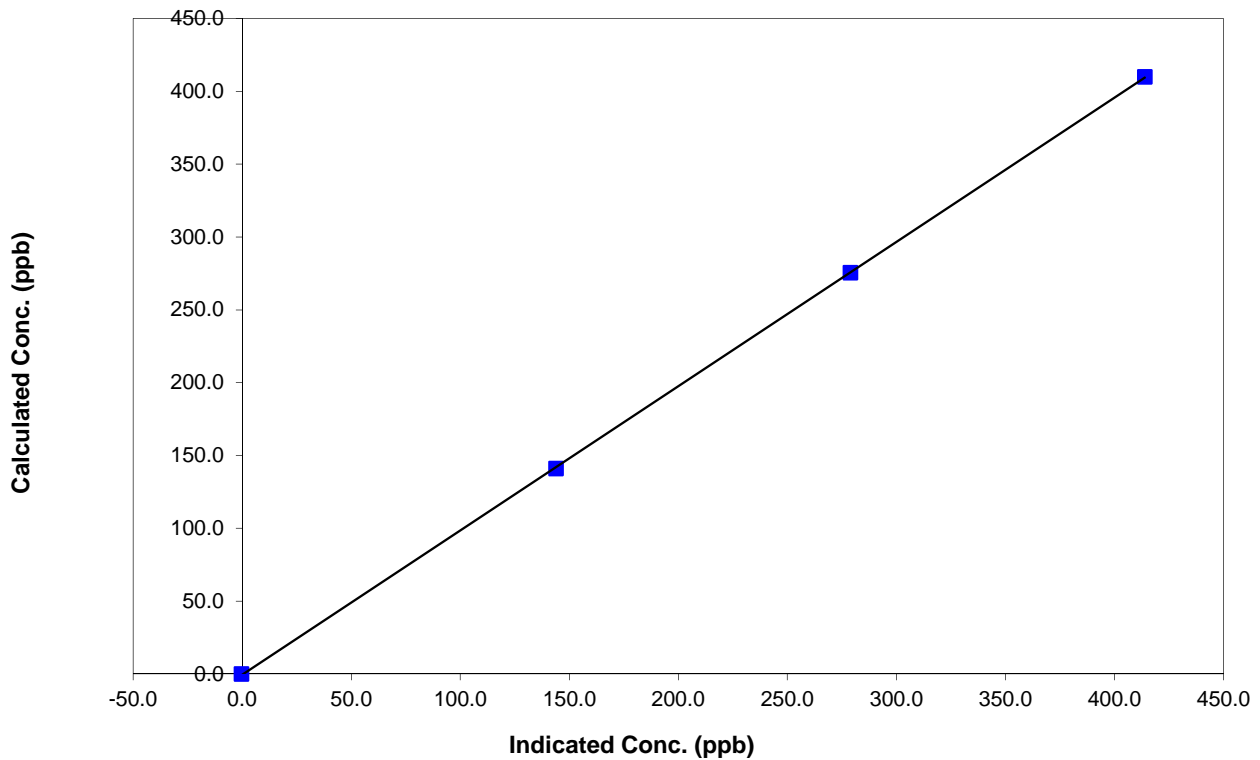
### Station Information

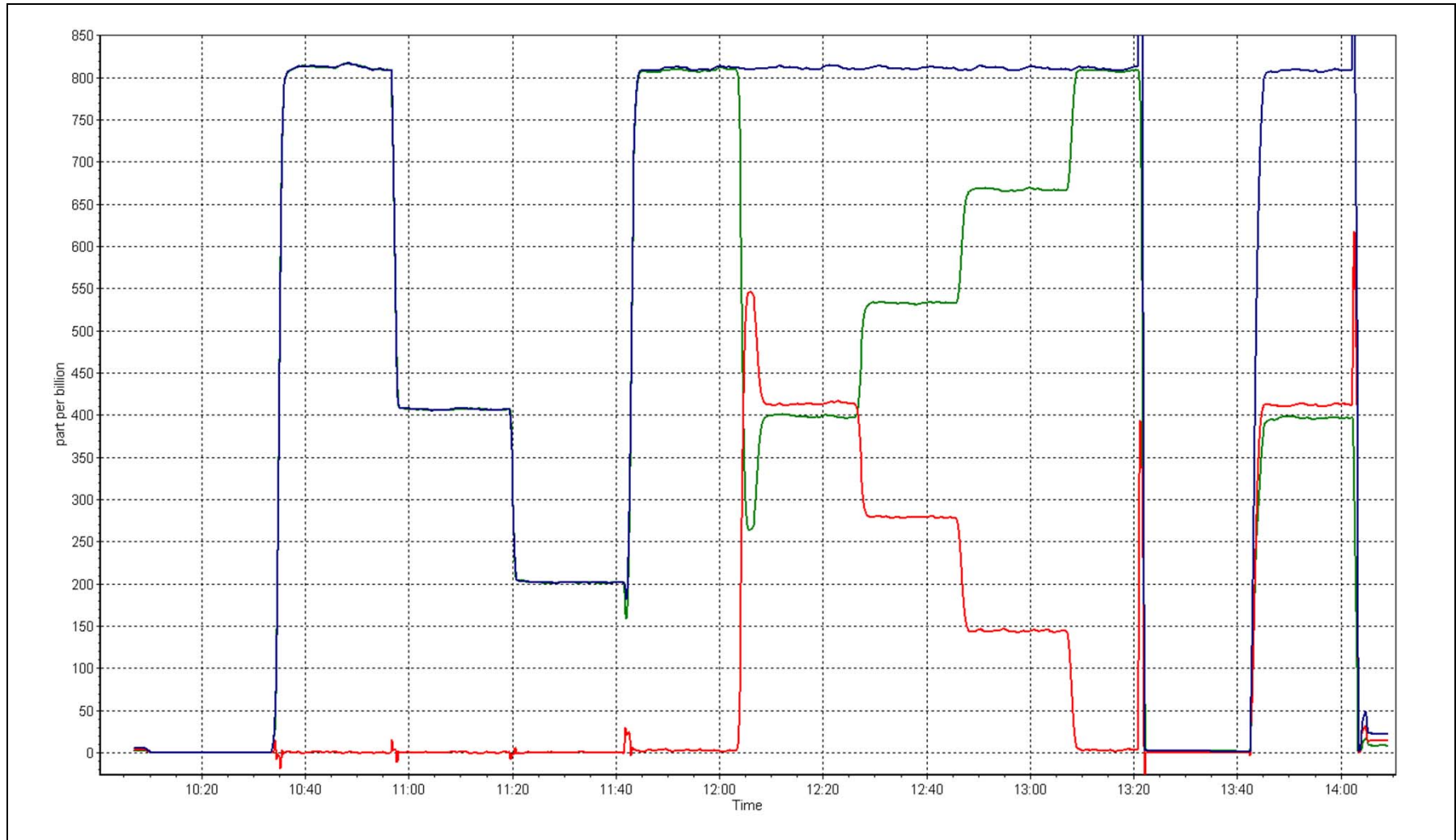
Calibration Date	February 11, 2015	Previous Calibration	January 14, 2015
Station Number	CNRL Horizon	Station Number	AMS 15
Start Time (MST)	10:10	End Time (MST)	14:10
Analyzer make	42i	Analyzer serial #	710321429

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.3	N/A	Correlation Coefficient	0.999977
410.1	413.9	0.9908		
275.4	278.9	0.9877	Slope	0.990558
141.1	144.0	0.9800		
			Intercept	-0.480559

### 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**  
**FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
 FEBRUARY 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	636	35	36	99.85	29	0	9	0
THC (ppm) Average	601	30	71	93.90	4.8	-	3.1	-
NO2 (ppb) Average	639	33	33	100.00	47	0	31	-
NO (ppb) Average	639	33	33	100.00	117	-	27	-
NOX (ppb) Average	639	33	33	100.00	159	-	58	-
PM2.5 (ug/m3) Average	671	0	1	99.85	55	-	11.1	0
Temperature 2 m (C) Average	672	0	0	100.00	-0.1	-	-3.5	-
Relative Humidity (%) Average	672	0	0	100.00	88	-	-	-
Barometric Pressure (inHg) Average	672	0	0	100.00	29.7	-	-	-
Wind Speed 10 m (km/h) Average	671	0	1	99.85	32	-	-	-
Wind Direction 10 m (deg) Average	671	0	1	99.85	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
 FEBRUARY 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	636	1.6	4	-	0	0	0	0	1	4	29
THC (ppm) Average	601	2.53	0.4	-	2.1	2.2	2.3	2.4	2.7	3.1	4.8
NO2 (ppb) Average	639	16.2	12	-	0	3	7	12	26	34	47
NO (ppb) Average	639	9.8	15	-	0	0	1	5	11	27	117
NOX (ppb) Average	639	26	24	-	0	4	10	19	35	59	159
PM2.5 (ug/m3) Average	671	5.92	4.1	-	1.4	2.9	3.9	5	6.7	9.6	55
Temperature 2 m (C) Average	672	-17.28	7.3	-	-38.3	-25.6	-22.6	-18	-12.3	-7.7	-0.1
Relative Humidity (%) Average	672	74.2	7	-	44	63	71	77	79	81	88
Barometric Pressure (inHg) Average	672	29.17	0.3	-	28.6	28.8	29	29.2	29.3	29.5	29.7
Wind Speed 10 m (km/h) Average	671	10.9	6	-	0	4	6	10	16	19	32
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - SHELL MUSKEG RIVER (AMS 16)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	18 Feb 2015 14:00	18 Feb 2015 14:00	1	Maintenance - manifold cleaning
THC	16 Feb 2015 19:00	18 Feb 2015 11:00	41	Analyzer failure - sample pump replaced
PM2.5	18 Feb 2015 14:00	18 Feb 2015 14:00	1	Maintenance - Flow and zero check, sample head cleaning
Wind Speed, Wind Direction	01 Feb 2015 18:00	01 Feb 2015 18:00	1	Flat line in sensor output signal -sensor frozen

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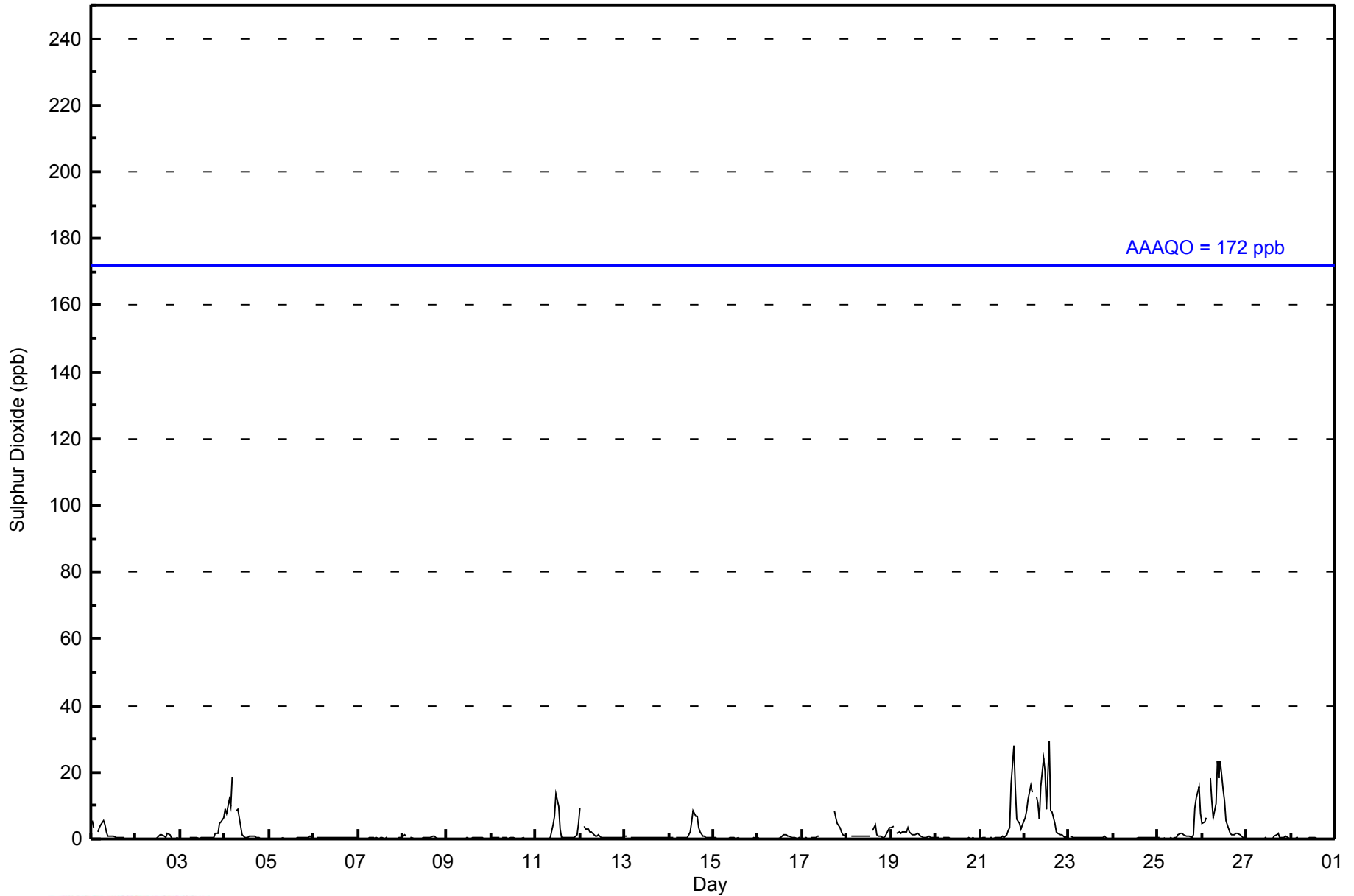


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 29 ppb on Feb 22 14:00										Maximum Daily Average: 9.3 ppb on Feb 22										Hours of Data: 636						
Minimum Value: 0 ppb on Feb 1 21:00										Minimum Daily Average: 0.2 ppb on Feb 9										Hours of Missing Data: 36						
Maximum Diurnal Average: 2.8 ppb at hour 5										Minimum Diurnal Average: 0.9 ppb at hour 17										Hours of Calibration: 35						
Monthly Average: 1.6 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> = 4 P <sub>99</sub> = 18										Percent Operational Time: 99.9						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	5	3	Z	2	3	4	5	4	2	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1.5	5
2-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	1	1	1	2	1	0	0	0	0	0	0.4	2
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	5	5	6	1.0	6
4-Feb	9	8	12	10	19	Z	8	9	6	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	3.8	19
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	1	0.3	1
6-Feb	1	Z	1	1	1	0	0	0	1	1	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0.4	1
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
8-Feb	1	1	1	Z	1	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0.4	1
9-Feb	0	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-Feb	0	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-Feb	Z	0	0	0	0	0	0	0	0	4	7	14	10	3	1	0	1	1	0	0	0	1	1	5	2.1	14
12-Feb	9	Z	4	3	3	2	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1.4	9
13-Feb	1	1	Z	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
14-Feb	0	0	0	Z	0	0	0	0	0	0	1	2	5	8	7	7	3	2	1	1	1	0	0	0	1.8	8
15-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0.4	1
17-Feb	Z	0	0	0	0	0	0	0	1	1	C	C	C	C	C	C	C	8	6	5	4	2	1	1	--	8
18-Feb	1	Z	1	1	1	1	1	1	1	1	1	1	1	M	2	4	1	1	1	1	1	1	2	3	1.2	4
19-Feb	3	4	Z	2	2	2	2	2	2	4	2	1	1	1	2	1	1	0	0	0	1	1	0	1	1.6	4
20-Feb	0	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-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	1	2	3	17	28	15	6	5	3	4	3.9	28
22-Feb	7	8	12	16	14	Z	13	11	6	16	24	20	9	29	9	8	5	2	2	1	1	1	1	1	9.3	29
23-Feb	Z	1	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.4	1
24-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	1	2	1	1	1	1	1	0	1	9	12	16	8	2.5	16
26-Feb	5	5	6	Z	18	12	6	11	23	18	23	15	11	6	3	2	1	1	2	2	1	1	0	0	7.5	23
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	1	0	0	0.3	2
28-Feb	0	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
1.9 1.4 1.7 1.6 2.8 1.1 1.5 1.5 1.7 1.8 2.4 2.2 1.7 2.2 1.2 1.2 0.9 1.5 1.7 1.2 1.0 1.1 1.2 1.2																								Diurnal Average		
9 8 12 16 19 12 13 11 23 18 24 20 11 29 9 8 5 17 28 15 9 12 16 8																								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  
Shell Muskeg River - February 2015







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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	611	96.07	96.07
11 - 20	20	3.14	99.21
21 - 60	5	0.79	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: 636

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Shell Muskeg River - February 2015**

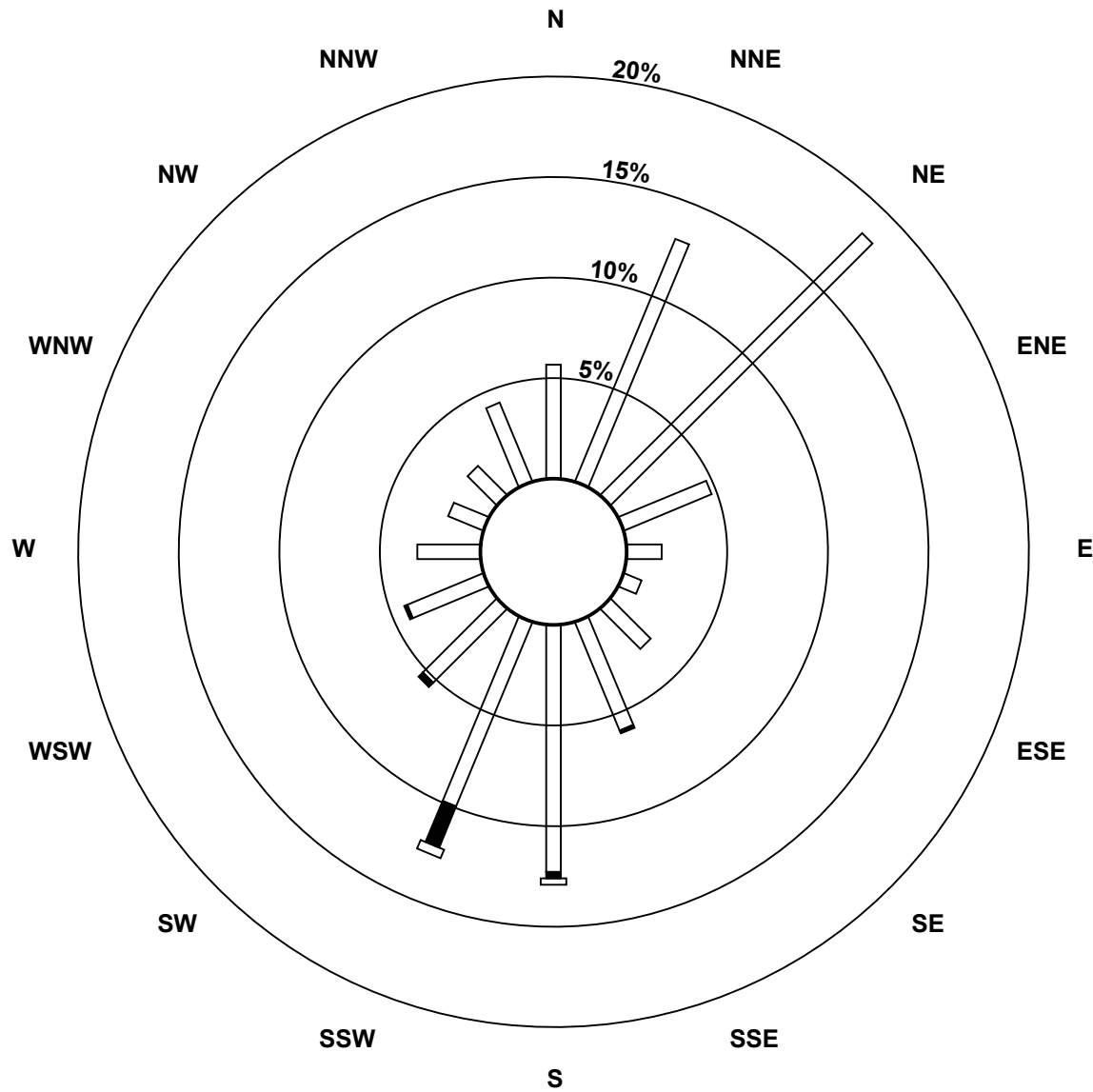
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	36	83	117	30	11	6	18	37	78	63	33	26	20	12	13	27	610
11 - 20	0	0	0	0	0	0	0	1	2	14	2	1	0	0	0	0	20
21 - 60	0	0	0	0	0	0	0	0	2	3	0	0	0	0	0	0	5
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	83	117	30	11	6	18	38	82	80	35	27	20	12	13	27	635

Total Number of Valid Hours: 635

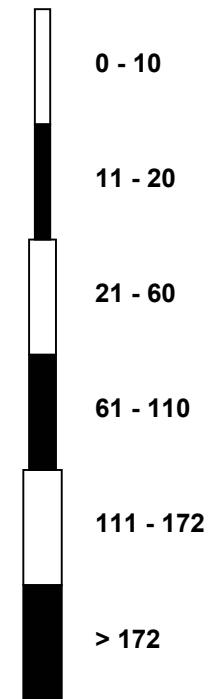
Total Number of Hours: 672

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River (AMS 16)**



Classes (ppb)

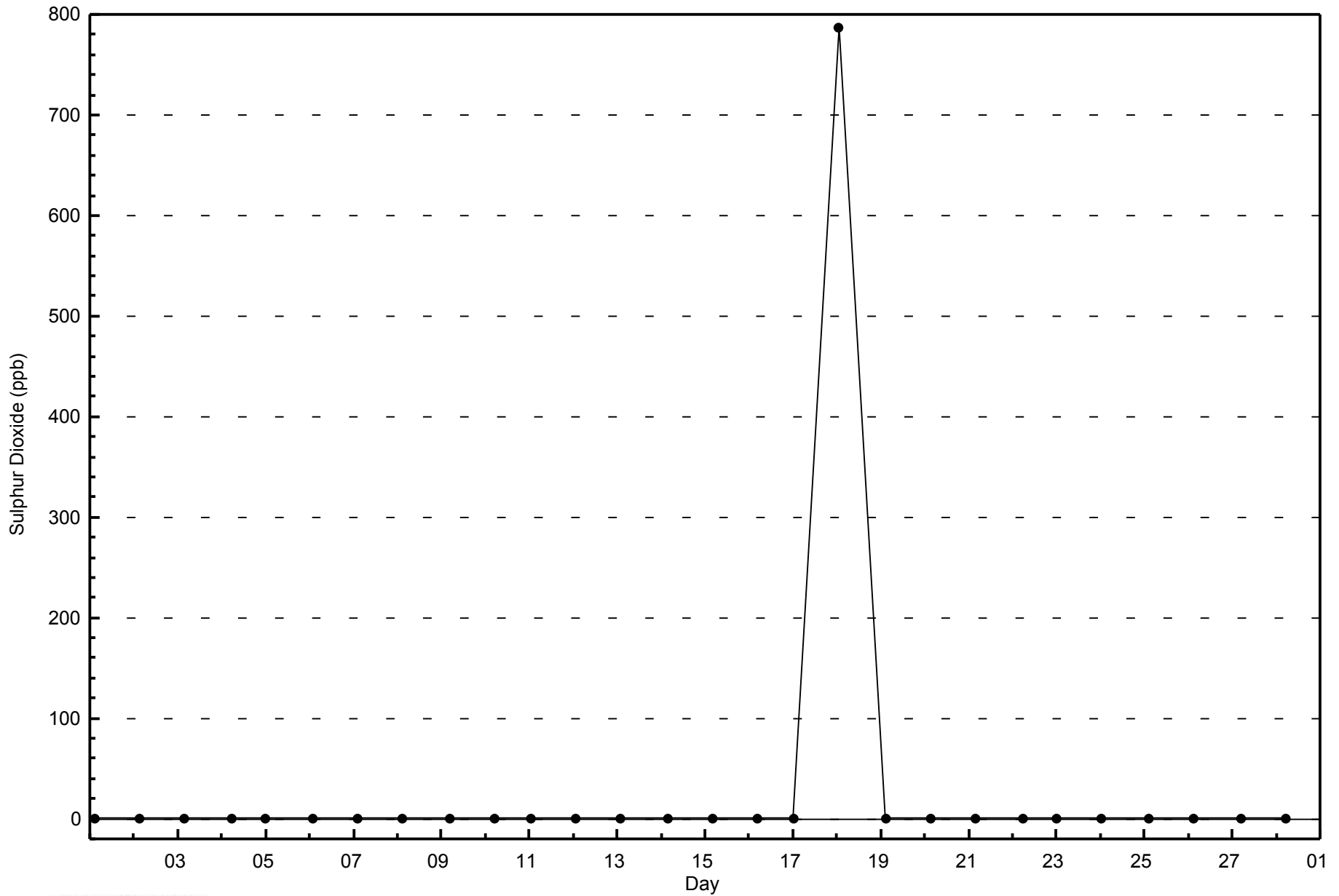


Total Number of Valid Hours: 635



WBEA  
Zero Responses

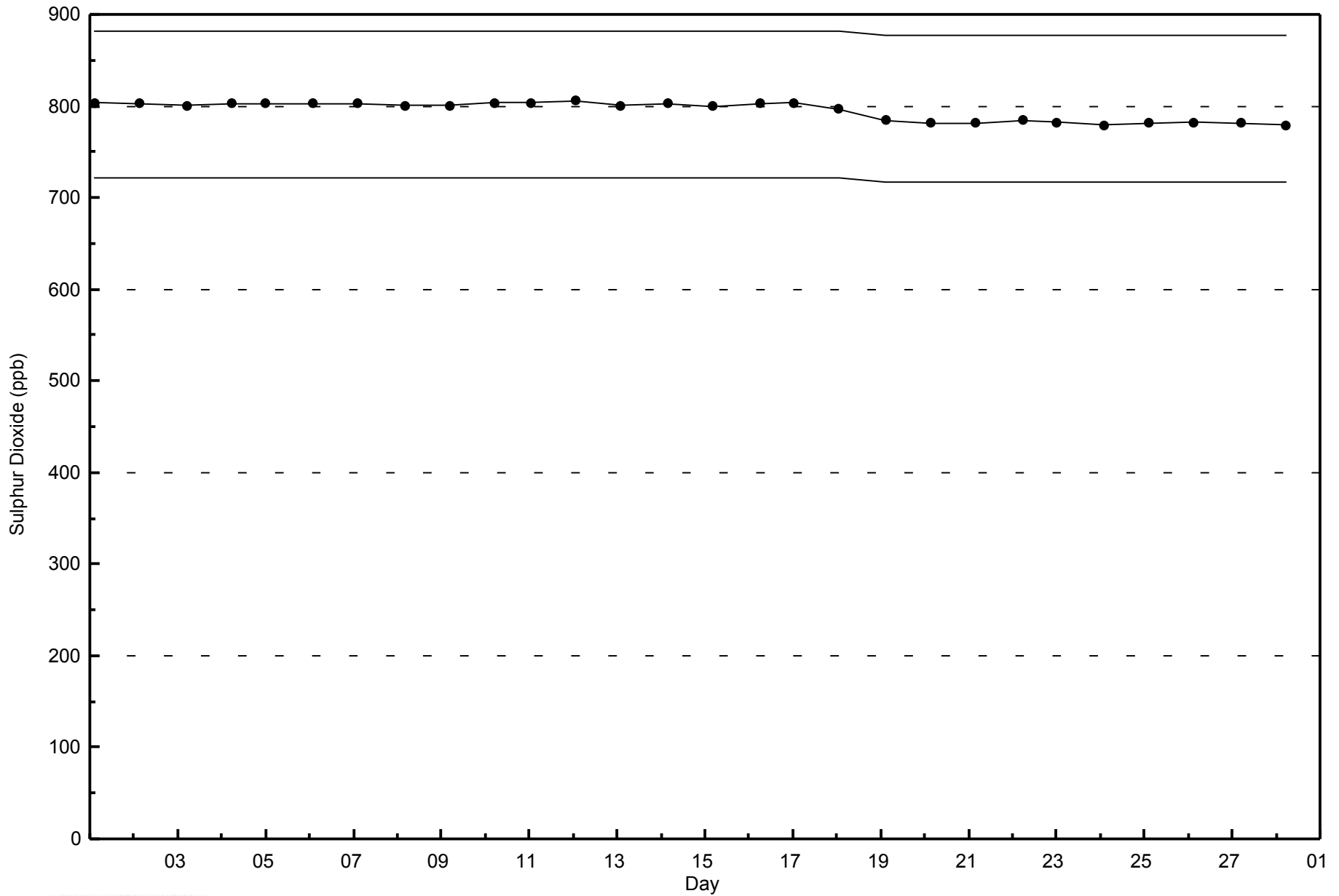
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Shell Muskeg River - February 2015





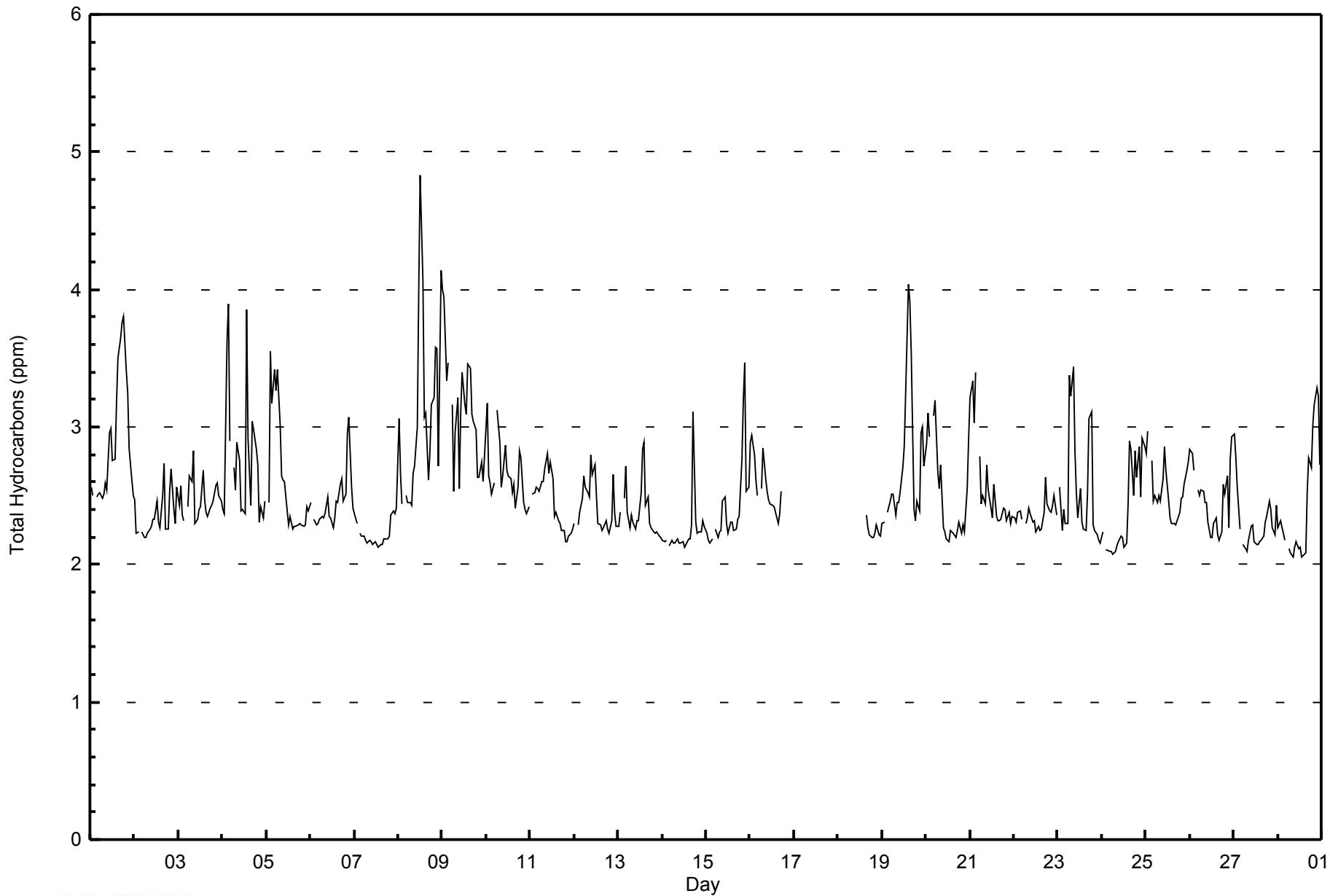
Maximum Value: 4.8 ppm on Feb 8 13:00		Maximum Daily Average: 3.1 ppm on Feb 9		Hours in Service: 672																							
Minimum Value: 2.1 ppm on Feb 28 09:00		Minimum Daily Average: 2.2 ppm on Feb 7		Hours of Data: 601																							
Maximum Diurnal Average: 2.6 ppm at hour 1		Minimum Diurnal Average: 2.5 ppm at hour 10		Hours of Missing Data: 71																							
Monthly Average: 2.53 ppm		Percentiles: P <sub>1</sub> = 2.1 P <sub>10</sub> = 2.2 Q <sub>1</sub> = 2.3 Median = 2.4 Q <sub>3</sub> = 2.7 P <sub>90</sub> = 3.1 P <sub>99</sub> = 4.0		Hours of Calibration: 30																							
				Percent Operational Time: 93.9																							
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-Feb	2.6	2.5	Z	2.5	2.5	2.5	2.5	2.5	2.6	2.5	3.0	3.0	2.8	2.8	3.2	3.5	3.7	3.8	3.8	3.4	3.3	2.8	2.7	2.5	2.9	3.8	
2-Feb	2.5	2.2	2.2	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.3	2.3	2.5	2.7	2.3	2.3	2.5	2.7	2.4	2.3	2.6	2.4	2.7	
3-Feb	2.4	2.6	2.4	2.3	Z	2.4	2.6	2.6	2.8	2.3	2.3	2.4	2.4	2.7	2.5	2.4	2.4	2.4	2.4	2.5	2.6	2.6	2.5	2.5	2.5	2.8	
4-Feb	2.4	2.4	3.6	3.9	2.9	Z	2.7	2.5	2.9	2.8	2.4	2.4	2.4	3.9	2.9	2.4	3.0	3.0	2.8	2.7	2.3	2.4	2.3	2.5	2.8	3.9	
5-Feb	Z	2.5	3.6	3.2	3.4	3.3	3.4	3.0	2.6	2.6	2.6	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.4	2.4	2.6	3.6	
6-Feb	2.4	Z	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.3	2.3	2.3	2.3	2.5	2.5	2.6	2.6	2.5	2.5	2.9	3.1	2.6	2.4	2.5	3.1	
7-Feb	2.4	2.3	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.4	2.2	2.4	
8-Feb	3.1	2.7	2.4	Z	2.5	2.4	2.4	2.4	2.7	2.7	3.0	4.0	4.8	4.1	3.1	3.1	2.6	2.8	3.2	3.2	3.6	3.6	2.7	4.1	3.1	4.8	
9-Feb	4.0	3.9	3.3	3.5	Z	3.2	2.5	3.0	3.2	2.6	3.1	3.4	3.2	3.1	3.5	3.4	3.1	3.0	3.0	2.6	2.6	2.7	2.6	2.8	3.1	4.0	
10-Feb	3.2	2.6	2.6	2.5	2.6	Z	3.1	2.9	2.6	2.6	2.9	2.7	2.6	2.6	2.5	2.6	2.4	2.6	2.8	2.8	2.4	2.4	2.4	2.4	2.6	3.2	
11-Feb	Z	2.5	2.5	2.6	2.5	2.5	2.6	2.6	2.7	2.8	2.7	2.7	2.6	2.3	2.4	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.4	2.8	
12-Feb	2.3	Z	2.3	2.4	2.5	2.6	2.6	2.5	2.5	2.8	2.7	2.7	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.3	2.7	2.4	2.3	2.4	2.8	
13-Feb	2.3	2.4	Z	2.5	2.7	2.4	2.3	2.4	2.3	2.3	2.3	2.3	2.5	2.8	2.9	2.4	2.5	2.3	2.3	2.2	2.2	2.2	2.2	2.2	2.4	2.9	
14-Feb	2.2	2.2	2.2	Z	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.3	3.1	2.3	2.2	2.2	2.3	2.3	2.3	2.2	3.1	
15-Feb	2.2	2.2	2.2	2.2	Z	2.3	2.2	2.2	2.3	2.5	2.5	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.8	3.2	3.5	2.5	2.6	2.4	3.5	
16-Feb	2.9	2.9	2.8	2.6	2.5	Z	2.6	2.8	2.6	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.4	2.5	AF	AF	AF	AF	AF	AF	--	2.9	
17-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	--	--
18-Feb	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	C	C	C	C	2.4	2.3	2.2	2.2	2.2	2.2	2.3	2.2	2.2	--	2.4	
19-Feb	2.3	2.3	Z	2.4	2.5	2.5	2.5	2.4	2.5	2.5	2.5	2.7	2.9	3.2	4.0	3.9	3.5	2.4	2.3	2.5	2.4	3.0	3.0	2.7	2.7	4.0	
20-Feb	2.9	3.1	2.9	Z	3.1	3.2	2.7	2.6	2.7	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.3	2.2	2.6	2.5	3.2	
21-Feb	3.2	3.3	3.0	3.4	Z	2.8	2.4	2.5	2.4	2.7	2.5	2.4	2.3	2.6	2.4	2.3	2.3	2.3	2.4	2.4	2.3	2.4	2.3	2.3	2.6	3.4	
22-Feb	2.3	2.3	2.4	2.4	2.3	Z	2.3	2.3	2.4	2.4	2.3	2.3	2.2	2.3	2.3	2.3	2.4	2.6	2.4	2.4	2.4	2.4	2.5	2.4	2.4	2.6	
23-Feb	Z	2.6	2.2	2.4	2.3	2.3	3.4	3.2	3.4	2.8	2.5	2.3	2.6	2.3	2.3	2.2	2.5	3.1	3.1	2.3	2.3	2.2	2.2	2.2	2.6	3.4	
24-Feb	2.2	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.4	2.9	2.8	2.5	2.8	2.6	2.9	2.5	2.9	2.9	2.4	2.9	
25-Feb	2.8	3.0	Z	2.8	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.9	2.7	2.5	2.3	2.3	2.3	2.3	2.3	2.4	2.5	2.5	2.6	2.7	2.7	2.5	3.0
26-Feb	2.8	2.8	2.7	Z	2.5	2.5	2.5	2.5	2.5	2.5	2.3	2.2	2.2	2.3	2.3	2.2	2.2	2.2	2.2	2.6	2.5	2.6	2.3	2.8	2.9	2.5	2.9
27-Feb	3.0	2.8	2.6	2.3	Z	2.1	2.1	2.1	2.2	2.3	2.3	2.2	2.1	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.5	2.4	2.3	2.2	2.4	2.3	3.0
28-Feb	2.3	2.3	2.3	2.2	2.2	Z	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.5	2.8	2.7	3.0	3.2	3.3	3.2	2.7	2.4	3.3	
																								Diurnal Average			
																								Diurnal Maximum			
																								2.6			
																								4.1			

Z - zerospan                      C - Calibration                      AF - Analyzer Failure



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	538	89.52	89.52
3.1 - 10.0	63	10.48	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 601

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Shell Muskeg River - February 2015**

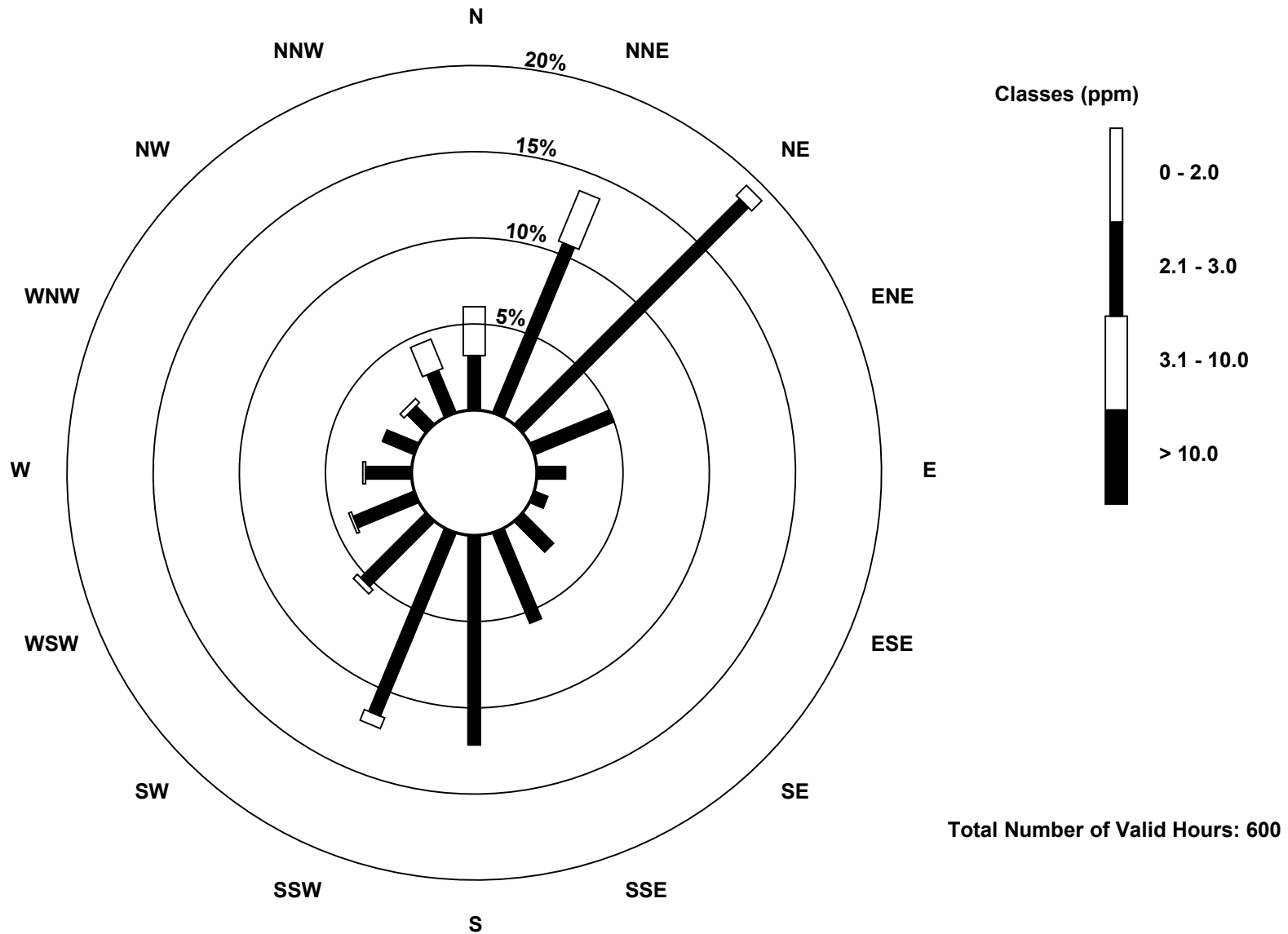
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	19	64	111	30	10	5	15	34	73	69	32	23	16	12	9	16	538
3.1 - 10.0	17	19	5	0	0	0	0	0	0	4	2	1	1	0	2	11	62
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	<b>36</b>	<b>83</b>	<b>116</b>	<b>30</b>	<b>10</b>	<b>5</b>	<b>15</b>	<b>34</b>	<b>73</b>	<b>73</b>	<b>34</b>	<b>24</b>	<b>17</b>	<b>12</b>	<b>11</b>	<b>27</b>	<b>600</b>

Total Number of Valid Hours: 600

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

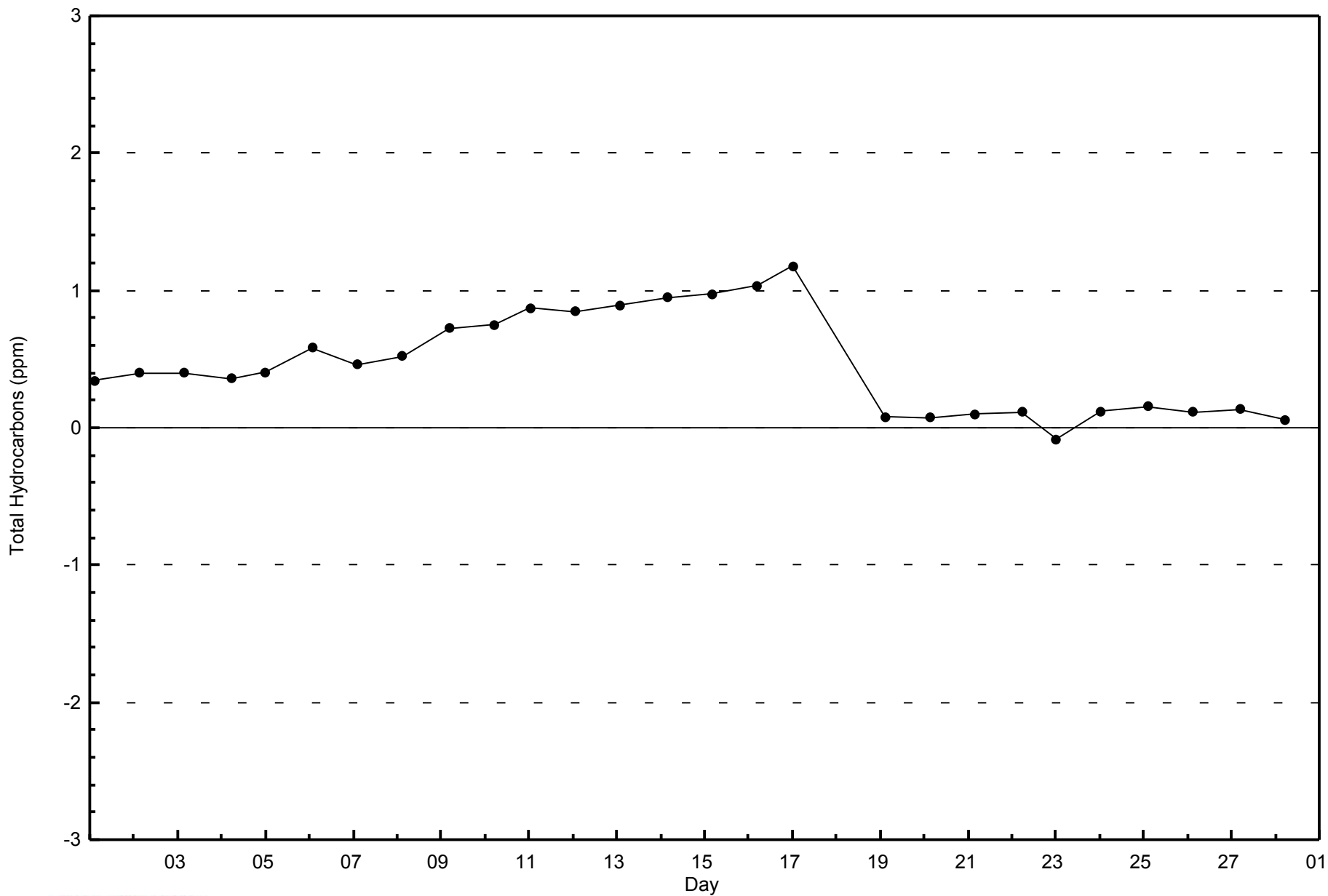
Total Hydrocarbons (THC) - ppm  
Shell Muskeg River (AMS 16)





WBEA  
Zero Responses

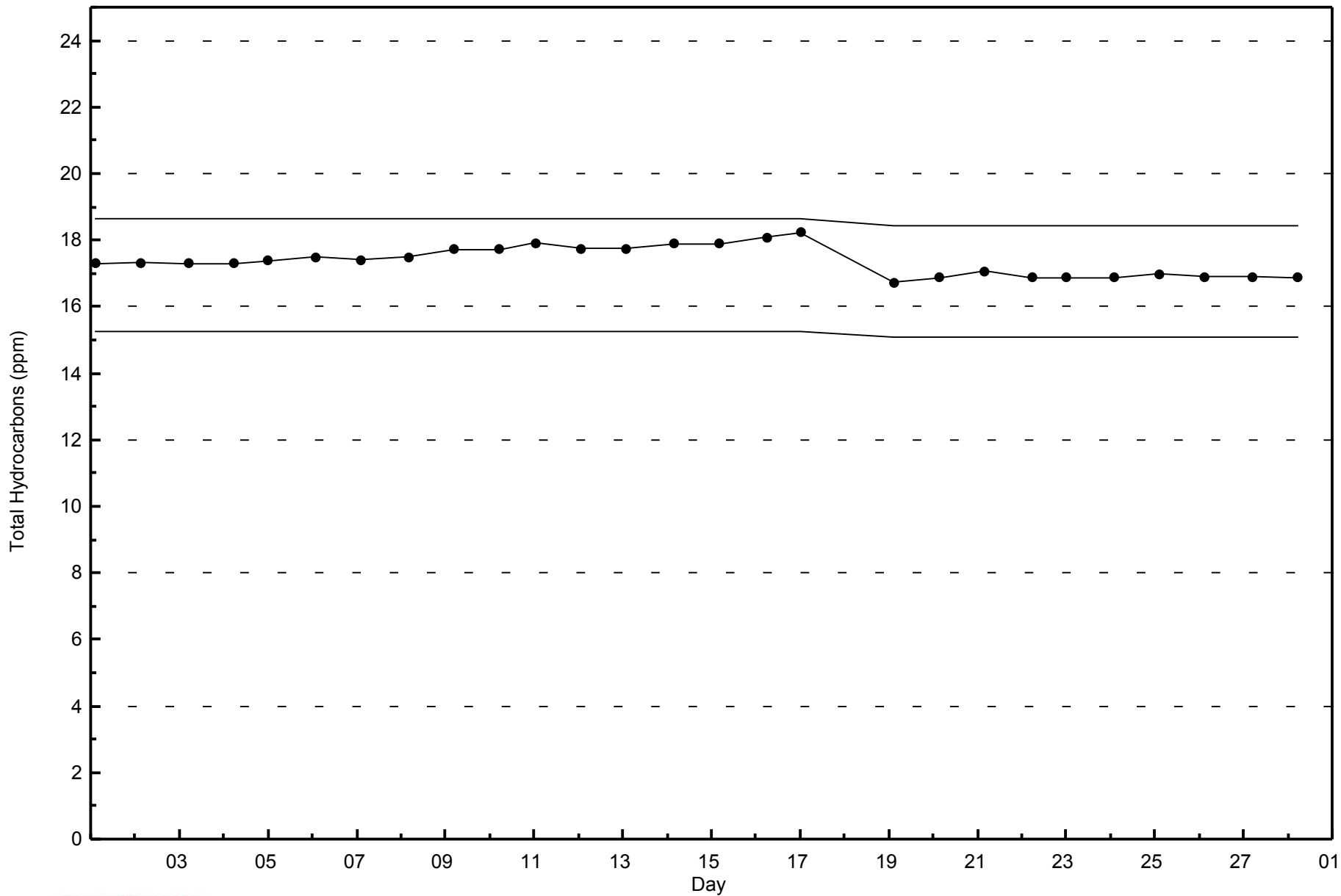
Total Hydrocarbons (THC) - ppm  
Shell Muskeg River - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Shell Muskeg River - February 2015



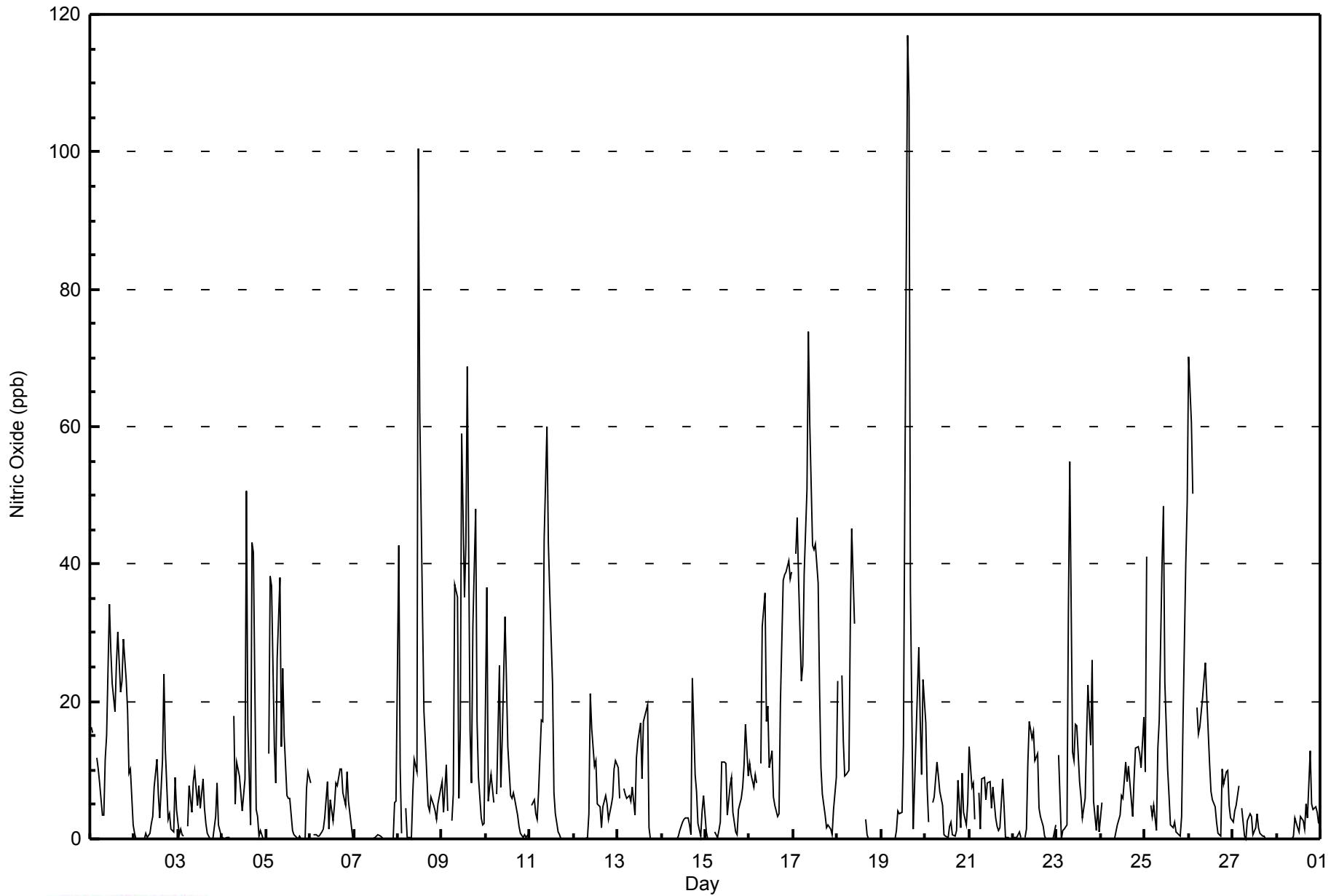


Maximum Value: 117 ppb on Feb 19 15:00																			Maximum Daily Average: 27.2 ppb on Feb 17						Hours in Service: 672	
Minimum Value: 0 ppb on Feb 2 02:00																			Minimum Daily Average: 0.6 ppb on Feb 7						Hours of Data: 639	
Maximum Diurnal Average: 16.8 ppb at hour 12																			Minimum Diurnal Average: 4.8 ppb at hour 6						Hours of Missing Data: 33	
Monthly Average: 9.8 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 5 Q <sub>3</sub> = 11 P <sub>90</sub> = 27 P <sub>99</sub> = 67						Hours of Calibration: 33	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	16	16	Z	12	10	8	3	3	12	15	34	27	23	19	25	30	21	23	29	23	19	10	10	2	17.0	34
2-Feb	1	0	0	Z	0	0	1	0	1	2	3	7	12	7	3	12	24	13	3	4	1	1	9	4	4.7	24
3-Feb	1	1	1	0	Z	2	8	4	8	10	5	8	4	9	5	2	1	0	0	0	3	8	2	0	3.6	10
4-Feb	0	0	0	0	0	Z	18	5	11	9	7	4	9	51	16	2	43	42	4	3	0	1	0	0	9.9	51
5-Feb	Z	12	38	37	13	8	26	38	13	25	15	6	6	6	1	1	0	0	0	0	0	0	7	10	11.5	38
6-Feb	8	Z	1	1	0	0	1	1	3	8	1	6	3	5	8	8	10	10	7	5	10	5	2	0	4.5	10
7-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	5	6	0.6	6
8-Feb	43	10	1	Z	4	0	0	0	7	12	10	100	62	33	18	14	5	4	6	5	4	3	5	7	15.4	100
9-Feb	8	4	11	4	Z	3	6	37	35	6	16	59	35	43	69	16	8	31	48	17	9	3	2	2	20.5	69
10-Feb	37	5	8	9	5	Z	6	25	8	15	32	23	13	6	6	7	6	3	2	1	0	1	0	1	9.5	37
11-Feb	Z	5	6	4	3	7	17	17	44	60	43	36	22	7	4	1	1	0	0	0	0	0	0	0	12.0	60
12-Feb	0	Z	0	0	0	0	0	0	4	21	16	10	11	5	5	2	5	6	5	3	5	6	10	11	5.5	21
13-Feb	10	6	Z	7	6	6	6	5	8	4	12	14	17	9	17	18	20	2	0	0	0	0	0	0	7.2	20
14-Feb	0	0	0	Z	0	0	0	0	0	0	1	2	3	3	3	2	1	23	9	7	2	0	4	6	3.0	23
15-Feb	1	0	0	0	Z	1	0	1	2	11	11	11	3	8	9	4	1	1	4	6	7	11	17	9	5.2	17
16-Feb	11	9	8	9	8	Z	11	31	36	17	19	10	13	6	5	3	4	20	38	38	39	40	38	39	19.7	40
17-Feb	Z	42	47	38	23	25	39	51	74	60	43	42	43	37	22	10	7	3	2	2	2	1	4	9	27.2	74
18-Feb	23	Z	24	14	9	9	10	31	45	31	C	C	C	C	C	3	1	0	0	0	0	0	0	0	11.2	45
19-Feb	0	0	Z	0	0	0	0	0	1	4	4	4	14	50	117	108	36	1	8	15	28	17	9	23	19.1	117
20-Feb	17	7	3	Z	5	6	11	9	7	5	1	0	0	2	2	1	0	1	9	2	10	4	2	5	4.7	17
21-Feb	13	7	8	3	Z	7	1	9	9	6	8	8	5	7	3	2	1	2	9	5	0	0	0	0	5.0	13
22-Feb	0	0	0	1	0	Z	0	1	11	17	15	16	11	12	4	3	2	0	0	0	0	0	0	2	4.2	17
23-Feb	Z	12	0	1	1	2	33	55	13	11	17	16	8	6	3	6	15	22	14	26	5	1	5	1	12.0	55
24-Feb	5	Z	0	0	0	0	0	0	1	2	4	6	6	11	8	11	8	3	9	13	13	12	10	18	6.1	18
25-Feb	10	41	Z	5	3	5	1	13	17	40	48	23	10	6	2	2	3	1	1	0	3	17	40	49	14.8	49
26-Feb	70	61	50	Z	19	15	16	21	23	26	20	11	7	6	5	2	1	0	10	8	10	10	5	3	17.3	70
27-Feb	2	4	5	8	Z	4	0	0	3	4	3	1	2	4	2	1	0	0	0	0	0	0	0	0	1.9	8
28-Feb	0	0	0	0	0	Z	0	0	0	0	3	2	1	3	3	1	5	3	13	5	4	5	4	2	2.4	13
																			Diurnal Average						Diurnal Maximum	
																			70						49	
Z - zerospan																			C - Calibration							



WBEA  
Hourly Averages

Nitric Oxide (NO) - ppb  
Shell Muskeg River - February 2015





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

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	549	85.92	85.92
21 - 40	58	9.08	94.99
41 - 80	29	4.54	99.53
81 - 159	3	0.47	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Shell Muskeg River - February 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	77	114	30	10	6	16	39	71	59	32	19	18	12	8	11	549
21 - 40	6	6	2	0	0	0	2	1	4	15	4	6	1	0	3	7	57
11 - 80	2	0	1	0	1	0	0	0	6	8	1	1	0	0	1	8	29
81 - 159	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	83	117	30	11	6	18	40	81	82	37	26	19	12	13	27	638

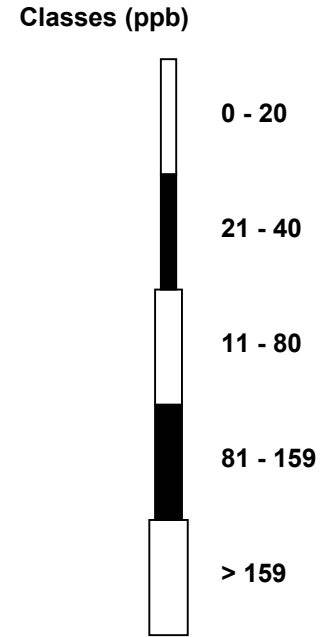
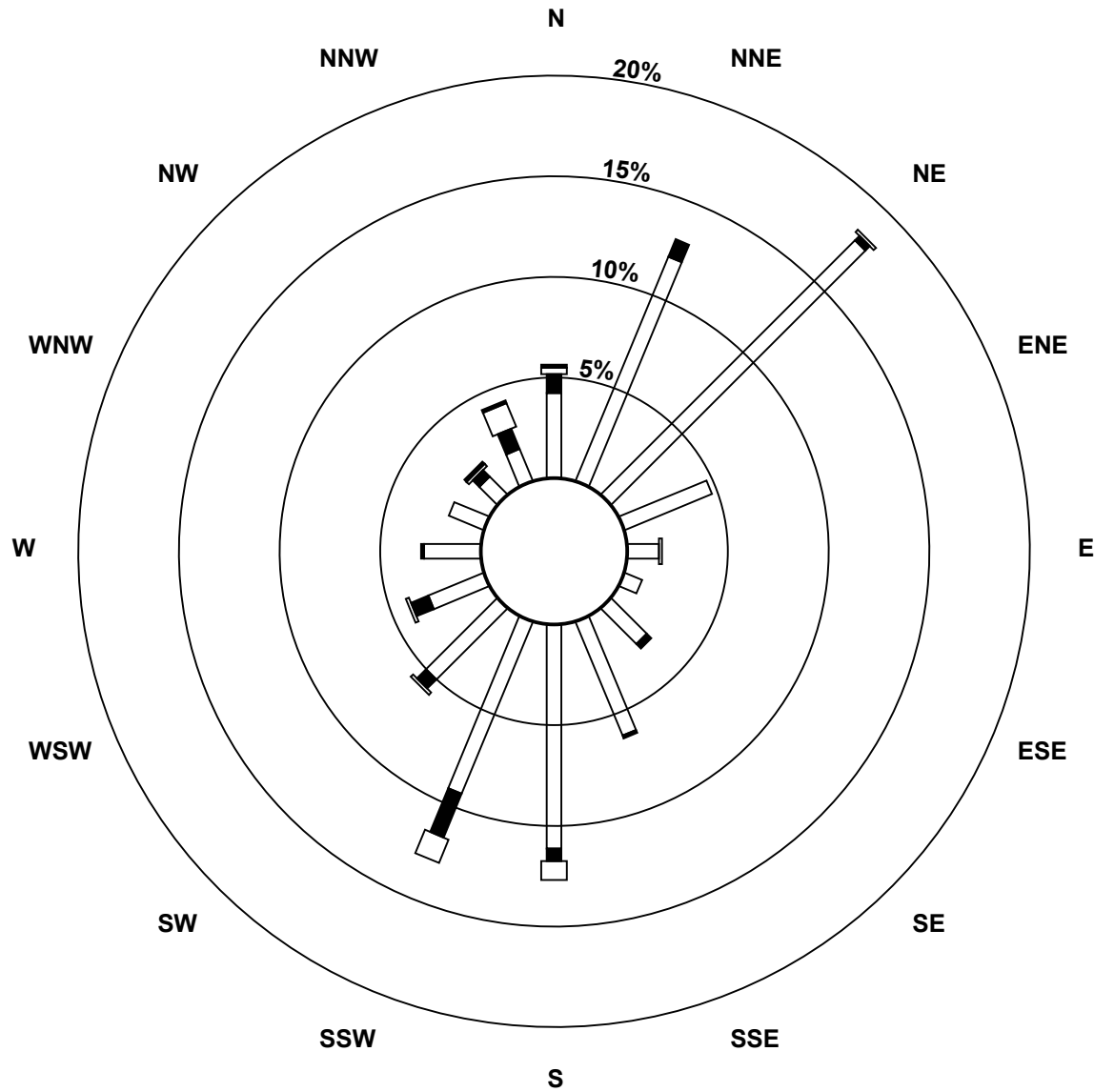
Total Number of Valid Hours: 638

Total Number of Hours: 672



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

**Nitric Oxide (NO) - ppb  
Shell Muskeg River (AMS 16)**

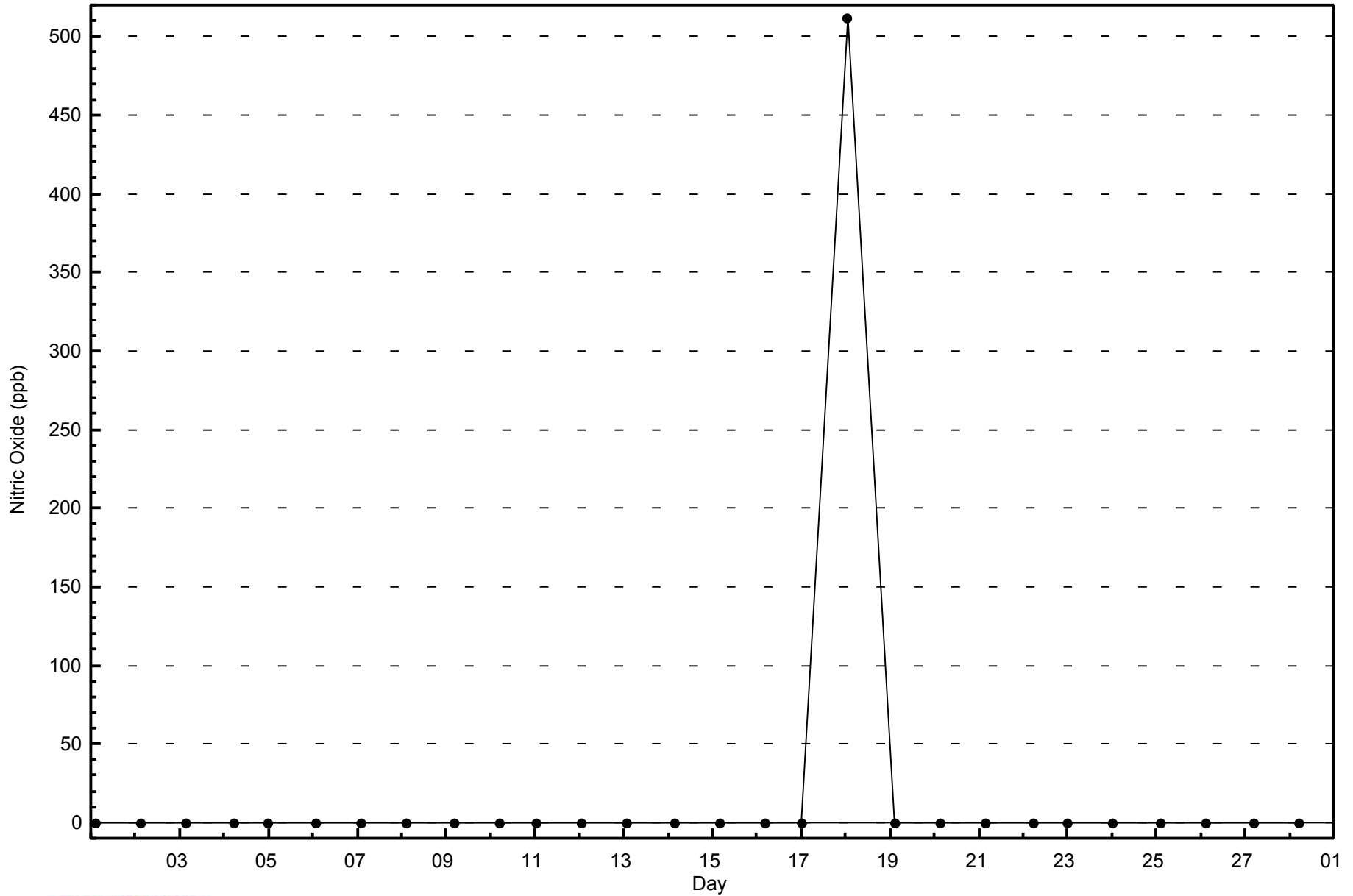


**Total Number of Valid Hours: 638**



WBEA  
Zero Responses

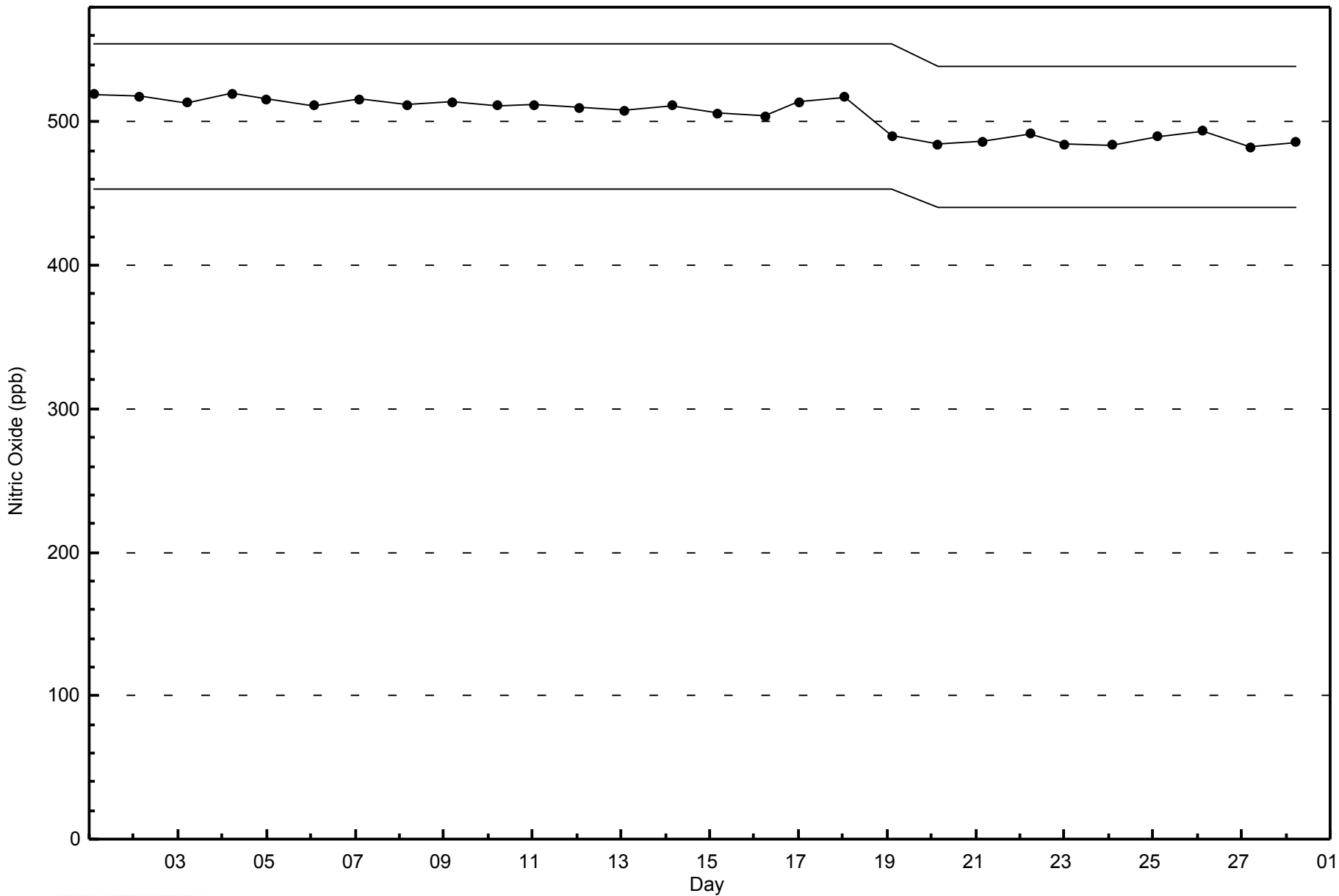
Nitric Oxide (NO) - ppb  
Shell Muskeg River - February 2015





WBEA  
Span Responses

Nitric Oxide (NO) - ppb  
Shell Muskeg River - February 2015



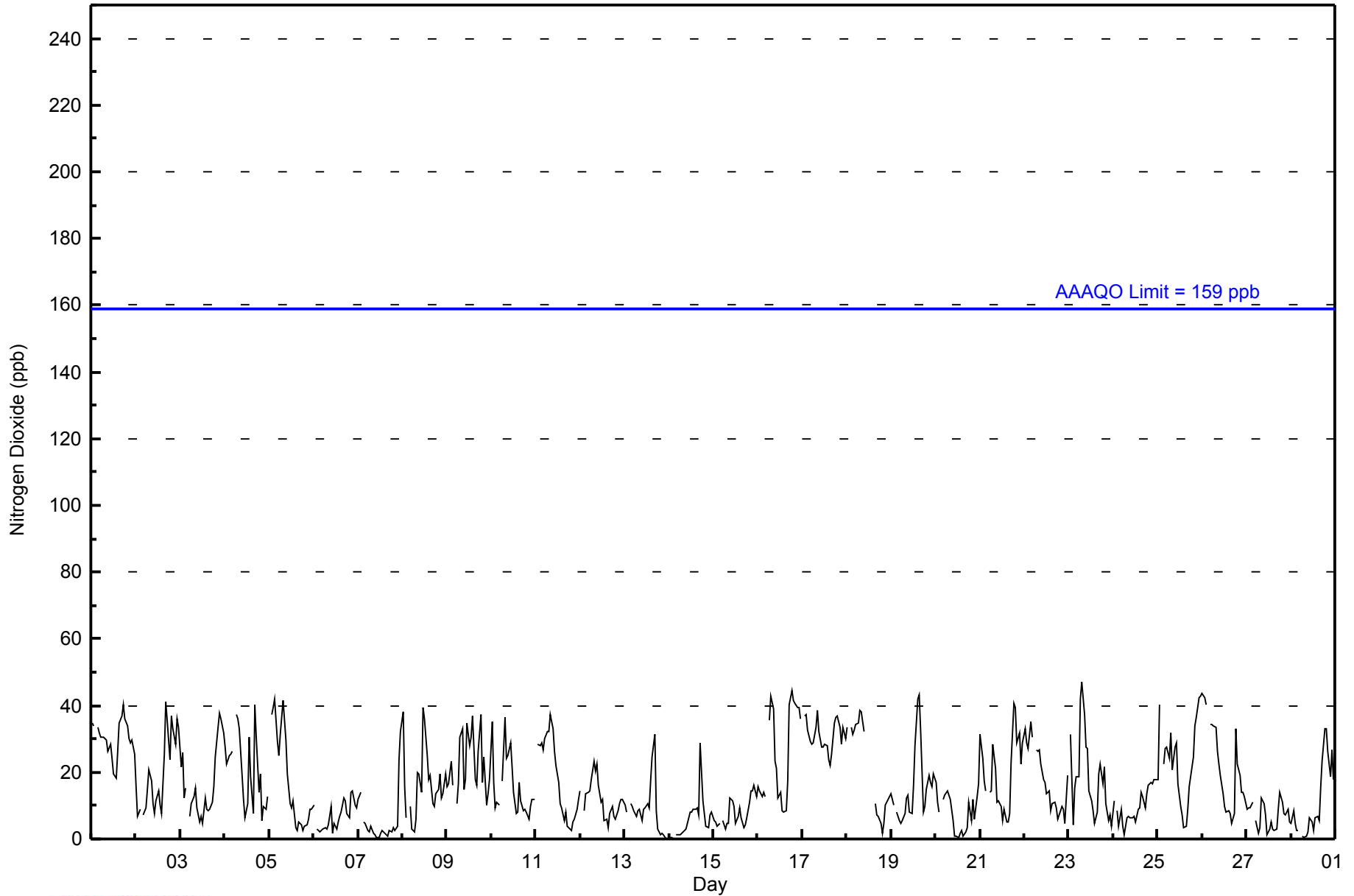


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																							
Maximum Value: 47 ppb on Feb 23 08:00										Maximum Daily Average: 31.0 ppb on Feb 17										Hours of Data: 639																													
Minimum Value: 0 ppb on Feb 14 03:00										Minimum Daily Average: 5.4 ppb on Feb 7										Hours of Missing Data: 33																													
Maximum Diurnal Average: 21.5 ppb at hour 8										Minimum Diurnal Average: 11.6 ppb at hour 15										Hours of Calibration: 33																													
Monthly Average: 16.2 ppb										Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 7 Median = 12 Q <sub>3</sub> = 26 P <sub>90</sub> = 34 P <sub>99</sub> = 43										Percent Operational Time: 100.0																													
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	35	34	Z	34	32	30	30	30	30	26	29	24	20	18	26	35	37	40	36	34	30	29	30	25	30.1	40																							
2-Feb	16	7	9	Z	7	10	15	21	18	11	8	11	15	10	8	25	41	36	24	37	33	28	36	34	19.8	41																							
3-Feb	22	26	12	15	Z	7	11	13	15	9	5	7	5	12	9	8	9	11	16	25	34	38	36	32	16.3	38																							
4-Feb	27	23	25	25	26	Z	38	36	33	19	12	7	11	30	19	8	40	31	14	20	6	10	9	13	20.8	40																							
5-Feb	Z	37	39	42	29	25	32	41	36	30	20	11	10	11	3	3	5	4	2	4	4	6	9	9	17.9	42																							
6-Feb	10	Z	3	2	2	3	4	3	4	10	2	5	3	5	7	8	12	12	8	7	14	14	10	10	6.8	14																							
7-Feb	12	14	Z	5	5	3	2	4	2	1	1	1	2	2	2	1	1	2	2	3	3	4	24	32	5.4	32																							
8-Feb	38	16	6	Z	10	3	2	6	20	19	14	39	36	25	18	19	11	10	14	15	19	12	13	20	16.7	39																							
9-Feb	16	16	24	16	Z	11	17	31	33	15	18	35	28	31	37	18	16	26	37	17	25	10	13	18	22.0	37																							
10-Feb	35	17	10	11	10	Z	17	36	24	25	29	22	14	8	8	17	11	8	9	8	6	10	12	12	15.6	36																							
11-Feb	Z	28	28	29	27	30	32	32	37	33	26	22	17	10	9	6	8	4	3	3	5	6	9	12	18.1	37																							
12-Feb	15	Z	8	14	14	15	18	23	20	22	16	11	12	6	6	4	8	10	7	6	9	11	12	12	12.0	23																							
13-Feb	10	8	Z	11	10	8	7	9	9	6	9	10	11	9	17	24	32	8	3	1	2	1	0	0	8.9	32																							
14-Feb	0	0	0	Z	1	1	1	2	3	3	5	8	8	8	9	9	7	29	12	8	4	3	7	8	6.0	29																							
15-Feb	5	5	4	5	Z	6	3	5	5	12	11	10	5	7	9	7	3	4	6	11	14	15	16	13	7.8	16																							
16-Feb	16	14	13	14	13	Z	36	43	39	23	21	12	14	8	8	9	17	40	45	41	41	40	39	36	25.3	45																							
17-Feb	Z	37	38	33	29	29	33	39	32	28	28	29	28	24	22	26	35	37	37	34	29	33	30	30	31.0	39																							
18-Feb	33	Z	33	32	33	34	35	39	38	32	C	C	C	C	C	11	7	7	5	2	5	10	12	13	21.1	39																							
19-Feb	14	10	Z	8	5	5	5	8	12	13	8	8	16	28	42	43	33	8	10	15	19	17	16	19	15.7	43																							
20-Feb	17	11	8	Z	12	13	15	13	12	5	1	1	1	2	3	1	2	4	11	6	12	6	13	17	7.9	17																							
21-Feb	31	24	17	14	Z	14	14	28	21	11	12	10	6	9	5	5	8	23	41	39	29	32	22	29	19.3	41																							
22-Feb	33	29	27	35	31	Z	27	26	27	23	18	17	14	15	9	11	11	10	6	9	10	9	5	19	18.1	35																							
23-Feb	Z	31	4	15	19	19	42	47	37	28	27	14	12	8	5	8	19	23	17	22	10	6	7	4	18.4	47																							
24-Feb	12	Z	8	4	9	4	1	6	7	6	7	7	5	9	9	14	13	9	13	16	17	17	18	18	9.9	18																							
25-Feb	18	40	Z	22	27	28	24	32	21	28	29	17	10	7	3	4	9	16	22	25	34	37	42	43	23.3	43																							
26-Feb	44	42	40	Z	34	34	34	34	26	23	19	14	10	8	9	8	5	8	33	22	19	14	14	13	22.0	44																							
27-Feb	9	9	9	11	Z	6	2	3	12	11	7	1	3	5	3	3	3	9	14	11	8	7	9	5	7.0	14																							
28-Feb	5	8	5	3	3	Z	1	0	1	2	6	5	3	6	7	6	15	23	33	33	26	19	27	18	11.0	33																							
																								19.6	20.3	16.1	17.3	16.8	14.6	17.5	21.5	20.7	17.1	14.3	13.1	11.6	12.1	11.6	11.9	14.6	16.0	17.0	16.9	16.8	15.6	17.6	18.2	Diurnal Average	
																								44	42	40	42	34	34	42	47	39	33	29	39	36	31	42	43	41	40	45	41	41	40	42	43	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 - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	436	68.23	68.23
21 - 40	187	29.26	97.50
41 - 80	16	2.50	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Shell Muskeg River - February 2015**

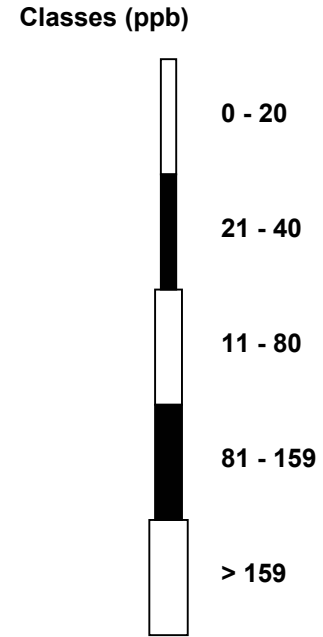
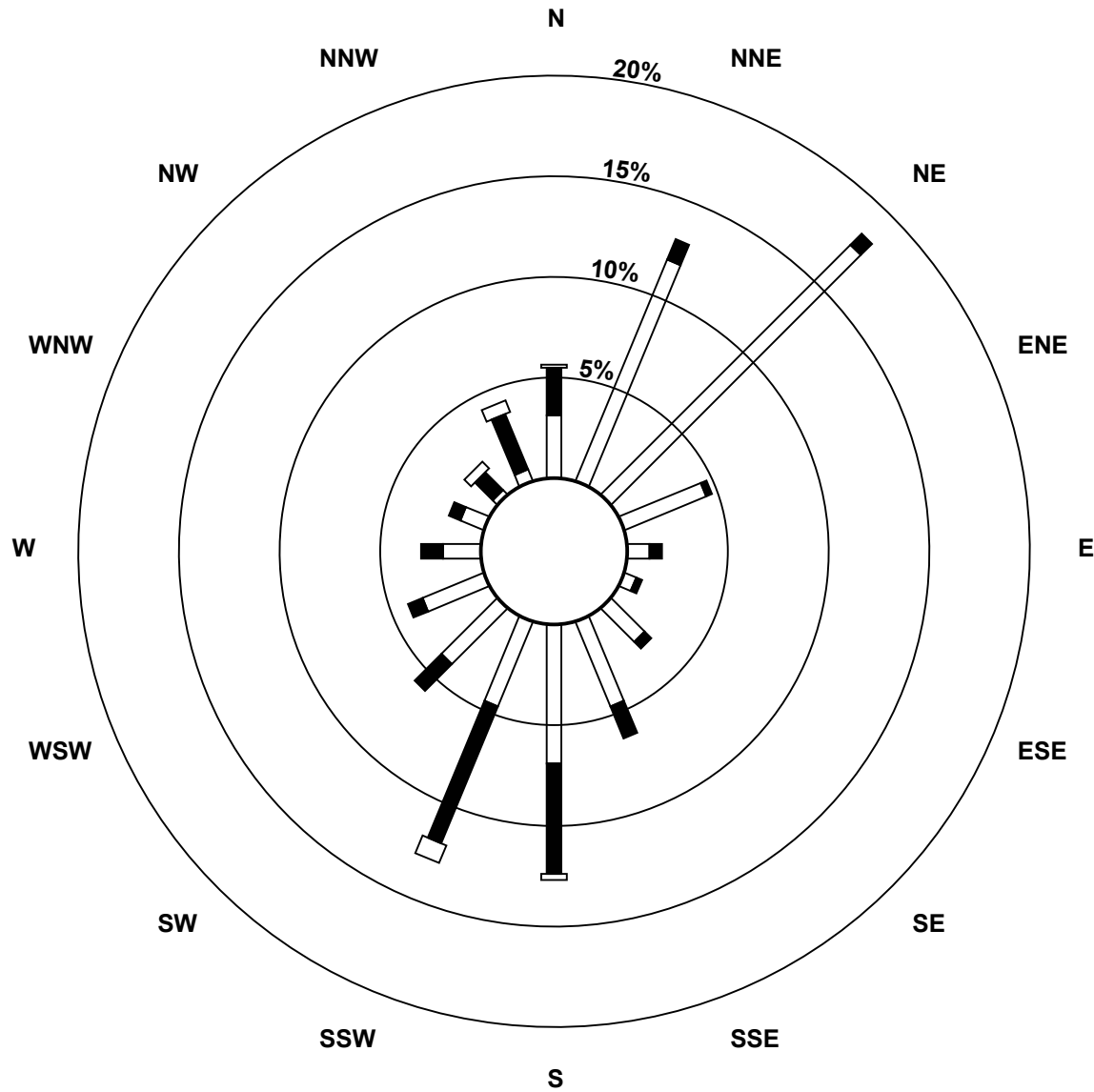
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	20	76	112	28	7	4	15	29	44	29	25	21	12	8	2	4	436
21 - 40	15	7	5	2	4	2	3	11	35	47	12	5	7	4	8	19	186
11 - 80	1	0	0	0	0	0	0	0	2	6	0	0	0	0	3	4	16
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	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	83	117	30	11	6	18	40	81	82	37	26	19	12	13	27	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
 Shell Muskeg River (AMS 16)



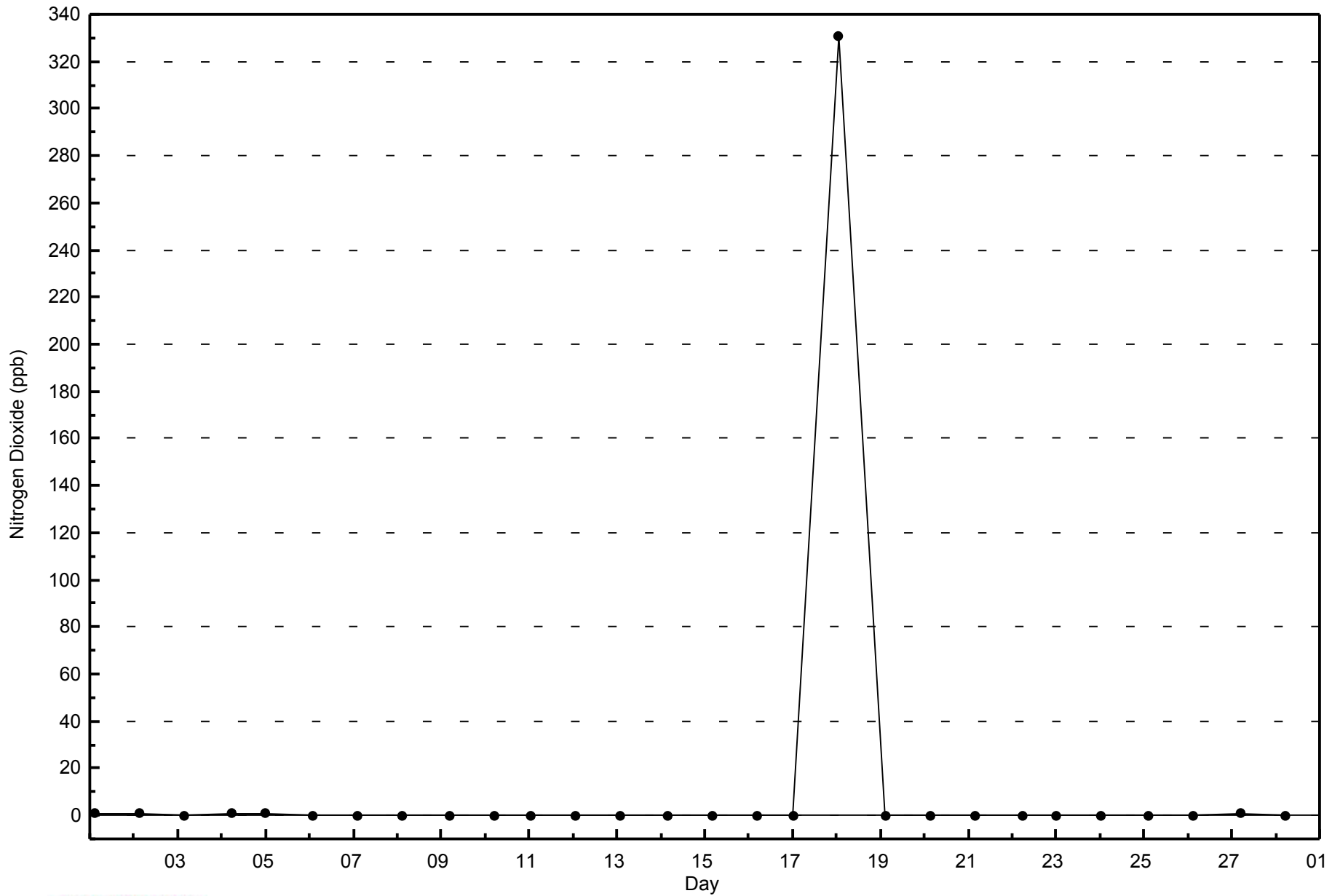
Total Number of Valid Hours: 638





WBEA  
Zero Responses

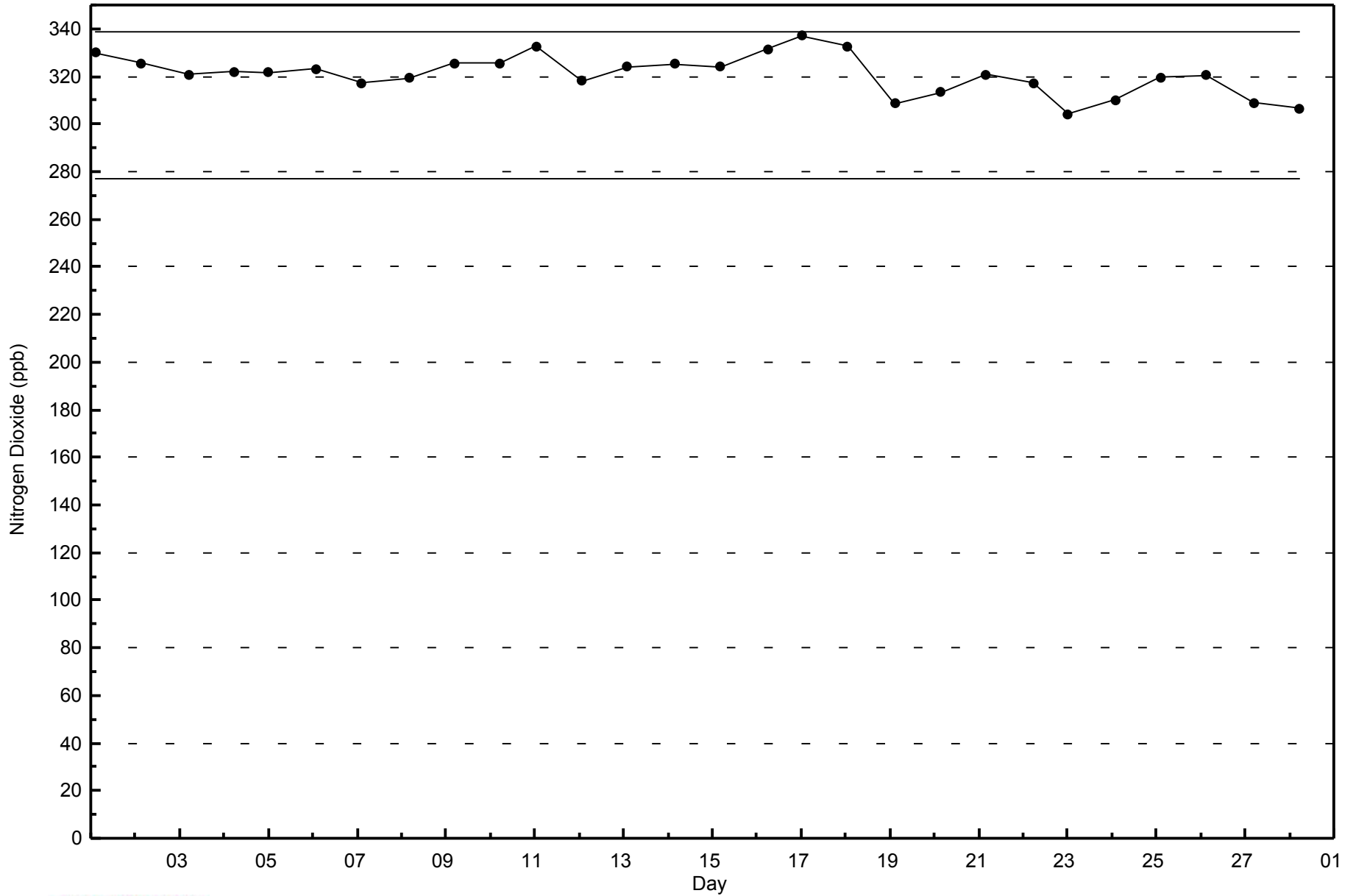
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Shell Muskeg River - February 2015



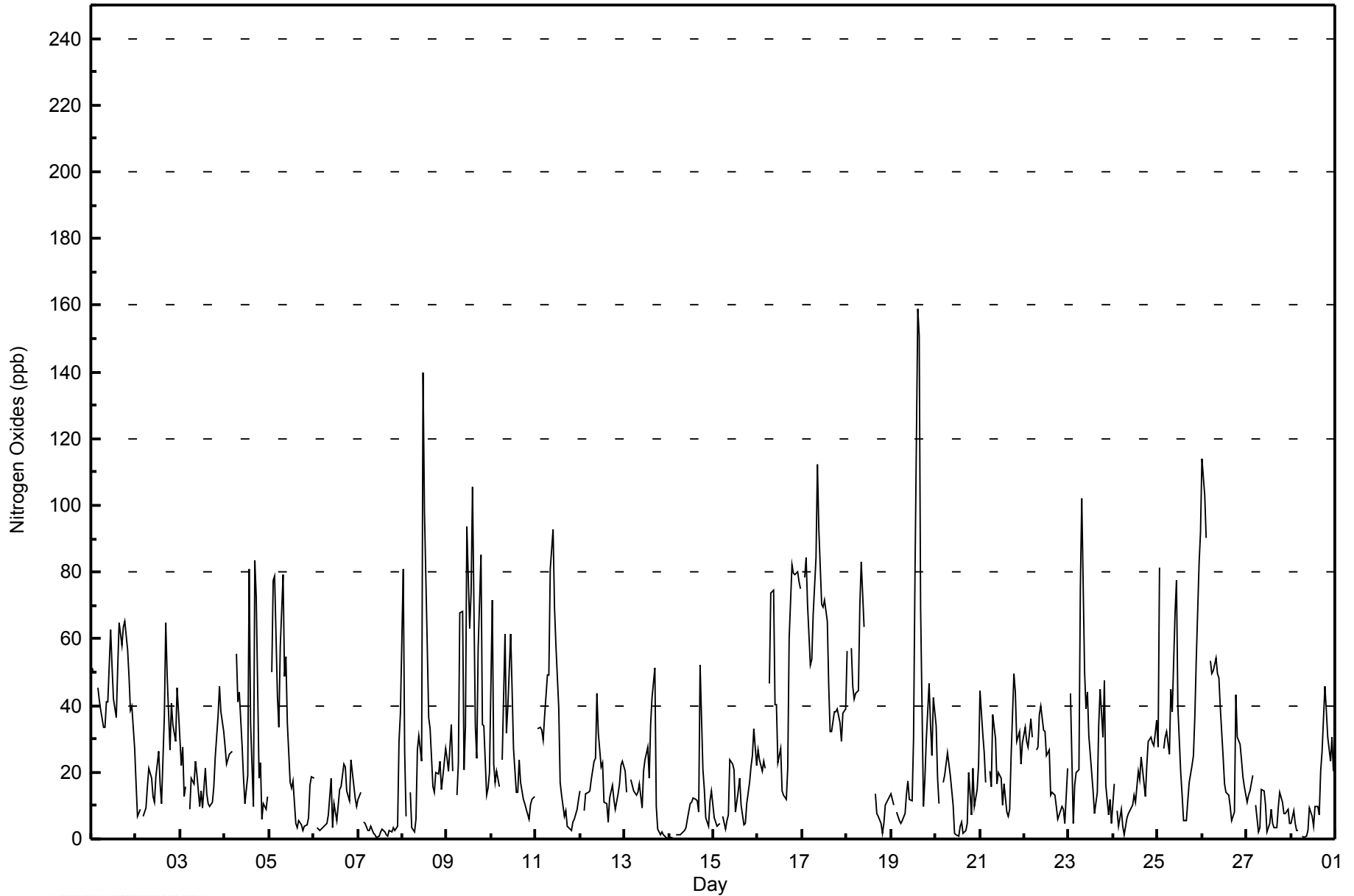


Maximum Value: 159 ppb on Feb 19 15:00																			Maximum Daily Average: 58.2 ppb on Feb 17						Hours in Service: 672	
Minimum Value: 0 ppb on Feb 14 03:00																			Minimum Daily Average: 6.0 ppb on Feb 7						Hours of Data: 639	
Maximum Diurnal Average: 34.8 ppb at hour 9																			Minimum Diurnal Average: 19.3 ppb at hour 6						Hours of Missing Data: 33	
Monthly Average: 26.0 ppb																			Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 4 Q <sub>1</sub> = 10 Median = 19 Q <sub>3</sub> = 35 P <sub>90</sub> = 59 P <sub>99</sub> = 99						Hours of Calibration: 33	
																									Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	51	49	Z	45	42	39	34	33	41	41	63	52	42	37	51	65	58	63	65	57	49	38	40	27	47.1	65
2-Feb	17	7	9	Z	7	10	16	21	18	13	11	19	26	17	11	37	65	49	27	41	35	29	45	38	24.5	65
3-Feb	22	27	13	16	Z	9	18	16	23	19	10	14	9	21	13	10	10	11	16	25	37	46	38	32	19.9	46
4-Feb	28	23	25	26	Z	26	55	41	44	28	18	10	19	81	35	10	83	73	18	23	6	11	9	13	30.7	83
5-Feb	Z	50	78	79	43	33	58	79	49	55	35	17	15	17	5	3	6	4	3	4	4	6	16	19	29.4	79
6-Feb	18	Z	4	3	3	3	4	5	7	18	3	11	6	10	15	16	22	22	14	11	24	20	12	10	11.3	24
7-Feb	12	14	Z	5	5	2	2	4	2	1	0	1	2	3	2	1	1	2	2	3	2	4	29	38	6.0	38
8-Feb	81	26	7	Z	14	3	2	6	27	31	23	140	98	58	37	33	16	14	20	20	24	15	19	27	32.1	140
9-Feb	24	20	34	20	Z	13	23	68	68	21	34	94	63	74	106	34	24	57	85	34	34	13	15	20	42.6	106
10-Feb	72	22	17	20	15	Z	24	61	32	40	61	45	27	14	14	24	17	12	11	9	6	10	12	13	25.1	72
11-Feb	Z	33	34	33	30	37	49	49	81	93	69	58	40	17	13	7	9	4	3	3	5	6	9	12	30.1	93
12-Feb	14	Z	8	14	14	15	18	23	24	43	32	22	23	11	11	5	12	16	12	9	13	17	22	23	17.4	43
13-Feb	20	14	Z	18	16	14	13	14	17	9	21	24	27	18	34	42	51	10	3	1	2	1	0	0	16.1	51
14-Feb	0	0	0	Z	1	1	1	2	3	3	6	11	11	12	12	11	8	52	21	15	6	4	12	14	9.0	52
15-Feb	6	5	4	5	Z	7	3	6	7	24	23	21	8	14	18	10	4	5	11	17	22	25	33	22	13.0	33
16-Feb	27	24	20	23	21	Z	47	74	74	40	40	23	27	14	13	12	21	60	82	80	79	80	77	75	44.9	82
17-Feb	Z	78	84	70	52	54	67	84	112	93	70	70	71	65	46	32	32	38	38	39	35	29	38	39	58.2	112
18-Feb	56	Z	57	46	42	44	45	70	83	63	C	C	C	C	C	14	7	7	5	2	5	10	12	13	32.2	83
19-Feb	14	10	Z	8	5	5	5	8	13	17	12	11	30	78	159	151	69	10	18	30	47	34	25	43	34.9	159
20-Feb	34	18	10	Z	17	19	26	22	19	10	2	1	1	4	5	2	2	5	20	7	21	10	15	22	12.7	34
21-Feb	45	32	26	17	Z	20	16	37	30	17	20	18	10	16	8	7	9	25	49	44	29	32	22	29	24.2	49
22-Feb	33	29	27	36	31	Z	27	27	37	40	33	32	25	27	13	14	13	10	6	9	10	9	5	21	22.3	40
23-Feb	Z	43	4	16	20	21	75	102	50	39	44	31	20	14	8	14	34	45	30	48	16	7	12	5	30.4	102
24-Feb	17	Z	8	4	9	4	1	7	7	8	10	13	11	20	18	25	21	13	22	29	31	29	28	35	16.1	35
25-Feb	27	81	Z	27	30	32	26	45	38	68	77	40	20	13	6	6	12	17	22	25	37	54	83	92	38.1	92
26-Feb	114	103	90	Z	53	50	50	54	50	48	40	25	17	14	13	10	5	8	43	30	29	24	19	16	39.3	114
27-Feb	11	13	14	19	Z	10	2	3	15	14	10	2	4	9	5	3	4	9	14	11	8	7	9	5	8.8	19
28-Feb	5	8	5	3	3	Z	1	0	1	2	9	7	4	10	10	7	20	26	46	38	31	23	30	20	13.4	46
31.1 30.5 25.2 24.0 21.7 19.3 25.3 34.3 34.8 32.1 28.8 29.9 24.3 25.5 25.1 21.6 22.8 23.8 25.2 23.7 23.0 21.2 24.5 25.8																								Diurnal Average		
114 103 90 79 53 54 75 102 112 93 77 140 98 81 159 151 83 73 85 80 79 80 83 92																								Diurnal Maximum		
Z - zerospan C - Calibration																										



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - February 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	343	53.68	53.68
21 - 40	168	26.29	79.97
41 - 80	103	16.12	96.09
81 - 159	21	3.29	99.37
> 159	0	0.00	99.37

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Shell Muskeg River - February 2015**

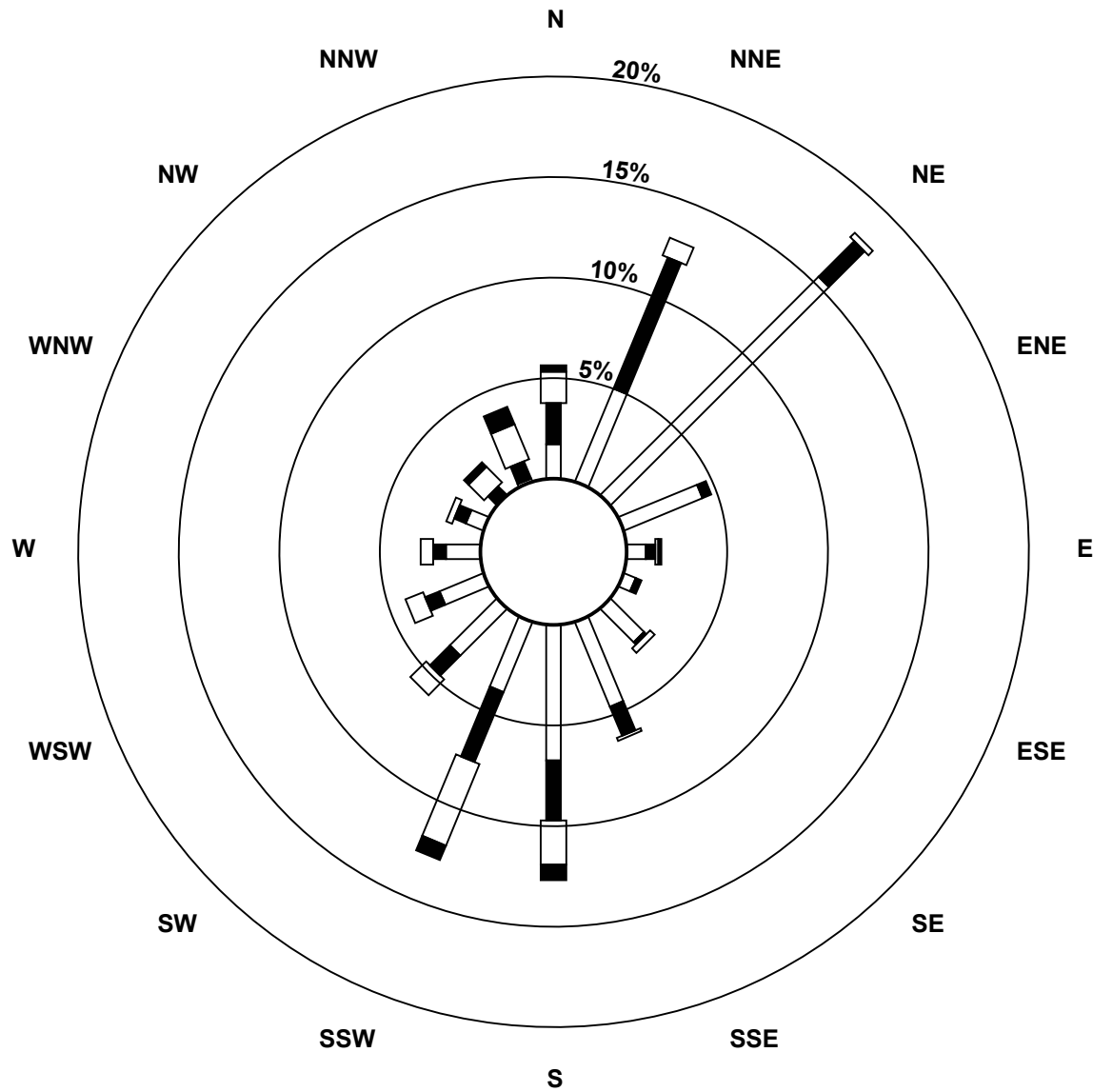
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	11	32	98	27	6	4	15	29	43	24	21	15	11	6	0	1	343
21 - 40	13	45	16	3	3	2	1	10	19	24	9	5	4	4	4	6	168
11 - 80	10	6	2	0	1	0	2	1	14	28	7	6	4	2	7	12	102
81 - 159	2	0	0	0	1	0	0	0	5	5	0	0	0	0	2	6	21
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	36	83	116	30	11	6	18	40	81	81	37	26	19	12	13	25	634

Total Number of Valid Hours: 638

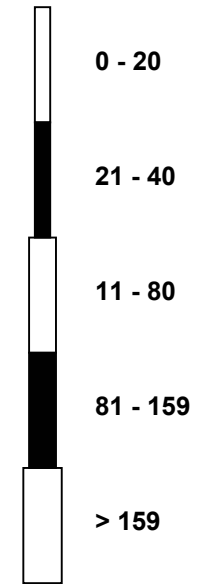
Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

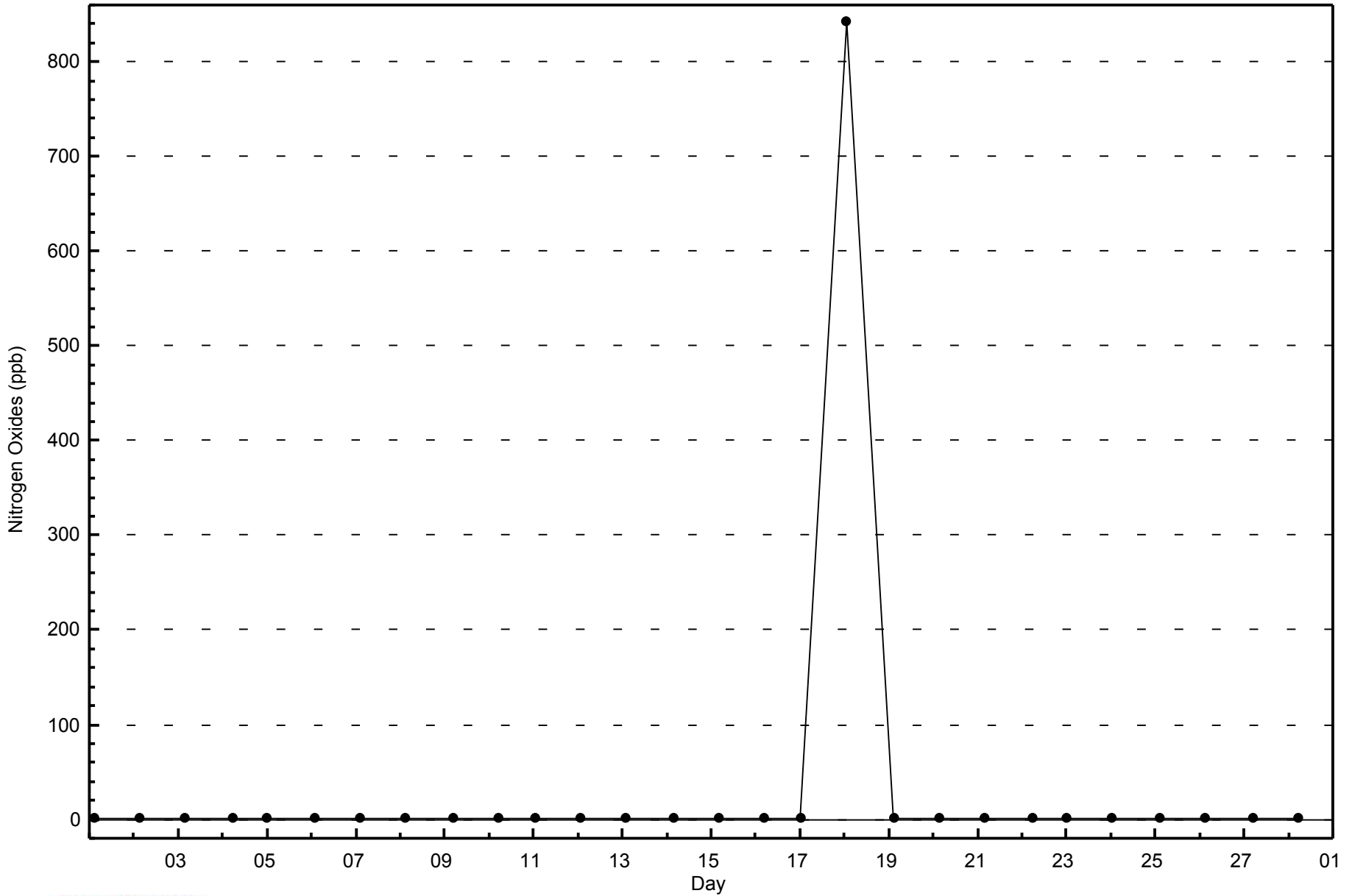
Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 Shell Muskeg River (AMS 16)



Classes (ppb)



Total Number of Valid Hours: 638

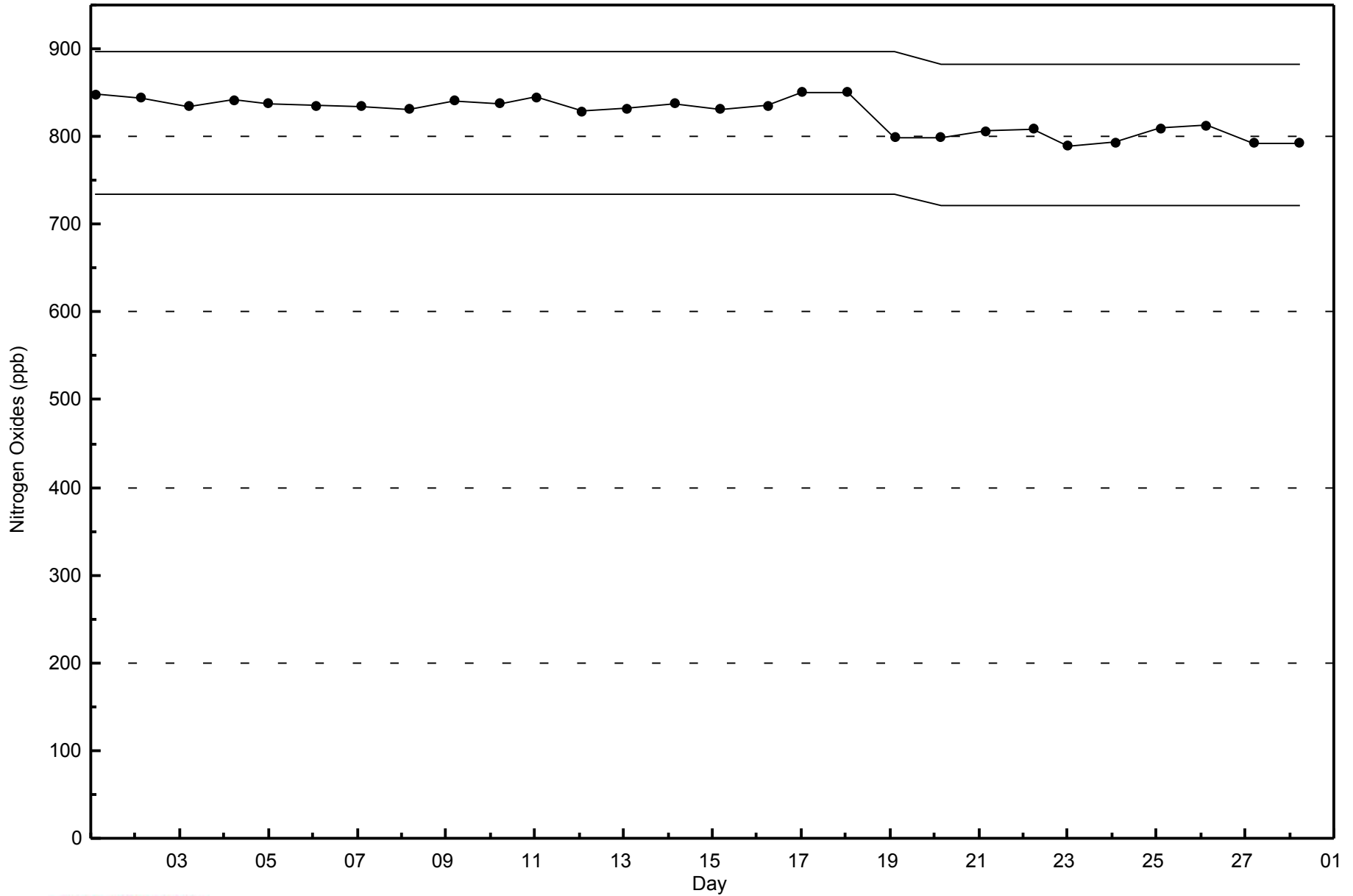






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Shell Muskeg River - February 2015



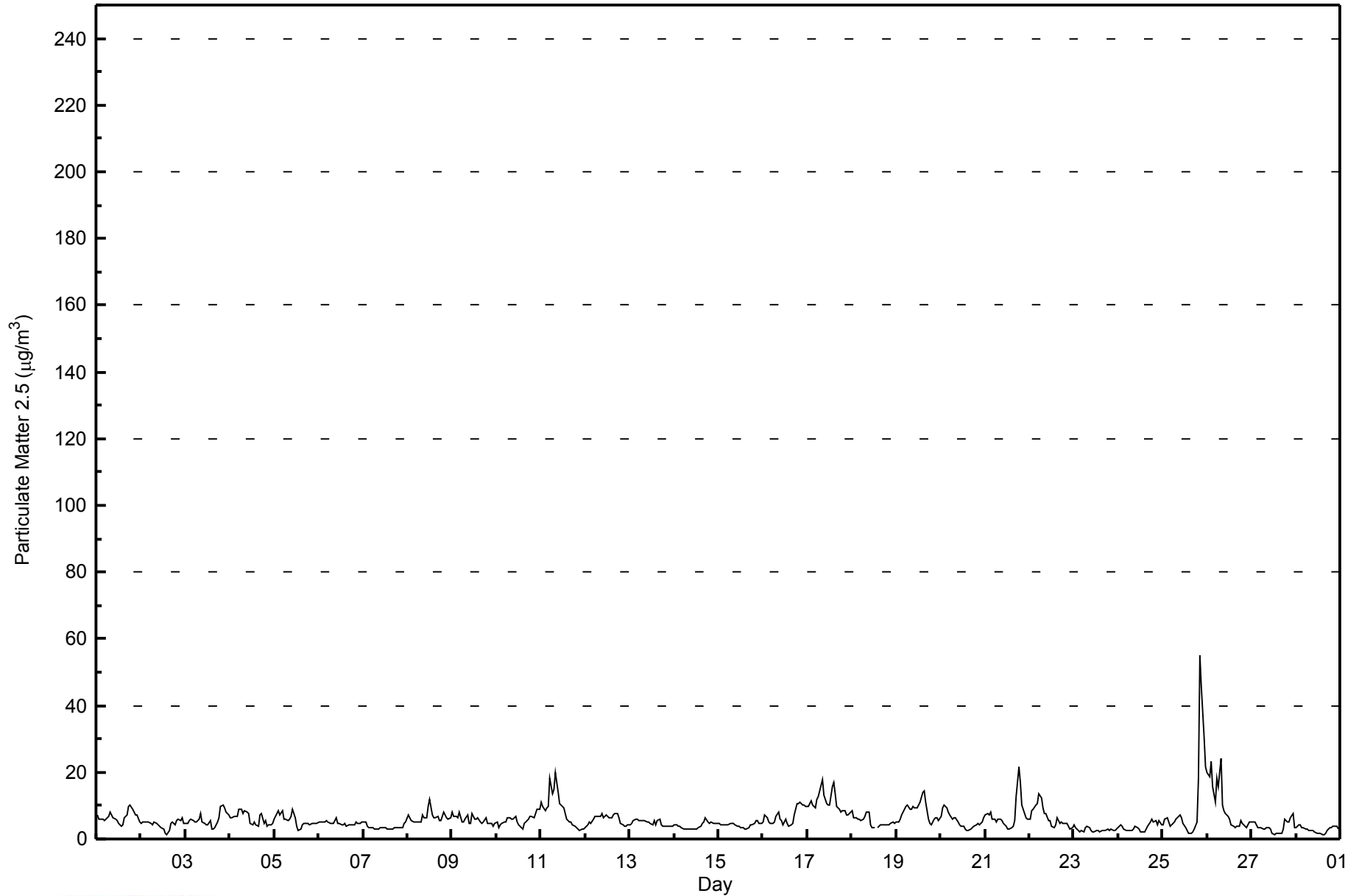


Number of Exceedences (AAAQO): 24-hr: 0 Maximum Value: 55.0 µg/m <sup>3</sup> on Feb 25 21:00 Minimum Value: 1.4 µg/m <sup>3</sup> on Feb 28 16:00 Maximum Diurnal Average: 7.3 µg/m <sup>3</sup> at hour 21 Monthly Average: 5.92 µg/m <sup>3</sup>		Maximum Daily Average: 11.1 µg/m <sup>3</sup> on Feb 17 Minimum Daily Average: 2.7 µg/m <sup>3</sup> on Feb 23 Minimum Diurnal Average: 4.4 µg/m <sup>3</sup> at hour 15 Percentiles: P <sub>1</sub> = 1.5 P <sub>10</sub> = 2.9 Q <sub>1</sub> = 3.9 Median = 5.0 Q <sub>3</sub> = 6.7 P <sub>90</sub> = 9.6 P <sub>99</sub> = 21.4		Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	7.3	6.0	5.8	5.8	5.4	5.7	6.9	8.0	7.3	6.3	5.9	5.6	4.6	4.0	4.3	6.2	7.4	9.9	10.0	8.7	8.1	7.3	7.0	5.1	6.6	10.0
2-Feb	4.7	5.0	5.1	5.3	5.1	4.5	4.3	4.9	4.6	4.0	3.6	3.4	3.1	1.6	1.4	2.6	4.8	4.9	4.4	5.7	5.8	5.7	6.3	4.8	4.4	6.3
3-Feb	4.8	4.8	5.3	6.1	5.4	5.2	5.3	5.7	7.6	5.1	4.7	4.3	4.3	5.4	2.9	2.9	3.5	4.9	6.5	9.6	10.2	9.5	8.1	7.0	5.8	10.2
4-Feb	6.4	6.4	6.7	6.8	6.6	8.7	8.7	7.7	8.5	8.0	7.6	4.8	4.2	5.2	4.1	3.8	7.0	7.5	4.8	5.6	3.8	4.4	4.4	4.8	6.1	8.7
5-Feb	6.0	7.4	8.5	7.3	8.6	5.9	6.0	5.7	5.8	6.8	8.8	6.5	4.0	2.7	3.0	4.1	4.5	4.6	4.8	4.4	4.5	4.5	4.8	4.6	5.6	8.8
6-Feb	5.3	5.2	5.0	4.9	5.5	5.0	4.8	4.8	4.8	6.3	4.8	4.6	4.2	4.3	4.6	4.0	4.4	4.3	4.3	4.4	5.1	4.8	4.8	5.1	4.8	6.3
7-Feb	5.1	5.1	3.7	3.4	3.4	3.4	3.1	3.1	3.2	3.5	3.5	3.4	3.3	3.2	3.1	3.0	3.1	3.3	3.5	3.5	3.6	3.5	4.8	5.0	3.6	5.1
8-Feb	7.1	6.4	5.4	5.0	5.2	5.2	5.1	5.2	7.0	6.5	6.2	9.9	11.8	7.0	6.5	6.3	6.6	5.7	5.4	7.9	7.3	6.2	5.8	6.4	6.6	11.8
9-Feb	8.0	6.8	6.6	6.3	8.1	4.9	4.9	6.0	7.0	4.6	4.8	7.4	5.8	5.9	6.2	5.3	4.8	5.0	6.3	4.5	4.5	4.6	4.0	4.5	5.7	8.1
10-Feb	4.9	3.6	4.3	4.6	5.2	5.1	6.4	6.6	5.8	6.0	6.6	5.2	4.4	3.5	3.1	4.8	5.2	5.9	6.9	6.7	6.4	7.6	9.1	8.9	5.7	9.1
11-Feb	11.0	9.7	8.6	9.3	9.7	18.1	13.5	14.9	19.7	14.0	10.5	10.1	9.5	7.5	6.1	5.3	5.3	4.3	3.7	3.5	2.9	2.5	2.8	3.1	8.6	19.7
12-Feb	3.5	4.4	4.9	4.8	5.8	6.7	6.7	6.6	6.8	7.5	6.5	7.0	6.7	6.3	6.5	7.3	7.6	7.7	6.2	4.5	4.1	4.0	3.8	4.1	5.8	7.7
13-Feb	4.4	4.7	5.4	5.8	6.0	5.6	5.5	5.4	5.4	5.3	4.9	4.6	4.2	5.5	4.3	5.6	5.9	4.2	3.7	3.7	3.9	3.9	3.8	3.9	4.8	6.0
14-Feb	4.0	4.2	4.0	3.6	3.4	3.1	3.1	3.1	2.9	2.9	2.9	3.0	3.3	3.6	4.5	5.3	6.6	5.0	4.8	4.9	4.8	4.7	4.7	4.7	4.0	6.6
15-Feb	4.6	4.2	4.4	4.4	4.4	4.4	4.7	4.8	4.6	4.3	3.7	3.7	3.4	3.2	2.9	3.1	3.4	4.1	4.2	4.8	5.6	5.3	4.5	4.7	4.2	5.6
16-Feb	5.2	7.3	6.3	5.1	4.8	4.6	5.3	6.7	8.0	5.8	5.3	4.4	5.7	4.5	3.9	4.1	4.5	7.1	10.5	10.4	11.0	10.4	10.3	9.7	6.7	11.0
17-Feb	9.6	10.6	11.3	10.0	9.3	11.7	12.9	16.3	18.0	13.3	10.6	10.2	10.1	15.5	17.0	13.6	9.6	8.8	8.2	8.6	8.3	7.0	7.1	8.2	11.1	18.0
18-Feb	8.3	6.2	6.4	5.9	5.7	5.7	5.8	6.9	8.1	8.0	4.1	3.2	3.5	M	3.3	4.1	4.3	4.1	4.1	4.1	4.1	4.8	5.0	4.7	5.2	8.3
19-Feb	5.1	5.0	5.8	7.0	9.0	9.9	10.0	8.7	9.0	9.7	9.4	9.3	10.3	10.9	14.2	14.5	11.2	6.0	4.5	4.4	5.8	6.5	6.4	5.3	8.3	14.5
20-Feb	6.8	9.3	10.3	9.1	7.8	7.2	6.0	6.2	6.4	5.2	4.2	3.8	3.6	3.1	2.7	2.7	3.1	3.5	3.9	4.3	4.7	4.2	5.0	6.2	5.4	10.3
21-Feb	7.2	7.8	7.1	8.1	6.1	6.0	5.3	6.0	6.1	5.6	4.7	4.0	2.8	2.9	3.6	3.9	5.3	12.7	21.8	17.1	10.0	7.8	6.3	6.0	7.3	21.8
22-Feb	6.0	8.3	9.1	10.1	10.6	13.6	12.3	9.2	7.6	7.8	5.4	5.7	3.8	3.2	4.2	6.3	4.7	5.0	4.7	4.6	4.5	4.0	3.1	3.4	6.5	13.6
23-Feb	4.2	3.5	2.4	2.3	2.4	2.2	3.4	3.8	3.3	2.4	2.2	2.0	2.4	2.4	2.3	2.4	2.4	2.6	2.9	2.4	2.8	2.7	2.7	3.0	2.7	4.2
24-Feb	3.7	4.3	3.8	2.9	2.6	2.4	2.4	2.7	3.0	3.7	3.3	2.8	2.2	2.0	2.1	3.0	3.9	5.1	6.0	5.2	5.3	4.1	5.3	4.2	3.6	6.0
25-Feb	4.3	5.8	6.3	4.9	4.0	4.4	5.1	6.0	6.5	7.0	6.3	4.8	3.6	2.6	1.7	1.6	2.0	3.2	4.9	18.0	55.0	45.6	30.4	21.4	10.6	55.0
26-Feb	19.8	18.4	23.2	15.6	10.9	18.2	15.5	24.1	10.3	8.6	7.7	6.9	5.7	4.0	3.7	3.5	3.6	4.0	5.4	4.5	4.0	3.5	4.3	4.9	9.6	24.1
27-Feb	5.1	5.1	5.0	3.5	3.5	3.3	3.0	3.1	3.4	3.2	3.1	1.8	1.5	1.6	1.5	1.8	1.8	3.1	5.9	5.1	4.9	6.2	7.8	3.2	3.6	7.8
28-Feb	3.5	4.3	4.2	3.5	3.5	3.0	2.8	2.6	2.5	2.4	1.9	1.6	1.6	1.6	1.4	1.4	1.5	2.4	3.2	3.5	3.6	3.9	3.6	3.2	2.8	4.3
																								Diurnal Average		
6.3 6.4 6.6 6.1 6.0 6.6 6.4 7.0 6.9 6.2 5.5 5.1 4.8 4.6 4.4 4.7 4.9 5.4 5.9 6.2 7.3 6.8 6.3 5.7																								Diurnal Maximum		
19.8 18.4 23.2 15.6 10.9 18.2 15.5 24.1 19.7 14.0 10.6 10.2 11.8 15.5 17.0 14.5 11.2 12.7 21.8 18.0 55.0 45.6 30.4 21.4																										
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 - February 2015**





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Shell Muskeg River - February 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	400	59.61	59.61
6 - 15	252	37.56	97.17
16 - 25	16	2.38	99.55
26 - 80	3	0.45	100.00
> 81.0	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Shell Muskeg River - February 2015**

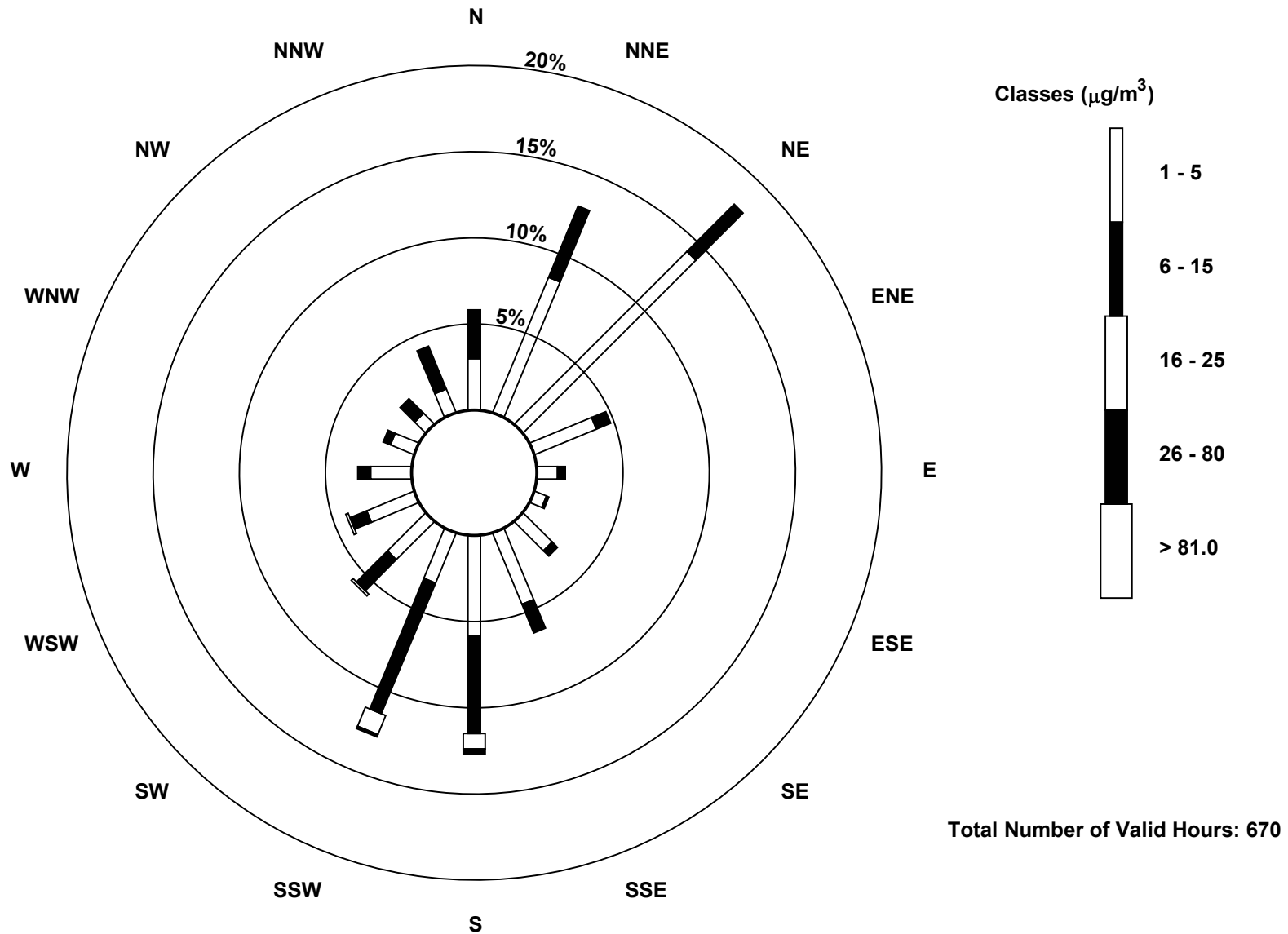
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	20	57	95	26	8	5	16	30	39	21	21	20	16	10	6	10	400
6 - 15	19	30	26	6	3	1	3	12	38	55	17	7	5	3	8	18	251
16 - 25	0	0	0	0	0	0	0	0	6	8	1	1	0	0	0	0	16
26 - 80	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	3
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	87	121	32	11	6	19	42	85	85	39	28	21	13	14	28	670

Total Number of Valid Hours: 670

Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$   
 Shell Muskeg River (AMS 16)



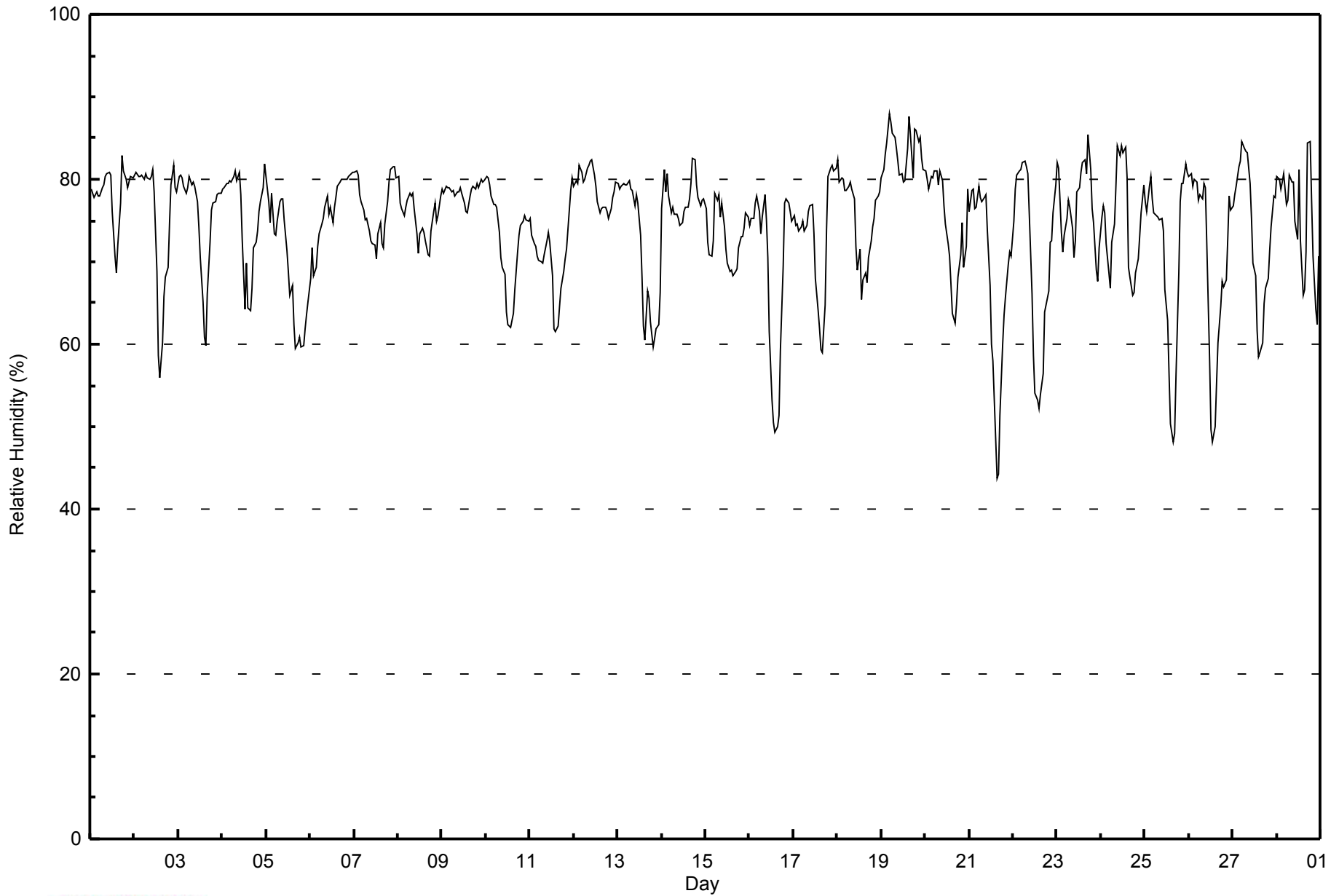


Maximum Value: 88 % on Feb 19 05:00																		Maximum Daily Average: 83.5 % on Feb 19																		Hours in Service: 672			
Minimum Value: 44 % on Feb 21 16:00																		Minimum Daily Average: 67.7 % on Feb 21																		Hours of Data: 672			
Maximum Diurnal Average: 78.2 % at hour 1																		Minimum Diurnal Average: 65.6 % at hour 16																		Hours of Missing Data: 0			
Monthly Average: 74.2 %																		Percentiles: P <sub>1</sub> = 50 P <sub>10</sub> = 63 Q <sub>1</sub> = 71 Median = 77 Q <sub>3</sub> = 79 P <sub>90</sub> = 81 P <sub>99</sub> = 85																		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-Feb	79	78	78	79	78	78	79	79	80	81	81	81	76	71	69	72	77	83	81	80	79	80	80	80	78.3	83													
2-Feb	80	81	80	80	81	80	81	80	80	80	81	78	69	59	56	60	66	68	69	75	79	82	79	79	75.1	82													
3-Feb	80	81	80	79	78	79	80	79	80	79	77	74	71	65	61	60	66	72	76	77	77	78	78	78	75.3	81													
4-Feb	79	79	79	79	80	80	80	81	80	81	78	73	64	70	64	64	67	72	72	74	76	77	79	82	75.4	82													
5-Feb	80	77	75	78	73	73	75	77	78	78	75	71	69	66	67	62	60	60	61	60	60	62	64	65	69.4	80													
6-Feb	68	72	68	69	72	73	75	75	77	78	76	77	75	77	78	79	80	80	80	80	80	80	81	81	76.2	81													
7-Feb	81	81	81	78	77	76	75	75	74	73	72	72	70	73	75	72	72	75	77	80	81	82	81	80	76.4	82													
8-Feb	80	77	76	76	77	77	78	78	78	77	73	71	73	74	74	73	71	71	74	76	77	75	76	78	75.4	80													
9-Feb	79	78	79	79	79	79	79	79	78	79	78	79	78	77	76	76	78	79	79	79	79	80	80	80	78.6	80													
10-Feb	80	80	79	78	77	77	77	74	71	69	69	64	62	62	63	64	67	71	73	74	75	76	75	75	72.1	80													
11-Feb	75	73	72	72	71	70	70	70	71	73	74	72	68	62	61	62	65	67	69	70	72	74	79	80	70.5	80													
12-Feb	79	80	80	82	81	80	80	81	82	82	82	81	79	77	76	76	77	77	76	75	77	78	78	80	79.0	82													
13-Feb	80	79	79	80	79	79	80	79	79	77	78	77	73	68	62	61	66	66	63	60	61	62	62	66	71.4	80													
14-Feb	76	81	78	81	78	76	77	76	76	75	74	75	76	77	77	78	80	83	82	79	78	77	77	78	77.6	83													
15-Feb	76	72	71	71	73	78	77	78	75	77	74	72	70	69	69	68	69	69	72	73	73	74	76	75	73.0	78													
16-Feb	74	75	75	77	78	76	73	75	78	75	71	61	53	51	49	50	51	59	70	77	78	77	76	75	69.0	78													
17-Feb	76	74	75	74	74	75	74	74	76	77	77	73	68	64	62	59	59	65	74	80	81	82	81	81	73.1	82													
18-Feb	82	80	80	80	79	79	79	80	79	78	72	69	72	65	68	69	67	71	73	74	75	77	78	79	75.1	82													
19-Feb	80	81	83	84	88	87	86	85	84	82	81	81	80	80	84	88	86	80	86	86	85	85	83	81	83.5	88													
20-Feb	81	80	79	80	80	81	81	79	81	80	77	75	72	71	67	64	63	65	68	71	75	69	72	79	74.5	81													
21-Feb	76	79	79	76	77	79	78	77	78	78	74	67	60	58	48	44	44	51	60	63	66	70	71	71	67.7	79													
22-Feb	75	79	81	81	81	82	82	82	81	76	66	59	54	53	52	54	56	64	65	66	72	73	76	79	70.4	82													
23-Feb	82	81	74	71	73	75	77	77	74	70	72	78	79	81	82	82	81	85	81	76	75	69	68	72	76.6	85													
24-Feb	75	77	76	72	69	67	72	74	79	84	83	84	83	84	80	69	68	66	66	69	70	73	76	79	74.9	84													
25-Feb	77	76	79	80	78	76	76	75	75	75	74	67	63	56	50	48	49	56	69	77	79	82	81	70.8	82														
26-Feb	80	81	79	80	80	77	78	78	80	79	72	58	50	48	50	55	60	65	68	67	68	73	78	76	69.9	81													
27-Feb	77	78	79	82	82	85	84	83	83	79	75	70	68	62	59	59	60	65	67	68	71	74	78	78	73.6	85													
28-Feb	80	80	79	80	81	77	78	81	80	80	75	73	81	72	66	67	71	84	85	77	71	64	62	71	75.5	85													
78.2 78.2 77.6 77.8 77.6 77.6 77.9 77.9 78.0 77.5 75.4 72.5 69.9 67.5 65.9 65.6 67.0 70.3 72.7 73.8 74.6 75.0 75.9 77.1																								Diurnal Average															
82 81 83 84 88 87 86 85 84 84 83 84 83 84 84 88 86 85 86 86 85 85 83 82																								Diurnal Maximum															



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Shell Muskeg River - February 2015**







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

**Relative Humidity (RH) - %**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	0	0.00	0.00
40 - 60	38	5.65	5.65
60 - 80	500	74.40	80.06
80 - 100	134	19.94	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

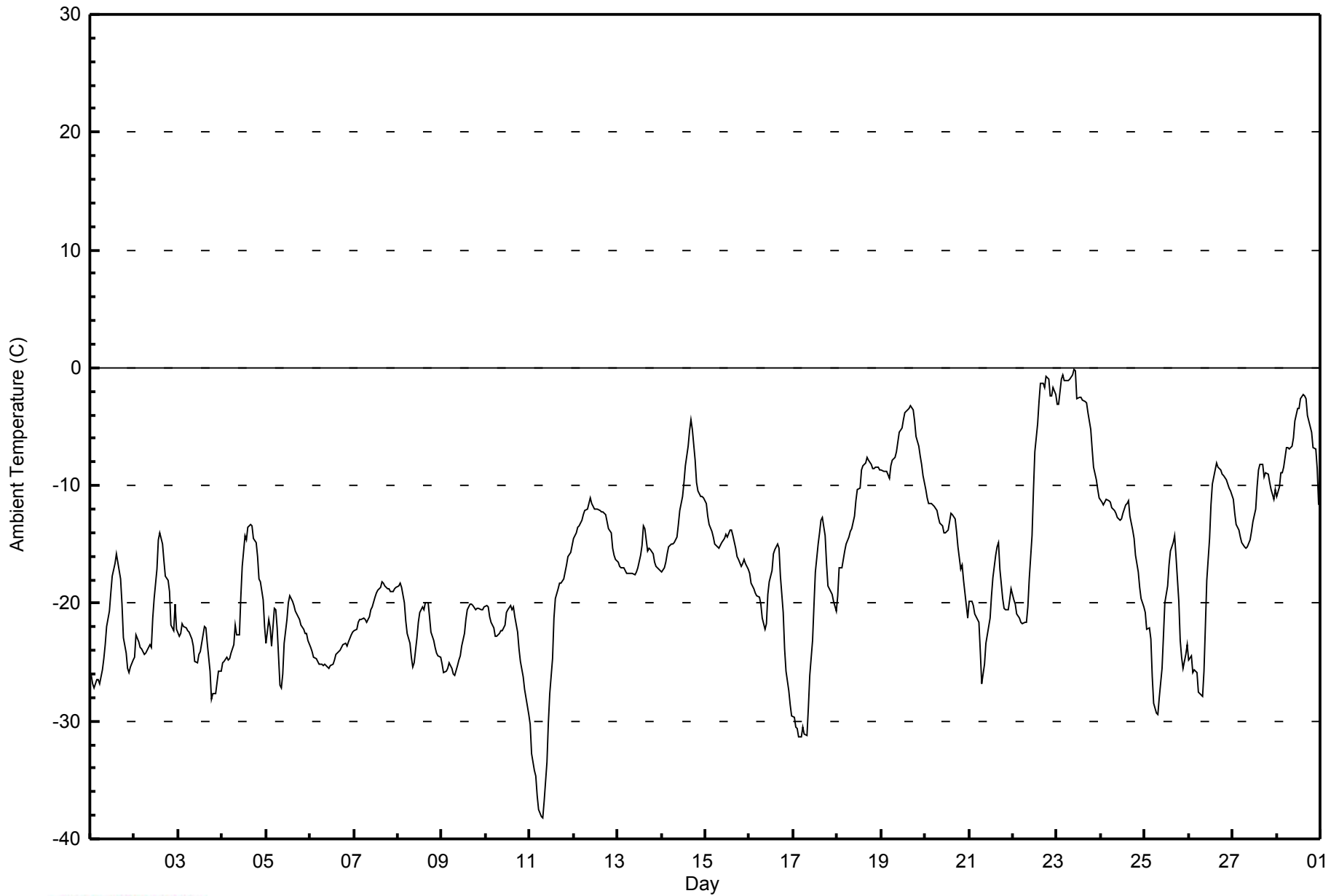


Maximum Value: -0.1 C on Feb 23 10:00		Maximum Daily Average: -3.5 C on Feb 23		Hours in Service: 672																						
Minimum Value: -38.3 C on Feb 11 08:00		Minimum Daily Average: -26.2 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -13.2 C at hour 16		Minimum Diurnal Average: -20.2 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -17.28 C		Percentiles: P <sub>1</sub> = -34.1 P <sub>10</sub> = -25.6 Q <sub>1</sub> = -22.6 Median = -18.0 Q <sub>3</sub> = -12.3 P <sub>90</sub> = -7.7 P <sub>99</sub> = -0.9		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-Feb	-26.2	-26.8	-27.2	-26.5	-26.5	-26.9	-25.6	-24.7	-23.5	-22.0	-20.6	-19.2	-17.6	-16.7	-15.8	-16.5	-17.9	-20.1	-22.9	-24.2	-25.5	-25.9	-25.4	-24.8	-22.9	-15.8
2-Feb	-24.6	-22.7	-23.2	-23.8	-23.8	-24.3	-24.2	-24.0	-23.5	-23.8	-21.3	-19.6	-17.0	-14.7	-14.1	-15.0	-16.3	-17.7	-18.0	-19.0	-21.8	-22.4	-20.1	-22.2	-20.7	-14.1
3-Feb	-22.8	-22.5	-21.7	-21.9	-22.1	-22.3	-22.5	-23.0	-23.7	-24.9	-25.1	-24.4	-24.1	-22.7	-22.0	-22.1	-23.4	-25.7	-28.1	-27.6	-27.6	-26.8	-25.7	-25.7	-24.1	-21.7
4-Feb	-25.1	-25.0	-24.5	-24.8	-24.7	-24.2	-23.5	-21.9	-22.7	-22.7	-19.5	-16.9	-14.2	-14.6	-13.5	-13.4	-13.5	-14.4	-14.9	-16.0	-18.0	-18.1	-19.7	-21.9	-19.5	-13.4
5-Feb	-23.4	-21.4	-22.0	-23.6	-20.5	-20.5	-22.1	-27.0	-27.2	-26.0	-23.4	-21.4	-19.9	-19.3	-19.8	-20.2	-20.7	-21.1	-21.4	-21.8	-22.2	-22.6	-22.5	-23.2	-22.2	-19.3
6-Feb	-23.8	-24.2	-24.6	-24.7	-25.0	-25.2	-25.2	-25.3	-25.2	-25.4	-25.5	-25.3	-25.1	-24.8	-24.3	-24.2	-23.9	-23.7	-23.5	-23.4	-23.6	-23.2	-22.7	-22.4	-24.3	-22.4
7-Feb	-22.3	-22.2	-21.6	-21.3	-21.3	-21.3	-21.3	-21.6	-21.1	-20.6	-20.3	-19.5	-19.1	-18.9	-18.6	-18.2	-18.3	-18.5	-18.7	-18.8	-19.0	-19.0	-18.8	-18.7	-20.0	-18.2
8-Feb	-18.5	-18.3	-18.7	-19.9	-21.5	-22.5	-23.4	-24.6	-25.4	-25.1	-22.9	-21.6	-20.8	-20.3	-20.5	-19.9	-19.9	-21.2	-22.5	-23.1	-23.8	-24.2	-24.5	-24.6	-22.0	-18.3
9-Feb	-25.1	-25.8	-25.8	-25.6	-25.1	-25.6	-26.0	-26.1	-25.3	-24.9	-24.5	-23.6	-22.6	-21.3	-20.6	-20.1	-20.1	-20.2	-20.5	-20.4	-20.4	-20.6	-20.5	-20.3	-23.0	-20.1
10-Feb	-20.1	-20.3	-21.2	-21.6	-22.1	-22.8	-22.8	-22.6	-22.4	-22.3	-21.8	-20.8	-20.5	-20.2	-20.6	-20.4	-21.1	-22.4	-23.9	-24.9	-26.2	-27.3	-28.0	-29.4	-22.7	-20.1
11-Feb	-30.2	-32.8	-34.2	-34.7	-36.3	-37.5	-38.1	-38.3	-36.8	-33.5	-30.1	-27.7	-24.7	-21.2	-19.6	-18.7	-18.3	-18.3	-18.0	-17.3	-16.7	-16.0	-15.7	-15.1	-26.2	-15.1
12-Feb	-14.5	-14.0	-13.5	-13.5	-13.0	-12.5	-12.2	-12.0	-11.6	-11.0	-11.6	-12.0	-12.0	-12.0	-12.1	-12.2	-12.3	-12.4	-13.0	-13.7	-14.0	-15.3	-15.9	-16.3	-13.0	-11.0
13-Feb	-16.5	-16.8	-17.0	-17.0	-17.2	-17.4	-17.5	-17.5	-17.6	-17.3	-17.0	-15.9	-15.1	-13.4	-13.6	-15.6	-15.4	-15.4	-15.8	-16.5	-16.9	-17.1	-17.2	-16.4	-13.4	-13.4
14-Feb	-17.3	-17.0	-16.6	-15.8	-15.2	-15.0	-15.0	-14.9	-14.4	-13.3	-12.1	-11.0	-9.7	-8.3	-6.7	-5.3	-4.3	-5.3	-7.8	-9.7	-10.5	-10.9	-11.0	-11.1	-11.6	-4.3
15-Feb	-11.6	-12.5	-13.3	-13.9	-14.4	-15.0	-15.2	-15.3	-15.1	-14.8	-14.5	-14.1	-14.4	-13.7	-13.8	-14.2	-15.3	-16.0	-16.3	-16.9	-16.6	-16.3	-16.6	-17.1	-14.9	-11.6
16-Feb	-17.5	-18.3	-18.7	-19.2	-19.4	-19.5	-20.1	-21.2	-22.2	-21.7	-19.3	-18.2	-17.3	-15.8	-15.5	-15.0	-15.3	-17.7	-20.8	-23.8	-25.7	-27.4	-28.6	-29.6	-20.3	-15.0
17-Feb	-29.6	-30.6	-30.7	-31.3	-31.3	-30.4	-31.1	-31.2	-28.8	-26.1	-23.1	-20.2	-17.3	-15.0	-14.0	-12.9	-12.7	-14.3	-16.7	-18.6	-19.0	-19.3	-19.8	-20.7	-22.7	-12.7
18-Feb	-19.3	-17.0	-17.0	-16.3	-15.5	-14.9	-14.4	-13.9	-13.6	-12.5	-11.3	-10.4	-10.2	-8.7	-8.3	-8.1	-7.6	-7.9	-8.2	-8.6	-8.6	-8.4	-8.5	-8.6	-11.6	-7.6
19-Feb	-8.7	-8.8	-8.8	-8.8	-9.4	-8.4	-7.9	-7.6	-7.1	-6.3	-5.5	-5.1	-4.5	-3.8	-3.6	-3.4	-3.2	-3.6	-4.5	-5.8	-6.7	-7.4	-8.2	-9.2	-6.5	-3.2
20-Feb	-10.3	-11.0	-11.5	-11.6	-11.7	-11.8	-12.1	-12.7	-13.2	-13.5	-14.1	-14.0	-13.7	-13.1	-12.3	-12.5	-12.8	-13.8	-15.2	-17.1	-16.7	-18.1	-20.2	-21.3	-13.9	-10.3
21-Feb	-19.8	-19.9	-20.2	-20.9	-21.1	-21.6	-24.1	-26.8	-25.1	-23.3	-22.7	-21.3	-19.3	-17.8	-16.0	-15.2	-14.9	-17.1	-19.5	-20.5	-20.5	-20.5	-19.7	-18.7	-20.3	-14.9
22-Feb	-19.8	-20.1	-20.9	-21.2	-21.6	-21.7	-21.6	-21.6	-20.3	-17.9	-14.2	-10.5	-7.1	-4.7	-2.9	-1.4	-1.3	-1.7	-0.8	-0.9	-2.4	-2.4	-1.6	-2.3	-10.9	-0.8
23-Feb	-3.1	-3.1	-0.9	-0.6	-1.1	-1.1	-1.1	-1.0	-0.6	-0.1	-0.2	-2.6	-2.5	-2.8	-2.9	-3.0	-3.9	-5.2	-6.9	-8.4	-9.5	-10.3	-11.1	-3.5	-0.1	
24-Feb	-11.5	-11.6	-11.4	-11.2	-11.3	-11.4	-11.9	-12.1	-12.4	-12.7	-12.9	-12.9	-12.3	-11.7	-11.6	-11.3	-12.6	-13.8	-14.5	-15.9	-17.4	-18.6	-19.6	-20.3	-13.4	-11.2
25-Feb	-20.8	-22.2	-22.1	-23.0	-26.2	-28.5	-29.3	-29.5	-28.0	-25.5	-22.8	-20.0	-18.5	-16.7	-15.6	-14.9	-14.2	-16.0	-19.8	-23.1	-24.6	-25.5	-24.3	-23.5	-22.3	-14.2
26-Feb	-24.8	-24.4	-25.9	-25.6	-25.8	-27.5	-27.7	-27.9	-25.8	-22.0	-18.0	-14.5	-11.6	-9.9	-8.7	-8.1	-8.5	-8.7	-9.0	-9.2	-9.5	-9.8	-10.2	-10.5	-16.8	-8.1
27-Feb	-11.2	-12.3	-13.3	-13.7	-14.4	-14.9	-15.1	-15.3	-15.2	-14.6	-13.9	-13.1	-12.0	-10.1	-8.7	-8.2	-8.2	-9.3	-8.9	-9.0	-9.8	-10.4	-11.2	-10.3	-11.8	-8.2
28-Feb	-10.9	-10.1	-8.9	-8.9	-8.4	-6.8	-6.8	-6.9	-6.7	-6.0	-4.5	-3.5	-3.5	-2.6	-2.2	-2.4	-2.6	-4.0	-5.0	-5.5	-6.8	-6.9	-8.6	-11.6	-6.3	-2.2
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - February 2015**





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

**Ambient Temperature (AT) - C**  
**Shell Muskeg River - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	277	41.22	41.22
-20 - 0	395	58.78	100.00
0 - 10	0	0.00	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

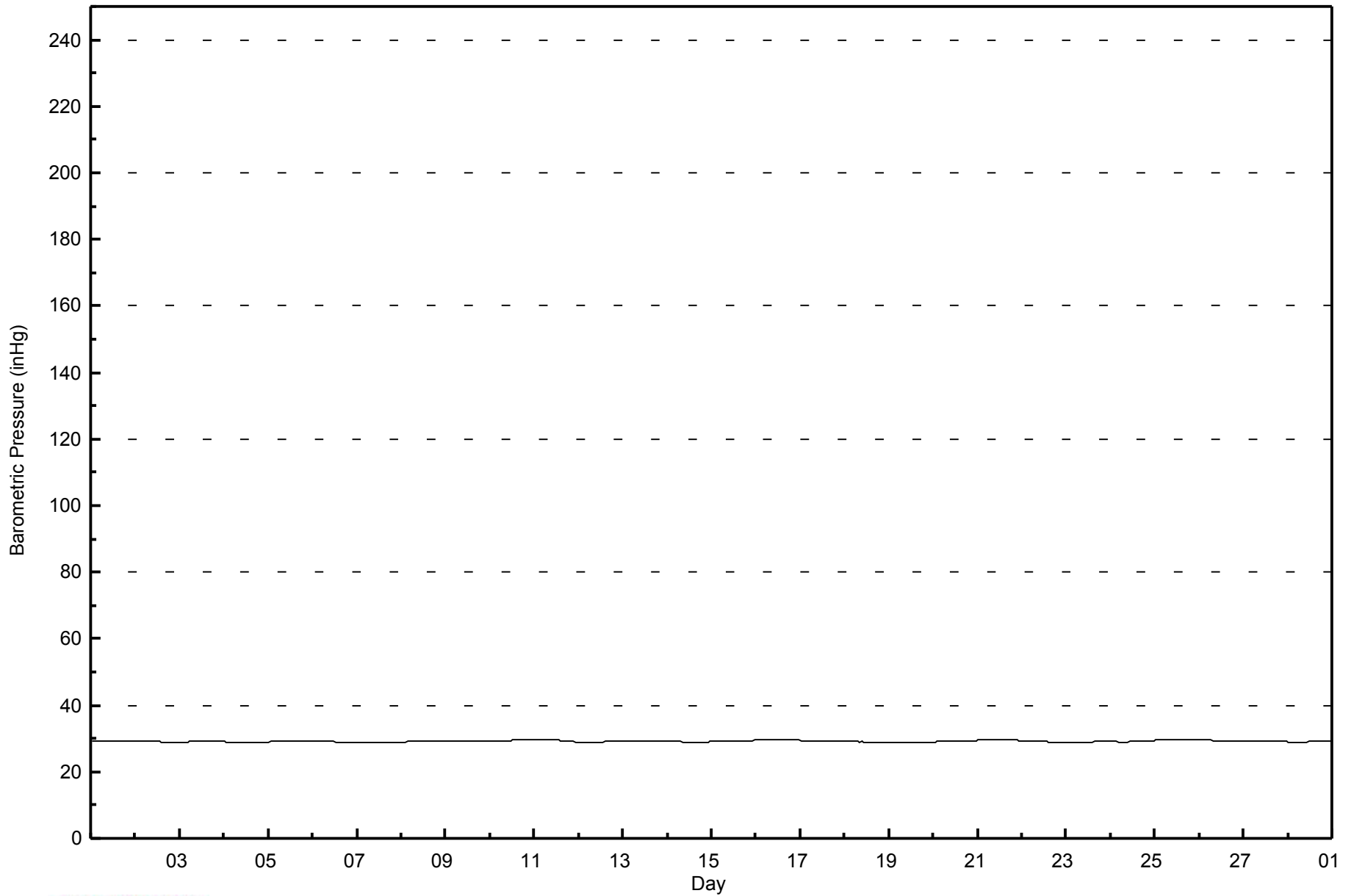


Maximum Value: 29.7 inHg on Feb 11 05:00		Maximum Daily Average: 29.6 inHg on Feb 25		Hours in Service: 672																							
Minimum Value: 28.6 inHg on Feb 7 08:00		Minimum Daily Average: 28.7 inHg on Feb 7		Hours of Data: 672																							
Maximum Diurnal Average: 29.2 inHg at hour 11		Minimum Diurnal Average: 29.1 inHg at hour 17		Hours of Missing Data: 0																							
Monthly Average: 29.17 inHg		Percentiles: P <sub>1</sub> = 28.7 P <sub>10</sub> = 28.8 Q <sub>1</sub> = 29.0 Median = 29.2 Q <sub>3</sub> = 29.3 P <sub>90</sub> = 29.5 P <sub>99</sub> = 29.7		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-Feb	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.2	29.3	
2-Feb	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	29.0	29.0	29.0	29.0	29.1	29.1
3-Feb	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.2	29.2
4-Feb	29.1	29.0	29.0	28.9	28.9	28.8	28.8	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.9	28.9	28.9	29.0	29.0	29.1	29.1
5-Feb	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.1	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
6-Feb	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	28.8	28.8	28.8	28.8	28.8	28.8	29.0	29.2	29.2
7-Feb	28.7	28.7	28.7	28.7	28.7	28.7	28.7	28.6	28.6	28.6	28.7	28.6	28.6	28.7	28.7	28.7	28.7	28.7	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.7	28.9
8-Feb	28.9	28.9	29.0	29.0	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.3	29.3
9-Feb	29.3	29.3	29.3	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.3
10-Feb	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.5	29.5	29.5	29.5	29.5	29.6	29.6	29.6	29.6	29.7	29.7	29.7	29.4	29.7	29.7
11-Feb	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.6	29.6	29.6	29.5	29.4	29.4	29.3	29.3	29.2	29.1	29.1	29.0	29.0	29.0	29.5	29.7	29.7
12-Feb	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	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.0	29.2	29.2
13-Feb	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.4	29.4	29.4
14-Feb	29.3	29.2	29.2	29.1	29.1	29.1	29.1	29.0	29.0	29.0	29.0	28.9	28.9	28.8	28.8	28.8	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.3
15-Feb	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	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.4	29.4	29.5	29.2	29.5
16-Feb	29.5	29.5	29.5	29.5	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.5	29.6
17-Feb	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.1	29.1	29.1	29.3	29.4
18-Feb	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	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.8	29.0	29.1
19-Feb	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	28.8	28.8	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.8	28.9
20-Feb	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.3	29.3	29.3	29.3	29.3	29.4	29.4	29.4	29.4	29.2	29.4	29.4
21-Feb	29.5	29.5	29.5	29.5	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.7	29.6	29.6	29.6	29.6	29.6	29.6	29.5	29.5	29.5	29.5	29.4	29.4	29.6	29.7	29.7
22-Feb	29.4	29.4	29.4	29.3	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.1	29.0	29.0	28.9	28.9	28.8	28.8	28.8	28.7	28.7	28.7	28.8	29.1	29.4	29.4
23-Feb	28.8	28.8	28.8	28.8	28.9	28.9	28.9	28.9	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.1	29.1
24-Feb	29.1	29.1	29.1	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.3	29.3	29.4	29.4	29.4	29.1	29.4	29.4
25-Feb	29.5	29.5	29.5	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.7	29.7	29.7	29.7	29.7	29.7	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.7
26-Feb	29.6	29.5	29.5	29.5	29.5	29.5	29.5	29.4	29.4	29.4	29.4	29.3	29.3	29.3	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.2	29.3	29.6	29.6
27-Feb	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	29.0	29.0	29.2	29.2	29.2
28-Feb	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	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.0	29.0	29.0
																								Diurnal Average			
																								Diurnal Maximum			



**WBEA**  
**Hourly Averages**

**Barometric Pressure (BP) - inHg**  
**Shell Muskeg River - February 2015**





Maximum Speed: 32 km/h on Feb 19 21:00		Maximum Daily Speed Average: 19.7 km/h on Feb 6		Hours in Service: 672																						
Minimum Speed Value: 0 km/h on Feb 18 07:00		Minimum Daily Speed Average: 0.8 km/h on Feb 21		Hours of Data: 671																						
Maximum Diurnal Speed Average: 6.2 km/h at hour 18		Minimum Diurnal Speed Average: 1.2 km/h at hour 9		Hours of Missing Data: 1																						
Monthly Average Velocity: 3.2 km/h 46.9 deg		Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 10 Q <sub>3</sub> = 16 P <sub>90</sub> = 19 P <sub>99</sub> = 24		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-Feb	SSW9	S10	S9	SSW10	S7	S9	SSE5	SSW6	SSW5	SSW3	S2	SSE4	WSW4	W5	W2	WSW5	SW4	AF	SSW5	SSW4	SSW7	SW7	SSW5	SW7	SSW5.2	S10
2-Feb	SSW7	SSW10	SSW7	SW5	SSW8	SSW9	SSW8	S5	SSW5	SSW5	SW6	SW3	SW3	WSW4	SW1	NW5	NW5	NW11	WNW9	W7	SW5	W9	NW9	NW0	WSW4.4	NW11
3-Feb	S4	E5	ENE13	ENE11	ENE14	NE14	NNE18	NE12	NNE16	NE20	NE19	NE17	NE12	NNW4	SSE3	SE5	ESE5	SE5	S7	S8	S10	S12	S11	S9	ENE5.5	NE20
4-Feb	S9	SSW8	SW10	SSW9	SSW10	SSW10	SSW8	SW9	SW10	SW14	SSW9	SW6	W5	NE8	ENE7	NE8	NNW8	N10	NNE14	NNE12	NE16	NE11	E1	SW3	SW1.2	NE16
5-Feb	WNW8	NW8	N6	NNW8	N14	NNE10	NNE4	SSW8	SSW5	S4	SSW4	SSE3	ESE5	ENE5	NE12	ENE15	ENE12	ENE11	ENE14	ENE12	ENE13	ENE12	NE18	NNE22	NE6.3	NNE22
6-Feb	NNE22	NE19	NE17	NE20	NE19	NE18	NE19	NE19	NE19	NNE21	NE21	NE22	NE24	NE23	NE21	NE21	NNE21	NE21	NE22	NE22	NNE21	NNE20	NE15	NE12	NE19.7	NE24
7-Feb	ENE9	ENE5	SE7	SE7	SE8	SE9	SE9	SE9	SSE10	SSE11	SSE12	SSE13	SE11	SE8	SE8	SE8	SSE9	SSE5	SSW1	SW2	ESE3	SSW2	WNW5	W5	SE5.9	SSE13
8-Feb	NNW7	NE16	NE16	NNE20	NE18	NE18	ENE11	E4	NNW0	WSW3	WSW4	NW4	N5	NNE5	NE9	NE11	NE17	NE19	NNE16	NNE11	NNE9	NNE12	NE15	NNE12	NE9.7	NNE20
9-Feb	NNE14	NNE11	NE10	NNE8	N7	NNE9	NNE7	NNW7	N4	NE5	NNE6	NNW5	NNW4	NNW6	NNW6	NNE10	N8	N6	NNW6	NE8	NNE8	NNE9	NE9	N5	NNE6.9	NNE14
10-Feb	N4	NE11	NNE20	NNE21	NE17	NE14	N10	NNW9	NNW14	NNW13	N11	NNW9	N11	NNE8	NNE7	NNW6	NE14	NE18	NE16	NE15	ENE10	ENE12	ENE9	ENE9	NNE10.7	NNE21
11-Feb	NNW2	SSE1	SSW5	SSW4	SSW6	S8	S8	SSW7	SSW6	SSW7	SSW4	WSW5	WSW9	S11	S14	S14	S17	SSE17	SSE16	SSE20	SSE18	S20	S17	S15	S9.8	S20
12-Feb	S12	S11	S7	S7	S8	SSW9	SW10	SW8	SW4	NNW6	NE15	NE14	NE9	NE12	NE18	NE18	NE15	NE17	NE18	NE19	NE20	NNE20	NNE22	NNE21	NE7.4	NNE22
13-Feb	NNE21	NNE20	NNE20	NE18	NNE16	NE20	NE19	NE18	NE19	NE21	NE17	NE16	NNE16	N11	NNE9	WNW8	S2	ESE11	SE11	SE14	SE14	SSE14	SSE15	SSE15	NE9.9	NNE21
14-Feb	SSE12	SSE16	SSE19	SSE18	SSE20	SSE19	SSE18	S19	S19	S17	S19	S22	S21	S17	S17	S13	SSW13	N15	NE22	NE20	NE20	NE18	NE12	NE15	SSE9.7	S22
15-Feb	NE13	ENE12	ENE11	ENE9	NE14	NE14	ENE11	NE15	NE16	NNE15	NNE16	NNE13	NE13	NE11	NE14	NE19	NE20	NE18	NE18	NNE15	NNE15	NNE17	NNE20	NNE17	NE14.2	NNE20
16-Feb	NNE17	NNE18	NNE17	NNE17	NNE14	NNE12	NNW9	NW4	SSW3	S4	SW6	WSW5	NW6	SW3	SE2	SSE4	E4	E4	NW1	SSW2	SSW3	SSW3	S5	SE5	NNE3.1	NNE18
17-Feb	SSE4	S4	S3	SSW4	SSW7	S5	SSW6	S6	S6	S4	SSW2	SSW4	SW4	WSW5	SW4	S4	SSE4	SSE3	ESE4	SSE4	S6	SSE6	SSE4	SE4	S3.9	SSW7
18-Feb	SW3	SW3	SSW4	W4	W3	WSW3	NW0	SE2	E3	NE1	S5	WSW4	W4	WSW5	WSW8	SW6	S8	SE5	SSE7	SSE5	S7	S8	S10	S8	SSW3.6	S10
19-Feb	S7	S7	S9	S10	S9	S10	S8	S6	S5	S6	SW5	W5	WNW5	NW6	NNW6	N3	NE7	NE18	NE20	NNE24	NNE32	NNE22	N24	NNE27	NNE4.2	NNE32
20-Feb	NNE25	N21	N20	N16	N15	NNE15	NNE19	NNE20	NNE15	NE16	NE19	NE16	NE17	NE13	NE15	NE16	NE20	NE19	NE16	ENE10	NE15	NE16	NNE6	NNE8	NNE15.4	NNE25
21-Feb	NNW10	N13	NNE13	N14	NNE16	NNE13	ENE8	ENE6	E4	NNE7	WSW2	SSW3	WSW3	WSW6	SW5	SSW7	SSE8	SSE8	S8	S7	S10	S9	S11	S9	E0.8	NNE16
22-Feb	SSW7	SSW8	SSW10	SSW11	SSW9	SSW9	SSW9	SSW8	SSW10	SSW9	S9	SSW10	SSW13	SSW14	SSW12	SSW12	S12	S12	SSW13	S11	SSE8	SW9	WSW8	NW10	SSW9.4	SSW14
23-Feb	NW9	WNW11	W17	WNW17	WNW14	WNW12	NNW10	NNW10	NNW10	W4	N12	NNE21	NNE16	NE15	NE17	NE18	NNE19	NNE24	N21	NNE25	NE23	NE20	NE17	NE18	N11.7	NNE25
24-Feb	NE15	ENE14	ENE10	E8	E8	E7	E7	ENE12	NE16	NE21	NE22	NE21	NE21	NE19	NNE20	NNE17	N19	N20	N19	N22	NNE21	NNE23	NNE16	NNE21	NE15.3	NNE23
25-Feb	NNE16	NNW7	N7	NE6	ENE3	ESE2	S2	S4	S3	SW3	WSW5	WSW5	WSW6	W5	W5	WSW4	SW3	SSE4	SSE6	S8	S8	S8	SSW8	SSW8	SSW1.9	NNE16
26-Feb	S10	SSW7	SSW7	SSW8	SSW8	SSW8	SSW9	SSW8	SSW9	SSW10	SW12	SSW13	SW15	SW18	SW16	WSW11	W7	NNW9	NNE15	NNE16	NNE17	N13	N14	SW4.3	SW18	
27-Feb	N16	N18	NNE18	NE17	NE15	NE17	ENE8	SE4	WSW4	WSW7	WSW7	SW7	SW9	SSW9	S11	S12	S11	S9	SSW9	SSW7	S7	SSW9	SW10	WSW11	SSW1.0	N18
28-Feb	WSW9	SW12	SW10	SSW7	WSW10	W16	W16	W16	W13	W9	WNW9	WNW9	W10	WNW8	WNW8	WSW6	NNW12	NNW11	N14	N14	N15	N18	N13	NE9	WNW7.3	N18
NNE3.6 NE3.1 NE3.1 NE3.2 NE3.1 ENE3.0 ENE2.2 E1.2 ENE1.2 NE1.4 NE2.1 NE2.0 NNE2.1 NNE1.4 NE2.4 ENE2.3 NE3.7 NE6.2 NE6.0 NE5.9 NE6.1 NE5.3 NE4.2 NE4.6																								Diurnal Average		
NNE25 N21 NNE20 NNE21 SSE20 NE20 NE19 NNE20 NE19 NNE21 NE22 S22 NE24 NE23 NE21 NE21 NNE21 NNE24 NE22 NNE25 NNE32 NNE23 N24 NNE27																								Diurnal Maximum		
AF - Analyzer Failure																										
All monthly, daily, and diurnal averages have been calculated using vector methods																										



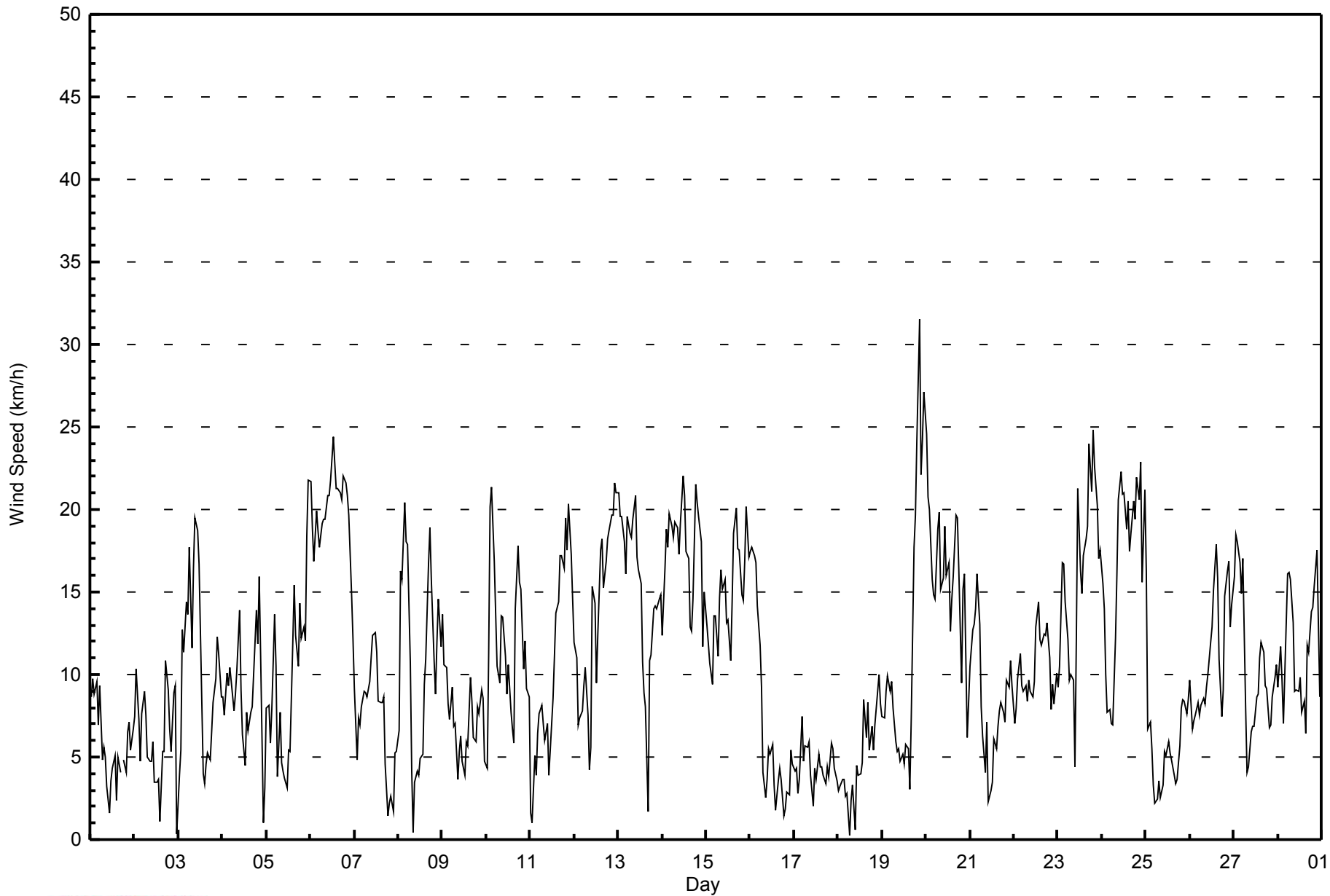
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 20 00:00 Minimum Value: 1 km/h on Feb 7 21:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 5 P <sub>99</sub> = 6																	Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9									
Day	Hourly Period Ending At (MST)																								Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	1	1	1	2	4	2	2	1	1	1	1	1	1	2	1	1	AF	2	1	2	2	2	2	4	
2-Feb	2	2	3	1	2	1	2	1	2	2	1	1	1	1	1	2	2	2	2	1	1	1	3	2	2	3
3-Feb	1	3	2	2	2	3	4	4	5	3	2	3	3	2	2	1	1	1	1	1	2	2	2	2	5	
4-Feb	2	1	2	2	1	2	2	2	2	3	7	3	3	3	3	2	3	4	5	5	3	3	2	1	7	
5-Feb	2	2	3	5	4	5	3	2	1	1	1	1	2	3	4	2	2	3	4	3	3	2	4	4	5	
6-Feb	4	4	2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	4	
7-Feb	2	2	3	2	3	3	3	2	3	4	4	4	4	3	3	3	3	1	1	1	1	1	1	1	4	
8-Feb	4	3	4	4	5	3	3	2	2	1	1	1	1	2	1	3	3	2	3	2	3	3	4	3	5	
9-Feb	4	2	2	3	2	2	2	2	2	2	2	1	1	2	2	3	3	3	2	2	2	2	2	2	4	
10-Feb	2	4	5	5	4	3	4	3	4	3	3	4	3	3	2	2	5	3	3	3	4	3	3	2	5	
11-Feb	3	1	2	1	1	1	1	1	2	2	1	2	4	4	4	4	5	5	4	6	5	6	5	4	6	
12-Feb	3	3	2	2	3	3	3	2	2	2	4	3	3	2	2	2	2	2	3	2	4	4	4	3	4	
13-Feb	3	4	5	4	4	4	3	3	3	3	3	3	3	3	4	2	3	4	5	5	5	5	5	5	5	
14-Feb	4	5	6	5	6	6	5	5	5	5	6	6	6	5	5	4	4	6	4	3	2	3	2	3	6	
15-Feb	3	3	3	2	3	3	3	3	3	3	4	3	3	3	3	3	3	2	2	4	4	5	5	5	5	
16-Feb	5	6	5	5	4	4	3	3	1	1	1	2	3	1	2	2	2	2	2	1	2	1	1	2	6	
17-Feb	2	1	1	1	2	1	2	1	1	1	1	2	1	1	1	2	1	1	1	1	2	1	1	1	2	
18-Feb	2	1	1	1	1	1	2	1	1	1	2	1	1	1	2	2	2	1	2	1	2	2	2	2	2	
19-Feb	2	2	2	2	2	3	3	2	1	2	1	1	1	1	1	2	3	2	4	5	7	6	7	7	7	
20-Feb	6	5	5	4	4	4	4	5	4	3	3	2	2	2	2	2	2	2	3	5	3	3	3	4	6	
21-Feb	3	4	4	4	3	3	4	6	4	4	2	1	1	1	2	2	2	2	1	1	2	1	2	2	6	
22-Feb	2	2	2	1	2	2	2	2	3	3	3	3	4	4	4	3	3	3	3	3	2	4	2	2	4	
23-Feb	2	4	3	3	2	3	3	4	3	2	7	4	4	3	2	3	5	7	6	5	4	3	3	2	7	
24-Feb	2	2	2	2	2	2	2	2	4	3	3	3	3	3	4	5	5	5	6	6	6	5	4	4	6	
25-Feb	4	3	2	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	
26-Feb	1	1	1	1	2	1	2	2	2	2	2	3	4	4	4	4	2	1	4	3	4	3	5	4	5	
27-Feb	5	5	5	3	3	3	4	2	2	1	1	2	2	3	4	3	3	2	2	1	1	1	2	1	5	
28-Feb	1	1	3	2	3	3	3	3	3	2	2	2	2	2	1	1	6	3	6	4	4	5	4	2	6	
Diurnal Maximum																										
AF - Analyzer Failure																										





**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - February 2015**





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

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	146	21.76	21.76
6 - 11	253	37.70	59.46
12 - 19	206	30.70	90.16
20 - 28	65	9.69	99.85
29 - 38	1	0.15	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Shell Muskeg River - February 2015**

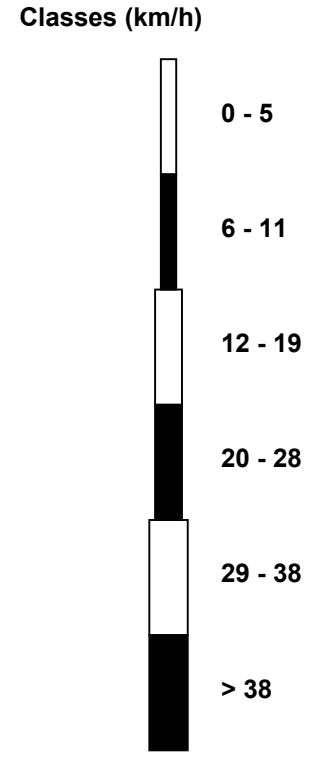
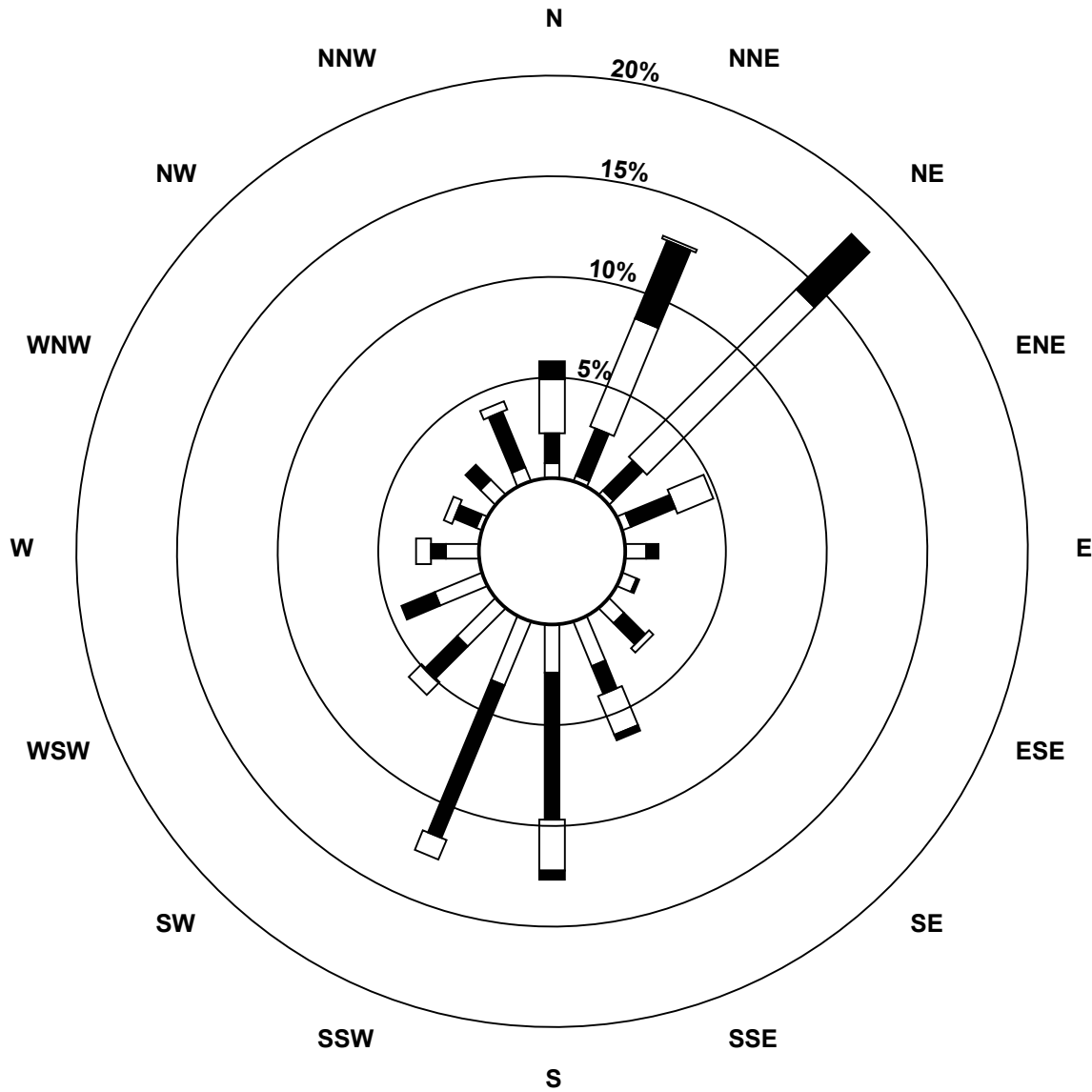
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	5	2	2	3	7	5	7	16	16	23	18	17	11	2	7	5	146
6 - 11	10	17	14	16	4	1	10	10	49	55	15	12	5	8	7	20	253
12 - 19	18	39	79	13	0	0	2	14	17	7	6	0	5	3	0	3	206
20 - 28	6	28	26	0	0	0	0	2	3	0	0	0	0	0	0	0	65
29 - 38	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	87	121	32	11	6	19	42	85	85	39	29	21	13	14	28	671

Total Number of Valid Hours: 671

Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Shell Muskeg River (AMS 16)**



**Total Number of Valid Hours: 671**



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

**Wind Direction (WD) - deg**  
**Shell Muskeg River - February 2015**

Direction of Maximum Speed: 23 deg on Feb 19 21:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 41.8 deg on Feb 6	Hours of Data: 671
Direction of Minimum Speed: 314 deg on Feb 18 07:00	Hours of Missing Data: 1
Direction of Minimum Daily Speed Average: 0.8 deg on Feb 21	Percent Operational Time: 99.9
Monthly Average Direction: 224.2 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-Feb	192	190	188	198	190	190	162	199	198	206	181	164	257	268	271	252	221	AF	213	203	198	218	213	226	204.7
2-Feb	202	201	199	230	196	199	201	180	204	200	224	226	232	238	233	324	305	304	287	270	222	271	310	325	237.9
3-Feb	184	95	65	68	57	54	31	34	21	37	48	40	44	337	166	137	106	125	180	183	187	185	184	189	69.1
4-Feb	185	192	220	209	213	201	213	216	236	224	200	225	274	51	57	51	337	358	22	29	51	45	87	224	220.0
5-Feb	303	317	4	338	357	15	12	199	203	183	200	155	103	78	49	57	75	69	60	67	69	68	38	31	45.2
6-Feb	31	34	56	49	50	52	51	49	48	31	50	47	48	46	42	40	31	38	43	40	22	21	43	51	41.8
7-Feb	59	70	141	135	144	133	141	145	148	149	153	153	141	136	129	146	157	155	194	236	120	200	293	279	143.0
8-Feb	334	43	51	29	41	50	60	97	345	241	245	321	352	23	47	46	42	34	29	28	23	29	45	30	35.6
9-Feb	21	29	35	29	11	31	13	345	356	49	27	341	335	340	348	13	7	350	339	40	12	27	49	10	15.5
10-Feb	8	38	28	29	35	38	9	338	347	345	350	341	9	13	29	332	43	45	51	55	62	61	65	61	27.4
11-Feb	337	148	198	196	193	186	177	198	199	210	195	253	241	184	174	186	174	164	166	166	168	174	177	180	181.2
12-Feb	181	178	183	177	185	200	219	218	217	335	37	37	48	48	45	48	48	47	44	45	42	32	32	33	50.3
13-Feb	32	30	27	38	25	38	43	43	45	46	41	40	31	8	16	288	189	109	137	145	141	148	154	156	54.7
14-Feb	152	152	156	162	167	164	165	169	170	171	179	175	178	181	181	184	202	5	38	42	48	47	46	40	148.5
15-Feb	53	72	76	75	53	53	65	53	46	26	26	27	44	35	42	46	45	49	46	31	14	13	29	23	41.6
16-Feb	21	16	17	22	23	23	336	326	197	189	214	257	307	225	124	147	99	87	306	195	213	203	178	138	16.0
17-Feb	150	172	186	200	199	188	199	186	189	172	210	211	230	239	234	169	154	147	106	153	186	164	168	137	182.7
18-Feb	220	222	212	279	270	238	314	127	79	55	186	240	274	249	242	229	172	146	148	163	183	186	187	187	198.6
19-Feb	183	189	182	188	179	181	176	174	177	190	231	261	299	310	337	8	48	48	38	27	23	17	7	20	30.5
20-Feb	16	6	0	6	10	12	27	23	23	44	47	43	41	47	46	40	40	47	36	59	41	46	31	13	30.2
21-Feb	345	358	12	357	32	30	59	59	84	24	255	198	242	244	226	193	166	167	179	186	186	178	170	185	86.3
22-Feb	196	204	211	212	205	196	198	210	200	200	185	203	193	208	200	192	189	190	202	189	164	218	256	305	202.8
23-Feb	309	283	276	292	299	292	341	336	347	281	5	33	27	35	45	45	27	21	7	31	44	46	43	43	10.8
24-Feb	47	66	66	79	81	98	94	63	42	43	44	45	39	32	12	6	1	4	6	14	25	20	29	34.1	
25-Feb	30	344	9	39	73	117	177	178	190	224	244	251	257	260	265	250	236	159	162	191	187	191	195	198	212.6
26-Feb	187	201	208	208	212	207	203	209	196	211	211	214	203	228	220	222	240	268	342	29	25	32	10	1	228.7
27-Feb	3	2	14	34	36	43	60	128	255	244	243	230	226	202	187	189	183	190	199	192	182	198	220	240	213.3
28-Feb	251	229	218	213	246	267	267	265	264	273	291	288	280	302	294	238	335	348	354	353	357	2	359	55	297.0
	27.4	37.1	45.5	40.5	50.1	65.0	68.9	88.2	60.3	46.8	51.8	37.8	30.7	24.2	56.0	60.4	54.5	44.4	41.6	49.9	51.3	48.1	42.5	38.1	
	Diurnal Average																								

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



Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

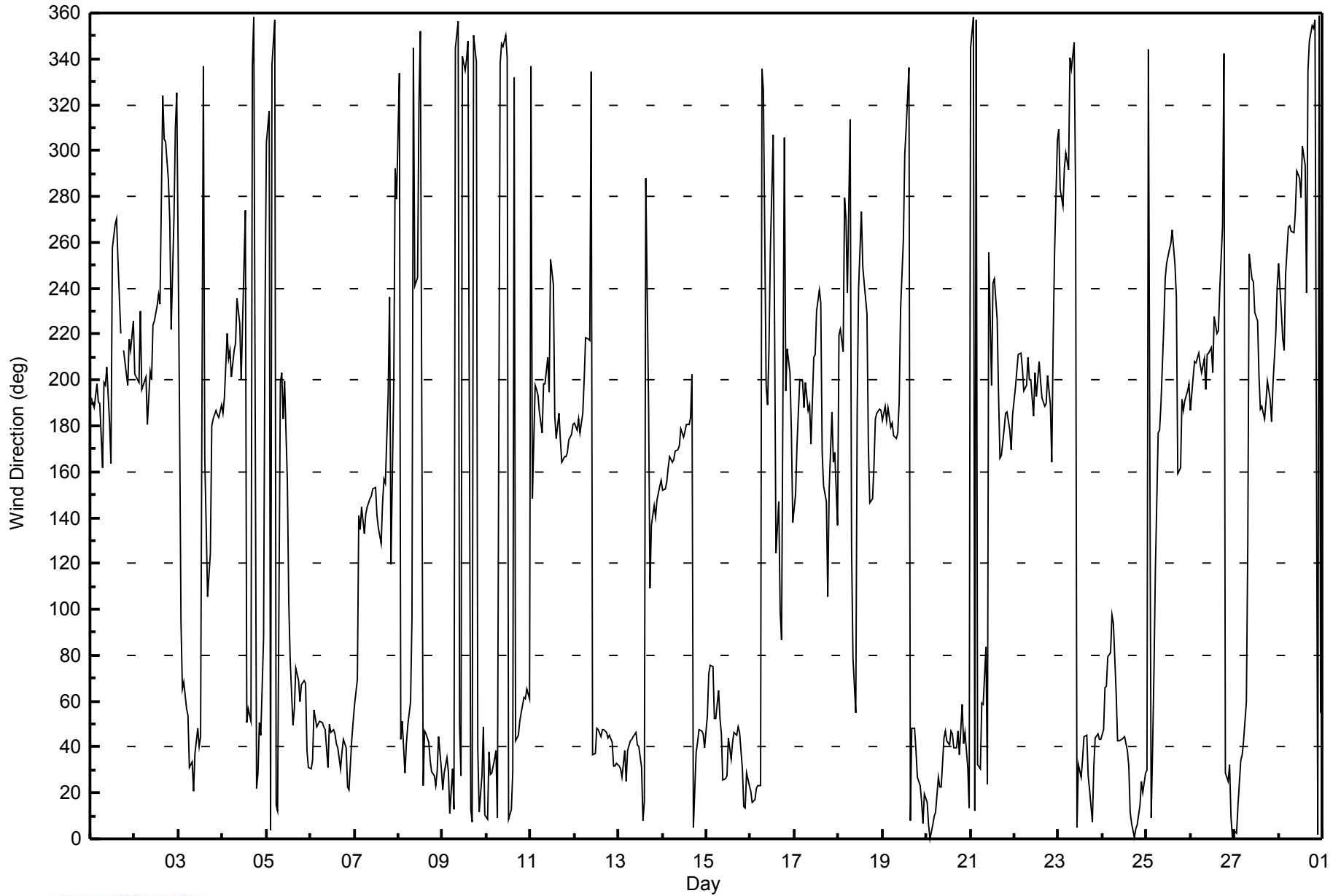
Shell Muskeg River - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 95 deg on Feb 3 00:00  Minimum Value: 5 deg on Feb 20 17:00  Percentiles: P <sub>1</sub> = 6 P <sub>10</sub> = 10 Q <sub>1</sub> = 13 Median = 17 Q <sub>3</sub> = 23 P <sub>90</sub> = 38 P <sub>99</sub> = 85																		Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9							
Day	Hourly Period Ending At (MST)																								Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	11	10	12	13	17	16	46	20	16	23	65	31	25	24	85	11	26	AF	20	16	13	24	36	21	85
2-Feb	18	14	28	25	14	14	23	33	44	25	24	29	29	30	94	37	31	13	13	13	16	26	12	95	95
3-Feb	17	32	10	11	9	14	14	21	23	13	11	14	19	64	70	31	16	22	13	12	11	12	13	15	70
4-Feb	15	15	12	14	11	16	19	15	14	7	49	37	50	25	27	18	20	36	20	32	9	15	79	44	79
5-Feb	13	16	36	51	19	26	77	11	16	20	23	55	36	51	24	14	12	16	17	11	10	11	18	13	77
6-Feb	12	15	10	7	8	9	8	8	9	12	8	9	8	9	11	13	13	12	9	12	7	6	12	9	15
7-Feb	9	20	18	18	17	17	17	16	16	18	17	17	18	19	20	21	17	19	34	41	15	48	12	17	48
8-Feb	29	18	12	12	19	9	21	49	88	47	16	47	28	38	7	9	6	13	12	14	16	14	9	12	88
9-Feb	13	14	13	22	22	17	29	19	59	32	28	27	42	27	30	22	22	36	23	23	33	23	20	40	59
10-Feb	46	27	13	11	18	17	22	18	16	15	15	28	29	38	42	37	31	12	10	10	19	12	17	17	46
11-Feb	84	90	28	30	11	12	12	12	14	19	38	20	21	20	16	16	15	14	14	14	14	14	15	17	90
12-Feb	15	14	20	15	21	18	12	14	36	41	23	15	28	14	7	6	10	9	10	10	11	15	13	13	41
13-Feb	13	14	15	16	18	13	12	12	11	8	13	13	15	20	23	36	66	14	17	17	18	17	16	15	66
14-Feb	16	16	16	15	14	14	15	15	14	14	16	14	15	17	16	15	21	33	12	11	7	8	15	12	33
15-Feb	17	13	14	18	17	14	18	13	9	18	16	23	16	28	17	9	7	6	10	20	19	20	13	17	28
16-Feb	19	19	19	18	20	30	18	73	45	18	29	31	40	51	94	67	33	28	73	58	52	41	13	29	94
17-Feb	29	21	37	28	14	17	12	16	15	25	56	38	38	23	23	34	19	14	14	23	20	15	15	14	56
18-Feb	50	33	28	12	42	37	85	28	29	89	37	40	26	30	16	36	17	22	16	12	14	15	16	17	89
19-Feb	17	16	14	15	13	14	16	17	16	21	19	19	30	22	21	75	23	6	14	10	12	17	18	15	75
20-Feb	17	18	18	19	21	20	13	19	20	11	10	8	6	10	9	7	5	6	12	32	12	7	25	27	32
21-Feb	18	22	20	18	15	17	55	81	62	40	81	62	64	19	30	28	15	13	9	12	14	11	10	14	81
22-Feb	14	13	11	11	14	15	14	15	17	19	22	23	20	18	20	20	17	16	19	17	20	23	26	21	26
23-Feb	17	18	11	12	12	23	20	20	17	43	38	12	17	14	8	9	15	17	20	12	11	11	11	7	43
24-Feb	14	8	10	15	15	18	21	13	10	7	7	9	9	12	15	20	19	18	19	18	18	12	16	8	21
25-Feb	15	39	31	68	45	50	44	29	34	27	10	23	19	24	23	28	19	24	15	11	12	10	14	14	68
26-Feb	11	15	15	15	14	13	15	13	18	15	16	17	20	18	13	13	12	25	19	18	15	14	21	20	25
27-Feb	18	18	19	15	15	12	48	41	49	12	14	20	18	30	22	19	15	16	18	16	12	15	12	7	49
28-Feb	11	6	16	19	24	11	11	10	11	15	12	18	15	16	12	19	41	19	20	18	19	18	20	20	41
																		84 90 37 68 45 50 85 81 88 89 81 62 64 64 94 75 66 36 73 58 52 48 79 95							
Diurnal Maximum																									
AF - Analyzer Failure																									



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Shell Muskeg River - February 2015**



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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 17, 2015	Previous Calibration	January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	15:47
Barometric Pressure	742 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
Cal Gas Concentration	50.8 ppm	Cal Gas Expiry Date	41788
Gas Cert Reference	LL107937		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632
DACS voltage range	ethernet connection	DACS channel #	192.168.1.43

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-710	-710
Analyzer Range (mv)	1000	1000	Lamp voltage	820	827
Calculated slope	0.999518	0.998632	Chamber temp.	45.0	44.9
Calculated intercept	2.959197	2.692679	Pressure (mmHg)	708.7	723.4
Analyzer Background	6.1	6.0	Flow (lpm)	0.447	0.456
Analyzer Coefficient	1.253	1.221	Intensity	90	88

Analyzer make Thermo 43i Analyzer serial # 1118148498

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.2	NA
as found span	5000	78.7	799.6	815.0	0.981
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	78.7	799.6	800.3	0.999
second point	5000	39.4	400.3	394.0	1.016
third point	5000	19.7	200.2	196.5	1.019
calibrator zero					
as left zero	5000	0.0	0.0	0.5	NA
as left span	5000	78.7	799.6	791.3	1.010
Average Correction Factor					1.011

Corrected As found 814.8 Previous response 797.0 % change -2.2%

#### Notes:

Adjusted Span. Filter was changed after as founds.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

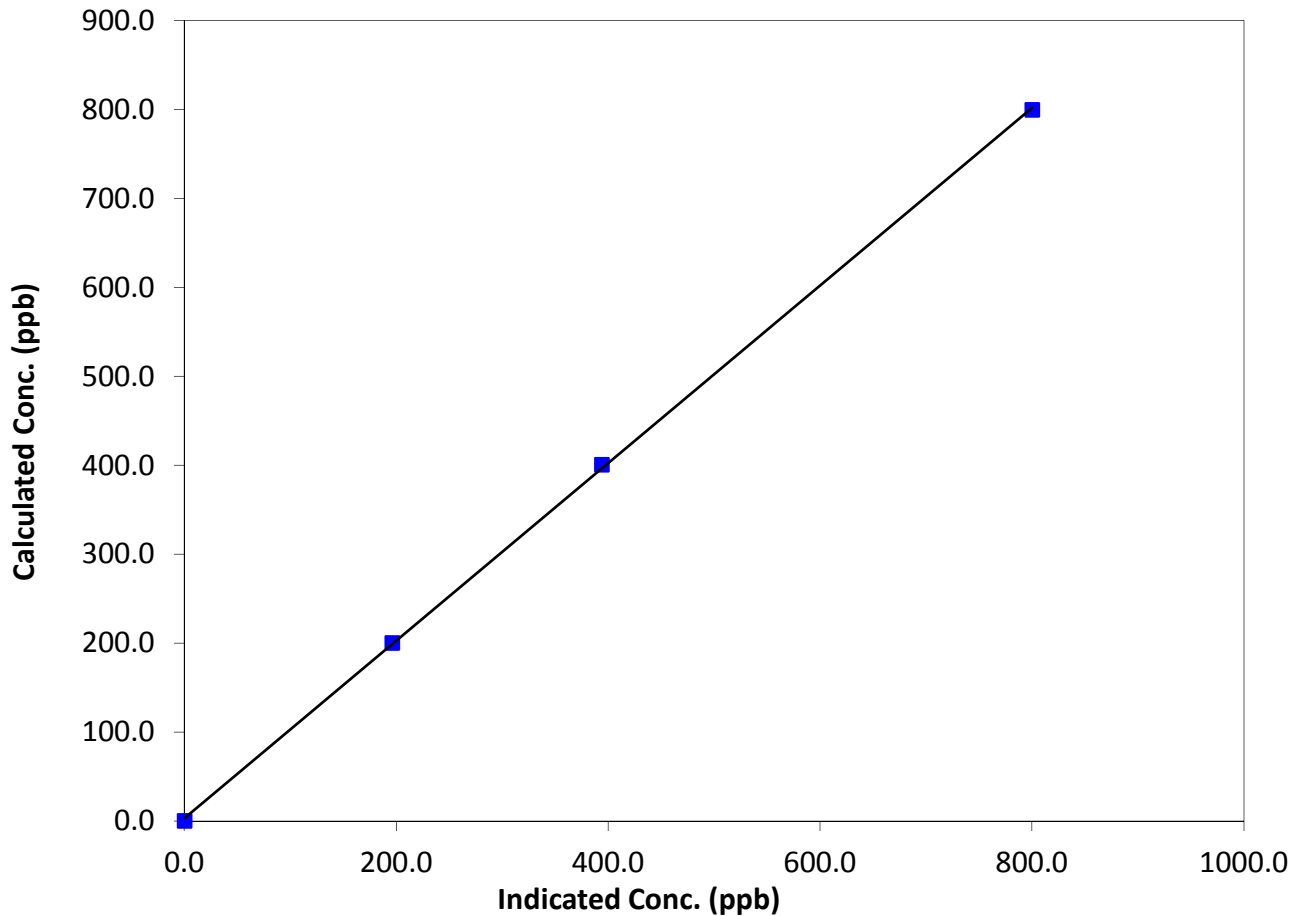
### Station Information

Calibration Date	February 17, 2015	Previous Calibration	January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:35	End Time (MST)	15:47
Analyzer make	Thermo 43i	Analyzer serial #	1118148498

### Calibration Data

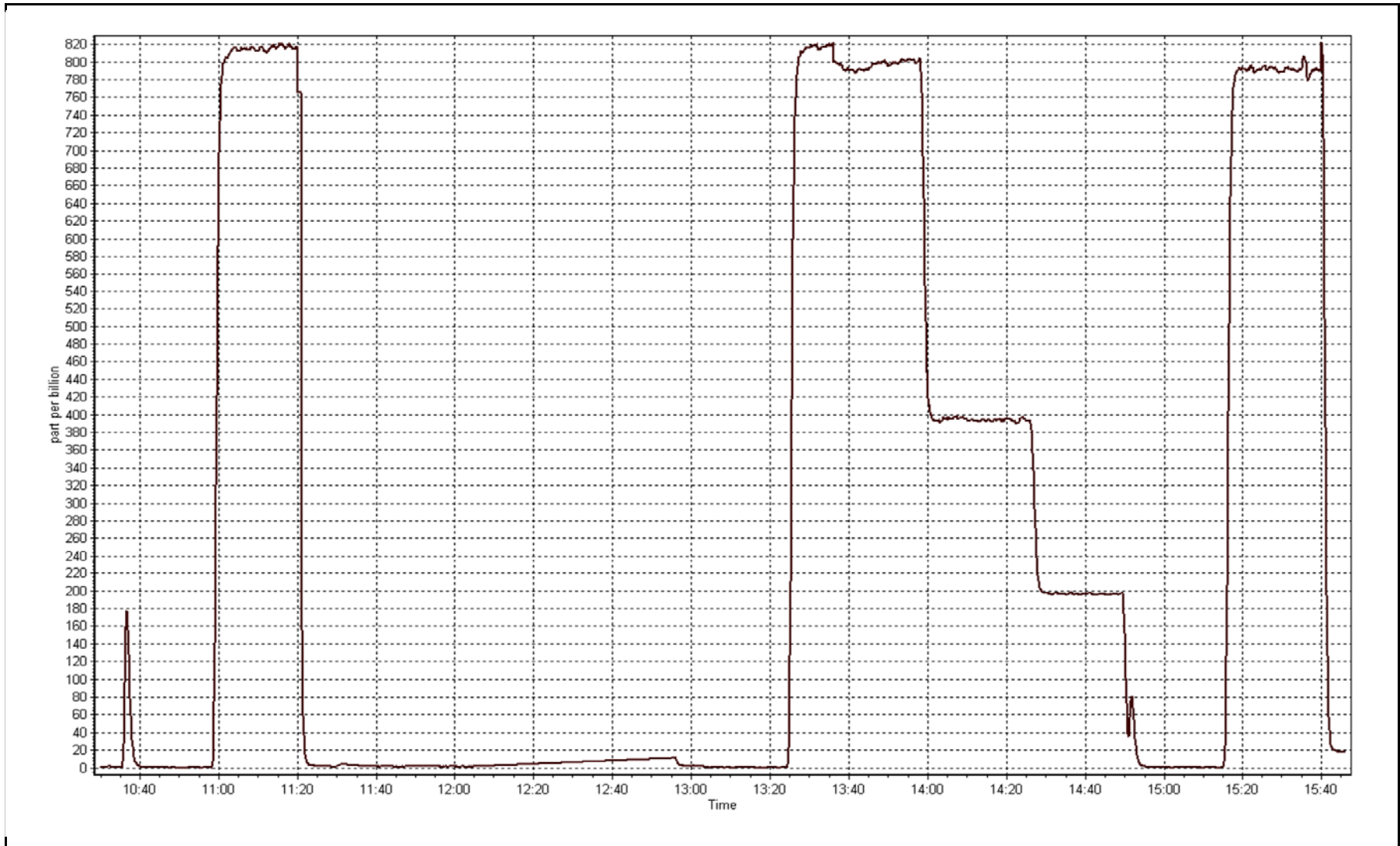
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999905
799.6	800.3	0.9991		
400.3	394.0	1.0159	Slope	0.998632
200.2	196.5	1.0186		
			Intercept	2.692679

**SO<sub>2</sub> Calibration Curve**



SO2 Calibration Plot

Date: February 17, 2015





# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Tuesday, February 17, 2015	Previous Calibration	Friday, January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	Routine		
Start Time (MST)	10:35	End Time (MST)	14:15
Barometric Pressure	736 mmHg	Station temp.	21 Deg C
Calibrator Make/Model	Sabio 4010	Serial Number	11081107
Gas Cert Reference	LL107937	Cal Gas Expiry Date	41788
CH4 Cal Gas Conc.	515 ppm	CH4 Equiv Conc.	1078.8 ppm
C3H8 Cal Gas Conc.	205 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	2632
DACS voltage range	ethernet connection	DACS channel #	192.168.1.51

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	25	25	Sample Pressure	8.2	8.2
Analyzer Range (mv)	25	25	Air or Bypass press	34.9	34.8
Calculated slope	1.001029	1.002175	Fuel Pressure	24.2	24.2
Calculated intercept	-0.017574	0.046560	Flame	157.1	157.0

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	0.02	N/A
as found span	5000	78.7	16.98	18.15	0.936
calibrator zero	5000	0.0	0.00	-0.01	N/A
high point	5000	78.7	16.98	16.92	1.004
second point	5000	39.4	8.50	8.40	1.012
third point	5000	19.7	4.25	4.17	1.019
calibrator zero					
as left zero	5000	0.0	0.00	0.10	N/A
as left span	5000	78.7	16.98	16.88	1.006
Average Correction Factor					1.012

Corrected As found	18.13	Previous response	16.98	% change	-6.3%
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#### Notes:

Cal from Feb 17-18. Replaced pump for preventative maintenance and to address baseline/zero drift. Allowed to stabilize overnight. Adjusted zero and span.

Calibration Performed By:

Michael Martineau



# Wood Buffalo Environmental Association

## THC Calibration Summary

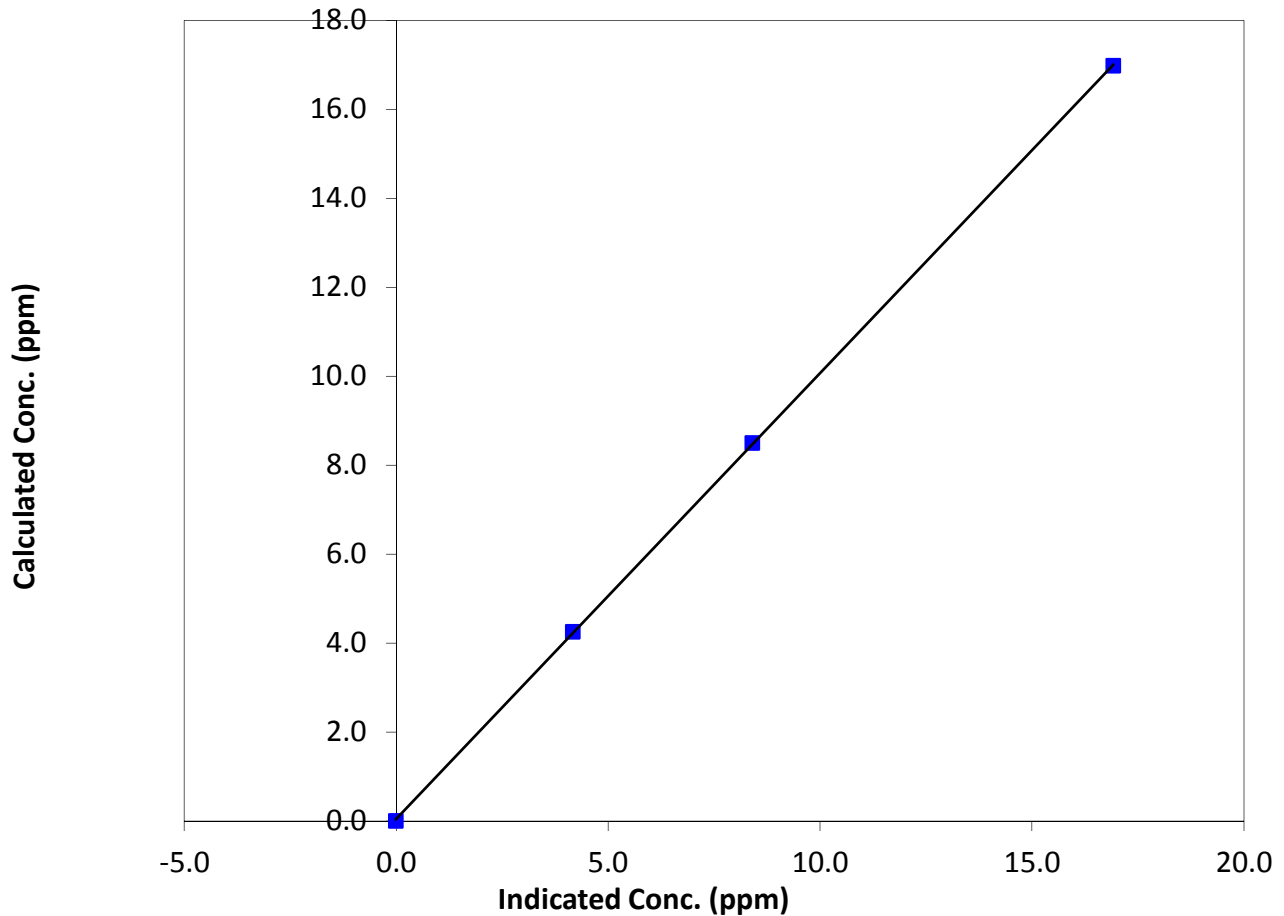
### Station Information

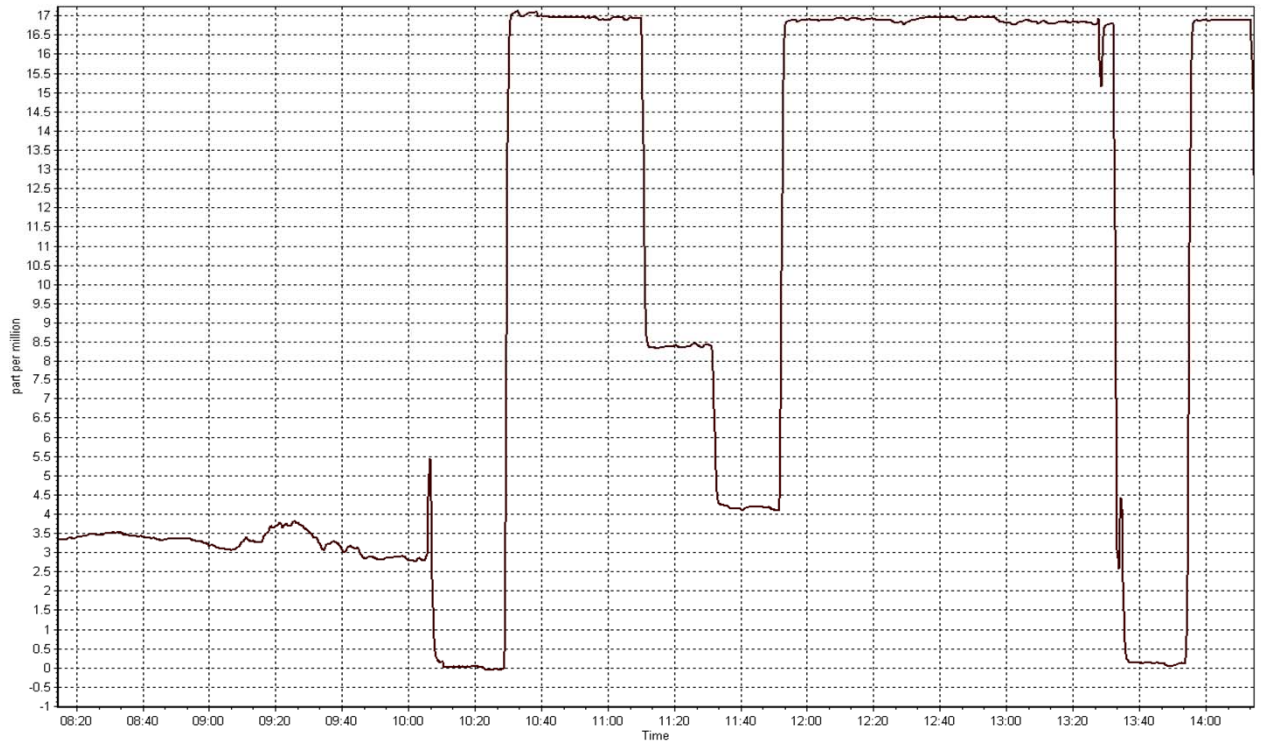
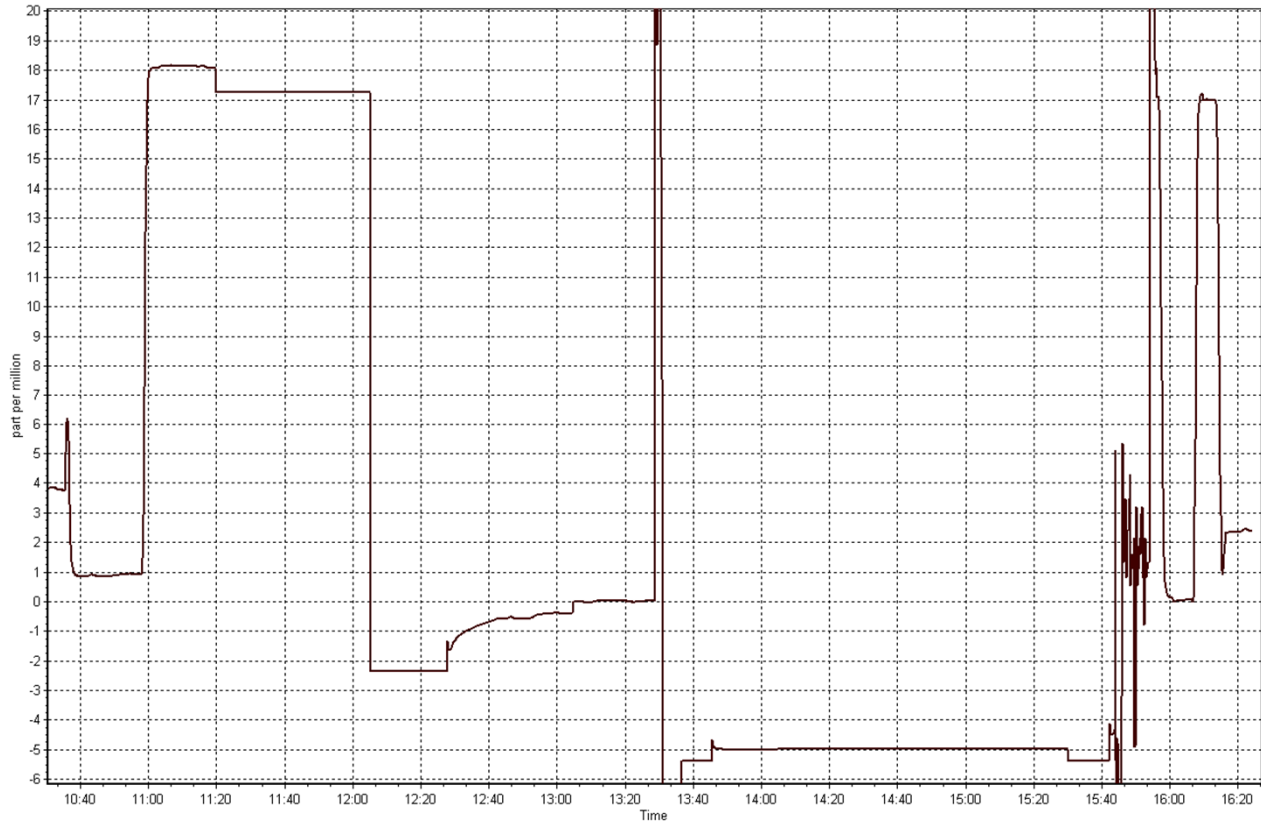
Calibration Date	February 17, 2015	Previous Calibration	January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:35	End Time (MST)	14:15
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153458

### Calibration Data

Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	-0.01	N/A	Correlation Coefficient	0.999976
16.98	16.92	1.0035		
8.50	8.40	1.0120	Slope	1.002175
4.25	4.17	1.0193		
			Intercept	0.046560

THC Calibration Curve







# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:05	End Time (MST)	14:15
Barometric Pressure	736 mmHg	Station Temperature	21.0 Deg C
Calibrator	SABIO 4010	Serial Number	11081107
NO Cal Gas Conc	51.2 ppm	Cal Gas Expiry Date	May 29, 2014
NO <sub>x</sub> Cal Gas Conc	51.3 ppm	Cal Gas Serial #	LL107937

### DACS Information

DACS make & model Campbell Scientific CR3000      DACS serial No. 2632

Parameter		NO <sub>x</sub>	NO	NO <sub>2</sub>
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.999183	0.998965	0.993478
	Data Offset	2.521607	2.558253	-1.137247
After	Data Slope	1.000090	0.999220	0.996995
	Data Offset	2.555321	2.781236	-0.067243
IP address		192.168.1.42		

### Analyzer Information

Analyzer make/model Thermo 42i      Analyzer serial # 1426262593

Test Point	before		after	
Concentration range	0-1000	ppb	0-1000	ppb
NO coefficient	0.844	ppb	0.812	ppb
NO <sub>x</sub> coefficient	0.999	ppb	0.999	ppb
NO <sub>2</sub> coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	8.8		8.5	
NO <sub>x</sub> bkgrnd	8.9		8.6	
Chamber Temp	50.5	Deg C	50.1	Deg C
Moly Temp	322.6	Deg C	322.9	Deg C
PMT Temp	-2.7	Deg C	-2.8	Deg C
O <sub>3</sub> flow	ok	ccm	ok	ccm
R Cell Press	169.2	mmHg	173.1	mmHg
Sample Flow	829	ccm	885	ccm

Notes:

Adjusted span.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 18, 2015

Station Number:

AMS 16

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3	N/A	N/A
as found span	5000	78.7	807.5	805.9	1.6	839.4	838.2	1.2	0.9620	0.9615
calibrator zero	5000	0.0	0.0	0.0	0.0	0.5	0.2	0.3	N/A	N/A
high point	5000	78.7	807.5	805.9	1.6	806.9	805.9	1.1	1.0006	1.0000
second point	5000	39.4	404.2	403.5	0.8	398.3	397.4	0.9	1.0151	1.0153
third point	5000	19.7	202.1	201.7	0.4	197.8	197.6	0.3	1.0219	1.0209
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	1.0	0.3	0.7	N/A	N/A
as left span	5000	78.1	801.3	489.3	312.0	797.1	486.9	310.2	1.0053	1.0049
Average Correction Factor									1.0125	1.0121

Corrected As found NO<sub>x</sub>= 838.9 NO= 838.0 Percent Change NO<sub>x</sub>= -4.0% NO= -4.0%  
 Previous Response NO<sub>x</sub>= 805.6 NO= 804.2

### GPT Calibration Data

Dilution Flow 5000 ccm Source Gas Flow 78.70 ccm

O3 Setpoint (ppb)	Indicated NO high point (ppb)	Indicated NO drop conc (ppb)	Calculated NO <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			0.3			N/A	
1st NO <sub>2</sub> (300)	N/A	489.3	315.7	806.0	489.3	316.8	0.9862	1.0000	0.9964	100.4%
2nd NO <sub>2</sub> (200)	N/A	591.7	213.2	805.7	591.7	214.0	0.9867	1.0000	0.9965	100.3%
3rd NO <sub>2</sub> (100)	N/A	693.4	111.6	805.0	693.4	111.6	0.9876	1.0000	0.9997	100.0%
4th NO <sub>2</sub> (0)	804.9	N/A	1.0	805.9	804.9	1.0	0.9864	1.0000	N/A	N/A
Average Correction Factor							0.9867	1.0000	0.9976	100.2%

Calibration Performed By: Asad Hidayat





# Wood Buffalo Environmental Association

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

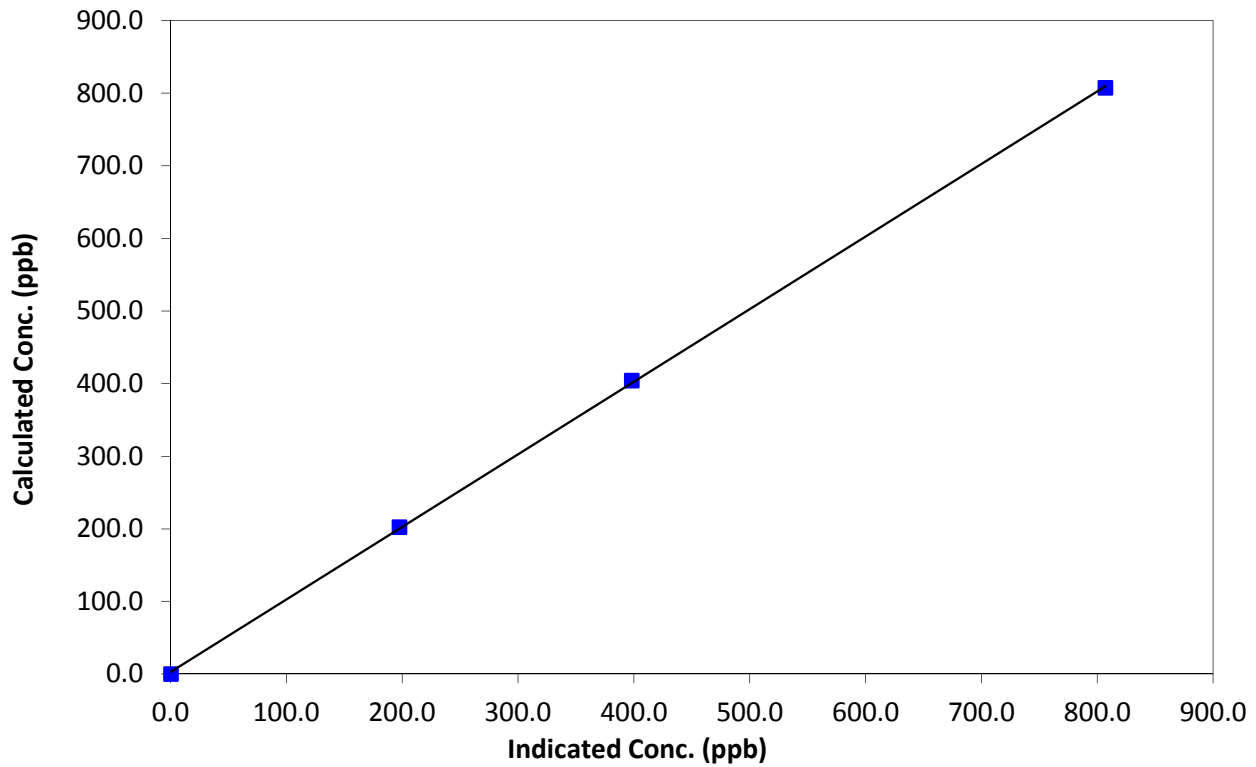
### Station Information

Calibration Date	February 18, 2015	Previous Calibration	January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:05	End Time (MST)	14:15
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.5	N/A	Correlation Coefficient	0.999920
807.5	806.9	1.0006		
404.2	398.3	1.0151	Slope	1.000090
202.1	197.8	1.0219		
			Intercept	2.555321

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

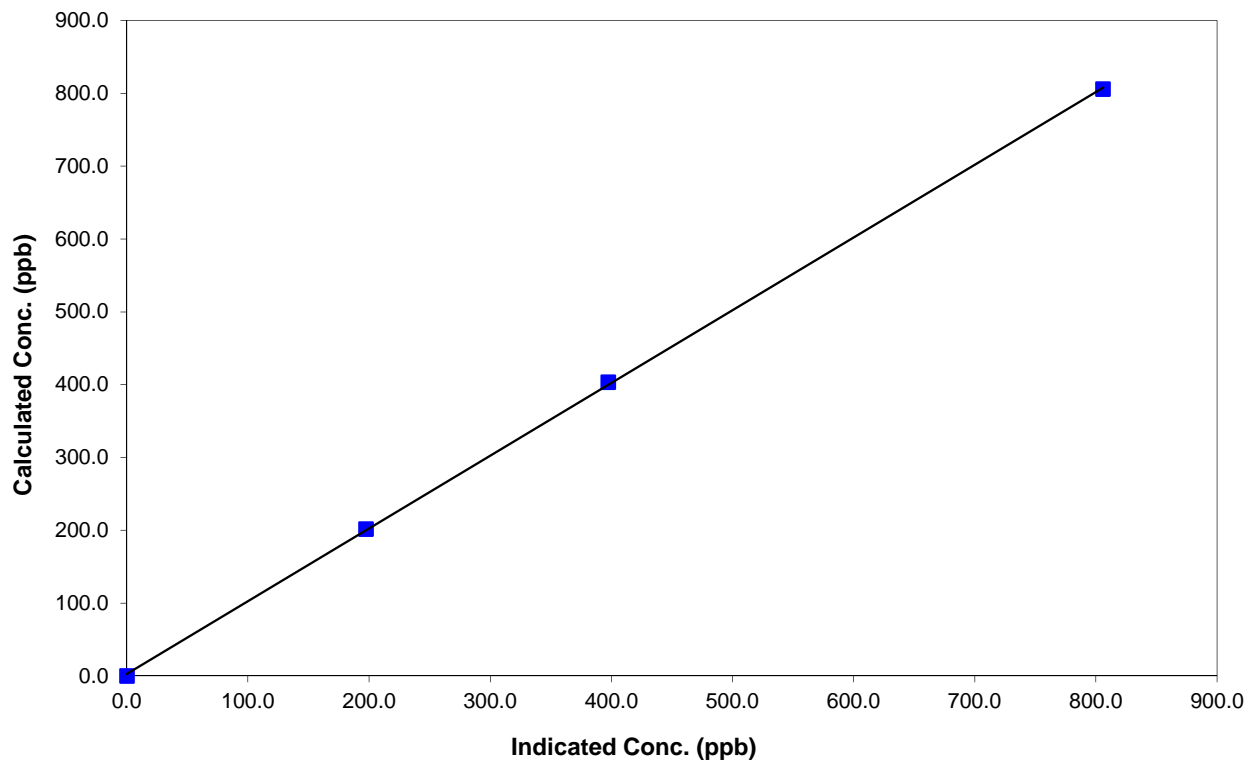
### Station Information

Calibration Date	January 23, 2015	Previous Calibration	January 23, 2015
Station Name	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:05	End Time (MST)	14:15
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	0.999919
805.9	805.9	1.0000		
403.5	397.4	1.0153	Slope	0.999220
201.7	197.6	1.0209		
			Intercept	2.781236

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

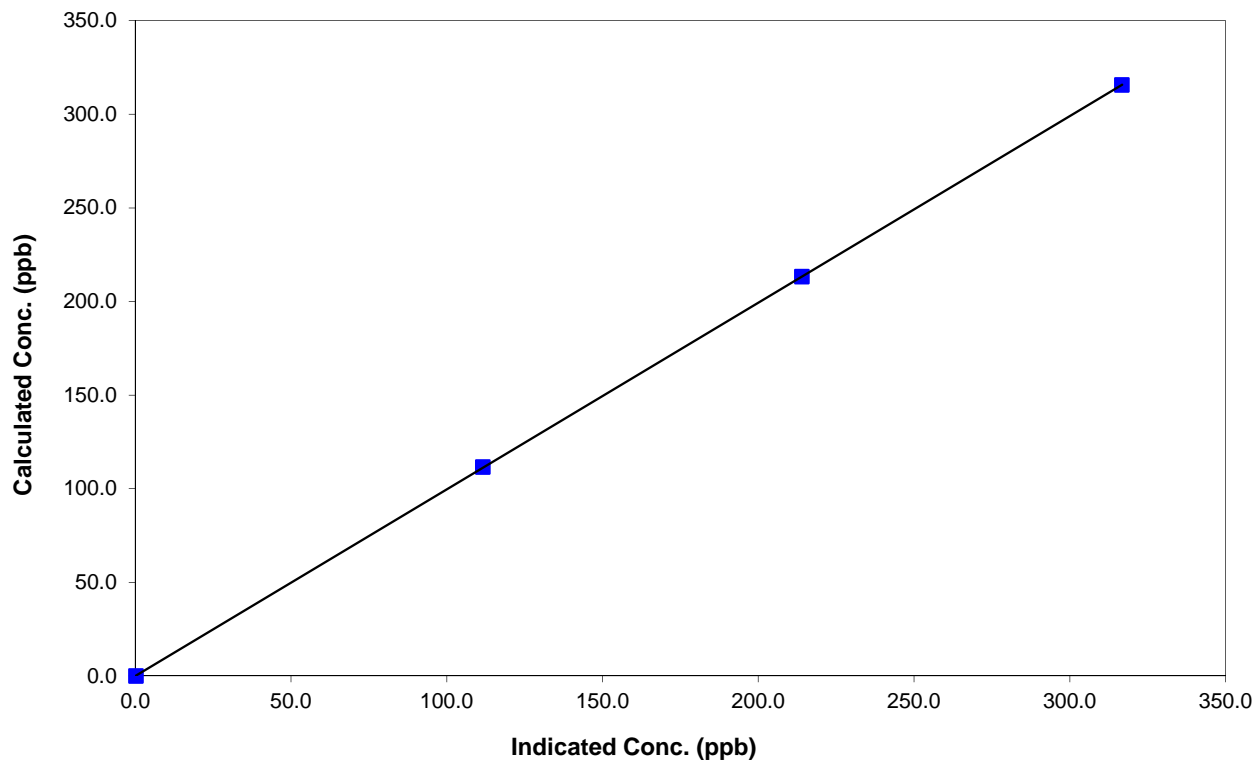
### Station Information

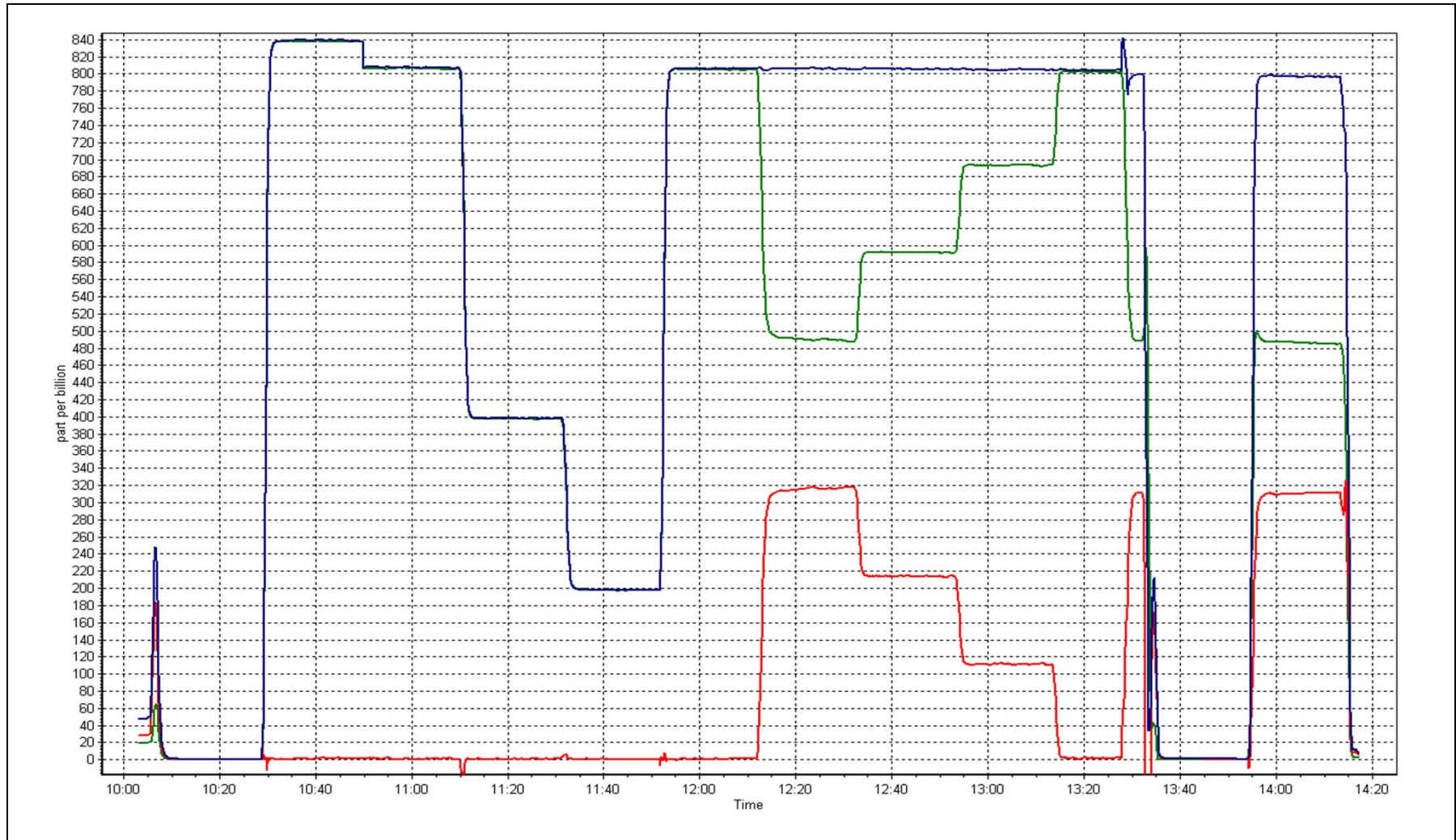
Calibration Date	February 18, 2015	Previous Calibration	January 23, 2015
Station Number	Shell Muskeg River	Station Number	AMS 16
Start Time (MST)	10:05	End Time (MST)	14:15
Analyzer make	Thermo 42i	Analyzer serial #	1426262593

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999996
315.7	316.8	0.9964		
213.2	214.0	0.9965	Slope	0.996995
111.6	111.6	0.9997		
			Intercept	-0.067243

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

CONTINUOUS AMBIENT AIR QUALITY  
MONITORING PROGRAM  
MONTHLY REPORT

**AMS 17  
WAPASU  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
 FEBRUARY 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	608	32	64	95.24	10	0	2	0
H2S (ppb) Average	628	34	44	98.51	1	0	0	0
THC (ppm) Average	630	33	42	98.66	2.5	-	2.2	-
O3 (ppb) Average	632	31	40	98.66	42	0	38	-
NO2 (ppb) Average	630	33	42	98.66	31	0	13	-
NO (ppb) Average	630	33	42	98.66	12	-	2	-
NOX (ppb) Average	630	33	42	98.66	44	-	15	-
PM2.5 (ug/m3) Average	661	0	11	98.36	23	-	8.5	0
Temperature 2 m (C) Average	672	0	0	100.00	0.8	-	-5.6	-
Relative Humidity (%) Average	672	0	0	100.00	93	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	30	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
 FEBRUARY 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	608	0.9	1	-	0	0	0	0	1	2	10
H2S (ppb) Average	628	0.3	0	-	0	0	0	0	0	0	1
THC (ppm) Average	630	2.1	0.1	-	2	2	2.1	2.1	2.1	2.2	2.5
O3 (ppb) Average	632	29.8	7	-	1	19	27	31	34	37	42
NO2 (ppb) Average	630	3.8	5	-	0	0	1	2	5	11	31
NO (ppb) Average	630	0.8	1	-	0	0	0	0	1	2	12
NOX (ppb) Average	630	4.6	5	-	0	1	1	3	6	12	44
PM2.5 (ug/m3) Average	661	4.12	2.8	-	0.6	1.7	2.4	3.3	4.8	7	23
Temperature 2 m (C) Average	672	-17.83	6.9	-	-38	-25.9	-22.9	-18.4	-13.7	-8.9	0.8
Relative Humidity (%) Average	672	74.8	9	-	38	63	70	76	81	84	93
Wind Speed 10 m (km/h) Average	672	8.5	4	-	0	4	6	8	11	13	30
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-



WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - WAPASU (AMS 17)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	14 Feb 2015 09:00	15 Feb 2015 16:00	32	Station Power failure and followed by tripped circuit breaker
H2S	14 Feb 2015 09:00	14 Feb 2015 18:00	10	Station Power failure
THC	14 Feb 2015 09:00	14 Feb 2015 17:00	9	Station Power failure
O3	14 Feb 2015 09:00	14 Feb 2015 17:00	9	Station Power failure
NO2, NO, NOX	14 Feb 2015 09:00	14 Feb 2015 17:00	9	Station Power failure
PM2.5	10 Feb 2015 08:00	10 Feb 2015 10:00	3	Maintenance - Flow and zero check, sample head cleaning
PM2.5	14 Feb 2015 09:00	14 Feb 2015 16:00	8	Station Power failure

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Summary of Hour Averages

Wapasu - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 10 ppb on Feb 27 18:00	Maximum Daily Average: 2.5 ppb on Feb 19		Hours of Data:	608
Minimum Value: 0 ppb on Feb 5 09:00	Minimum Daily Average: 0.3 ppb on Feb 23		Hours of Missing Data:	64
Maximum Diurnal Average: 1.3 ppb at hour 18	Minimum Diurnal Average: 0.6 ppb at hour 14		Hours of Calibration:	32
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> =8		Percent Operational Time:	95.2

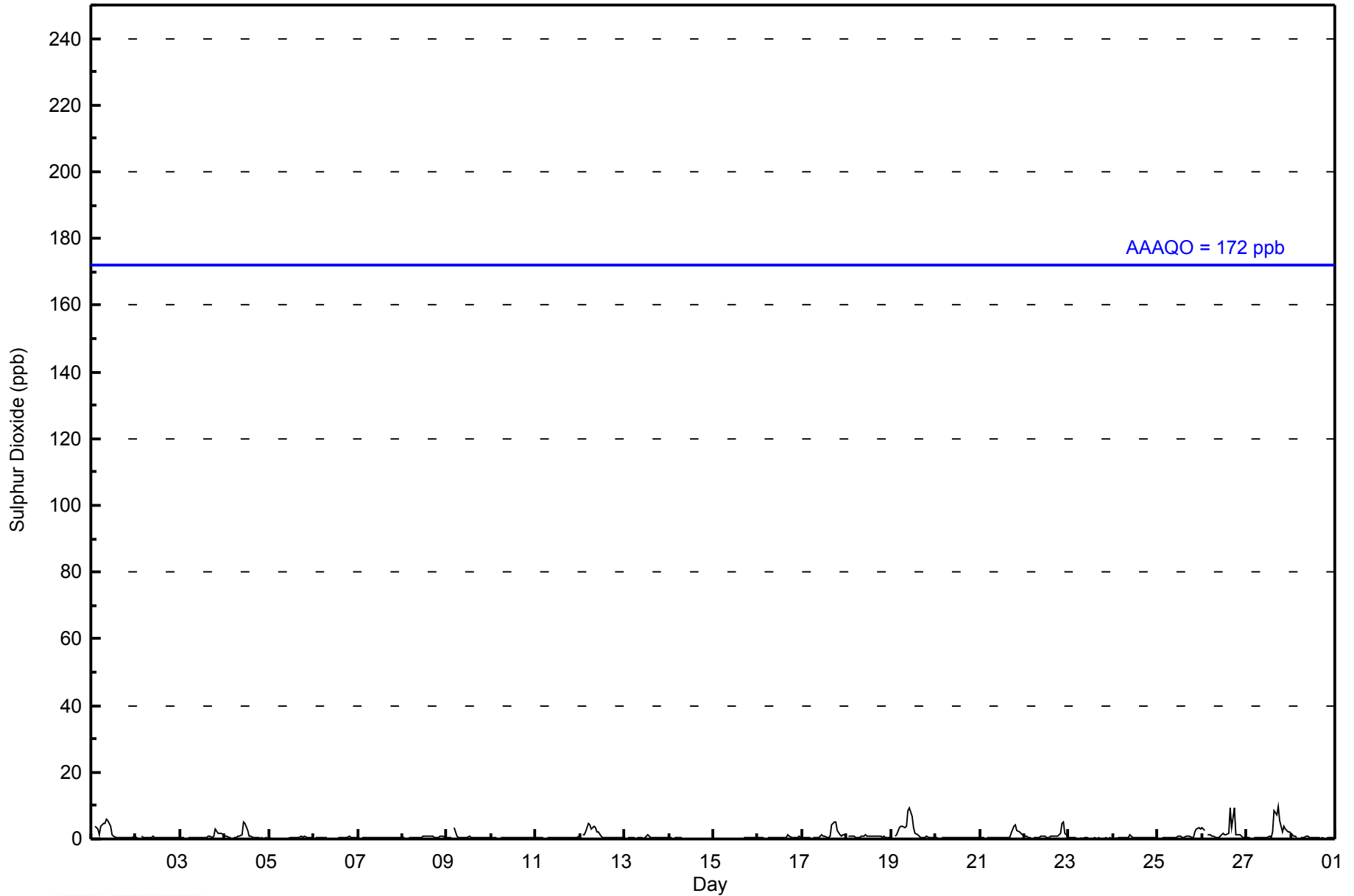
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	4	Z	4	3	1	4	4	5	6	6	4	1	1	1	0	0	0	0	0	0	0	1	1	2.1	6	
2-Feb	1	0	Z	1	1	0	1	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0.4	1	
3-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	3	2	2	1	0.7	3	
4-Feb	1	1	1	1	Z	1	1	1	1	1	5	5	2	1	1	0	0	0	0	0	0	0	0	1.0	5	
5-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0.4	1	
6-Feb	Z	1	0	0	0	0	0	0	C	C	C	C	C	1	1	0	0	1	1	1	0	0	0	0.5	1	
7-Feb	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	
8-Feb	0	1	Z	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	1	0.6	1	
9-Feb	1	1	0	Z	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0.6	3	
10-Feb	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0.4	1	
12-Feb	Z	1	1	2	5	4	3	4	3	2	2	1	1	1	1	0	0	0	0	0	0	0	0	1.4	5	
13-Feb	0	Z	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0.4	1	
14-Feb	0	0	Z	0	0	0	0	0	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	--	0	
15-Feb	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	M	0	0	0	0	0	0	0	--	0	
16-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1	0.5	1	
17-Feb	0	0	0	0	0	Z	0	0	0	0	1	1	1	1	0	1	4	5	5	3	1	1	1	1.3	5	
18-Feb	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1	
19-Feb	1	Z	1	1	4	4	4	3	4	8	9	7	3	2	1	1	1	1	1	1	0	0	1	2.5	9	
20-Feb	1	1	Z	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
21-Feb	0	0	0	Z	0	0	0	0	1	1	1	1	1	1	0	1	1	2	4	4	3	2	2	1.1	4	
22-Feb	1	1	1	0	Z	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	4	5	2	1.1	5	
23-Feb	1	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	
24-Feb	Z	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1	
25-Feb	0	Z	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	2	3	3	0.9	3	
26-Feb	3	3	Z	1	1	1	1	1	1	1	1	2	1	1	2	9	3	9	1	1	1	1	1	2.0	9	
27-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	1	1	2	8	7	10	5	2	4	3	2	2.2	10	
28-Feb	2	1	1	0	Z	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	2	
	0.8	0.6	0.6	0.7	0.9	0.9	0.8	0.8	0.9	1.1	1.2	1.0	0.8	0.6	0.6	1.2	1.0	1.3	1.0	0.9	0.9	0.9	0.7	0.7	Diurnal Average	
	4	3	4	3	5	4	4	5	6	8	9	7	3	2	2	9	7	10	5	4	4	5	3	3	Diurnal Maximum	

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



WBEA  
Hourly Averages

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	608	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: 608

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Wapasu - February 2015**

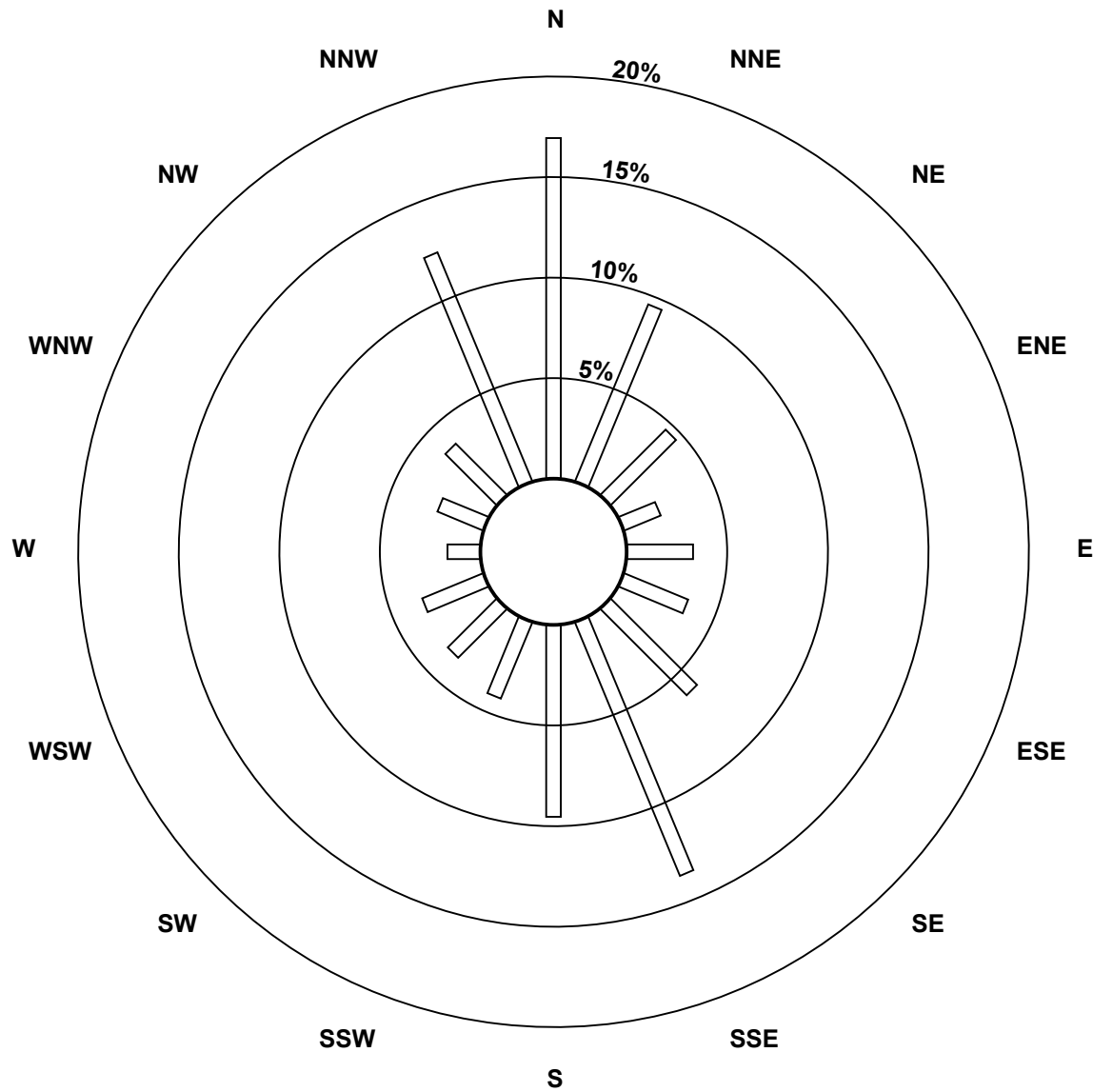
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	103	58	28	12	20	21	37	83	58	25	21	20	10	15	22	75	608
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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>	103	58	28	12	20	21	37	83	58	25	21	20	10	15	22	75	608

Total Number of Valid Hours: 608

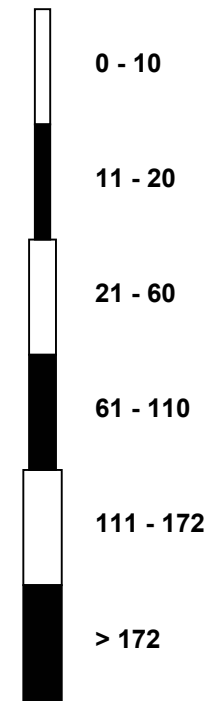
Total Number of Hours: 672

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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu (AMS 17)**



**Classes (ppb)**

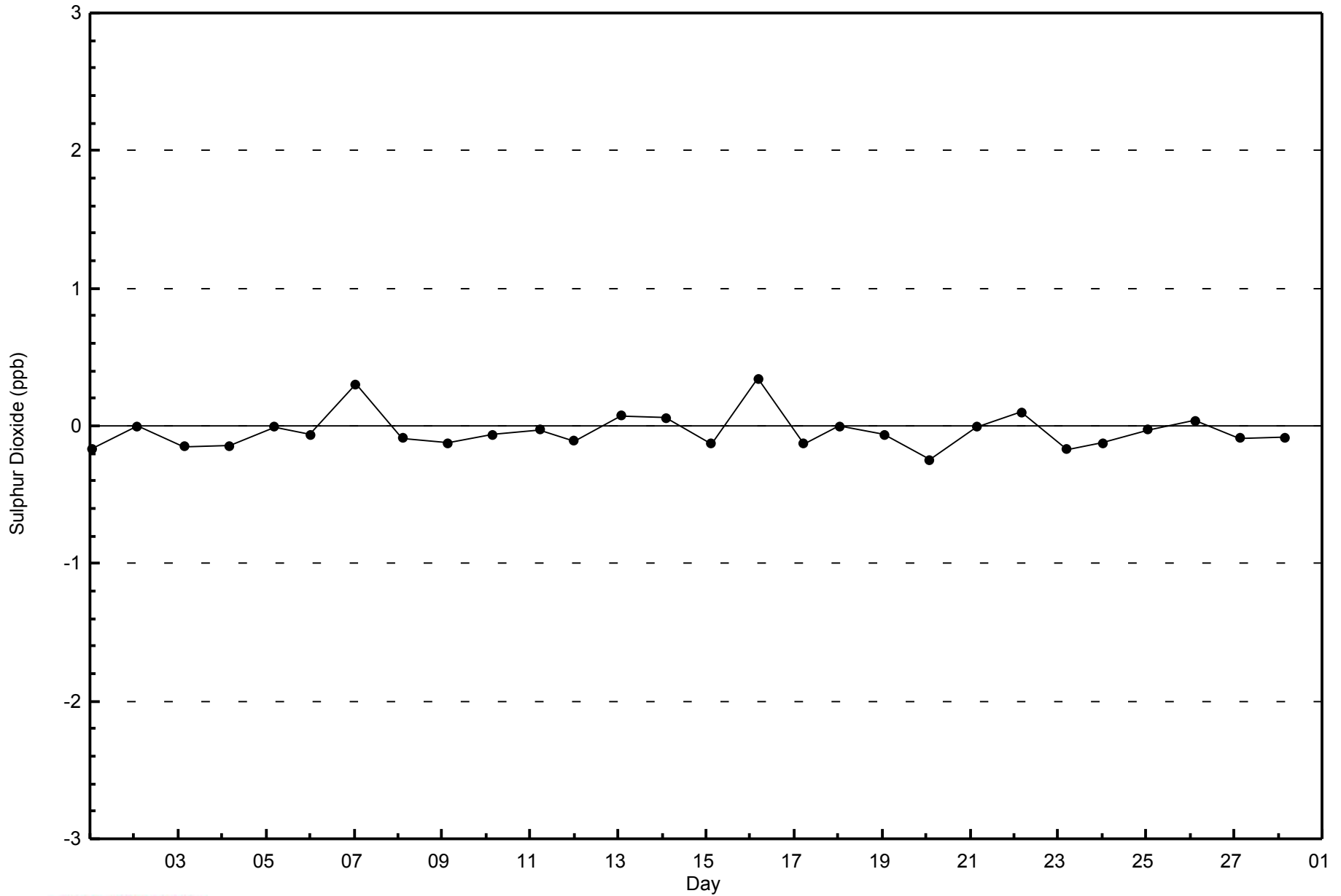


**Total Number of Valid Hours: 608**



WBEA  
Zero Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - February 2015

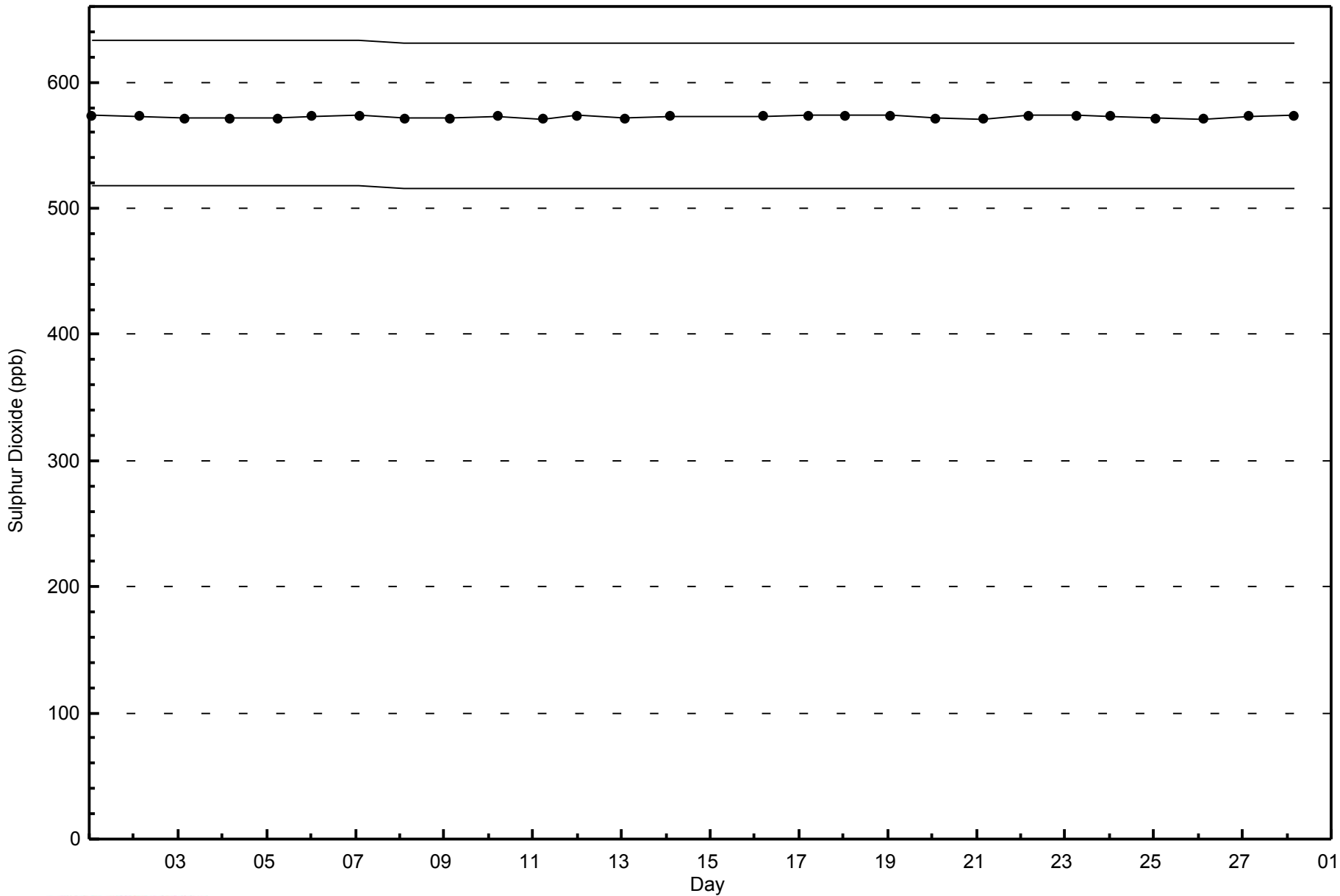






WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Wapasu - February 2015





Summary of Hour Averages

Wapasu - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 1 ppb on Feb 9 04:00	Maximum Daily Average: 0.4 ppb on Feb 12		Hours of Data:	628
Minimum Value: 0 ppb on Feb 1 16:00	Minimum Daily Average: 0.2 ppb on Feb 20		Hours of Missing Data:	44
Maximum Diurnal Average: 0.3 ppb at hour 4	Minimum Diurnal Average: 0.3 ppb at hour 17		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:	98.5

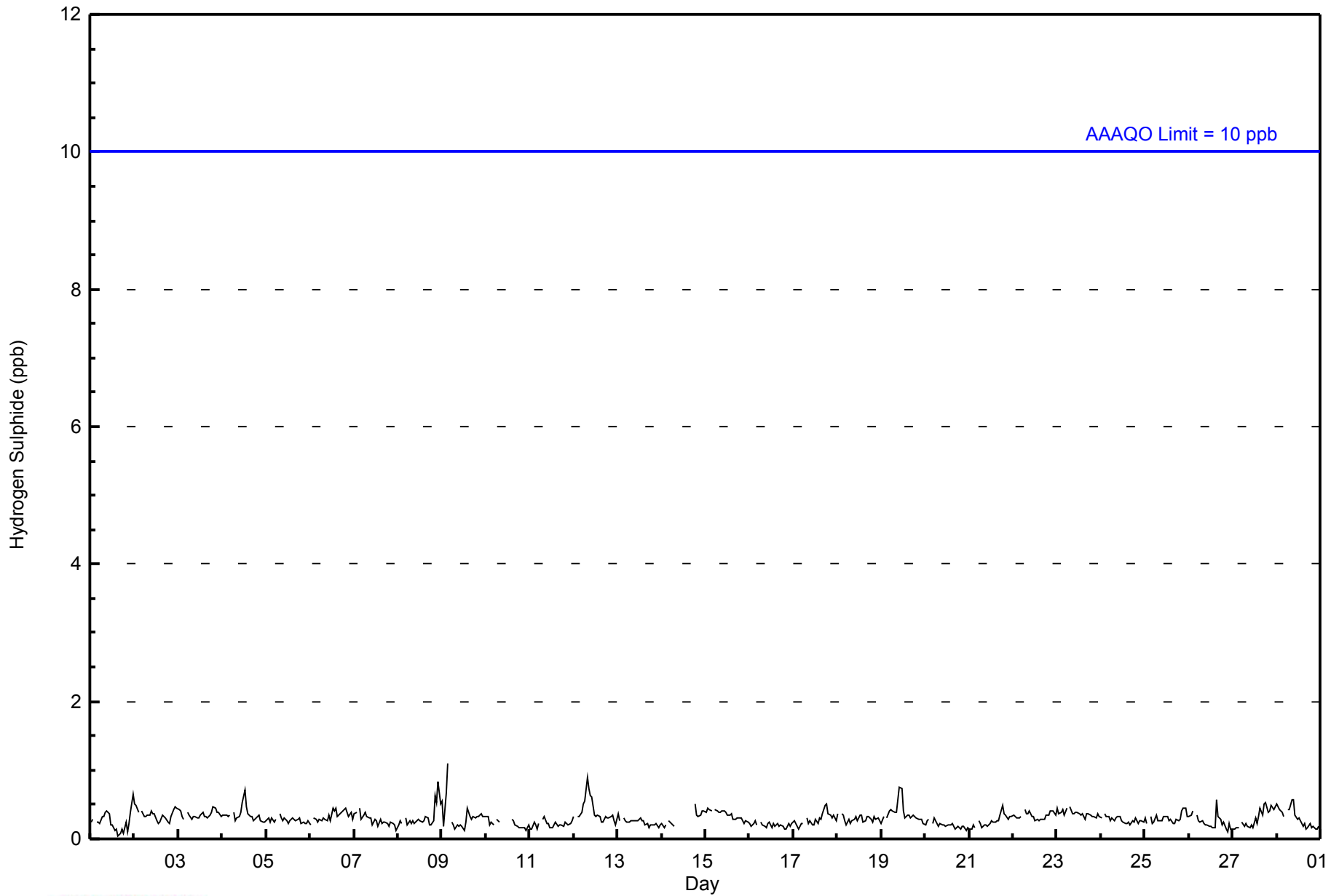
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1	
2-Feb	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	
3-Feb	0	0	0	0	Z	0	0	0	0	0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

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - February 2015





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	628	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: 628

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Wapasu - February 2015**

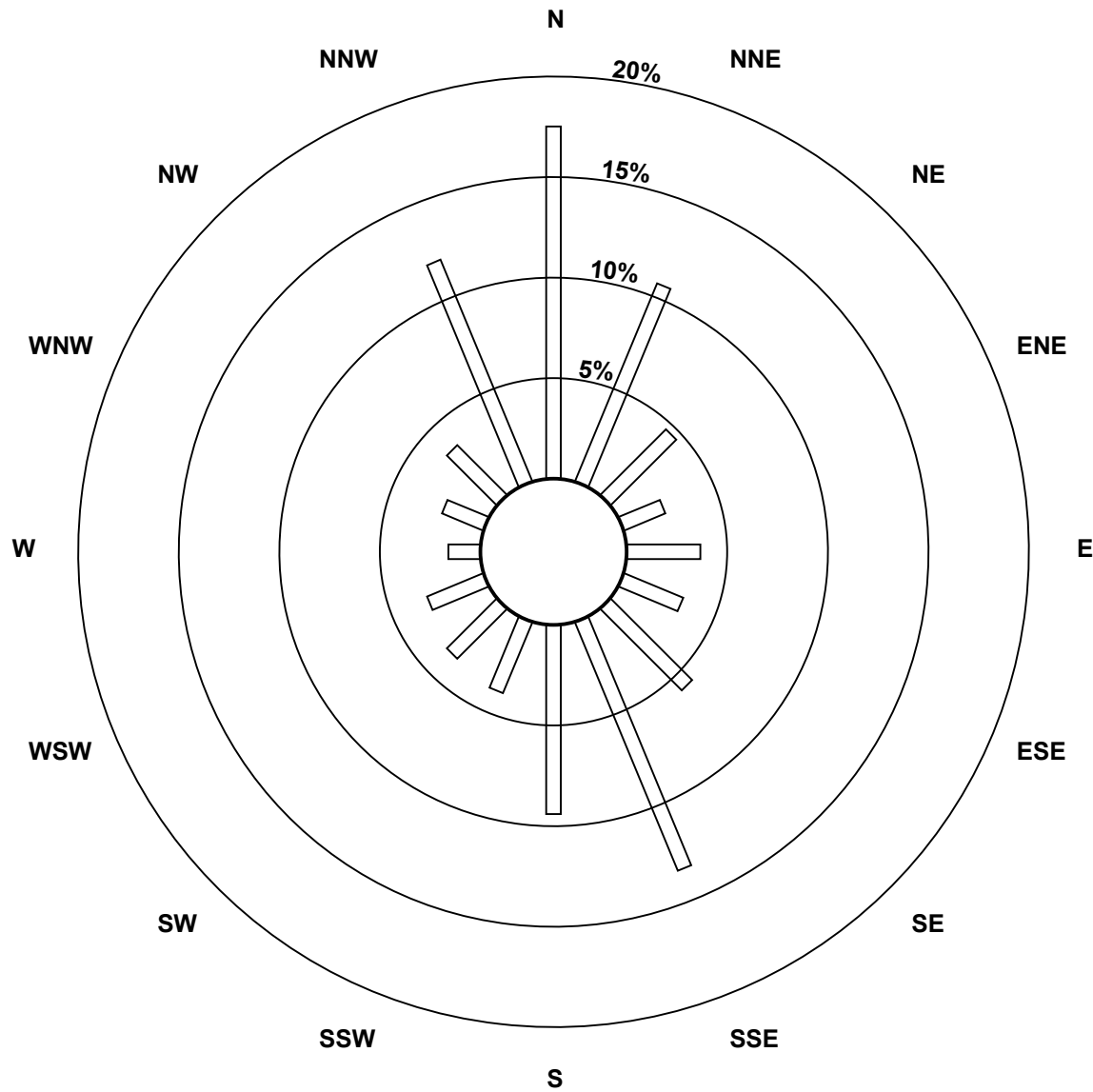
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	110	67	29	14	23	20	36	84	59	24	22	19	10	14	22	75	628
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	110	67	29	14	23	20	36	84	59	24	22	19	10	14	22	75	628

Total Number of Valid Hours: 628

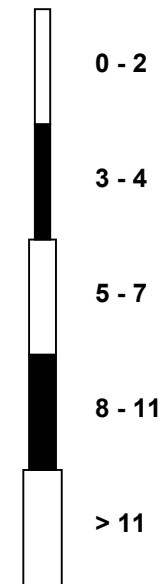
Total Number of Hours: 672

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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu (AMS 17)**



Classes (ppb)

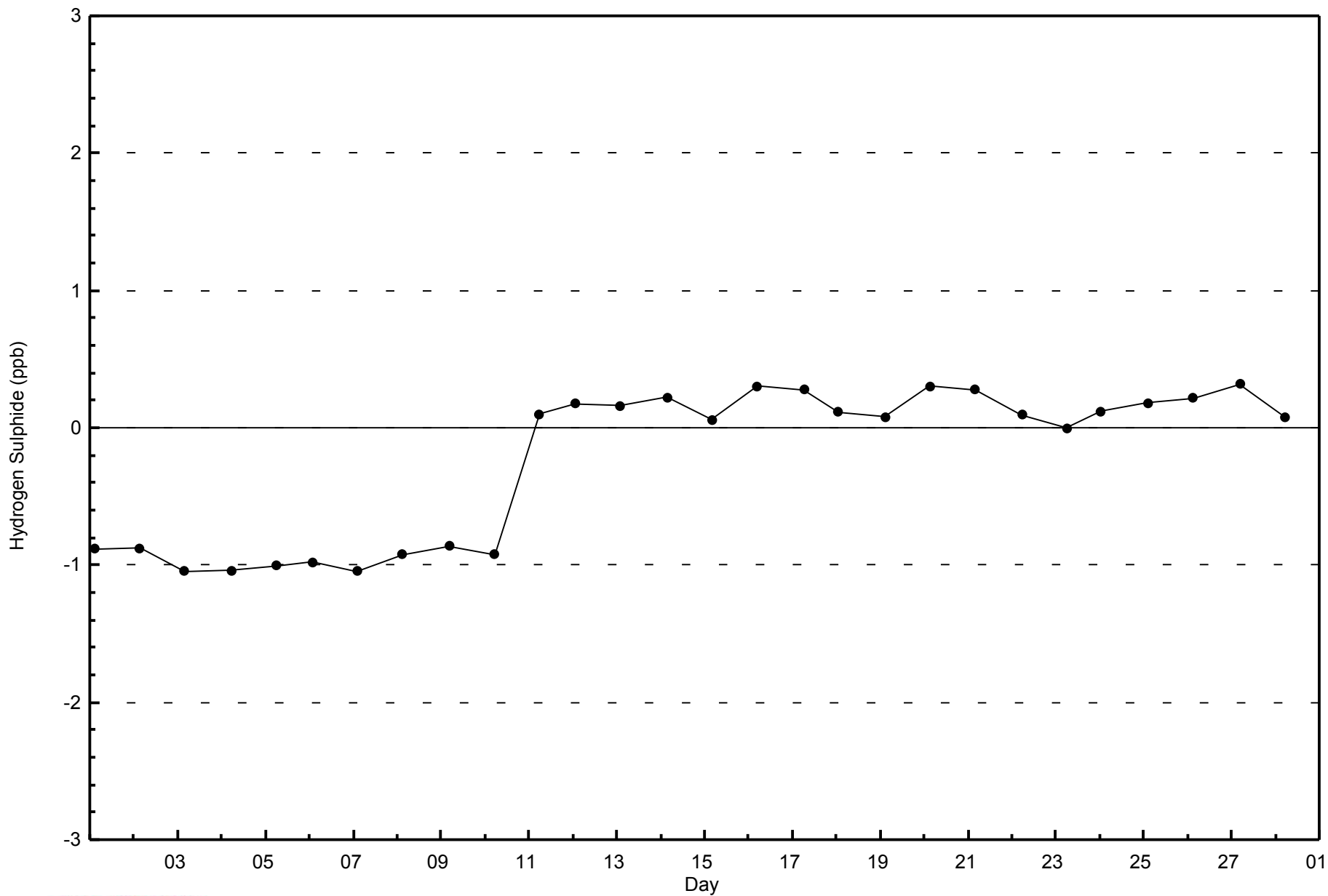


**Total Number of Valid Hours: 628**



WBEA  
Zero Responses

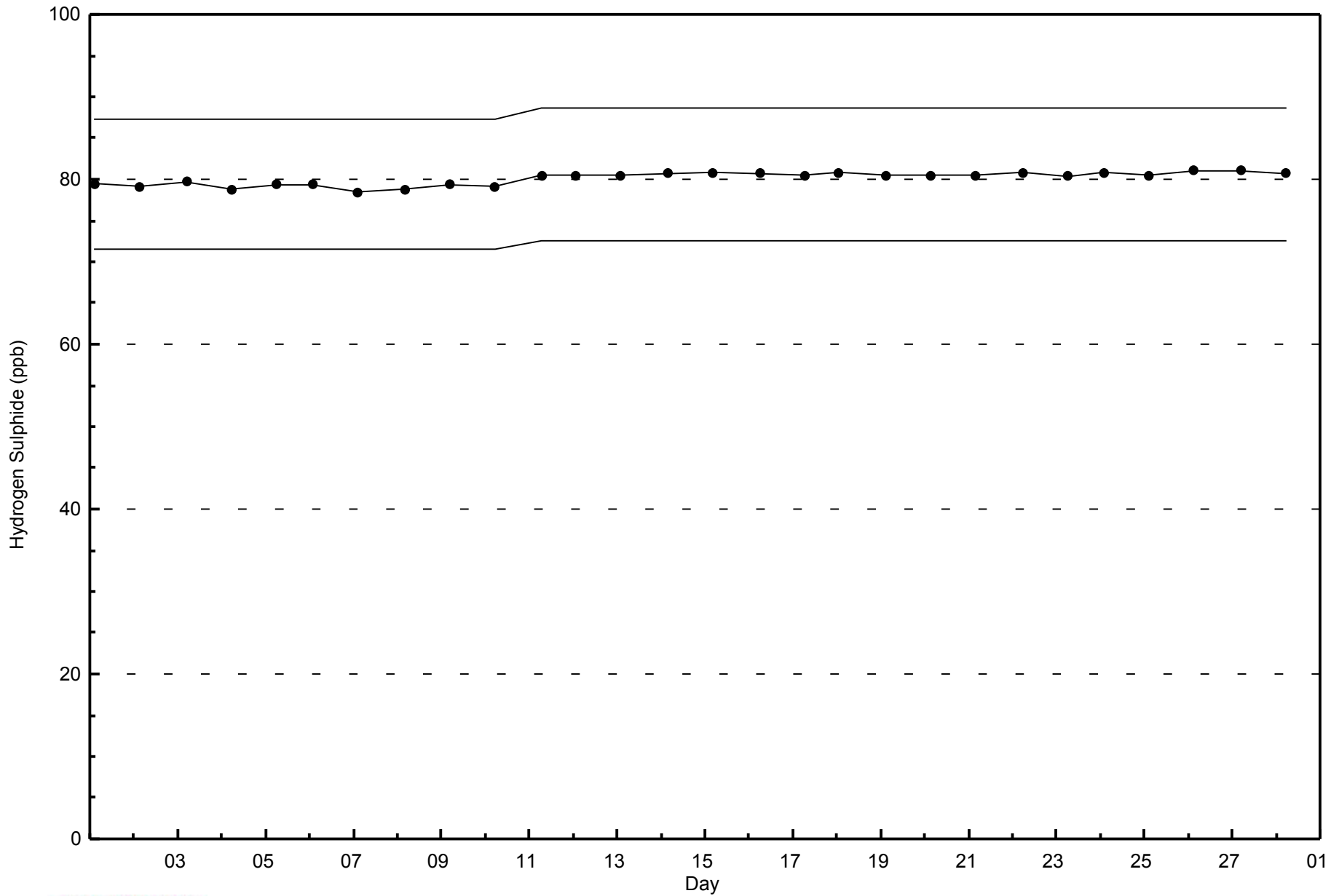
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - February 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Wapasu - February 2015







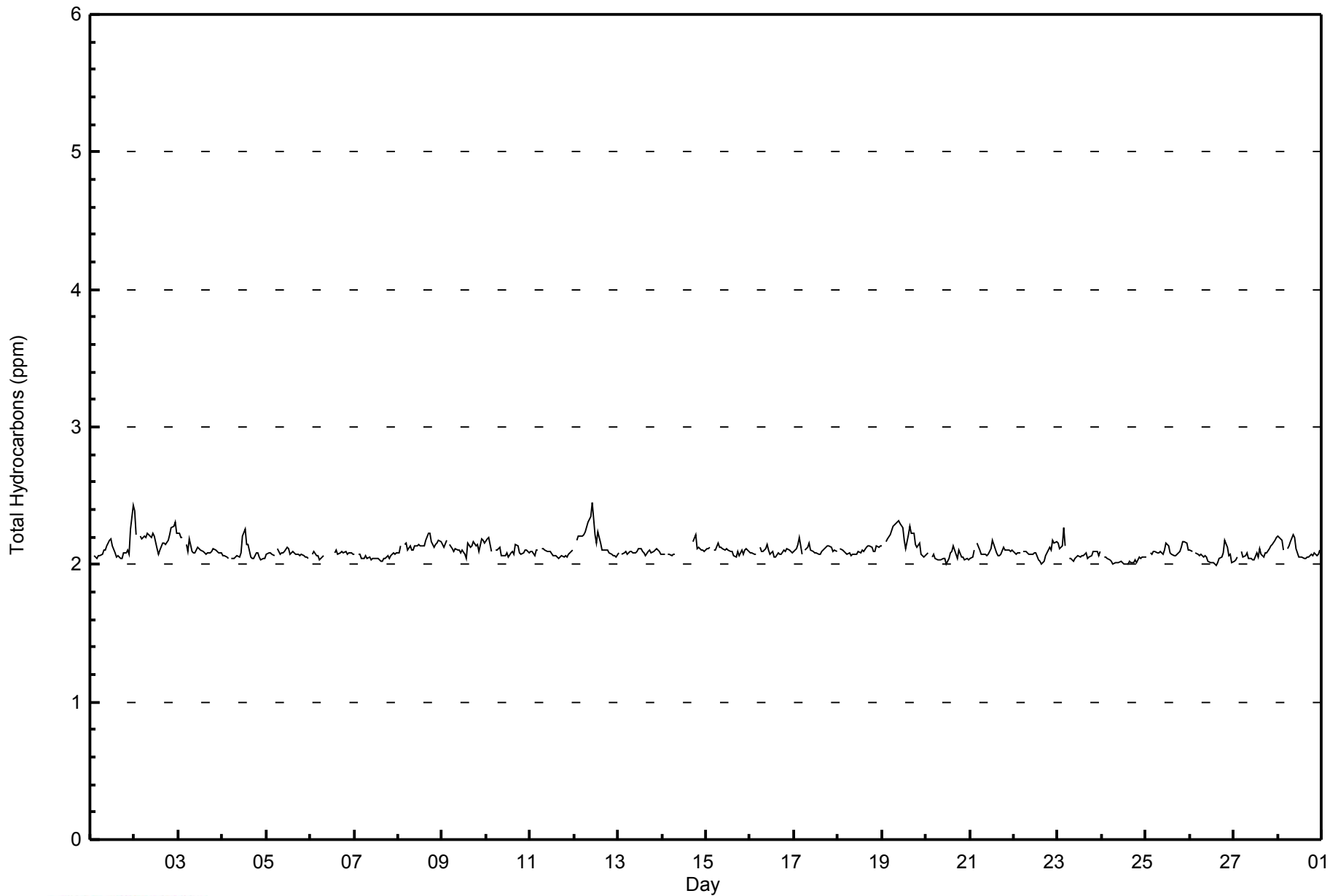
Maximum Value: 2.5 ppm on Feb 12 11:00		Maximum Daily Average: 2.2 ppm on Feb 2		Hours in Service: 672																						
Minimum Value: 2.0 ppm on Feb 26 15:00		Minimum Daily Average: 2.0 ppm on Feb 24		Hours of Data: 630																						
Maximum Diurnal Average: 2.1 ppm at hour 1		Minimum Diurnal Average: 2.1 ppm at hour 16		Hours of Missing Data: 42																						
Monthly Average: 2.10 ppm		Percentiles: P <sub>1</sub> = 2.0 P <sub>10</sub> = 2.0 Q <sub>1</sub> = 2.1 Median = 2.1 Q <sub>3</sub> = 2.1 P <sub>90</sub> = 2.2 P <sub>99</sub> = 2.3		Hours of Calibration: 33																						
				Percent Operational Time: 98.7																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	2.1	Z	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.3	2.4	2.1	2.4
2-Feb	2.4	2.2	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.2	2.2	2.1	2.2	2.2	2.3	2.3	2.3	2.2	2.2	2.4
3-Feb	2.2	2.2	2.2	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
4-Feb	2.1	2.1	2.1	2.0	Z	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.3	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.0	2.0	2.0	2.1	2.3
5-Feb	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	2.0	2.1	2.1
6-Feb	Z	2.1	2.1	2.1	2.1	2.0	2.1	2.1	C	C	C	C	C	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
7-Feb	2.1	Z	2.1	2.1	2.0	2.0	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1
8-Feb	2.1	2.1	Z	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.2
9-Feb	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	2.0	2.2	2.1	2.1	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.2
10-Feb	2.2	2.2	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
11-Feb	2.1	2.1	2.1	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
12-Feb	Z	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.5	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	2.5
13-Feb	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
14-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	PF	PF	PF	PF	PF	PF	PF	PF	PF	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.2
15-Feb	2.1	2.1	2.1	Z	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
16-Feb	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
17-Feb	2.1	2.1	2.1	2.2	2.1	Z	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
18-Feb	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
19-Feb	2.1	Z	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.2	2.3	2.2	2.2	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.3
20-Feb	2.1	2.1	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	2.0	2.1	2.0	2.0	2.0	2.0	2.1	2.1
21-Feb	2.0	2.1	2.1	Z	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
22-Feb	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	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.2
23-Feb	2.2	2.1	2.1	2.3	2.1	Z	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.3
24-Feb	Z	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.0	2.1	2.1	2.1	2.1
25-Feb	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.2
26-Feb	2.1	2.1	Z	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.1	2.1	2.1	2.0	2.2
27-Feb	2.0	2.0	2.1	Z	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
28-Feb	2.2	2.2	2.2	2.1	Z	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2
																								Diurnal Average		
																								Diurnal Maximum		
																								2.1		
																								2.4		

Z - zerospan      C - Calibration      PF - Power Failure



**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - February 2015**





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

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	86	13.65	13.65
2.1 - 3.0	544	86.35	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 630

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Wapasu - February 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	11	3	3	3	2	9	10	5	7	3	1	1	1	3	14	86
2.1 - 3.0	102	54	25	9	17	19	28	73	53	18	18	19	9	14	20	66	544
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>	112	65	28	12	20	21	37	83	58	25	21	20	10	15	23	80	630

Total Number of Valid Hours: 630

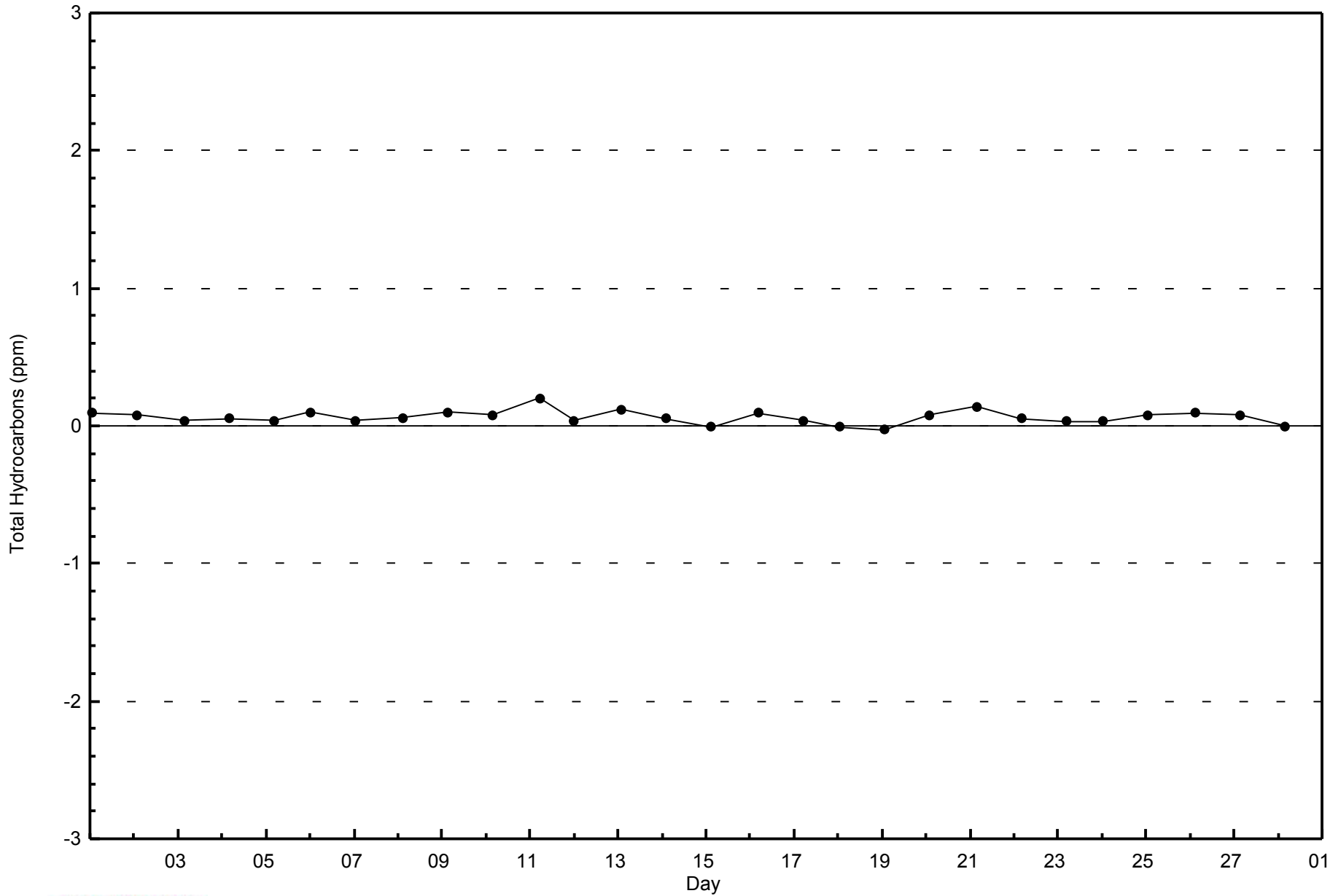
Total Number of Hours: 672





WBEA  
Zero Responses

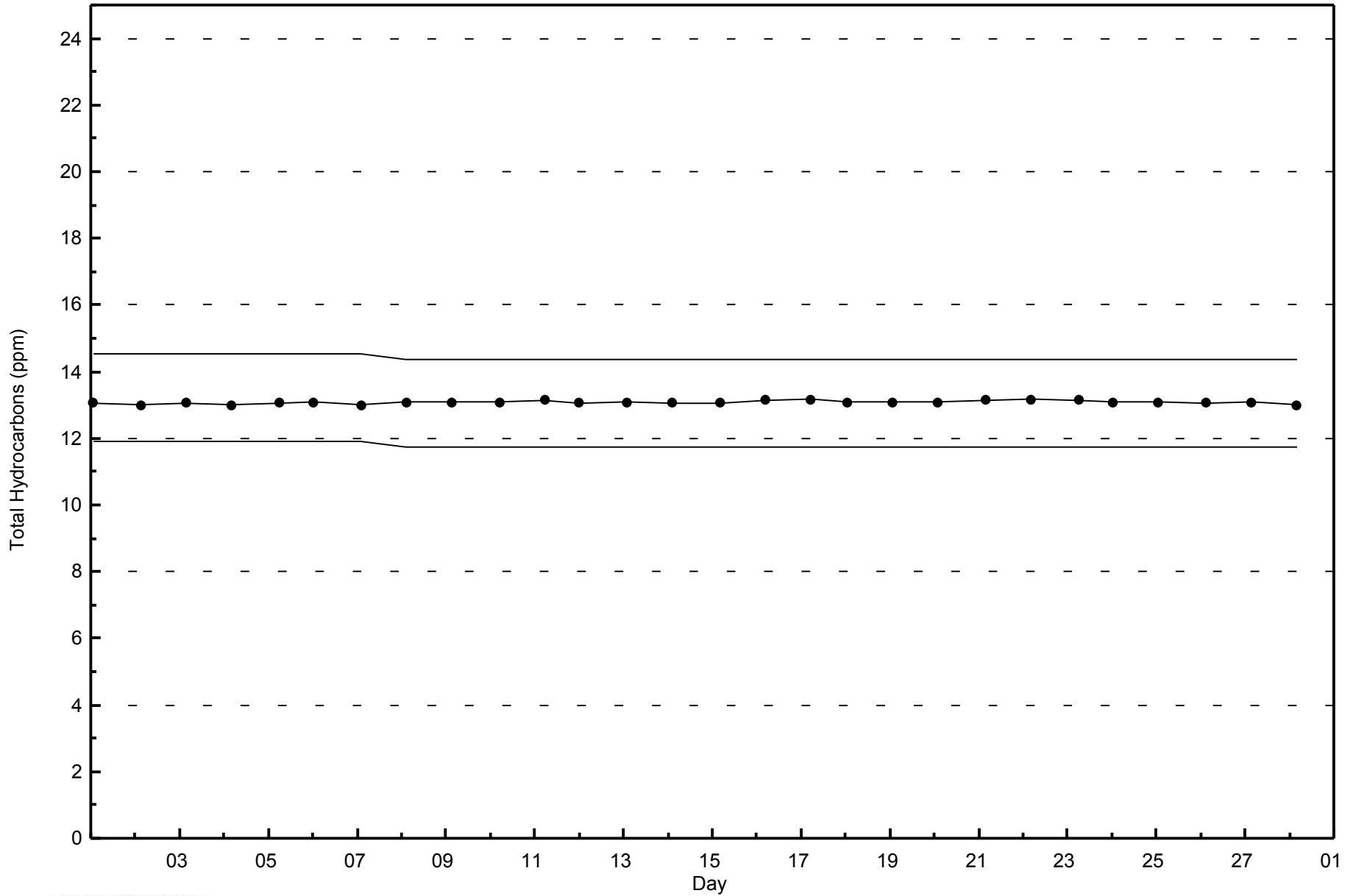
Total Hydrocarbons (THC) - ppm  
Wapasu - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Wapasu - February 2015





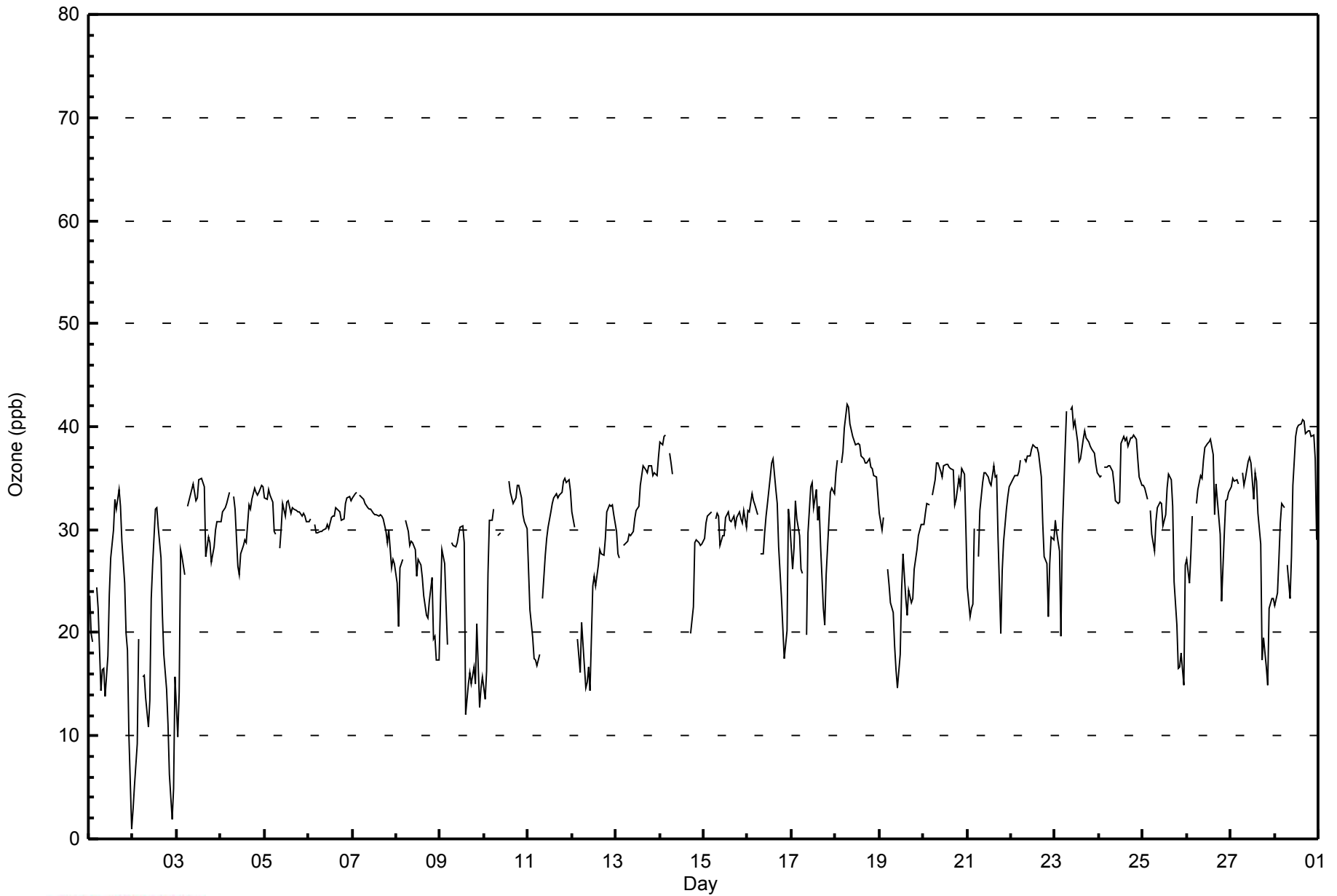
Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																
Maximum Value: 42 ppb on Feb 18 07:00										Maximum Daily Average: 37.5 ppb on Feb 18										Hours of Data: 632						
Minimum Value: 1 ppb on Feb 2 00:00										Minimum Daily Average: 16.2 ppb on Feb 2										Hours of Missing Data: 40						
Maximum Diurnal Average: 33.5 ppb at hour 14										Minimum Diurnal Average: 27.8 ppb at hour 1										Hours of Calibration: 31						
Monthly Average: 29.8 ppb										Percentiles: P <sub>1</sub> = 9 P <sub>10</sub> = 19 Q <sub>1</sub> = 27 Median = 31 Q <sub>3</sub> = 34 P <sub>90</sub> = 37 P <sub>99</sub> = 40										Percent Operational Time: 98.7						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	24	20	19	Z	24	22	14	16	17	14	18	24	27	30	33	32	34	32	29	25	20	18	10	1	21.9	34
2-Feb	3	5	9	19	Z	16	16	14	11	13	23	27	32	32	30	27	22	18	15	11	6	2	5	16	16.2	32
3-Feb	10	14	28	27	26	Z	32	33	34	34	33	33	35	35	35	34	27	29	29	27	28	30	31	31	29.4	35
4-Feb	31	32	32	33	33	34	Z	33	32	26	26	28	28	29	29	32	32	33	34	34	33	34	34	34	31.6	34
5-Feb	33	33	34	33	33	30	30	Z	28	30	33	31	33	33	32	32	32	32	32	32	31	32	31	31	31.7	34
6-Feb	31	31	Z	30	30	30	30	30	30	30	30	30	31	31	31	32	32	32	31	31	33	33	33	33	31.1	33
7-Feb	33	33	34	Z	33	33	33	33	32	32	32	32	31	31	31	32	31	31	30	29	30	26	27	27	31.2	34
8-Feb	25	21	26	27	Z	31	30	29	29	29	28	25	27	27	25	24	22	21	23	25	19	20	17	17	24.7	31
9-Feb	23	28	27	23	19	Z	29	28	28	29	30	30	30	29	12	15	16	15	17	15	21	13	15	16	22.0	30
10-Feb	14	16	26	31	31	32	Z	29	30	30	C	C	C	35	34	33	33	33	34	34	33	32	31	30	30.0	35
11-Feb	26	22	20	17	17	17	18	Z	23	28	29	30	32	33	33	33	33	33	34	35	35	35	35	34	28.3	35
12-Feb	32	30	Z	19	16	21	19	15	15	17	14	24	25	24	27	28	28	28	29	32	32	32	32	31	24.9	32
13-Feb	30	28	27	Z	28	29	29	29	29	30	31	32	32	34	35	36	36	36	36	36	35	36	35	37	32.5	37
14-Feb	39	38	39	39	Z	37	36	35	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	20	22	29	29	29	29	-	39
15-Feb	29	31	31	32	32	Z	31	32	31	28	29	29	31	32	31	31	31	30	31	32	31	31	32	30	30.8	32
16-Feb	32	32	34	33	32	31	Z	28	28	30	31	33	35	36	37	34	32	28	23	20	17	20	32	31	30.0	37
17-Feb	26	28	33	31	29	26	26	Z	20	30	34	35	32	34	31	32	28	22	21	26	31	34	34	34	29.4	35
18-Feb	35	37	Z	37	38	40	42	42	40	39	39	38	38	38	37	37	36	36	37	36	36	35	35	33	37.5	42
19-Feb	32	30	31	Z	26	25	23	22	19	16	15	18	24	28	23	22	24	23	23	26	28	29	30	31	24.7	32
20-Feb	31	32	33	32	Z	33	35	36	37	36	35	36	36	36	36	36	36	32	33	35	34	36	35	30	34.4	37
21-Feb	24	22	22	23	30	Z	27	32	35	36	36	35	35	34	36	35	35	29	20	26	29	32	33	34	30.4	36
22-Feb	35	35	35	35	36	37	Z	37	37	37	37	38	38	38	38	37	35	31	27	27	22	27	29	29	33.8	38
23-Feb	31	30	28	20	30	38	41	Z	42	42	40	40	38	37	37	39	40	39	39	38	38	37	36	36	36.3	42
24-Feb	35	35	Z	36	36	36	36	36	34	33	33	33	38	39	39	38	39	39	39	39	39	37	35	34	36.5	39
25-Feb	34	34	33	Z	32	30	28	31	32	33	33	30	31	34	35	35	32	25	21	17	17	18	15	27	28.5	35
26-Feb	27	25	28	31	Z	33	34	35	35	37	38	38	39	39	37	31	34	31	30	23	30	33	33	34	32.8	39
27-Feb	34	35	35	35	34	Z	36	34	35	37	37	36	33	35	35	32	29	17	20	17	15	22	23	23	29.9	37
28-Feb	23	24	27	31	33	Z	27	23	27	34	39	40	40	40	40	41	40	39	40	40	39	39	37	29	34.1	41
27.8 27.9 28.7 29.3 29.5 30.1 29.3 29.8 29.1 29.7 30.7 31.8 32.9 33.5 32.6 32.3 31.5 29.2 28.5 28.4 28.3 28.6 28.8 28.6																								Diurnal Average		
39 38 39 39 38 40 42 42 42 42 40 40 40 40 40 41 40 39 40 40 39 39 37 37																								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**  
**Wapasu - February 2015**





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

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	76	12.03	12.03
21 - 50	556	87.97	100.00
51 - 82	0	0.00	100.00
> 83	0	0.00	100.00

Total Number of Valid Hours: 632

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Ozone (O<sub>3</sub>) - ppb**  
**Wapasu - February 2015**

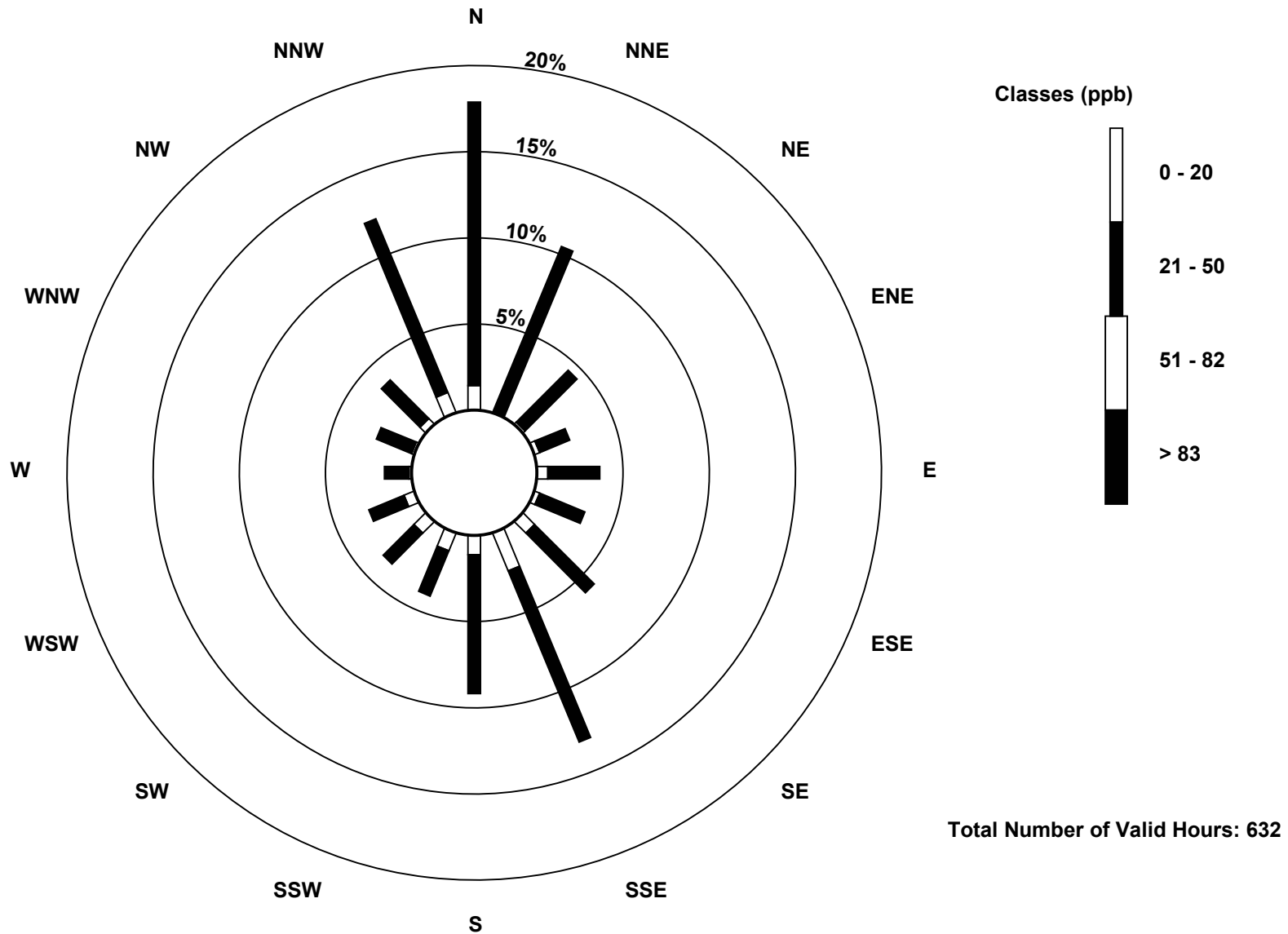
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	9	0	1	2	4	2	6	15	7	7	6	4	1	1	3	8	76
21 - 50	104	66	27	12	19	18	31	68	51	18	16	14	9	14	20	69	556
51 - 82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	113	66	28	14	23	20	37	83	58	25	22	18	10	15	23	77	632

Total Number of Valid Hours: 632

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

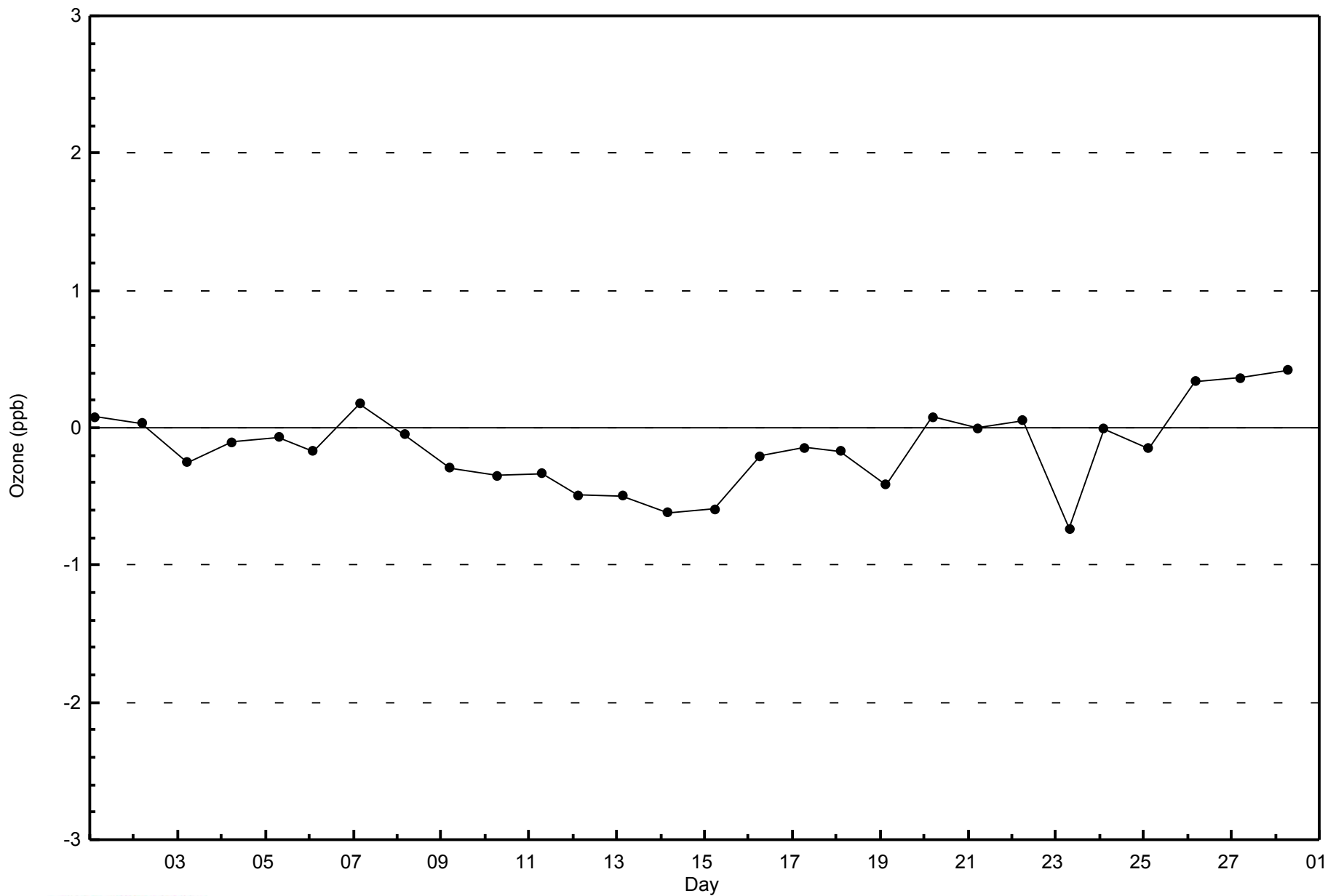
Ozone (O<sub>3</sub>) - ppb  
Wapasu (AMS 17)





WBEA  
Zero Responses

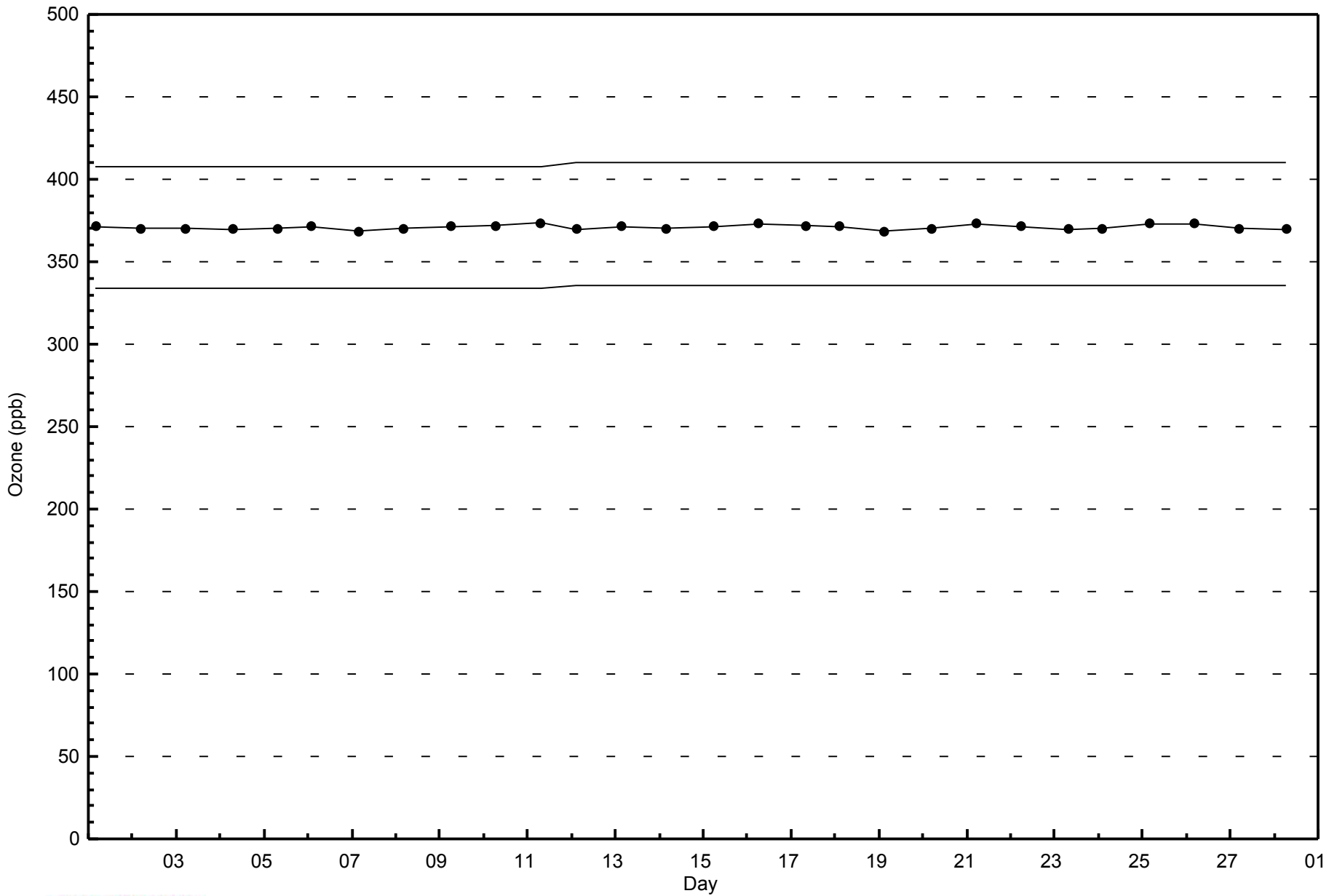
Ozone (O<sub>3</sub>) - ppb  
Wapasu - February 2015





WBEA  
Span Responses

Ozone (O<sub>3</sub>) - ppb  
Wapasu - February 2015

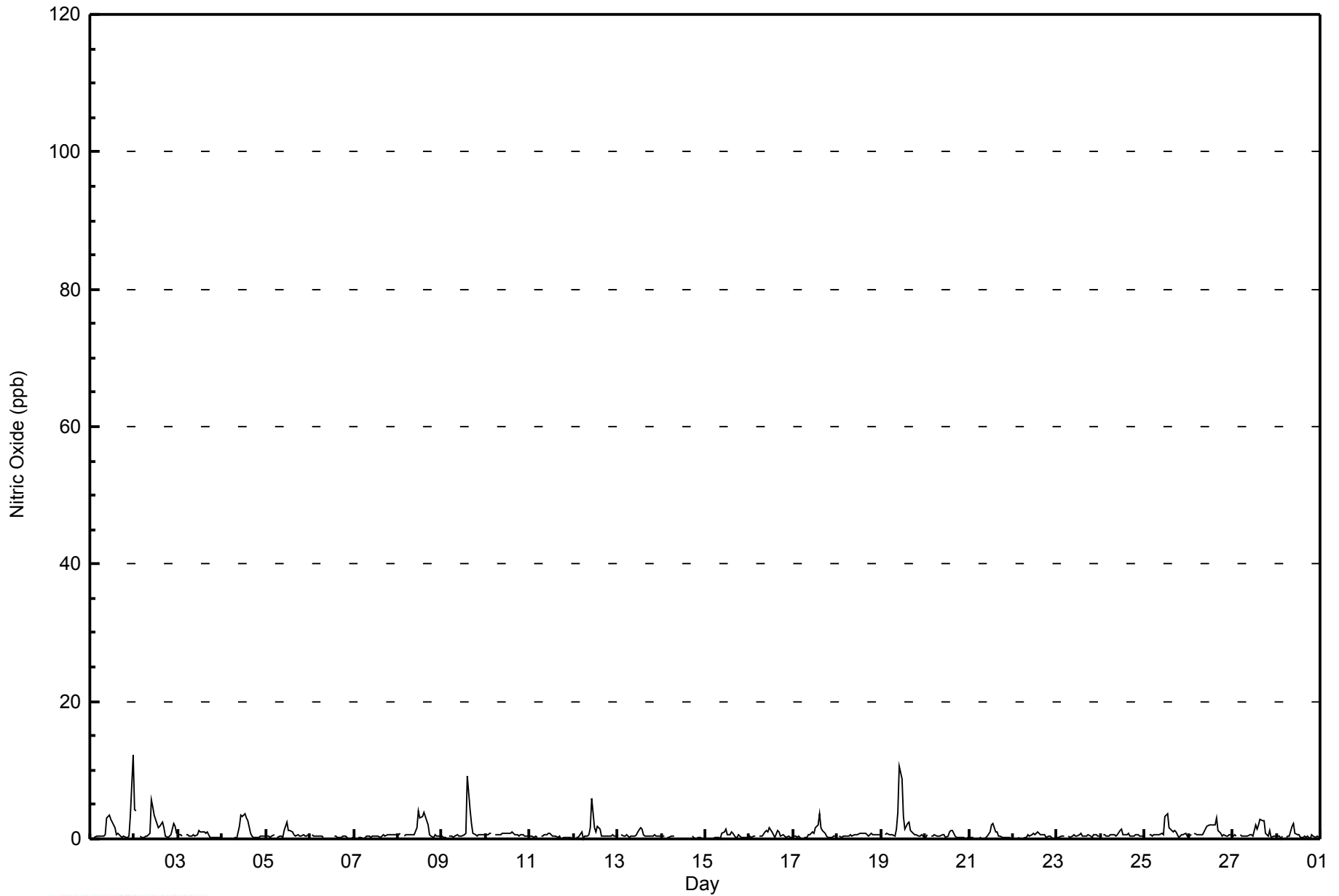






**WBEA**  
**Hourly Averages**

**Nitric Oxide (NO) - ppb**  
**Wapasu - February 2015**







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

**Nitric Oxide (NO) - ppb**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	630	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: 630

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitric Oxide (NO) - ppb**  
**Wapasu - February 2015**

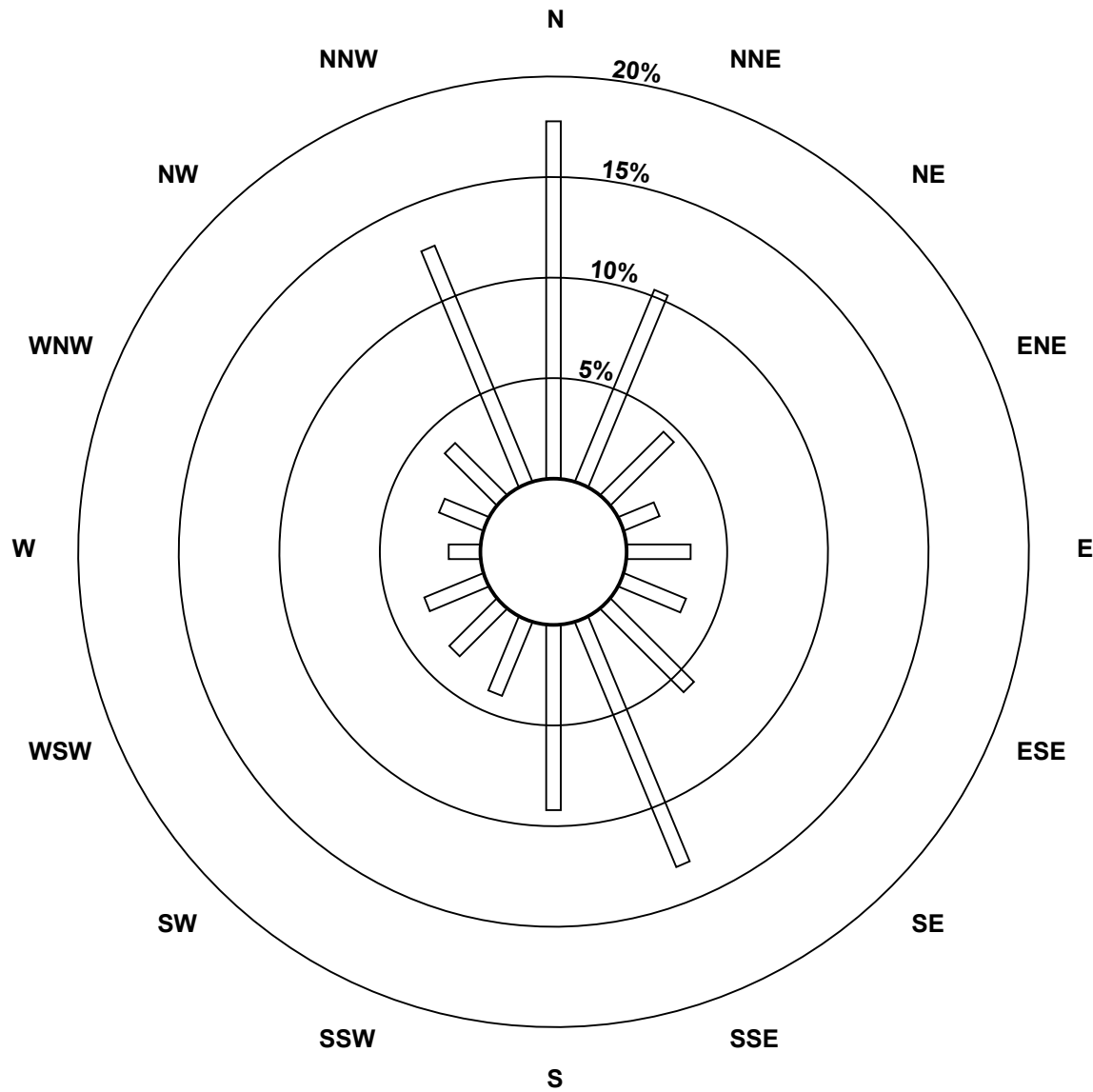
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	112	65	28	12	20	21	37	83	58	25	21	20	10	15	23	80	630
21 - 40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	112	65	28	12	20	21	37	83	58	25	21	20	10	15	23	80	630

Total Number of Valid Hours: 630

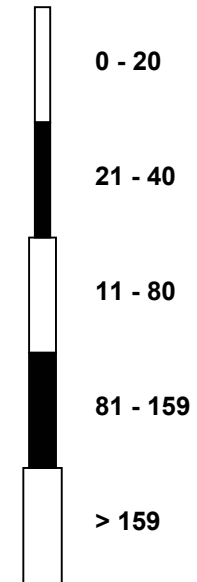
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitric Oxide (NO) - ppb  
Wapasu (AMS 17)



Classes (ppb)

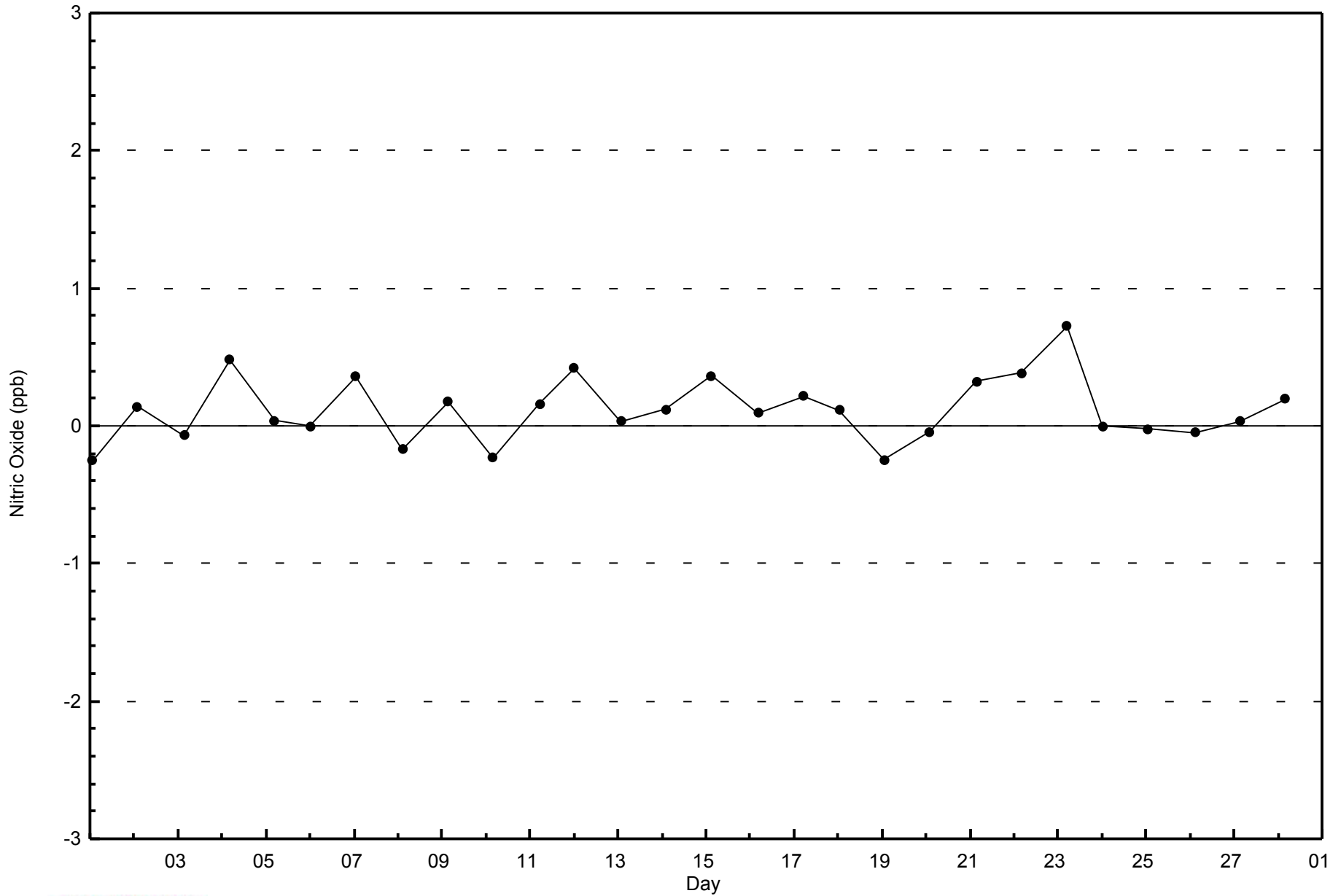


Total Number of Valid Hours: 630



WBEA  
Zero Responses

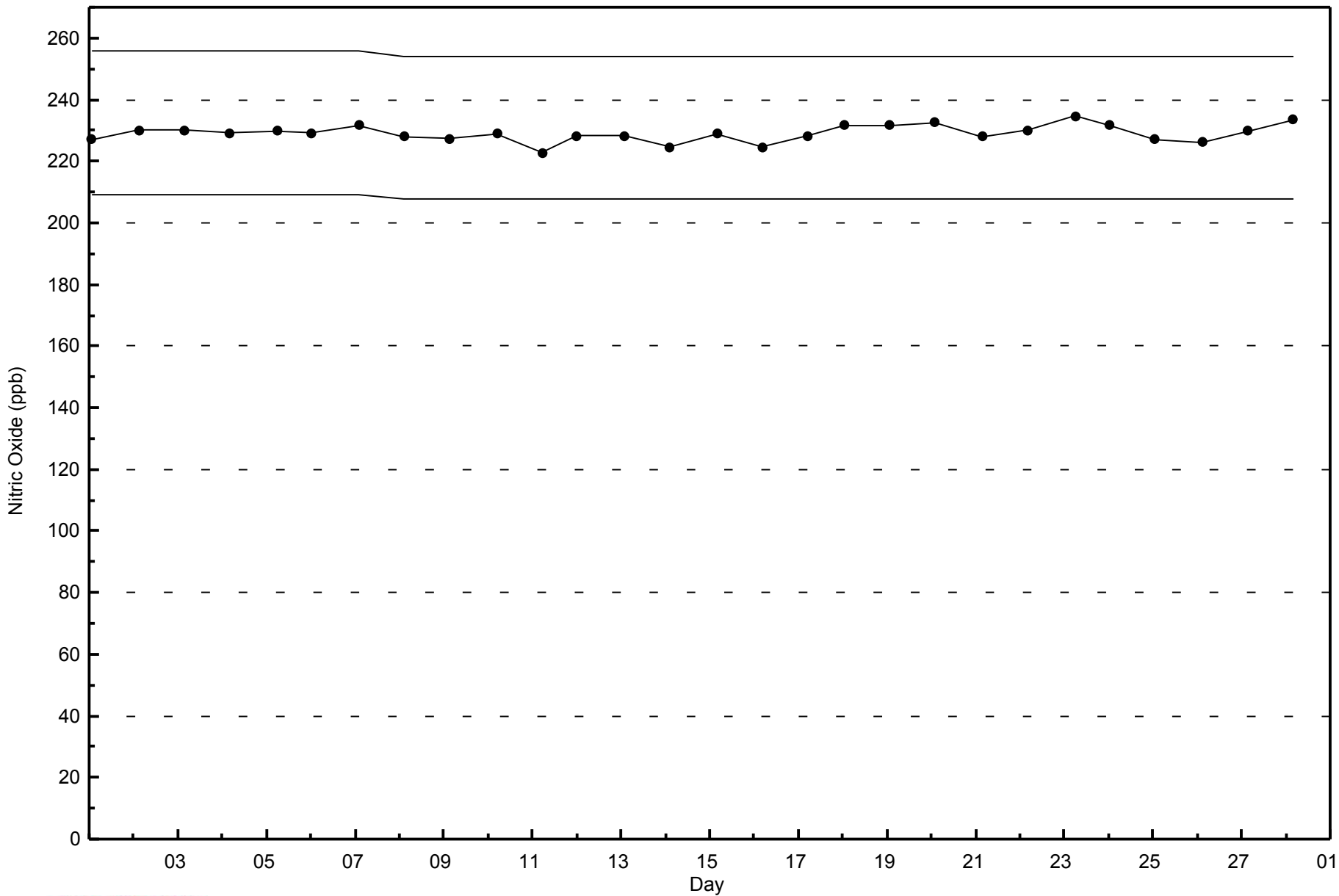
Nitric Oxide (NO) - ppb  
Wapasu - February 2015





**WBEA**  
**Span Responses**

**Nitric Oxide (NO) - ppb**  
**Wapasu - February 2015**



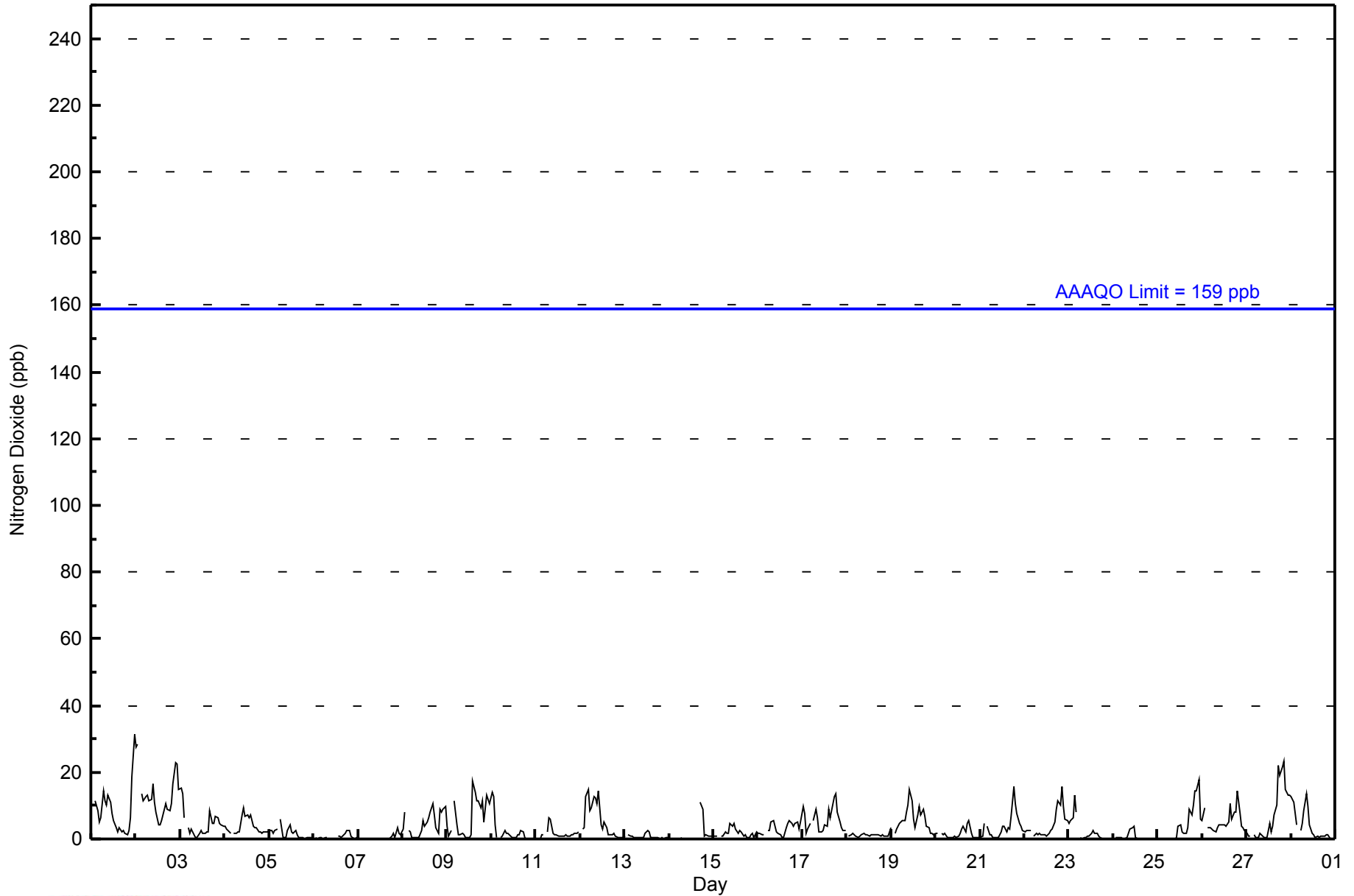


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																	
Maximum Value: 31 ppb on Feb 2 00:00										Maximum Daily Average: 13.2 ppb on Feb 2										Hours of Data: 630							
Minimum Value: 0 ppb on Feb 6 23:00										Minimum Daily Average: 0.5 ppb on Feb 7										Hours of Missing Data: 42							
Maximum Diurnal Average: 5.2 ppb at hour 18										Minimum Diurnal Average: 2.3 ppb at hour 6										Hours of Calibration: 33							
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> = 5 P <sub>90</sub> = 11 P <sub>99</sub> = 22										Percent Operational Time: 98.7							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	7	Z	11	9	5	6	14	11	10	13	11	8	5	4	2	4	2	3	2	1	3	6	19	31	8.2	31	
2-Feb	28	28	Z	14	11	13	13	11	12	17	11	8	4	4	6	9	11	9	9	11	17	23	23	15	13.2	28	
3-Feb	15	13	6	Z	3	2	3	1	1	1	2	3	2	2	2	2	8	5	5	7	6	5	4	4	4.4	15	
4-Feb	4	3	2	2	Z	2	2	2	2	7	9	7	7	6	7	4	4	3	2	2	2	2	2	2	3.7	9	
5-Feb	3	2	2	3	3	Z	6	1	1	1	3	4	2	2	3	1	1	0	0	0	0	0	1	1	1.6	6	
6-Feb	Z	0	0	0	0	0	0	0	C	C	C	C	C	1	1	1	1	2	3	3	1	1	0	1	0.8	3	
7-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	3	2	1	0.5	3
8-Feb	3	8	Z	3	2	0	0	0	0	0	2	6	4	5	6	8	11	7	4	2	9	8	9	10	4.7	11	
9-Feb	4	1	3	Z	12	4	1	1	2	1	1	1	1	1	18	14	11	12	9	12	5	13	12	10	6.4	18	
10-Feb	14	13	4	0	Z	0	1	3	2	2	1	1	1	1	1	1	3	2	0	0	0	0	0	0	2.1	14	
11-Feb	0	0	0	1	1	Z	2	6	6	2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1.6	6	
12-Feb	Z	3	3	13	15	9	9	13	12	11	14	4	3	5	4	1	1	1	2	1	1	0	0	1	5.4	15	
13-Feb	1	Z	1	1	1	1	0	0	0	0	0	2	3	2	1	0	0	0	0	0	0	0	0	0	0.7	3	
14-Feb	0	0	Z	0	0	0	0	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	11	9	1	1	1	1	1	--	11
15-Feb	1	1	1	Z	1	1	2	2	2	5	4	5	3	2	2	2	2	1	1	1	1	2	1	2	1.8	5	
16-Feb	2	2	1	1	Z	3	3	5	6	4	2	2	1	0	1	3	5	6	5	4	5	5	3	5	3.1	6	
17-Feb	10	8	2	3	5	Z	6	9	6	2	2	2	4	4	9	7	9	13	14	8	5	3	3	3	5.8	14	
18-Feb	Z	1	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1.2	2	
19-Feb	3	Z	2	3	5	5	6	6	8	10	15	11	6	3	7	10	7	9	7	4	3	2	2	1	5.8	15	
20-Feb	2	2	Z	2	1	2	1	0	0	1	1	1	1	2	3	4	2	5	5	2	1	1	1	1	1.6	5	
21-Feb	0	1	5	Z	4	1	1	1	1	0	1	2	4	4	2	3	3	7	16	11	8	5	4	3	3.7	16	
22-Feb	2	2	2	2	Z	1	2	1	2	1	1	1	1	2	2	3	5	9	11	10	16	10	6	6	4.3	16	
23-Feb	5	6	6	13	8	Z	0	0	0	0	1	1	2	3	2	2	1	1	0	0	0	0	0	0	2.2	13	
24-Feb	Z	1	1	0	0	0	0	0	2	3	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0.6	4	
25-Feb	0	Z	0	0	0	0	0	0	0	0	1	4	4	4	2	2	4	9	7	10	15	15	18	6	4.3	18	
26-Feb	5	9	Z	4	4	3	3	2	3	4	4	4	4	4	5	11	6	8	8	14	8	4	3	3	5.3	14	
27-Feb	2	1	1	Z	1	1	0	2	1	0	0	1	5	2	4	7	10	22	19	22	23	15	13	13	7.2	23	
28-Feb	13	11	8	4	Z	2	5	9	14	10	4	2	1	1	1	1	1	1	1	1	1	0	0	0	3.9	14	
5.1 5.0 2.7 3.4 3.6 2.3 2.9 3.2 3.6 3.7 3.7 3.2 2.7 2.3 3.4 3.7 4.0 5.2 5.0 4.6 4.7 4.5 4.5 4.4										Diurnal Average																	
28 28 11 14 15 13 14 13 14 17 15 11 7 6 18 14 11 22 19 22 23 23 23 31										Diurnal Maximum																	
Z - zerospan 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 - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	622	98.73	98.73
21 - 40	8	1.27	100.00
41 - 80	0	0.00	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 630

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Wapasu - February 2015**

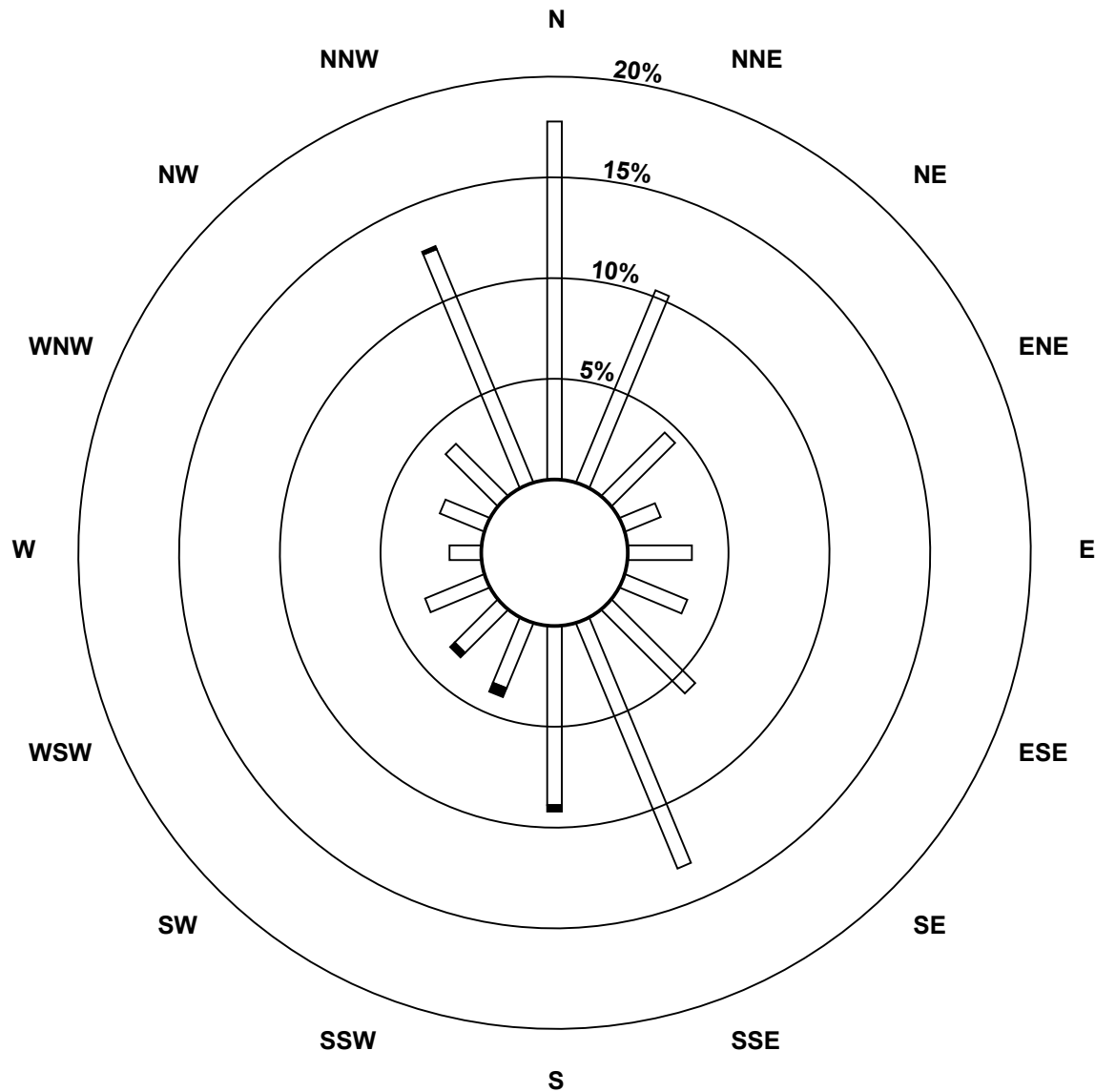
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	112	65	28	12	20	21	37	83	56	22	19	20	10	15	23	79	622
21 - 40	0	0	0	0	0	0	0	0	2	3	2	0	0	0	0	1	8
41 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	112	65	28	12	20	21	37	83	58	25	21	20	10	15	23	80	630

Total Number of Valid Hours: 630

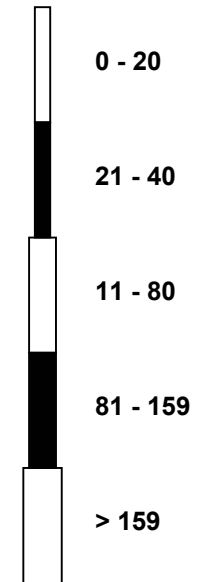
Total Number of Hours: 672

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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu (AMS 17)**



Classes (ppb)

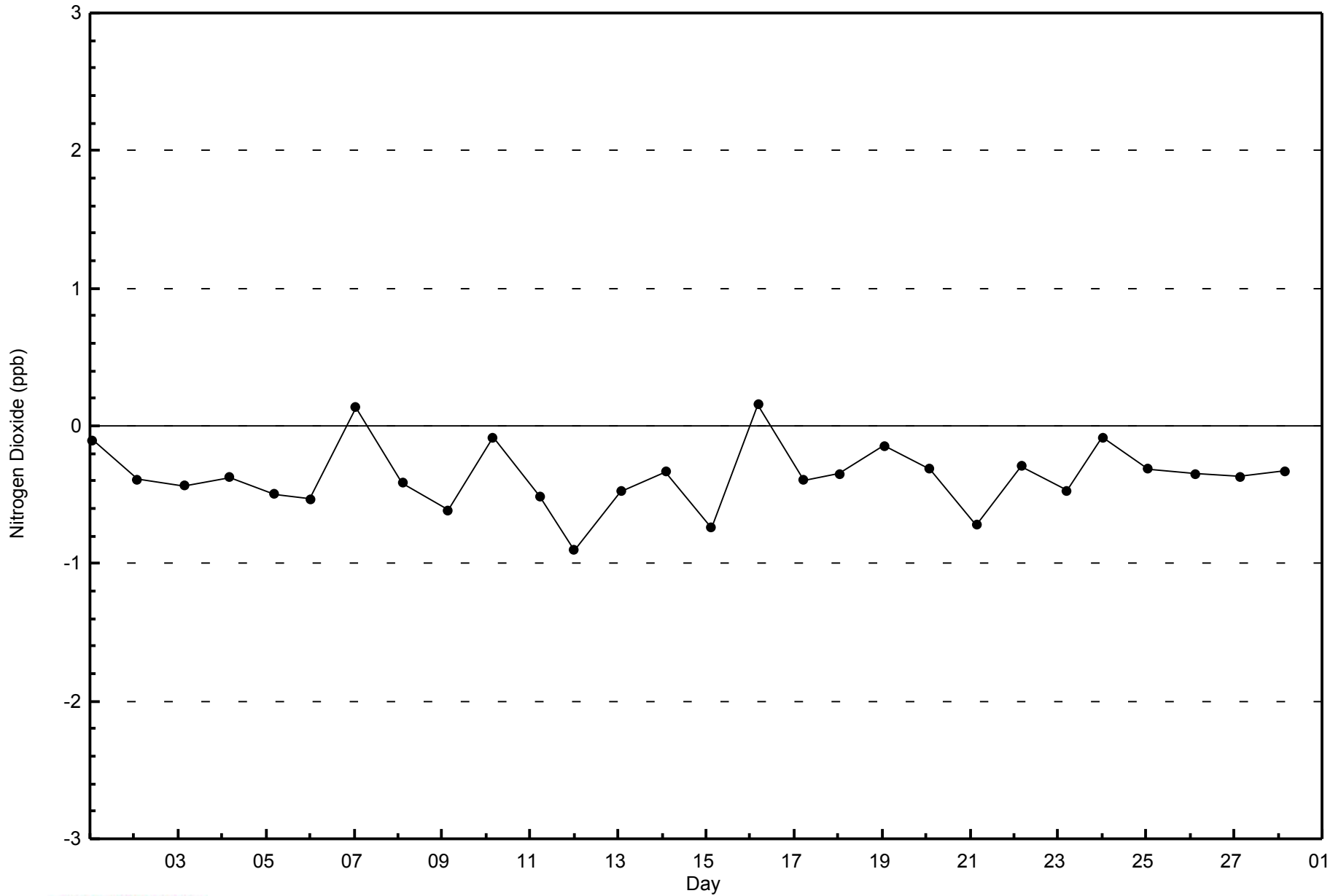


Total Number of Valid Hours: 630



WBEA  
Zero Responses

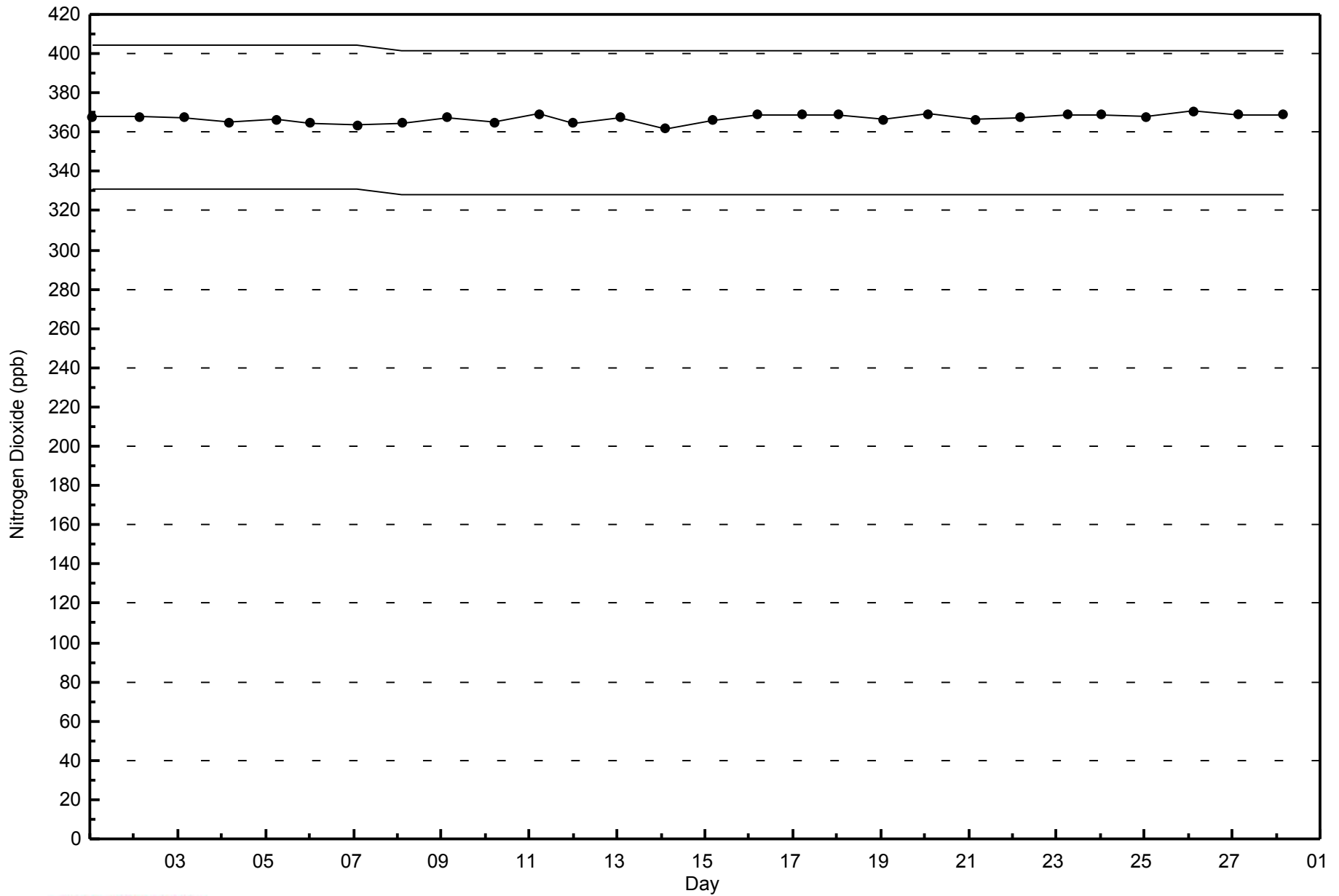
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Wapasu - February 2015



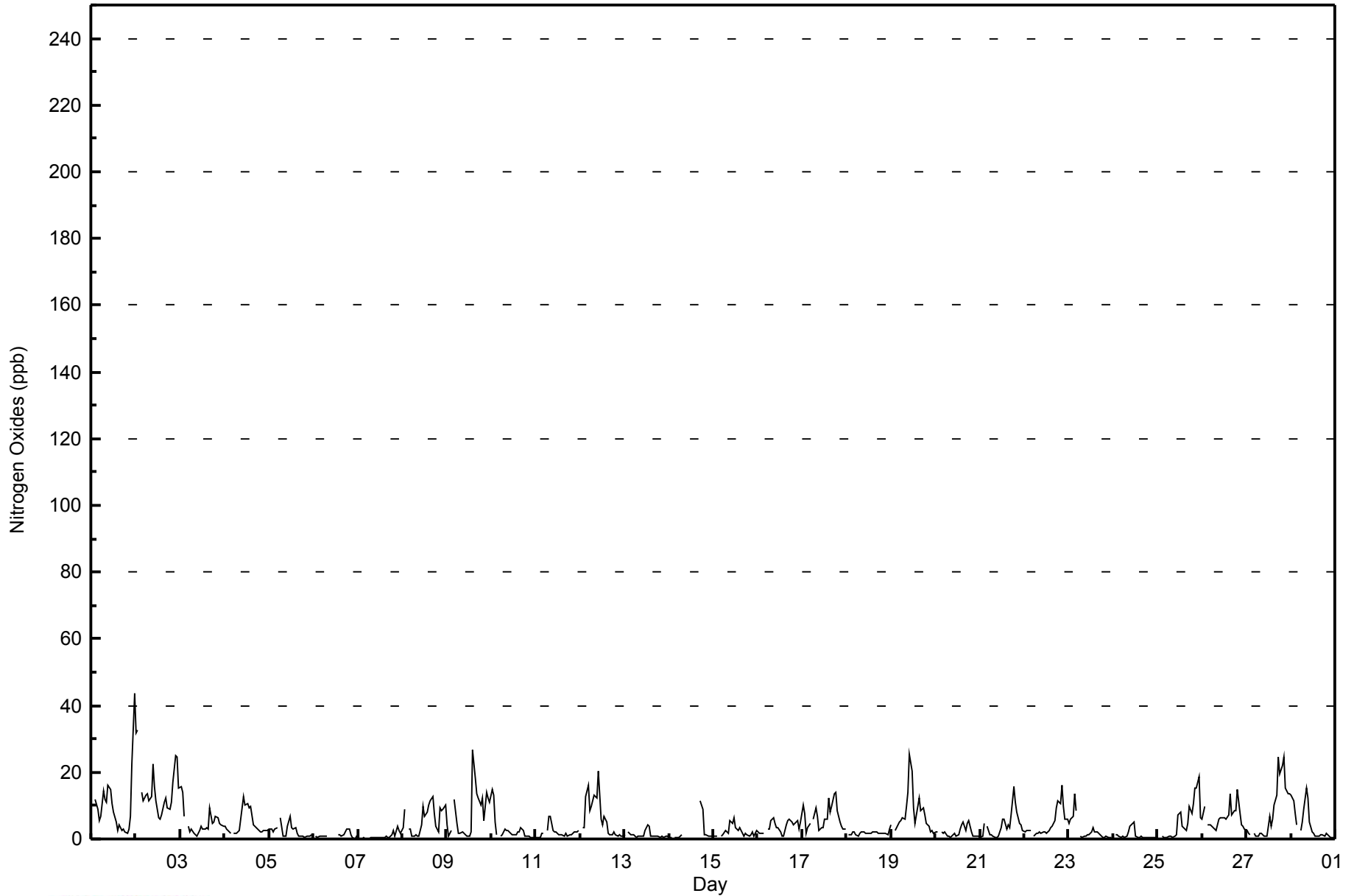


Maximum Value: 44 ppb on Feb 2 00:00																	Maximum Daily Average: 15.0 ppb on Feb 2																	Hours in Service: 672	
Minimum Value: 0 ppb on Feb 7 06:00																	Minimum Daily Average: 0.8 ppb on Feb 7																	Hours of Data: 630	
Maximum Diurnal Average: 5.8 ppb at hour 18																	Minimum Diurnal Average: 2.7 ppb at hour 6																	Hours of Missing Data: 42	
Monthly Average: 4.6 ppb																	Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 1 Median = 3 Q <sub>3</sub> = 6 P <sub>90</sub> = 12 P <sub>99</sub> = 25																	Hours of Calibration: 33	
																																		Percent Operational Time: 98.7	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24											
1-Feb	7	Z	12	9	5	7	15	12	11	16	15	11	8	5	3	4	3	3	2	2	3	7	22	44	9.7	44									
2-Feb	32	33	Z	14	12	13	13	12	13	22	16	12	7	6	7	11	12	10	9	11	17	25	24	15	15.0	33									
3-Feb	16	14	7	Z	4	2	3	2	1	1	3	4	3	3	3	3	9	5	5	7	6	5	4	4	4.9	16									
4-Feb	4	3	2	2	Z	2	2	2	2	9	13	10	11	9	10	4	4	3	3	2	2	3	2	2	4.6	13									
5-Feb	3	3	2	3	4	Z	6	1	1	1	4	7	3	3	4	2	1	1	1	1	1	1	1	1	2.3	7									
6-Feb	Z	1	1	1	1	1	1	1	C	C	C	C	C	1	1	1	1	2	3	3	1	1	0	1	1.1	3									
7-Feb	1	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	4	2	2	0.8	4									
8-Feb	3	9	Z	3	3	1	1	1	1	1	4	10	7	8	10	11	13	8	4	2	9	9	9	10	5.9	13									
9-Feb	4	1	3	Z	12	5	2	2	2	2	1	1	1	2	27	18	14	12	10	12	6	14	12	11	7.5	27									
10-Feb	15	13	5	1	Z	1	1	3	3	3	2	1	1	1	2	2	3	3	1	1	1	0	1	1	2.8	15									
11-Feb	1	1	1	2	2	Z	2	7	7	3	2	2	1	1	1	1	2	1	1	1	2	2	2	2	2.0	7									
12-Feb	Z	3	3	13	16	9	10	13	13	12	20	6	4	7	5	2	1	1	2	1	1	1	1	1	6.3	20									
13-Feb	1	Z	2	1	1	1	1	1	1	1	1	1	3	4	4	1	1	1	1	1	1	1	1	1	1.3	4									
14-Feb	1	1	Z	0	0	0	1	1	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	PF	1	1	1	1	--	12									
15-Feb	1	1	1	Z	1	1	3	2	2	5	5	6	3	3	3	3	3	1	2	1	1	1	2	1	2	2.2	6								
16-Feb	2	2	2	2	Z	3	3	5	7	5	3	4	2	1	1	4	6	6	5	4	5	6	3	5	3.7	7									
17-Feb	10	8	2	3	5	Z	6	9	7	3	3	6	6	12	8	10	13	14	8	5	4	3	3	6.6	14										
18-Feb	Z	1	1	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	3	1.7	3									
19-Feb	4	Z	3	4	5	6	6	6	10	14	25	20	9	5	10	12	8	9	7	4	4	2	2	2	7.7	25									
20-Feb	2	2	Z	2	2	2	1	1	1	1	2	1	1	3	4	5	3	5	5	2	1	1	1	1	2.1	5									
21-Feb	1	1	5	Z	4	1	1	1	1	1	1	3	6	6	3	4	4	7	16	11	8	5	4	3	4.1	16									
22-Feb	2	2	2	3	Z	1	2	2	2	2	2	2	2	3	3	4	6	9	11	11	16	10	6	6	4.7	16									
23-Feb	5	6	7	14	9	Z	1	0	1	1	1	1	2	3	2	2	2	1	0	0	1	1	0	1	2.6	14									
24-Feb	Z	1	1	1	1	1	1	1	2	4	5	5	1	1	1	1	0	0	1	1	0	1	0	1	1.2	5									
25-Feb	0	Z	1	1	0	1	1	1	1	1	1	7	8	4	3	3	5	10	8	11	15	15	19	7	5.2	19									
26-Feb	6	10	Z	4	4	4	3	3	4	6	6	6	6	6	7	14	7	9	9	15	8	4	4	3	6.4	15									
27-Feb	2	2	1	Z	2	1	1	2	2	1	1	1	7	4	6	10	13	25	20	22	25	15	13	14	8.2	25									
28-Feb	13	12	8	4	Z	3	5	9	15	12	5	2	2	1	1	1	1	1	1	2	1	0	0	0	4.4	15									
																	5.7 5.5 3.0 3.8 4.0 2.7 3.3 3.6 4.2 4.9 5.5 5.0 4.2 3.6 4.9 5.0 4.9 5.8 5.4 5.0 5.1 4.9 5.1 5.2																	Diurnal Average	
																	32 33 12 14 16 13 15 13 15 22 25 20 11 9 27 18 14 25 20 22 25 25 24 44																	Diurnal Maximum	
Z - zerospan			C - Calibration				PF - Power Failure																												



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - February 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	618	98.10	98.10
21 - 40	11	1.75	99.84
41 - 80	1	0.16	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 630

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Wapasu - February 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	112	65	28	12	20	21	37	83	55	21	18	20	10	15	23	78	618
21 - 40	0	0	0	0	0	0	0	0	2	4	3	0	0	0	0	2	11
11 - 80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	112	65	28	12	20	21	37	83	58	25	21	20	10	15	23	80	630

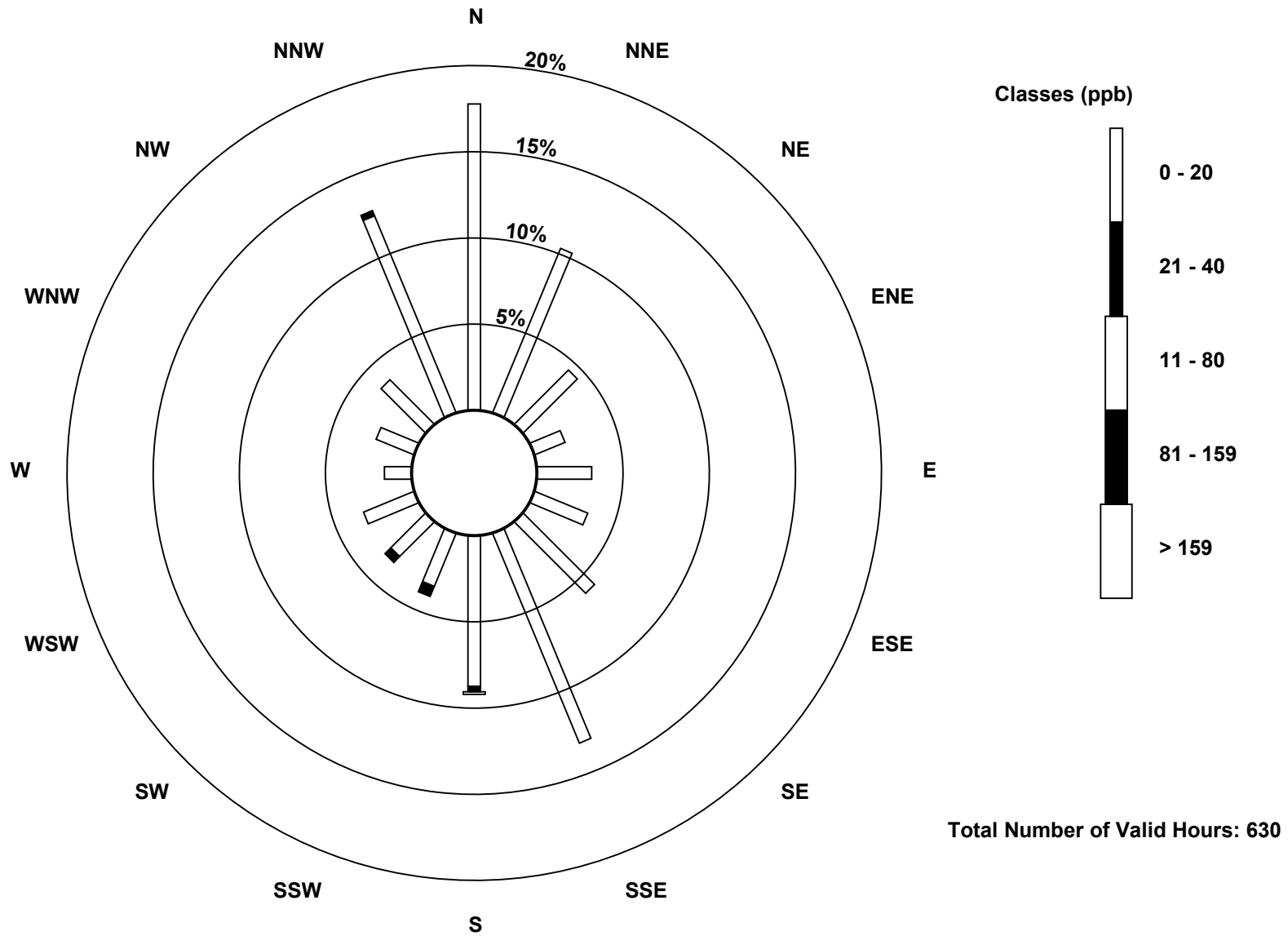
Total Number of Valid Hours: 630

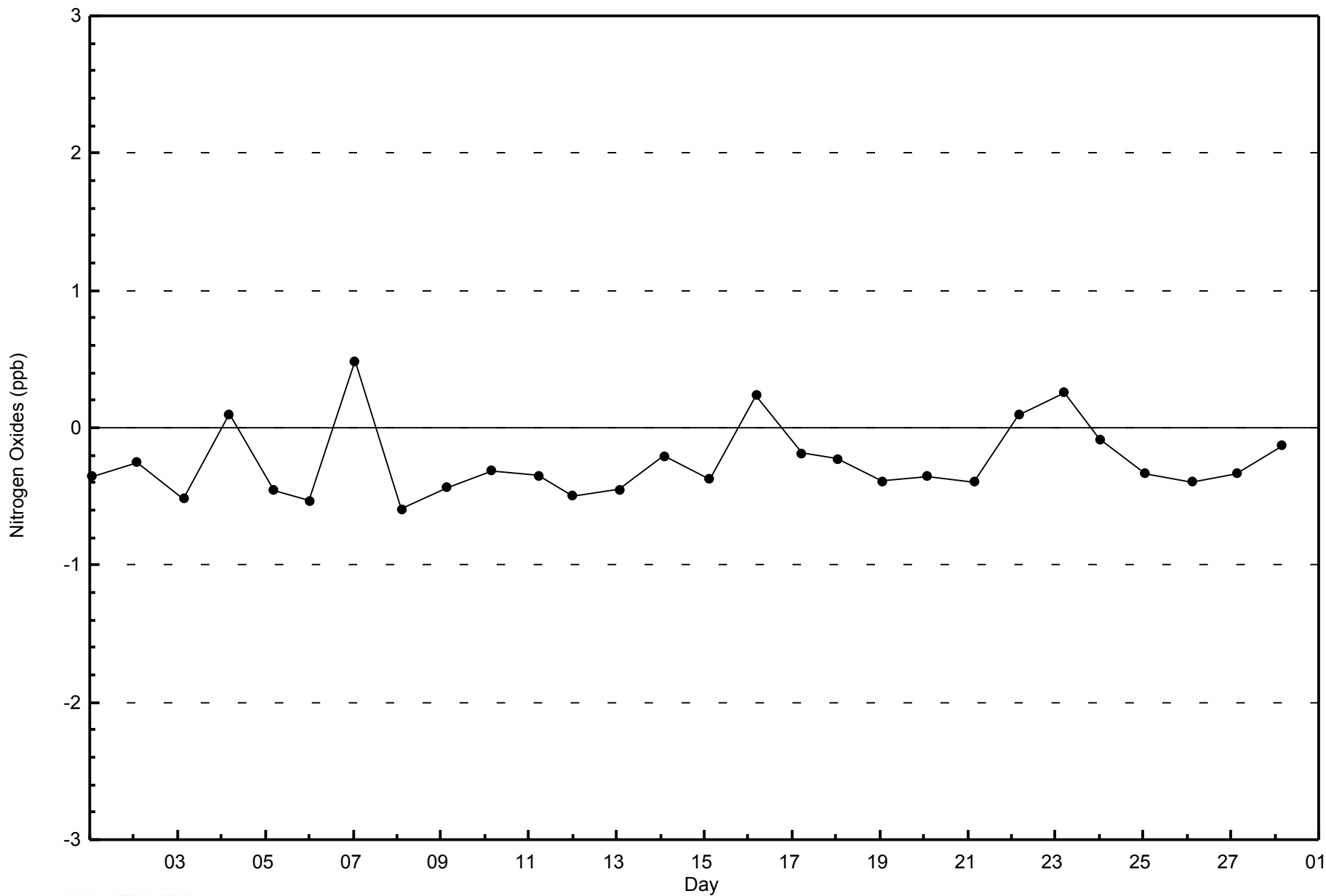
Total Number of Hours: 672



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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu (AMS 17)**

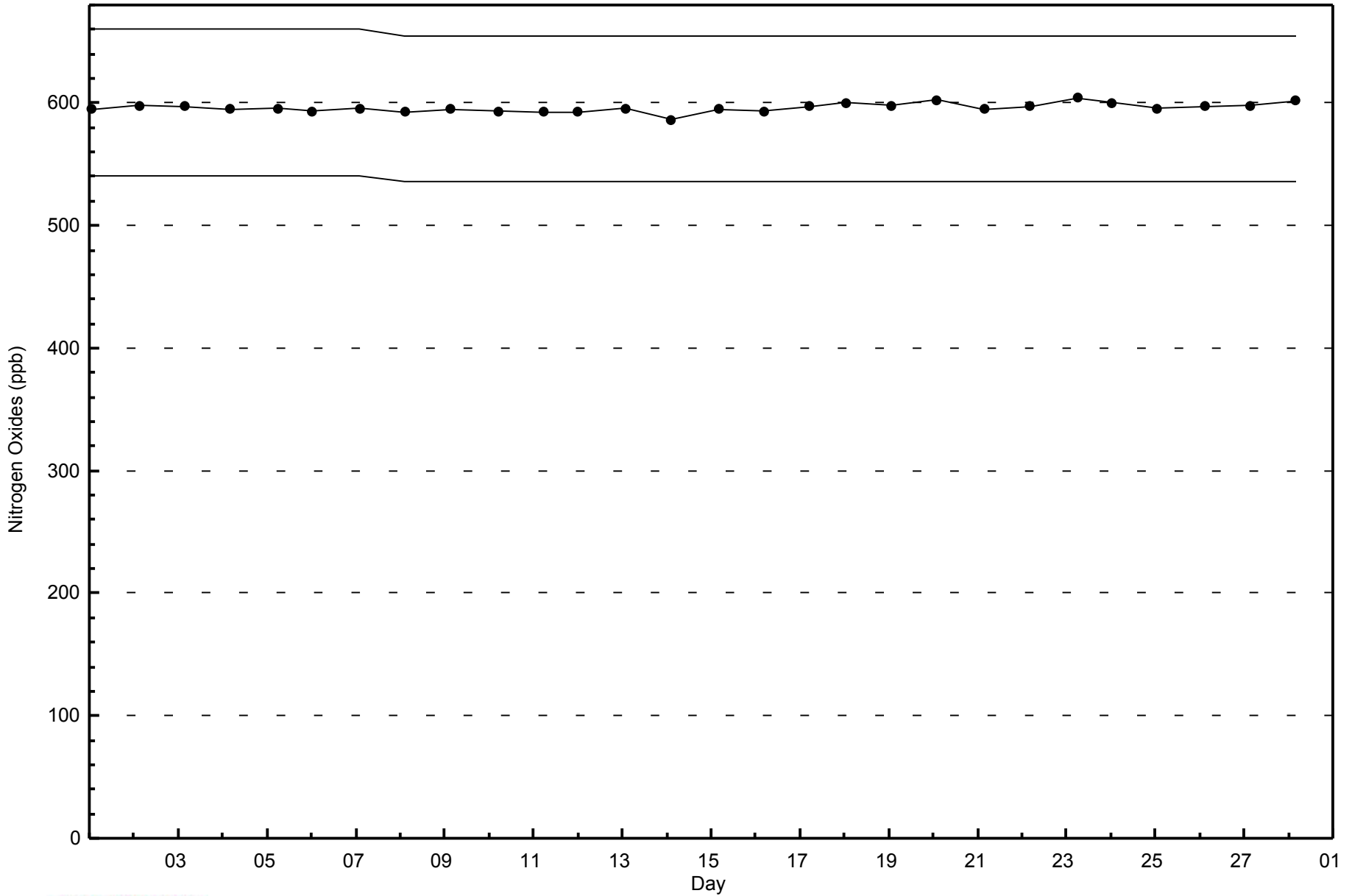






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Wapasu - February 2015





Summary of Hour Averages

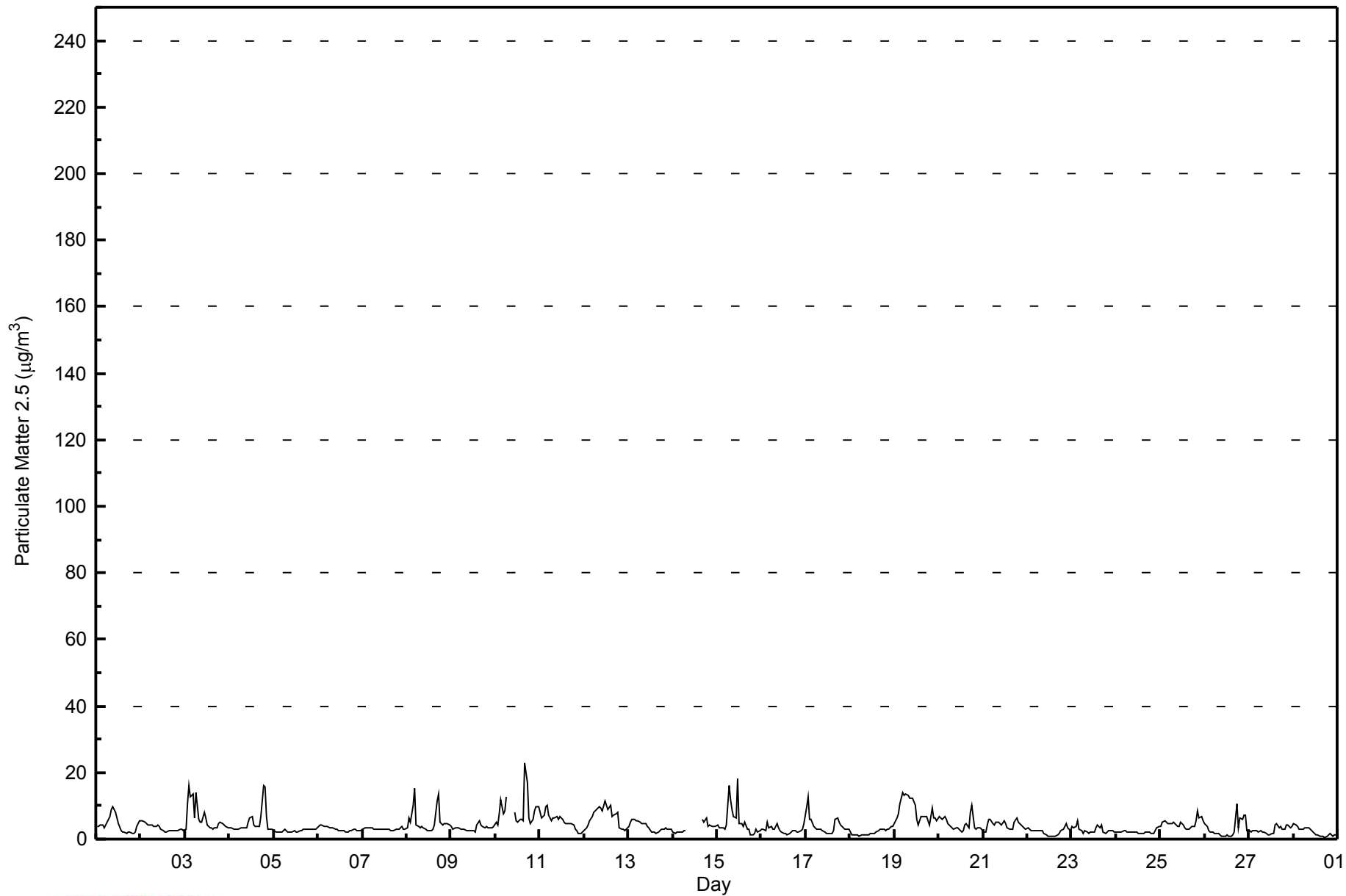
Wapasu - February 2015

Number of Exceedences (AAAQO): 24-hr: 0		Hours in Service: 672																									
Maximum Value: 23.0 µg/m <sup>3</sup> on Feb 10 17:00		Maximum Daily Average: 8.5 µg/m <sup>3</sup> on Feb 19																									
Minimum Value: 0.6 µg/m <sup>3</sup> on Feb 28 18:00		Hours of Data: 661																									
Maximum Diurnal Average: 5.2 µg/m <sup>3</sup> at hour 4		Hours of Missing Data: 11																									
Monthly Average: 4.12 µg/m <sup>3</sup>		Hours of Calibration: 0																									
Minimum Daily Average: 2.0 µg/m <sup>3</sup> on Feb 18		Percent Operational Time: 98.4																									
Minimum Diurnal Average: 2.9 µg/m <sup>3</sup> at hour 14		Percentiles: P <sub>1</sub> = 0.9 P <sub>10</sub> = 1.7 Q <sub>1</sub> = 2.4 Median = 3.3 Q <sub>3</sub> = 4.8 P <sub>90</sub> = 7.0 P <sub>99</sub> = 15.4																									
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-Feb	3.7	3.7	4.1	4.1	3.4	4.1	5.7	6.8	8.8	9.7	8.2	6.2	4.6	2.6	2.0	2.2	1.9	2.0	1.9	1.7	1.6	2.0	3.9	5.4	4.2	9.7	
2-Feb	5.6	5.5	5.2	4.7	4.4	4.3	4.4	3.9	3.6	4.3	3.7	3.0	2.5	2.3	2.1	2.3	2.5	2.4	2.5	2.4	2.6	3.1	2.8	2.7	3.4	5.6	
3-Feb	3.0	10.6	16.1	12.7	13.6	6.5	13.8	5.8	5.2	5.2	8.2	6.5	4.0	3.6	3.2	3.1	3.3	3.5	4.7	5.0	4.6	4.2	3.7	3.2	6.4	16.1	
4-Feb	3.2	3.3	3.0	3.0	3.1	3.1	3.5	3.5	3.2	3.6	5.2	6.5	6.7	4.0	4.0	3.7	3.9	6.9	16.2	15.5	6.7	3.1	3.1	3.1	5.0	16.2	
5-Feb	2.6	2.3	2.1	2.1	2.3	2.5	3.1	2.2	2.0	2.0	1.9	2.5	2.2	1.9	2.4	2.6	2.8	2.9	3.0	3.1	3.0	2.8	2.8	3.1	2.5	3.1	
6-Feb	3.6	4.2	4.2	3.8	3.9	3.6	3.6	3.5	3.3	3.1	2.9	2.6	2.6	2.4	2.4	2.2	2.2	2.4	2.5	3.0	3.0	2.6	2.4	2.7	3.0	4.2	
7-Feb	3.0	3.4	3.2	3.2	3.3	3.2	3.0	3.1	2.9	3.1	3.0	2.8	2.8	2.9	2.9	2.7	2.7	2.6	2.8	3.0	3.0	3.7	3.1	3.0	3.0	3.7	
8-Feb	3.6	6.4	4.9	10.2	15.3	4.2	3.8	3.5	3.6	3.2	2.9	2.7	2.5	2.7	3.0	4.3	11.6	13.5	5.0	4.3	4.8	4.6	4.7	4.4	5.4	15.3	
9-Feb	3.8	3.1	3.5	3.5	3.4	3.2	3.1	3.0	2.7	2.6	2.4	2.4	2.4	2.3	4.3	5.4	4.1	3.9	3.6	3.7	3.4	3.5	3.4	3.7	3.3	5.4	
10-Feb	5.2	4.3	7.8	12.0	7.6	8.5	12.7	M	M	M	8.1	5.5	5.2	5.8	5.8	5.4	23.0	17.1	6.2	4.6	5.9	8.6	9.7	9.6	8.5	23.0	
11-Feb	8.2	6.1	7.0	9.6	10.0	7.1	5.4	6.2	6.4	6.6	6.1	6.6	6.0	4.9	4.9	4.8	4.6	4.6	4.1	2.9	2.4	1.8	1.9	2.0	5.4	10.0	
12-Feb	2.6	3.5	4.1	5.4	6.8	8.2	8.3	9.4	9.7	9.1	8.5	11.5	10.4	8.8	10.0	6.8	7.4	7.6	8.2	3.5	3.0	2.9	2.5	2.8	6.7	11.5	
13-Feb	3.7	5.3	6.0	5.9	5.6	5.6	5.2	4.6	4.7	4.5	4.0	3.2	2.2	2.0	2.0	1.7	1.9	2.3	2.9	3.0	3.2	2.9	2.9	2.8	3.7	6.0	
14-Feb	1.9	1.9	2.2	2.2	2.2	2.2	2.3	2.4	PF	PF	PF	PF	PF	PF	PF	PF	PF	5.8	5.2	6.4	4.0	4.2	3.9	3.9	3.9	-	6.4
15-Feb	4.2	3.5	3.4	3.3	3.1	4.3	16.0	11.9	8.7	6.7	6.3	18.1	4.6	4.6	3.8	5.1	3.1	3.1	1.5	1.2	1.9	2.9	2.0	2.5	5.2	18.1	
16-Feb	2.8	3.1	2.7	4.9	3.4	3.8	3.0	3.0	4.6	3.2	2.6	2.0	1.6	1.5	1.4	1.6	2.0	2.4	2.6	2.2	2.1	2.6	3.0	4.7	2.8	4.9	
17-Feb	10.0	12.8	5.9	5.7	3.7	3.6	3.1	3.0	2.8	2.6	2.1	1.5	1.7	1.8	1.8	2.6	5.8	6.1	5.2	4.3	3.5	3.2	3.1	2.9	4.1	12.8	
18-Feb	1.9	1.4	1.4	1.3	1.1	1.0	1.2	1.2	1.1	1.3	1.4	1.5	1.5	1.7	2.1	2.3	3.0	3.0	3.0	2.4	2.8	3.0	3.6	3.6	2.0	3.6	
19-Feb	4.6	6.6	7.8	10.8	13.8	13.0	13.4	13.2	12.3	12.4	12.4	10.1	5.9	4.4	6.6	6.9	6.6	6.9	5.5	4.4	9.2	6.5	6.3	5.3	8.5	13.8	
20-Feb	6.7	6.4	6.0	6.7	6.1	4.8	3.8	3.3	3.2	3.4	3.3	2.8	2.3	2.6	4.1	4.8	3.3	8.0	10.2	3.6	3.1	3.5	3.5	2.9	4.5	10.2	
21-Feb	2.0	2.1	4.2	6.1	5.7	4.9	4.4	5.3	5.3	4.5	4.1	5.7	4.6	3.5	3.1	2.9	3.0	4.9	6.4	4.9	4.6	3.9	3.4	3.1	4.3	6.4	
22-Feb	3.2	3.0	2.6	2.7	2.8	2.6	2.5	2.3	2.4	1.6	1.3	1.1	0.9	0.8	0.8	1.0	1.2	1.8	2.7	3.1	3.7	4.7	3.4	2.7	2.3	4.7	
23-Feb	3.8	3.5	4.0	5.5	3.0	2.5	1.6	2.5	2.2	1.8	2.0	2.1	2.3	3.2	4.1	3.3	4.1	2.1	1.6	2.3	2.4	2.5	2.4	2.3	2.8	5.5	
24-Feb	2.0	2.2	2.1	2.2	2.4	2.5	2.1	2.0	2.0	2.1	2.0	2.0	1.7	1.6	1.6	1.7	2.1	2.2	2.0	1.6	1.6	2.6	3.5	3.8	2.1	3.8	
25-Feb	3.8	5.2	5.3	5.1	4.7	4.7	4.6	5.1	4.7	3.9	3.6	5.0	4.2	3.5	2.9	3.0	3.3	3.7	3.9	5.5	8.6	6.4	6.9	5.7	4.7	8.6	
26-Feb	4.7	3.7	2.6	2.0	1.9	1.8	1.7	1.5	1.4	1.0	0.9	0.9	1.2	1.0	0.9	1.4	2.2	10.5	3.6	6.5	6.1	7.2	7.0	2.7	3.1	10.5	
27-Feb	2.5	2.2	2.5	2.5	2.5	2.2	2.4	2.3	2.1	1.7	1.4	1.3	1.7	1.5	4.3	4.8	3.6	3.8	3.1	3.0	4.2	4.4	3.6	3.8	2.8	4.8	
28-Feb	4.6	4.3	3.7	3.0	2.9	2.9	3.3	3.6	3.6	2.9	2.4	1.5	1.2	1.1	0.9	0.6	0.7	0.6	1.0	1.3	1.8	1.0	1.1	1.1	2.1	4.6	
																								Diurnal Average			
																								Diurnal Maximum			
4.0 4.4 4.6 5.2 5.1 4.3 5.0 4.4 4.3 4.1 4.1 4.4 3.3 2.9 3.2 3.3 4.4 4.8 4.4 3.8 3.8 3.7 3.7 3.6																											
10.0 12.8 16.1 12.7 15.3 13.0 16.0 13.2 12.3 12.4 12.4 18.1 10.4 8.8 10.0 6.9 23.0 17.1 16.2 15.5 9.2 8.6 9.7 9.6																											
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 - February 2015





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

**Particulate Matter 2.5 (PM<sub>2.5</sub>) -  $\mu\text{g}/\text{m}^3$**   
**Wapasu - February 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	520	78.67	78.67
6 - 15	122	18.46	97.13
16 - 25	7	1.06	98.18
26 - 80	0	0.00	98.18
> 81.0	0	0.00	98.18

Total Number of Valid Hours: 661

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>**  
**Wapasu - February 2015**

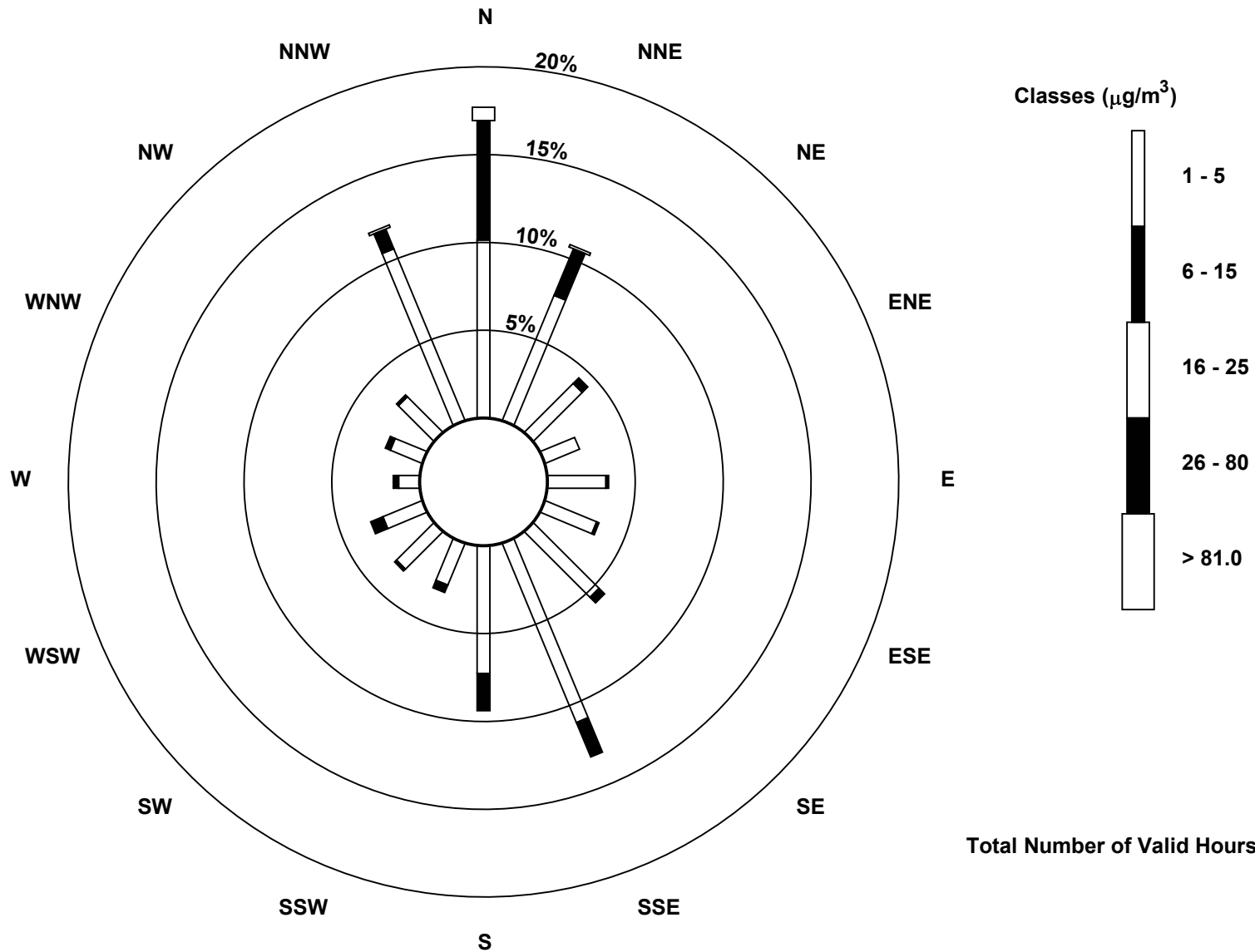
Concentration Ranges (μg/m <sup>3</sup> )	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
1 - 5	67	51	26	14	22	21	35	73	48	17	20	16	8	13	19	70	520
6 - 15	45	19	3	0	1	1	3	14	14	3	1	5	2	2	1	8	122
16 - 25	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
26 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 81.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	117	71	29	14	23	22	38	87	62	20	21	21	10	15	20	79	649

Total Number of Valid Hours: 661

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Particulate Matter 2.5 (PM<sub>2.5</sub>) - μg/m<sup>3</sup>  
Wapasu (AMS 17)





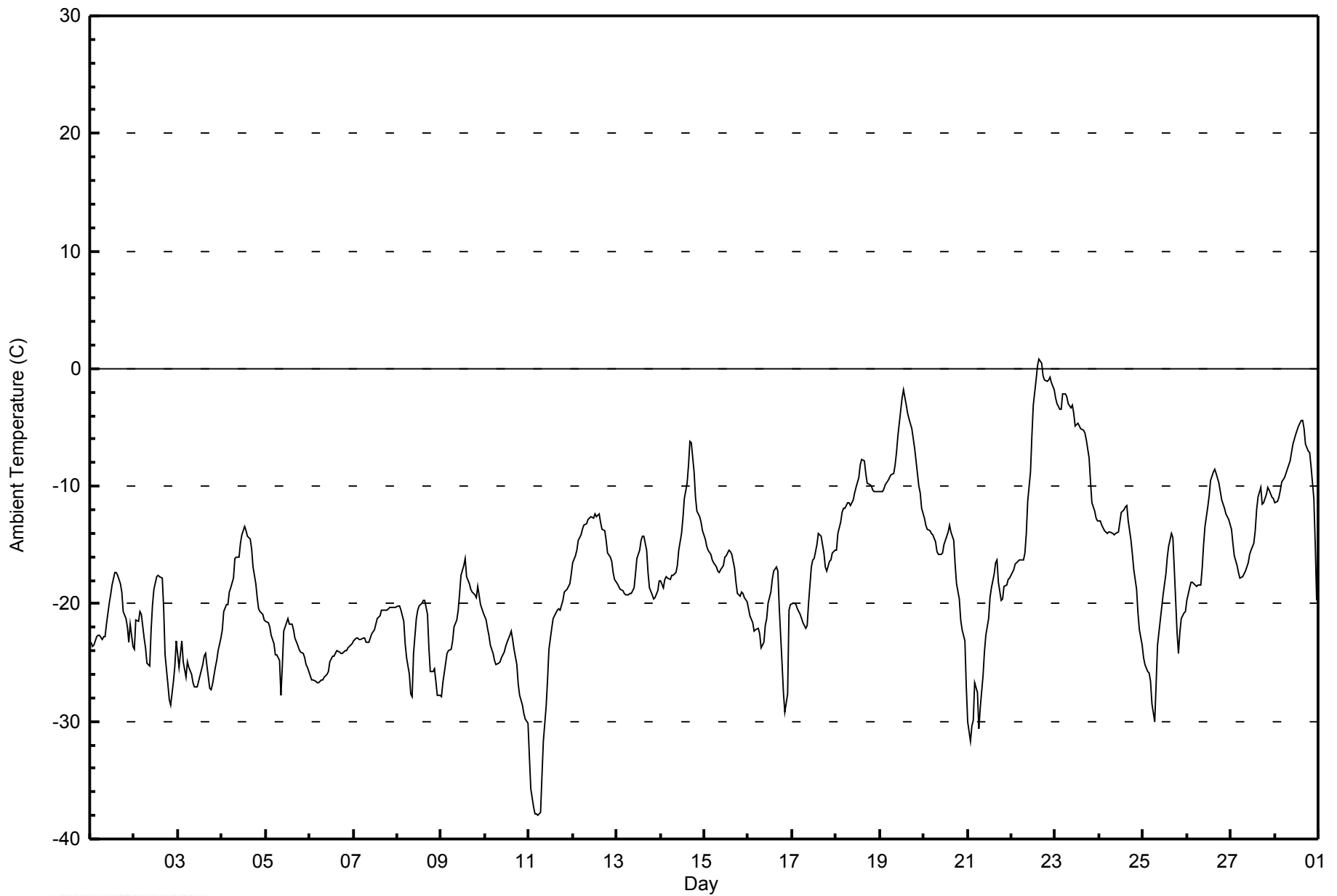


Maximum Value: 0.8 C on Feb 22 16:00		Maximum Daily Average: -5.6 C on Feb 23		Hours in Service: 672																						
Minimum Value: -38.0 C on Feb 11 06:00		Minimum Daily Average: -26.7 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -14.3 C at hour 16		Minimum Diurnal Average: -20.0 C at hour 7		Hours of Missing Data: 0																						
Monthly Average: -17.83 C		Percentiles: P <sub>1</sub> = -34.0 P <sub>10</sub> = -25.9 Q <sub>1</sub> = -22.9 Median = -18.4 Q <sub>3</sub> = -13.7 P <sub>90</sub> = -8.9 P <sub>99</sub> = -1.0		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-Feb	-23.2	-23.7	-23.5	-22.8	-22.7	-22.7	-23.0	-22.8	-22.8	-21.8	-20.0	-19.2	-18.4	-17.4	-17.4	-17.5	-18.3	-19.0	-20.7	-21.2	-22.0	-23.3	-21.8	-23.7	-21.2	-17.4
2-Feb	-23.9	-21.4	-21.5	-20.7	-20.9	-22.9	-23.7	-25.0	-25.2	-22.3	-20.0	-18.8	-17.7	-17.5	-17.7	-17.9	-20.5	-24.4	-26.8	-28.1	-28.6	-26.6	-25.3	-23.2	-22.5	-17.5
3-Feb	-25.5	-24.2	-23.2	-25.0	-26.2	-24.9	-25.4	-26.0	-26.7	-27.1	-27.1	-26.5	-26.1	-25.2	-24.5	-24.2	-25.3	-27.2	-27.3	-26.8	-25.4	-24.8	-24.0	-22.9	-25.5	-22.9
4-Feb	-22.2	-20.7	-20.1	-20.0	-19.0	-18.6	-17.8	-16.1	-16.1	-16.1	-14.8	-14.1	-13.4	-13.8	-14.2	-14.5	-15.4	-16.9	-18.2	-19.5	-20.4	-20.6	-20.9	-21.3	-17.7	-13.4
5-Feb	-21.5	-21.6	-21.9	-22.7	-23.4	-24.3	-24.3	-24.8	-27.8	-25.3	-22.3	-21.6	-21.2	-21.7	-21.7	-22.2	-23.0	-23.5	-23.9	-24.1	-24.2	-24.5	-25.1	-25.4	-23.4	-21.2
6-Feb	-26.1	-26.4	-26.5	-26.6	-26.7	-26.7	-26.5	-26.5	-26.2	-26.0	-25.7	-24.9	-24.5	-24.5	-24.2	-23.9	-24.1	-24.2	-24.2	-24.0	-24.0	-23.8	-23.5	-23.3	-25.1	-23.3
7-Feb	-23.1	-22.9	-22.9	-23.0	-23.0	-22.9	-22.9	-23.2	-23.3	-22.9	-22.6	-22.2	-21.7	-21.3	-21.0	-20.6	-20.5	-20.5	-20.5	-20.5	-20.4	-20.3	-20.3	-20.3	-21.8	-20.3
8-Feb	-20.2	-20.2	-20.6	-21.5	-23.3	-24.5	-25.9	-27.6	-27.9	-24.2	-21.2	-20.5	-20.2	-19.9	-19.7	-19.7	-20.9	-23.7	-25.8	-25.8	-25.5	-26.6	-27.8	-27.8	-23.4	-19.7
9-Feb	-27.9	-26.7	-25.0	-24.2	-24.0	-23.9	-23.1	-22.0	-21.3	-20.6	-19.1	-17.6	-16.7	-16.1	-17.7	-18.3	-18.7	-19.0	-19.2	-19.4	-18.6	-20.1	-20.4	-20.8	-20.9	-16.1
10-Feb	-21.4	-22.0	-22.7	-23.5	-24.3	-24.8	-25.2	-25.0	-24.9	-24.6	-24.2	-23.6	-23.3	-22.6	-22.4	-23.0	-23.9	-25.2	-26.8	-27.8	-28.7	-29.3	-29.8	-30.1	-25.0	-21.4
11-Feb	-33.0	-35.8	-37.2	-37.8	-37.9	-38.0	-37.7	-34.7	-31.7	-28.8	-26.4	-23.9	-22.1	-21.2	-21.0	-20.6	-20.5	-20.5	-19.8	-19.0	-18.9	-18.7	-18.2	-17.5	-26.7	-17.5
12-Feb	-16.5	-15.9	-15.4	-14.6	-14.1	-13.7	-13.3	-13.2	-12.9	-12.7	-12.7	-12.7	-12.4	-12.6	-12.4	-13.1	-13.7	-13.8	-14.6	-15.6	-16.0	-16.4	-17.3	-18.0	-14.3	-12.4
13-Feb	-18.2	-18.5	-18.7	-18.8	-19.1	-19.2	-19.2	-19.1	-19.1	-18.7	-17.5	-16.1	-15.5	-14.6	-14.2	-14.2	-15.5	-17.4	-18.7	-19.3	-19.6	-19.5	-18.9	-18.1	-17.8	-14.2
14-Feb	-18.0	-18.6	-18.0	-17.7	-17.8	-17.9	-17.6	-17.5	-17.3	-16.8	-15.4	-14.0	-12.7	-11.0	-9.8	-8.2	-6.2	-6.3	-8.8	-10.9	-12.1	-12.6	-13.0	-13.7	-13.8	-6.2
15-Feb	-14.5	-15.0	-15.4	-15.9	-16.2	-16.6	-16.9	-17.2	-17.3	-17.1	-16.7	-16.1	-15.9	-15.5	-15.6	-15.8	-17.0	-18.1	-19.1	-19.3	-19.0	-19.1	-19.5	-19.8	-17.0	-14.5
16-Feb	-20.4	-21.1	-21.6	-22.3	-22.2	-22.1	-22.5	-23.8	-23.3	-21.8	-21.2	-20.0	-19.0	-17.9	-17.2	-16.8	-17.2	-20.3	-25.1	-27.6	-29.2	-27.6	-20.6	-20.0	-21.7	-16.8
17-Feb	-20.0	-20.0	-20.1	-20.4	-20.9	-21.3	-21.6	-22.1	-21.8	-19.9	-16.8	-16.2	-16.1	-15.0	-14.0	-14.1	-14.3	-15.7	-16.8	-17.2	-16.4	-16.3	-15.7	-15.4	-17.8	-14.0
18-Feb	-15.4	-14.0	-13.0	-12.3	-11.9	-11.8	-11.5	-11.4	-11.7	-11.2	-10.6	-10.2	-9.3	-8.2	-7.7	-7.8	-8.9	-9.7	-9.9	-10.3	-10.4	-10.4	-10.4	-10.4	-10.8	-7.7
19-Feb	-10.4	-10.4	-10.3	-9.9	-9.5	-9.3	-9.1	-8.9	-8.2	-7.1	-5.7	-3.6	-2.6	-1.8	-3.1	-3.8	-4.3	-5.1	-6.0	-6.8	-8.9	-10.0	-10.6	-11.8	-7.4	-1.8
20-Feb	-12.7	-13.3	-13.6	-13.8	-14.0	-14.2	-14.7	-15.6	-15.8	-15.8	-15.6	-15.0	-14.2	-14.0	-13.3	-14.0	-14.6	-16.6	-18.3	-19.6	-21.4	-22.2	-23.2	-27.1	-16.4	-12.7
21-Feb	-30.1	-31.7	-30.4	-29.9	-26.7	-27.6	-30.7	-28.9	-26.2	-24.1	-22.6	-21.2	-19.5	-18.6	-17.4	-16.5	-16.3	-18.2	-19.7	-19.6	-18.5	-18.4	-18.0	-17.8	-22.9	-16.3
22-Feb	-17.4	-17.1	-16.7	-16.4	-16.2	-16.2	-16.3	-15.7	-14.0	-11.3	-8.8	-5.7	-3.1	-1.0	0.2	0.8	0.5	-0.6	-1.0	-1.1	-1.0	-0.7	-1.2	-1.8	-7.6	0.8
23-Feb	-2.5	-3.0	-3.4	-3.5	-2.2	-2.2	-2.4	-3.0	-3.3	-3.1	-3.8	-4.9	-4.7	-4.8	-5.2	-5.3	-5.5	-6.1	-7.6	-9.6	-11.4	-12.1	-12.7	-12.9	-5.6	-2.2
24-Feb	-12.9	-13.3	-13.5	-13.7	-14.0	-14.0	-13.9	-14.0	-14.1	-14.0	-13.9	-13.1	-12.3	-12.0	-11.8	-11.6	-12.9	-14.6	-15.8	-17.1	-18.7	-20.8	-22.2	-23.5	-14.9	-11.6
25-Feb	-24.5	-25.2	-25.7	-25.8	-26.6	-28.5	-30.1	-26.9	-23.6	-21.4	-20.3	-19.2	-17.5	-16.1	-15.1	-14.0	-14.4	-17.0	-22.4	-24.2	-22.4	-21.2	-20.8	-20.6	-21.8	-11.0
26-Feb	-19.7	-18.7	-18.1	-18.1	-18.4	-18.6	-18.4	-18.4	-17.0	-15.0	-13.5	-11.7	-10.8	-9.5	-8.9	-8.5	-9.0	-9.7	-10.5	-11.2	-11.9	-12.4	-12.6	-12.8	-13.9	-8.5
27-Feb	-13.6	-14.9	-15.9	-16.8	-17.3	-17.8	-17.7	-17.4	-17.2	-16.5	-15.8	-15.4	-14.9	-13.8	-11.9	-10.9	-10.1	-11.5	-11.4	-10.7	-10.1	-10.3	-10.9	-11.1	-13.9	-10.1
28-Feb	-11.4	-11.3	-10.9	-10.4	-9.6	-9.3	-8.9	-8.6	-7.9	-7.1	-6.4	-5.6	-5.2	-4.9	-4.4	-4.4	-5.1	-6.5	-7.0	-7.2	-8.3	-11.0	-14.9	-19.7	-8.6	-4.4
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Wapasu - February 2015**





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

**Ambient Temperature (AT) - C**  
**Wapasu - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	276	41.07	41.07
-20 - 0	393	58.48	99.55
0 - 10	3	0.45	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

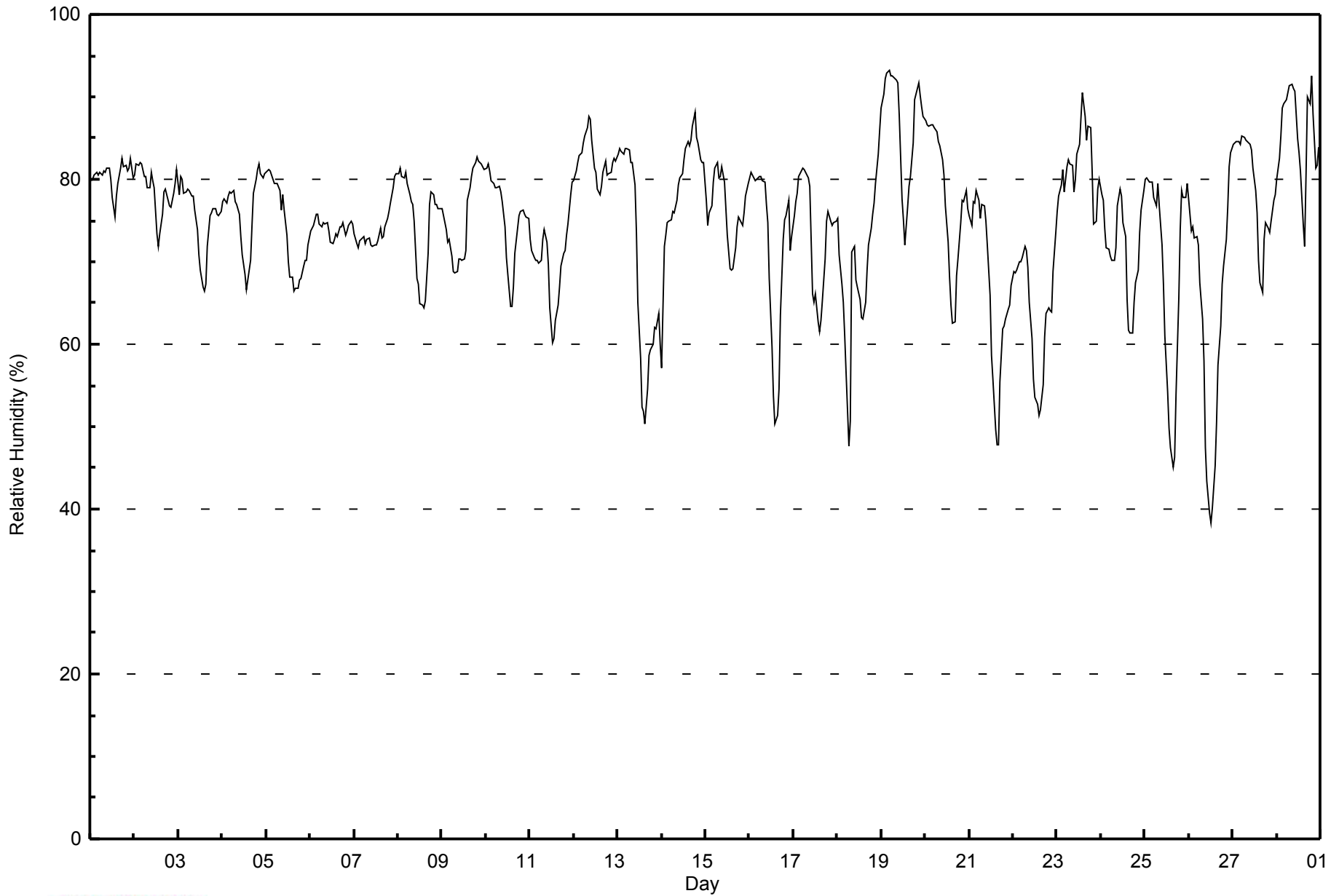


Maximum Value: 93 % on Feb 19 05:00																		Maximum Daily Average: 87.1 % on Feb 19						Hours in Service: 672																									
Minimum Value: 38 % on Feb 26 13:00																		Minimum Daily Average: 62.8 % on Feb 26						Hours of Data: 672																									
Maximum Diurnal Average: 78.5 % at hour 5																		Minimum Diurnal Average: 66.6 % at hour 15						Hours of Missing Data: 0																									
Monthly Average: 74.8 %																		Percentiles: P <sub>1</sub> = 47 P <sub>10</sub> = 63 Q <sub>1</sub> = 70 Median = 76 Q <sub>3</sub> = 81 P <sub>90</sub> = 84 P <sub>99</sub> = 92						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-Feb	80	80	81	81	81	81	81	81	81	81	81	80	78	75	78	80	81	83	82	82	81	81	83	80	80.4	83																							
2-Feb	81	82	82	82	82	80	80	79	79	81	80	79	73	72	73	76	79	79	78	77	77	78	80	81	78.7	82																							
3-Feb	78	80	80	78	78	79	79	78	78	76	74	71	69	67	66	67	72	76	76	77	76	76	76	76	75.1	80																							
4-Feb	77	78	77	78	78	78	79	77	77	76	73	71	69	67	68	70	74	78	80	81	82	81	80	81	76.2	82																							
5-Feb	81	81	81	80	80	79	80	79	76	78	76	73	70	68	68	66	67	67	68	68	69	70	70	72	73.7	81																							
6-Feb	74	74	74	76	76	75	74	75	75	75	74	72	72	73	73	73	74	74	75	73	74	74	75	75	74.1	76																							
7-Feb	73	72	72	73	73	73	72	73	73	72	72	72	72	73	74	73	73	74	75	76	77	79	80	81	74.0	81																							
8-Feb	81	81	80	80	81	80	78	77	77	75	68	67	65	65	64	65	71	77	78	78	77	77	77	76	74.8	81																							
9-Feb	76	76	74	72	73	71	69	69	69	70	70	70	70	71	77	79	80	81	82	83	82	82	82	81	75.4	83																							
10-Feb	81	82	81	80	79	79	79	79	79	77	74	71	68	65	65	67	71	74	76	76	76	76	75	75	75.2	82																							
11-Feb	73	71	71	70	70	70	70	73	74	72	70	64	60	61	63	65	67	70	71	71	73	75	78	80	70.0	80																							
12-Feb	80	81	82	83	83	84	85	86	88	87	85	81	81	79	78	79	81	82	81	81	81	82	83	82	82.3	88																							
13-Feb	83	84	83	83	84	84	83	82	82	79	74	65	58	52	52	50	55	59	59	60	62	62	64	60	69.1	84																							
14-Feb	57	72	73	75	75	75	76	76	77	79	80	81	82	84	85	84	85	87	88	85	84	82	82	82	79.4	88																							
15-Feb	77	74	76	77	80	81	82	80	80	82	80	76	73	69	69	69	72	74	75	75	74	76	78	80	76.3	82																							
16-Feb	80	81	80	80	80	80	80	80	80	77	75	68	60	54	50	51	55	63	73	75	76	78	71	73	71.6	81																							
17-Feb	76	77	78	80	81	81	81	80	80	79	66	65	66	63	62	63	65	70	75	76	75	74	75	75	73.5	81																							
18-Feb	75	71	67	65	61	57	48	51	71	72	68	67	65	63	63	65	69	72	74	76	77	80	83	86	68.6	86																							
19-Feb	89	90	92	93	93	93	93	92	92	92	88	78	75	72	77	79	80	84	90	90	92	90	89	88	87.1	93																							
20-Feb	87	87	86	87	87	86	86	85	84	82	81	77	72	68	65	63	63	68	70	75	78	77	79	76	77.8	87																							
21-Feb	76	74	77	77	79	77	75	77	77	75	72	66	59	56	50	48	48	55	62	62	63	64	65	67	66.7	79																							
22-Feb	69	69	69	70	70	70	72	71	69	65	61	56	54	53	51	52	55	61	64	64	64	64	69	74	64.0	74																							
23-Feb	76	78	79	81	79	81	82	82	82	79	80	83	84	87	90	88	85	87	86	81	75	75	79	80	81.6	90																							
24-Feb	78	78	74	72	71	71	70	70	72	77	79	78	75	73	65	62	61	61	65	67	69	74	76	79	71.5	79																							
25-Feb	80	80	80	80	80	78	77	79	77	72	67	61	54	50	47	45	46	54	66	74	79	78	78	79	69.2	80																							
26-Feb	78	74	74	73	73	72	67	63	58	47	43	40	38	40	45	51	57	62	67	69	73	77	82	83	62.8	83																							
27-Feb	84	84	85	85	84	85	85	85	85	84	84	81	79	76	70	67	66	73	75	74	74	75	77	78	78.9	85																							
28-Feb	80	83	85	89	89	90	91	91	92	91	91	85	83	81	75	72	80	90	89	93	88	81	82	84	85.6	93																							
																								77.8	78.3	78.4	78.5	78.5	78.3	77.6	77.5	77.9	76.9	74.4	71.4	68.8	67.0	66.6	66.8	69.0	72.7	75.0	75.7	76.0	76.3	77.3	78.0	Diurnal Average	
																								89	90	92	93	93	93	93	92	92	92	91	85	84	87	90	88	85	90	90	93	92	90	89	88	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Wapasu - February 2015**





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

**Relative Humidity (RH) - %**  
**Wapasu - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	2	0.30	0.30
40 - 60	42	6.25	6.55
60 - 80	430	63.99	70.54
80 - 100	198	29.46	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Wood Buffalo Environmental Association

Summary of Hour Averages

Wind Speed (WS) - km/h

Wapasu - February 2015

Maximum Speed: 30 km/h on Feb 14 04:00	Maximum Daily Speed Average: 12.5 km/h on Feb 14	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 8 00:00	Minimum Daily Speed Average: 0.5 km/h on Feb 21	Hours of Data: 672
Maximum Diurnal Speed Average: 2.3 km/h at hour 20	Minimum Diurnal Speed Average: 0.6 km/h at hour 10	Hours of Missing Data: 0
Monthly Average Velocity: 0.8 km/h 86.0 deg	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 4 Q <sub>1</sub> = 6 Median = 8 Q <sub>3</sub> = 11 P <sub>90</sub> = 13 P <sub>99</sub> = 24	Percent Operational Time: 100.0

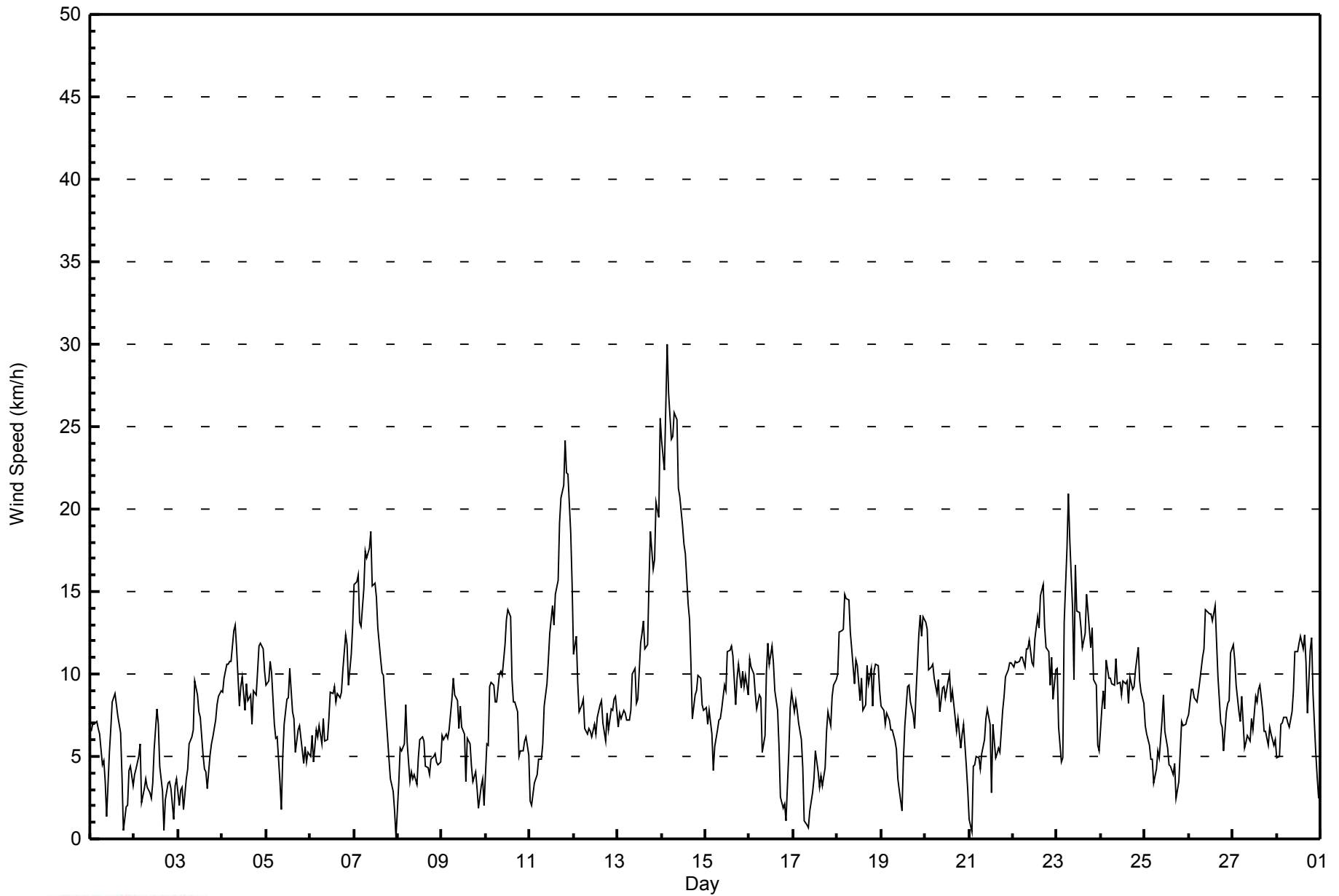
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	S7	SSE7	SSE7	S7	SSE7	S6	SSE5	S5	S4	SSE1	N5	N7	NNW8	NNW9	NNW8	NNW7	NNW6	NNW4	NNE1	SSE2	S2	SW4	SW4	S3	SSW0.7	NNW9
2-Feb	S4	SSW4	SW5	WSW6	WSW2	SSE3	SSE4	SSE3	SSE3	SSW2	W3	NW5	NW8	NNW7	WNW4	WNW3	SW1	SE2	SE3	SE3	SSE3	SW1	NNW3	NNW4	WSW1.3	NW8
3-Feb	NW2	N3	NNE3	NNE2	NNE4	N4	N6	NNE6	N7	N10	N9	NNW8	NNW7	NNW5	NW4	WSW4	S3	SSE5	SSE6	SSE6	S7	S8	S9	S9	N0.9	N10
4-Feb	S9	S10	S11	S11	S11	S11	S13	S13	SSW12	SSW8	SW9	WSW10	WNW8	NNW9	NNW8	NNW9	NNW7	N9	N9	N10	N12	NNW12	N12	NNW10	W2.4	S13
5-Feb	NNW9	NNW10	NNW11	NNW10	N7	N6	N6	NNE3	E2	N5	N7	N8	N9	NNW10	NNW8	NNE7	NNE5	NNE7	NE7	NNE6	NE5	NNE6	N5	N5	N6.4	NNW11
6-Feb	NNE5	NNE6	NE5	NE7	NE6	ENE7	NE6	NE7	ENE6	NE6	ENE7	E9	E9	E9	E8	E9	E9	E9	E10	ESE12	ESE12	ESE9	ESE11	SE13	E7.3	SE13
7-Feb	SE15	SE16	SE16	SE13	SSE13	SE15	SE17	SE17	SE18	SE19	SSE15	SE15	SE15	SSE13	SE11	SSE10	SSE10	SSE9	S6	S5	SSW4	W3	WNW2	S0	SSE11.0	SE19
8-Feb	N3	NNE6	NNE5	N6	N8	NNE6	ENE3	ENE4	ESE4	ESE4	WSW3	WNW5	NW6	WNW6	NW6	NNW4	NNE4	NE4	E5	ESE5	ESE5	E5	E5	ENE5	NNE2.3	N8
9-Feb	ENE6	E6	ESE6	E6	ESE7	ESE8	ESE10	ESE9	SE8	SSE7	SSE8	SSE7	SSE6	SE4	NNW6	N6	N4	N3	NNW4	N3	NE2	NNW3	NNW4	N2	E3.1	ESE10
10-Feb	NNW6	N6	N9	N10	N9	N8	N8	N10	NNW10	NNW10	NNW12	NNW13	NNW14	NNW13	NNW10	NNW8	N8	N8	NNE5	NNE5	NNE5	NNE6	NNE6	NNE5	N8.2	NNW14
11-Feb	NE2	ESE2	E3	SE4	SE4	SSE5	SE5	SSE6	SSE8	SSE9	SSE11	S12	S14	SSE13	SSE15	SSE16	SSE19	SSE21	SSE21	SSE24	SSE22	SSE22	S19	S15	SSE11.8	SSE24
12-Feb	S11	SSW12	S9	SSW8	SW8	WSW8	WSW7	WSW6	WSW7	WNW7	N6	N7	NW6	N7	NNE8	NE8	NNE7	NNE6	N8	NNE7	NNE8	NNE8	NE8	NNE9	NNW1.7	SSW12
13-Feb	NNE7	NE8	NNE7	NNE8	NNE8	NNE7	NE7	NE8	NE10	ENE10	ENE8	E8	ESE12	ESE12	SE13	SE11	SE12	SE16	SE19	SE16	SSE17	SE20	SSE20	SE26	ESE8.6	SSE26
14-Feb	SSE24	SSE22	SSE26	SSE30	SSE27	SSE24	SSE24	SSE26	SSE25	SSE21	SSE21	S19	S18	S17	SSW14	SSW13	SSW11	NW7	N9	NNE9	NNE10	NNE10	NNE8	NNE8	SSE12.5	SSE30
15-Feb	NNE8	N7	N8	NNE6	N4	N6	N7	NNE7	N7	NNW8	NNW9	NNW11	N11	NNW12	N11	N8	N10	N11	N9	N10	N9	N10	N9	N9	N8.5	NNW12
16-Feb	N11	N10	N10	N9	N8	N9	NNW9	N5	N6	N10	NNW12	NNW11	NNW12	NW11	NW9	WNW8	NW6	NW3	E2	E2	ENE1	NNW5	NNW8	N9	NNW7.1	NNW12
17-Feb	N8	N8	N8	N7	NNW6	NNW4	WNW1	WSW1	NE1	E2	NNW3	W4	WSW5	WSW4	SSW3	S4	S3	SE4	SE7	SE8	SE7	SE9	SE9	SE10	SE0.6	SE10
18-Feb	SSE10	SSE13	SSE13	SSE13	SSE15	SSE15	SE14	SSE13	SSE11	SSE9	SSE11	SSE11	SSE8	SSE10	S8	SSE8	SSE11	SSE9	SSE10	SSE8	SSE10	SSE11	SSE10	SSE9	SSE10.7	SSE15
19-Feb	SSE8	S8	S7	S8	S7	S7	S7	SSE6	S5	SSW4	S3	W2	N5	N7	N9	N9	NNW8	N8	N7	N9	N12	N14	N12	N13	N1.9	N14
20-Feb	N13	N13	N10	N10	N11	N10	NNE9	NNE10	NNE8	N9	N9	N9	N10	N10	N8	NNW9	N7	N7	N7	NNE6	NE6	NE7	NNE4	N3	N8.2	N13
21-Feb	NE1	NNE0	N4	N4	N5	NNE5	NNE4	NE5	NNE6	N7	N8	NNW7	NW3	WNW7	WSW5	WSW5	SSW6	S5	SSE8	SSE9	SSE10	S10	S11	S11	S0.5	S11
22-Feb	S10	S11	S11	S11	S11	S11	S10	S11	S12	S12	S11	S11	S12	SSW13	SSW13	SSW15	SSW15	SSW13	SSW12	SSW11	SW9	WSW11	W8	NNW10	SSW10.0	SSW15
23-Feb	NNW10	NNW7	NW5	NW5	NW13	NNW18	NNW21	NNW18	NNW14	NNW17	NNW14	NNW14	NNW13	NNW12	NNW12	N15	N14	N12	NE13	NE10	ENE9	ENE6	E5	N10.4	NNW21	
24-Feb	ESE8	ESE9	ESE8	SE11	SE10	SE10	SE9	ESE9	ESE11	E9	E9	ENE10	ENE9	NE10	NNE8	NNE10	NNE9	NNE9	NNE9	NNE10	NNE12	NNE10	NNE9	NNE8	ENE6.8	NNE12
25-Feb	NE7	NNE6	NNE6	NNE5	NE5	NNE3	NE4	NE5	NNE5	NNE7	N9	NNW7	NNW6	WNW4	NW4	WNW4	W5	W2	SE4	SSE5	SSE7	SSE7	SSE7	SSE7	NNE1.8	N9
26-Feb	SSE8	SSE9	S9	S9	S8	S9	S10	S11	SSW12	SSW14	SSW14	SSW14	SW14	SSW13	SW14	SW12	WSW10	W7	NW7	N5	N8	N8	N8	NNW11	SW5.9	SW14
27-Feb	NNW12	N11	N9	N8	N7	N9	N6	N6	NW6	NW6	WNW7	W7	WSW9	SW8	SW9	SW9	SW8	SSW7	SSW6	SSW6	SW7	SW6	SW6	SW6	W3.5	NNW12
28-Feb	SW5	SW5	WSW7	SW7	WSW7	WSW7	WSW7	W7	WNW8	NW9	NNW11	NNW11	NNW12	NNW12	NNW12	NW12	NW11	NW8	NNW11	NNW12	N9	NNE5	NE4	E2	NW6.1	NW12
E1.4 ESE1.6 ESE1.6 SE1.6 SE1.2 ESE1.4 ESE2.0 ESE2.1 SE1.9 ESE0.6 NNW1.0 NW1.0 NW1.8 NW1.9 NW1.7 NW1.4 NW0.6 NE1.1 ENE1.8 E2.3 E2.1 E1.6 E1.4 ENE1.5																								Diurnal Average		
SSE24 SSE22 SSE26 SSE30 SSE27 SSE24 SSE24 SSE26 SSE25 SSE21 SSE21 S19 S18 S17 SSE15 SSE16 SSE19 SSE21 SSE21 SSE24 SSE22 SSE22 SSE20 SSE26																								Diurnal Maximum		

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



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**Wapasu - February 2015**







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

**Wind Speed (WS) - km/h**  
**Wapasu - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	156	23.21	23.21
6 - 11	393	58.48	81.70
12 - 19	103	15.33	97.02
20 - 28	19	2.83	99.85
29 - 38	1	0.15	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Wapasu - February 2015**

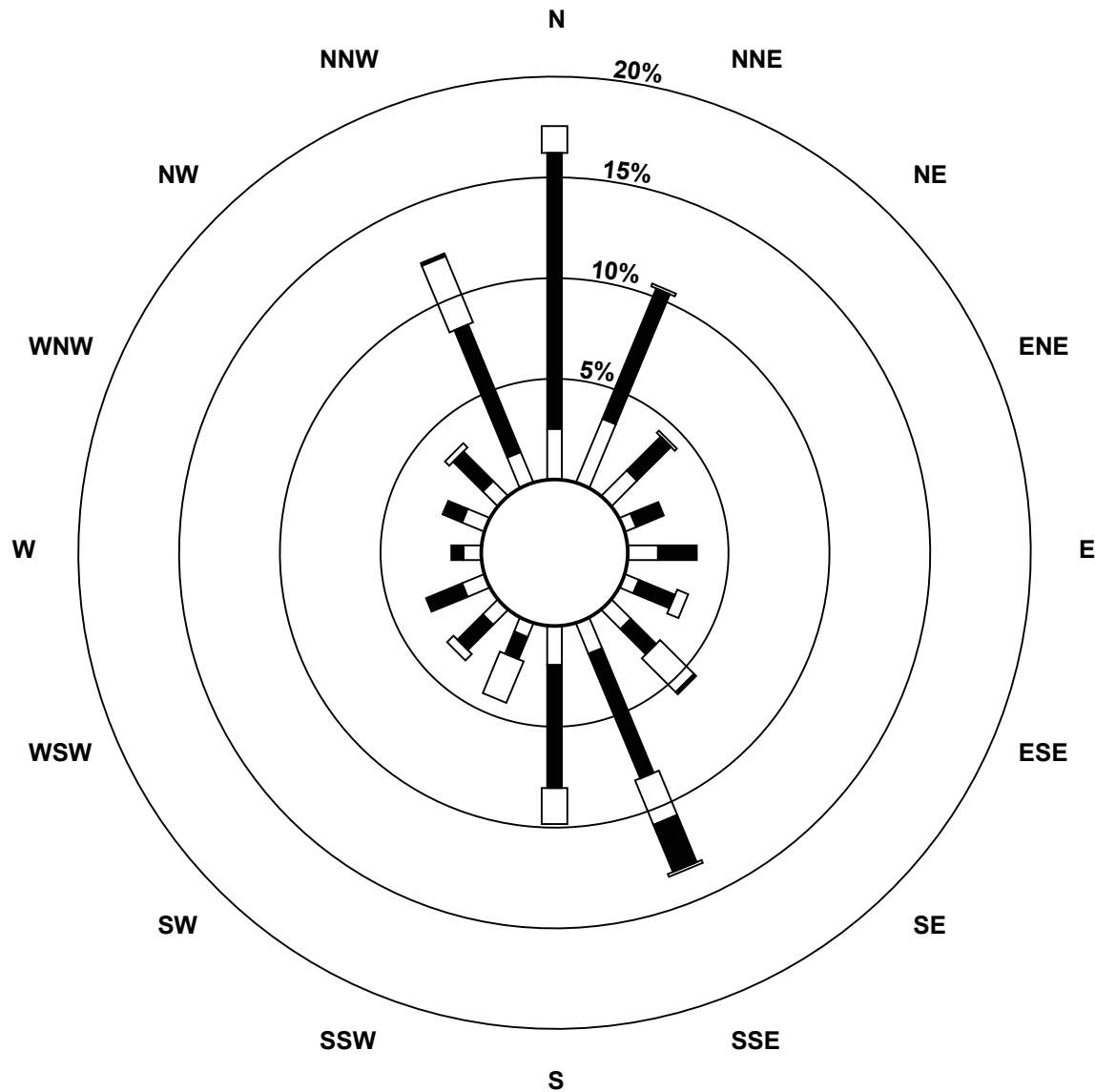
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	17	23	12	4	10	5	9	11	13	5	7	8	6	8	7	11	156
6 - 11	92	47	16	10	13	13	12	45	41	8	12	13	4	7	14	46	393
12 - 19	9	1	1	0	0	4	16	16	12	15	3	0	0	0	2	24	103
20 - 28	0	0	0	0	0	0	1	17	0	0	0	0	0	0	0	1	19
29 - 38	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	118	71	29	14	23	22	38	90	66	28	22	21	10	15	23	82	672

Total Number of Valid Hours: 672

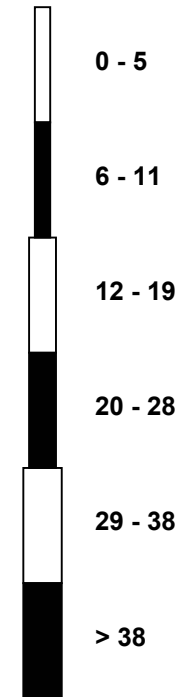
Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Wapasu (AMS 17)**



**Classes (km/h)**



**Total Number of Valid Hours: 672**



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

**Wind Speed (WS) - km/h**  
**Wapasu - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 9 km/h on Feb 14 08:00 Minimum Value: 0 km/h on Feb 2 21:00 Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 3 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 P <sub>99</sub> = 8																	Hours in Service: 672 Hours of Data: 672 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-Feb	2	1	1	2	2	2	1	1	1	1	3	2	3	3	3	2	2	1	1	1	1	1	2	1	3
2-Feb	1	1	2	2	1	1	1	1	1	1	1	2	2	2	2	1	1	1	1	1	0	1	1	1	2
3-Feb	1	1	1	1	1	1	2	2	3	3	3	2	2	2	1	1	1	1	1	2	2	3	2	3	
4-Feb	2	3	3	3	3	4	4	4	4	3	3	2	2	3	3	2	3	3	3	4	4	4	4	4	
5-Feb	3	4	3	3	3	2	2	2	1	2	3	3	3	3	3	3	2	2	2	2	2	2	2	4	
6-Feb	2	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	4	4	3	4	4	
7-Feb	5	5	5	4	4	4	5	5	5	5	5	4	4	4	3	3	3	3	2	2	1	1	1	5	
8-Feb	2	2	2	2	3	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	3	
9-Feb	1	2	2	2	2	2	3	3	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	3	
10-Feb	2	2	3	3	3	3	3	4	3	3	4	4	4	4	3	2	3	3	2	2	2	2	2	4	
11-Feb	1	1	1	1	1	1	2	1	2	3	4	4	5	4	5	5	6	7	6	7	8	7	6	8	
12-Feb	4	4	3	3	3	3	2	2	2	2	2	2	2	2	3	3	3	2	3	3	3	2	3	4	
13-Feb	3	3	3	3	2	2	3	2	3	3	3	3	4	3	4	3	3	5	5	5	5	6	7	8	
14-Feb	8	7	8	8	9	7	8	9	8	8	7	6	6	6	5	5	4	3	4	4	4	3	3	9	
15-Feb	3	3	3	2	2	2	2	2	3	2	3	3	4	4	4	3	4	4	4	3	3	4	3	4	
16-Feb	4	4	4	3	3	3	3	2	2	4	4	4	4	3	3	2	2	1	1	1	1	2	2	4	
17-Feb	3	3	3	2	2	2	1	1	1	1	2	2	2	2	2	1	1	1	2	1	1	2	2	3	
18-Feb	3	3	3	4	4	4	4	4	3	3	4	4	3	3	3	2	3	3	3	3	3	3	3	4	
19-Feb	3	2	2	2	2	2	2	1	1	1	1	2	2	3	3	3	3	3	2	4	4	5	5	5	
20-Feb	5	5	4	4	4	4	3	4	3	3	3	3	3	3	3	3	3	2	2	1	2	2	1	5	
21-Feb	1	1	1	1	1	1	1	1	2	2	3	3	2	2	2	2	2	2	2	2	3	3	3	3	
22-Feb	3	3	3	3	3	3	3	3	4	4	4	3	4	5	5	6	6	5	4	4	3	3	3	6	
23-Feb	3	2	2	2	5	6	6	5	4	3	6	4	4	4	4	4	5	5	4	5	4	3	2	6	
24-Feb	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	4	3	3	4	4	3	3	4	
25-Feb	2	2	2	1	1	1	1	1	2	3	3	3	2	2	2	1	1	1	1	1	1	1	1	3	
26-Feb	2	2	3	3	2	3	3	3	4	5	5	5	5	5	4	3	2	2	2	2	3	3	3	5	
27-Feb	4	4	4	3	3	3	2	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	1	4	
28-Feb	1	1	2	2	2	2	2	2	2	3	3	4	4	4	4	4	3	2	4	3	4	1	1	4	
																	Diurnal Maximum								



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

**Wind Direction (WD) - deg**  
**Wapasu - February 2015**

Direction of Maximum Speed: 149 deg on Feb 14 04:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 159.4 deg on Feb 14	Hours of Data: 672
Direction of Minimum Speed: 181 deg on Feb 8 00:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 0.5 deg on Feb 21	Percent Operational Time: 100.0
Monthly Average Direction: 318.1 deg	

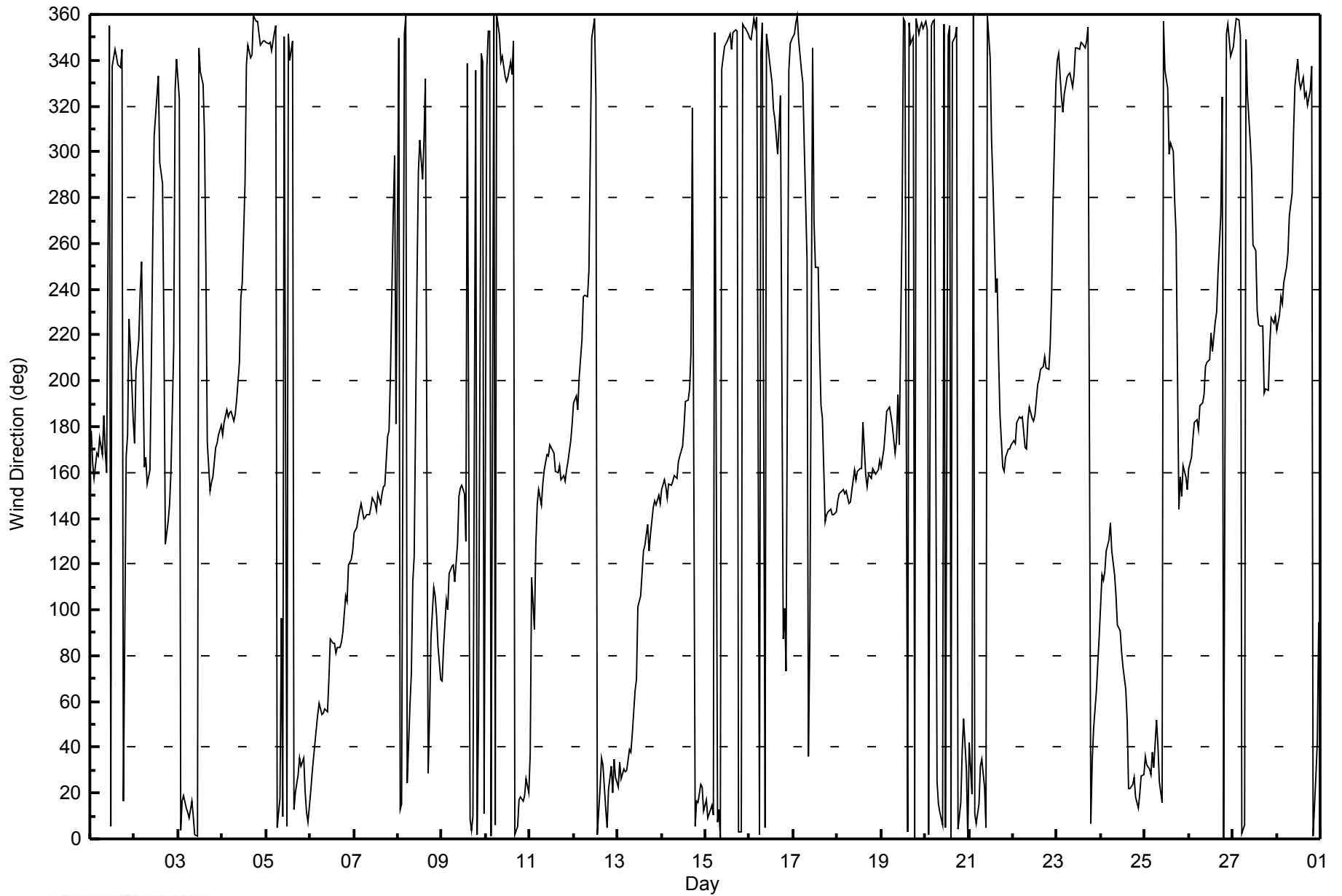
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	178	164	157	169	167	175	168	185	169	160	355	6	337	344	342	338	337	345	16	167	176	227	215	183	212.8
2-Feb	173	204	218	239	252	162	167	155	161	207	261	307	325	333	295	286	220	129	138	146	160	215	327	340	238.9
3-Feb	323	4	16	19	14	11	9	16	10	2	1	345	335	329	308	251	173	152	156	158	171	173	176	181	4.3
4-Feb	176	182	187	184	186	186	182	185	192	208	236	243	286	338	346	341	342	359	357	357	352	346	349	348	261.4
5-Feb	348	347	348	344	352	355	5	18	96	10	350	5	351	340	348	13	20	28	36	32	35	20	11	7	2.5
6-Feb	21	29	35	48	55	59	54	55	57	55	69	88	86	85	81	84	84	86	90	106	104	120	122	126	82.3
7-Feb	134	136	140	143	147	140	140	142	142	145	149	146	143	151	146	151	154	155	176	178	202	273	298	181	146.4
8-Feb	349	13	15	351	359	25	58	73	112	123	243	291	305	288	305	332	28	53	88	110	106	98	84	70	26.4
9-Feb	69	84	104	100	116	119	119	112	129	149	153	154	151	130	339	8	4	10	336	2	53	343	339	11	98.9
10-Feb	337	352	352	1	360	6	360	351	339	342	333	331	333	340	334	348	2	5	17	18	16	19	26	20	351.7
11-Feb	37	114	92	128	146	152	146	155	161	168	167	172	170	168	160	160	163	157	158	156	161	165	174	181	161.6
12-Feb	190	194	188	201	218	237	237	237	248	300	350	358	324	2	23	35	33	14	5	21	31	20	35	27	335.4
13-Feb	23	34	26	30	29	30	39	38	46	65	70	101	106	116	126	128	138	126	133	144	148	146	150	146	110.8
14-Feb	153	157	154	149	155	154	156	159	157	165	167	172	180	191	192	197	213	319	5	17	16	24	23	12	159.4
15-Feb	17	9	11	15	10	352	7	13	0	336	346	347	348	351	345	352	354	353	3	3	356	355	354	352	356.6
16-Feb	350	349	358	355	359	2	343	356	5	352	347	340	330	319	314	299	311	325	87	101	73	335	347	349	343.7
17-Feb	351	356	359	349	335	330	303	253	36	88	345	270	249	249	213	189	184	139	142	143	144	141	142	143	139.8
18-Feb	148	151	152	152	151	152	146	147	152	161	157	161	162	161	182	158	154	159	157	161	161	159	161	165	156.1
19-Feb	162	170	178	187	189	185	180	168	174	194	172	271	358	357	3	357	347	351	0	358	351	354	356	354	349.5
20-Feb	357	353	2	355	357	358	25	16	12	6	355	5	351	355	1	348	350	355	4	16	39	53	30	0	3.7
21-Feb	42	20	359	11	6	15	32	35	23	5	360	341	305	286	239	245	211	186	162	160	167	170	170	172	175.7
22-Feb	174	173	182	184	184	184	171	170	183	189	183	182	185	198	201	205	206	210	205	205	216	238	278	329	196.5
23-Feb	340	343	324	317	325	333	334	334	328	334	345	346	345	348	347	345	349	354	6	34	48	65	77	88	349.6
24-Feb	115	113	116	126	131	138	126	115	106	94	91	82	75	65	52	22	22	24	27	18	13	20	28	28	72.8
25-Feb	36	32	30	28	38	31	52	41	25	16	357	336	328	299	304	300	278	264	144	158	149	163	158	153	27.5
26-Feb	162	167	175	182	183	179	189	190	194	206	208	209	221	213	226	230	247	273	324	0	352	356	349	342	215.7
27-Feb	346	352	358	358	351	2	6	349	325	305	292	259	257	231	224	224	224	195	197	196	215	228	225	228	279.7
28-Feb	222	229	237	234	243	250	256	272	282	308	329	341	331	328	332	324	326	320	327	337	1	28	42	94	311.9
93.3 106.8 111.4 125.6 129.3 123.2 121.6 120.5 132.9 116.5 348.1 324.7 313.6 316.7 313.9 312.3 312.5 46.0 77.6 90.4 89.3 89.7 80.5 77.9																									
Diurnal Average																									

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



**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**Wapasu - February 2015**





Wood Buffalo Environmental Association

Summary of Hour Standard Deviations

Wind Direction (WD) - deg

Wapasu - February 2015

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 91 deg on Feb 21 02:00		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0																							
Minimum Value: 8 deg on Feb 25 21:00																									
Percentiles: P <sub>1</sub> = 12 P <sub>10</sub> = 20 Q <sub>1</sub> = 24 Median = 29 Q <sub>3</sub> = 34 P <sub>90</sub> = 37 P <sub>99</sub> = 70																									
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-Feb	27	15	16	23	24	23	23	29	27	78	32	37	26	30	28	26	25	28	53	24	29	22	33	36	78
2-Feb	20	31	30	23	70	29	14	13	15	29	32	26	28	31	26	43	70	19	11	11	22	64	20	21	70
3-Feb	27	22	22	19	18	24	33	33	37	34	35	36	26	37	42	34	27	8	14	17	22	24	26	27	42
4-Feb	28	29	32	32	31	31	30	34	34	35	28	23	28	31	28	26	28	34	31	31	29	31	30	31	35
5-Feb	27	28	28	27	28	29	34	34	47	31	31	37	35	26	32	33	37	33	29	31	31	34	33	35	47
6-Feb	32	31	37	27	27	25	26	24	24	25	24	26	24	24	25	24	23	23	25	23	24	26	24	22	37
7-Feb	21	20	21	21	20	20	19	18	18	19	20	21	20	21	24	23	22	22	32	31	33	28	60	84	84
8-Feb	46	37	32	29	31	32	31	19	16	20	62	41	33	34	31	49	29	17	19	19	24	25	17	18	62
9-Feb	15	19	23	27	24	21	19	21	21	25	21	28	29	74	25	32	37	36	31	41	52	52	40	43	74
10-Feb	28	30	32	35	33	32	33	30	25	26	24	24	24	29	28	30	35	33	29	30	27	27	33	26	35
11-Feb	36	44	14	20	20	13	21	11	22	28	26	31	29	26	24	26	23	24	23	22	24	26	30	31	44
12-Feb	33	34	34	36	36	28	25	22	25	31	35	34	31	34	37	33	34	35	33	37	31	35	35	31	37
13-Feb	41	34	35	31	30	34	30	28	27	27	26	31	25	25	23	25	20	19	21	21	22	22	25	21	41
14-Feb	23	24	22	20	22	21	23	30	25	28	26	28	29	34	34	37	33	52	35	39	37	33	32	39	52
15-Feb	36	37	39	36	40	30	34	34	35	27	30	33	32	34	29	30	37	34	34	35	32	34	31	33	40
16-Feb	31	31	35	32	34	35	28	30	31	31	30	29	28	26	25	29	22	29	37	46	49	19	26	30	49
17-Feb	31	31	35	32	22	22	54	51	64	59	70	46	37	58	61	34	24	19	14	13	15	15	18	18	70
18-Feb	19	18	19	21	20	20	18	20	20	26	25	26	31	30	36	31	22	24	24	29	26	22	24	25	36
19-Feb	23	27	27	31	33	29	25	22	26	35	40	85	43	39	35	31	29	31	38	35	32	32	35	33	85
20-Feb	33	33	35	31	34	34	34	35	40	37	34	37	33	32	37	28	34	30	29	24	22	19	22	17	40
21-Feb	59	91	19	21	25	21	19	22	29	36	36	33	80	33	44	42	36	22	18	19	22	24	25	26	91
22-Feb	27	25	31	28	31	31	24	25	29	33	32	31	34	32	36	35	34	34	34	32	34	26	37	23	37
23-Feb	22	27	39	39	22	21	21	22	22	23	28	29	28	31	29	30	29	34	36	31	30	27	24	27	39
24-Feb	23	21	21	19	21	19	19	22	21	25	23	27	27	30	31	41	33	32	32	35	33	32	33	32	41
25-Feb	27	30	26	23	23	25	16	26	31	34	35	40	47	49	46	48	25	38	29	13	8	10	13	12	49
26-Feb	15	21	27	30	28	25	30	30	35	35	36	35	36	35	31	29	25	33	22	33	31	32	33	25	36
27-Feb	28	33	35	35	30	35	36	36	31	38	32	34	24	32	36	31	37	27	30	35	33	26	23	26	38
28-Feb	27	26	21	26	20	24	20	25	27	23	22	27	24	22	23	22	28	18	19	24	34	28	19	45	45
	59	91	39	39	70	35	54	51	64	78	70	85	80	74	61	49	70	52	53	46	52	64	60	84	
	Diurnal Maximum																								

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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:05
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Cal Gas Concentration	47.8 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130010A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-702	-702
Analyzer Range (mv)	1000	1000	Lamp voltage	895	895
Calculated slope	0.992121	0.995682	Chamber temp.	44.9	44.9
Calculated intercept	0.728537	-0.026312	Pressure (mmHg)	693.4	693.4
Analyzer Background	8.3	8.3	Flow (lpm)	0.453	0.453
Analyzer Coefficient	0.808	0.808	Intensity	82	82

Analyzer make	Thermo 43i	Analyzer serial #	1218153459
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.1	NA
as found span	5000	60.4	577.4	579.6	0.996
calibrator zero	5000	0.0	0.0	-0.1	NA
high point	5000	60.4	577.4	579.6	0.996
second point	5000	30.2	288.7	290.9	0.992
third point	5000	15.1	144.4	144.6	0.998
calibrator zero	6000	0.0	0.0	0.1	NA
as left zero	6000	0.0	0.0	0.1	NA
as left span	5000	60.4	577.4	582.1	0.992
Average Correction Factor					0.996

Corrected As found	579.7	Previous response	581.3	% change	0.3%
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#### Notes:

No Maintenance Done, Filter changed out, No adjustments made

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

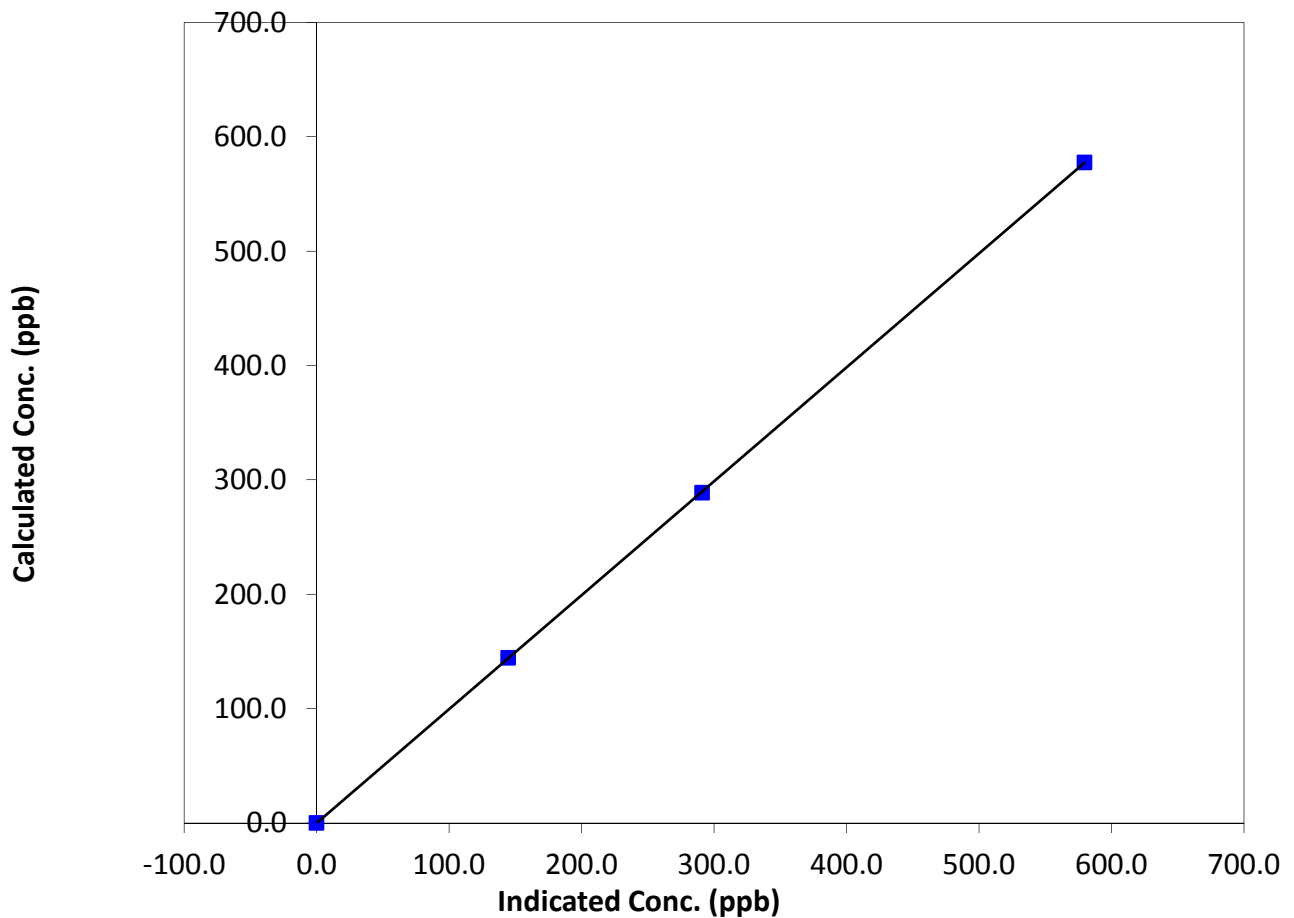
### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:25	End Time (MST)	12:05
Analyzer make	Thermo 43i	Analyzer serial #	1218153459

### Calibration Data

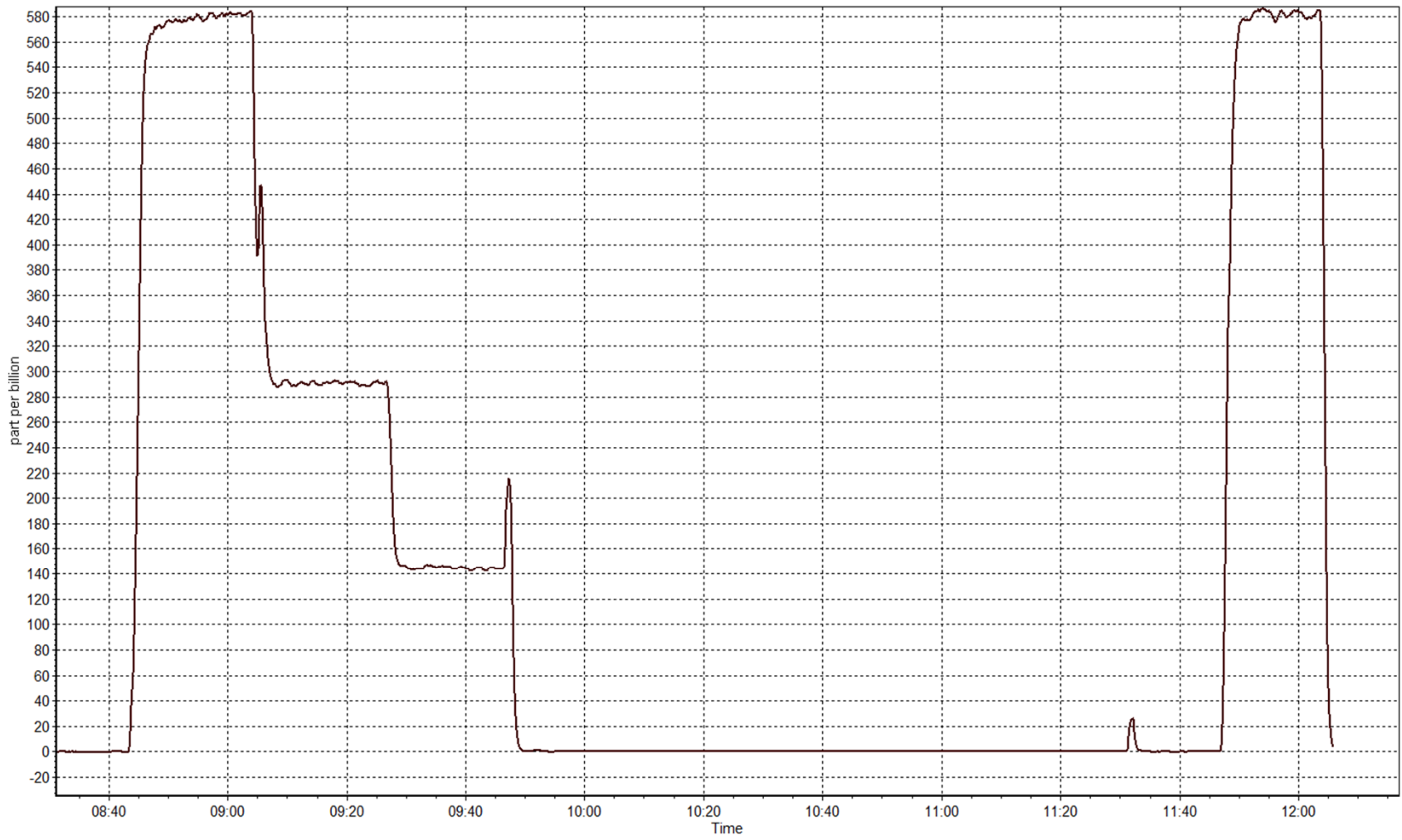
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999994
577.4	579.6	0.9962		
288.7	290.9	0.9925	Slope	0.995682
144.4	144.6	0.9983		
			Intercept	-0.026312

**SO<sub>2</sub> Calibration Curve**



SO2 Calibration Plot

Date: February 6, 2015





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	January 15, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:05	End Time (MST)	12:40
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	997
Cal Gas Concentration	5.1 ppm H2S	Cal Gas Expiry Date	9-Sep-17
Gas Cert Reference	CC107167	SO2 gas conc.	47.8 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	TCP/IP

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	-651	-651
Analyzer Range (mv)	100	100	Lamp voltage	813	813
Calculated slope	0.997755	0.988745	Chamber temp.	45	45
Calculated intercept	-0.446792	0.649370	Pressure	563.0	563.0
Analyzer Background	12.9	11.7	Flow	0.978	0.978
Analyzer Coefficient	0.863	0.863	Intensity	91	91
			Converter temp.	342	342

Analyzer make/model	450i	Analyzer serial #	1218153583
Converter make/model		Converter serial #	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.9	NA
as found span	5000	78.4	80.0	80.0	1.000
SO2 scrubber check	5000	40.0	382.4	1.4	NA
calibrator zero	5000	0.0	0.0	-0.9	NA
high point	5000	78.4	80.0	80.0	1.000
second point	5000	39.2	40.0	40.2	0.995
third point	5000	19.6	20.0	19.6	1.020
calibrator zero	5000	0.0	0.0	0.2	NA
as left zero	5000	0.0	0.0	0.2	NA
as left span	5000	78.4	80.0	81.2	0.985
Average Correction Factor					1.005

Corrected As found	80.9	Previous response	80.6	% change	-0.4%
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#### Notes:

No adjustments or maintenance done. Scrubber checked before the as founds, filter changed. Was linear, zero adjusted after calibration done

Calibration Performed By:

Melissa Lemay  
Asad Hidayat



# Wood Buffalo Environmental Association

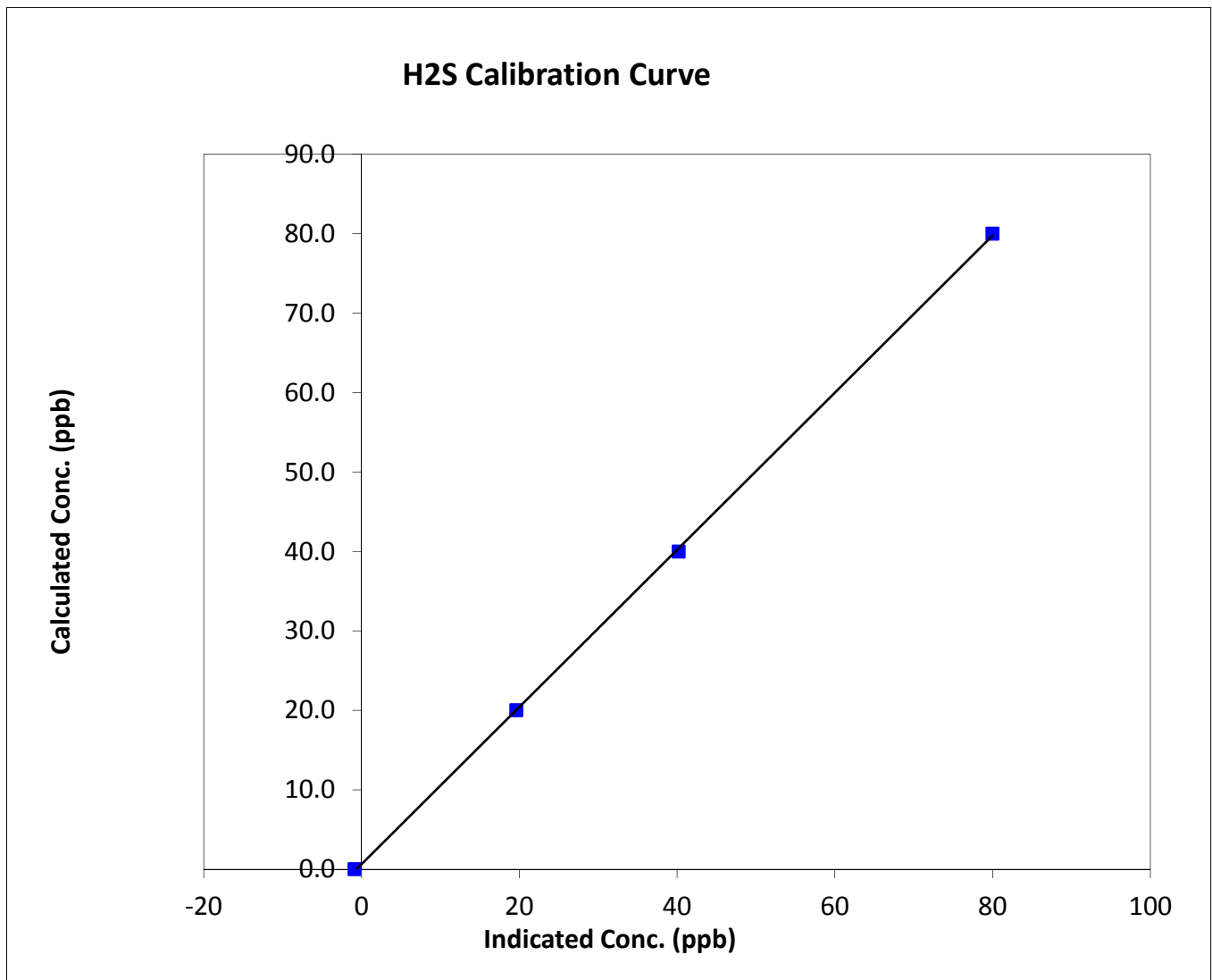
## H2S Calibration Summary

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	January 15, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:05	End Time (MST)	12:40
Analyzer make	450i	Analyzer serial #	1218153583

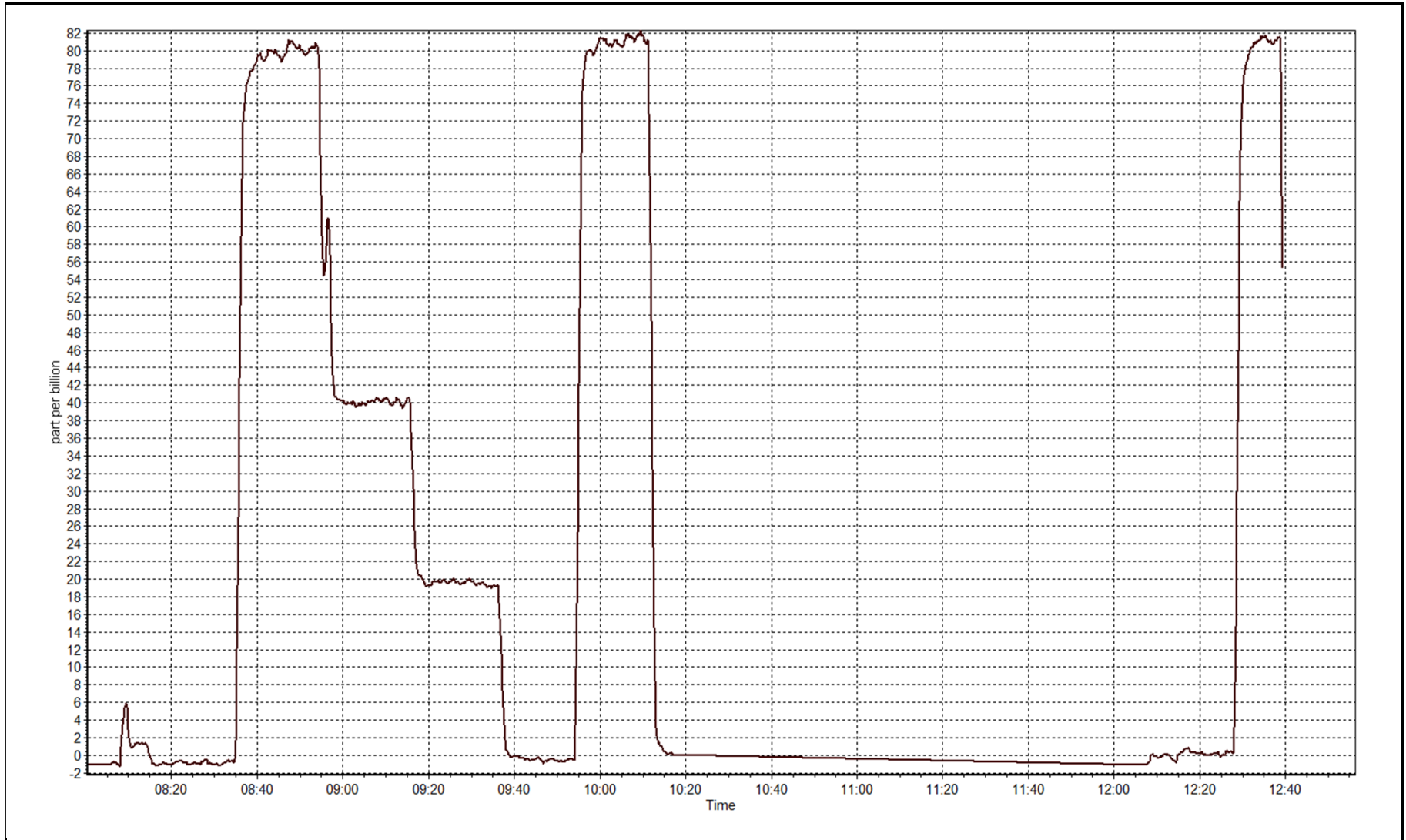
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.9	N/A	Correlation Coefficient	0.999922
80.0	80.0	0.9996		
40.0	40.2	0.9946	Slope	0.988745
20.0	19.6	1.0200		
			Intercept	0.649370



H2S Calibration Plot

Date: Tuesday, February 10, 2015





# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Friday, February 06, 2015	Previous Calibration	Tuesday, January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:05
Barometric Pressure	716 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	API T700	Serial Number	493
Gas Cert Reference	SA130010A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	6894
DACS voltage range	NA	DACS channel #	NA

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	39.6	39.6
Calculated slope	1.006880	1.005925	Fuel Pressure	24.8	24.8
Calculated intercept	-0.022055	-0.003983		2.7	2.7
				4.976	4.976

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	0.02	N/A
as found span	5000	60.4	13.19	13.13	1.005
calibrator zero	5000	0.0	0.00	0.02	N/A
high point	5000	60.4	13.19	13.13	1.005
second point	5000	30.2	6.60	6.55	1.007
third point	5000	15.1	3.30	3.27	1.009
calibrator zero	5000	0.0	0.00	0.06	N/A
as left zero	5000	0.0	0.00	0.06	N/A
as left span	5000	60.4	13.19	13.03	1.013
Average Correction Factor					1.007

Corrected As found 13.11 Previous response 13.13 % change 0.1%

#### Notes:

Filter changed, no adjustments or maintenance made,

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

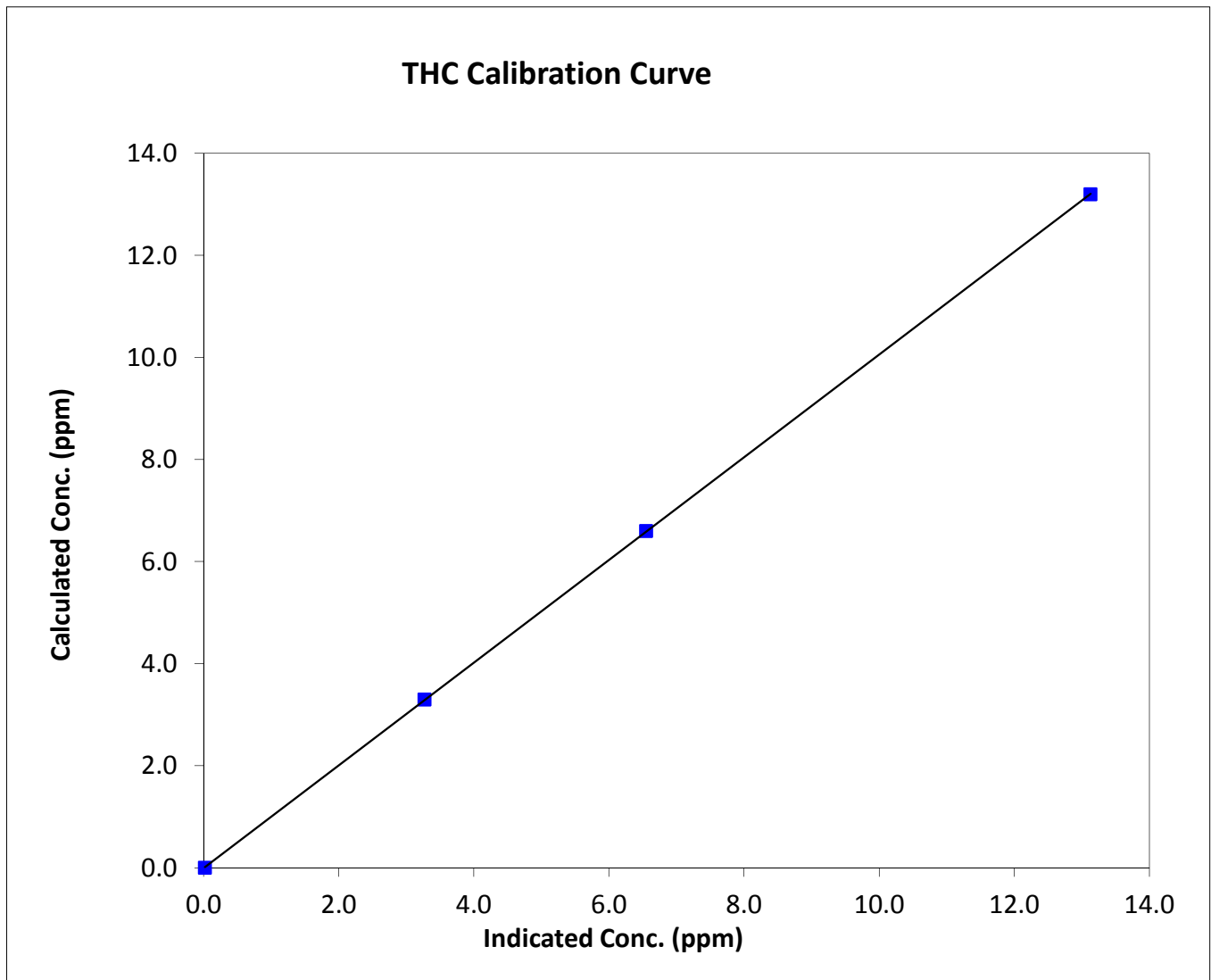
## THC Calibration Summary

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:25	End Time (MST)	12:05
Analyzer make	Thermo 51i-LT	Analyzer serial #	1218153352

### Calibration Data

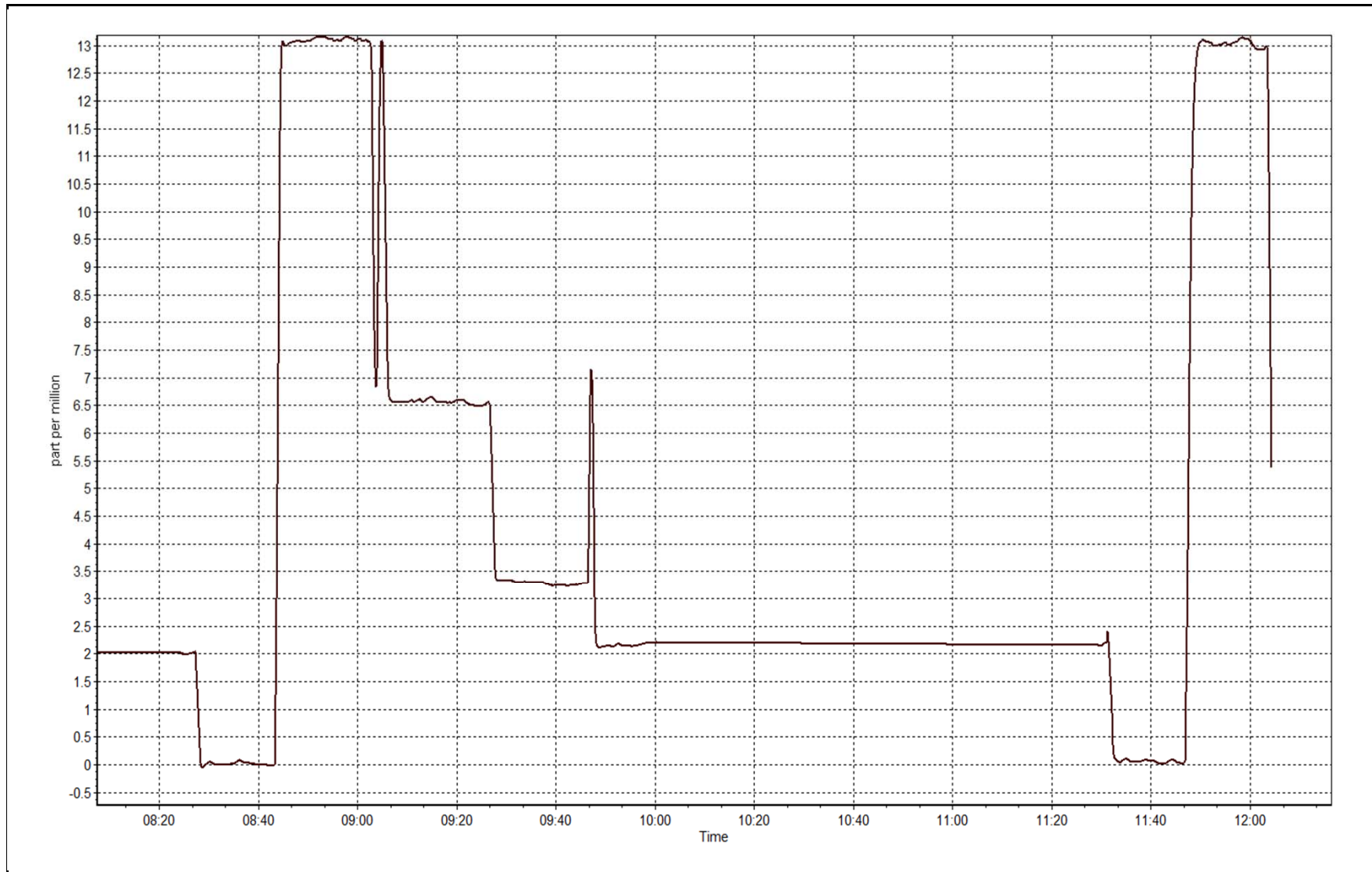
Calculated concentration (ppm) (Cc)	Indicated concentration (ppm) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.00	0.02	N/A	Correlation Coefficient	0.999993
13.19	13.13	1.0049		
6.60	6.55	1.0072	Slope	1.005925
3.30	3.27	1.0087		
			Intercept	-0.003983





THC Calibration Plot

Date: February 6, 2015





# Wood Buffalo Environmental Association

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

### Station Information

Calibration Date	February 10, 2015	Previous Calibration	January 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:10	End Time (MST)	12:10
Barometric Pressure	23 mmHg	Station temp.	23 Deg C
Calibrator Make/Model	T700	Serial Number	997
NO2 calibration used	Friday, February 06, 2015	Transfer Standard	23
DACS make/model	N/A	DACS serial No.	N/A
DACS voltage range	N/A	DACS channel #	N/A

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	500	500	Box temp.	26.8	26.8
Analyzer Range (input)	500	500	Photo Lamp Temp.	58.0	58.0
Calculated slope	0.995671	0.979633	Pressure	26.5	26.5
Calculated intercept	0.806965	-0.064520	Flow	732-750	732-751
Analyzer Background	5.506	5.506			
Analyzer Coefficient	0.982	0.982			

Analyzer make	T400	Analyzer serial #	824
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### Calibration Data

Set Point	Dilution air flow rate (cc/min)	Calibrator Lamp Intensity (mV)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.2	N/A
as found span	5000	932.0	363.5	371.1	0.980
calibrator zero	5000	0.0	0.0	-0.2	N/A
high point	5000	713.5	363.5	371.1	0.980
second point	5000	495.5	245.3	250.4	0.980
third point	5000	260.7	126.0	129.1	0.976
calibrator zero	5000	0.0	0.0	0.2	N/A
as left zero	5000	0.0	0.0	0.2	N/A
as left span	5000	714.7	363.5	372.5	0.976
Average Correction Factor					0.978

Corrected As found	371.2	Previous response	364.3	% change	-1.9%
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#### Notes:

Filter changed out, no adjustments, no maintenance done

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

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

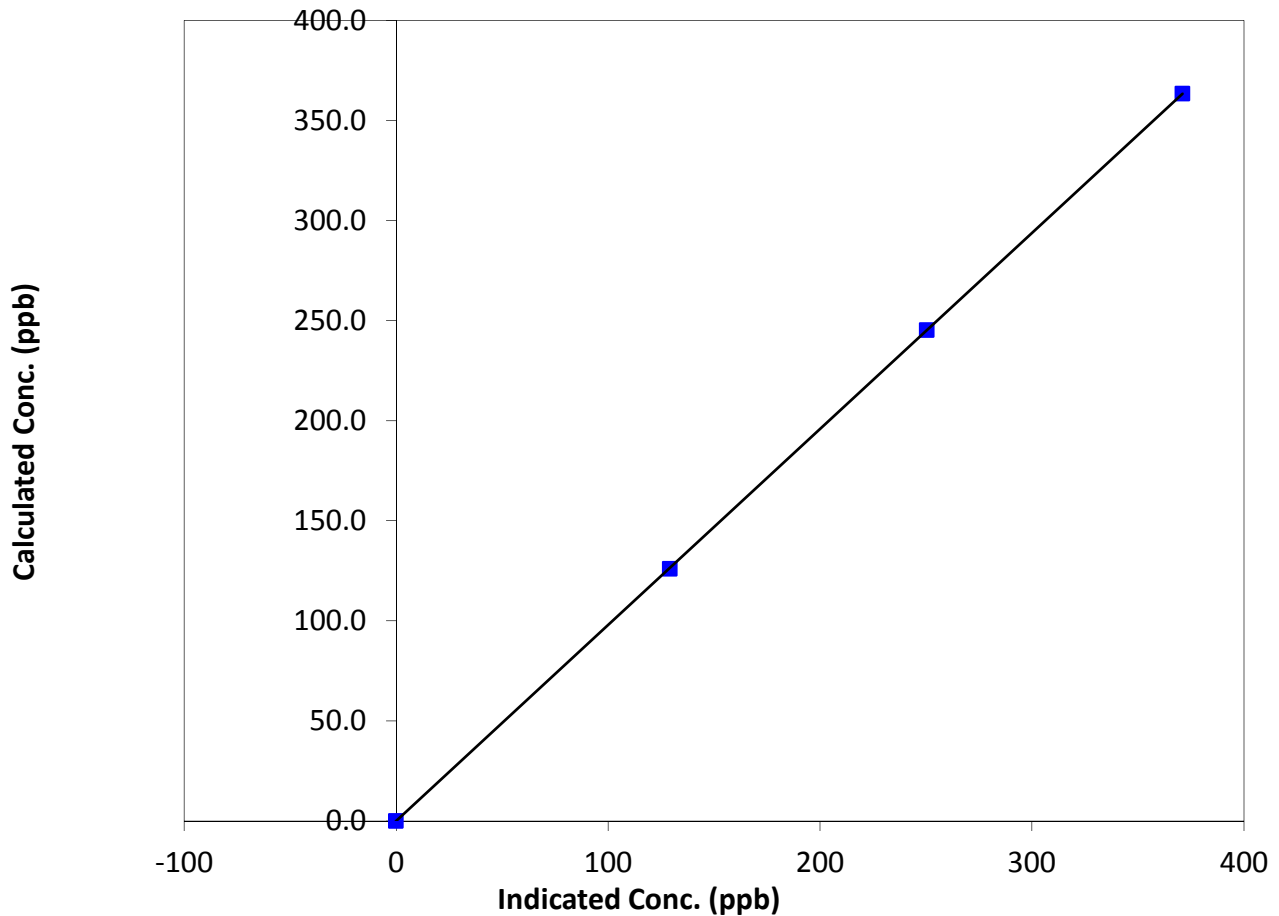
### Station Information

Calibration Date	Tuesday, February 10, 2015	Previous Calibration	January 14, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:10	End Time (MST)	12:10
Analyzer make	T400	Analyzer serial #	824

### Calibration Data

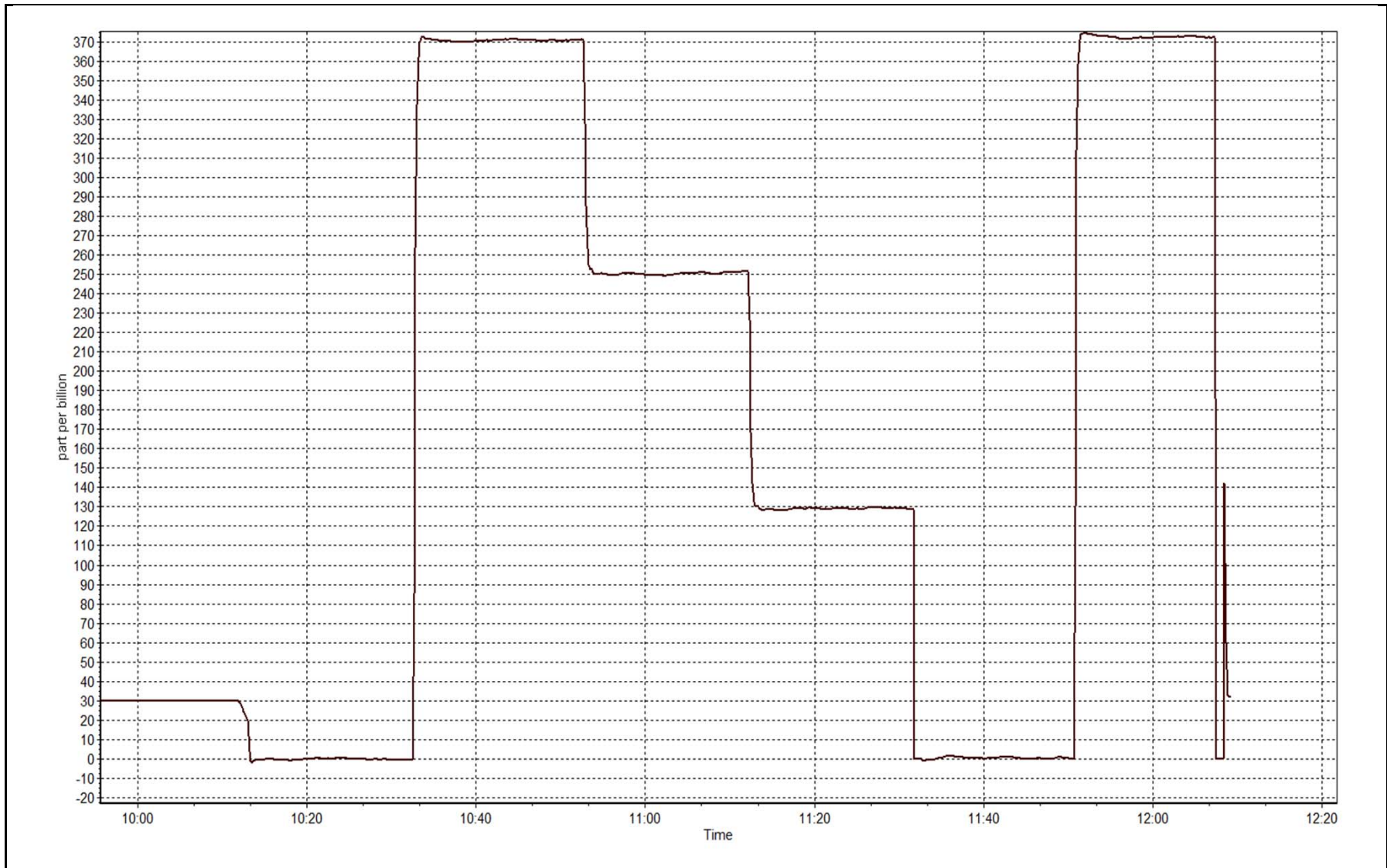
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999997
363.5	371.1	0.9797		
245.3	250.4	0.9798	Slope	0.979633
126.0	129.1	0.9760		
			Intercept	-0.064520

**O<sub>3</sub> Calibration Curve**



O3 Calibration Plot

Date: February 10, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Reason:	Routine		
Start Time (MST)	8:25	End Time (MST)	12:05
Barometric Pressure	mmHg	Station Temperature	21.0 Deg C
Calibrator	API T700	Serial Number	997
NO Cal Gas Conc	49.7 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	49.7 ppm	Cal Gas Serial #	SA130010A

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998493	1.001502	1.002595
	Data Offset	0.545907	0.204798	0.574008
After	Data Slope	1.008742	1.010384	0.993471
	Data Offset	0.323390	0.210137	-0.136903
Channel #				
Voltage Range				

### Analyzer Information

Analyzer make/model	API T200	Analyzer serial #	833
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.993	ppb	0.993	ppb
NOX coefficient	0.993	ppb	0.993	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	-0.4		-0.4	
NOX bkgrnd	0.7		0.7	
Nt coefficient				
Chamber Temp	50.0	Deg C	50.0	Deg C
Moly Temp	316.0	Deg C	316.0	Deg C
PMT Temp	7.0	Deg C	7.0	Deg C
O3 flow	72.0	ccm	72.0	ccm
R Cell Press	5.9	mmHg	5.9	mmHg
Sample Flow	445	ccm	445.000	ccm

**Notes:**

Filter changed, No Maintenance or adjustments Done



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 6, 2015

Station Number:

AMS 17

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	0.2	-0.4	N/A	N/A
as found span	5000	60.4	600.4	600.4	0.0	594.5	593.8	0.7	1.0099	1.0111
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	0.2	-0.4	N/A	N/A
high point	5000	60.4	600.4	600.4	0.0	594.5	593.8	0.7	1.0099	1.0111
second point	5000	30.2	300.2	300.2	0.0	298.4	298.0	0.5	1.0060	1.0073
third point	5000	15.1	150.1	150.1	0.0	147.6	146.9	0.7	1.0169	1.0217
calibrator zero	6000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	-0.4	-0.1	-0.3	N/A	N/A
as left span	5000	60.4	600.4	234.9	365.5	600.5	235.1	365.4	0.9998	0.9991
Average Correction Factor									1.0109	1.0134

Corrected As found NO<sub>x</sub>= 594.7 NO= 593.6 Percent Change NO<sub>x</sub>= 1.0% NO= 1.0%  
 Previous Response NO<sub>x</sub>= 600.7 NO= 599.3

### 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 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			-0.4			N/A	
1st NO <sub>2</sub> (300)	N/A	234.9	363.5	600.7	234.9	365.9	0.9875	1.0000	0.9934	100.7%
2nd NO <sub>2</sub> (200)	N/A	353.1	245.3	599.8	353.1	246.7	0.9890	1.0000	0.9943	100.6%
3rd NO <sub>2</sub> (100)	N/A	472.4	126.0	600.4	472.4	128.0	0.9880	1.0000	0.9844	101.6%
4th NO <sub>2</sub> (0)	598.4	N/A	0.6	599.0	598.4	0.6	0.9903	1.0000	N/A	N/A
Average Correction Factor							0.9887	1.0000	0.9907	100.9%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

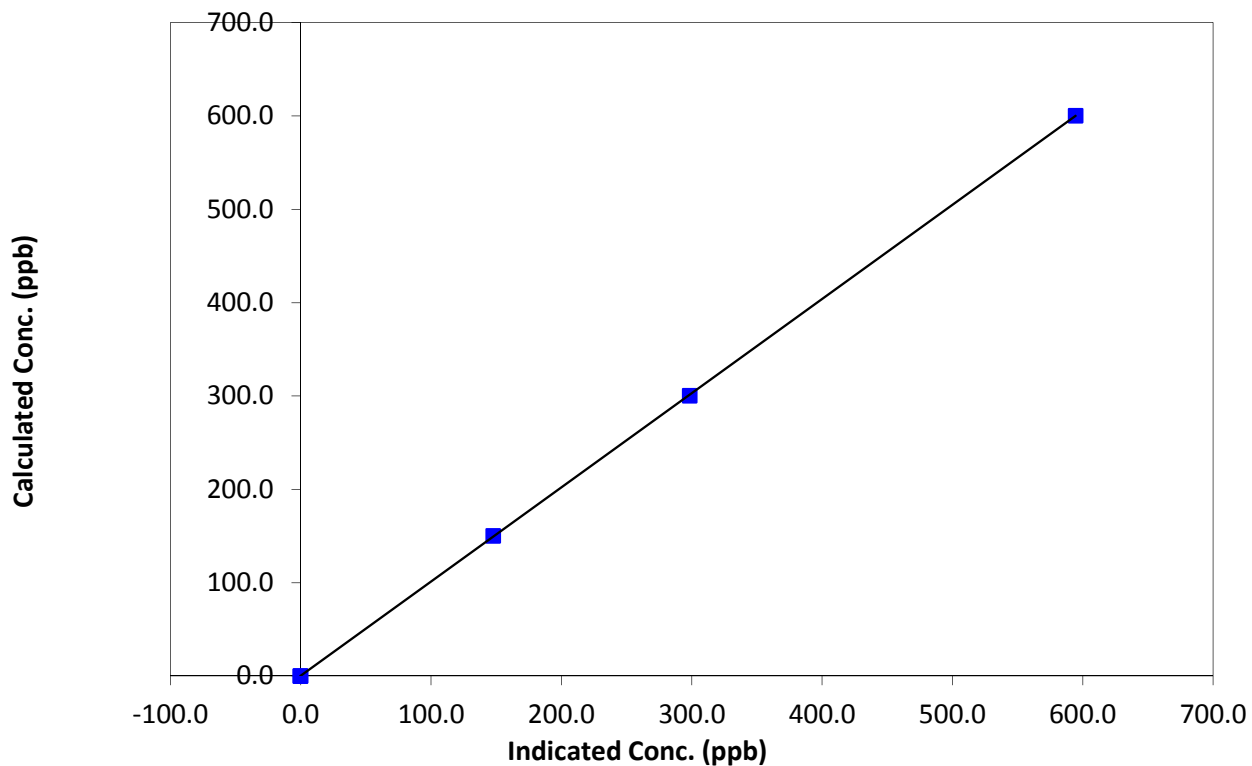
### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:25	End Time (MST)	12:05
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	0.999991
600.4	594.5	1.0099		
300.2	298.4	1.0060	Slope	1.008742
150.1	147.6	1.0169		
0.0	-0.4	0.0000	Intercept	0.323390

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

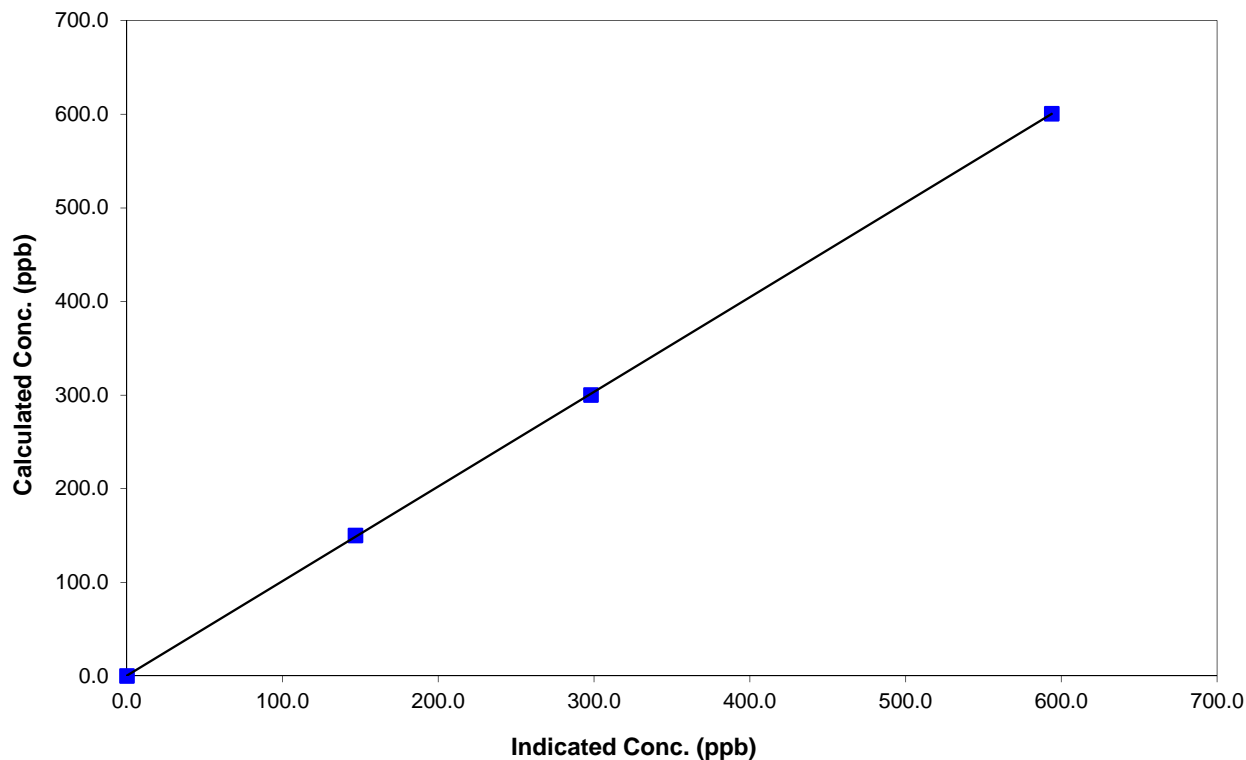
### Station Information

Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Name	Wapasu	Station Number	AMS 17
Start Time (MST)	8:25	End Time (MST)	12:05
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.2	N/A	Correlation Coefficient	0.999986
600.4	593.8	1.0111		
300.2	298.0	1.0073	Slope	1.010384
150.1	146.9	1.0217		
0.0	-0.1	0.0000	Intercept	0.210137

### NO Calibration Curve







# Wood Buffalo Environmental Association

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

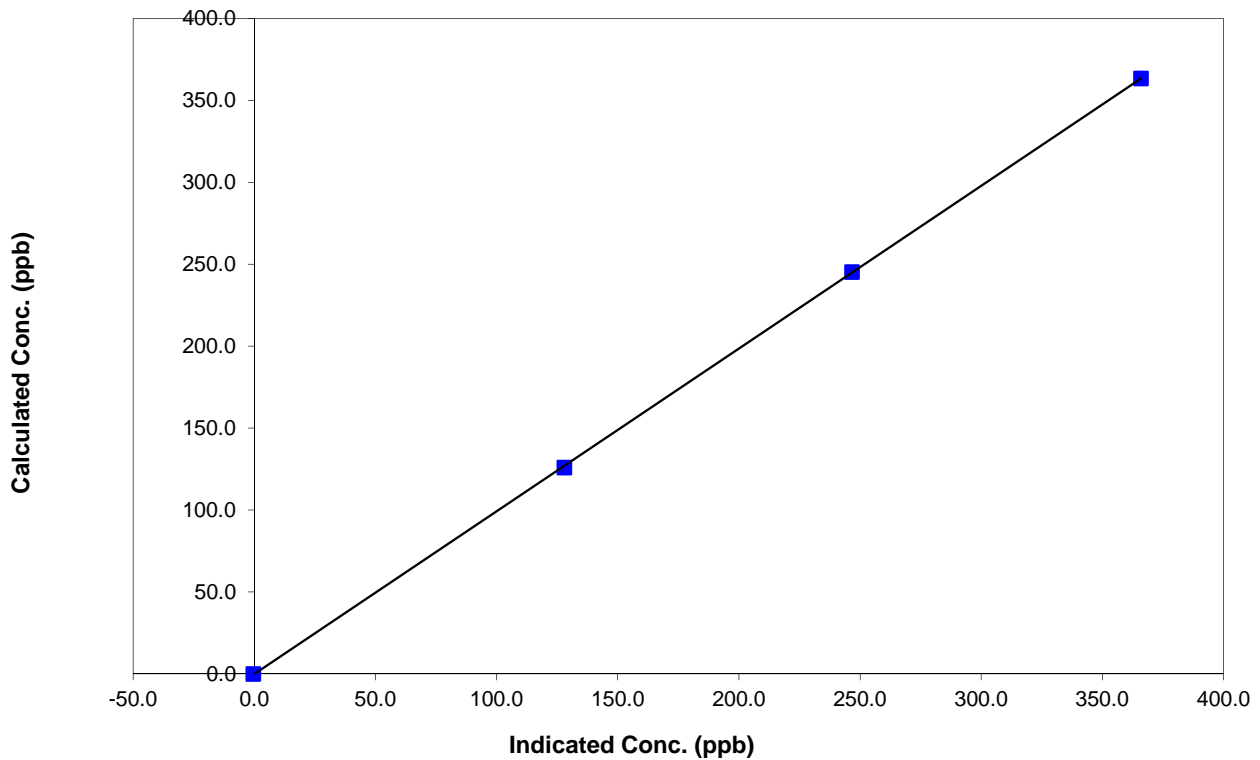
### Station Information

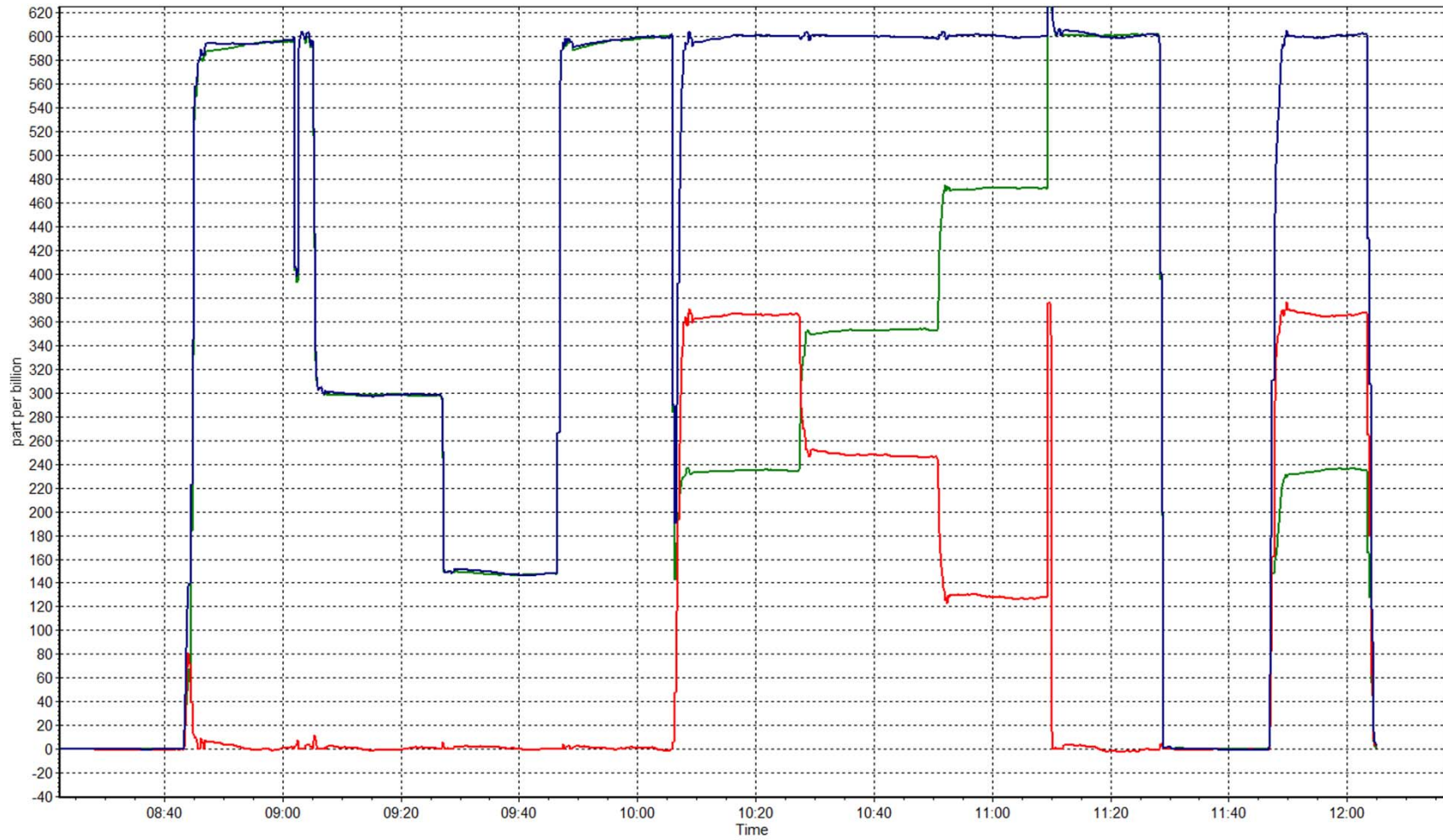
Calibration Date	February 6, 2015	Previous Calibration	January 13, 2015
Station Number	Wapasu	Station Number	AMS 17
Start Time (MST)	8:25	End Time (MST)	12:05
Analyzer make	API T200	Analyzer serial #	833

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999980
363.5	365.9	0.9934		
245.3	246.7	0.9943	Slope	0.993471
126.0	128.0	0.9844		
			Intercept	-0.136903

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





**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

**AMS 19  
FIREBAG  
FEBRUARY 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

March 30, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
 FEBRUARY 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	639	33	33	100.00	12	0	3	0
H2S (ppb) Average	636	32	36	99.40	3	0	1	0
THC (ppm) Average	639	33	33	100.00	2.6	-	2.3	-
NO2 (ppb) Average	639	33	33	100.00	51	0	14	0
NO (ppb) Average	639	33	33	100.00	101	-	12	-
NOX (ppb) Average	639	33	33	100.00	151	-	22	-
Temperature 2 m (C) Average	672	0	0	100.00	-0.4	-	-6.3	-
Relative Humidity (%) Average	672	0	0	100.00	94	-	-	-
Wind Speed 10 m (km/h) Average	671	0	1	99.85	42	-	-	-
Wind Direction 10 m (deg) Average	671	0	1	99.85	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
 FEBRUARY 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	639	1	1	-	0	0	0	0	1	2	12
H2S (ppb) Average	636	0.4	0	-	0	0	0	0	1	1	3
THC (ppm) Average	639	2.18	0.1	-	2.1	2.1	2.1	2.2	2.2	2.3	2.6
NO2 (ppb) Average	639	4.9	6	-	0	0	0	3	7	11	51
NO (ppb) Average	639	2.1	6	-	0	0	0	0	2	6	101
NOX (ppb) Average	639	7	11	-	0	0	0	4	9	17	151
Temperature 2 m (C) Average	672	-18.17	6.4	-	-35.1	-25.5	-22.9	-18.7	-14.4	-9.4	-0.4
Relative Humidity (%) Average	672	76.6	9	-	39	66	73	78	82	85	94
Wind Speed 10 m (km/h) Average	671	14.4	8	-	0	5	9	14	19	23	42
Wind Direction 10 m (deg) Average	671	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - FIREBAG (AMS 19)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
H2S	13 Feb 2015 09:00	13 Feb 2015 12:00	4	Maintenance - manifold cleaning
Wind Speed, Wind Direction	02 Feb 2015 18:00	02 Feb 2015 18:00	1	Flat line in sensor output signal - sensor frozen

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Summary of Hour Averages

Firebag - February 2015

Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 12 ppb on Feb 27 18:00	Maximum Daily Average: 2.6 ppb on Feb 27		Hours of Data:	639
Minimum Value: 0 ppb on Feb 23 14:00	Minimum Daily Average: 0.2 ppb on Feb 23		Hours of Missing Data:	33
Maximum Diurnal Average: 1.6 ppb at hour 18	Minimum Diurnal Average: 0.6 ppb at hour 3		Hours of Calibration:	33
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> =7		Percent Operational Time:	100.0

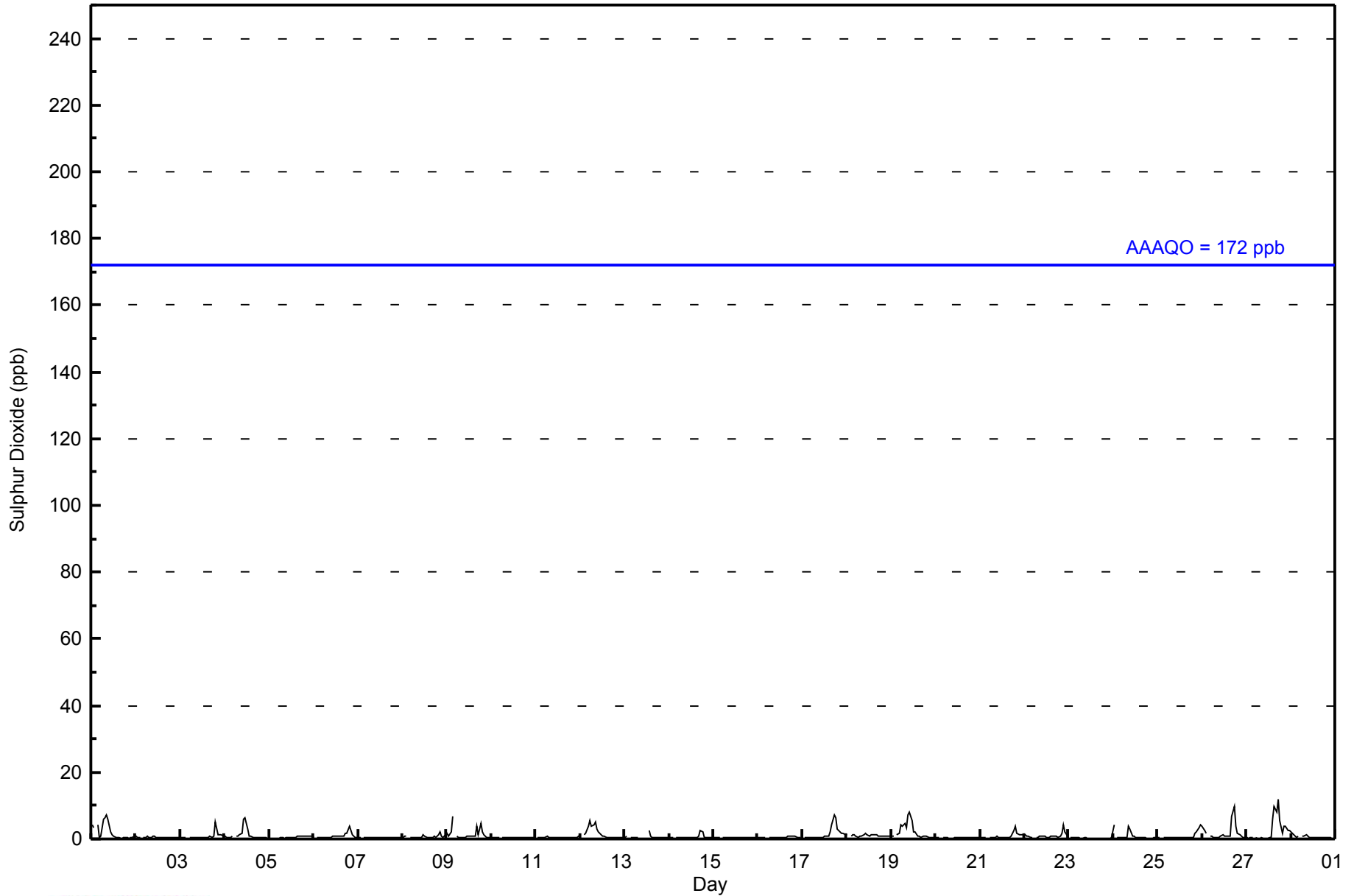
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	4	4	Z	4	1	1	6	6	7	6	2	1	1	0	0	0	0	0	0	0	0	0	0	1	2.0	7
2-Feb	1	0	1	Z	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0.5	1
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	1	5	1	1	1	1	0.7	5
4-Feb	1	1	1	1	1	Z	1	1	1	2	6	6	3	1	1	1	0	0	0	0	0	0	0	0	1.2	6
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0.4	1
6-Feb	1	Z	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	4	3	1	0	0	1.0	4
7-Feb	0	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
8-Feb	0	1	1	Z	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	2	1	0	1	0.7	2
9-Feb	2	1	2	7	Z	1	1	1	1	1	1	1	1	1	1	4	1	5	2	1	1	1	1	1	1.4	7
10-Feb	1	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Feb	Z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
12-Feb	1	Z	1	2	4	6	4	4	5	3	2	1	1	1	1	1	0	0	0	0	0	0	0	0	1.7	6
13-Feb	0	1	Z	1	0	0	0	0	C	C	C	C	C	2	1	1	0	1	1	0	1	1	0	0	0.6	2
14-Feb	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	1	1	0	0	0	0.6	2
15-Feb	0	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-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0.4	1
17-Feb	Z	0	0	0	0	0	0	0	0	0	1	1	1	1	1	2	4	7	6	3	2	2	2	1	1.6	7
18-Feb	1	Z	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	2
19-Feb	1	1	Z	1	2	4	4	5	3	7	8	6	2	2	1	1	1	1	1	1	1	0	0	0	2.2	8
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
21-Feb	0	0	0	0	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	2	1	1	1	0.9	4
22-Feb	1	1	1	1	0	Z	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	4	2	1	0.9	4
23-Feb	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	1
24-Feb	4	Z	0	0	0	0	0	0	4	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.8	4
25-Feb	0	0	Z	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	2	2	3	4	0.9	4
26-Feb	4	3	2	Z	1	1	1	1	0	0	1	1	1	1	1	7	10	4	2	1	1	0	0	0	1.8	10
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	1	6	10	8	12	5	2	4	4	3	2	2.6	12
28-Feb	2	1	1	1	1	Z	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	2
	1.1	0.7	0.6	1.0	0.7	0.8	0.9	0.9	1.1	1.1	1.1	1.0	0.7	0.6	0.7	0.9	1.2	1.6	1.3	1.1	1.0	0.9	0.7	0.7	Diurnal Average	
	4	4	2	7	4	6	6	6	7	7	8	6	3	2	6	10	8	12	6	5	4	4	3	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 - February 2015





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	638	99.84	99.84
11 - 20	1	0.16	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: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**Firebag - February 2015**

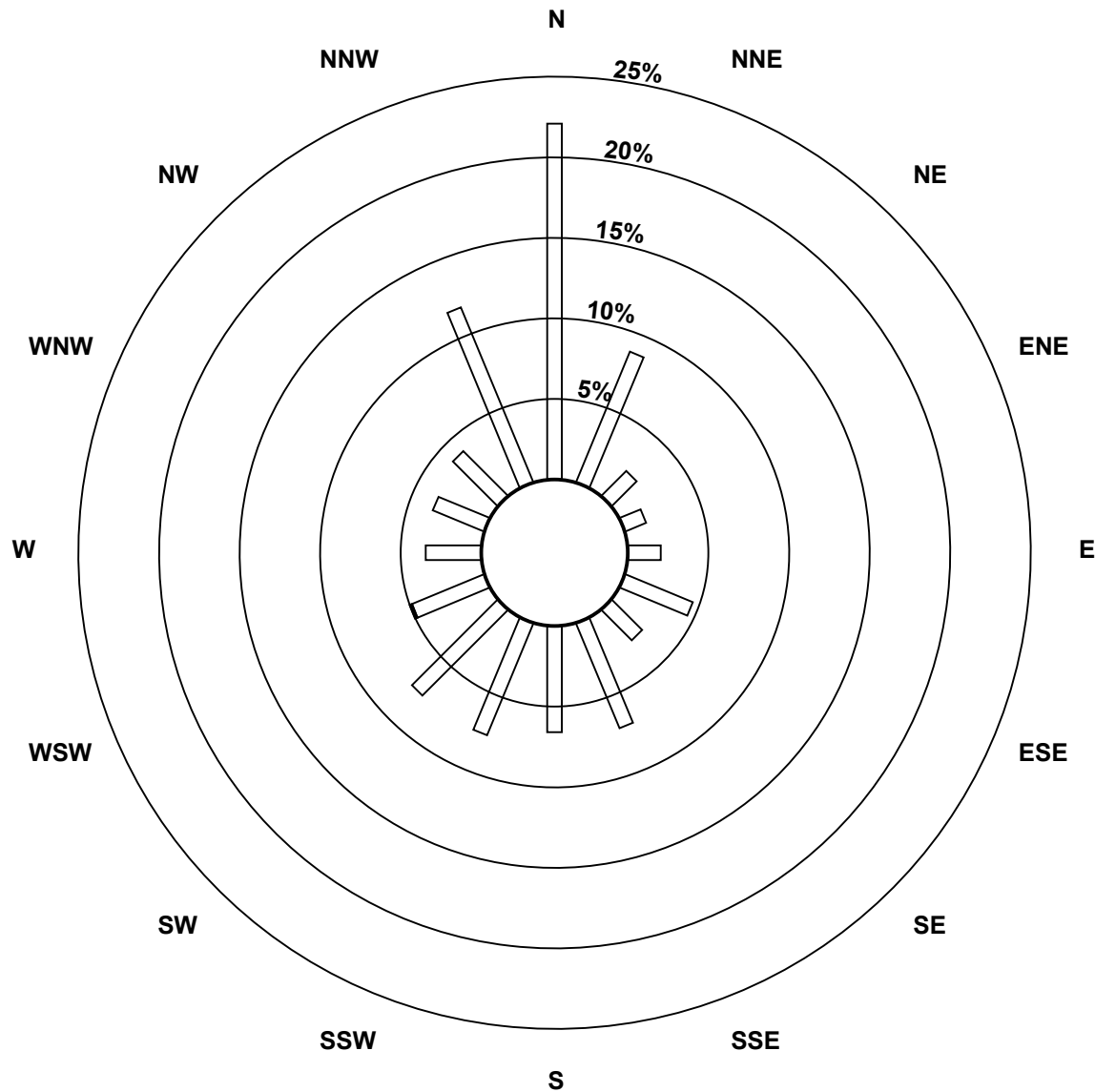
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	141	56	14	9	13	29	17	45	42	48	48	31	22	22	25	75	637
11 - 20	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	56	14	9	13	29	17	45	42	48	48	32	22	22	25	75	638

Total Number of Valid Hours: 638

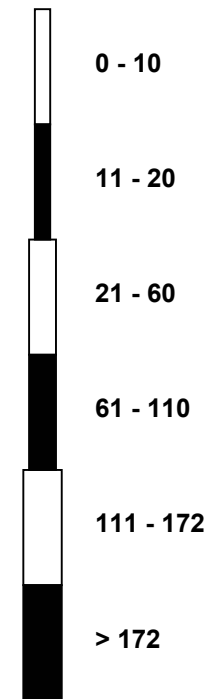
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag (AMS 19)



Classes (ppb)

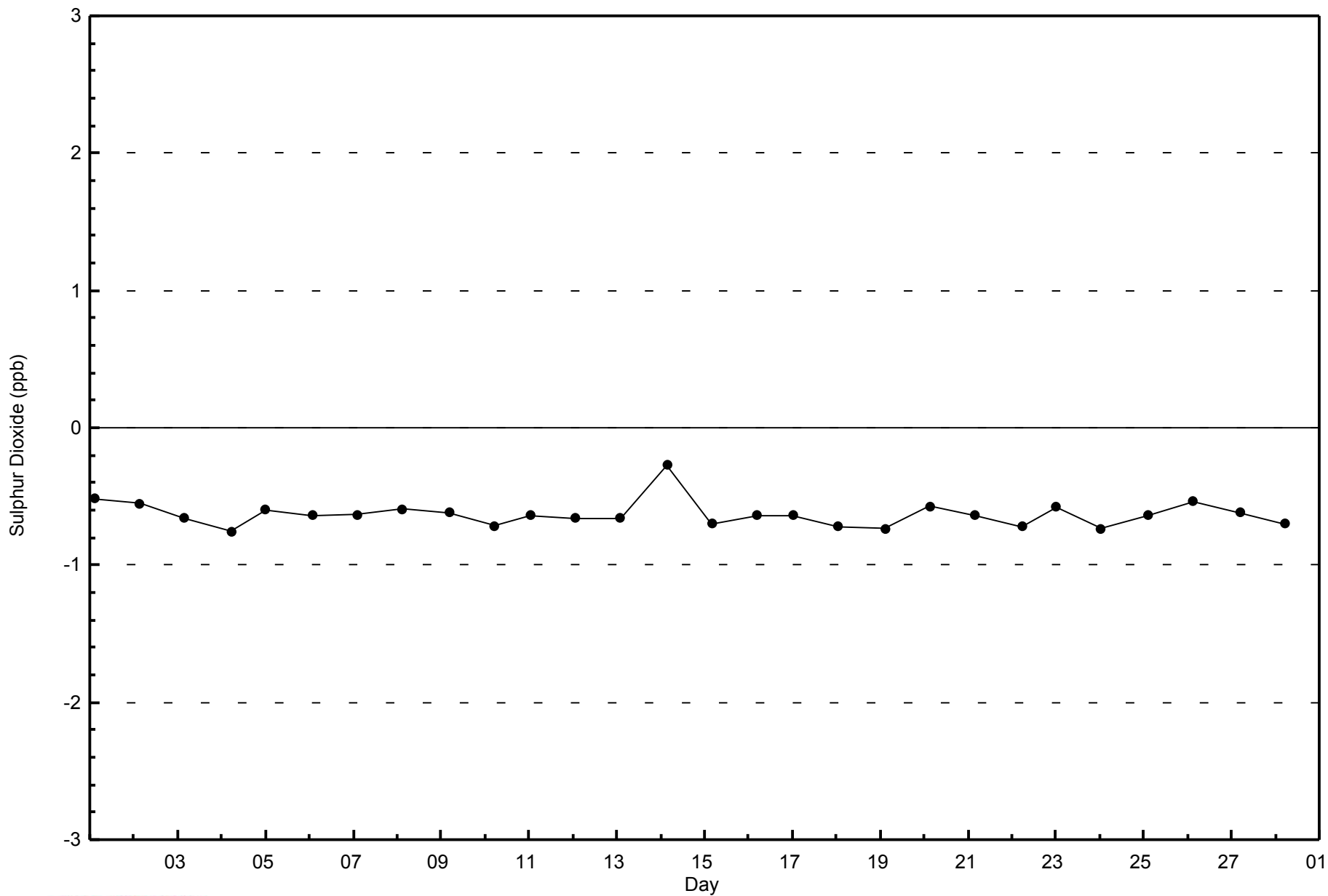


Total Number of Valid Hours: 638



WBEA  
Zero Responses

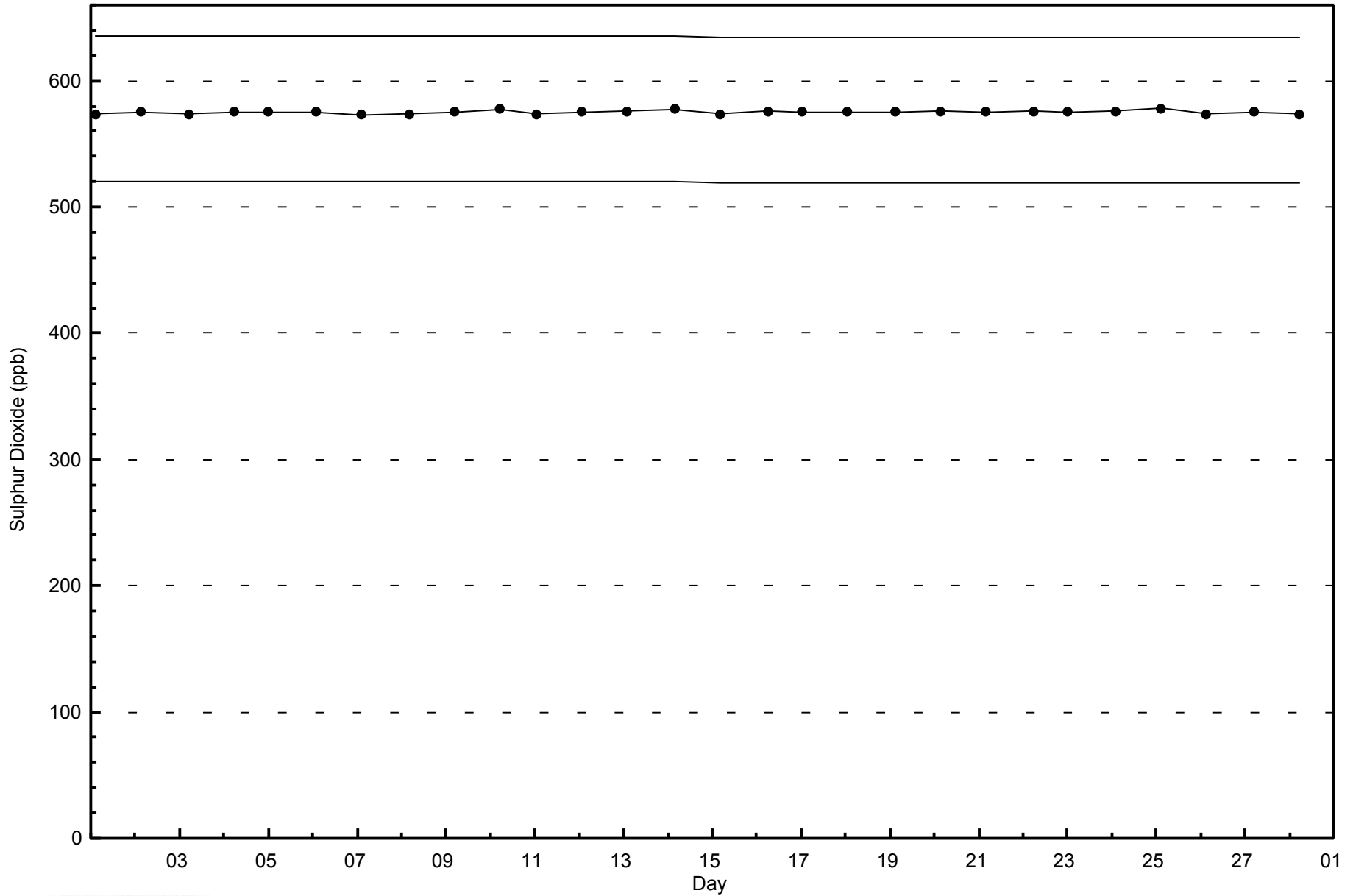
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
Firebag - February 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 3 ppb on Feb 11 07:00	Maximum Daily Average: 0.7 ppb on Feb 9		Hours of Data:	636
Minimum Value: 0 ppb on Feb 3 09:00	Minimum Daily Average: 0.2 ppb on Feb 20		Hours of Missing Data:	36
Maximum Diurnal Average: 0.6 ppb at hour 7	Minimum Diurnal Average: 0.3 ppb at hour 4		Hours of Calibration:	32
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> =1 P <sub>90</sub> =1 P <sub>99</sub> =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-Feb	1	1	1	Z	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.4	1
2-Feb	1	1	1	1	Z	1	1	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0.6	1
3-Feb	0	1	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0.3	1
4-Feb	0	0	0	0	0	1	Z	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.4	1
5-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
6-Feb	0	0	Z	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0.6	1
7-Feb	1	0	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0.6	1
8-Feb	0	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	1	1	1	1	0.5	1
9-Feb	2	2	1	0	1	Z	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0.7	2
10-Feb	1	1	1	0	0	0	Z	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
11-Feb	0	Z	0	0	1	2	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.7	3
12-Feb	0	1	Z	0	0	1	1	1	1	C	C	C	C	1	1	1	1	1	1	1	1	1	1	1	0.7	1
13-Feb	1	1	1	Z	1	1	1	1	M	M	M	M	0	1	0	0	0	0	0	0	0	0	0	0	0.5	1
14-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0.3	1
15-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.4	1
16-Feb	0	0	0	1	0	0	Z	1	0	0	0	0	1	0	0	0	0	1	0	1	1	0	1	1	0.4	1
17-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0.6	1
18-Feb	1	1	Z	0	0	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0.6	1
19-Feb	1	0	1	Z	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0.4	1
20-Feb	0	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-Feb	0	0	1	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Feb	0	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
23-Feb	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0
24-Feb	0	0	Z	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0.4	1
25-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0.5	1
26-Feb	1	1	1	1	Z	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0.5	1
27-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0.3	1
28-Feb	1	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
	0.5	0.5	0.4	0.3	0.4	0.4	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5		Diurnal Average
	2	2	1	1	1	2	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		Diurnal Maximum

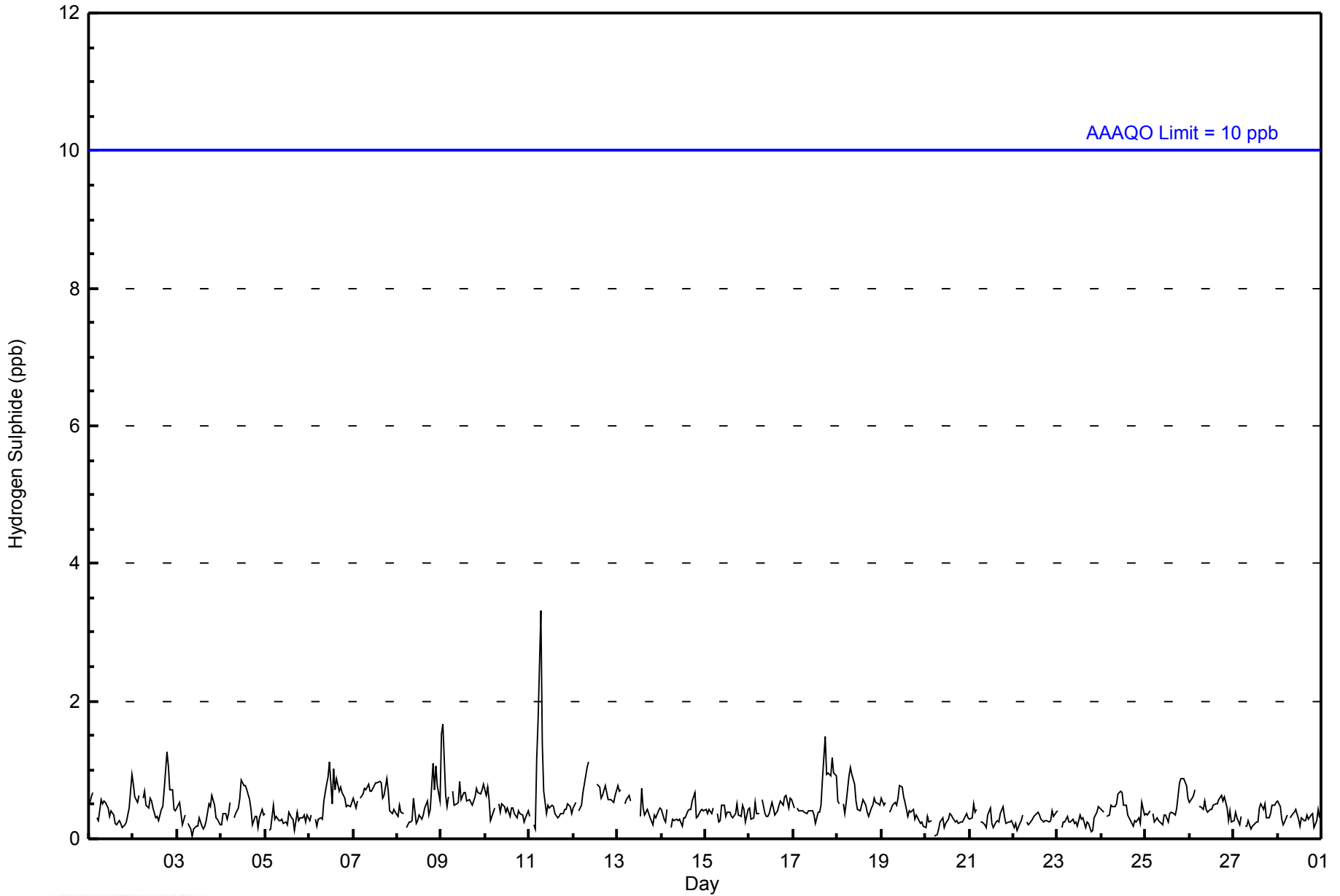
Z - zerospan      C - Calibration      M - Maintenance  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb      24-hr 3 ppb





WBEA  
Hourly Averages

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - February 2015





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	635	99.84	99.84
3 - 4	1	0.16	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: 636

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**Firebag - February 2015**

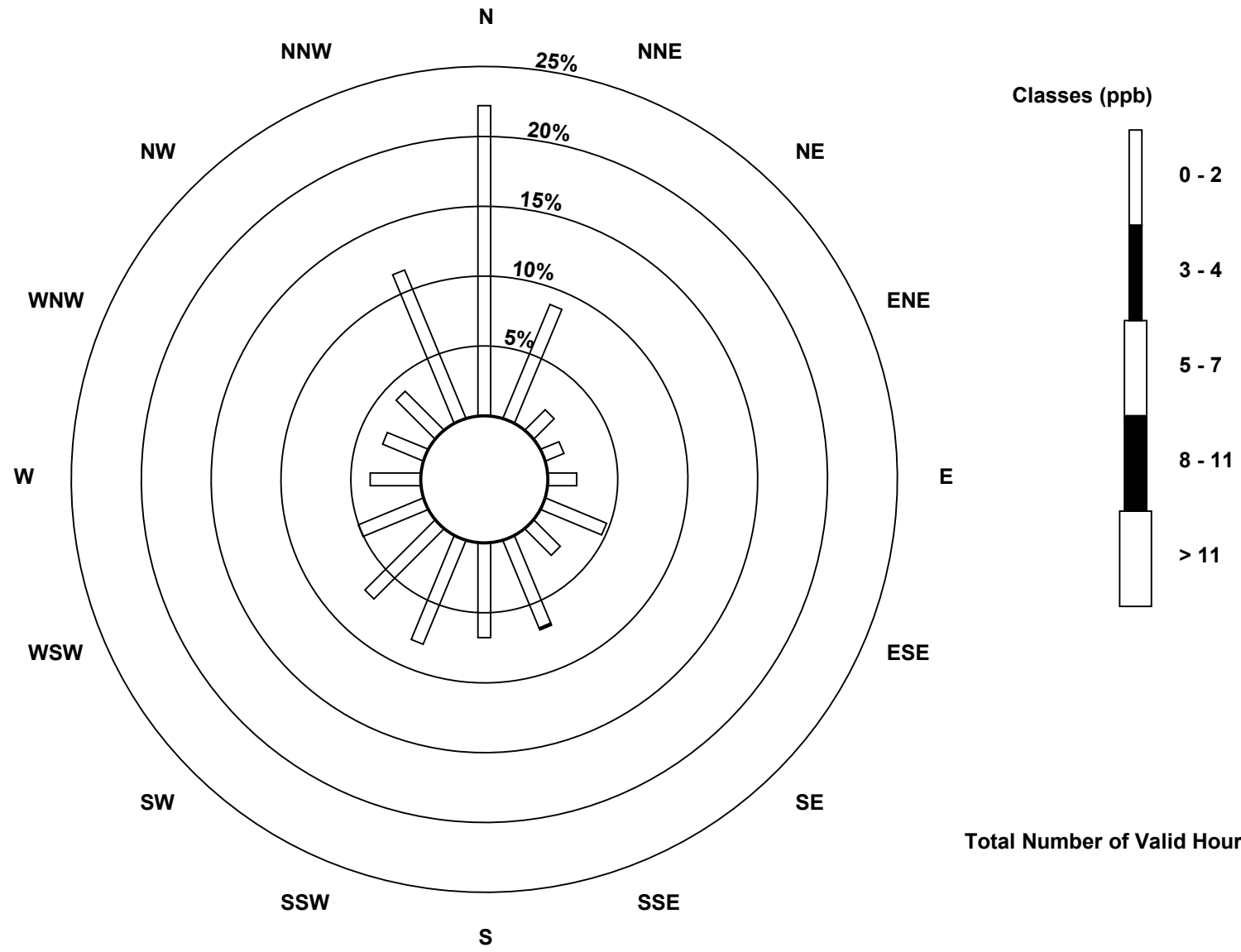
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	141	56	13	9	13	30	17	43	43	51	45	32	23	20	25	73	634
3 - 4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	56	13	9	13	30	17	44	43	51	45	32	23	20	25	73	635

Total Number of Valid Hours: 635

Total Number of Hours: 672

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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag (AMS 19)**

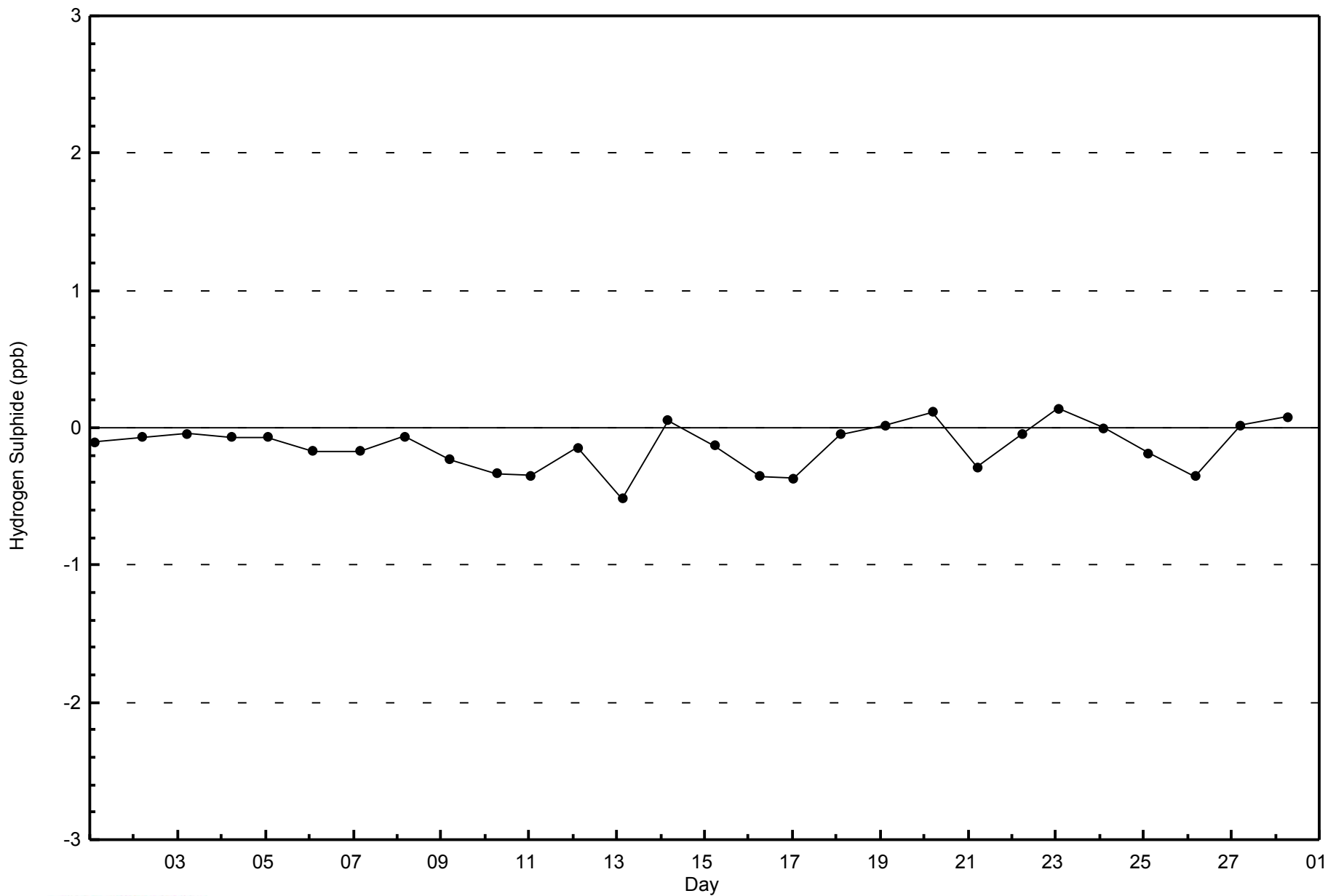


**Total Number of Valid Hours: 635**



WBEA  
Zero Responses

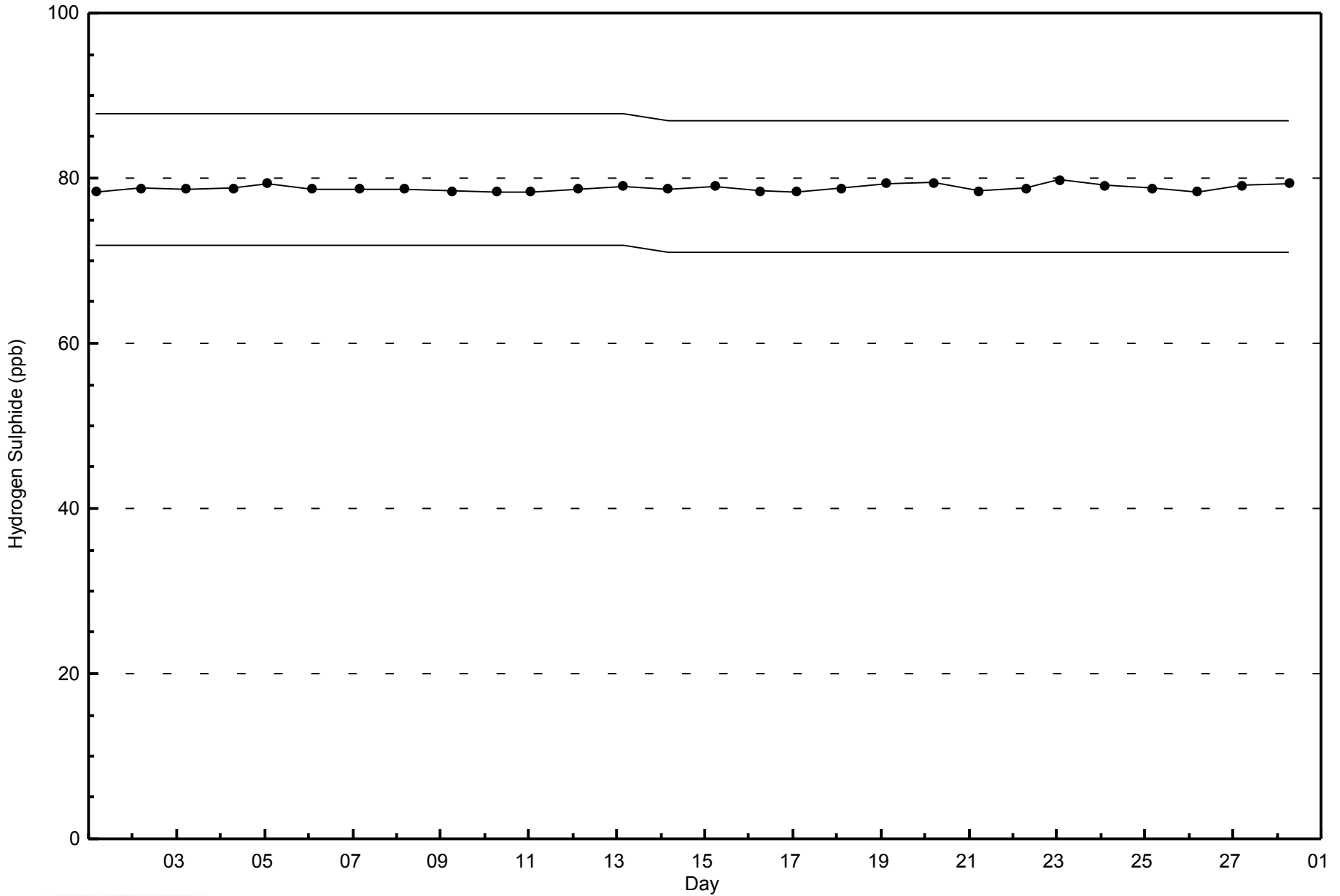
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - February 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
Firebag - February 2015

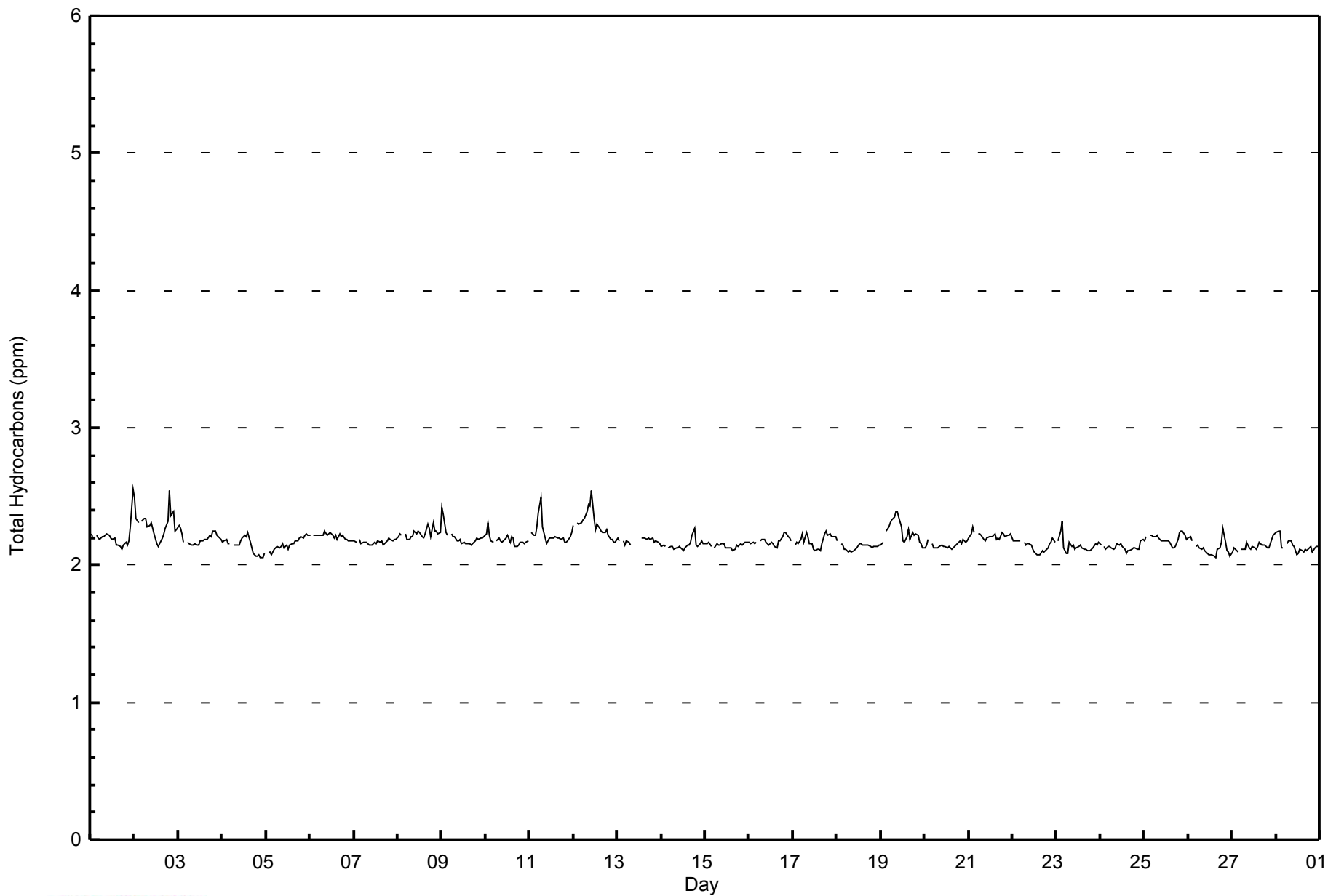






**WBEA**  
**Hourly Averages**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - February 2015**







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

**Total Hydrocarbons (THC) - ppm**  
**Firebag - February 2015**

<b>Concentration Ranges (ppm)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2.0	0	0.00	0.00
2.1 - 3.0	639	100.00	100.00
3.1 - 10.0	0	0.00	100.00
> 10.0	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Total Hydrocarbons (THC) - ppm**  
**Firebag - February 2015**

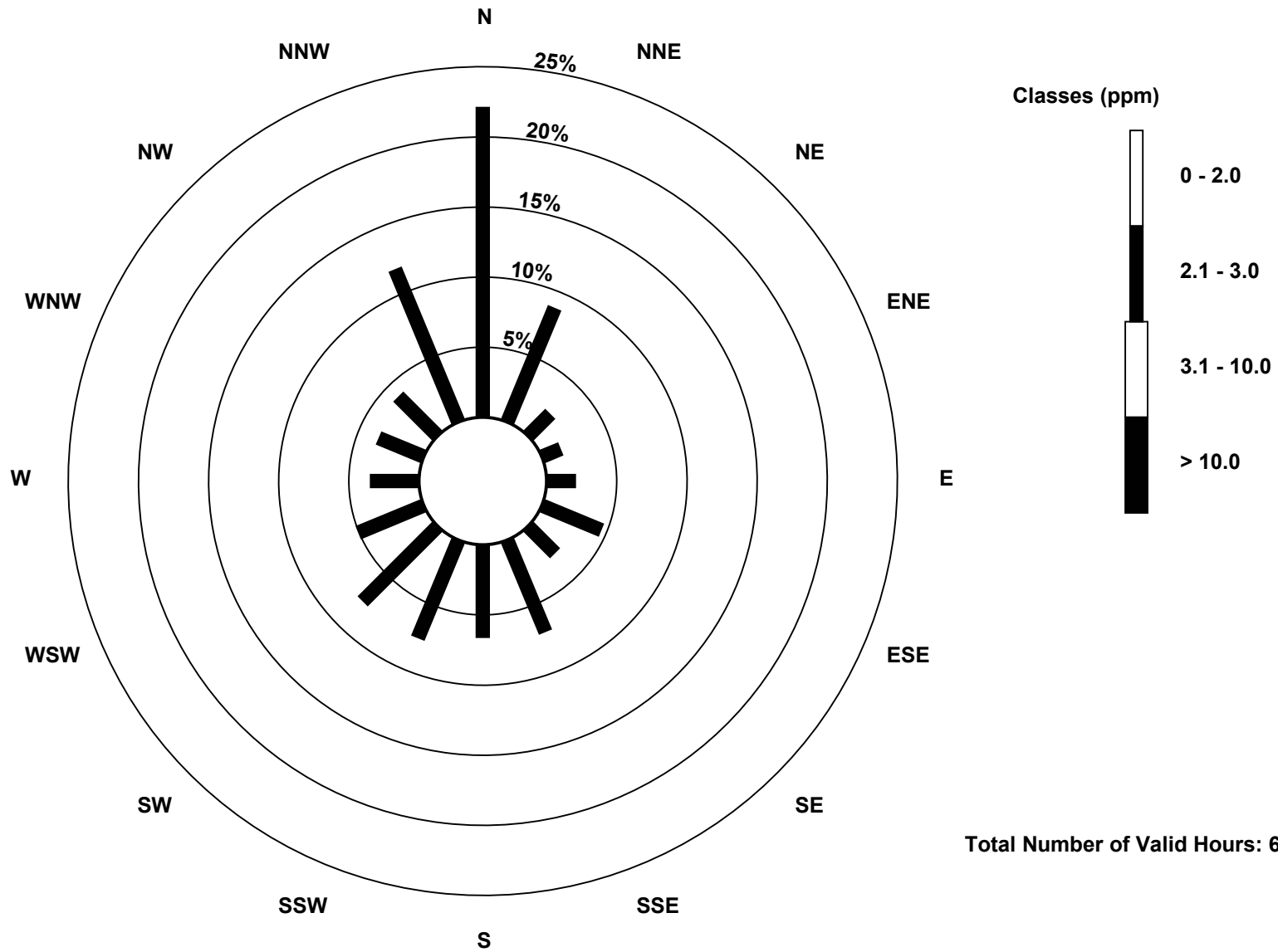
Concentration Ranges (ppm)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.1 - 3.0	141	56	14	9	13	29	17	45	42	48	48	32	22	22	25	75	638
3.1 - 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	56	14	9	13	29	17	45	42	48	48	32	22	22	25	75	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

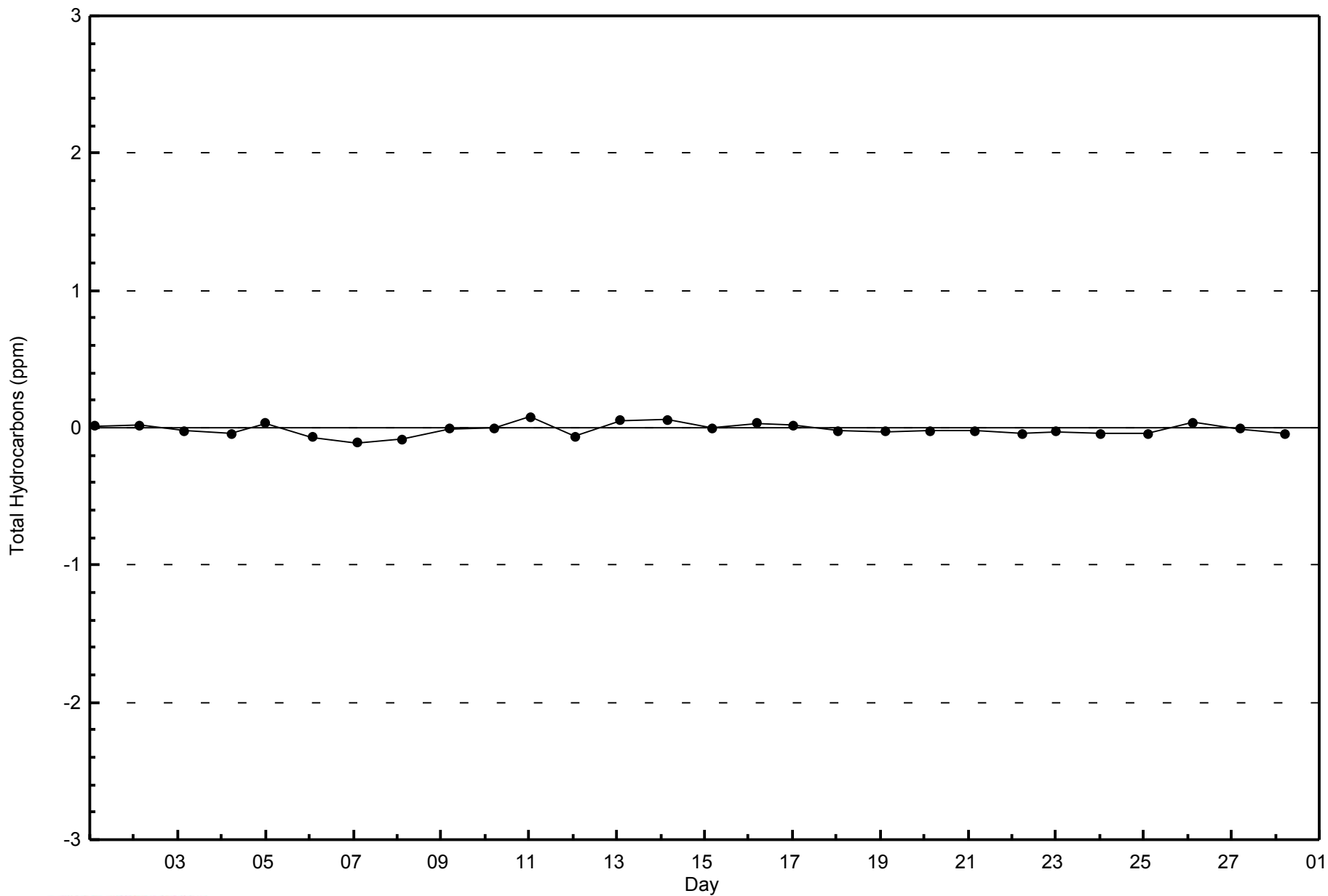
Total Hydrocarbons (THC) - ppm  
Firebag (AMS 19)





WBEA  
Zero Responses

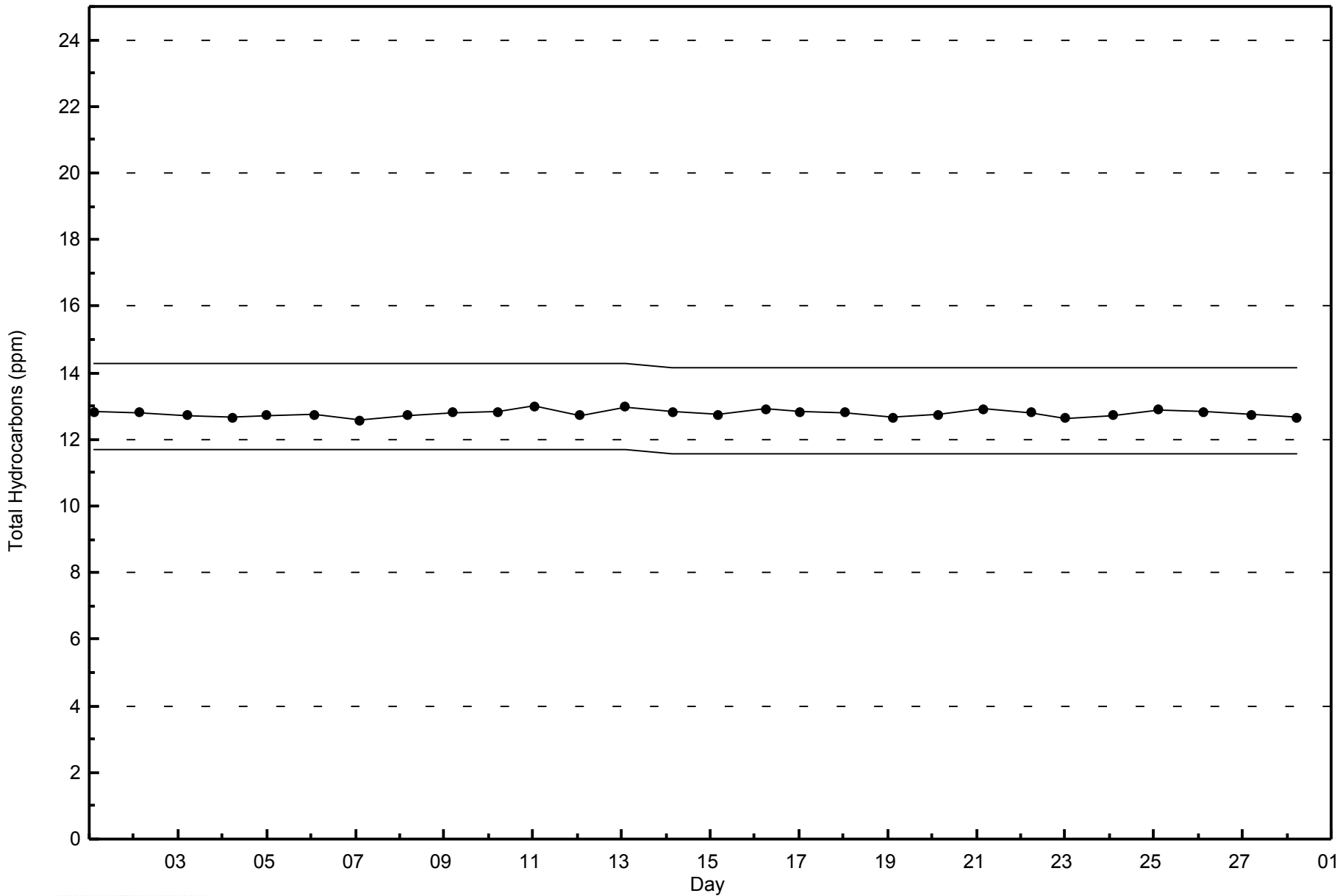
Total Hydrocarbons (THC) - ppm  
Firebag - February 2015





WBEA  
Span Responses

Total Hydrocarbons (THC) - ppm  
Firebag - February 2015



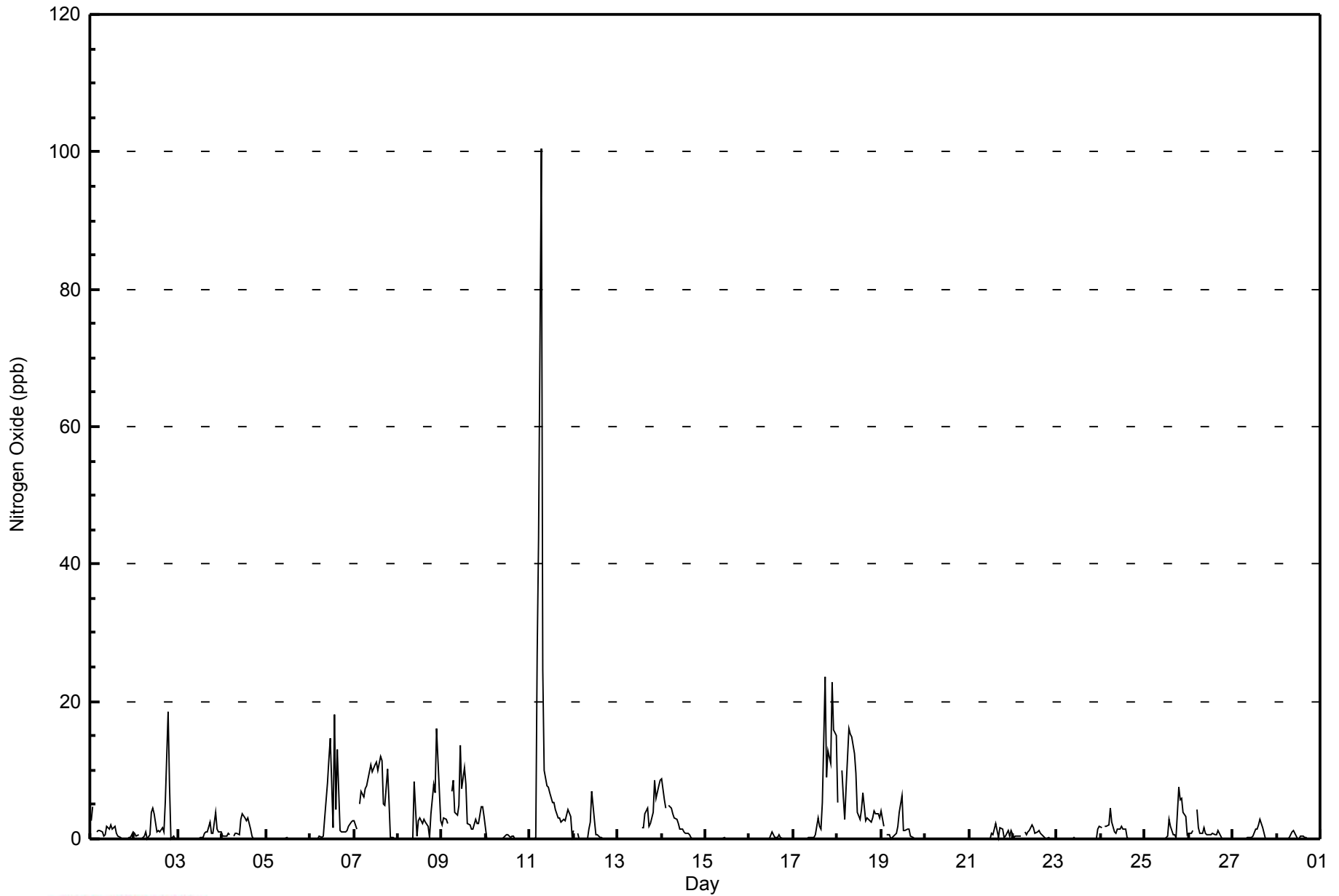


Maximum Value: 101 ppb on Feb 11 07:00		Maximum Daily Average: 11.7 ppb on Feb 11		Hours in Service: 672																							
Minimum Value: 0 ppb on Feb 1 18:00		Minimum Daily Average: 0.0 ppb on Feb 20		Hours of Data: 639																							
Maximum Diurnal Average: 5.1 ppb at hour 7		Minimum Diurnal Average: 0.8 ppb at hour 2		Hours of Missing Data: 33																							
Monthly Average: 2.1 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> = 22		Hours of Calibration: 33																							
				Percent Operational Time: 100.0																							
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	3	5	Z	1	1	1	1	0	1	2	2	2	1	2	1	0	0	0	0	0	0	0	0	1	1.1	5	
2-Feb	1	0	1	Z	0	0	1	0	1	4	4	4	1	1	1	2	1	6	18	8	0	0	0	0	2.3	18	
3-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	1	1	1	2	1	1	4	1	1	1	0.6	4	
4-Feb	0	0	0	1	1	Z	0	1	1	1	3	4	3	3	3	1	0	0	0	0	0	0	0	0	1.0	4	
5-Feb	Z	0	0	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-Feb	0	Z	0	0	0	0	0	0	3	8	12	15	2	18	4	13	1	1	1	1	1	2	3	3	3.8	18	
7-Feb	3	1	Z	5	7	6	7	8	10	11	10	11	11	10	12	11	5	5	10	5	0	0	0	0	6.5	12	
8-Feb	0	0	0	Z	0	0	0	0	0	8	0	3	3	2	3	2	2	0	4	8	7	16	12	3	3.2	16	
9-Feb	2	3	3	2	Z	7	9	4	3	5	14	7	10	8	2	2	1	1	3	2	2	5	5	3	4.5	14	
10-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0.1	1	
11-Feb	Z	0	0	0	27	44	101	25	10	8	7	7	5	5	4	3	3	2	3	3	3	4	3	0	11.7	101	
12-Feb	1	Z	1	0	0	0	0	0	1	2	7	3	1	1	0	0	0	0	0	0	0	0	0	0	0.7	7	
13-Feb	0	0	Z	0	0	0	0	0	C	C	C	C	C	2	2	4	4	2	2	4	8	6	8	9	2.8	9	
14-Feb	9	6	4	Z	5	4	4	3	3	2	1	1	1	1	1	1	0	0	0	0	0	0	0	0	2.0	9	
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0.1	1	
17-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	3	2	1	5	24	9	13	11	23	16	15	5.4	24	
18-Feb	5	Z	10	6	3	8	16	15	15	12	10	4	3	4	7	3	3	3	2	3	4	4	4	3	6.4	16	
19-Feb	4	2	Z	1	1	0	0	1	1	2	4	6	1	1	1	1	0	0	0	0	0	0	0	0	1.2	6	
20-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	
21-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	1	0	2	1	0	0	1	0	1	0.5	2	
22-Feb	0	0	0	0	0	Z	1	1	1	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0.6	2	
23-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0.2	2	
24-Feb	2	Z	2	2	2	4	2	1	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	1.0	4	
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	3	2	1	1	0	8	6	6	4	3	1	1.4	8
26-Feb	1	1	1	Z	4	2	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0.8	4	
27-Feb	0	0	0	0	Z	0	0	0	0	0	0	0	1	1	2	3	2	1	0	0	0	0	0	0	0.5	3	
28-Feb	0	0	0	0	0	Z	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	
		1.3	0.8	1.0	0.8	2.2	3.3	5.1	2.1	2.0	2.6	2.9	2.7	1.9	2.5	1.9	1.9	1.2	1.8	2.2	1.9	1.7	2.4	2.0	1.5	Diurnal Average	
		9	6	10	6	27	44	101	25	15	12	14	15	11	18	12	13	5	24	18	13	11	23	16	15	Diurnal Maximum	
Z - zerospan		C - Calibration																									



**WBEA**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - February 2015**





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

**Nitrogen Oxide (NO) - ppb**  
**Firebag - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	633	99.06	99.06
21 - 40	4	0.63	99.69
41 - 80	1	0.16	99.84
81 - 159	1	0.16	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**Firebag - February 2015**

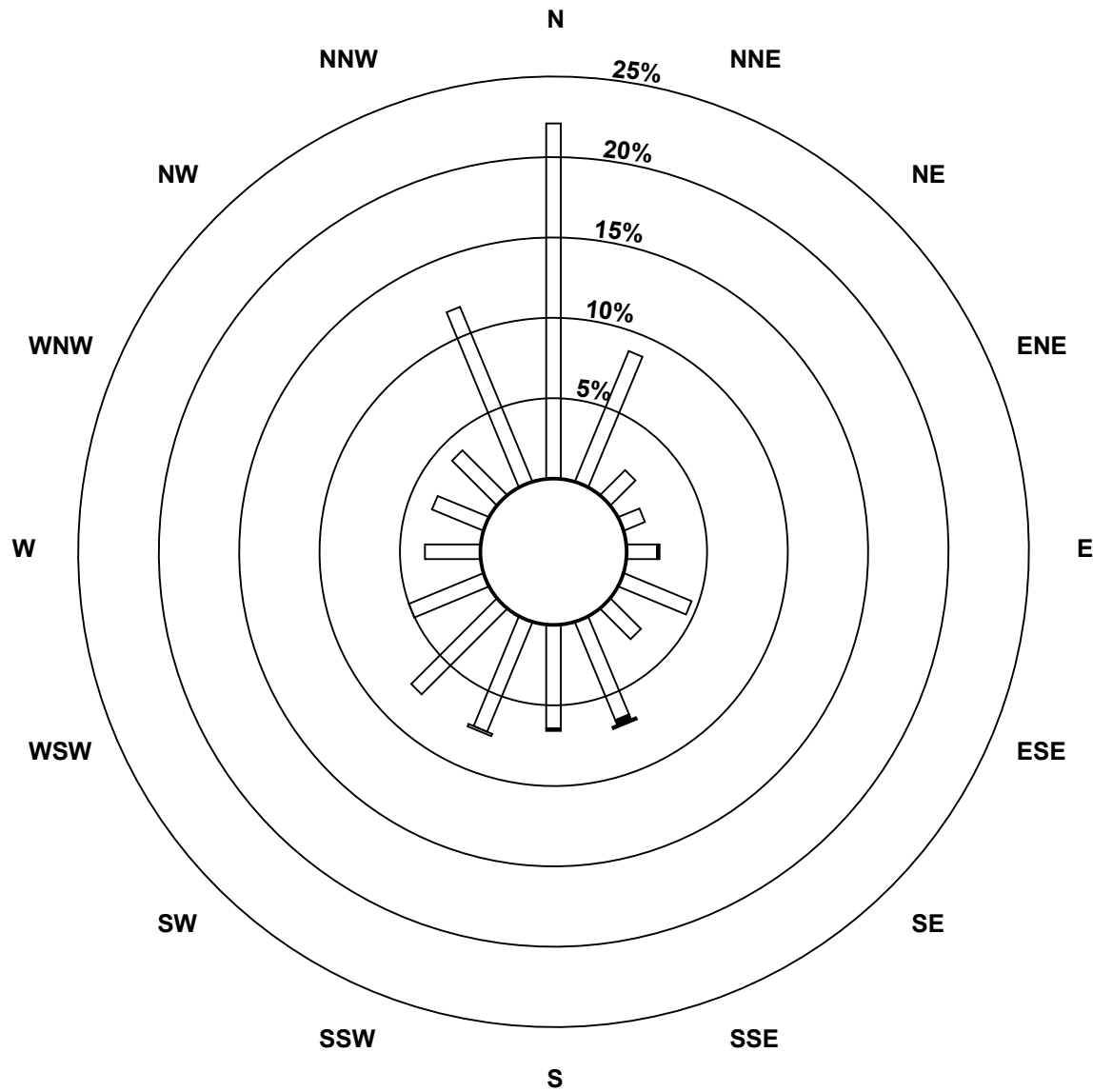
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	141	56	14	9	12	29	17	42	41	47	48	32	22	22	25	75	632
21 - 40	0	0	0	0	1	0	0	2	1	0	0	0	0	0	0	0	4
11 - 80	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
81 - 159	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	56	14	9	13	29	17	45	42	48	48	32	22	22	25	75	638

Total Number of Valid Hours: 638

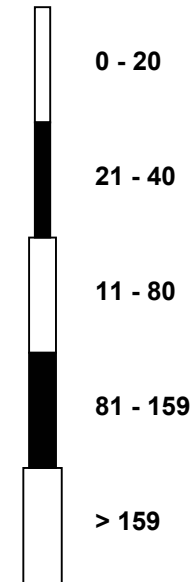
Total Number of Hours: 672

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

**Nitrogen Oxide (NO) - ppb  
Firebag (AMS 19)**



**Classes (ppb)**

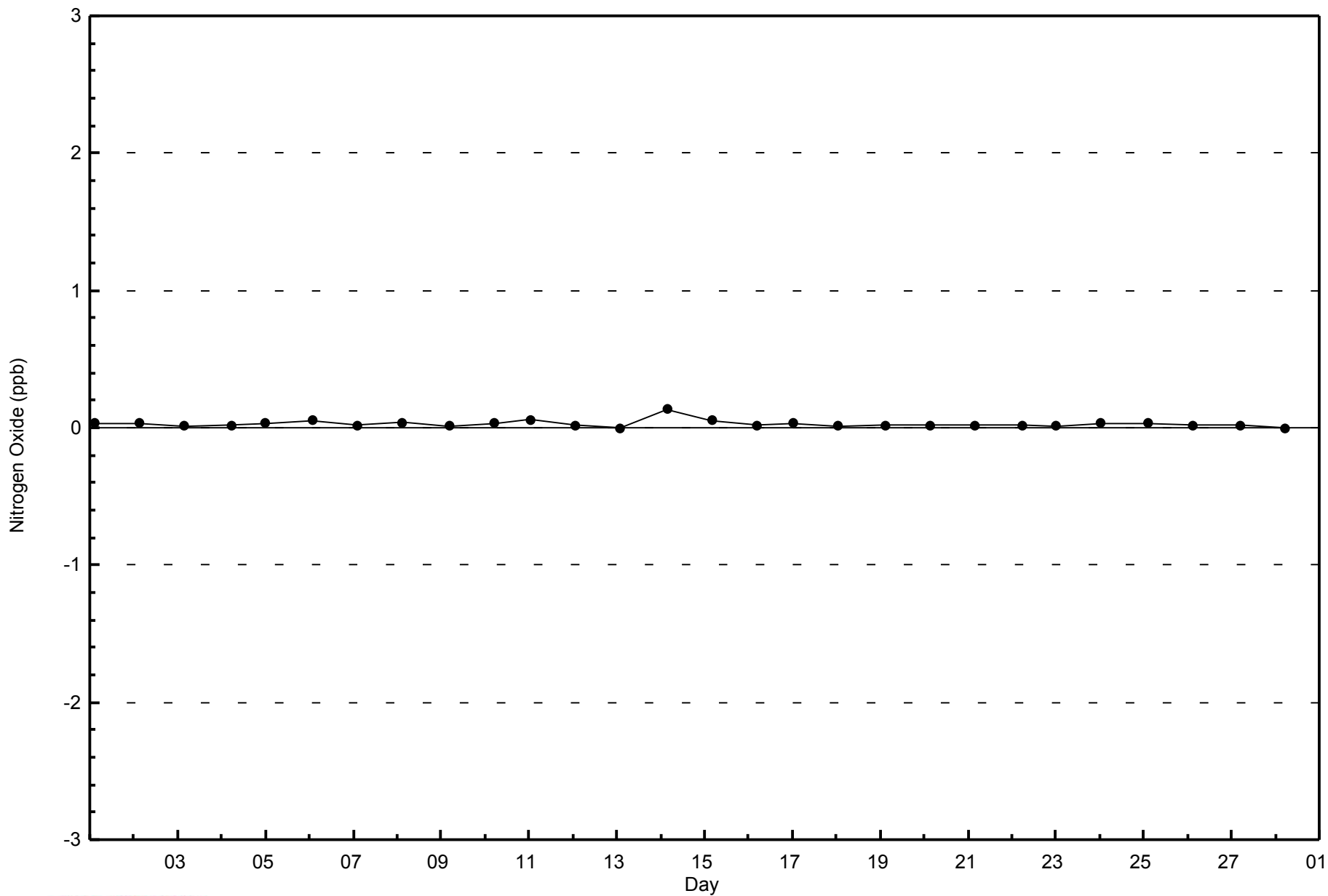


**Total Number of Valid Hours: 638**



WBEA  
Zero Responses

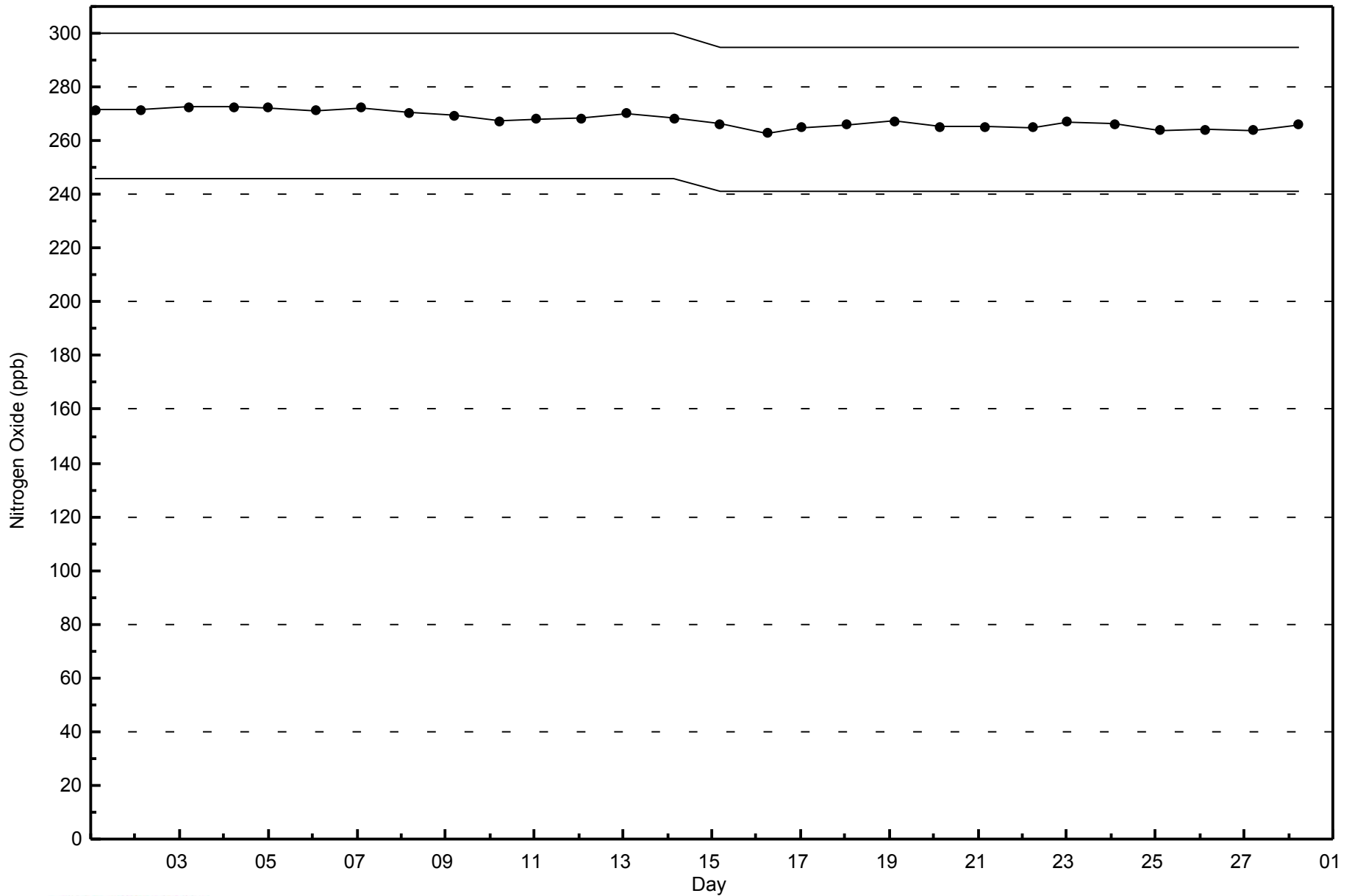
Nitrogen Oxide (NO) - ppb  
Firebag - February 2015





WBEA  
Span Responses

Nitrogen Oxide (NO) - ppb  
Firebag - February 2015



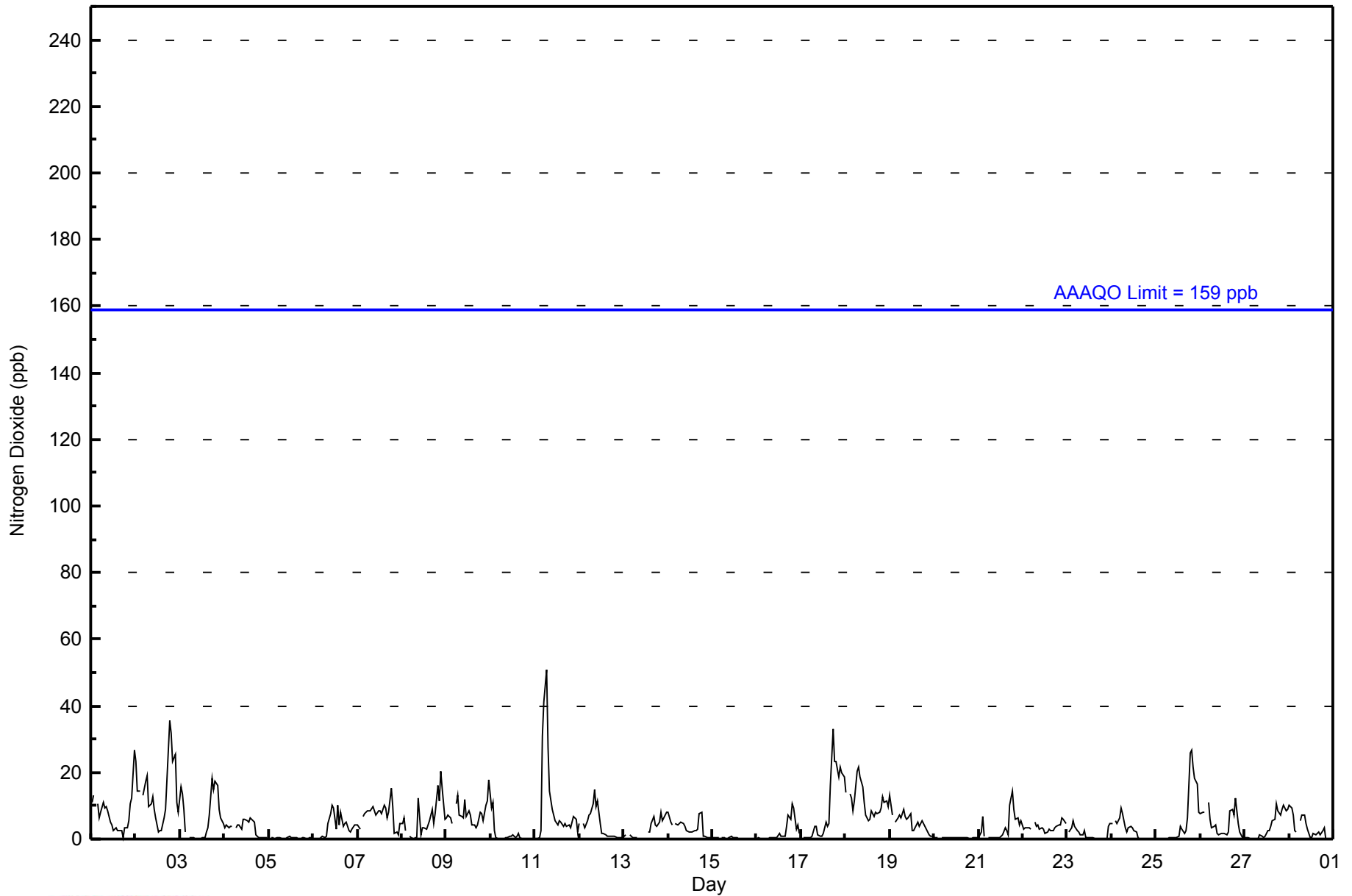


Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0										Hours in Service: 672																																							
Maximum Value: 51 ppb on Feb 11 07:00										Maximum Daily Average: 14.2 ppb on Feb 2										Hours of Data: 639																													
Minimum Value: 0 ppb on Feb 23 19:00										Minimum Daily Average: 0.3 ppb on Feb 15										Hours of Missing Data: 33																													
Maximum Diurnal Average: 7.6 ppb at hour 19										Minimum Diurnal Average: 2.4 ppb at hour 13										Hours of Calibration: 33																													
Monthly Average: 4.9 ppb										Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 3 Q <sub>3</sub> = 7 P <sub>90</sub> = 11 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-Feb	11	13	Z	11	7	8	11	9	10	8	5	4	3	3	3	3	3	1	4	3	5	11	12	27	7.5	27																							
2-Feb	24	14	15	Z	13	18	19	10	10	13	9	6	2	3	3	6	9	18	36	32	24	26	11	8	14.2	36																							
3-Feb	16	14	9	2	Z	1	0	0	0	0	0	0	1	1	2	4	7	18	15	17	16	9	6	5	6.2	18																							
4-Feb	4	4	4	4	4	Z	4	4	4	3	6	5	5	5	7	6	5	1	1	0	0	0	0	0	3.4	7																							
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
6-Feb	0	Z	0	0	0	1	1	1	5	8	10	9	3	10	4	8	4	5	5	2	2	3	4	4	3.9	10																							
7-Feb	4	3	Z	7	8	8	9	9	10	9	7	8	9	8	10	9	7	8	15	10	2	2	1	5	7.2	15																							
8-Feb	5	7	2	Z	1	0	0	0	0	12	1	4	4	3	4	5	9	5	8	16	12	20	15	6	6.1	20																							
9-Feb	6	7	6	5	Z	11	13	7	7	6	12	7	9	7	4	4	4	4	8	8	6	10	11	18	7.8	18																							
10-Feb	9	11	2	0	0	Z	0	0	0	0	1	1	1	1	1	2	1	0	0	0	0	0	0	0	1.4	11																							
11-Feb	Z	0	0	3	31	41	51	27	14	9	7	5	4	6	5	4	5	4	4	4	5	7	6	2	10.6	51																							
12-Feb	5	Z	5	3	6	7	8	10	15	10	11	5	2	2	1	1	1	1	1	1	1	0	0	1	4.2	15																							
13-Feb	1	1	Z	1	1	1	1	0	C	C	C	C	C	2	2	5	7	4	4	5	8	6	7	8	3.5	8																							
14-Feb	8	5	4	Z	5	4	5	5	5	4	3	2	2	2	3	3	3	8	8	1	1	1	1	1	3.5	8																							
15-Feb	0	0	0	0	Z	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	2	1	1	1	4	7	6	11	9	3	4	2	2.3	11																							
17-Feb	Z	0	0	0	0	1	1	4	4	1	1	1	2	5	4	5	16	33	24	23	19	22	20	19	8.9	33																							
18-Feb	14	Z	14	12	8	12	21	22	19	16	11	7	5	6	9	7	8	8	8	10	13	11	11	10	11.3	22																							
19-Feb	13	7	Z	5	7	7	6	9	7	6	6	8	3	3	4	5	4	5	5	4	2	1	1	1	5.1	13																							
20-Feb	1	1	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1																							
21-Feb	0	2	7	1	Z	1	0	0	0	0	0	0	1	1	4	3	1	10	15	9	6	6	4	5	3.4	15																							
22-Feb	3	3	4	4	3	Z	5	4	4	3	4	3	2	2	3	3	3	3	4	4	4	7	6	5	3.6	7																							
23-Feb	Z	2	3	6	4	2	2	1	1	2	0	0	0	0	0	0	0	0	0	0	0	4	5	5	1.6	6																							
24-Feb	5	Z	5	5	6	9	8	3	2	4	4	3	2	2	0	0	0	0	0	0	0	0	0	0	2.6	9																							
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	4	3	2	2	6	26	27	22	18	17	8	6.0	27																							
26-Feb	8	8	8	Z	11	6	4	4	4	2	1	2	2	2	1	2	9	9	7	12	5	2	1	1	4.7	12																							
27-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	2	3	4	6	6	11	8	7	9	10	8	9	3.8	11																							
28-Feb	10	9	7	3	2	Z	5	7	7	5	3	1	0	2	1	2	2	1	3	3	0	0	0	0	3.2	10																							
																								6.1	4.7	4.2	3.1	5.1	6.0	6.2	5.0	4.9	4.6	3.9	3.2	2.4	3.0	3.0	3.4	4.3	6.1	7.6	7.5	6.1	6.3	5.5	5.3	Diurnal Average	
																								24	14	15	12	31	41	51	27	19	16	12	9	9	10	10	9	16	33	36	32	24	26	20	27	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 - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	620	97.03	97.03
21 - 40	17	2.66	99.69
41 - 80	2	0.31	100.00
81 - 159	0	0.00	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**Firebag - February 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	141	56	14	9	12	29	17	38	41	46	46	28	21	21	25	75	619
21 - 40	0	0	0	0	1	0	0	6	1	1	2	4	1	1	0	0	17
11 - 80	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	56	14	9	13	29	17	45	42	48	48	32	22	22	25	75	638

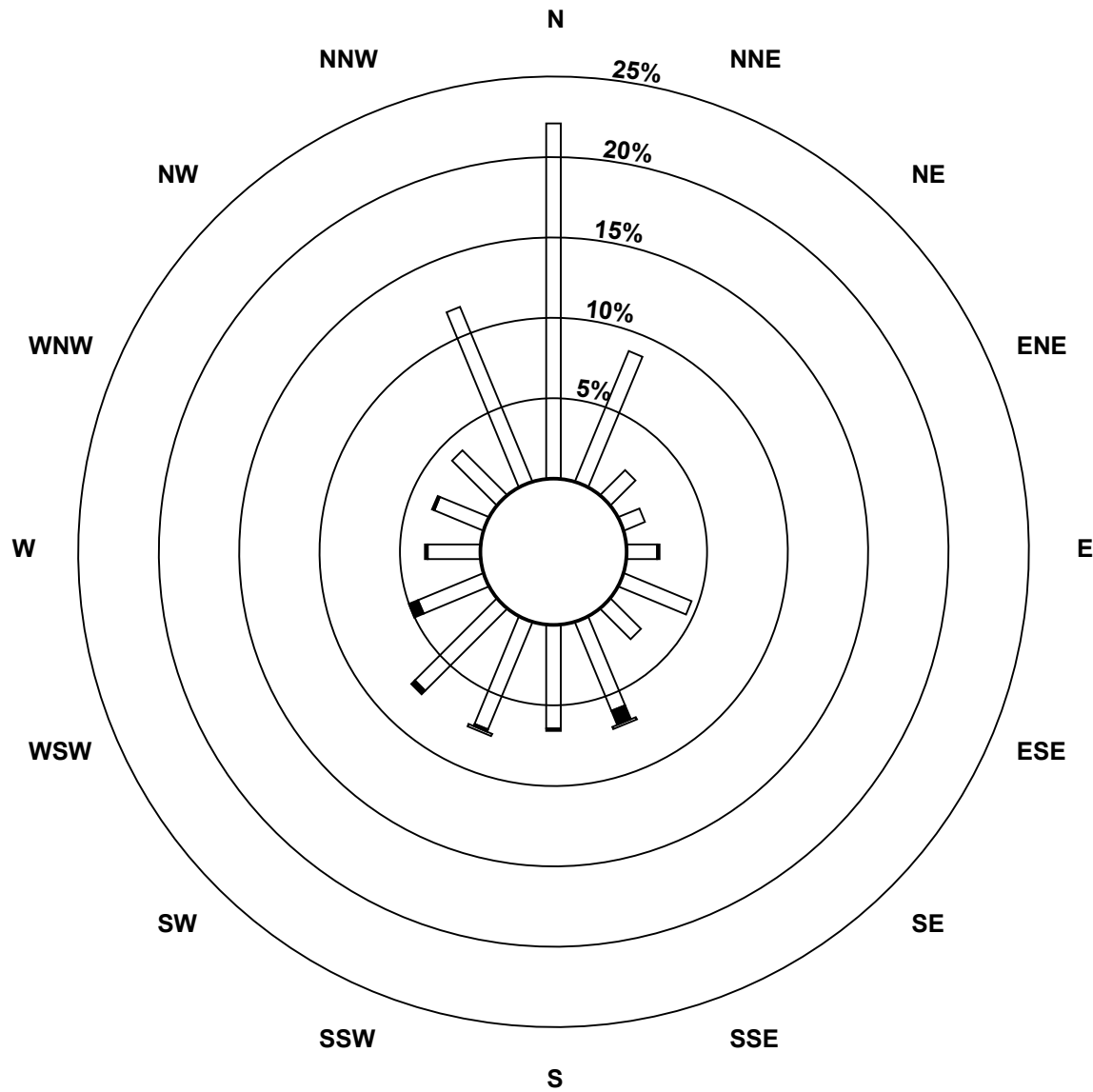
Total Number of Valid Hours: 638

Total Number of Hours: 672

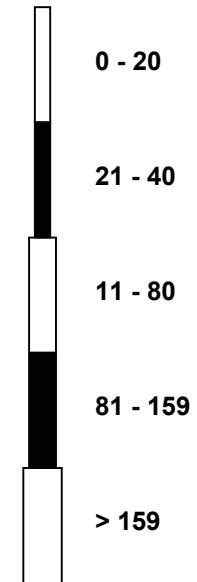


**Wood Buffalo Environmental Association  
Wind Rose Feb 2015**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag (AMS 19)**



Classes (ppb)

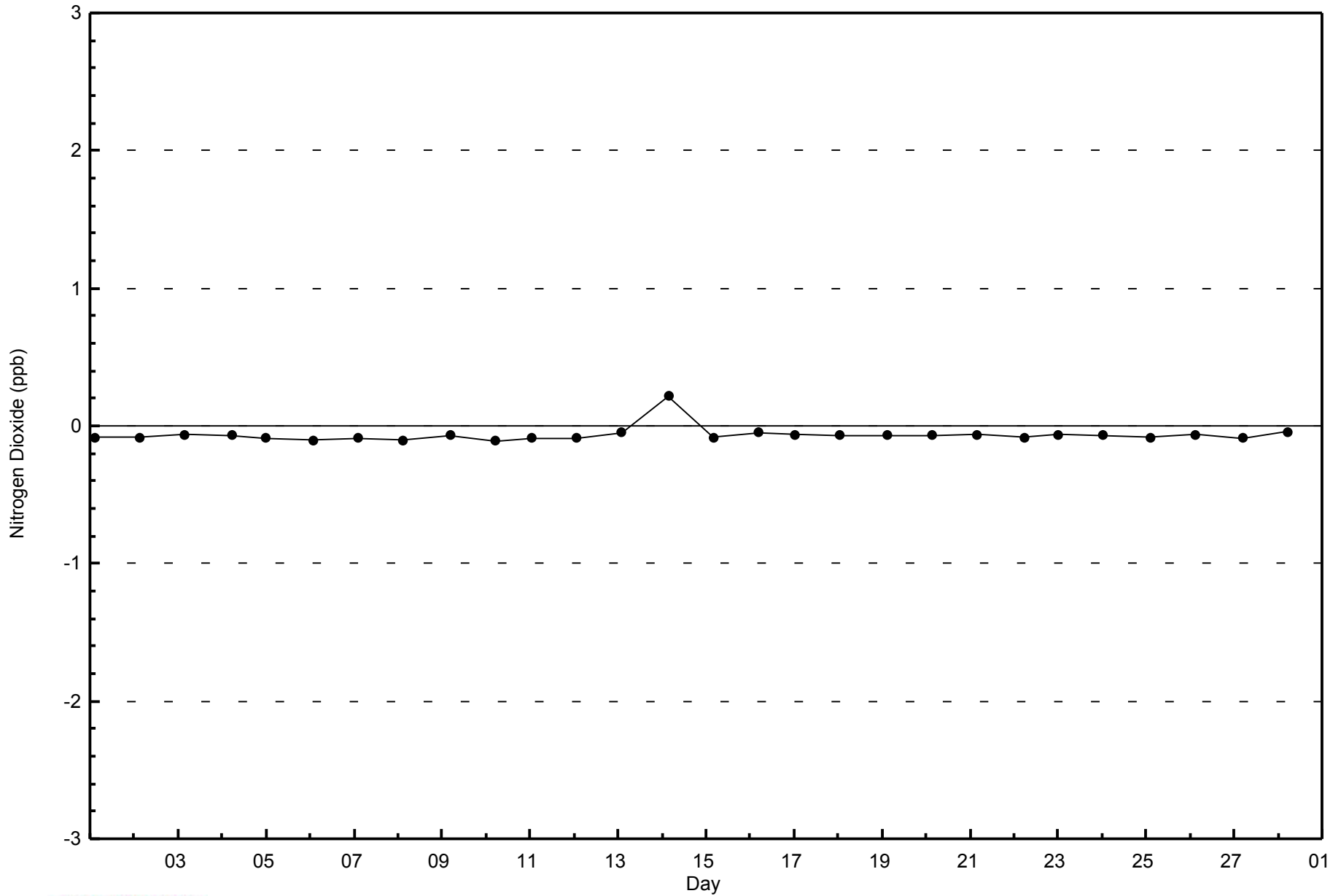


**Total Number of Valid Hours: 638**



WBEA  
Zero Responses

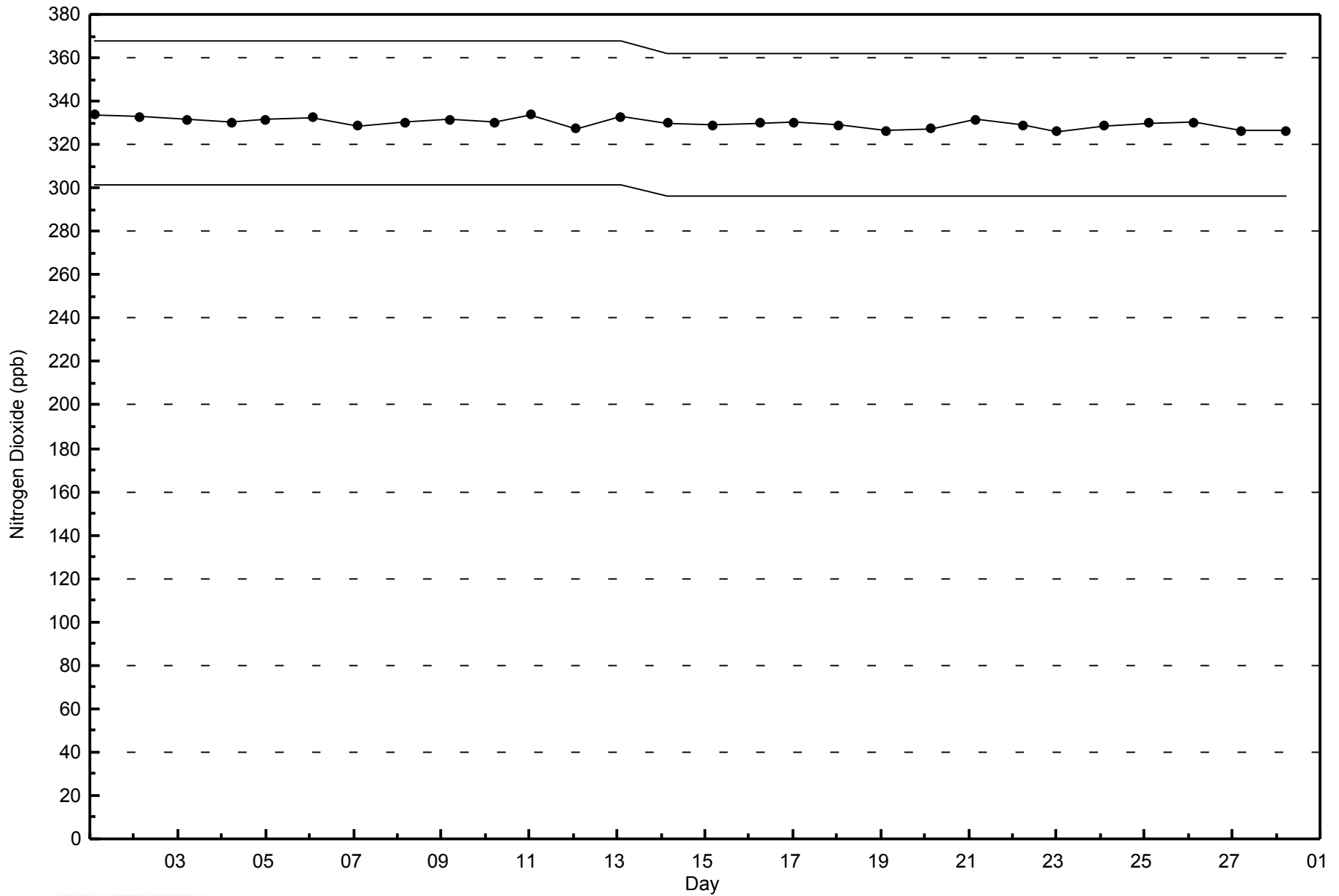
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
Firebag - February 2015



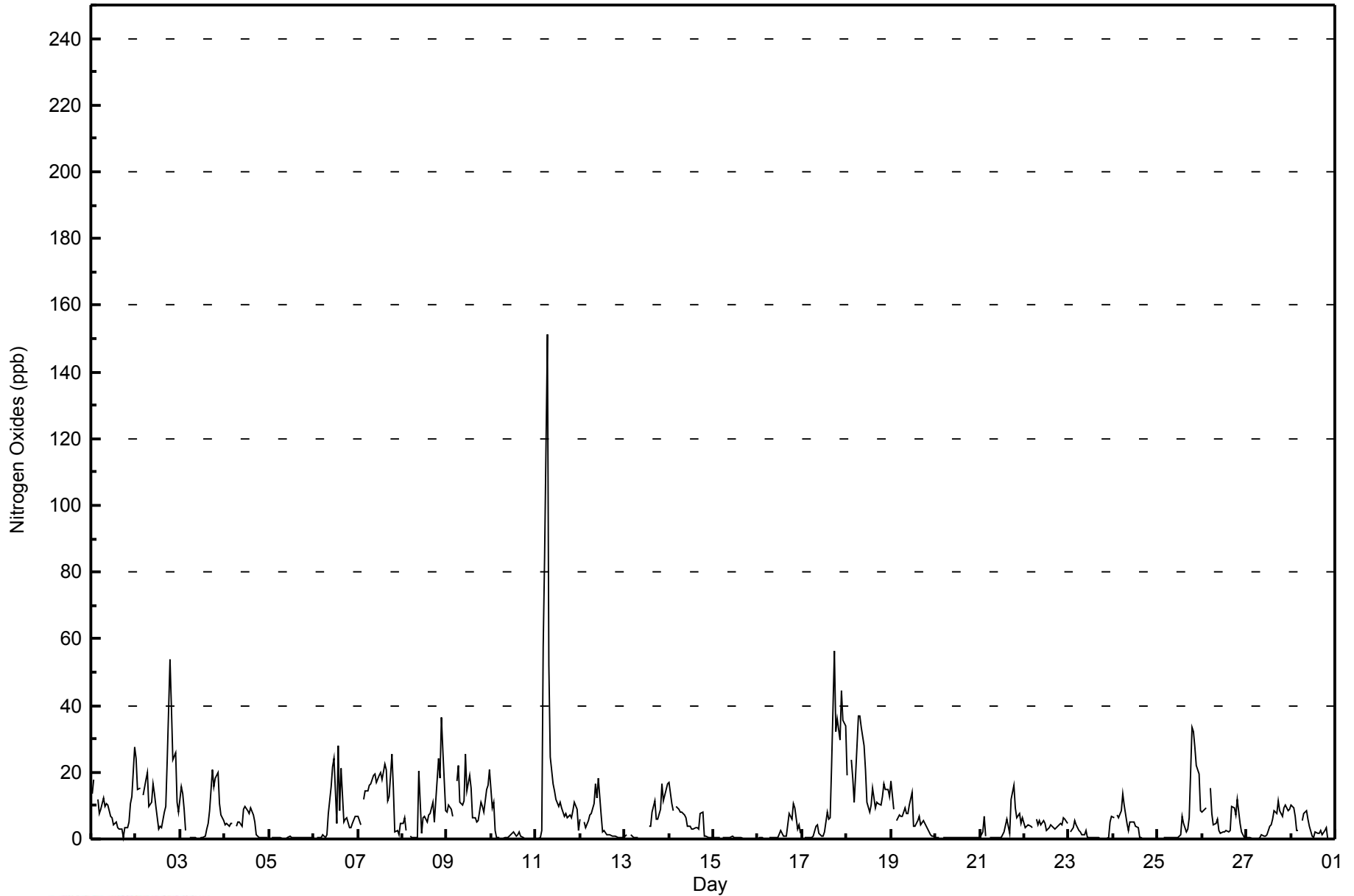


Maximum Value: 151 ppb on Feb 11 07:00																		Maximum Daily Average: 22.3 ppb on Feb 11																		Hours in Service: 672	
Minimum Value: 0 ppb on Feb 24 21:00																		Minimum Daily Average: 0.3 ppb on Feb 15																		Hours of Data: 639	
Maximum Diurnal Average: 11.3 ppb at hour 7																		Minimum Diurnal Average: 3.9 ppb at hour 4																		Hours of Missing Data: 33	
Monthly Average: 7.0 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 0 Median = 4 Q <sub>3</sub> = 9 P <sub>90</sub> = 17 P <sub>99</sub> = 50																		Hours of Calibration: 33	
																																				Percent Operational Time: 100.0	
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24													
1-Feb	14	18	Z	12	8	9	12	10	10	10	7	6	4	5	3	3	3	0	4	3	5	11	13	28	8.6	28											
2-Feb	24	15	15	Z	13	18	20	10	11	16	13	10	3	4	4	8	10	23	54	39	24	26	11	8	16.5	54											
3-Feb	16	14	9	2	Z	0	0	0	0	0	0	0	1	1	3	5	9	21	16	18	20	10	7	5	6.9	21											
4-Feb	4	5	4	5	4	Z	4	5	5	4	9	10	8	8	9	7	5	1	1	0	0	0	0	0	4.3	10											
5-Feb	Z	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
6-Feb	0	Z	0	0	0	1	1	1	8	16	22	24	5	28	9	21	5	6	6	3	3	5	7	7	7.8	28											
7-Feb	7	4	Z	12	15	14	16	16	19	19	17	19	20	18	22	21	12	13	25	15	2	2	1	4	13.7	25											
8-Feb	5	6	2	Z	1	0	0	0	0	20	2	6	7	5	7	8	11	5	11	24	18	36	27	8	9.2	36											
9-Feb	8	10	9	7	Z	17	22	11	10	11	25	14	19	15	6	6	5	5	11	10	8	15	16	21	12.3	25											
10-Feb	9	11	2	0	0	Z	0	0	0	0	1	1	2	2	1	1	2	1	0	0	0	0	0	0	1.5	11											
11-Feb	Z	0	0	3	58	85	151	52	24	17	15	12	10	11	9	7	8	6	7	6	9	11	9	3	22.3	151											
12-Feb	6	Z	5	3	5	7	8	10	16	12	18	7	2	3	1	1	1	1	1	1	0	0	0	1	4.9	18											
13-Feb	1	1	Z	1	1	1	0	0	C	C	C	C	C	4	4	8	11	6	6	9	16	11	15	17	6.3	17											
14-Feb	17	11	9	Z	10	9	8	8	7	6	4	4	3	3	4	3	3	8	8	1	1	1	0	0	5.5	17											
15-Feb	0	0	0	0	Z	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1											
16-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	3	2	1	1	4	8	6	11	9	3	4	2	2.4	11											
17-Feb	Z	0	0	0	0	1	1	4	4	2	1	1	2	8	6	6	22	56	32	36	30	45	36	34	14.2	56											
18-Feb	19	Z	24	18	11	19	37	37	33	28	21	11	8	10	15	9	11	10	10	13	17	15	15	13	17.6	37											
19-Feb	17	9	Z	6	7	7	7	9	8	8	10	14	4	4	6	7	4	5	5	4	2	1	1	1	6.3	17											
20-Feb	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											
21-Feb	0	2	7	1	Z	1	0	0	0	0	0	0	1	2	6	4	2	12	16	9	6	8	5	6	3.9	16											
22-Feb	3	4	4	4	3	Z	6	4	5	4	5	4	3	3	4	4	3	3	4	4	4	6	6	5	4.3	6											
23-Feb	Z	2	3	6	4	2	2	1	1	3	0	0	0	0	0	0	0	0	0	0	0	5	7	7	1.7	7											
24-Feb	6	Z	7	6	8	14	10	4	3	5	5	4	4	1	0	0	0	0	0	0	0	0	0	0	3.6	14											
25-Feb	0	0	Z	0	0	0	0	0	0	0	0	0	1	7	5	2	3	7	33	32	27	22	20	9	7.4	33											
26-Feb	8	9	9	Z	15	8	4	5	6	3	2	2	2	2	2	2	10	9	7	12	5	2	1	1	5.5	15											
27-Feb	0	0	0	0	Z	0	0	0	1	1	1	1	4	4	6	8	8	11	8	7	9	10	8	9	4.3	11											
28-Feb	10	9	7	3	2	Z	5	8	9	6	4	1	0	2	2	2	3	1	3	3	0	0	0	0	3.4	10											
																		7.4 5.5 5.2 3.9 7.3 9.3 11.3 7.1 6.8 7.2 6.8 5.8 4.3 5.5 4.9 5.3 5.5 7.9 9.8 9.4 7.8 8.7 7.5 6.7																		Diurnal Average	
																		24 18 24 18 58 85 151 52 33 28 25 24 20 28 22 21 22 56 54 39 30 45 36 34																		Diurnal Maximum	
Z - zerospan C - Calibration																																					



WBEA  
Hourly Averages

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - February 2015





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	595	93.11	93.11
21 - 40	37	5.79	98.90
41 - 80	5	0.78	99.69
81 - 159	2	0.31	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**Firebag - February 2015**

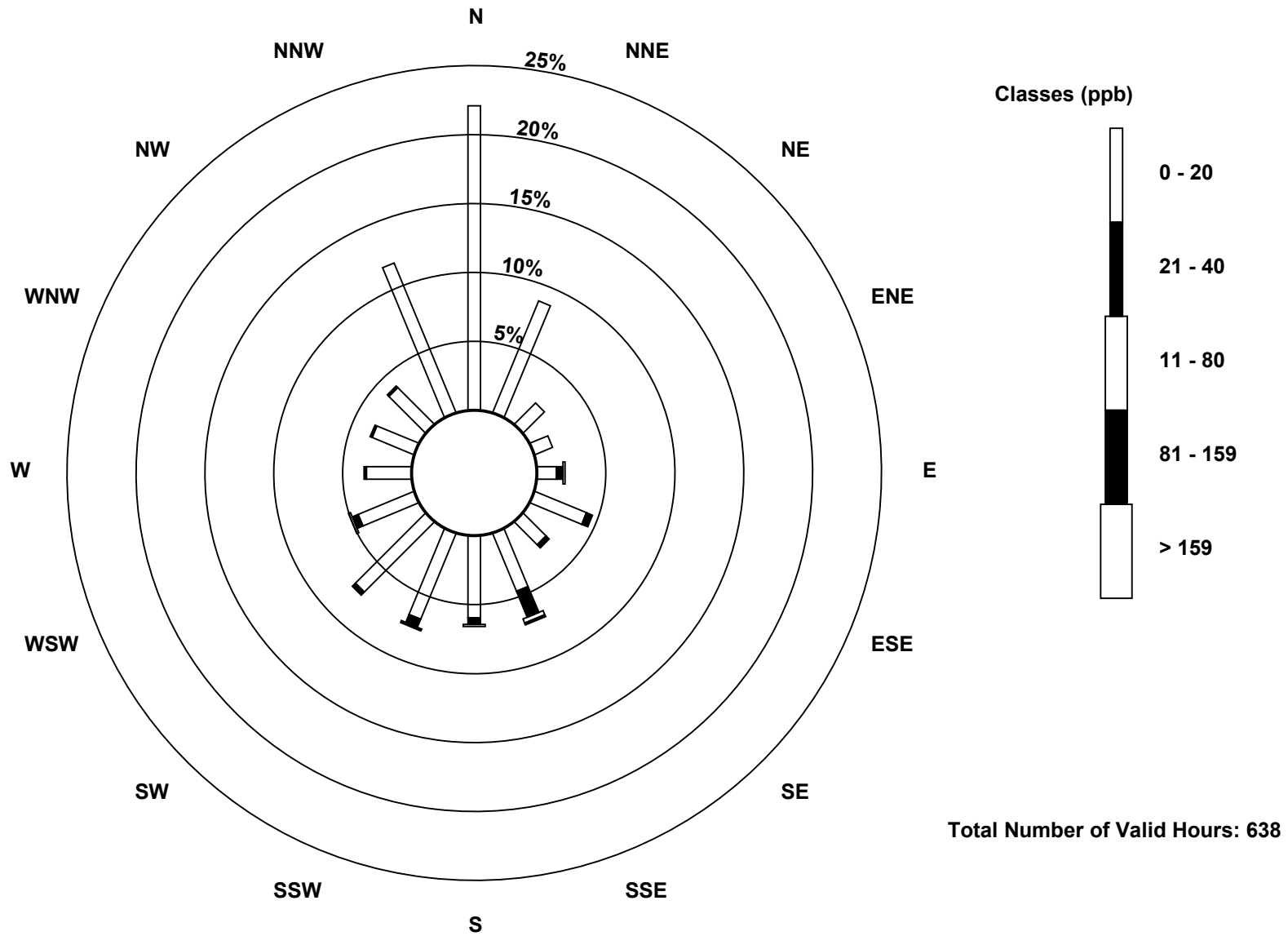
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	141	56	14	9	9	26	15	29	38	43	46	28	21	21	24	75	595
21 - 40	0	0	0	0	3	3	2	13	3	4	2	3	1	1	1	0	36
11 - 80	0	0	0	0	1	0	0	2	1	0	0	1	0	0	0	0	5
81 - 159	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	141	56	14	9	13	29	17	45	42	48	48	32	22	22	25	75	638

Total Number of Valid Hours: 638

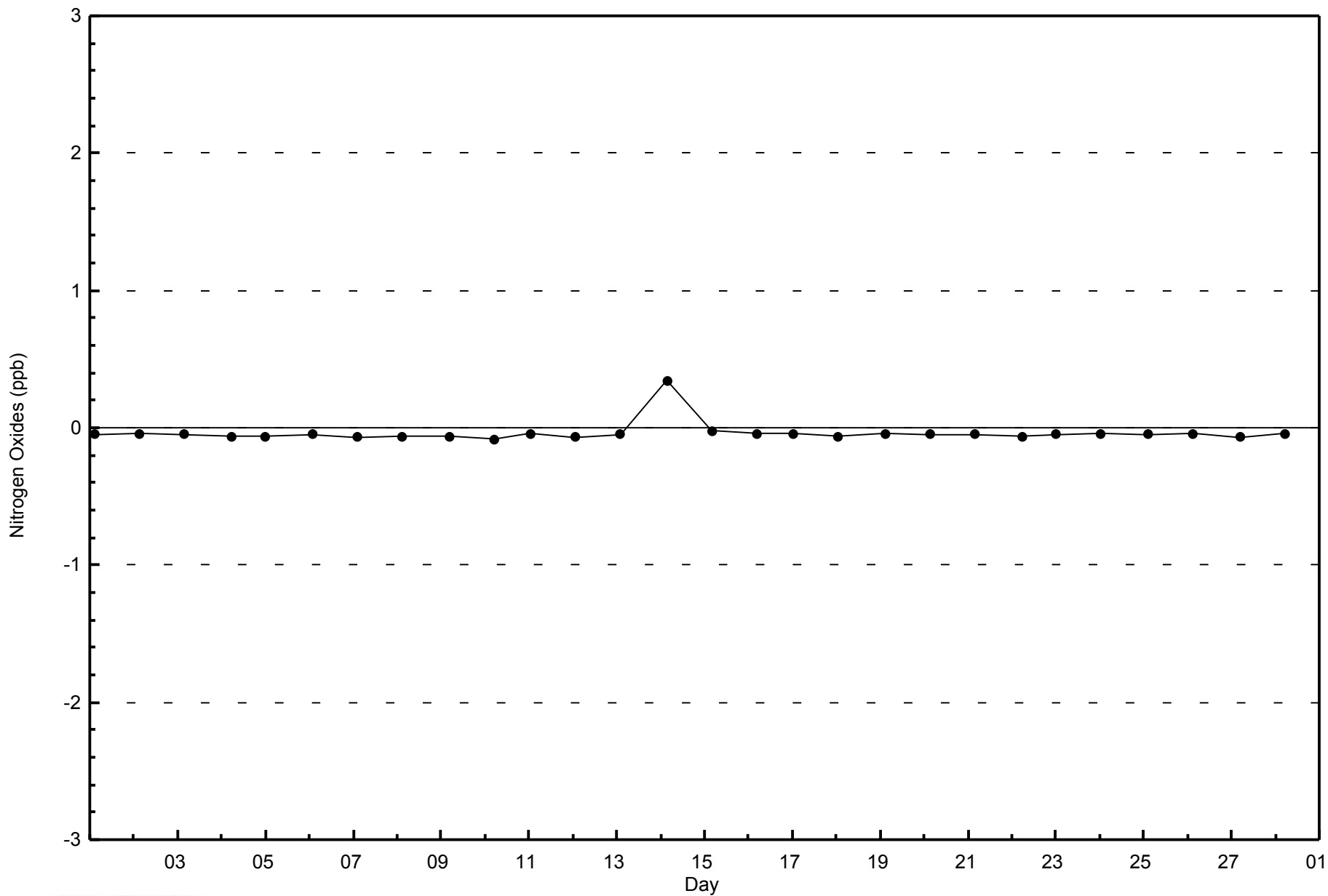
Total Number of Hours: 672

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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag (AMS 19)**



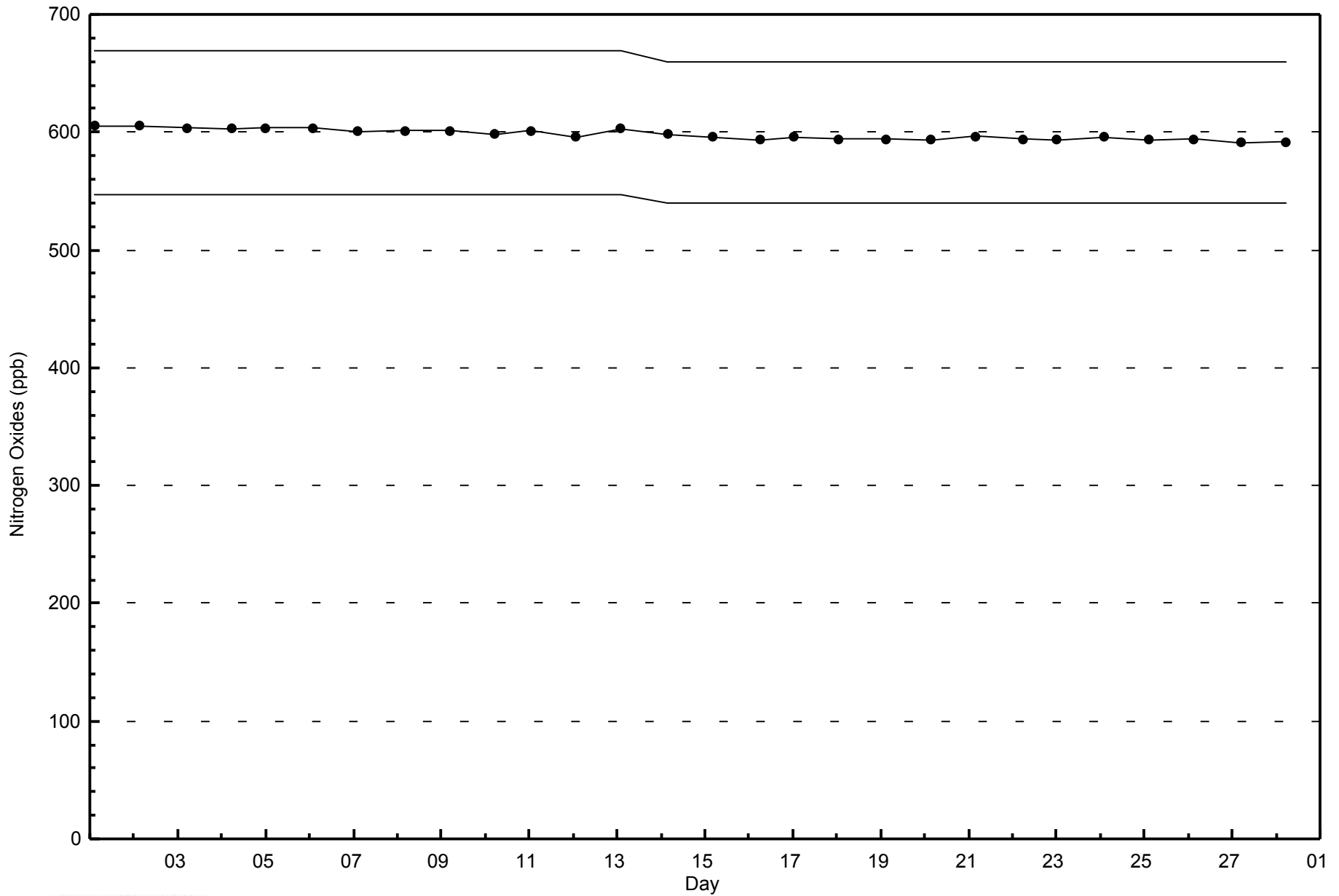






WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
Firebag - February 2015



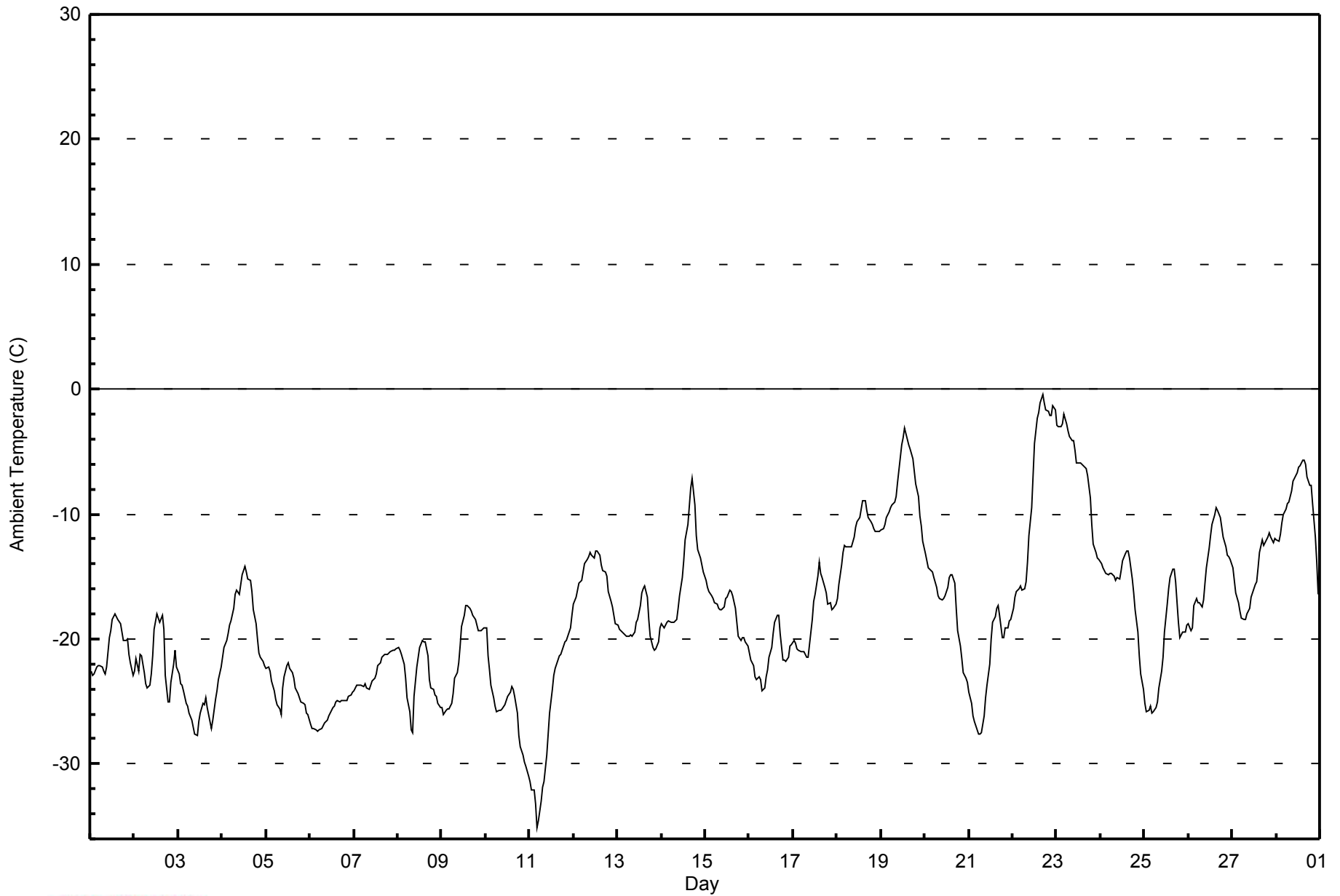


Maximum Value: -0.4 C on Feb 22 17:00		Maximum Daily Average: -6.3 C on Feb 23		Hours in Service: 672																						
Minimum Value: -35.1 C on Feb 11 05:00		Minimum Daily Average: -26.2 C on Feb 11		Hours of Data: 672																						
Maximum Diurnal Average: -15.2 C at hour 16		Minimum Diurnal Average: -20.0 C at hour 8		Hours of Missing Data: 0																						
Monthly Average: -18.17 C		Percentiles: P <sub>1</sub> = -31.4 P <sub>10</sub> = -25.5 Q <sub>1</sub> = -22.9 Median = -18.7 Q <sub>3</sub> = -14.4 P <sub>90</sub> = -9.4 P <sub>99</sub> = -1.8		Hours of Calibration: 0																						
				Percent Operational Time: 100.0																						
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	-22.5	-22.9	-22.8	-22.3	-22.1	-22.1	-22.3	-22.5	-22.8	-22.2	-19.8	-19.3	-18.5	-18.0	-18.2	-18.4	-18.7	-19.4	-20.1	-20.1	-20.0	-21.2	-21.9	-22.9	-20.9	-18.0
2-Feb	-22.6	-21.6	-22.6	-21.3	-21.3	-22.7	-23.6	-23.9	-23.7	-22.8	-21.3	-19.2	-18.0	-18.3	-18.7	-18.1	-19.2	-22.9	-25.0	-25.0	-23.5	-22.1	-20.9	-22.2	-21.7	-18.0
3-Feb	-22.8	-23.6	-23.6	-24.2	-25.1	-25.3	-25.9	-26.5	-27.1	-27.6	-27.7	-26.6	-25.9	-25.2	-25.3	-24.7	-25.4	-26.6	-27.1	-26.5	-24.8	-24.1	-23.2	-22.3	-25.3	-22.3
4-Feb	-21.5	-20.7	-20.1	-19.5	-18.9	-18.5	-17.6	-16.5	-16.1	-16.4	-15.7	-14.9	-14.2	-14.7	-15.1	-15.3	-16.2	-17.7	-18.8	-20.1	-21.1	-21.4	-21.8	-22.1	-18.1	-14.2
5-Feb	-22.4	-22.2	-22.5	-23.4	-24.2	-24.9	-25.3	-25.6	-26.0	-23.9	-23.1	-22.1	-21.9	-22.4	-22.7	-23.2	-23.9	-24.3	-24.8	-25.0	-25.1	-25.3	-25.9	-26.1	-24.0	-21.9
6-Feb	-26.9	-27.1	-27.1	-27.2	-27.3	-27.3	-27.1	-26.9	-26.7	-26.5	-26.2	-25.9	-25.5	-25.4	-25.0	-24.9	-25.0	-25.0	-24.9	-24.9	-24.9	-24.6	-24.4	-24.3	-25.9	-24.3
7-Feb	-24.2	-23.7	-23.7	-23.7	-23.7	-23.8	-23.6	-23.9	-24.0	-23.7	-23.4	-23.1	-22.7	-22.2	-21.9	-21.5	-21.4	-21.3	-21.2	-21.1	-21.0	-20.9	-20.9	-20.8	-22.6	-20.8
8-Feb	-20.7	-20.9	-21.3	-22.0	-23.2	-24.7	-25.8	-27.3	-27.5	-24.6	-22.2	-21.5	-20.7	-20.2	-20.3	-20.3	-21.3	-23.3	-24.0	-24.0	-24.4	-24.6	-25.2	-25.4	-23.1	-20.2
9-Feb	-25.5	-26.1	-25.7	-25.6	-25.5	-25.1	-24.4	-23.1	-22.7	-22.0	-20.6	-18.9	-18.1	-17.4	-17.3	-17.5	-17.8	-18.1	-18.5	-18.9	-19.3	-19.4	-19.2	-19.1	-21.1	-17.3
10-Feb	-19.1	-21.3	-22.4	-23.7	-24.7	-25.3	-25.9	-25.7	-25.8	-25.6	-25.3	-24.9	-24.6	-24.2	-23.8	-24.0	-24.6	-26.0	-27.7	-28.6	-29.2	-29.8	-30.2	-31.0	-25.6	-19.1
11-Feb	-31.4	-32.1	-32.1	-33.2	-35.1	-34.5	-33.0	-31.8	-31.4	-29.3	-27.7	-26.0	-24.0	-22.9	-22.3	-21.7	-21.4	-21.3	-20.6	-20.2	-20.1	-19.7	-19.1	-18.1	-26.2	-18.1
12-Feb	-17.2	-16.6	-16.1	-15.5	-15.3	-14.6	-14.0	-13.6	-13.4	-13.0	-13.3	-13.5	-13.0	-12.9	-13.3	-14.1	-14.5	-14.6	-15.0	-16.2	-17.0	-17.4	-18.2	-18.7	-15.0	-12.9
13-Feb	-18.9	-19.2	-19.4	-19.5	-19.7	-19.7	-19.7	-19.7	-19.7	-19.4	-18.6	-18.4	-17.3	-16.3	-16.0	-15.8	-16.7	-18.4	-19.8	-20.6	-20.9	-20.8	-20.2	-19.2	-18.9	-15.8
14-Feb	-18.7	-19.1	-18.9	-18.7	-18.6	-18.7	-18.7	-18.7	-18.4	-17.6	-16.5	-15.1	-13.7	-12.1	-10.8	-9.4	-8.0	-7.1	-9.2	-11.7	-12.9	-13.6	-14.1	-14.6	-14.8	-7.1
15-Feb	-15.3	-15.9	-16.2	-16.6	-16.8	-17.1	-17.2	-17.5	-17.7	-17.6	-17.4	-16.7	-16.6	-16.1	-16.2	-16.5	-17.6	-18.7	-19.8	-20.2	-19.9	-19.9	-20.3	-20.6	-17.7	-15.3
16-Feb	-21.1	-21.7	-22.1	-23.1	-23.2	-23.0	-23.2	-24.1	-23.9	-23.0	-22.5	-21.5	-20.7	-19.6	-18.7	-18.1	-18.1	-19.6	-21.7	-21.7	-21.8	-21.5	-20.6	-20.4	-21.5	-18.1
17-Feb	-20.1	-20.4	-20.8	-20.9	-21.1	-21.0	-21.1	-21.4	-21.4	-20.5	-18.4	-16.9	-16.4	-14.9	-13.8	-14.7	-15.1	-15.9	-16.4	-17.2	-17.1	-17.6	-17.5	-17.2	-18.2	-13.8
18-Feb	-16.7	-15.6	-14.1	-13.1	-12.5	-12.6	-12.6	-12.6	-12.6	-11.8	-11.0	-10.6	-10.3	-9.6	-8.9	-9.0	-9.7	-10.3	-10.6	-10.8	-11.2	-11.4	-11.4	-11.4	-11.7	-8.9
19-Feb	-11.2	-11.2	-10.8	-10.2	-9.8	-9.5	-9.3	-9.1	-8.5	-7.5	-6.4	-4.5	-3.9	-3.1	-4.0	-4.4	-4.8	-5.6	-6.6	-7.6	-8.6	-10.2	-10.9	-12.1	-7.9	-3.1
20-Feb	-13.2	-13.7	-14.3	-14.5	-14.7	-15.0	-15.9	-16.6	-16.8	-16.9	-16.7	-16.5	-15.8	-15.1	-14.9	-14.8	-15.5	-17.5	-19.3	-20.6	-21.5	-22.7	-23.1	-23.4	-17.0	-13.2
21-Feb	-24.2	-25.1	-26.2	-26.6	-26.9	-27.6	-27.6	-27.5	-26.1	-24.7	-23.6	-22.0	-20.0	-18.6	-18.2	-17.6	-17.3	-18.2	-19.9	-19.9	-19.1	-19.2	-18.6	-18.4	-22.2	-17.3
22-Feb	-17.5	-16.7	-16.2	-16.0	-15.7	-16.1	-15.9	-15.4	-13.8	-11.7	-9.5	-6.9	-4.3	-2.3	-1.9	-1.1	-0.4	-1.1	-1.7	-1.8	-2.1	-2.1	-1.3	-1.6	-8.1	-0.4
23-Feb	-2.9	-3.0	-3.0	-2.8	-2.0	-2.8	-3.3	-3.8	-4.2	-4.1	-4.9	-5.9	-5.9	-6.0	-6.3	-6.4	-7.0	-8.7	-10.9	-12.4	-13.0	-13.5	-13.6	-6.3	-2.0	
24-Feb	-13.9	-14.3	-14.5	-14.8	-14.9	-14.8	-14.8	-15.0	-15.3	-15.1	-15.2	-14.5	-13.8	-13.2	-13.0	-12.9	-13.5	-15.2	-16.3	-17.7	-19.4	-21.4	-22.8	-24.0	-15.8	-12.9
25-Feb	-25.1	-25.8	-25.7	-25.4	-25.9	-25.8	-25.5	-25.0	-23.9	-22.6	-21.4	-19.4	-17.3	-16.0	-15.1	-14.4	-14.4	-15.4	-18.7	-19.9	-19.7	-19.4	-19.4	-18.9	-20.8	-14.4
26-Feb	-18.7	-19.3	-19.1	-17.3	-16.8	-17.1	-17.1	-17.5	-16.9	-15.5	-14.3	-12.8	-11.7	-10.8	-10.1	-9.5	-9.8	-10.3	-11.1	-11.9	-12.7	-13.2	-13.4	-13.6	-14.2	-9.5
27-Feb	-14.3	-15.3	-16.4	-17.1	-17.8	-18.3	-18.4	-18.4	-18.0	-17.6	-16.6	-16.3	-15.6	-15.4	-14.3	-13.1	-12.1	-12.5	-12.3	-11.8	-11.5	-11.8	-12.3	-11.9	-15.0	-11.5
28-Feb	-12.0	-12.2	-11.6	-10.7	-10.0	-9.6	-9.2	-9.0	-8.2	-7.3	-7.1	-6.7	-6.3	-6.1	-5.7	-5.6	-6.0	-7.0	-7.6	-7.7	-9.1	-11.8	-13.9	-16.4	-9.0	-5.6
																								Diurnal Average		
																								Diurnal Maximum		



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**Firebag - February 2015**





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

**Ambient Temperature (AT) - C**  
**Firebag - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	284	42.26	42.26
-20 - 0	388	57.74	100.00
0 - 10	0	0.00	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

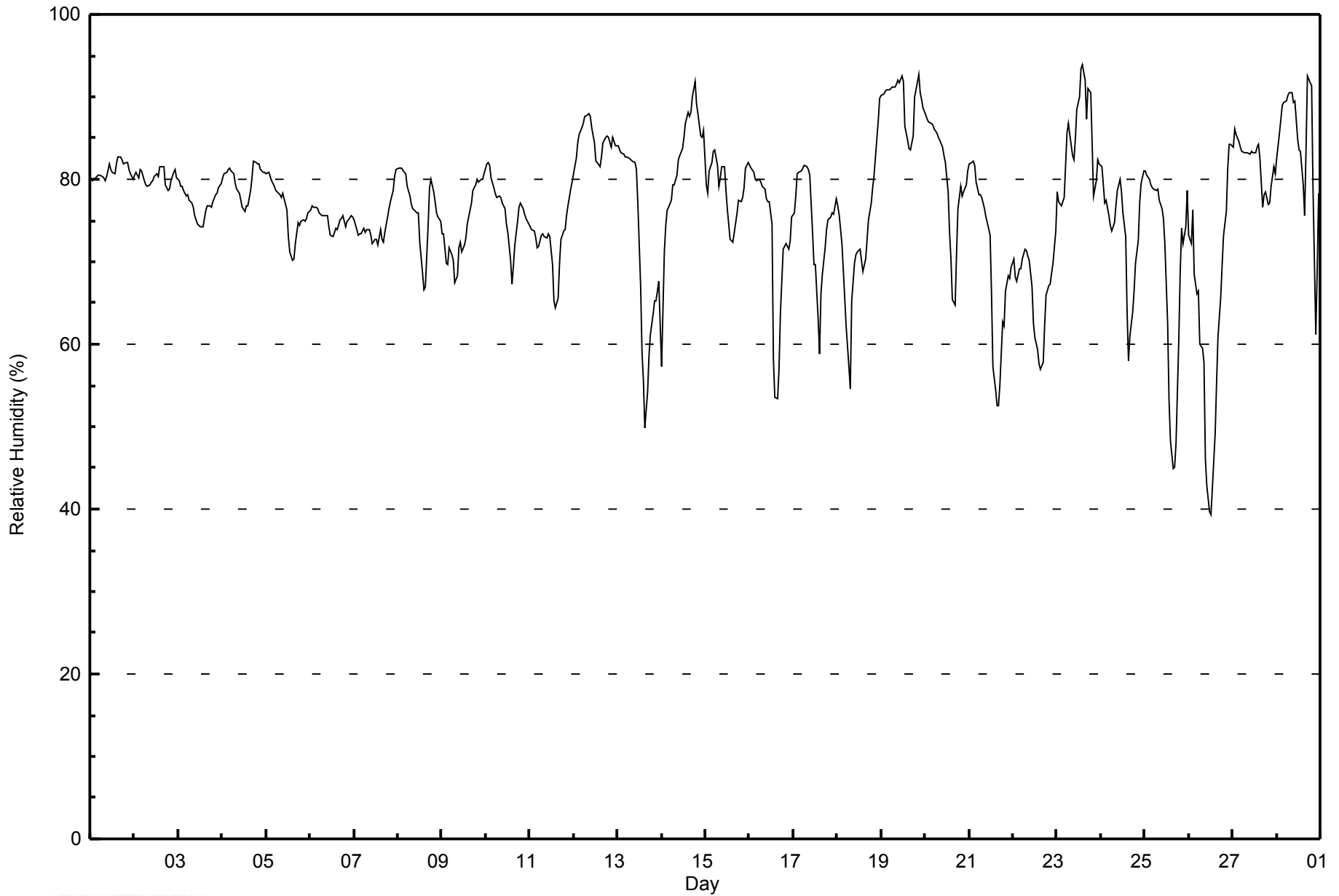


Maximum Value: 94 % on Feb 23 15:00      Maximum Daily Average: 89.7 % on Feb 19																		Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0									
Minimum Value: 39 % on Feb 26 13:00      Minimum Daily Average: 62.9 % on Feb 26 Maximum Diurnal Average: 79.4 % at hour 3      Minimum Diurnal Average: 70.1 % at hour 16 Monthly Average: 76.6 %      Percentiles: P <sub>1</sub> = 48 P <sub>10</sub> = 66 Q <sub>1</sub> = 73 Median = 78 Q <sub>3</sub> = 82 P <sub>90</sub> = 85 P <sub>99</sub> = 92																											
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24			
1-Feb	80	80	80	80	80	81	80	80	80	80	82	81	81	81	82	83	83	82	82	82	82	81	81	80	81.0	83	
2-Feb	80	81	80	81	81	80	79	79	79	80	80	80	81	80	82	82	82	79	79	79	80	81	81	80	80.2	82	
3-Feb	80	79	79	79	78	78	77	77	77	76	75	74	74	75	76	77	77	77	77	78	78	79	80	77.1	80		
4-Feb	80	81	81	81	81	81	81	80	79	78	77	77	76	77	79	80	82	82	82	82	81	81	81	79.8	82		
5-Feb	81	81	80	80	79	79	78	78	78	78	78	76	73	71	70	70	72	75	74	75	75	75	76	76.2	81		
6-Feb	76	77	77	77	76	76	76	76	76	76	74	73	73	74	74	74	75	75	76	74	75	75	76	75.2	77		
7-Feb	75	74	73	73	73	74	73	74	74	73	72	73	73	72	74	73	72	74	75	76	77	79	80	74.5	81		
8-Feb	81	81	81	81	81	79	78	77	76	76	76	76	72	69	67	67	74	79	80	78	77	76	75	75	76.4	81	
9-Feb	73	73	70	70	72	71	70	67	68	72	72	71	72	73	74	76	77	79	79	80	80	80	80	74.2	81		
10-Feb	82	82	82	80	79	78	78	78	78	77	76	75	74	70	67	70	72	75	77	77	77	76	75	75	76.2	82	
11-Feb	74	74	74	73	72	72	73	73	73	73	73	73	70	65	64	66	70	73	74	74	76	77	79	72.6	80		
12-Feb	81	83	84	85	86	87	88	88	88	88	86	84	82	82	81	83	84	85	85	85	84	85	85	84	84.7	88	
13-Feb	84	84	83	83	83	83	83	82	82	82	81	77	67	59	56	50	54	59	61	64	65	65	68	62	71.5	84	
14-Feb	57	71	74	76	77	77	79	79	81	82	83	84	85	87	88	88	90	92	89	88	85	85	86	82.2	92		
15-Feb	79	78	81	82	83	84	82	79	80	81	81	79	76	73	73	72	75	76	77	77	78	79	81	78.7	84		
16-Feb	82	81	81	80	80	80	80	79	79	78	77	77	75	58	54	53	57	64	72	72	72	71	73	75	72.9	82	
17-Feb	76	78	81	81	81	81	82	81	81	81	74	70	70	63	59	66	69	72	74	75	75	76	76	78	74.9	82	
18-Feb	77	76	72	69	66	62	57	55	65	70	71	71	71	70	69	70	73	75	77	79	81	83	87	90	72.3	90	
19-Feb	90	90	91	91	91	91	91	91	92	92	92	92	92	86	85	84	84	85	90	91	93	91	90	89	89.7	93	
20-Feb	88	87	87	87	87	86	86	85	85	84	83	82	78	73	70	65	65	71	76	79	78	79	79	81	80.1	88	
21-Feb	82	82	82	82	80	78	78	78	76	75	75	73	66	57	54	53	53	55	63	62	67	68	68	69	69.8	82	
22-Feb	70	68	68	69	69	70	72	71	71	70	67	62	61	59	58	57	58	62	66	67	67	69	70	74	66.5	74	
23-Feb	78	77	77	77	78	86	87	86	83	82	85	89	90	93	94	92	87	91	90	84	78	80	82	82	84.5	94	
24-Feb	82	79	77	77	76	74	74	75	77	79	80	78	76	73	64	58	61	64	66	70	73	77	80	81	73.8	82	
25-Feb	81	81	80	79	79	79	79	79	77	76	75	72	63	53	48	45	45	48	61	69	74	72	74	79	69.5	81	
26-Feb	73	72	76	69	66	67	60	60	58	46	43	40	39	43	49	55	61	66	70	73	76	81	84	84	62.9	84	
27-Feb	84	86	85	85	84	83	83	83	83	83	83	83	83	83	83	83	83	84	84	83	77	78	78	77	79	82.0	86
28-Feb	83	86	87	89	89	89	90	91	90	89	90	85	83	83	79	76	84	93	92	91	79	61	69	78	84.4	93	
78.9 79.4 79.4 79.1 78.8 78.8 78.3 77.9 78.1 77.8 77.2 76.0 74.2 71.6 70.4 70.1 71.7 74.4 76.6 77.2 77.2 77.1 78.4 79.2																		Diurnal Average									
90 90 91 91 91 91 91 91 92 92 92 92 92 92 93 94 92 88 93 92 91 93 91 90 90																		Diurnal Maximum									



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**Firebag - February 2015**





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

**Relative Humidity (RH) - %**  
**Firebag - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	2	0.30	0.30
40 - 60	36	5.36	5.65
60 - 80	388	57.74	63.39
80 - 100	246	36.61	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672





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

**Wind Speed (WS) - km/h**  
**Firebag - February 2015**

Maximum Speed: 42 km/h on Feb 14 05:00	Maximum Daily Speed Average: 21.6 km/h on Feb 23	Hours in Service: 672
Minimum Speed Value: 0 km/h on Feb 11 05:00	Minimum Daily Speed Average: 2.0 km/h on Feb 17	Hours of Data: 671
Maximum Diurnal Speed Average: 2.9 km/h at hour 14	Minimum Diurnal Speed Average: 0.8 km/h at hour 8	Hours of Missing Data: 1
Monthly Average Velocity: 1.2 km/h 330.1 deg	Percentiles: P <sub>1</sub> = 2 P <sub>10</sub> = 5 Q <sub>1</sub> = 9 Median = 14 Q <sub>3</sub> = 19 P <sub>90</sub> = 23 P <sub>99</sub> = 38	Percent Operational Time: 99.9

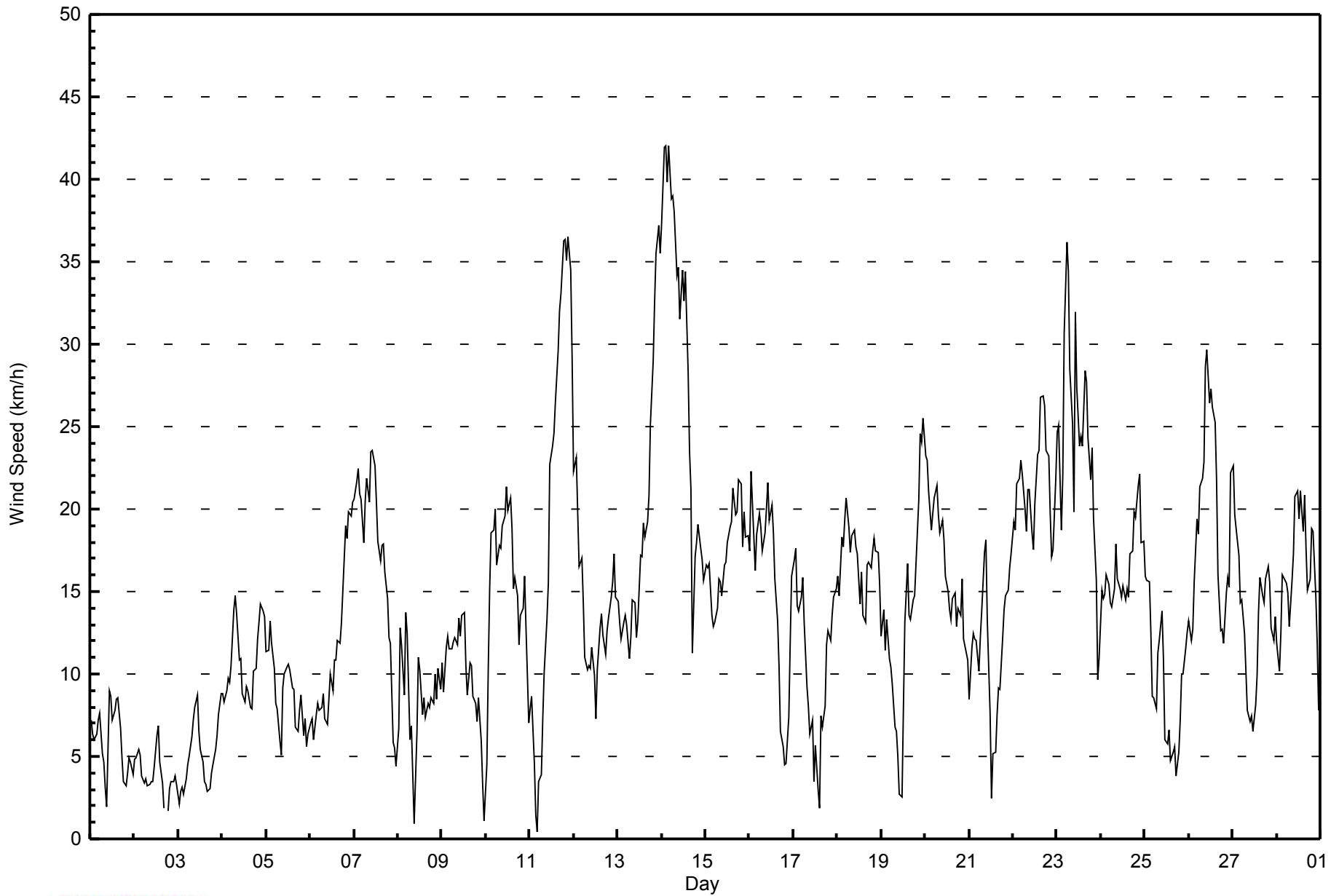
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	SW7	SW6	SSW6	SSW6	SSW7	SSW8	SW5	SW5	WSW3	WNW2	N9	N9	NNW7	NNW8	NNW8	NNW9	NNW7	NNW5	NNW4	WNW3	W4	W5	WSW5	WSW4	WNW3.2	N9
2-Feb	WSW5	WSW5	WSW5	W5	WNW4	W3	WSW4	W3	W3	W4	WNW4	WNW4	NNW6	NNW7	NW5	NW3	NW2	AF	WSW2	WSW3	W3	WNW4	NW4	NNW3	WNW3.4	NNW7
3-Feb	NW2	NNW3	N3	N3	N4	N4	N5	N6	N7	N8	N9	N7	NNW5	NNW5	WNW3	W3	SW3	SSW3	SSW4	SSW4	SSW5	SSW6	SSW8	SW9	NW2.1	SW9
4-Feb	SSW9	SSW8	SSW9	SSW10	SSW9	SSW10	SSW14	SSW15	SW14	SW11	WSW11	W9	WNW8	NNW9	NNW9	NNW8	NNW8	N10	N10	N12	N13	N14	N14	N13	WNW4.6	SSW15
5-Feb	N11	N11	N13	N12	N10	N8	N8	N6	N5	N9	N10	N10	N11	NNW10	N9	N9	N7	NNE7	NNE8	NE9	NNE6	NNE7	NNE6	N6	N8.4	N13
6-Feb	NNE7	NNE7	NE6	NE8	ENE8	ENE8	ENE8	ENE9	ENE7	E7	E8	ESE10	E9	E11	E11	E12	E12	ESE13	ESE15	ESE19	ESE18	ESE20	SE20	SE20	E10.1	SE20
7-Feb	SE21	SE22	SSE22	SSE21	SSE21	SSE18	SSE21	SSE22	SSE20	SSE24	SSE24	SSE23	SSE20	SSE18	SSE17	SSE18	S18	S16	S15	SSW12	SSW12	SW6	WNW5	WNW4	SSE16.0	SSE24
8-Feb	NNW7	NNE13	NNE12	N9	NNE14	N12	N6	NE7	NE4	ENE1	WSW6	W11	WNW10	NW8	WNW9	NNW7	NNE8	NE8	E9	ESE8	ESE10	ESE8	SE10	ESE9	NNE3.8	NNE14
9-Feb	E11	ESE9	ESE12	ESE12	ESE11	ESE12	SE12	SE12	SE12	SSE13	SSE12	SSE14	SSE14	SSE11	ESE9	ESE11	ESE11	ESE9	ESE8	ESE7	ESE9	SSE6	SE3	NW1	SE9.4	SSE14
10-Feb	N5	NNW10	N15	N19	N19	N20	N17	N18	N18	NNW19	NNW20	NNW21	NNW20	NNW21	NNW19	NNW15	N16	N15	N12	N14	N14	N16	NNE13	NNE7	N15.5	NNW21
11-Feb	N8	N9	N5	NE1	E0	SSW3	SSE4	SSE7	S10	S13	S15	S23	S24	S25	S26	S30	S32	S33	S36	S36	S35	S36	S34	SSW29	S17.8	S36
12-Feb	SSW22	SSW23	SW20	SW17	SW17	WSW14	WSW11	W10	W10	WNW10	NNW12	N10	NNW7	N10	NNE13	NE14	NNE12	NNE11	N13	NNE13	NNE15	NNE16	NNE17	NNE15	NW4.6	SSW23
13-Feb	NNE14	NNE13	NNE12	NNE13	NE14	NNE13	NE11	NE12	NE15	ENE14	E12	ESE13	ESE17	ESE17	SE19	SE18	SE19	SE21	SE25	SSE29	SSE33	SSE36	SSE37	SSE36	ESE13.4	SSE37
14-Feb	SSE37	SSE42	SSE42	SSE40	SSE42	SSE39	S39	S38	S34	S35	S32	S34	SSW33	SSW34	SW28	SW23	SW21	NW11	N17	NNE18	NNE19	NNE18	NNE17	N16	S18.8	SSE42
15-Feb	N17	N16	N17	N14	N13	N13	N14	N16	N16	NNW15	N17	NNW17	NNW18	NNW19	N19	N21	N20	N20	N22	N22	N18	N20	N18	N18	N17.3	N22
16-Feb	N17	N22	N18	N16	N18	N20	N19	N17	N19	N20	N22	NNW19	NNW20	NW19	NW16	NW13	NW10	NW7	NW6	WNW5	NW5	NNW7	NNW12	NNW16	NNW14.5	N22
17-Feb	N17	N18	N14	NNW14	NNW15	NNW16	NNW13	NW9	NW8	NW6	NNW7	NNW4	W6	WSW3	SW2	SW7	SSW7	S8	SSE12	SSE13	S12	SSE14	SSE15	SSE15	NW2.0	N18
18-Feb	S16	S15	SSE18	S18	S19	SSE21	SSE19	SSE17	SSE18	SSE19	SSE18	S17	S14	SSE16	SSE14	S13	S17	S17	S16	S17	S18	S17	S17	S15	S16.8	SSE21
19-Feb	S12	S14	SSW11	SW13	SW11	SW10	SW9	SW7	SW7	WSW5	WSW3	NNE3	N8	N13	N17	N14	N13	NNE14	NNE15	NNE17	N21	N25	N24	N26	NNW5.3	N26
20-Feb	N23	N23	N21	N19	N20	N21	NNE21	NNE20	N19	N19	N18	N16	N15	N14	N13	N15	N15	N13	N14	N14	NNE16	NNE12	NNE11	N11	N16.6	N23
21-Feb	N8	NNW12	NNW12	NNW12	N12	N10	N12	N14	N17	N18	N13	N8	WSW2	WNW5	W5	WSW8	SW9	SW9	SSW12	SSW14	SSW15	SSW15	SSW16	SSW17	NW3.4	N18
22-Feb	SSW19	SSW19	SSW22	SSW22	SW23	SW22	SW20	SSW19	SSW21	SW21	SW19	SSW18	SSW20	SSW23	SSW24	SSW27	SW27	SW26	SW24	SW23	WSW20	WSW17	WNW18	NNW22	SW19.3	SW27
23-Feb	NNW25	NNW25	NNW19	NNW22	NNW31	NNW36	NNW34	NNW28	NNW25	NNW20	NNW32	N27	NNW24	NNW24	NNW24	NNW28	NNW28	N24	N22	NE24	NE19	ENE16	ENE10	E11	N21.6	NNW36
24-Feb	ESE15	ESE15	ESE15	ESE16	SE15	SE14	SE14	ESE15	ESE18	ESE16	E15	E15	E15	ENE15	NE15	NE15	NNE17	NNE17	NNE20	NNE19	NNE21	NNE22	NNE18	NNE18	ENE11.5	NNE22
25-Feb	NNE16	NNE16	NNE16	NNE13	N9	N9	N8	NNE11	N12	NNE14	N11	NNW6	NNW6	NNW7	WNW5	WNW5	NW6	WNW4	SW5	SW7	SSW10	SSW10	SSW12	SSW13	N4.2	NNE16
26-Feb	SSW13	SSW12	SSW13	SSW16	SW19	SW18	SW21	SW22	SW23	SW29	SW30	SW26	SW27	SW26	SW25	SW22	WSW16	W13	NW13	N12	N15	N16	N15	N22	WSW13.0	SW30
27-Feb	NNW23	NNW20	N19	N17	N14	N15	N12	N10	NNW8	NW7	NW7	W7	W8	WSW10	WSW14	WSW16	WSW15	SW14	SW16	SW16	WSW16	WSW13	WSW12	W13	WNW7.9	NNW23
28-Feb	W12	WSW10	WSW12	W16	W16	W15	W15	WNW13	WNW16	NW17	NNW21	N21	NNW19	NNW21	NNW19	NNW21	NNW18	NW15	NW16	N19	NNE19	NNE15	NNE12	NNE8	NW12.6	N21
N1.4 N1.7 N1.1 NW1.1 NW1.4 NW1.8 NW1.1 NNW0.8 NW1.0 NNW1.7 NW2.6 NNW1.7 NNW2.4 NNW2.9 NNW2.5 NNW2.5 NNW2.3 NNW1.2 NE1.1 ENE1.7 ENE1.6 NE1.7 NE1.4 NNE1.9																								Diurnal Average		
SSE37 SSE42 SSE42 SSE40 SSE42 SSE39 S39 S38 S34 S35 NNW32 S34 SSW33 SSW34 SW28 S30 S32 S33 S36 S36 S35 S36 SSE37 SSE36																								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 - February 2015**





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

**Wind Speed (WS) - km/h**  
**Firebag - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	76	11.33	11.33
6 - 11	172	25.63	36.96
12 - 19	284	42.32	79.28
20 - 28	105	15.65	94.93
29 - 38	28	4.17	99.11
> 38	6	0.89	100.00

Total Number of Valid Hours: 671

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**Firebag - February 2015**

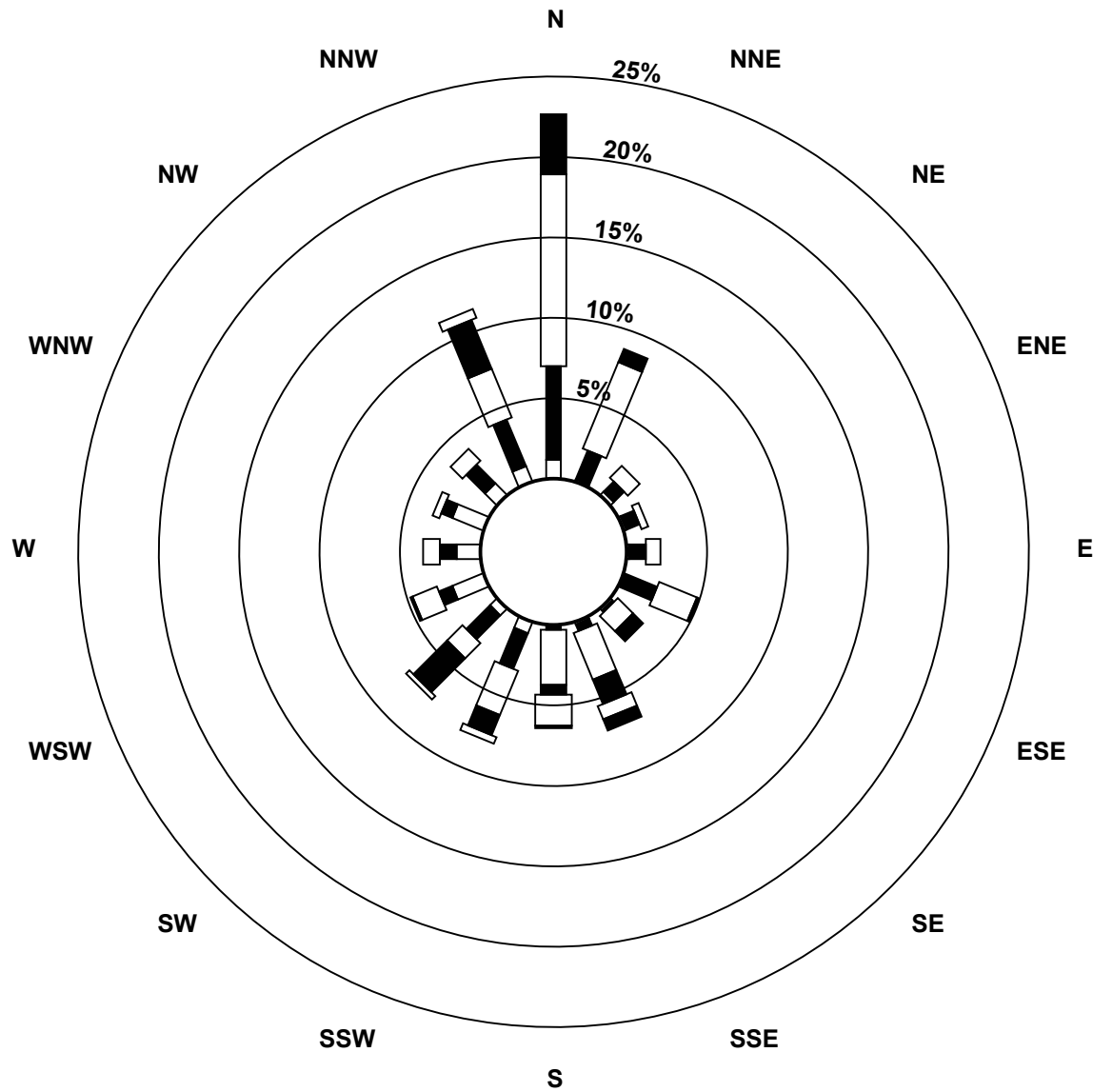
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	8	1	2	1	1	0	1	1	0	5	4	14	10	14	7	7	76
6 - 11	39	13	6	6	7	15	1	3	2	16	14	6	7	5	11	21	172
12 - 19	80	39	7	3	6	17	9	21	23	20	9	11	7	3	7	22	284
20 - 28	25	6	0	0	0	1	6	11	4	9	20	1	0	0	0	22	105
29 - 38	0	0	0	0	0	0	0	6	13	3	2	0	0	0	0	4	28
> 38	0	0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	6
<b>Totals</b>	152	59	15	10	14	33	17	47	43	53	49	32	24	22	25	76	671

Total Number of Valid Hours: 671

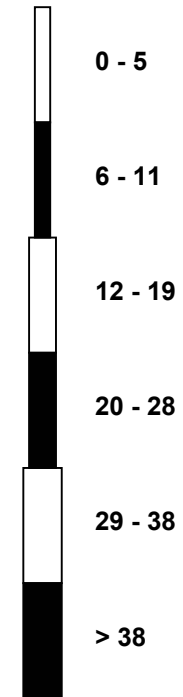
Total Number of Hours: 672

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

**Wind Speed (WS) - km/h  
Firebag (AMS 19)**



**Classes (km/h)**



**Total Number of Valid Hours: 671**



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

**Wind Speed (WS) - km/h**  
**Firebag - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 14 09:00	Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 0 km/h on Feb 3 18:00	
Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 1 Q <sub>1</sub> = 2 Median = 2 Q <sub>3</sub> = 3 P <sub>90</sub> = 4 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-Feb	1	1	1	1	1	1	1	1	1	1	2	1	2	1	2	1	1	1	0	1	0	1	1	0	2	
2-Feb	1	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	0	AF	1	1	0	0	0	1	1	
3-Feb	0	0	0	1	0	1	1	1	1	2	1	1	1	1	1	1	0	0	0	0	1	1	1	1	2	
4-Feb	1	1	1	1	1	2	2	2	2	1	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	
5-Feb	2	2	2	3	2	1	2	3	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	3	
6-Feb	2	2	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	3	3	4	3	4	4	3	4	
7-Feb	4	4	5	4	4	3	4	4	3	4	4	4	3	3	3	3	3	3	2	2	2	2	1	1	5	
8-Feb	2	3	2	2	3	2	1	1	1	1	4	2	3	2	2	2	1	1	1	1	2	1	2	3	4	
9-Feb	2	2	2	2	2	2	2	2	2	2	2	2	2	3	1	2	2	2	1	2	2	2	1	1	3	
10-Feb	3	2	3	3	4	3	3	3	3	4	3	4	4	4	4	3	3	3	2	2	2	2	3	1	4	
11-Feb	2	1	1	1	1	1	1	1	2	2	2	4	4	4	4	4	5	5	5	6	5	6	5	4	6	
12-Feb	4	3	3	3	2	3	2	2	2	2	2	2	2	2	2	2	3	2	3	2	2	3	3	3	4	
13-Feb	2	2	2	3	2	2	3	2	2	3	2	3	3	3	4	3	4	4	4	5	6	6	6	6	6	
14-Feb	6	7	7	7	7	6	6	6	7	6	5	4	5	5	6	4	4	4	3	3	3	3	3	3	7	
15-Feb	3	3	3	4	2	2	3	3	3	3	3	3	4	3	3	4	3	4	4	4	3	4	4	3	4	
16-Feb	3	4	4	2	3	3	3	2	2	3	3	3	3	4	3	3	2	1	1	1	1	2	2	3	4	
17-Feb	3	3	2	2	3	2	2	2	1	1	2	2	2	2	2	1	1	1	2	2	1	2	2	2	3	
18-Feb	2	2	3	3	3	3	3	3	3	3	3	3	3	2	2	3	2	2	3	3	3	2	3	3	3	
19-Feb	2	2	2	2	2	2	2	1	1	1	2	3	2	3	3	2	2	2	3	3	4	4	4	5	5	
20-Feb	5	4	4	4	4	3	4	3	4	3	2	2	3	3	2	2	2	1	1	1	2	2	1	1	5	
21-Feb	1	1	1	1	1	1	1	2	3	3	2	2	2	3	2	2	1	1	2	1	1	2	2	2	3	
22-Feb	3	3	3	3	3	3	3	2	3	3	3	3	4	4	4	5	4	4	4	4	3	3	4	5	5	
23-Feb	4	4	3	5	7	7	6	5	7	3	6	5	5	5	4	6	5	5	4	5	4	3	2	2	7	
24-Feb	2	3	3	2	3	2	3	3	3	3	3	3	3	3	3	2	4	3	3	3	4	3	3	3	4	
25-Feb	2	2	2	2	2	2	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	2	
26-Feb	1	1	1	3	3	3	4	3	4	5	5	5	4	4	5	4	3	2	2	3	3	3	3	5	5	
27-Feb	4	3	3	3	2	3	3	2	2	2	2	2	2	2	2	3	3	2	2	2	2	1	1	1	4	
28-Feb	1	1	2	2	2	3	2	2	3	4	4	4	4	4	4	4	3	3	3	4	4	3	2	1	4	
	6	7	7	7	7	7	6	6	7	6	6	5	5	5	6	6	5	5	5	6	6	6	6	6	6	
Diurnal Maximum																										

AF - Analyzer Failure



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

**Wind Direction (WD) - deg**  
**Firebag - February 2015**

Direction of Maximum Speed: 164 deg on Feb 14 05:00		Hours in Service: 672
Direction of Maximum Daily Speed Average: 350.0 deg on Feb 23		Hours of Data: 671
Direction of Minimum Speed: 94 deg on Feb 11 05:00	Direction of Minimum Daily Speed Average: 2.0 deg on Feb 17	Hours of Missing Data: 1
Monthly Average Direction: 303.5 deg		Percent Operational Time: 99.9

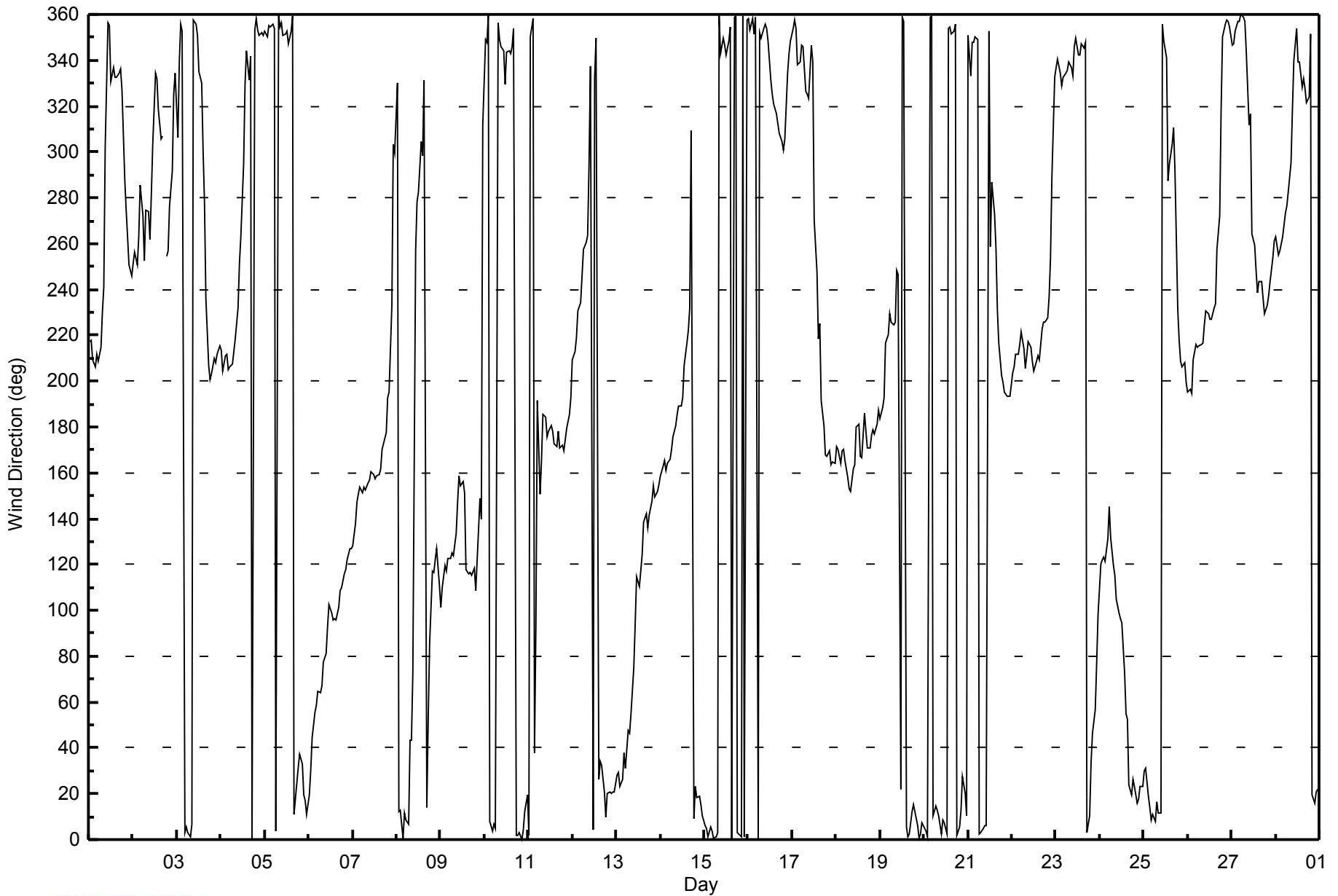
Day	Hourly Period Ending At (MST)																								Daily Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1-Feb	217	218	209	206	211	209	215	230	241	302	357	355	331	337	332	333	335	336	327	288	275	263	251	246	281.3
2-Feb	251	256	251	263	286	272	252	275	274	262	282	303	335	332	319	306	307	AF	255	257	277	292	325	335	287.0
3-Feb	306	339	356	352	3	5	3	2	7	358	356	351	335	330	301	278	236	207	201	203	210	208	212	215	313.7
4-Feb	213	204	211	212	205	206	207	213	219	232	252	263	295	329	344	331	341	1	354	358	353	351	352	351	283.4
5-Feb	353	350	355	354	356	354	4	360	355	356	351	351	353	347	353	360	11	24	31	37	33	19	17	11	1.7
6-Feb	20	30	44	55	59	65	64	67	78	81	93	102	99	96	96	96	101	109	110	116	118	122	127	127	97.5
7-Feb	128	138	147	151	154	151	153	153	155	157	160	159	157	158	159	161	170	172	178	193	195	233	303	300	159.2
8-Feb	330	12	13	0	12	8	7	44	43	73	257	278	282	304	298	331	14	53	86	117	117	122	127	111	17.9
9-Feb	101	110	120	117	122	123	125	124	133	147	159	154	156	152	118	116	117	116	118	109	122	149	140	312	128.9
10-Feb	349	348	360	8	3	7	5	357	349	346	344	330	343	344	343	346	354	2	2	3	0	4	12	19	354.6
11-Feb	2	350	358	38	94	192	151	165	185	184	176	178	180	178	173	171	178	171	172	169	174	179	186	193	176.9
12-Feb	209	213	219	230	235	246	257	260	264	295	338	4	333	350	26	34	32	21	10	20	21	20	21	21	318.8
13-Feb	28	30	23	26	38	31	47	46	55	75	94	115	111	117	124	139	142	136	141	148	154	149	152	155	117.2
14-Feb	159	163	165	161	164	166	170	176	181	185	189	189	193	207	217	222	232	309	9	23	18	19	15	10	178.3
15-Feb	6	5	1	6	3	0	1	3	360	343	349	347	343	348	355	0	359	360	3	2	1	359	1	357	358.0
16-Feb	358	353	358	352	359	1	352	350	354	356	354	348	331	325	321	317	312	308	304	301	306	334	343	348	344.0
17-Feb	354	358	354	338	339	346	346	326	325	323	347	339	270	248	219	225	192	181	168	167	169	164	165	164	313.6
18-Feb	171	170	164	169	170	165	158	153	152	162	164	180	181	167	167	186	178	171	171	177	179	177	181	187	170.5
19-Feb	184	189	193	217	220	230	226	224	226	248	247	22	359	357	5	1	2	12	15	12	6	0	2	7	345.5
20-Feb	5	3	1	359	359	10	14	13	10	2	9	7	3	354	354	352	352	355	2	6	13	27	20	10	5.0
21-Feb	351	333	348	348	350	349	2	3	5	6	6	353	258	287	273	258	232	217	202	199	195	194	193	193	305.0
22-Feb	204	206	212	212	216	221	214	206	211	217	215	209	205	209	211	209	223	226	226	228	237	254	289	332	221.2
23-Feb	337	341	334	329	333	335	336	339	337	333	346	350	342	342	347	345	348	3	11	34	46	57	77	99	350.0
24-Feb	120	122	123	122	131	145	132	119	115	105	99	96	95	73	55	52	24	19	26	23	16	17	23	23	73.7
25-Feb	30	31	19	14	8	11	8	16	11	12	356	348	341	288	295	303	311	291	232	218	208	206	208	199	350.1
26-Feb	196	196	195	209	216	215	216	216	217	225	231	230	227	227	232	234	258	272	318	350	356	358	357	355	237.2
27-Feb	346	347	353	357	357	360	359	357	344	312	317	265	259	249	238	243	243	236	230	233	238	244	254	261	292.1
28-Feb	263	255	257	260	263	273	276	283	295	318	340	354	339	339	329	332	328	321	324	351	19	16	21	22	320.9
3.7 357.0 353.2 314.5 310.6 321.7 322.0 342.1 311.9 298.7 324.2 300.9 282.0 293.3 301.7 294.0 294.6 338.9 36.4 66.0 67.3 51.1 41.7 20.8																									
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 - February 2015**







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

**Wind Direction (WD) - deg**  
**Firebag - February 2015**

Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 80 deg on Feb 19 12:00	Hours in Service: 672 Hours of Data: 671 Hours of Missing Data: 1 Hours of Calibration: 0 Percent Operational Time: 99.9
Minimum Value: 4 deg on Feb 2 07:00	
Percentiles: P <sub>1</sub> = 5 P <sub>10</sub> = 8 Q <sub>1</sub> = 9 Median = 11 Q <sub>3</sub> = 13 P <sub>90</sub> = 16 P <sub>99</sub> = 49	

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-Feb	6	6	6	7	7	7	12	10	35	34	12	10	19	16	11	11	11	19	13	12	11	8	7	6	35	
2-Feb	6	9	6	9	13	14	4	11	7	8	14	15	14	14	12	13	11	AF	16	11	4	12	12	12	16	
3-Feb	10	13	8	14	9	9	11	11	13	14	14	17	15	21	16	16	12	6	4	5	6	7	7	7	21	
4-Feb	8	7	9	8	8	8	8	9	9	8	8	10	20	15	12	12	12	12	11	13	12	12	13	12	20	
5-Feb	11	12	13	13	11	10	12	15	10	9	11	13	14	16	14	13	12	8	10	8	10	11	8	10	16	
6-Feb	9	9	10	6	8	9	8	9	12	11	13	11	12	10	11	11	11	11	11	9	10	10	10	10	13	
7-Feb	10	11	10	11	10	10	10	10	9	10	11	10	10	11	10	9	10	8	9	11	6	36	17	23	36	
8-Feb	24	14	11	11	10	10	11	10	7	37	13	18	17	21	19	16	16	12	13	9	12	8	11	12	37	
9-Feb	11	13	8	9	11	10	10	10	13	10	10	12	11	20	13	12	10	12	13	19	18	14	38	76	76	
10-Feb	18	14	13	12	13	12	13	11	11	10	11	11	14	14	15	12	13	12	10	11	11	11	9	10	18	
11-Feb	10	11	14	35	58	17	15	12	8	9	8	8	11	9	8	8	8	8	8	8	9	9	8	7	58	
12-Feb	11	8	10	9	10	8	9	9	10	18	16	13	26	15	13	12	10	13	10	13	11	10	11	12	26	
13-Feb	11	11	13	13	10	10	12	9	8	15	15	14	13	12	12	13	12	11	11	9	10	9	9	9	15	
14-Feb	9	9	8	9	9	9	9	9	12	9	9	7	9	12	12	11	8	39	16	8	9	10	11	11	39	
15-Feb	12	13	12	11	12	13	12	13	12	11	13	11	11	12	13	13	11	12	13	14	12	13	12	12	14	
16-Feb	12	12	12	9	12	12	13	8	10	12	12	15	12	13	14	15	10	14	9	12	13	15	10	10	15	
17-Feb	12	13	12	10	10	8	10	9	14	15	25	58	25	37	44	11	20	10	7	7	7	8	8	8	58	
18-Feb	7	7	8	9	8	8	8	9	9	11	9	10	10	14	12	12	11	8	8	9	7	8	8	7	14	
19-Feb	9	7	10	9	8	8	9	10	9	19	53	80	12	14	12	15	12	10	9	10	12	12	14	12	80	
20-Feb	12	14	13	12	13	13	9	10	11	13	12	12	16	13	15	12	9	9	11	10	7	6	8	10	16	
21-Feb	10	5	8	5	8	5	9	13	11	12	12	16	61	50	40	18	13	9	8	5	5	6	5	8	61	
22-Feb	8	8	8	8	7	7	8	7	8	8	10	9	11	11	10	11	9	9	8	9	8	10	19	13	19	
23-Feb	10	9	9	13	10	10	10	11	13	12	12	12	11	10	11	12	12	15	13	11	9	10	17	18	18	
24-Feb	10	11	11	10	11	11	12	12	8	13	10	11	12	14	12	14	11	9	8	9	9	8	8	8	14	
25-Feb	7	6	7	10	10	9	9	9	11	11	14	18	24	32	43	41	11	30	15	12	9	7	7	6	43	
26-Feb	5	6	7	9	7	8	8	8	9	9	9	10	10	11	12	11	12	20	13	11	13	11	12	13	20	
27-Feb	12	13	14	13	16	13	12	15	19	18	18	25	16	17	14	11	9	7	8	7	7	7	6	7	25	
28-Feb	7	6	10	8	8	11	10	10	11	15	12	13	13	13	14	10	10	11	10	16	10	7	10	8	16	
	24	14	14	35	58	17	15	15	35	37	53	80	61	50	44	41	20	39	16	19	18	36	38	76		
Diurnal Maximum																										

AF - Analyzer Failure

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# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	12:01
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
Cal Gas Concentration	49.3 ppm	Cal Gas Expiry Date	12-Dec-16
Gas Cert Reference	SA130123A		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range	NA	DACS channel #	N/A

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	-606	-606
Analyzer Range (mv)	1000	1000	Lamp voltage	807	807
Calculated slope	0.984192	0.986550	Chamber temp.	45.0	45.0
Calculated intercept	-0.315980	-0.317852	Pressure (mmHg)	694.7	694.7
Analyzer Background	8.7	8.7	Flow (lpm)	0.453	0.453
Analyzer Coefficient	0.958	0.958	Intensity	90	90

Analyzer make Thermo 43i Analyzer serial # 1410661308

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.7	NA
as found span	5000	58.3	574.8	581.8	0.988
calibrator zero	5000	0.0	0.0	-0.7	NA
high point	5000	58.3	574.8	581.8	0.988
second point	5000	29.1	286.9	293.7	0.977
third point	5000	14.7	144.9	146.9	0.987
calibrator zero	6000	0.0	0.0	-0.4	NA
as left zero	6000	0.0	0.0	-0.4	NA
as left span	5000	58.3	574.8	582.1	0.987
Average Correction Factor					0.984

Corrected As found 582.5 Previous response 584.4 % change 0.3%

#### Notes:

No Maintenance or adjustments Done, Filter changed out,

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Summary

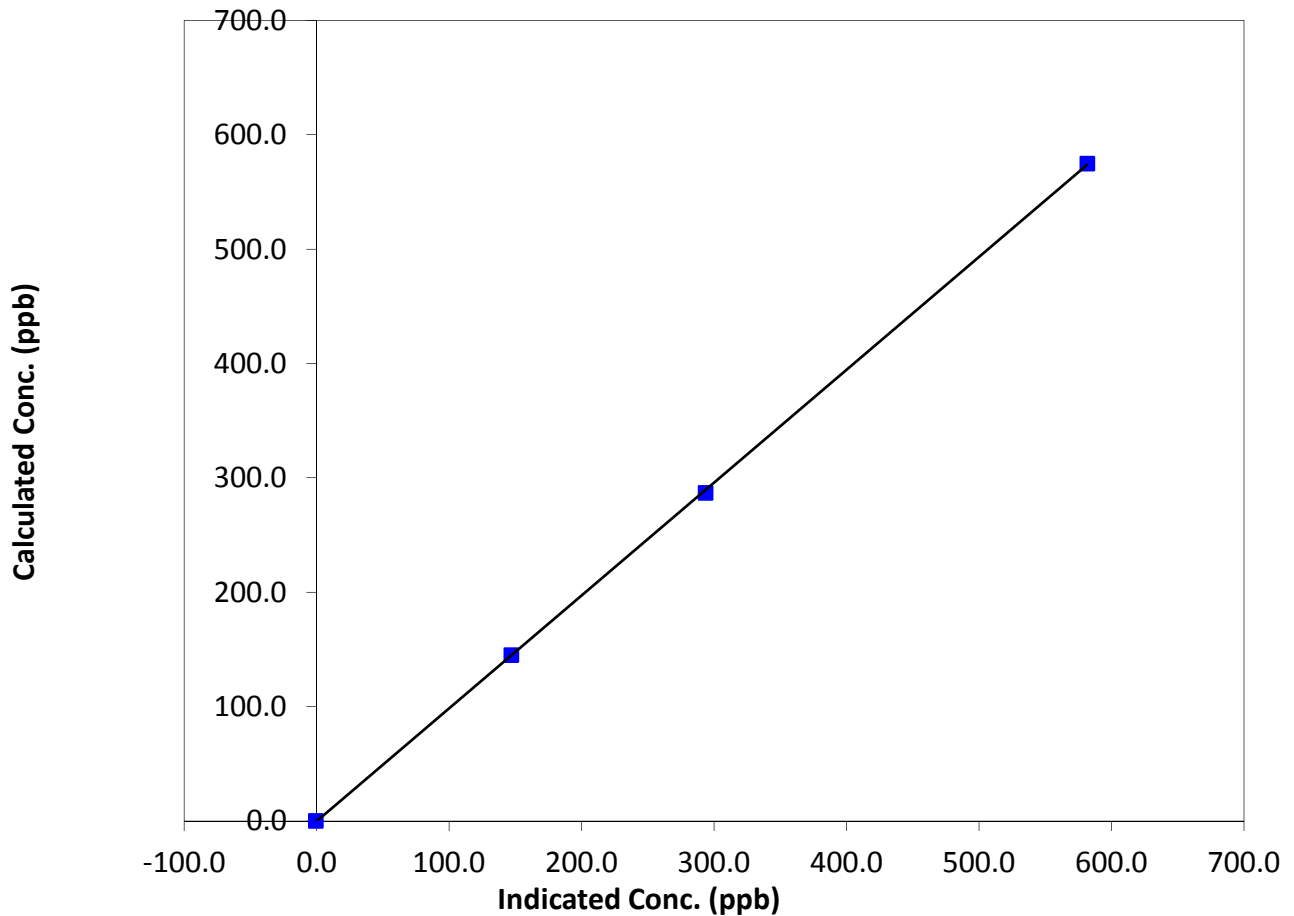
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:20	End Time (MST)	12:01
Analyzer make	Thermo 43i	Analyzer serial #	1410661308

### Calibration Data

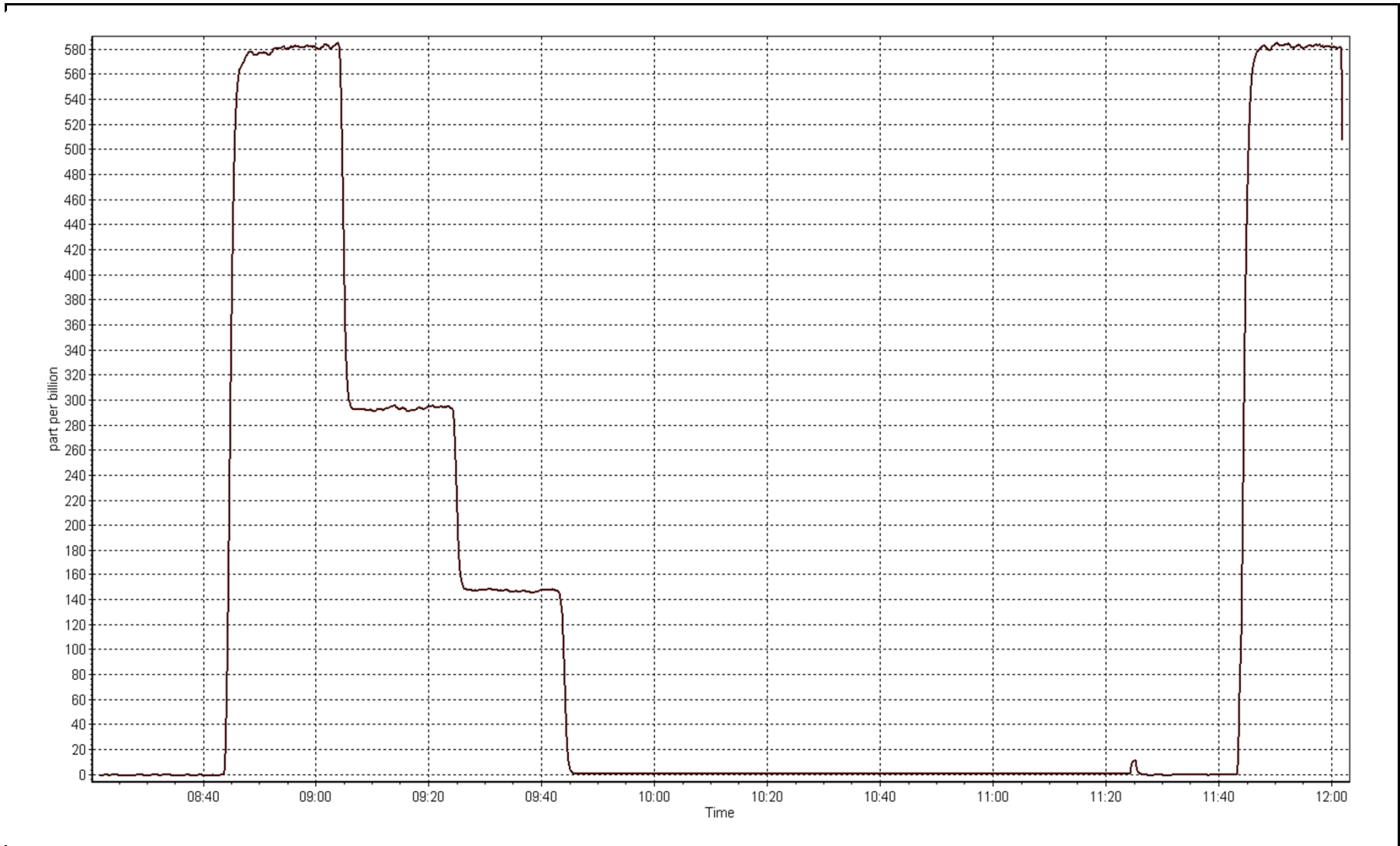
Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.7	N/A	Correlation Coefficient	0.999951
574.8	581.8	0.9880		
286.9	293.7	0.9769	Slope	0.986550
144.9	146.9	0.9867		
			Intercept	-0.317852

**SO<sub>2</sub> Calibration Curve**



SO2 Calibration Plot

Date: February 13, 2015





# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 27, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	9:45	End Time (MST)	12:04
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	996
Cal Gas Concentration	4.85 ppm H2S	Cal Gas Expiry Date	10-Jun-14
Gas Cert Reference	ALM066720	SO2 gas conc.	49.3 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	N/A
DACS voltage range	NA	DACS channel #	TCP/IP

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	HVPS	488	488
Analyzer Range (mv)	100	100	Lamp voltage	2118	2118
Calculated slope	0.997324	0.995992	Chamber temp.	30	30
Calculated intercept	0.349062	0.226548	Pressure	23.3	23.3
Analyzer Background	19.3	19.3	Flow	592	592
Analyzer Coefficient	1.099	1.099	Intensity	52	52
			Converter temp.	316	316

Analyzer make/model	API H2S T101	Analyzer serial #	158
Converter make/model		Converter serial #	

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	-0.4	NA
as found span	5000	83.3	80.8	80.8	1.001
SO2 scrubber check	5000	29.2	287.9	5.7	NA
calibrator zero	5000	0.0	0.0	-0.4	NA
high point	5000	83.3	80.8	80.8	1.001
second point	5000	41.7	40.4	40.6	0.996
third point	5000	21.0	20.4	20.3	1.002
calibrator zero	5000	0.0	0.0	-0.2	NA
as left zero	5000	0.0	0.0	-0.2	NA
as left span	5000	83.3	80.8	80.6	1.002
Average Correction Factor					1.000

Corrected As found	81.2	Previous response	80.7	% change	-0.6%
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#### Notes:

Scrubber checked before as founds. No maintenance or adjustments done, Filter changed out.

Calibration Performed By:

Melissa Lemay /Asad Hidayat



# Wood Buffalo Environmental Association

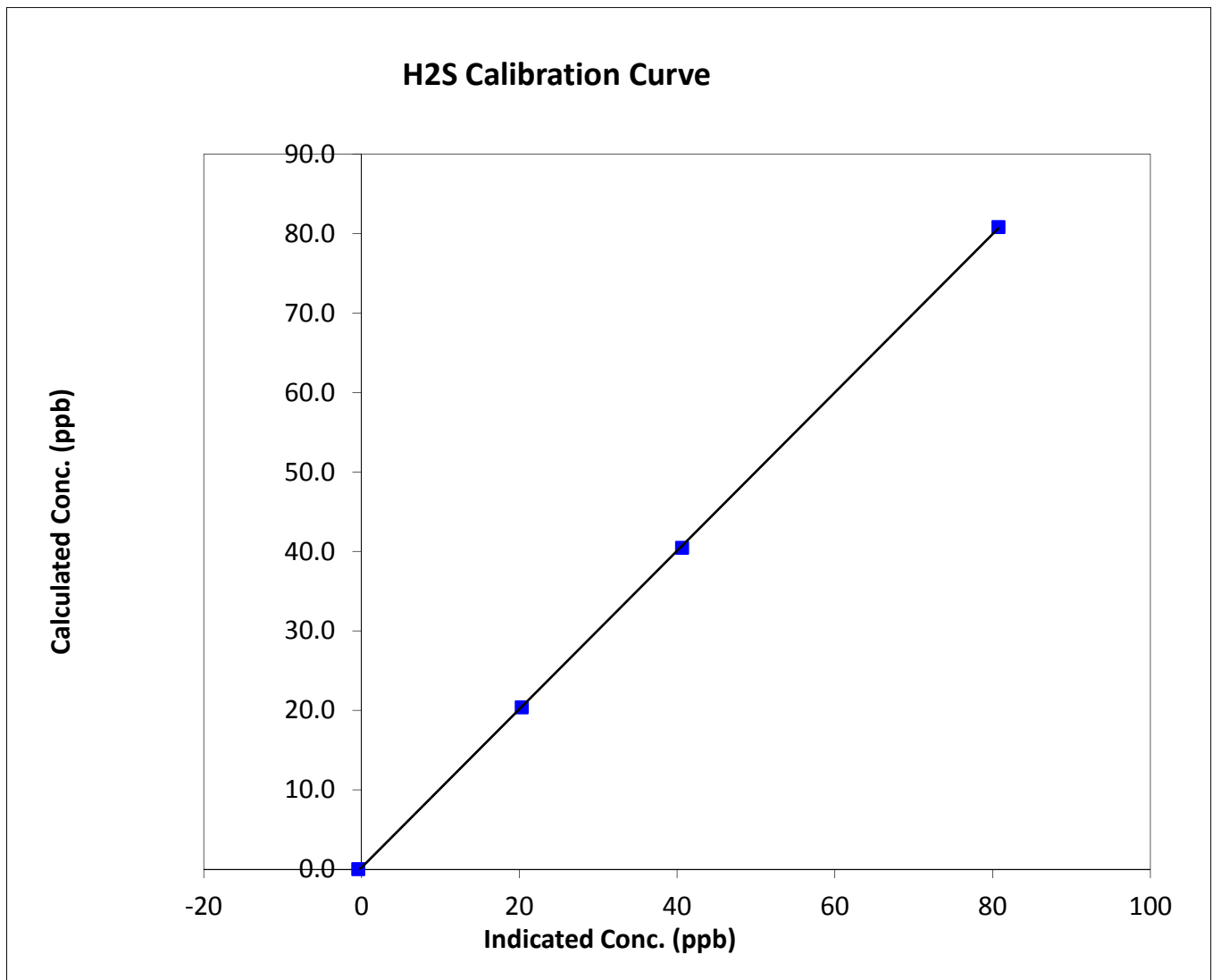
## H2S Calibration Summary

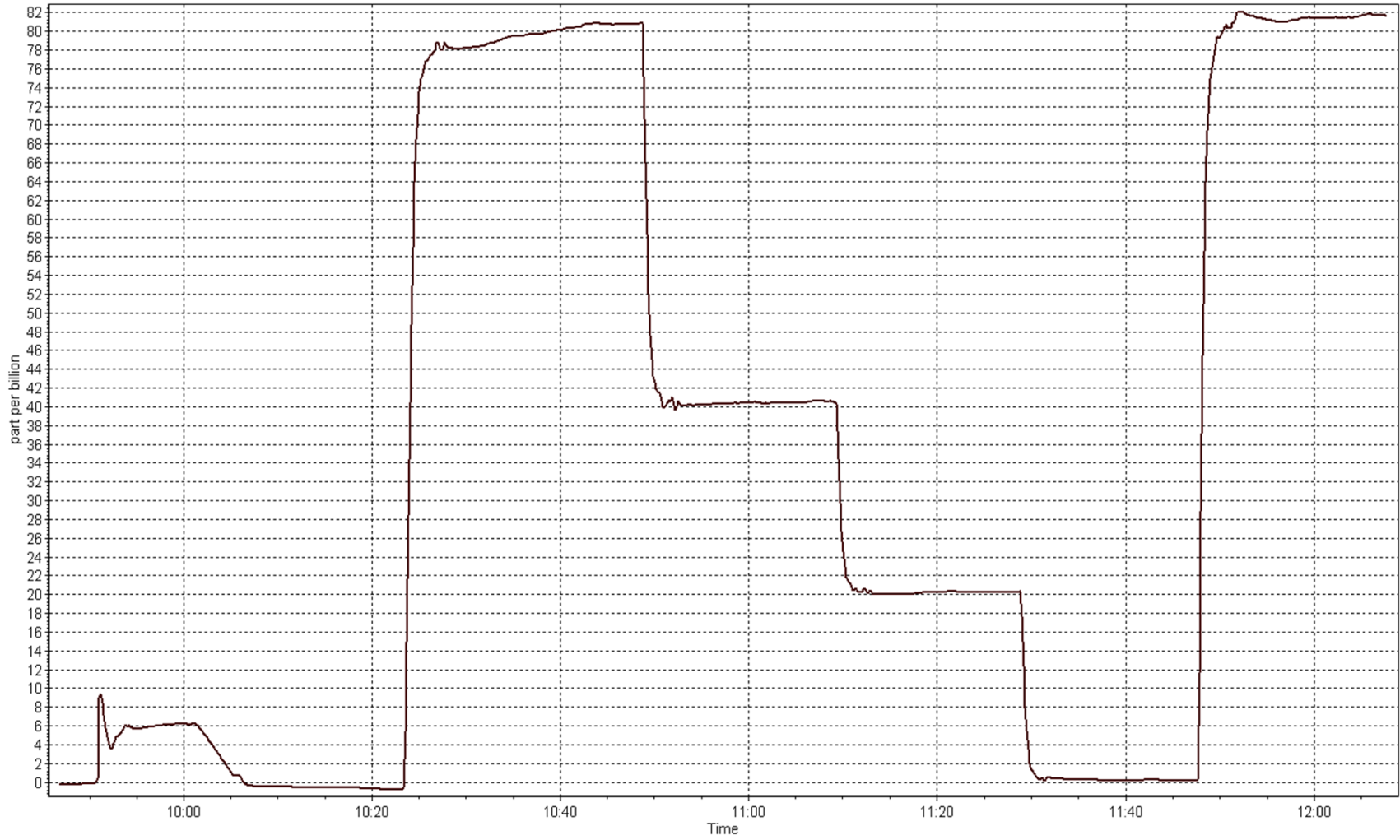
### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 27, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	9:45	End Time (MST)	12:04
Analyzer make	API H2S T101	Analyzer serial #	158

### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.4	N/A	Correlation Coefficient	0.999964
80.8	80.8	1.0006		
40.4	40.6	0.9955	Slope	0.995992
20.4	20.3	1.0025		
			Intercept	0.226548









# Wood Buffalo Environmental Association

## THC Calibration Report

### Station Information

Calibration Date	Friday, February 13, 2015	Previous Calibration	Wednesday, January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	12:01
Barometric Pressure	mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	996
Gas Cert Reference	SA130123A	Cal Gas Expiry Date	12-Dec-16
CH4 Cal Gas Conc.	512 ppm	CH4 Equiv Conc.	1092.3 ppm
C3H8 Cal Gas Conc.	211 ppm		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	9037
DACS voltage range	NA	DACS channel #	NA

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppm)	100	100	Sample Pressure	8.5	8.5
Analyzer Range (mv)	100	100	Air or Bypass press	34.9	34.9
Calculated slope	1.000474	1.000495	Fuel Pressure	22.9	23.0
Calculated intercept	-0.088792	-0.078901		4.5	4.5
				3.439	3.439

Analyzer make Thermo 51i-LT Analyzer serial # 1336160089

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration THC (ppm) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.00	0.01	N/A
as found span	5000	58.3	12.74	12.80	0.995
calibrator zero	5000	0.0	0.00	0.07	N/A
high point	5000	58.3	12.74	12.80	0.995
second point	5000	29.2	6.38	6.47	0.986
third point	5000	14.7	3.21	3.29	0.976
calibrator zero	5000	0.0	0.00	-0.03	N/A
as left zero	5000	0.0	0.00	-0.03	N/A
as left span	5000	58.3	12.74	12.81	0.994
Average Correction Factor					0.986

Corrected As found 12.79 Previous response 12.82 % change 0.2%

#### Notes:

Filter changed out, No Maintenance or adjustments done

Calibration Performed By:

Melissa Lemay



# Wood Buffalo Environmental Association

## THC Calibration Summary

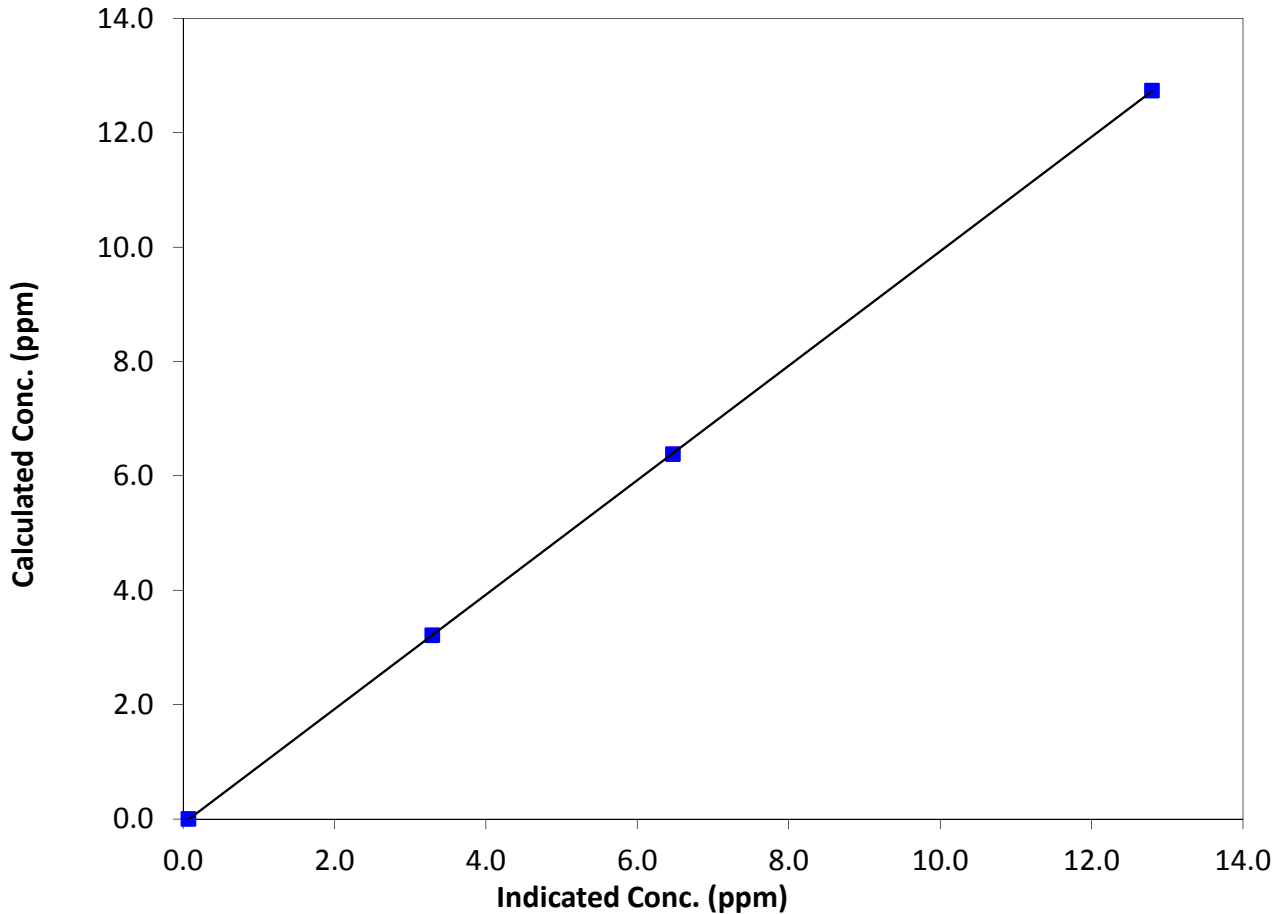
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:20	End Time (MST)	12:01
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	N/A	Correlation Coefficient	0.999996
12.74	12.80	0.9950		
6.38	6.47	0.9859	Slope	1.000495
3.21	3.29	0.9761		
			Intercept	-0.078901

### THC Calibration Curve



THC Calibration Plot

Date: February 13, 2015





# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Reason:	Routine		
Start Time (MST)	8:20	End Time (MST)	12:01
Barometric Pressure	mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	996
NO Cal Gas Conc	51.5 ppm	Cal Gas Expiry Date	December 12, 2016
NOx Cal Gas Conc	51.5 ppm	Cal Gas Serial #	SA130123A

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	6894
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.999082	0.999552	1.006246
	Data Offset	-0.642062	-0.499459	-0.471639
After	Data Slope	1.000665	1.007877	0.995865
	Data Offset	-0.586147	-0.538063	-0.534697
Channel #				
Voltage Range				

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1410661309
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.910	ppb	0.910	ppb
NOX coefficient	1.004	ppb	1.004	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	3.8		3.8	
NOX bkgrnd	4.0		4.0	
Nt coefficient	N/A		N/A	
Chamber Temp	50.7	Deg C	50.7	Deg C
Moly Temp	325.7	Deg C	325.7	Deg C
PMT Temp	-3.1	Deg C	-3.1	Deg C
O3 flow	ok	ccm	ok	ccm
R Cell Press	171.9	mmHg	171.9	mmHg
Sample Flow	0.610	ccm	0.610	ccm

**Notes:**

Filter changed out, no adjustments or maintenance done



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date:

February 13, 2015

Station Number:

AMS 19

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1	N/A	N/A
as found span	5000	58.3	600.5	600.5	0.0	599.6	595.4	4.1	1.0015	1.0085
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.1	0.1	-0.1	N/A	N/A
high point	5000	58.3	600.5	600.5	0.0	599.6	595.4	4.1	1.0015	1.0085
second point	5000	29.1	299.7	299.7	0.0	302.1	299.8	2.2	0.9922	0.9998
third point	5000	14.7	151.4	151.4	0.0	152.2	150.7	1.5	0.9948	1.0047
calibrator zero	6000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	N/A	N/A
as left zero	6000	0.0	0.0	0.0	0.0	0.0	0.1	-0.1	N/A	N/A
as left span	5000	58.3	600.5	272.2	328.3	596.2	269.8	326.4	1.0072	1.0089
Average Correction Factor									0.9961	1.0043

Corrected As found NO<sub>x</sub>= 599.7 NO= 595.4 Percent Change NO<sub>x</sub>= 0.3% NO= 1.0%  
 Previous Response NO<sub>x</sub>= 601.7 NO= 601.3

### 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 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			-0.1			N/A	
1st NO <sub>2</sub> (300)	N/A	272.2	325.1	598.5	272.2	326.4	0.9918	1.0000	0.9960	100.4%
2nd NO <sub>2</sub> (200)	N/A	378.1	219.2	599.2	378.1	221.1	0.9906	1.0000	0.9914	100.9%
3rd NO <sub>2</sub> (100)	N/A	483.6	113.7	599.1	483.6	115.5	0.9908	1.0000	0.9844	101.6%
4th NO <sub>2</sub> (0)	597.3	N/A	2.9	600.2	597.3	2.9	0.9890	1.0000	N/A	N/A
Average Correction Factor							0.9905	1.0000	0.9906	100.9%

Calibration Performed By: Melissa Lemay



# Wood Buffalo Environmental Association

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

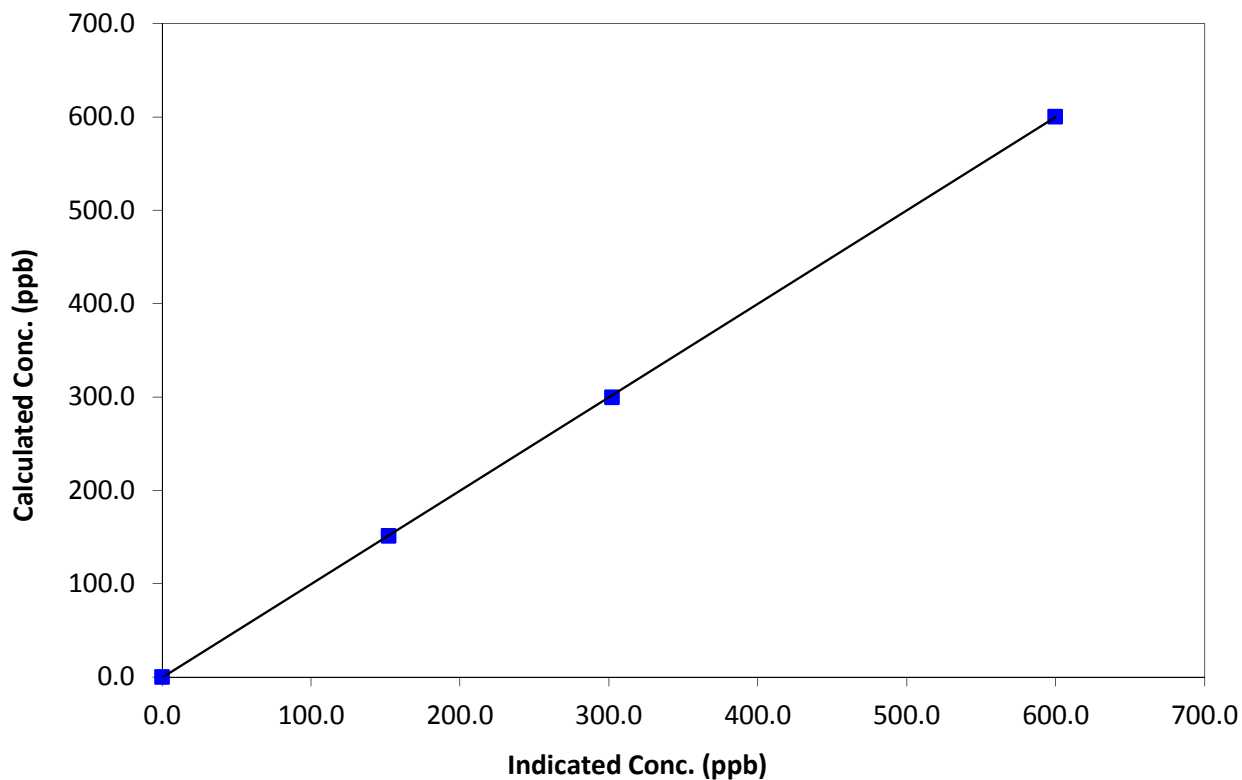
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:20	End Time (MST)	12:01
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999976
600.5	599.6	1.0015		
299.7	302.1	0.9922	Slope	1.000665
151.4	152.2	0.9948		
0.0	0.0	0.0000	Intercept	-0.586147

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

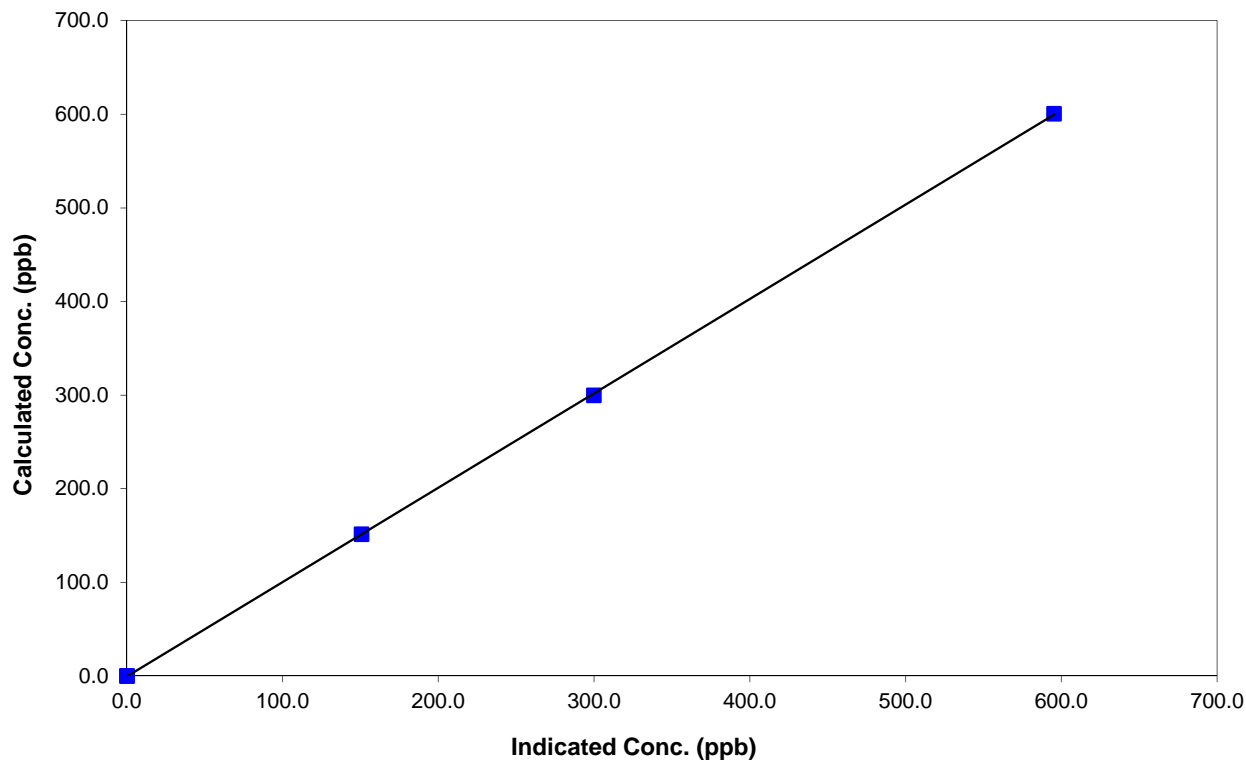
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:20	End Time (MST)	12:01
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999981
600.5	595.4	1.0085		
299.7	299.8	0.9998	Slope	1.007877
151.4	150.7	1.0047		
0.0	0.1	0.0000	Intercept	-0.538063

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

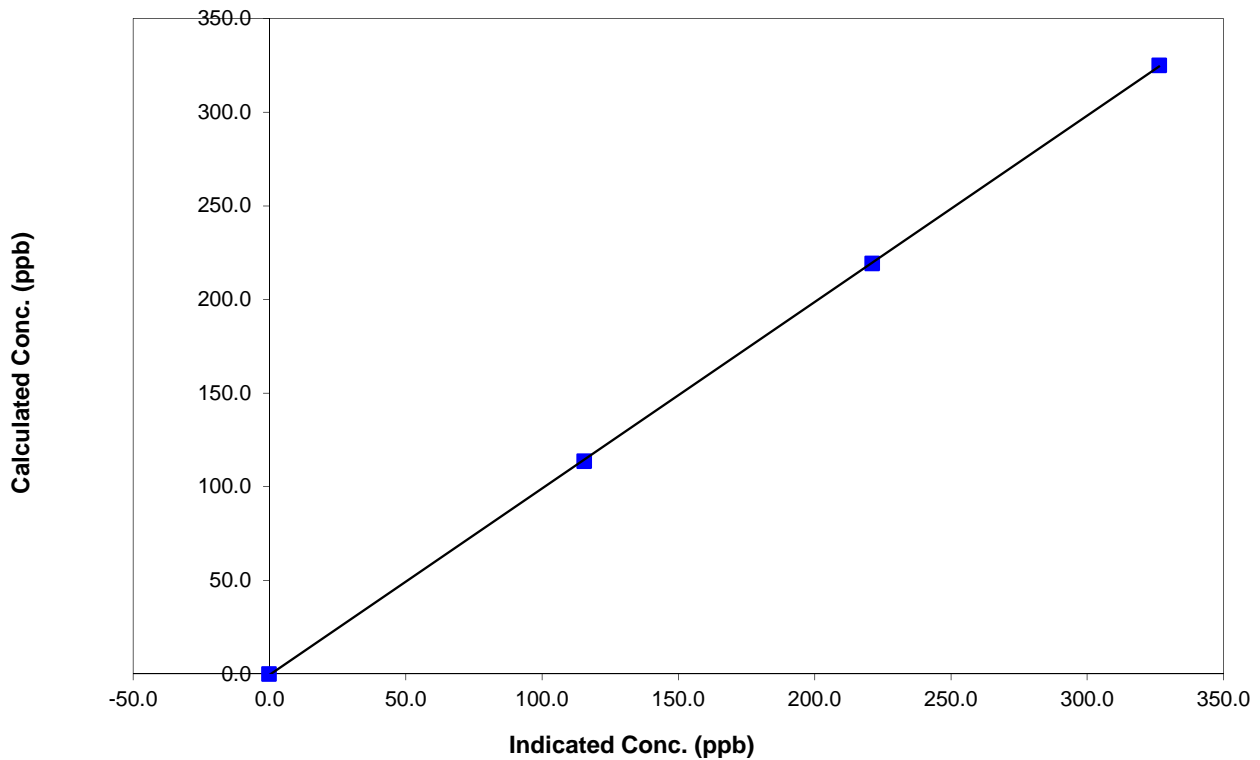
### Station Information

Calibration Date	February 13, 2015	Previous Calibration	January 28, 2015
Station Name	Firebag	Station Number	AMS 19
Start Time (MST)	8:20	End Time (MST)	12:01
Analyzer make	Thermo 42i	Analyzer serial #	1410661309

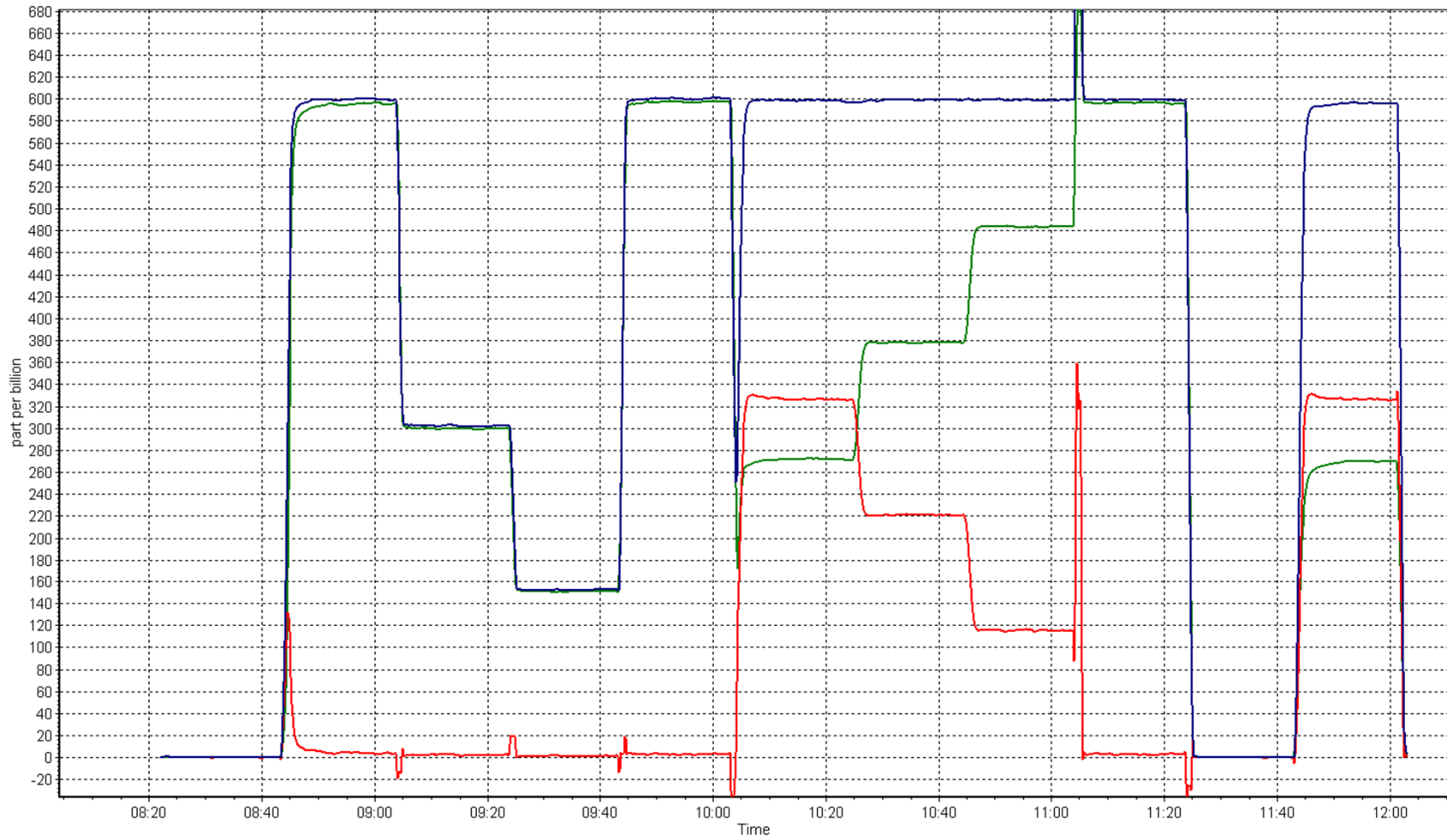
### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.1	N/A	Correlation Coefficient	0.999973
325.1	326.4	0.9960		
219.2	221.1	0.9914	Slope	0.995865
113.7	115.5	0.9844		
			Intercept	-0.534697

### 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  
FEBRUARY 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

March 26, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 FEBRUARY 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	618	34	54	97.02	18	0	6	0
H2S (ppb) Average	638	31	34	99.55	2	0	1	0
NO2 (ppb) Average	639	33	33	100.00	29	0	12	-
NO (ppb) Average	639	33	33	100.00	91	-	18	-
NOX (ppb) Average	639	33	33	100.00	115	-	25	-
Temperature 2 m (C) Average	672	0	0	100.00	1.9	-	-1.6	-
Relative Humidity (%) Average	672	0	0	100.00	96	-	-	-
Wind Speed 10 m (km/h) Average	672	0	0	100.00	37	-	-	-
Wind Direction 10 m (deg) Average	672	0	0	100.00	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
 FEBRUARY 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	618	1.3	2	-	0	0	0	1	1	3	18
H2S (ppb) Average	638	0.5	0	-	0	0	0	0	1	1	2
NO2 (ppb) Average	639	6.8	5	-	0	2	3	6	9	13	29
NO (ppb) Average	639	5.9	9	-	0	0	1	2	6	18	91
NOX (ppb) Average	639	12.7	13	-	1	3	5	8	17	28	115
Temperature 2 m (C) Average	672	-15.54	6.4	-	-31.1	-23	-20	-16.6	-11.8	-6.1	1.9
Relative Humidity (%) Average	672	76.7	10	-	39	64	72	79	83	87	96
Wind Speed 10 m (km/h) Average	672	14.1	6	-	2	6	10	14	18	21	37
Wind Direction 10 m (deg) Average	672	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - CONOCOPHILLIPS SURMONT (AMS 502)  
FEBRUARY 2015

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	01 Feb 2015 03:00	28 Feb 2015 06:00	20	Stabilization after daily span
H2S	17 Feb 2015 15:00	17 Feb 2015 15:00	1	Intermittent unstable operation - excessive baseline drift
H2S	23 Feb 2015 23:00	23 Feb 2015 23:00	1	Intermittent unstable operation - excessive baseline drift
H2S	24 Feb 2015 03:00	24 Feb 2015 03:00	1	Intermittent unstable operation - excessive baseline drift

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Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0	Hours in Service: 672
Maximum Value: 18 ppb on Feb 23 07:00	Maximum Daily Average: 5.8 ppb on Feb 23
Minimum Value: 0 ppb on Feb 24 19:00	Hours of Data: 618
Maximum Diurnal Average: 2.0 ppb at hour 7	Hours of Missing Data: 54
Monthly Average: 1.3 ppb	Hours of Calibration: 34
Minimum Daily Average: 0.2 ppb on Feb 24	Percent Operational Time: 97.0
Minimum Diurnal Average: 0.8 ppb at hour 22	
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> =9	

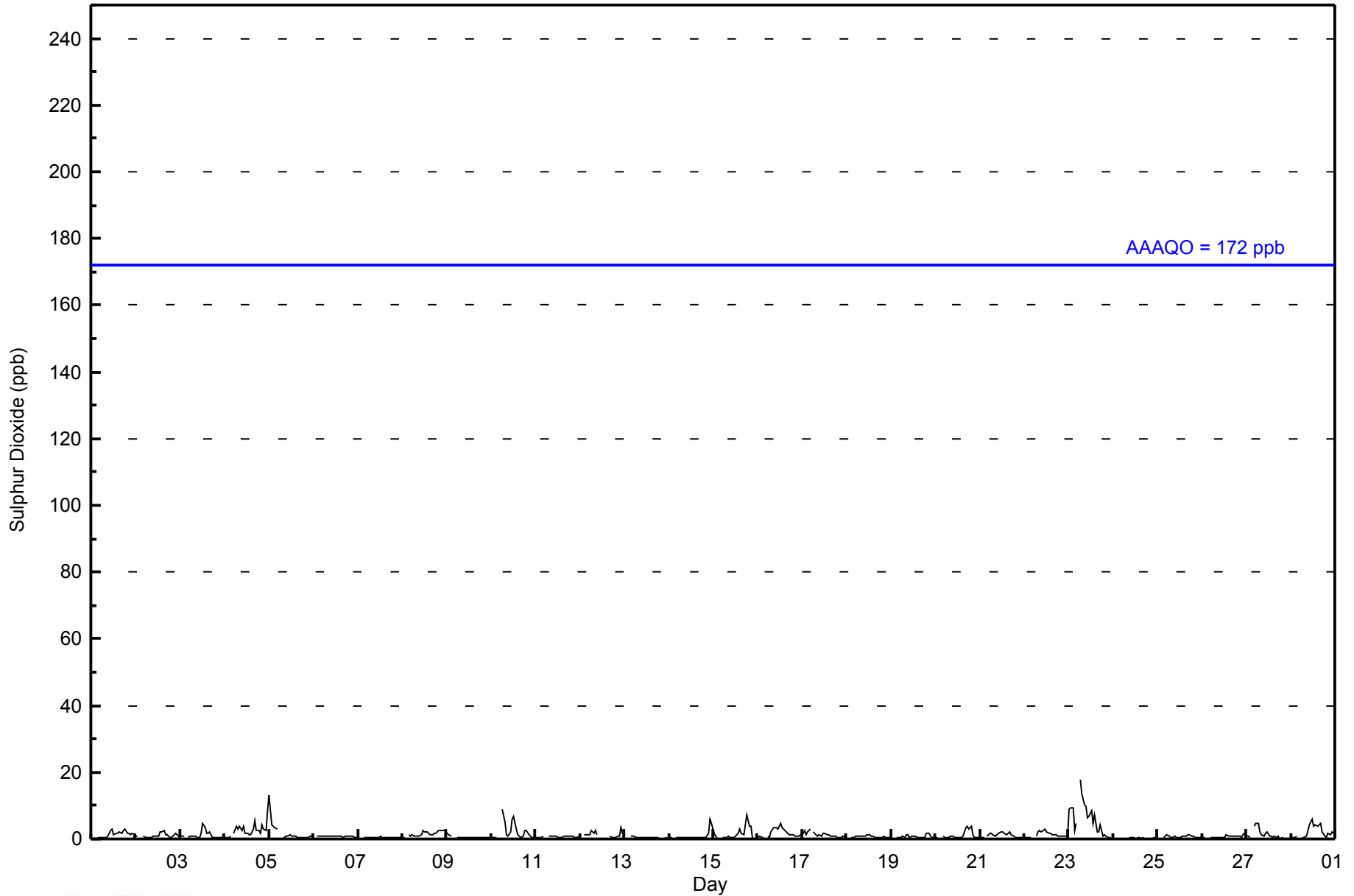
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																									
1-Feb	0	Z	RE	0	0	0	0	0	1	1	3	3	1	2	2	2	2	3	3	2	2	1	2	1	1.4	3																							
2-Feb	1	1	Z	RE	1	0	1	1	1	1	1	1	1	2	2	2	1	1	0	1	1	2	1	1	1.0	2																							
3-Feb	1	1	1	Z	1	1	1	1	1	1	1	2	5	3	2	2	2	0	0	0	0	0	0	0	1.1	5																							
4-Feb	0	0	1	1	Z	2	4	3	4	3	4	2	2	1	1	3	5	2	2	2	4	3	3	9	2.6	9																							
5-Feb	13	4	4	3	3	Z	RE	1	1	1	1	1	1	1	1	1	0	2	0	1	1	1	1	1	1.8	13																							
6-Feb	Z	RE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
7-Feb	1	Z	RE	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	1	0.6	1																							
8-Feb	0	0	Z	1	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2	2	3	2	3	3	1.6	3																							
9-Feb	2	1	1	Z	RE	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0.6	2																							
10-Feb	0	1	0	1	Z	RE	9	5	1	1	2	6	7	3	1	1	1	1	3	2	1	1	0	0	2.2	9																							
11-Feb	1	1	1	0	1	Z	RE	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0.7	1																							
12-Feb	Z	RE	1	1	1	1	3	2	3	1	C	C	C	C	C	C	1	1	1	0	1	1	3	2	--	3																							
13-Feb	1	Z	RE	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1																							
14-Feb	0	0	Z	RE	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	6	5	0	0.9	6																							
15-Feb	2	1	1	Z	RE	1	0	0	1	0	0	1	1	2	3	2	1	4	7	4	4	0	0	0	1.6	7																							
16-Feb	0	1	0	0	Z	1	1	2	3	3	3	3	4	3	3	2	2	1	1	1	1	1	1	1	1.8	4																							
17-Feb	2	2	1	2	3	Z	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	0	1.3	3																							
18-Feb	Z	RE	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0.7	1																							
19-Feb	0	Z	RE	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0	0	2	2	1	0	1	0.7	2																							
20-Feb	0	0	Z	RE	1	0	0	0	1	1	0	1	0	0	0	1	3	4	3	4	1	0	0	0	1.1	4																							
21-Feb	0	0	0	Z	1	2	2	1	1	1	2	2	2	2	1	2	2	1	1	0	0	0	0	0	1.1	2																							
22-Feb	0	0	0	0	Z	RE	1	2	2	2	2	3	2	2	2	1	1	1	1	1	1	1	1	1	1.3	3																							
23-Feb	9	9	9	2	5	Z	18	13	10	10	6	7	9	5	7	2	2	4	1	1	1	0	0	0	5.8	18																							
24-Feb	Z	RE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0																							
25-Feb	0	Z	RE	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	0	0.7	1																							
26-Feb	1	0	Z	RE	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	0.7	2																							
27-Feb	1	1	0	Z	4	5	5	2	1	1	2	2	1	1	1	1	1	1	0	0	0	0	0	0	1.2	5																							
28-Feb	0	0	1	1	Z	RE	0	1	1	2	4	6	4	4	4	4	5	2	1	1	2	1	2	2	2.1	6																							
																								1.6	1.3	1.3	0.9	1.2	0.9	2.0	1.5	1.4	1.4	1.4	1.8	1.8	1.5	1.4	1.3	1.4	1.3	1.2	1.1	1.0	0.8	1.1	1.2	Diurnal Average	
																								13	9	9	3	5	5	18	13	10	10	6	7	9	5	7	4	5	4	7	4	4	3	6	9	Diurnal Maximum	

Z - zerospan      C - Calibration      RE - Recovery  
 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 - February 2015**





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

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 10	615	99.51	99.51
11 - 20	3	0.49	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: 618

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Sulphur Dioxide (SO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - February 2015**

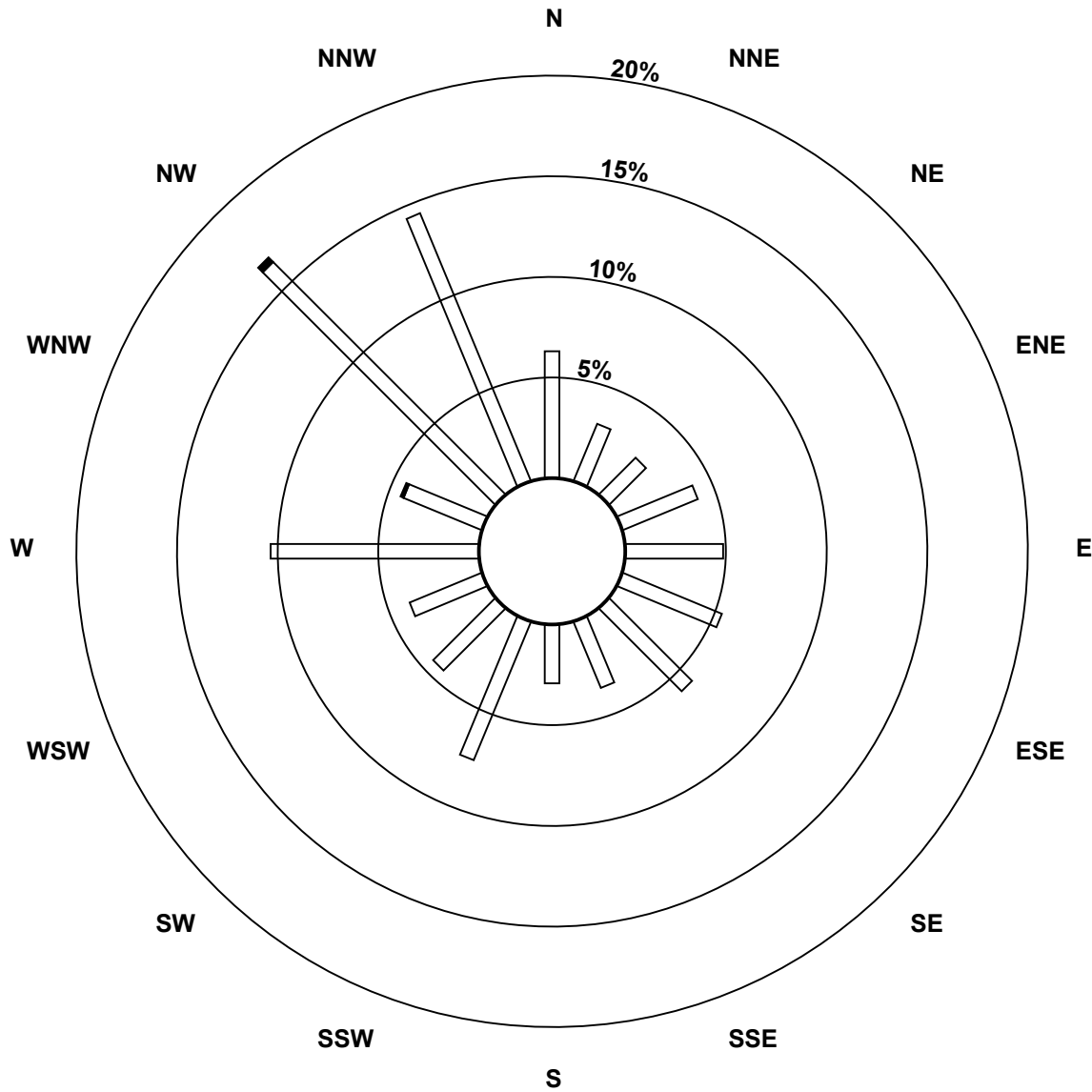
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 10	39	19	16	25	30	33	36	22	18	46	27	24	64	26	101	89	615
11 - 20	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3
21 - 60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61 - 110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111 - 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	39	19	16	25	30	33	36	22	18	46	27	24	64	27	103	89	618

Total Number of Valid Hours: 618

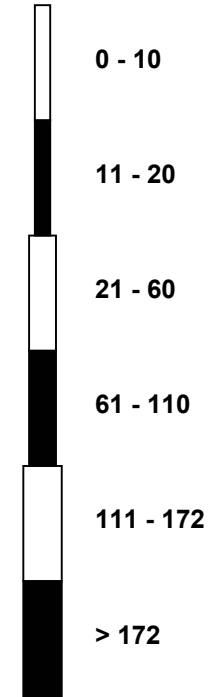
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

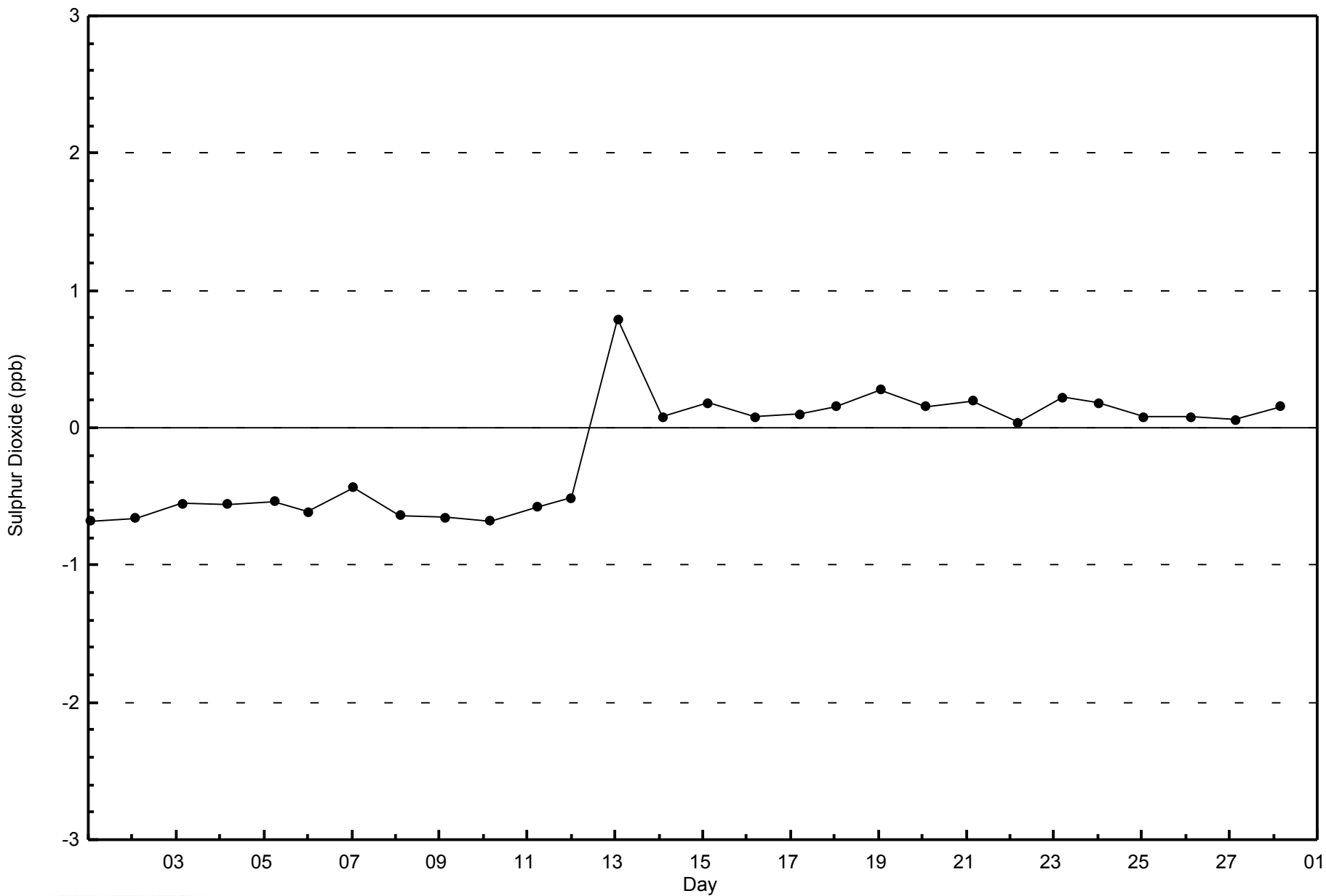


Total Number of Valid Hours: 618



WBEA  
Zero Responses

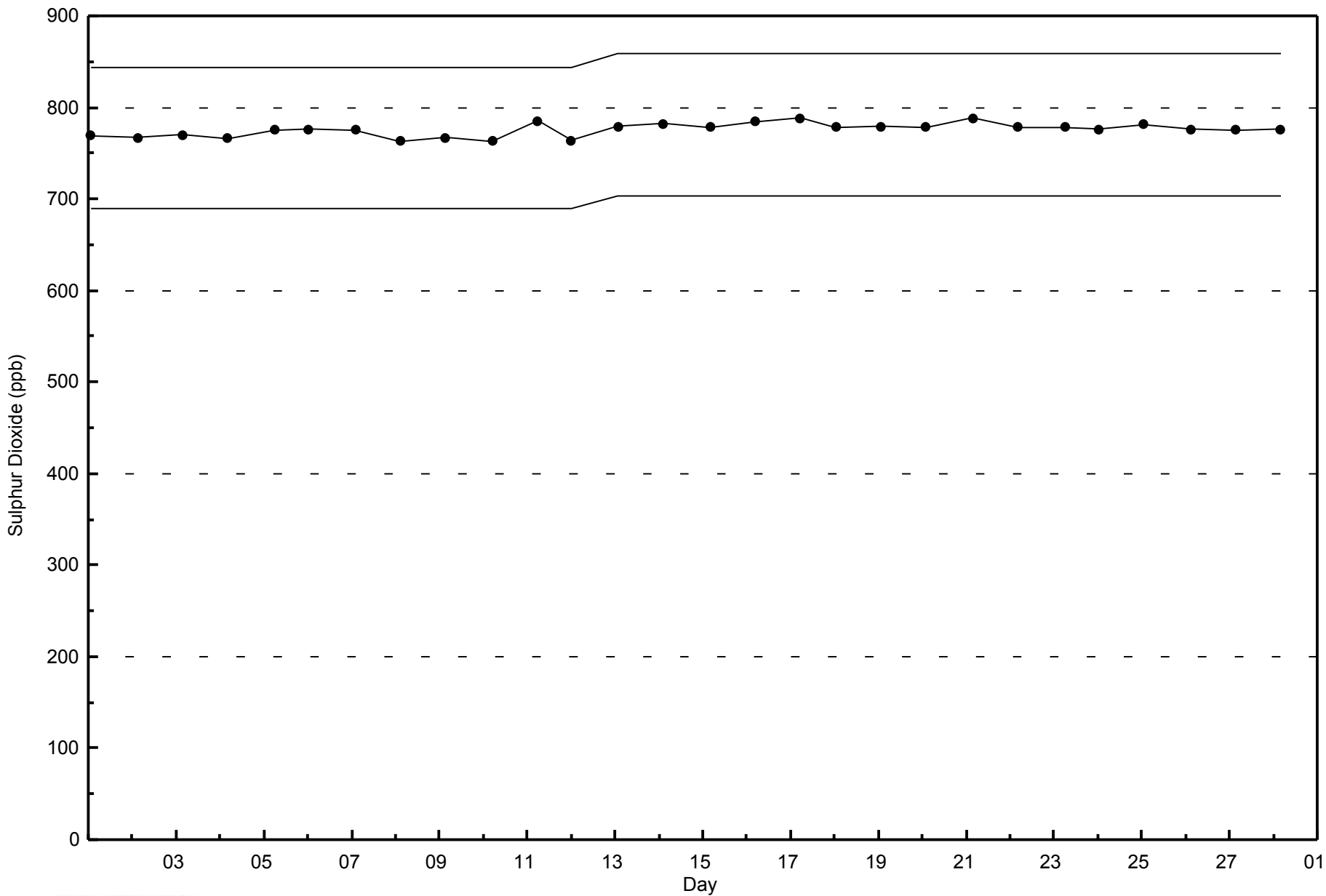
Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - February 2015





WBEA  
Span Responses

Sulphur Dioxide (SO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - February 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 2 ppb on Feb 12 09:00	Maximum Daily Average: 0.9 ppb on Feb 15		Hours of Data:	638
Minimum Value: 0 ppb on Feb 13 10:00	Minimum Daily Average: 0.2 ppb on Feb 13		Hours of Missing Data:	34
Maximum Diurnal Average: 0.6 ppb at hour 9	Minimum Diurnal Average: 0.4 ppb at hour 15		Hours of Calibration:	31
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> =1 P <sub>90</sub> =1 P <sub>99</sub> =2		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-Feb	0	0	Z	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0.5	1
2-Feb	1	1	1	Z	0	0	0	0	0	0	0	1	0	0	1	1	1	1	0	0	1	1	1	1	0.5	1
3-Feb	1	1	1	1	Z	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0.5	1
4-Feb	0	0	0	0	0	Z	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	0.5	1
5-Feb	1	1	1	1	1	1	Z	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
6-Feb	0	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-Feb	0	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-Feb	0	0	1	Z	1	0	0	1	2	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0.6	2
9-Feb	0	0	0	0	Z	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1
10-Feb	0	1	1	1	1	Z	2	1	1	1	1	1	1	0	1	0	1	1	1	1	2	1	1	1	0.8	2
11-Feb	0	0	0	1	0	0	Z	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0.4	1
12-Feb	0	Z	0	0	0	0	2	1	2	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	0.7	2
13-Feb	0	0	Z	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1
14-Feb	0	0	0	Z	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0.4	1
15-Feb	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.9	1
16-Feb	1	1	1	1	1	Z	1	1	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	1	0.6	1
17-Feb	0	1	0	0	0	1	Z	1	1	1	0	0	0	0	UO	0	0	0	0	0	0	0	0	0	0.5	1
18-Feb	0	Z	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0.4	1
19-Feb	0	0	Z	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	2	1	2	1	0.8	2
20-Feb	1	1	1	Z	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0.6	1
21-Feb	1	1	0	0	Z	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	1
22-Feb	0	0	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.3	1
23-Feb	1	1	1	1	1	1	Z	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	UO	0.7	1
24-Feb	0	Z	UO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
25-Feb	0	1	Z	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.3	1
26-Feb	0	0	0	Z	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.2	1
27-Feb	1	0	0	1	Z	1	1	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0.5	1
28-Feb	0	0	0	0	1	Z	0	0	0	1	1	1	0	1	1	1	1	1	1	0	1	0	0	1	0.5	1
	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	Diurnal Average	
	1	1	1	1	1	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2	1	2	1	Diurnal Maximum	

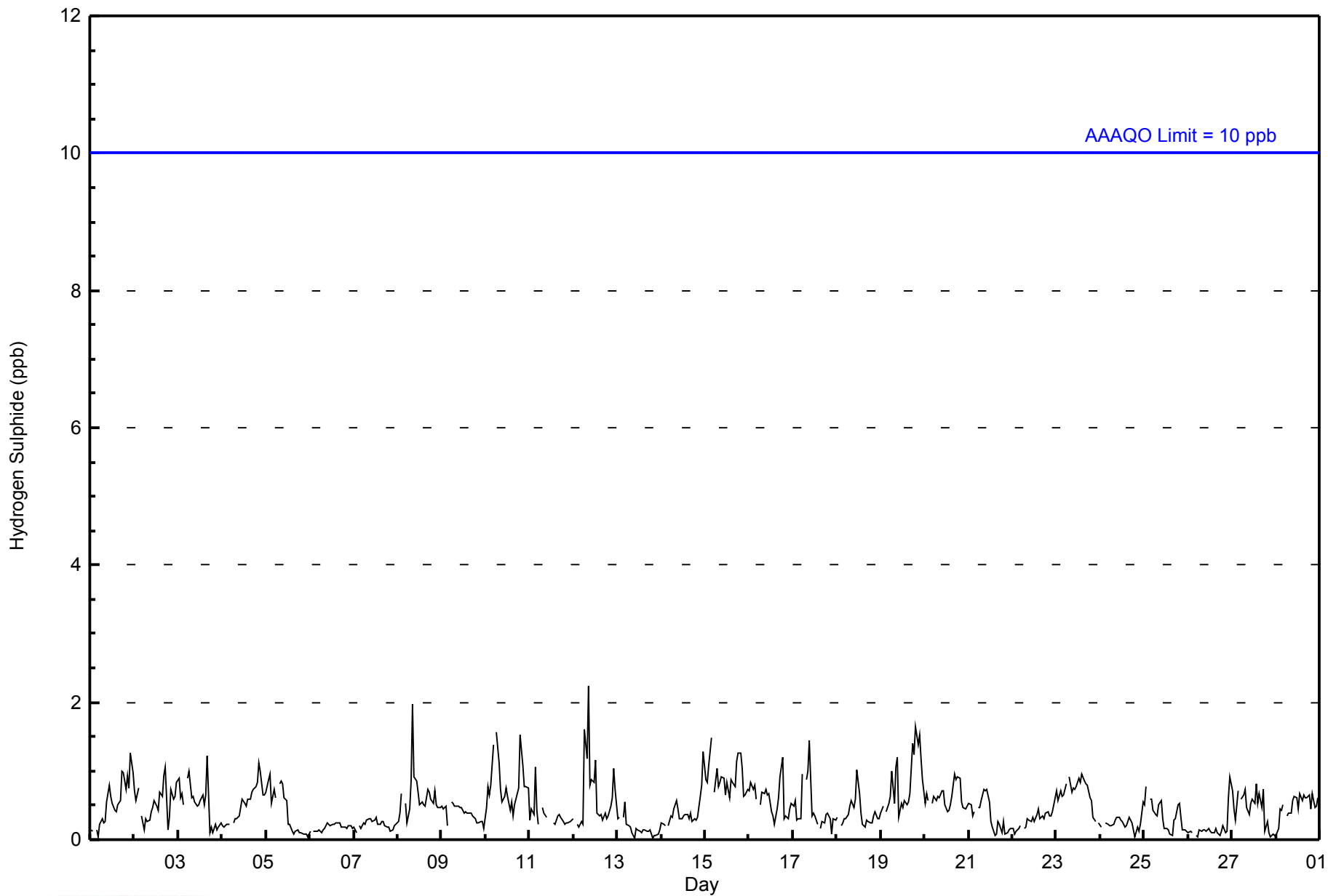
Z - zeronspan                      C - Calibration                      UO - Unstable Operation  
 Alberta Ambient Air Quality Objectives (AAAQO): 1-hr 10 ppb    24-hr 3 ppb





**WBEA**  
**Hourly Averages**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - February 2015**





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

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 2	638	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: 638

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Hydrogen Sulphide (H<sub>2</sub>S) - ppb**  
**ConocoPhillips - Surmont - February 2015**

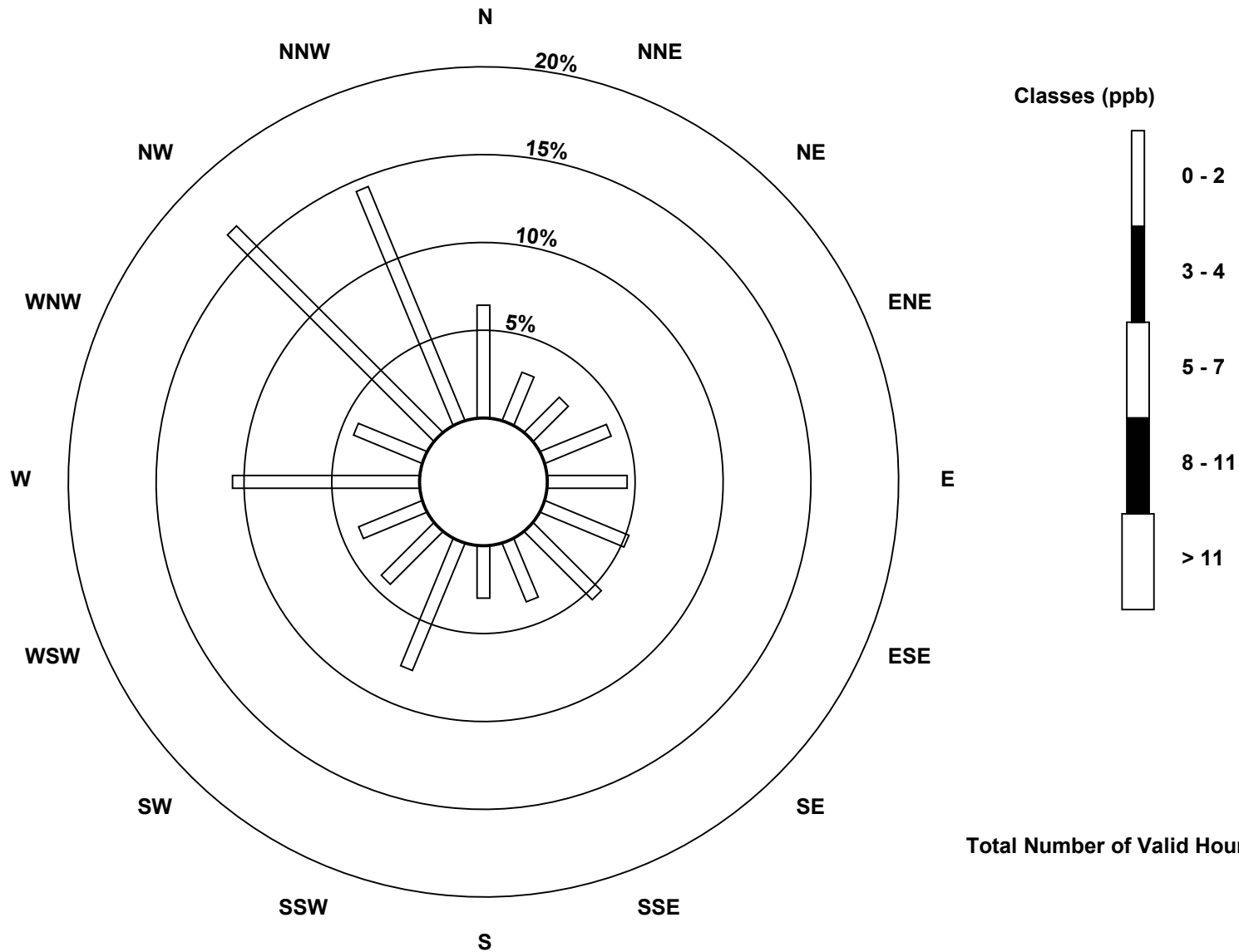
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 2	41	19	18	26	29	33	35	23	19	50	27	25	68	27	106	92	638
3 - 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	19	18	26	29	33	35	23	19	50	27	25	68	27	106	92	638

Total Number of Valid Hours: 638

Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont (AMS502)

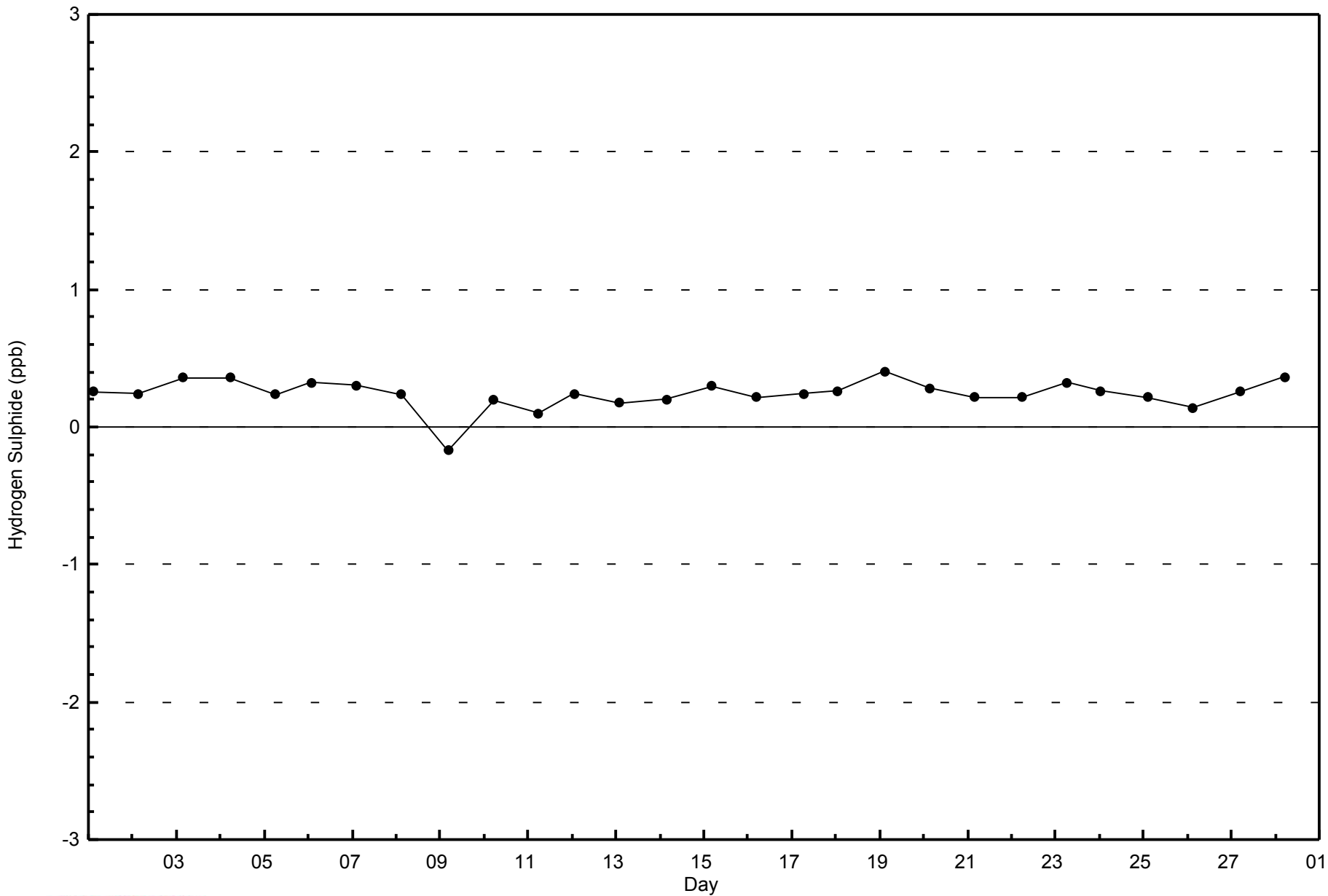


Total Number of Valid Hours: 638



WBEA  
Zero Responses

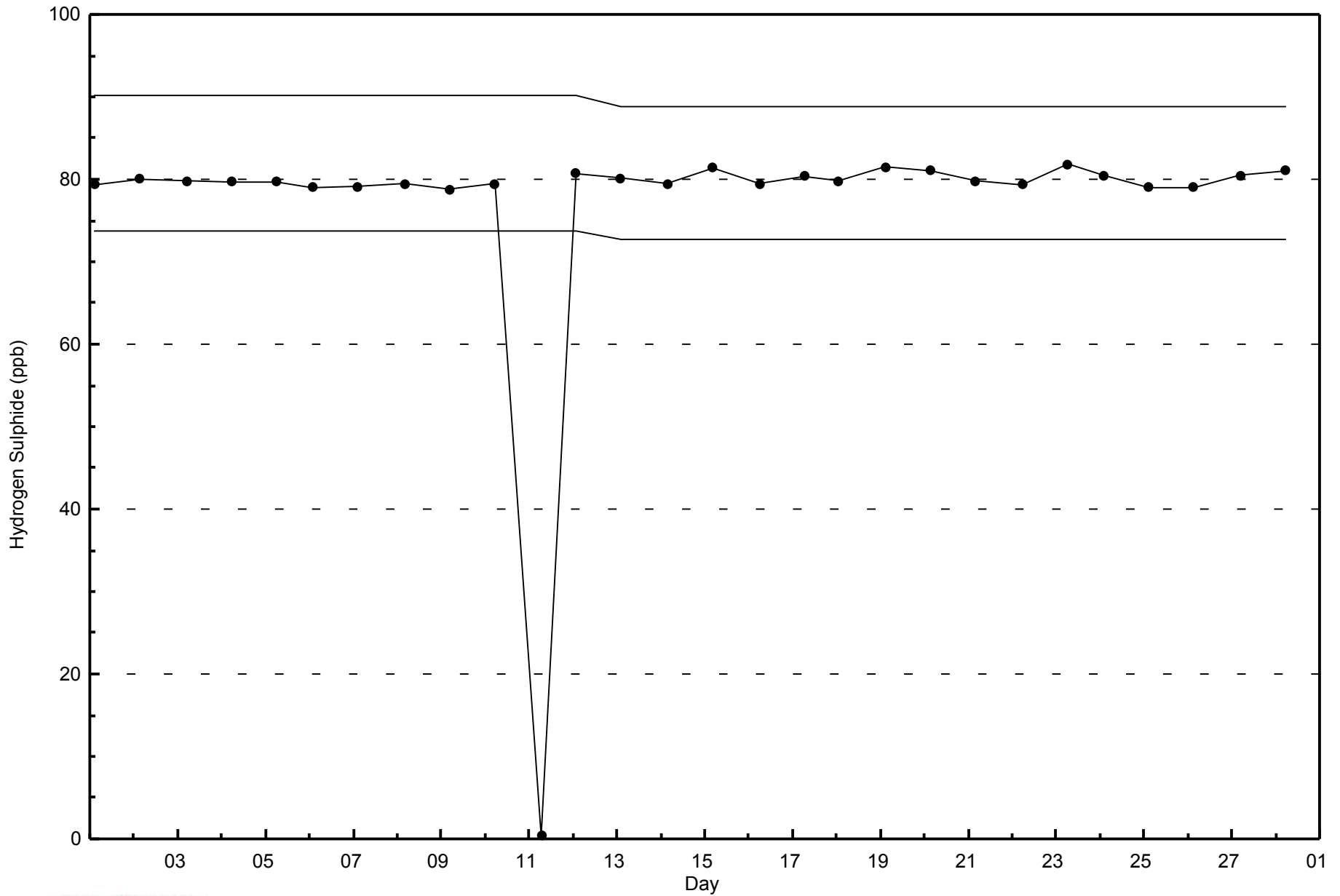
Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - February 2015





WBEA  
Span Responses

Hydrogen Sulphide (H<sub>2</sub>S) - ppb  
ConocoPhillips - Surmont - February 2015



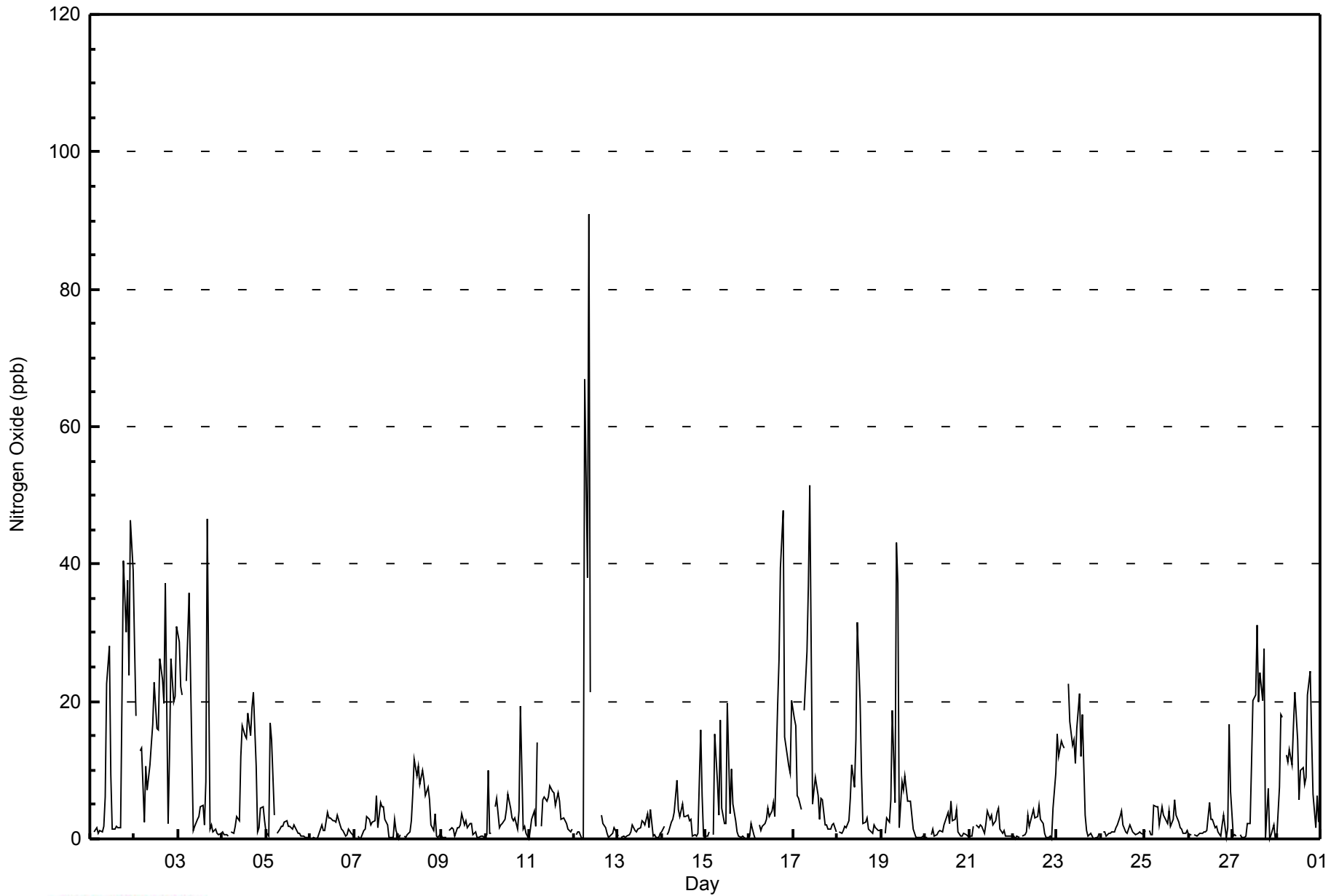


Maximum Value: 91 ppb on Feb 12 09:00																		Maximum Daily Average: 17.7 ppb on Feb 2						Hours in Service: 672		
Minimum Value: 0 ppb on Feb 7 04:00																		Minimum Daily Average: 1.2 ppb on Feb 9						Hours of Data: 639		
Maximum Diurnal Average: 10.4 ppb at hour 9																		Minimum Diurnal Average: 3.3 ppb at hour 22						Hours of Missing Data: 33		
Monthly Average: 5.9 ppb																		Percentiles: P <sub>1</sub> = 0 P <sub>10</sub> = 0 Q <sub>1</sub> = 1 Median = 2 Q <sub>3</sub> = 6 P <sub>90</sub> = 18 P <sub>99</sub> = 46						Hours of Calibration: 33		
																		Percent Operational Time: 100.0								
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	1	Z	1	2	1	1	1	2	6	23	28	9	1	2	2	2	20	41	30	38	24	46	39	13.9	46	
2-Feb	28	18	Z	13	13	2	11	7	11	14	17	23	16	16	26	23	20	37	2	12	26	20	21	31	17.7	37
3-Feb	29	22	21	Z	23	29	36	12	1	2	3	3	5	5	2	8	47	1	2	1	1	1	1	1	11.1	47
4-Feb	1	1	1	0	Z	1	1	2	3	3	12	16	15	15	18	15	19	21	11	1	2	5	5	3	7.4	21
5-Feb	1	0	17	14	3	Z	1	1	2	2	2	3	2	2	2	2	2	1	1	0	0	0	0	0	2.6	17
6-Feb	Z	0	0	0	0	1	2	1	1	4	3	3	3	3	3	4	2	2	1	0	1	1	1	1	1.5	4
7-Feb	0	Z	0	0	0	1	1	3	3	2	2	3	6	2	5	5	5	3	2	0	0	0	3	1	2.1	6
8-Feb	0	1	Z	0	0	1	1	3	7	12	9	11	8	10	8	6	8	6	2	1	4	0	0	1	4.2	12
9-Feb	0	0	0	Z	1	2	2	0	2	2	2	4	2	3	2	2	2	1	1	0	0	0	0	0	1.2	4
10-Feb	1	10	1	1	Z	5	6	2	2	2	3	4	7	5	3	3	3	1	4	19	1	2	1	0	3.7	19
11-Feb	1	3	4	2	14	Z	2	6	6	5	6	8	7	7	5	7	5	3	3	3	2	1	1	1	4.4	14
12-Feb	Z	1	1	1	0	0	67	38	91	21	C	C	C	C	C	3	2	2	1	0	1	1	2	1	12.9	91
13-Feb	0	Z	0	0	0	0	1	1	2	1	1	1	2	3	2	2	4	2	4	0	1	0	0	1	1.3	4
14-Feb	1	2	Z	1	1	2	3	4	8	4	3	5	3	3	4	3	3	0	1	0	1	16	6	0	3.3	16
15-Feb	0	0	1	Z	1	15	8	3	17	4	2	2	20	4	10	5	3	1	0	0	0	0	0	0	4.3	20
16-Feb	0	2	1	0	Z	2	1	2	2	3	4	3	4	5	3	19	26	39	48	15	13	11	10	20	10.2	48
17-Feb	18	17	6	6	4	Z	19	27	37	51	5	7	9	6	3	6	6	2	2	1	1	2	2	1	10.4	51
18-Feb	Z	1	1	1	2	2	3	6	11	8	14	32	20	9	2	2	3	1	1	1	2	2	1	1	5.4	32
19-Feb	1	Z	1	3	2	6	19	5	43	37	2	8	7	9	6	5	5	1	1	0	0	0	0	0	7.1	43
20-Feb	0	0	Z	1	1	0	1	1	1	1	2	3	4	2	5	3	3	4	1	0	0	1	1	0	1.6	5
21-Feb	0	0	2	Z	2	2	2	2	1	2	4	3	3	2	3	4	4	1	1	1	0	0	0	0	1.8	4
22-Feb	0	0	0	0	Z	0	1	1	4	2	4	4	3	3	5	3	2	1	0	0	0	0	4	10	2.1	10
23-Feb	15	12	14	14	13	Z	23	17	14	14	11	16	21	12	18	4	1	0	1	0	0	0	1	1	9.7	23
24-Feb	Z	1	1	0	1	1	1	1	2	2	3	4	2	1	1	1	2	1	1	1	1	1	1	1	1.3	4
25-Feb	1	Z	1	1	1	5	5	5	2	5	4	3	2	4	2	3	6	4	2	2	1	1	1	1	2.6	6
26-Feb	1	1	Z	1	0	1	1	1	1	1	1	5	3	3	2	2	1	0	2	3	0	2	17	7	2.4	17
27-Feb	0	1	0	Z	1	0	0	0	2	2	11	20	21	31	20	24	20	28	0	7	0	1	2	0	8.4	31
28-Feb	0	7	18	18	Z	12	11	13	11	16	21	15	6	10	10	8	9	21	25	15	6	2	6	2	11.4	25
																		Diurnal Average						Diurnal Maximum		
4.2 4.4 4.0 3.4 3.7 3.8 8.1 5.9 10.4 8.8 6.7 8.1 7.5 6.5 6.3 6.2 7.7 7.4 5.7 4.2 3.8 3.3 4.7 4.5																		29 22 21 18 23 29 67 38 91 51 28 32 21 31 26 24 47 39 48 30 38 24 46 39								
Z - zerospan																		C - Calibration								



**WBEA**  
**Hourly Averages**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - February 2015**







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

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	593	92.80	92.80
21 - 40	38	5.95	98.75
41 - 80	7	1.10	99.84
81 - 159	1	0.16	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxide (NO) - ppb**  
**ConocoPhillips - Surmont - February 2015**

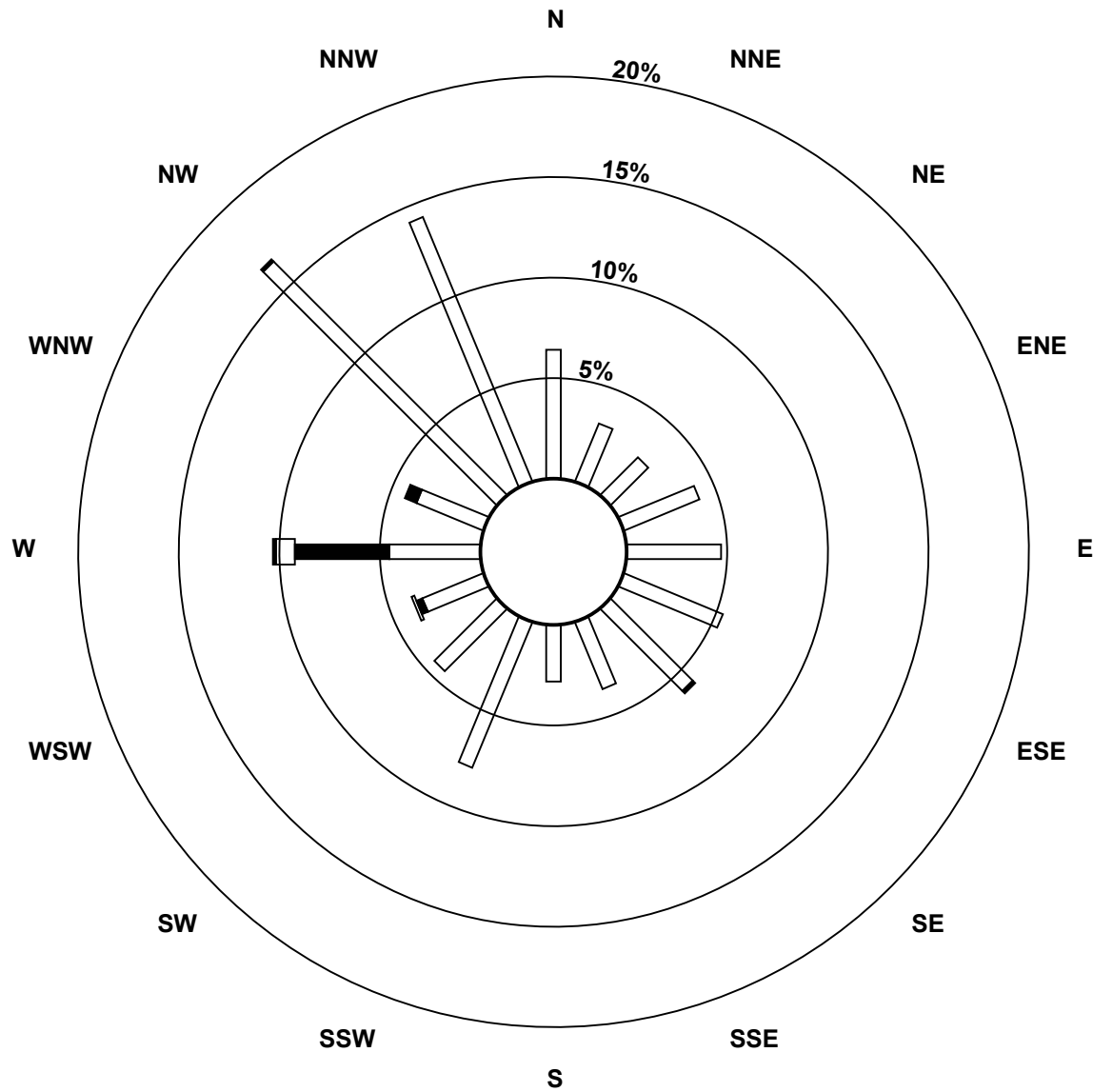
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	20	17	26	30	34	37	23	18	50	28	21	29	23	105	91	593
21 - 40	0	0	0	0	0	0	1	0	0	0	0	2	30	4	1	0	38
41 - 80	0	0	0	0	0	0	0	0	0	0	0	1	6	0	0	0	7
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	20	17	26	30	34	38	23	18	50	28	24	66	27	106	91	639

Total Number of Valid Hours: 639

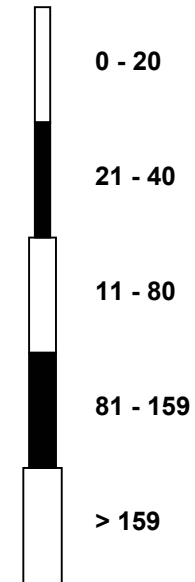
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

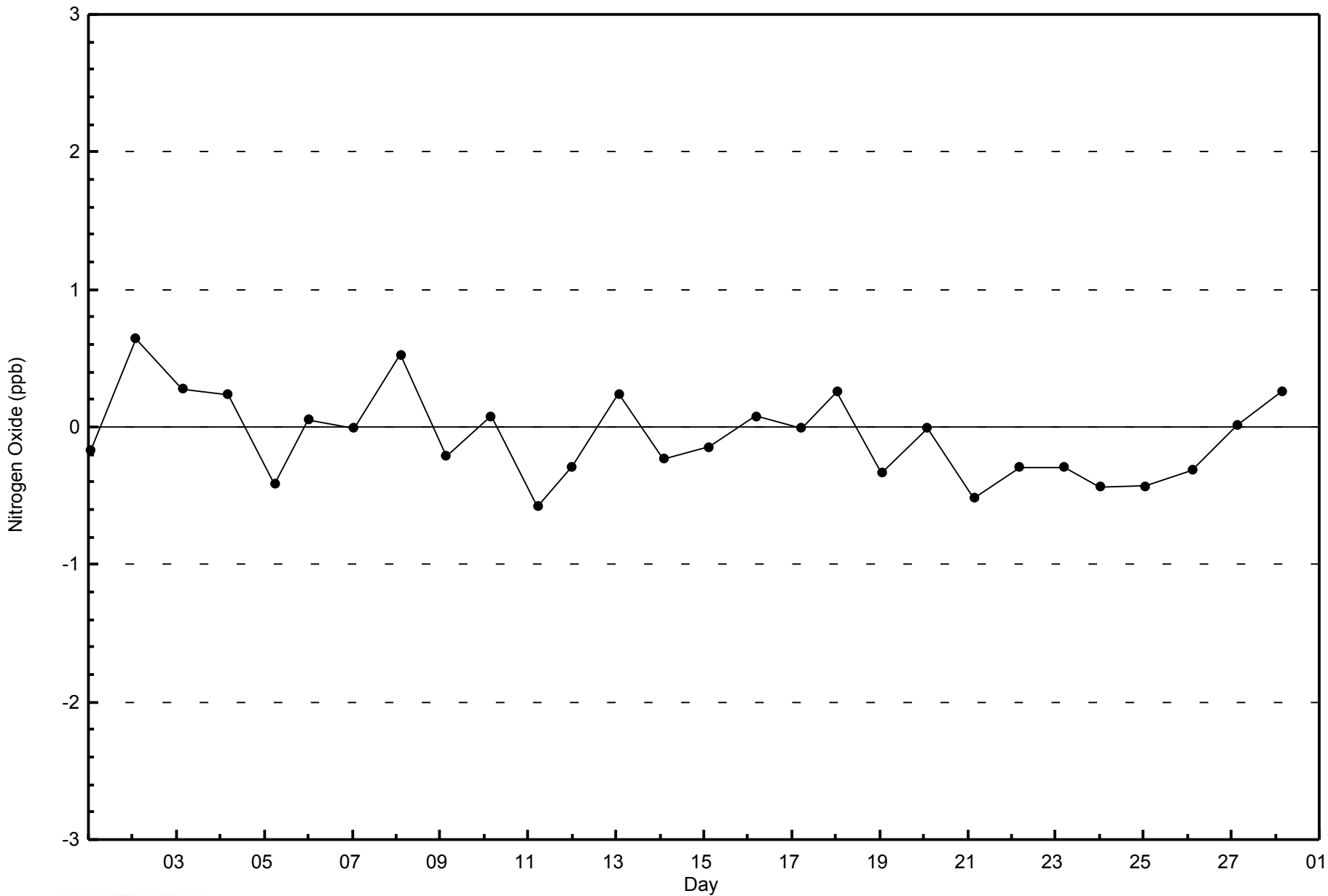


Total Number of Valid Hours: 639



WBEA  
Zero Responses

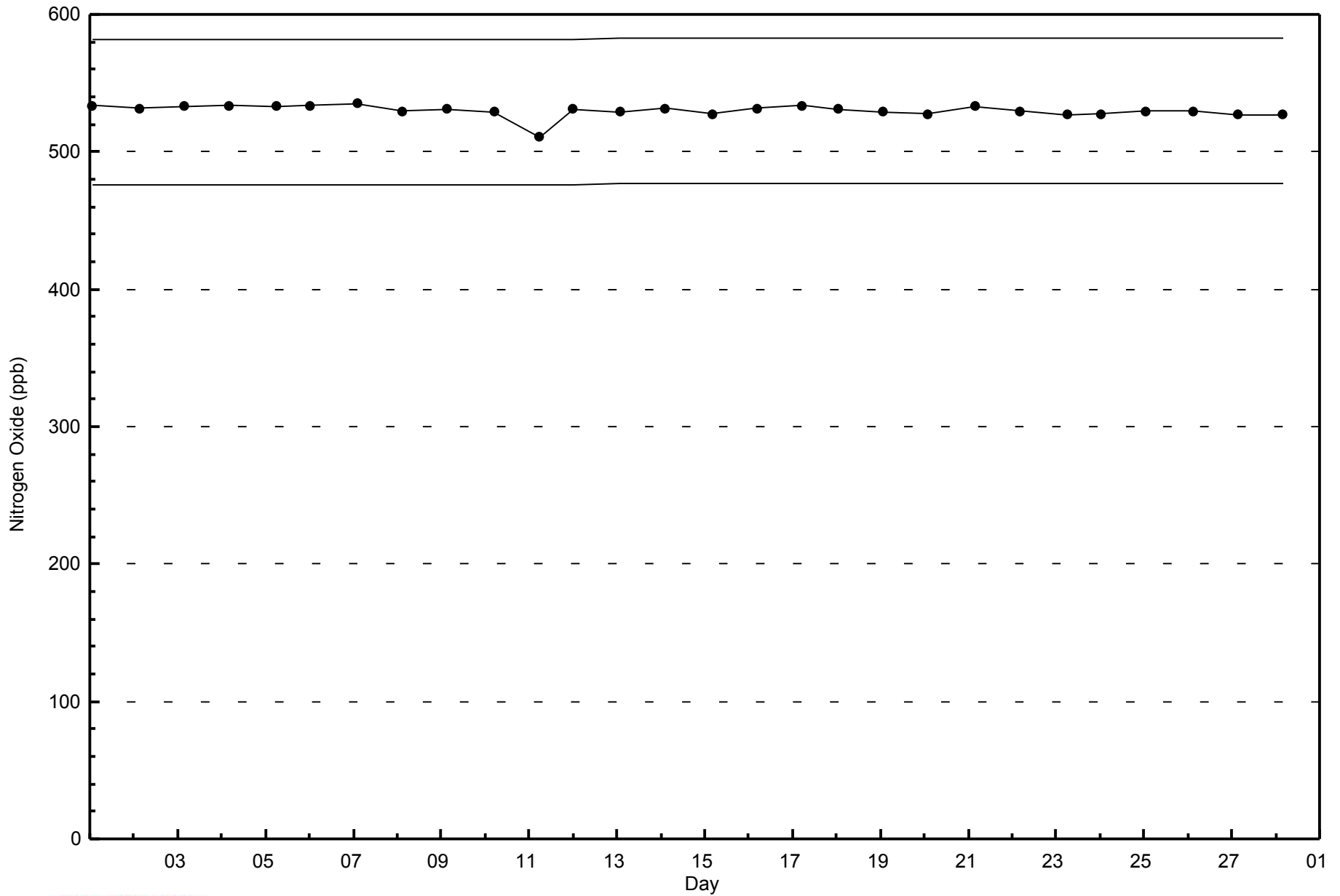
Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont - February 2015





WBEA  
Span Responses

Nitrogen Oxide (NO) - ppb  
ConocoPhillips - Surmont - February 2015





Number of Exceedences (AAAQO):	1-hr: 0	24-hr: 0	Hours in Service:	672
Maximum Value: 29 ppb on Feb 19 07:00	Maximum Daily Average: 12.1 ppb on Feb 17		Hours of Data:	639
Minimum Value: 0 ppb on Feb 7 23:00	Minimum Daily Average: 2.0 ppb on Feb 7		Hours of Missing Data:	33
Maximum Diurnal Average: 9.2 ppb at hour 18	Minimum Diurnal Average: 5.1 ppb at hour 2		Hours of Calibration:	33
Monthly Average: 6.8 ppb	Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 2 Q <sub>1</sub> = 3 Median = 6 Q <sub>3</sub> = 9 P <sub>90</sub> = 13 P <sub>99</sub> = 23		Percent Operational Time:	100.0

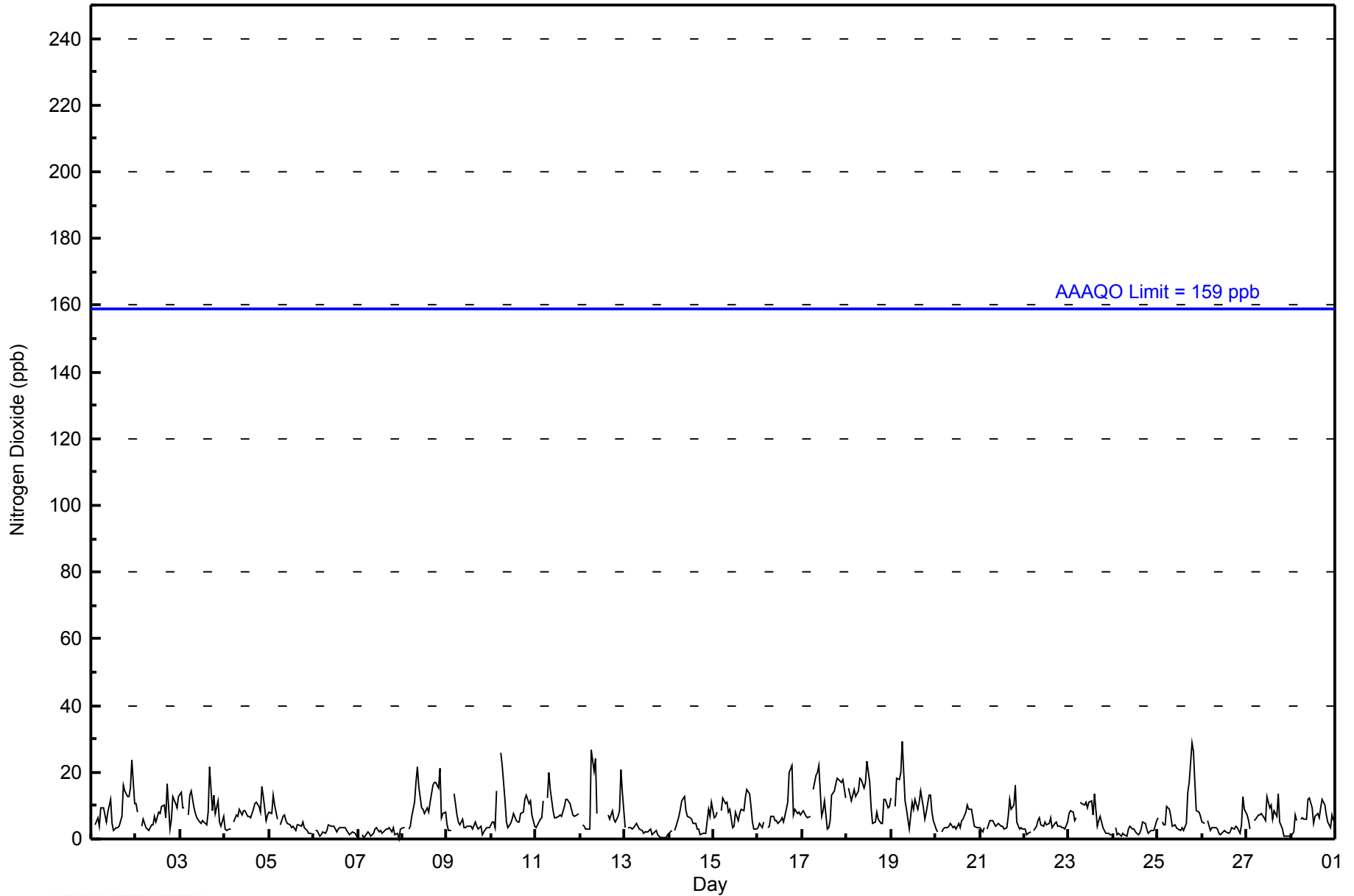
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1-Feb	4	Z	4	7	4	10	9	7	5	8	12	5	3	3	3	4	7	16	15	13	13	15	24	11	8.7	24
2-Feb	11	8	Z	4	6	4	3	3	4	4	7	5	8	8	10	10	6	16	3	6	13	11	9	13	7.4	16
3-Feb	14	9	10	Z	7	13	15	9	8	6	5	5	5	5	4	8	22	9	13	8	12	5	4	7	8.7	22
4-Feb	3	3	3	3	Z	5	7	7	9	7	8	8	7	7	6	9	11	11	10	8	16	13	6	7	7.5	16
5-Feb	8	8	13	10	6	Z	4	7	7	5	5	4	3	4	3	4	4	4	5	3	3	2	2	2	5.0	13
6-Feb	Z	3	3	1	1	2	2	3	4	4	4	4	2	3	4	3	3	3	3	1	2	2	2	1	2.5	4
7-Feb	1	Z	1	1	1	2	2	1	2	3	3	2	3	2	3	3	3	4	2	3	1	2	0	3	2.0	4
8-Feb	3	3	Z	3	4	7	11	17	22	16	9	9	8	9	8	11	16	17	17	15	21	6	8	8	10.8	22
9-Feb	4	2	3	Z	14	7	5	4	6	3	3	4	4	4	3	5	4	3	4	1	2	3	3	3	4.1	14
10-Feb	5	5	3	14	Z	26	22	11	5	3	5	6	8	6	5	5	8	8	12	13	11	12	7	4	8.8	26
11-Feb	4	4	6	7	12	Z	12	20	15	8	6	6	7	7	7	10	12	12	11	9	7	7	7	8	8.8	20
12-Feb	Z	4	4	3	3	3	27	20	24	8	C	C	C	C	C	7	6	9	6	5	7	9	21	14	9.9	27
13-Feb	3	Z	3	3	3	3	5	4	3	3	2	2	2	3	3	1	2	2	1	1	0	1	1	1	2.2	5
14-Feb	2	2	Z	3	4	7	9	12	13	9	7	7	6	5	5	3	3	1	2	2	2	9	7	11	5.5	13
15-Feb	7	7	8	Z	8	12	11	11	8	9	4	4	8	6	8	9	9	12	15	14	10	5	3	3	8.2	15
16-Feb	3	5	4	5	Z	4	4	7	7	6	6	5	6	6	5	9	11	20	22	7	9	8	8	7	7.5	22
17-Feb	9	8	7	6	7	Z	15	19	20	22	7	9	12	3	3	6	13	15	17	18	18	17	18	12	12.1	22
18-Feb	Z	15	12	13	15	13	14	18	18	15	17	23	17	9	5	5	8	6	5	5	12	12	10	10	12.0	23
19-Feb	12	Z	10	18	18	20	29	12	9	6	3	11	9	12	9	11	14	9	6	8	13	13	8	6	11.5	29
20-Feb	3	2	Z	2	3	3	4	4	5	3	4	3	5	3	5	6	8	10	9	9	6	4	3	3	4.7	10
21-Feb	3	2	3	Z	3	5	6	5	4	4	5	4	4	3	3	7	12	9	10	16	5	3	3	3	5.4	16
22-Feb	3	1	2	2	Z	3	4	5	7	4	4	5	4	5	6	3	5	5	4	4	4	3	3	5	3.9	7
23-Feb	8	9	8	6	7	Z	11	11	10	11	9	11	11	7	14	4	6	7	3	3	2	2	1	1	7.0	14
24-Feb	Z	3	1	2	1	2	1	1	3	4	3	3	2	1	2	3	5	5	3	2	2	3	3	5	2.6	5
25-Feb	6	Z	5	4	4	10	9	7	4	4	4	3	3	4	3	5	14	17	29	26	17	8	8	7	8.6	29
26-Feb	5	5	Z	6	3	3	3	3	3	2	1	2	3	2	2	2	3	3	4	4	2	4	13	9	3.7	13
27-Feb	7	5	3	Z	6	6	7	7	8	6	6	13	9	10	6	8	7	14	5	3	1	1	1	1	6.0	14
28-Feb	1	2	7	6	Z	6	6	6	6	12	12	10	5	7	8	7	9	12	10	7	5	4	7	6	6.9	12
	5.4	5.1	5.3	5.5	6.0	7.3	9.1	8.6	8.4	7.0	5.9	6.3	6.0	5.3	5.2	6.0	8.2	9.2	8.7	7.6	7.6	6.5	6.7	6.1	Diurnal Average	
	14	15	13	18	18	26	29	20	24	22	17	23	17	12	14	11	22	20	29	26	21	17	24	14	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  
ConocoPhillips - Surmont - February 2015





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

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	624	97.65	97.65
21 - 40	15	2.35	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: 639

Total Number of Hours: 672





**WBEA**  
**Frequency Distribution**

**Nitrogen Dioxide (NO<sub>2</sub>) - ppb**  
**ConocoPhillips - Surmont - February 2015**

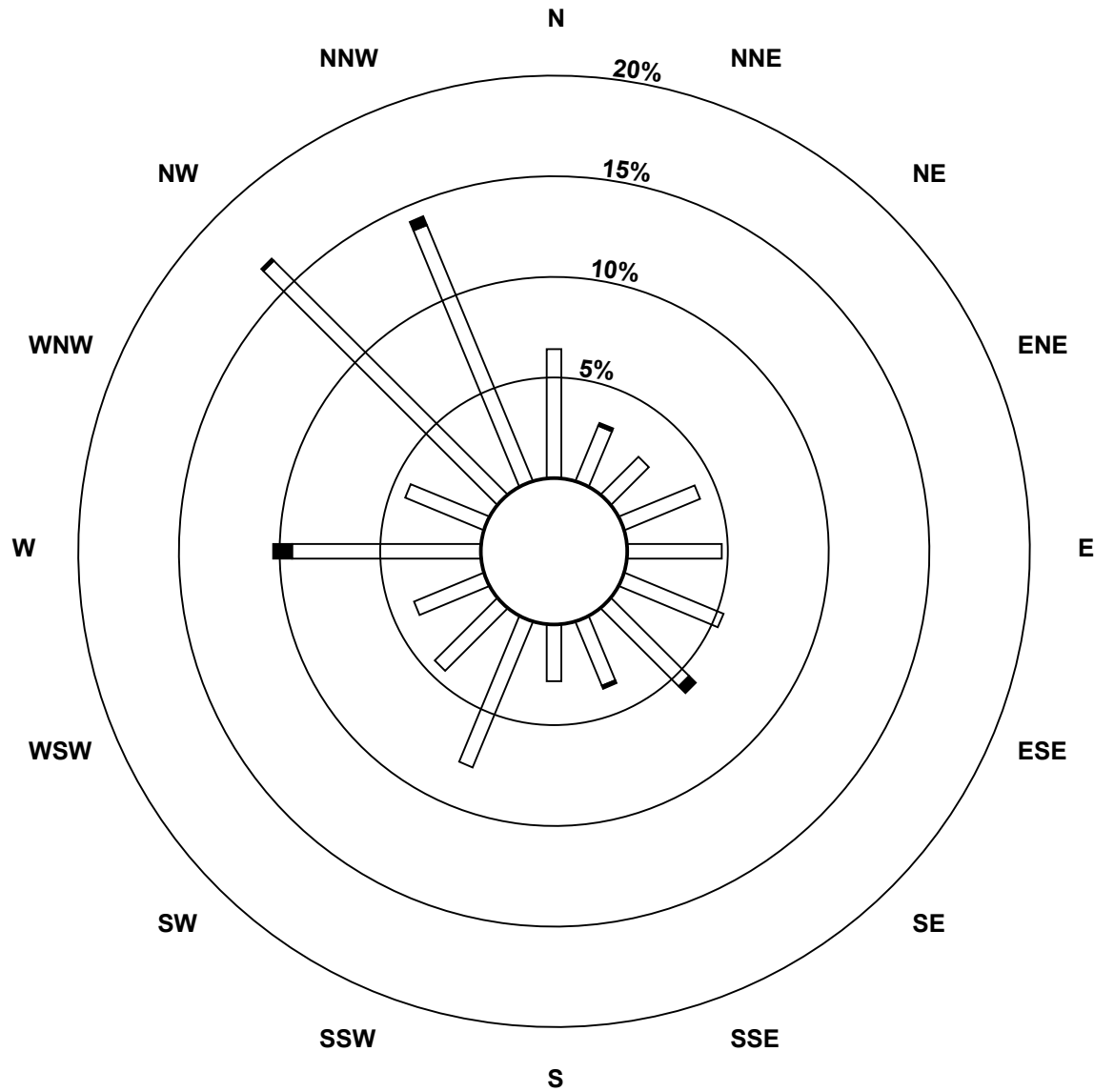
Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 20	41	19	17	26	30	34	35	22	18	50	28	24	60	27	105	88	624
21 - 40	0	1	0	0	0	0	3	1	0	0	0	0	6	0	1	3	15
11 - 80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
> 159	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	41	20	17	26	30	34	38	23	18	50	28	24	66	27	106	91	639

Total Number of Valid Hours: 639

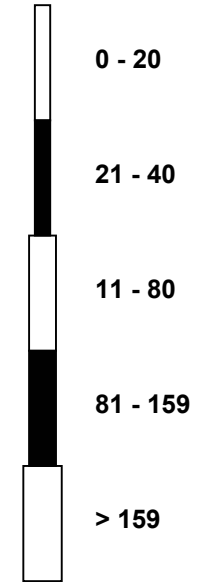
Total Number of Hours: 672

Wood Buffalo Environmental Association  
Wind Rose Feb 2015

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont (AMS502)



Classes (ppb)

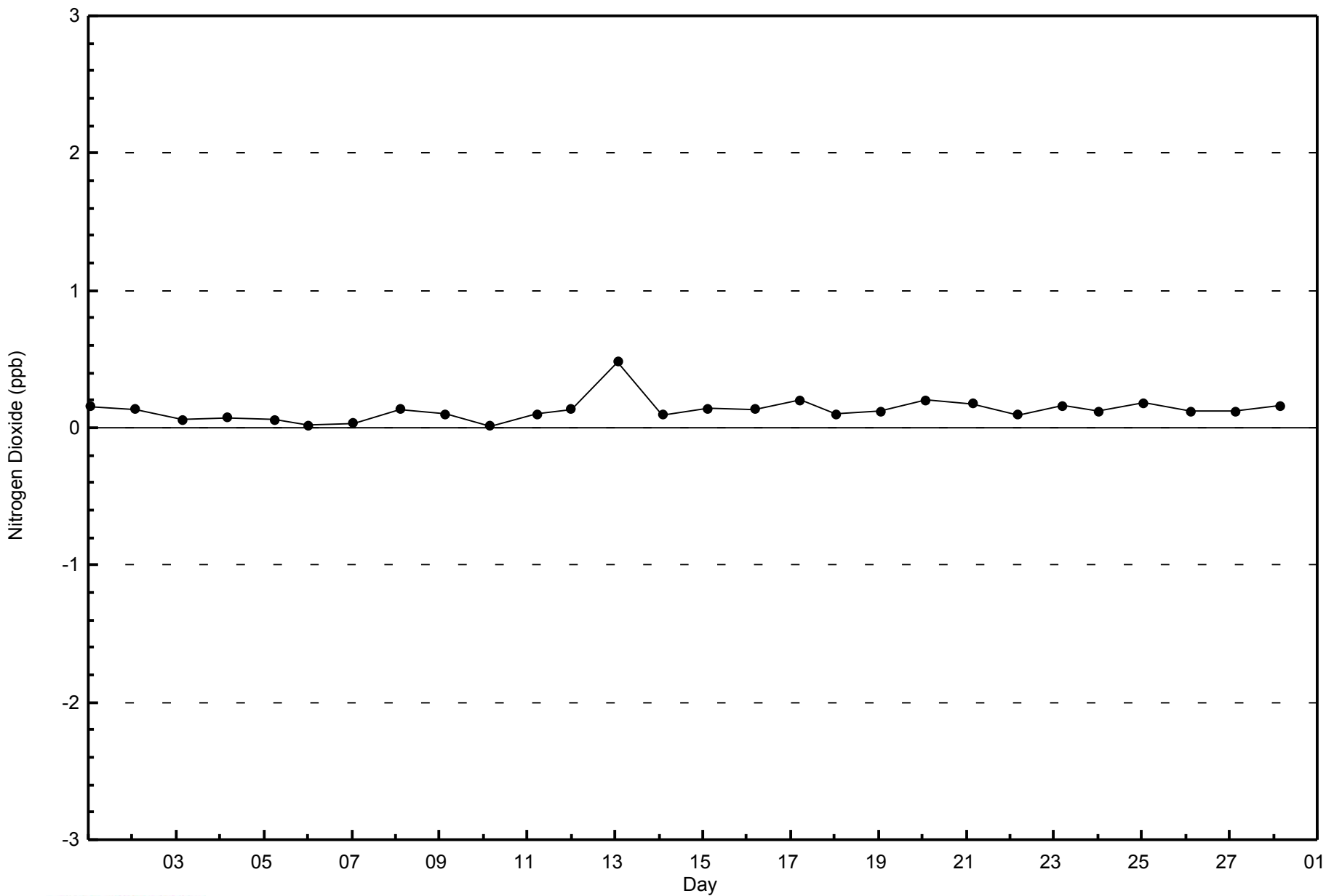


Total Number of Valid Hours: 639



WBEA  
Zero Responses

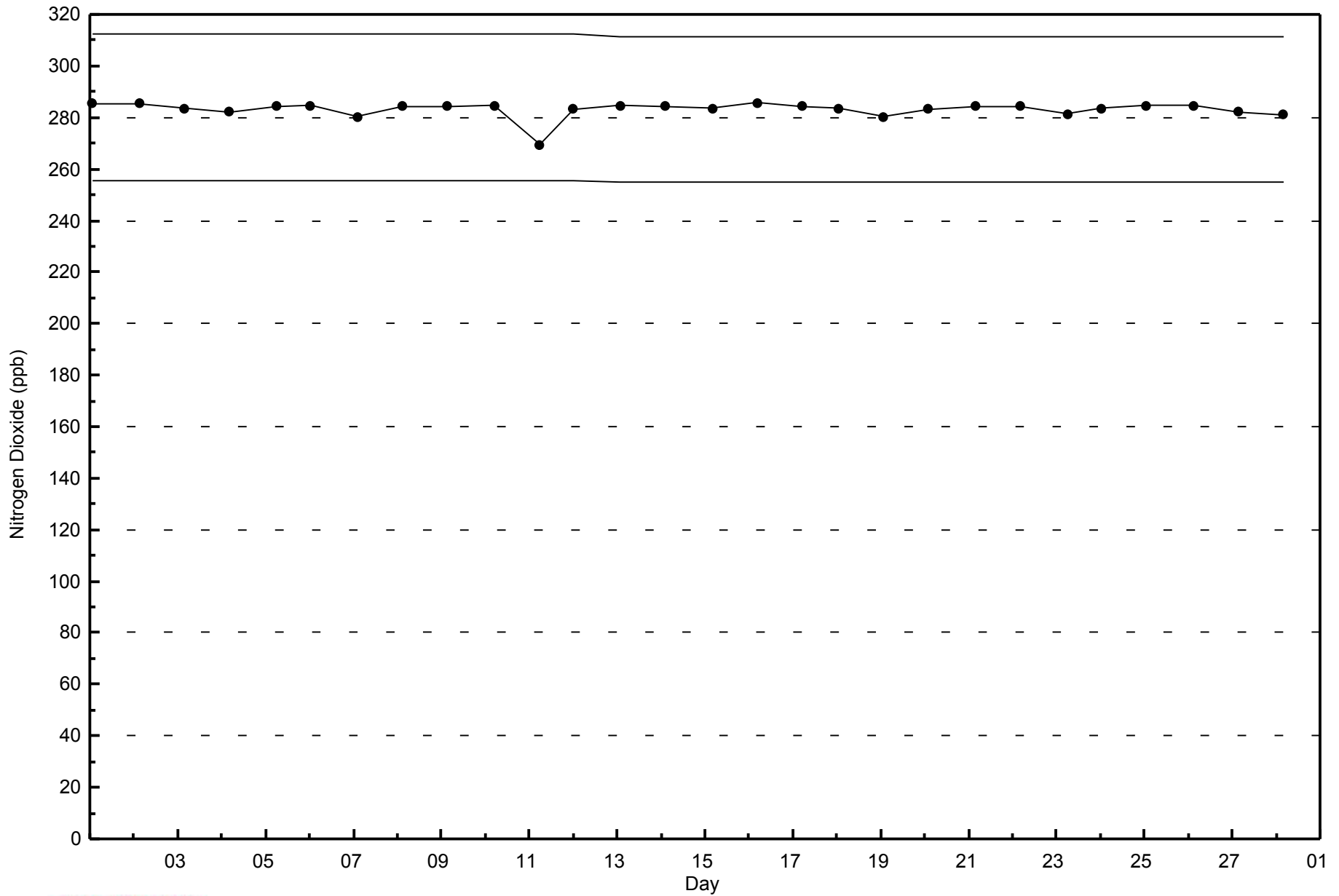
Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - February 2015





WBEA  
Span Responses

Nitrogen Dioxide (NO<sub>2</sub>) - ppb  
ConocoPhillips - Surmont - February 2015



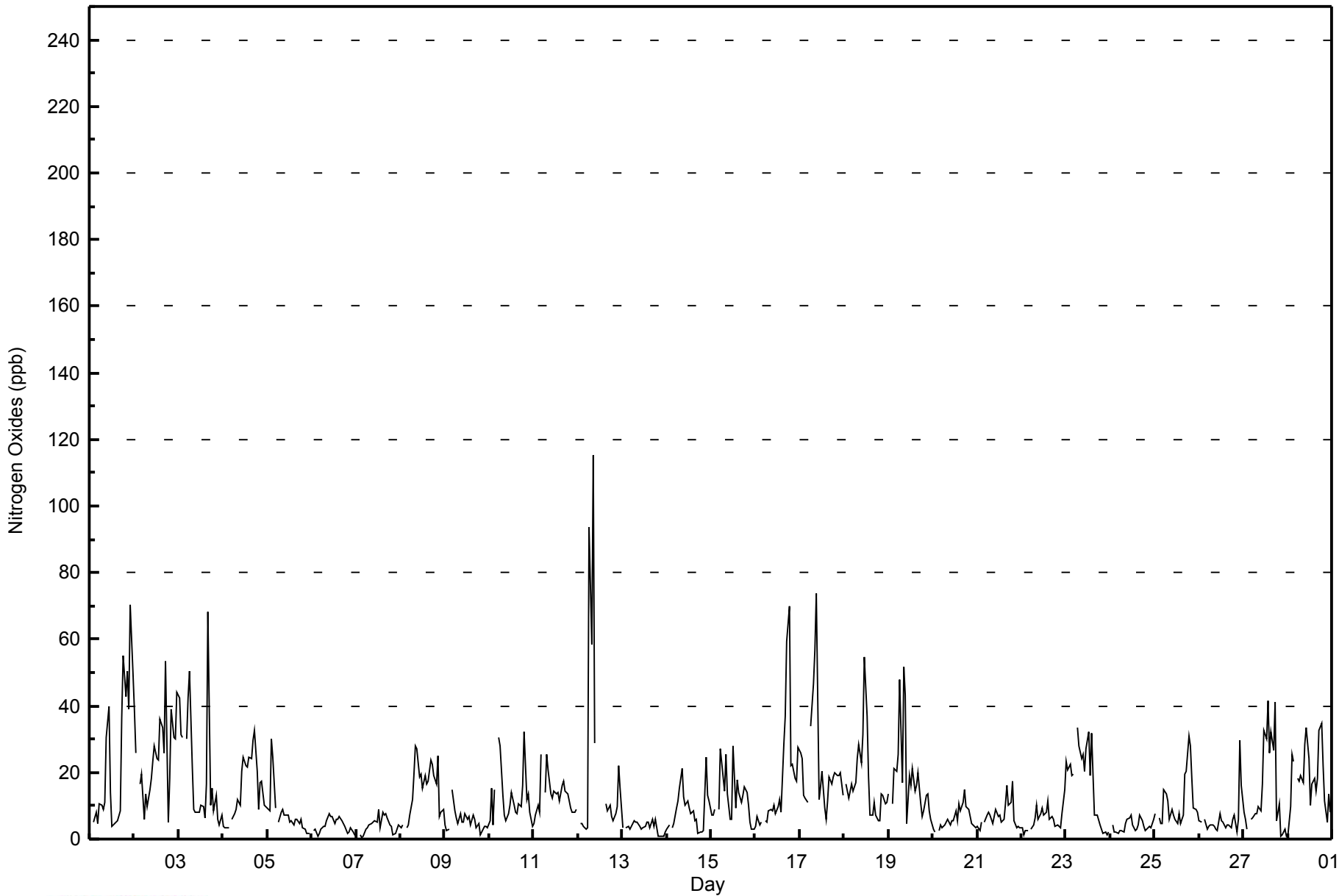


Maximum Value: 115 ppb on Feb 12 09:00														Maximum Daily Average: 25.1 ppb on Feb 2														Hours in Service: 672			
Minimum Value: 1 ppb on Feb 7 04:00														Minimum Daily Average: 3.5 ppb on Feb 13														Hours of Data: 639			
Maximum Diurnal Average: 18.8 ppb at hour 9														Minimum Diurnal Average: 8.9 ppb at hour 4														Hours of Missing Data: 33			
Monthly Average: 12.7 ppb														Percentiles: P <sub>1</sub> = 1 P <sub>10</sub> = 3 Q <sub>1</sub> = 5 Median = 8 Q <sub>3</sub> = 17 P <sub>90</sub> = 28 P <sub>99</sub> = 67														Hours of Calibration: 33			
																												Percent Operational Time: 100.0			
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
1-Feb	5	Z	5	8	5	11	10	9	11	31	40	14	4	5	5	5	8	36	55	43	51	39	70	50	22.6	70					
2-Feb	38	26	Z	16	19	6	14	10	15	18	23	28	24	24	36	33	26	54	5	18	39	31	30	44	25.1	54					
3-Feb	43	32	30	Z	30	42	50	22	9	8	8	8	10	10	6	17	68	10	15	8	13	6	4	7	19.9	68					
4-Feb	4	3	3	3	Z	6	8	9	12	10	20	25	22	22	25	24	30	33	20	9	17	17	10	10	14.9	33					
5-Feb	9	8	30	25	9	Z	5	8	9	7	7	7	5	5	4	6	6	5	6	3	3	2	2	2	7.5	30					
6-Feb	Z	3	3	1	2	3	4	4	6	8	7	7	5	6	6	7	5	5	4	2	2	3	2	1	4.0	8					
7-Feb	1	Z	1	1	1	3	3	4	5	5	6	5	9	3	8	7	8	7	4	4	1	2	3	4	4.1	9					
8-Feb	4	4	Z	3	4	7	12	20	28	27	19	19	15	19	17	17	24	23	19	16	25	7	8	9	15.0	28					
9-Feb	4	3	3	Z	15	9	6	5	8	5	5	7	6	7	4	7	6	3	5	1	2	4	4	4	5.3	15					
10-Feb	6	15	4	15	Z	31	28	13	7	6	7	10	14	10	8	8	11	10	16	32	12	13	8	4	12.5	32					
11-Feb	5	7	10	8	25	Z	14	26	21	14	12	14	13	14	12	16	17	15	14	11	10	8	8	9	13.2	26					
12-Feb	Z	5	5	4	3	3	94	58	115	29	C	C	C	C	C	10	8	10	7	5	8	10	22	15	22.8	115					
13-Feb	4	Z	3	4	3	4	5	5	5	4	3	4	4	5	5	3	6	4	6	1	1	1	1	2	3.5	6					
14-Feb	3	4	Z	3	5	9	12	15	21	13	10	12	9	8	8	6	6	2	2	2	3	25	13	12	8.8	25					
15-Feb	7	7	9	Z	9	27	19	14	25	14	6	6	28	9	18	14	11	13	16	14	10	5	3	3	12.5	28					
16-Feb	4	7	4	5	Z	6	5	9	9	8	10	8	10	12	8	28	37	59	70	22	23	18	18	28	17.7	70					
17-Feb	26	24	13	12	11	Z	34	47	57	74	12	16	20	9	6	11	19	17	19	20	19	19	20	13	22.5	74					
18-Feb	Z	16	12	14	17	14	17	24	28	23	31	55	37	18	7	7	11	7	6	6	14	13	11	11	17.4	55					
19-Feb	13	Z	10	21	20	26	48	17	52	43	4	19	16	21	15	16	20	11	7	8	13	13	8	6	18.6	52					
20-Feb	3	2	Z	3	4	4	4	5	6	4	6	6	9	5	11	8	11	15	10	9	7	5	4	3	6.2	15					
21-Feb	4	3	5	Z	5	7	8	7	5	7	9	7	7	5	6	11	16	10	11	17	6	3	4	3	7.2	17					
22-Feb	3	1	2	2	Z	3	4	6	10	6	8	9	7	8	11	6	7	6	4	4	4	3	8	15	6.0	15					
23-Feb	23	21	22	19	20	Z	34	28	24	25	20	27	32	19	32	7	7	7	4	3	2	2	1	2	16.6	34					
24-Feb	Z	4	2	2	2	3	2	2	5	6	6	7	4	3	3	4	7	6	4	3	3	4	4	6	3.9	7					
25-Feb	8	Z	6	5	5	15	13	11	6	9	7	6	5	8	5	7	20	20	31	28	18	9	9	8	11.2	31					
26-Feb	6	5	Z	6	3	4	4	4	4	3	3	8	6	5	3	4	4	3	6	7	2	6	30	16	6.1	30					
27-Feb	8	6	3	Z	6	6	7	8	10	9	17	33	30	41	26	32	27	41	5	10	1	1	3	1	14.4	41					
28-Feb	1	10	25	23	Z	18	17	19	17	28	34	24	10	17	18	14	18	33	35	22	11	5	14	8	18.3	35					
																												Diurnal Average			
9.6														9.4														10.6			
43														32														50			
9.3														8.9														11.4			
30														25														70			
11.1														17.2														11.8			
42														94														51			
14.5														18.8														11.4			
58														115														39			
15.8														12.6														11.4			
74														40														51			
13.4														11.8														11.4			
37														41														39			
11.6														12.1														11.4			
36														33														51			
15.8														16.5														11.4			
68														59														39			
14.4														11.8														11.4			
43														51														39			
11.4														9.8														11.4			
51														39														70			
11.4														11.4														10.6			
39														70														50			
Diurnal Average														Diurnal Maximum																	
Z - zerospan C - Calibration																															



**WBEA**  
**Hourly Averages**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - February 2015**





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

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	525	82.16	82.16
21 - 40	89	13.93	96.09
41 - 80	23	3.60	99.69
81 - 159	2	0.31	100.00
> 159	0	0.00	100.00

Total Number of Valid Hours: 639

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Nitrogen Oxides (NO<sub>x</sub>) - ppb**  
**ConocoPhillips - Surmont - February 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	39	18	17	26	29	34	29	20	17	50	27	21	10	6	96	86	525
21 - 40	2	2	0	0	1	0	7	3	1	0	1	1	36	20	10	5	89
11 - 80	0	0	0	0	0	0	2	0	0	0	0	2	18	1	0	0	23
81 - 159	0	0	0	0	0	0	0	0	0	0	0	0	2	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>	41	20	17	26	30	34	38	23	18	50	28	24	66	27	106	91	639

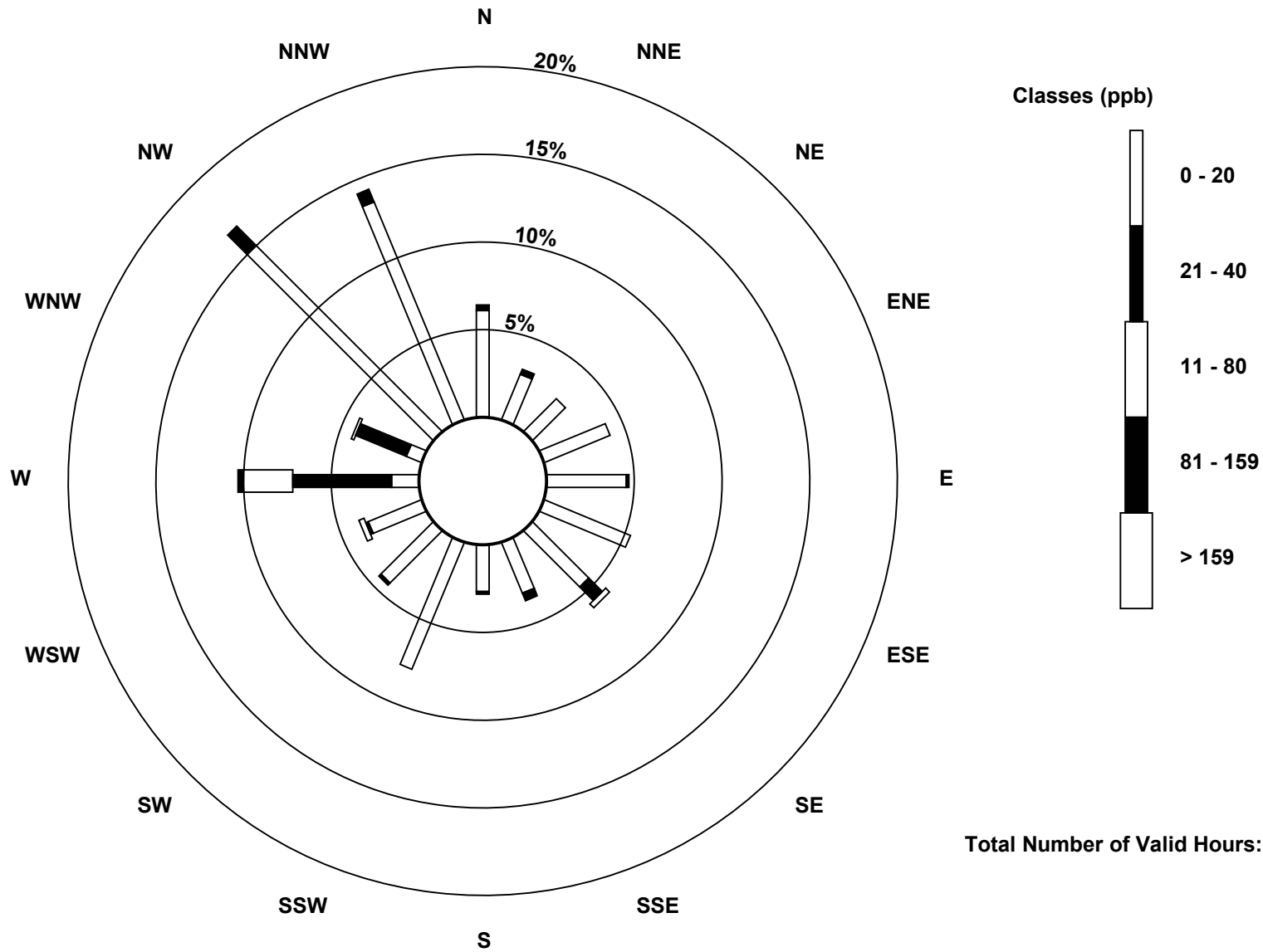
Total Number of Valid Hours: 639

Total Number of Hours: 672

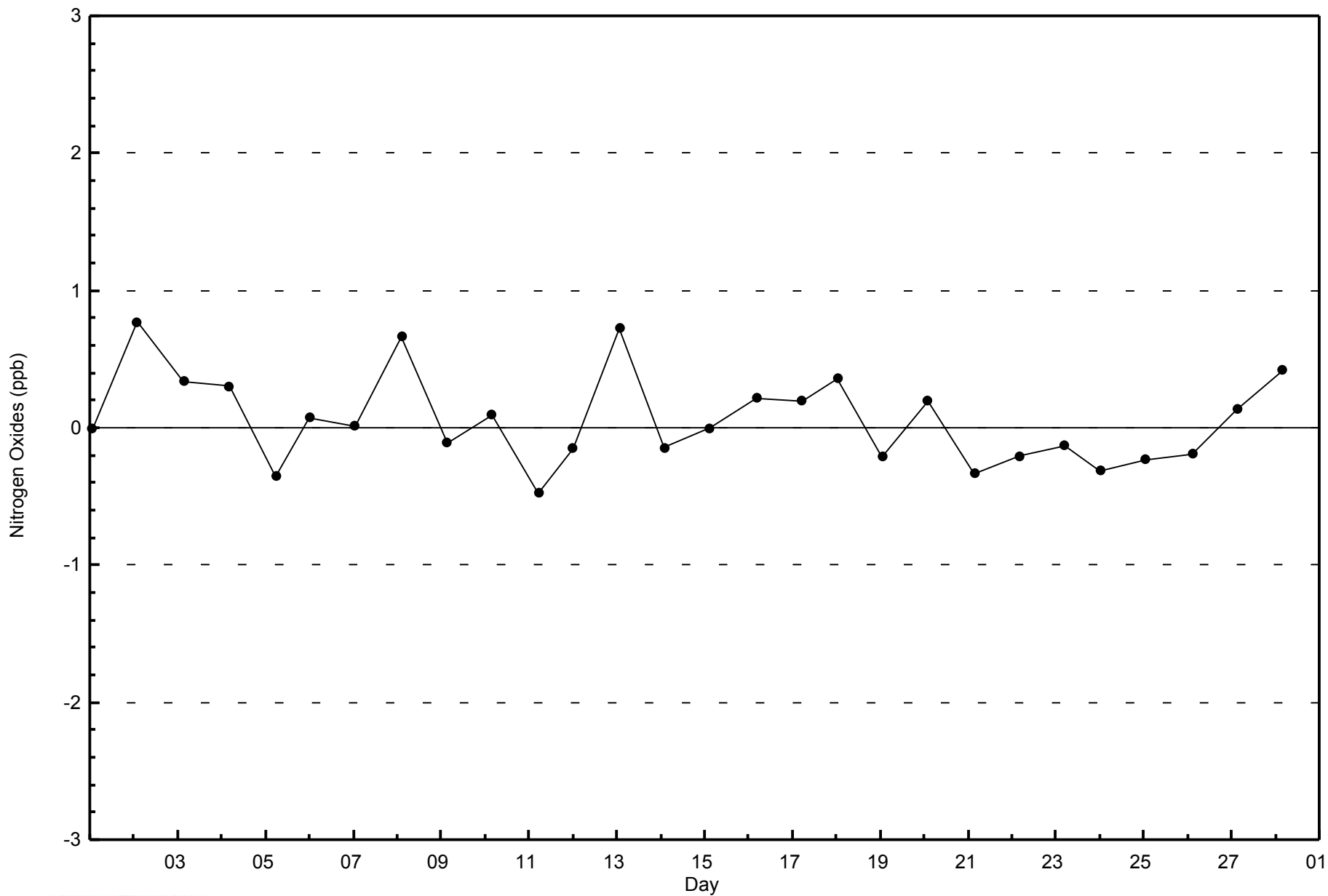


Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
 ConocoPhillips - Surmont (AMS502)



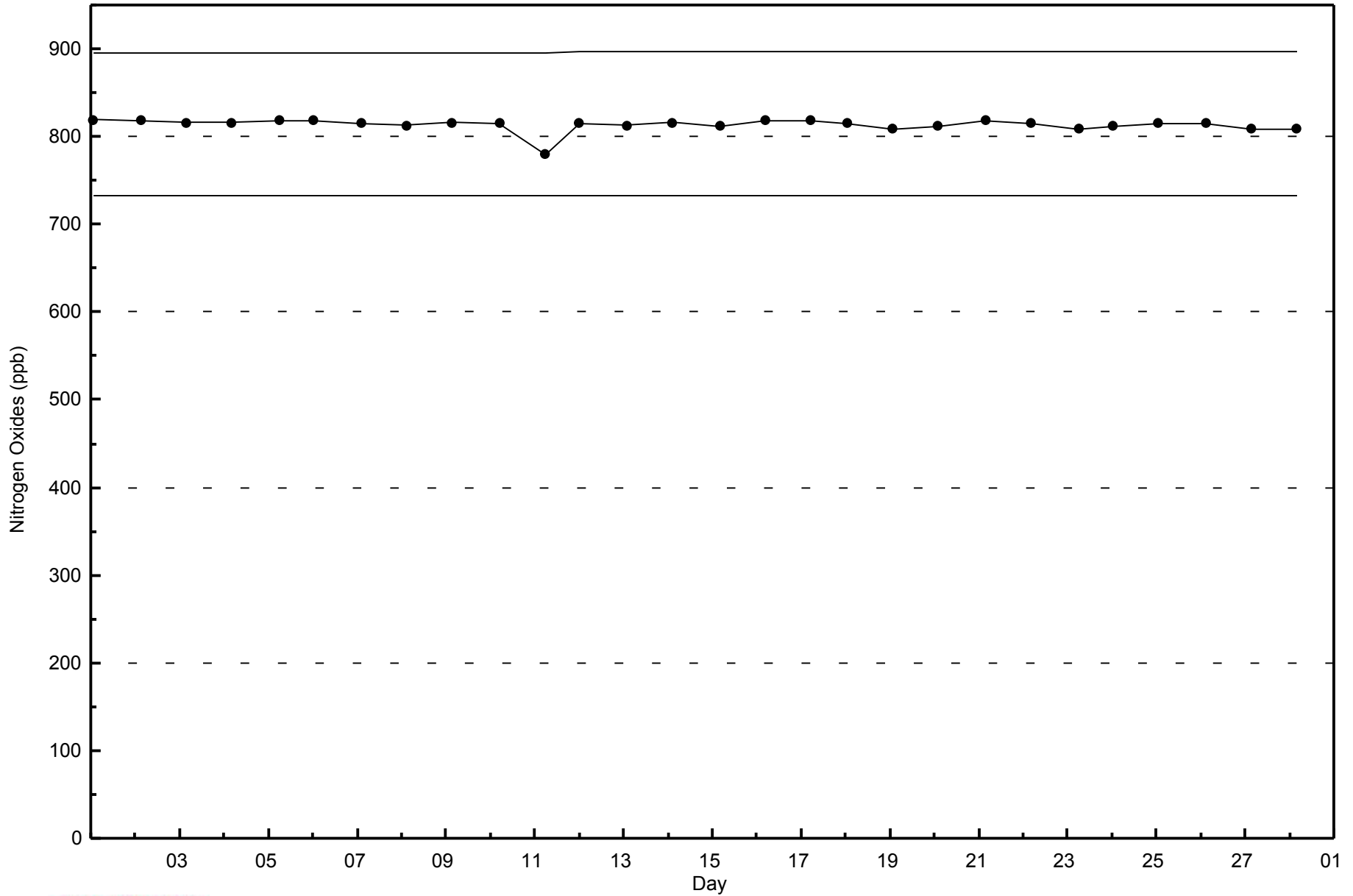
Total Number of Valid Hours: 639





WBEA  
Span Responses

Nitrogen Oxides (NO<sub>x</sub>) - ppb  
ConocoPhillips - Surmont - February 2015



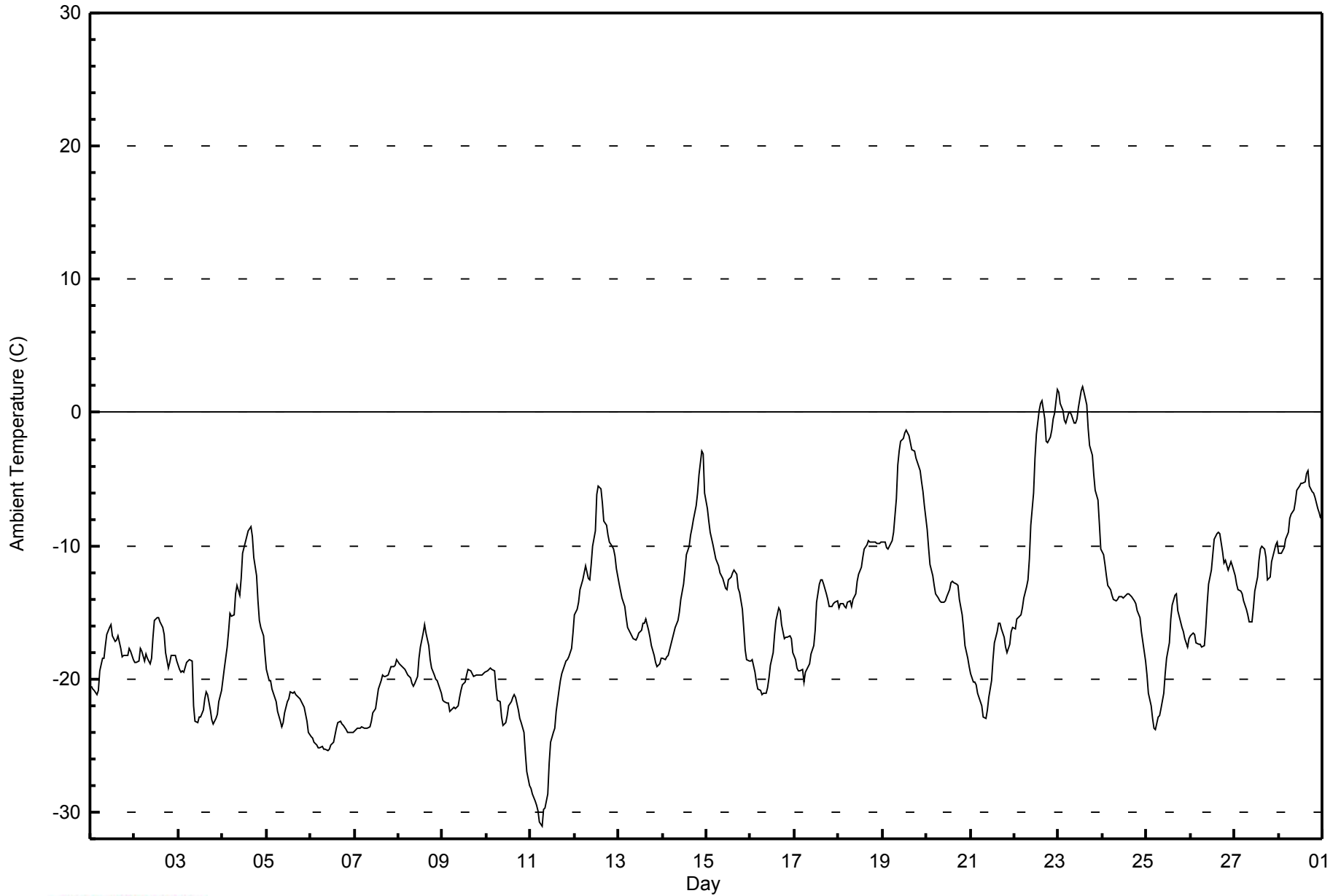


Maximum Value: 1.9 C on Feb 23 14:00		Maximum Daily Average: -1.6 C on Feb 23		Hours in Service: 672																							
Minimum Value: -31.1 C on Feb 11 07:00		Minimum Daily Average: -24.4 C on Feb 11		Hours of Data: 672																							
Maximum Diurnal Average: -13.0 C at hour 16		Minimum Diurnal Average: -17.3 C at hour 6		Hours of Missing Data: 0																							
Monthly Average: -15.54 C		Percentiles: P <sub>1</sub> = -28.7 P <sub>10</sub> = -23.0 Q <sub>1</sub> = -20.0 Median = -16.6 Q <sub>3</sub> = -11.8 P <sub>90</sub> = -6.1 P <sub>99</sub> = 0.6		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-Feb	-20.5	-20.7	-20.9	-21.2	-20.9	-19.4	-18.5	-18.4	-17.5	-16.7	-16.2	-15.9	-16.7	-17.2	-17.1	-16.8	-17.7	-18.4	-18.2	-18.3	-18.2	-17.7	-17.9	-18.6	-18.3	-15.9	
2-Feb	-18.8	-18.8	-18.7	-17.7	-17.9	-18.7	-18.1	-18.4	-18.9	-18.5	-16.8	-15.7	-15.4	-15.4	-15.7	-16.2	-16.7	-18.0	-19.1	-18.8	-18.3	-18.2	-18.2	-18.7	-17.7	-15.4	
3-Feb	-19.3	-19.5	-19.4	-19.5	-18.8	-18.7	-18.6	-18.7	-22.0	-23.2	-23.3	-22.9	-22.9	-22.3	-21.5	-21.0	-21.1	-22.3	-23.0	-23.4	-23.0	-22.7	-21.7	-20.9	-21.2	-18.6	
4-Feb	-20.1	-19.1	-17.7	-16.5	-15.1	-15.3	-15.2	-13.6	-13.0	-13.7	-12.4	-10.5	-9.7	-9.3	-8.9	-8.5	-9.3	-10.9	-12.2	-14.2	-15.6	-16.2	-16.7	-18.1	-13.8	-8.5	
5-Feb	-19.3	-20.1	-20.2	-20.7	-21.4	-21.7	-22.5	-23.2	-23.6	-23.2	-22.6	-21.7	-21.5	-21.0	-21.0	-20.9	-21.2	-21.4	-21.5	-21.7	-22.1	-22.7	-23.2	-24.0	-21.8	-19.3	
6-Feb	-24.3	-24.5	-24.8	-25.0	-25.1	-25.1	-25.1	-25.2	-25.3	-25.4	-25.3	-25.0	-24.7	-24.2	-23.7	-23.3	-23.1	-23.3	-23.5	-23.8	-24.0	-24.0	-24.0	-24.0	-24.4	-23.1	
7-Feb	-23.9	-23.7	-23.7	-23.7	-23.6	-23.7	-23.7	-23.7	-23.5	-23.2	-22.6	-22.2	-21.5	-20.8	-20.1	-19.7	-19.8	-19.8	-19.7	-19.4	-19.1	-19.0	-18.9	-18.6	-21.6	-18.6	
8-Feb	-18.8	-19.0	-19.1	-19.3	-19.5	-19.7	-19.9	-20.3	-20.5	-20.4	-19.8	-18.5	-17.6	-16.6	-15.9	-16.6	-17.5	-18.5	-19.1	-19.7	-20.0	-20.2	-20.4	-21.1	-19.1	-15.9	
9-Feb	-21.6	-21.7	-21.8	-21.8	-22.4	-22.3	-22.1	-22.3	-22.0	-21.4	-20.9	-20.4	-20.2	-19.7	-19.2	-19.4	-19.6	-19.8	-19.8	-19.7	-19.7	-19.7	-19.6	-19.5	-20.7	-19.2	
10-Feb	-19.4	-19.2	-19.2	-19.3	-19.4	-20.7	-21.6	-21.7	-22.9	-23.5	-23.3	-22.7	-22.0	-21.7	-21.4	-21.1	-21.4	-22.3	-22.9	-23.2	-24.0	-25.6	-27.0	-28.0	-22.2	-19.2	
11-Feb	-28.2	-28.6	-29.1	-29.5	-29.9	-30.7	-31.1	-29.7	-29.6	-28.7	-26.4	-24.8	-24.0	-23.7	-22.4	-20.9	-20.1	-19.6	-18.9	-18.7	-18.6	-18.3	-17.7	-16.6	-24.4	-16.6	
12-Feb	-15.2	-14.8	-14.3	-13.3	-12.5	-12.0	-11.5	-12.4	-12.6	-11.4	-10.0	-8.9	-6.2	-5.5	-5.7	-6.8	-8.1	-8.5	-9.2	-9.7	-10.0	-10.3	-10.8	-11.7	-10.5	-5.5	
13-Feb	-12.9	-13.4	-13.9	-14.5	-15.4	-16.1	-16.6	-16.8	-17.0	-17.1	-16.9	-16.6	-16.3	-15.8	-15.8	-15.5	-16.3	-16.8	-17.5	-18.2	-18.8	-19.0	-18.9	-18.4	-16.4	-12.9	
14-Feb	-18.4	-18.5	-18.3	-18.2	-17.8	-17.0	-16.6	-16.1	-15.6	-15.0	-14.0	-12.9	-11.8	-10.7	-10.0	-9.2	-8.6	-8.0	-6.9	-6.1	-4.7	-2.9	-3.2	-6.1	-11.9	-2.9	
15-Feb	-7.2	-8.2	-9.0	-10.0	-10.5	-11.0	-11.5	-12.1	-12.3	-12.5	-13.2	-13.3	-12.6	-12.3	-12.1	-11.8	-12.1	-13.2	-13.5	-14.7	-16.3	-17.8	-18.5	-18.6	-12.7	-7.2	
16-Feb	-18.7	-18.5	-19.5	-20.2	-20.7	-20.8	-21.2	-21.1	-21.1	-20.6	-20.0	-19.0	-18.0	-16.7	-15.6	-14.7	-14.9	-15.9	-17.0	-16.8	-16.8	-16.8	-17.0	-18.1	-18.3	-14.7	
17-Feb	-18.5	-19.2	-19.4	-19.4	-19.3	-20.2	-19.5	-19.0	-18.9	-18.1	-17.5	-16.4	-14.2	-12.9	-12.6	-12.6	-12.9	-13.6	-14.0	-14.5	-14.5	-14.4	-14.2	-14.2	-16.2	-12.6	
18-Feb	-14.7	-14.4	-14.3	-14.5	-14.6	-14.2	-14.1	-14.6	-14.0	-13.7	-12.7	-12.1	-11.6	-10.9	-10.2	-9.9	-9.6	-9.7	-9.7	-9.7	-9.7	-9.8	-9.9	-9.7	-12.0	-9.6	
19-Feb	-9.7	-9.7	-10.1	-10.3	-9.9	-9.6	-9.0	-6.5	-3.9	-2.9	-2.1	-2.0	-1.6	-1.3	-1.8	-2.2	-2.8	-2.9	-3.4	-3.7	-4.4	-5.2	-6.0	-7.0	-5.3	-1.3	
20-Feb	-8.8	-10.1	-11.4	-12.3	-12.9	-13.6	-13.9	-14.1	-14.2	-14.3	-14.2	-13.8	-13.3	-12.8	-12.6	-12.8	-12.9	-13.0	-14.1	-15.2	-16.2	-17.5	-18.5	-19.0	-13.8	-8.8	
21-Feb	-19.6	-20.3	-20.3	-20.4	-21.1	-21.7	-22.1	-22.8	-23.0	-22.3	-21.4	-20.1	-18.5	-17.3	-16.4	-15.9	-15.8	-16.3	-16.8	-17.6	-18.1	-17.4	-16.4	-16.2	-19.1	-15.8	
22-Feb	-16.3	-15.5	-15.4	-15.1	-14.6	-13.9	-13.1	-12.5	-11.0	-8.5	-6.0	-3.4	-1.6	0.2	0.6	0.9	-0.5	-2.1	-2.3	-1.9	-1.3	-0.5	0.0	1.7	-6.3	1.7	
23-Feb	1.5	0.6	0.2	-0.5	-0.7	0.0	0.0	-0.2	-0.8	-0.8	-0.4	0.4	1.6	1.9	1.6	0.6	-1.2	-2.5	-3.2	-4.7	-5.9	-6.5	-8.4	-10.2	-1.6	1.9	
24-Feb	-10.7	-11.4	-12.3	-13.0	-13.3	-13.7	-14.0	-14.1	-14.0	-13.9	-13.9	-14.0	-13.8	-13.6	-13.6	-13.7	-13.8	-14.1	-14.4	-14.9	-15.4	-16.4	-17.2	-18.6	-14.1	-10.7	
25-Feb	-19.7	-21.0	-22.0	-23.0	-23.7	-23.8	-22.9	-22.7	-22.2	-21.1	-19.6	-18.5	-17.3	-15.5	-14.4	-13.7	-13.6	-14.9	-15.8	-16.1	-16.5	-17.0	-17.6	-17.0	-18.7	-13.6	
26-Feb	-16.7	-16.6	-16.7	-17.3	-17.4	-17.4	-17.6	-17.5	-16.1	-14.4	-12.9	-11.9	-10.7	-9.5	-9.1	-9.0	-9.1	-10.5	-11.3	-11.1	-11.8	-11.6	-11.2	-11.5	-13.3	-9.0	
27-Feb	-12.2	-12.9	-13.3	-13.4	-13.6	-14.1	-14.7	-15.2	-15.7	-15.7	-14.7	-13.4	-12.4	-11.1	-10.2	-10.1	-10.2	-10.9	-12.6	-12.3	-11.1	-10.7	-9.9	-9.7	-12.5	-9.7	
28-Feb	-10.5	-10.6	-10.3	-10.1	-9.5	-9.0	-7.9	-7.6	-7.3	-6.7	-5.8	-5.5	-5.3	-5.4	-5.2	-4.6	-4.3	-5.5	-6.0	-6.1	-6.3	-7.2	-7.5	-8.0	-7.2	-4.3	
		-16.5	-16.8	-16.9	-17.1	-17.2	-17.3	-17.2	-17.2	-17.1	-16.7	-15.9	-15.1	-14.3	-13.6	-13.2	-13.0	-13.4	-14.0	-14.5	-14.8	-15.0	-15.2	-15.4	-15.7	Diurnal Average	
		1.5	0.6	0.2	-0.5	-0.7	0.0	0.0	-0.2	-0.8	-0.8	-0.4	0.4	1.6	1.9	1.6	0.9	-0.5	-2.1	-2.3	-1.9	-1.3	-0.5	0.0	1.7	Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - February 2015**





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

**Ambient Temperature (AT) - C**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (C)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
-50 - -20	168	25.00	25.00
-20 - 0	491	73.07	98.07
0 - 10	13	1.93	100.00
10 - 20	0	0.00	100.00
> 20	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672

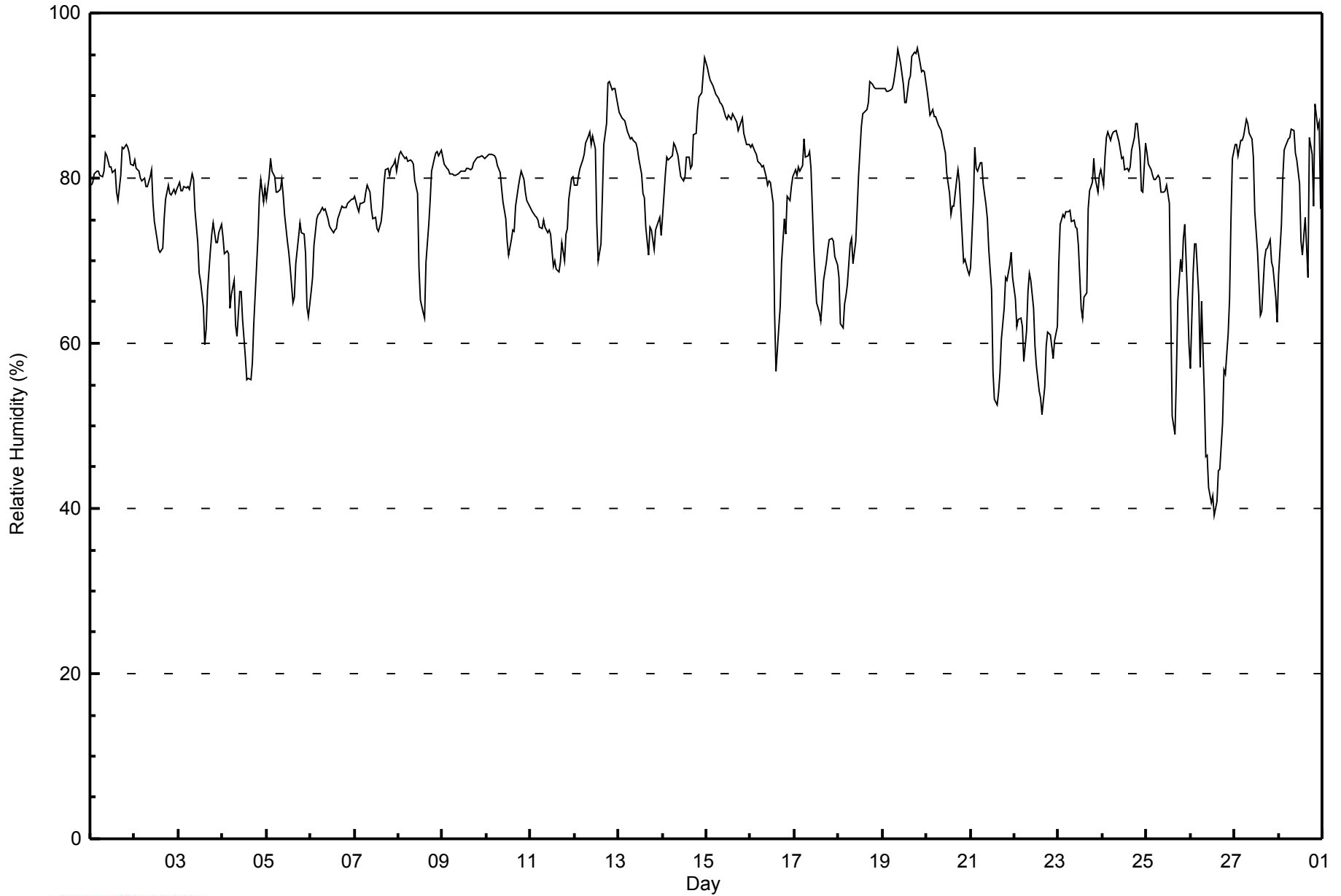


Maximum Value: 96 % on Feb 19 20:00														Maximum Daily Average: 92.6 % on Feb 19														Hours in Service: 672	
Minimum Value: 39 % on Feb 26 14:00														Minimum Daily Average: 56.1 % on Feb 26														Hours of Data: 672	
Maximum Diurnal Average: 80.0 % at hour 4														Minimum Diurnal Average: 69.4 % at hour 15														Hours of Missing Data: 0	
Monthly Average: 76.7 %														Percentiles: P <sub>1</sub> = 46 P <sub>10</sub> = 64 Q <sub>1</sub> = 72 Median = 79 Q <sub>3</sub> = 83 P <sub>90</sub> = 87 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-Feb	79	79	81	81	81	80	80	81	83	83	81	81	81	81	78	77	80	84	84	84	84	83	82	82	81.2	84			
2-Feb	82	81	81	80	80	80	79	79	80	81	77	75	73	71	71	71	75	77	79	78	78	79	78	79	77.7	82			
3-Feb	80	78	78	79	79	79	79	80	80	76	72	68	67	64	60	62	66	71	73	75	72	72	73	74	73.3	80			
4-Feb	73	71	71	71	64	66	68	62	61	66	66	63	58	56	56	56	58	62	69	73	78	80	77	79	66.8	80			
5-Feb	77	80	82	81	80	78	78	79	80	78	76	72	71	69	65	66	70	73	75	73	73	71	64	63	74.0	82			
6-Feb	66	68	72	75	76	76	76	76	76	75	74	74	73	74	74	75	76	77	77	77	77	77	77	78	74.8	78			
7-Feb	78	76	76	77	77	77	78	79	78	76	75	75	74	74	75	76	79	81	81	80	81	82	82	81	77.9	82			
8-Feb	83	83	83	82	83	82	82	82	82	80	78	69	65	64	63	70	74	77	81	82	83	83	83	83	78.3	83			
9-Feb	83	82	81	81	81	80	80	80	80	81	81	81	81	81	81	81	81	82	82	82	83	83	83	82	81.4	83			
10-Feb	83	83	83	83	83	82	82	81	79	77	75	72	71	73	74	74	77	79	80	81	80	78	77	77	78.4	83			
11-Feb	76	76	75	75	75	74	74	75	74	73	74	73	69	70	69	69	70	72	70	73	74	77	80	80	73.7	80			
12-Feb	79	79	80	81	82	83	84	85	86	84	85	84	75	70	72	78	84	87	92	92	91	91	91	90	83.5	92			
13-Feb	88	88	87	87	86	86	85	85	85	84	84	82	81	78	78	74	71	74	74	71	74	74	75	73	80.1	88			
14-Feb	75	81	82	82	82	83	84	84	83	81	80	80	83	83	81	82	85	85	88	90	90	93	95	95	83.8	95			
15-Feb	93	93	92	91	91	90	90	89	89	89	88	87	88	87	88	87	87	86	86	87	86	85	84	84	88.1	93			
16-Feb	84	84	83	83	82	82	81	81	80	79	80	79	77	64	57	62	64	70	75	73	78	77	79	80	76.5	84			
17-Feb	81	80	81	81	82	85	83	83	83	81	71	68	65	64	63	65	68	70	71	73	73	72	71	70	74.2	85			
18-Feb	68	62	62	65	66	67	72	73	70	72	76	80	86	88	88	88	89	92	91	91	91	91	91	91	79.6	92			
19-Feb	91	91	91	90	91	91	92	94	96	95	94	91	89	89	92	92	95	95	95	96	94	93	93	93	92.6	96			
20-Feb	91	89	88	88	87	87	87	86	86	84	83	80	78	76	77	77	80	81	80	73	70	70	69	68	80.6	91			
21-Feb	69	77	84	81	81	82	82	79	77	75	71	66	57	53	53	54	56	61	64	68	68	70	71	68	69.4	84			
22-Feb	65	62	63	63	62	58	61	66	68	68	64	60	57	54	53	51	55	60	61	61	60	58	60	62	60.6	68			
23-Feb	70	74	76	75	76	76	76	75	75	74	74	72	64	63	66	66	76	79	79	82	80	78	80	81	74.5	82			
24-Feb	79	83	85	86	85	85	86	86	85	84	82	83	81	81	81	83	85	87	87	83	79	78	84	84	83.3	87			
25-Feb	83	82	81	80	80	80	80	80	80	78	78	79	79	77	64	51	49	56	65	70	69	73	74	65	60	72.2	83		
26-Feb	57	69	72	72	66	57	65	54	46	46	43	41	42	39	41	45	45	50	57	56	61	65	75	82	56.1	82			
27-Feb	84	84	83	85	85	85	87	87	85	85	83	76	71	67	63	64	70	71	72	73	70	69	66	63	76.1	87			
28-Feb	68	74	80	83	84	85	85	86	86	83	82	79	72	71	75	72	68	85	83	77	89	86	87	76	79.8	89			
78.1														78.9														Diurnal Average	
93														92														Diurnal Maximum	



**WBEA**  
**Hourly Averages**

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - February 2015**







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

**Relative Humidity (RH) - %**  
**ConocoPhillips - Surmont - February 2015**

<b>Concentration Ranges (%)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 20	0	0.00	0.00
20 - 40	1	0.15	0.15
40 - 60	40	5.95	6.10
60 - 80	337	50.15	56.25
80 - 100	294	43.75	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



Maximum Speed: 37 km/h on Feb 22 19:00	Maximum Daily Speed Average: 19.9 km/h on Feb 22	Hours in Service: 672
Minimum Speed Value: 2 km/h on Feb 8 21:00	Minimum Daily Speed Average: 3.4 km/h on Feb 17	Hours of Data: 672
Maximum Diurnal Speed Average: 6.3 km/h at hour 24	Minimum Diurnal Speed Average: 3.0 km/h at hour 18	Hours of Missing Data: 0
Monthly Average Velocity: 4.6 km/h 291.4 deg	Percentiles: P <sub>1</sub> = 3 P <sub>10</sub> = 6 Q <sub>1</sub> = 10 Median = 14 Q <sub>3</sub> = 18 P <sub>90</sub> = 21 P <sub>99</sub> = 28	Percent Operational Time: 100.0

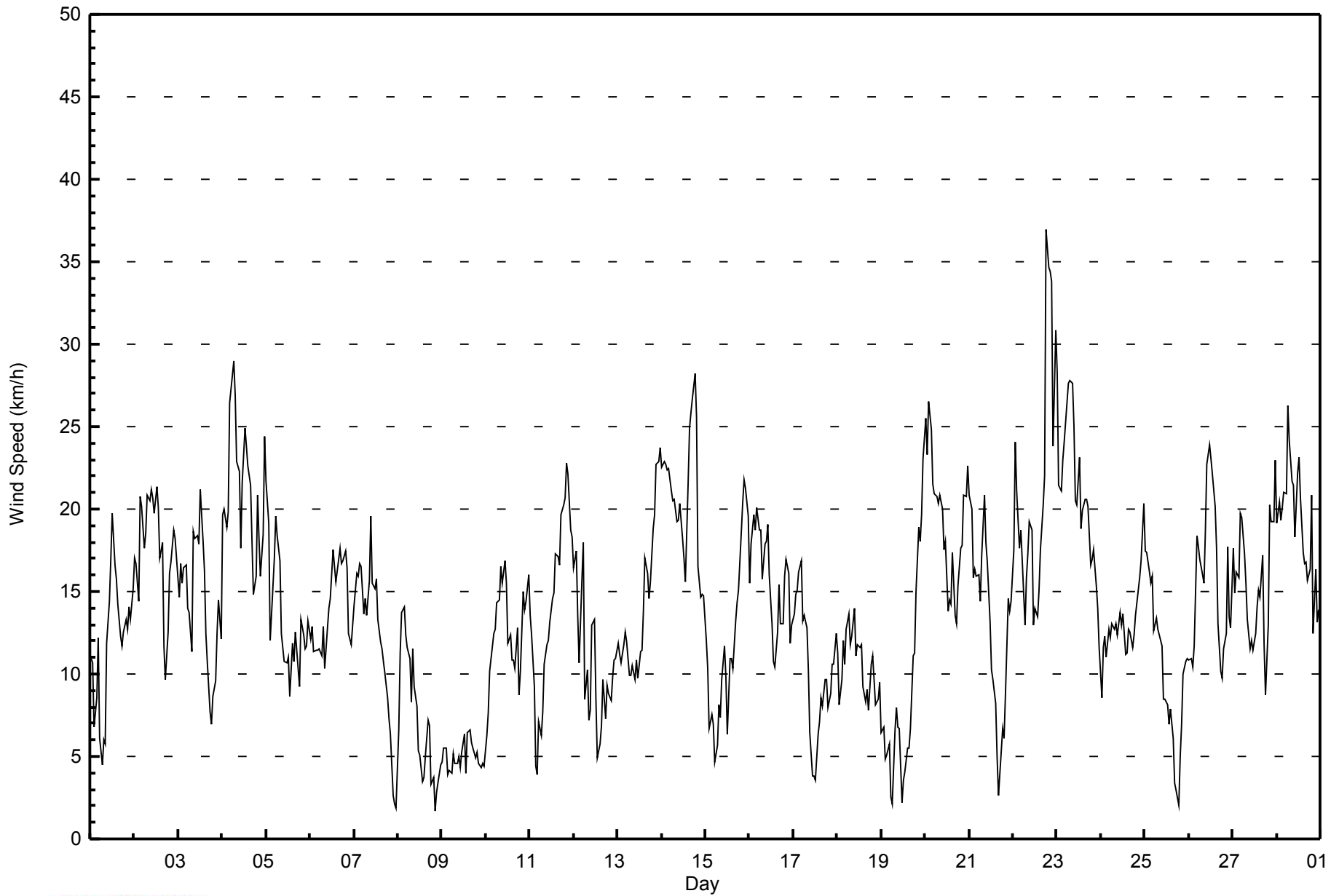
Day	Hourly Period Ending At (MST)																								Daily Average	Daily Maximum																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24																								
1-Feb	SW11	SSW11	SW7	SW9	SW12	S6	S5	SSW6	SW6	WSW12	W14	NNW17	NNW20	NNW17	NNW16	NNW14	NNW12	WNW12	W13	W13	W13	W14	W13	W15	W8.6	NNW20																						
2-Feb	W17	W17	W14	W21	W20	WSW18	WSW19	WSW21	W21	W21	W21	W20	W21	W20	W17	W18	WNW12	W10	WSW13	W16	W17	W19	W18	W17	W17.5	W21																						
3-Feb	W15	W17	W15	WSW16	W17	W14	W14	NNW11	NNW19	NNW18	NNW18	NNW21	NNW18	NNW16	NNW12	W11	WSW8	SSW7	SSW9	S10	SSW12	SW14	S12	W10.0	NNW21																							
4-Feb	SSW20	SW20	SSW19	S20	SSW26	SSW27	SW29	SSW27	SSW23	SW22	WSW18	W22	W25	W24	W23	W21	WNW18	WNW15	NW16	NW21	NNW18	NW16	NW18	NW24	WSW14.9	SW29																						
5-Feb	NNW22	NNW19	WNW12	WNW14	NW17	NW20	NW18	NNW17	NNW12	NNW12	NNW11	NNW11	N11	N9	N12	N11	N13	N10	N9	N13	N12	N11	N12	N13	NNW12.5	NW22																						
6-Feb	NNE12	NNE13	NNE11	NE11	NE11	ENE11	ENE11	ENE13	ENE10	ENE13	ENE14	E15	E18	E17	ENE16	ENE16	ENE18	ENE17	E17	E17	E16	E12	E12	E13	ENE13.2	ENE18																						
7-Feb	E14	E16	ESE16	ESE17	ESE17	ESE14	ESE15	ESE14	ESE16	SE20	ESE16	SE15	ESE16	ESE13	SE12	ESE12	ESE11	ESE10	ESE9	SE7	ESE6	ESE3	SE2	SSW2	ESE11.9	SE20																						
8-Feb	N7	NNW11	NNW14	NNW14	NNW12	NNW12	NNW11	NNW8	NNW12	NNW9	NNW8	N5	NNE5	ENE3	NNE4	NNE5	N7	N7	NNE3	NE4	NNE2	ENE3	E3	E4	N6.4	NNW14																						
9-Feb	ESE5	ESE6	E5	NE4	NE4	ENE4	ENE5	ENE5	E5	E5	NE4	NE5	NNE6	ENE4	NE6	NNE7	NE6	NE5	ENE5	E5	NE5	N4	N5	N4	ENE4.3	NNE7																						
10-Feb	NNW6	NNW8	NNW10	NNW11	NW12	NNW13	NW14	NW14	NW17	NW16	NW17	NW16	NNW12	NNW12	NNW11	NNW11	NNW10	NNW13	NNW9	NW10	NW15	NNW14	NNW14	NW16	NNW12.4	NW17																						
11-Feb	NW14	NW12	NW9	NW4	SW4	SSW7	SSW6	SSE8	S11	S12	SSE12	SE13	SE15	SE15	SE17	SE17	SE17	SE20	SE20	SE21	SSE23	SSE22	SSE19	S18	SSE10.1	SSE23																						
12-Feb	S16	SSW17	SSW14	SW11	SW16	SW18	W8	W10	W7	W8	W13	W13	W9	NE5	N6	N7	N10	N7	N9	N9	NNW8	NNW10	NNW11	NNW11	W5.3	SW18																						
13-Feb	N12	NNW11	N11	NNW12	NNW13	N12	NNE10	N10	NNE10	NE10	ENE11	ENE10	ENE11	ENE11	E14	E17	E16	ESE15	ESE16	ESE19	ESE20	ESE23	ESE23	SE24	ENE9.0	SE24																						
14-Feb	SE23	SE23	SE23	SE22	SE22	SE21	SE20	SE21	SE19	SSE19	SSE20	SSE18	S17	S16	S22	SSW25	SW26	SW27	SW28	WSW26	WSW17	W15	NW15	NNW15	S13.3	SW28																						
15-Feb	NNW12	NNW10	NNW7	NNW8	NNW7	NNW5	NNW6	NNW8	NW7	NNW10	NNW12	NNW10	NW6	NNW11	NW11	NNW10	NNW13	NNW14	NNW15	NW19	NW20	NW22	NW21	NW20	NNW11.8	NW22																						
16-Feb	NNW16	NW18	NW20	NW19	NW20	NW19	NW19	NW16	NW18	NW18	NW19	NNW16	NNW13	NNW11	NNW10	NNW13	W15	W13	W13	W16	W17	WNW16	WNW12	WNW13	NW14.6	NW20																						
17-Feb	WNW14	WNW15	WNW15	WNW16	WNW17	W13	W14	W13	WNW10	W6	ESE4	ESE4	E4	E6	ESE7	ESE9	ESE8	SE10	SSE10	SSE8	SSE9	S11	S11	SSE12	SW3.4	WNW17																						
18-Feb	SSE11	SSE8	SE10	SSE12	SSE11	SSE13	SSE14	SE12	SE12	SE14	SSE11	SE12	SE12	SE12	SE9	ESE8	ESE9	ESE8	ESE11	SE11	SE10	SE8	SSE8	SSE10	SE10.3	SE14																						
19-Feb	SE6	SSE7	SE5	SE5	SSE6	E3	SE2	SW7	WSW8	WSW7	SW7	NE2	ENE4	NNE4	NNE6	NNE6	N7	NNW11	NNW11	NNW15	NW19	NW18	NW20	NW23	NW4.2	NW23																						
20-Feb	NW25	NW23	NW26	NW25	NW22	NW21	NW21	NW20	NW21	NW20	NW18	NNW18	NNW14	NNW14	NNW14	NNW17	NW14	NW13	NW15	NW18	NW18	NW21	NW21	NW23	NW19.2	NW26																						
21-Feb	NW21	NW20	NW16	NW16	NW16	NW16	NW14	NW17	NW21	NW18	NNW17	NNW13	NNW10	N10	N8	NE5	NE3	SW4	S7	S6	SSW9	SW15	SW14	SSW14	NW8.6	NW21																						
22-Feb	SSW18	SW24	SW21	SSW18	SSW19	SSW17	SSW13	SSW16	SSW17	SSW19	SSW19	SSW13	SSW14	S13	S15	SSW18	SSW20	SSW22	SW37	SW35	SW34	SW34	WSW24	W31	SW19.9	SW37																						
23-Feb	WNW28	WNW21	WNW21	W23	W24	WNW26	WNW28	NW28	NW28	NW25	NW21	WNW20	NW23	WNW19	WNW20	NW21	NNW21	NW20	NNW17	N17	N18	N15	NNE14	NNE12	NW18.9	WNW28																						
24-Feb	ENE9	ENE12	E12	E11	E13	E12	E13	E13	E13	E12	ENE14	ENE13	ENE14	NE11	NE11	NNE13	NNE13	NNE12	N12	NNW14	NNW15	NNW16	NNW17	NW20	NE9.1	NW20																						
25-Feb	NW17	NW13	NW16	NNW16	NW16	NW13	NW13	NW13	NW12	NW12	N8	N9	N8	N7	N8	N6	NNE3	NE3	SE2	SSE5	S7	SSW10	SSW11	SSW11	NW6.6	NW17																						
26-Feb	SSW11	SSW11	SSW10	SSW12	SSW18	SSW18	SSW17	SSW16	SSW16	SSW19	SSW23	SSW24	SSW23	SSW22	SSW20	SSW18	SSW13	SSW10	SSW10	WSW12	SW12	WSW18	WNW13	NW13	SSW14.1	SSW24																						
27-Feb	NNW18	NNW15	NNW16	NNW16	NW20	NW19	NNW17	NNW16	NNW13	NNW12	NW12	WNW11	W12	W14	W15	W15	W17	W12	WSW9	WSW13	WSW20	WSW19	WSW19	WSW23	WNW12.5	WSW23																						
28-Feb	WSW19	WSW20	W19	W20	W21	W21	W26	W24	W22	WNW21	WNW18	NW22	NW23	NW21	NW17	NW17	NW17	W16	W16	W21	NW12	NW16	NW13	NW14	WNW17.8	W26																						
WNW5.8																								WNW5.9	WNW5.2	WNW5.4	W6.1	W5.4	WNW5.4	WNW5.0	WNW5.0	WNW4.7	WNW4.7	NW4.6	NW3.8	NW3.2	WNW3.1	NW3.4	NW3.4	WNW3.0	W3.4	W4.3	WNW4.0	WNW5.9	WNW5.7	WNW6.3	Diurnal Average	
WNW28																								SW24	NW26	NW25	SSW26	SSW27	SW29	NW28	NW28	NW25	SSW23	SSW24	W25	W24	W23	SSW25	SW26	SW27	SW37	SW35	SW34	SW34	WSW24	W31	Diurnal Maximum	

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



**WBEA**  
**Hourly Averages**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - February 2015**





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

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - February 2015**

<b>Wind Speed Ranges (km/h)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	55	8.18	8.18
6 - 11	167	24.85	33.04
12 - 19	324	48.21	81.25
20 - 28	120	17.86	99.11
29 - 38	6	0.89	100.00
> 38	0	0.00	100.00

Total Number of Valid Hours: 672

Total Number of Hours: 672



**WBEA**  
**Frequency Distribution**

**Wind Speed (WS) - km/h**  
**ConocoPhillips - Surmont - February 2015**

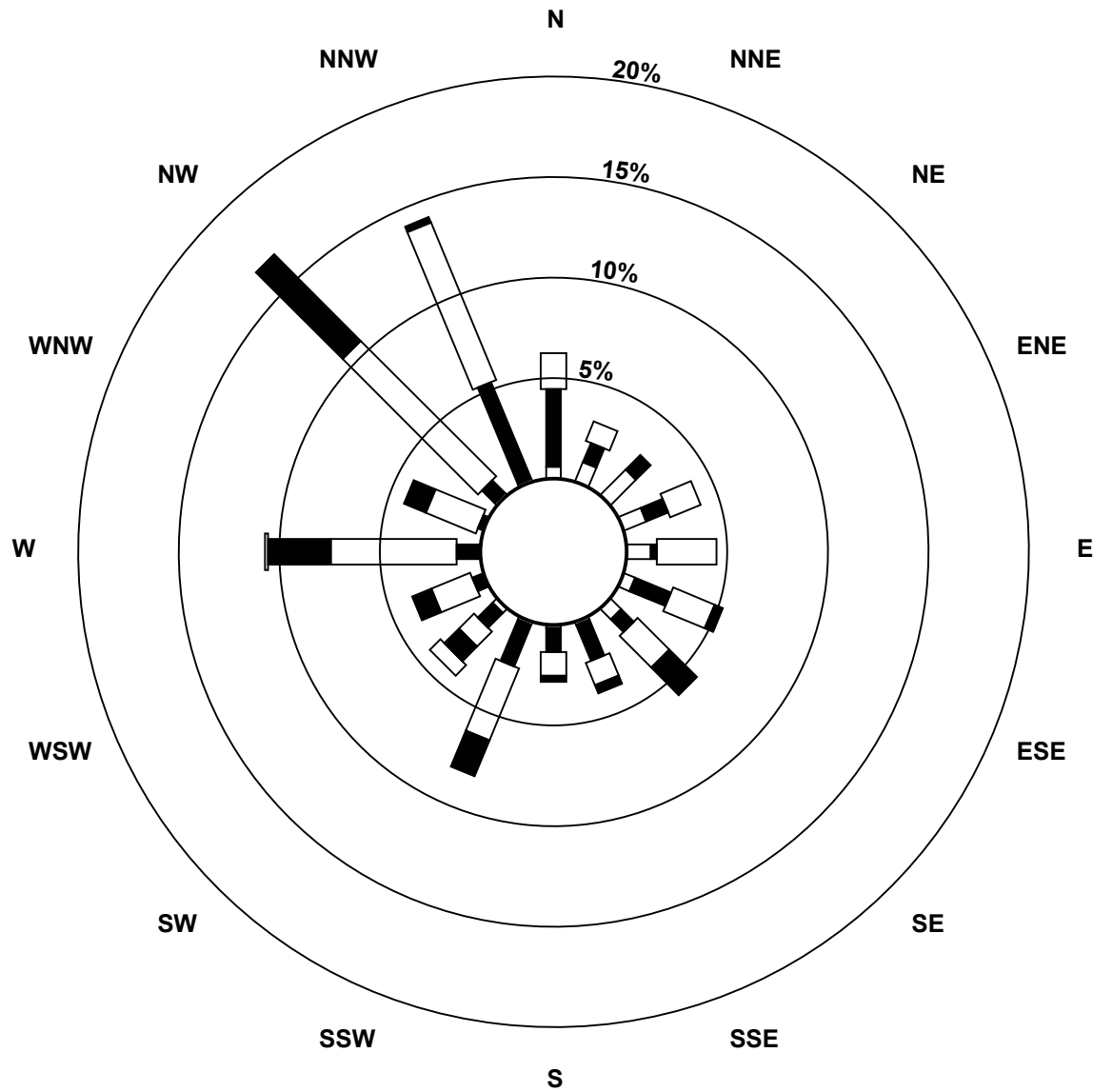
Wind Speed Ranges (km/h)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	4	7	12	8	8	4	5	1	1	1	2	0	0	0	1	1	55
6 - 11	26	7	7	8	2	13	6	13	8	15	7	4	8	2	6	35	167
12 - 19	12	7	0	11	20	15	15	8	8	26	7	14	42	18	64	57	324
20 - 28	0	0	0	0	0	3	13	3	2	13	7	7	21	8	41	2	120
29 - 38	0	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	6
> 38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Totals</b>	42	21	19	27	30	35	39	25	19	55	28	25	72	28	112	95	672

Total Number of Valid Hours: 672

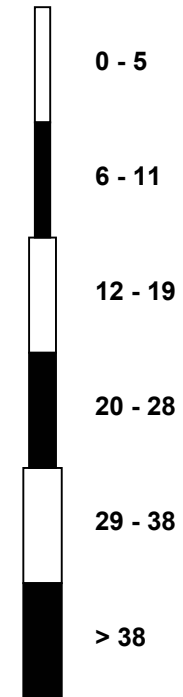
Total Number of Hours: 672

Wood Buffalo Environmental Association  
 Wind Rose Feb 2015

Wind Speed (WS) - km/h  
 ConocoPhillips - Surmont (AMS502)



Classes (km/h)



Total Number of Valid Hours: 672



Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 7 km/h on Feb 4 06:00  Minimum Value: 1 km/h on Feb 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> = 7																	Hours in Service: 672 Hours of Data: 672 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-Feb	3	3	2	2	2	3	2	2	2	3	3	4	4	3	3	3	2	2	2	2	2	2	2	2	4
2-Feb	2	2	4	3	3	3	4	3	3	4	4	5	4	4	4	3	3	1	2	2	3	3	3	3	5
3-Feb	2	3	3	2	3	2	2	3	4	4	4	4	4	4	4	3	2	1	1	2	2	3	4	3	4
4-Feb	5	5	5	5	7	7	6	6	6	5	6	5	4	4	5	4	4	3	3	4	3	4	5	5	7
5-Feb	4	5	2	3	3	4	3	3	3	2	2	3	3	2	2	2	2	2	2	2	2	2	2	2	5
6-Feb	3	3	3	2	2	3	2	3	3	3	3	3	4	3	3	3	4	4	4	4	3	3	2	2	4
7-Feb	3	4	3	4	3	3	3	3	3	4	3	3	3	3	2	2	2	2	2	1	2	1	1	1	4
8-Feb	3	2	3	3	3	2	2	2	2	2	2	1	2	2	2	2	1	2	1	1	1	1	1	2	3
9-Feb	1	2	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	1	1	2
10-Feb	2	2	2	2	2	2	3	3	3	4	4	3	2	2	2	2	3	3	2	3	3	2	3	2	4
11-Feb	2	3	3	2	1	1	1	2	2	2	3	3	3	3	3	3	3	4	4	5	5	5	5	5	5
12-Feb	5	5	5	3	5	4	2	2	3	2	2	3	3	1	2	1	3	2	1	2	2	2	2	2	5
13-Feb	2	2	2	3	2	2	2	2	2	2	2	2	3	3	3	4	4	3	4	4	4	4	4	5	5
14-Feb	4	4	4	4	5	5	4	4	4	5	4	4	5	5	6	7	6	5	5	4	3	3	3	3	7
15-Feb	2	2	2	2	3	2	2	2	2	2	2	2	2	2	3	2	3	2	3	4	3	3	4	4	4
16-Feb	3	3	3	3	3	3	3	3	3	3	4	4	2	2	2	4	2	2	2	3	2	3	2	2	4
17-Feb	2	2	2	2	2	3	2	2	2	2	1	1	2	1	1	1	1	2	2	2	2	3	2	2	3
18-Feb	3	2	3	3	3	3	3	2	2	3	2	2	2	2	2	1	2	1	2	2	2	1	2	2	3
19-Feb	1	1	1	1	2	1	1	3	2	2	2	1	1	1	1	1	1	2	2	2	3	3	3	5	5
20-Feb	4	4	5	5	4	4	4	3	4	4	3	3	3	3	3	3	4	3	3	3	3	4	3	3	5
21-Feb	3	3	3	3	3	3	3	3	4	3	3	3	2	2	2	1	1	3	1	1	3	2	3	4	4
22-Feb	4	5	5	4	4	5	5	5	5	5	5	5	4	4	5	5	6	6	7	6	5	6	5	6	7
23-Feb	6	4	4	4	5	5	7	6	7	6	5	4	5	4	5	5	4	5	4	3	4	3	3	3	7
24-Feb	2	2	2	2	2	3	2	2	3	3	3	3	2	2	3	2	2	2	2	2	3	4	3	3	4
25-Feb	3	3	3	2	2	3	2	2	2	3	1	2	1	2	1	1	1	2	1	1	2	1	2	1	3
26-Feb	1	2	2	3	4	3	3	4	3	4	6	6	7	6	5	5	3	3	2	3	2	3	3	3	7
27-Feb	3	3	4	3	4	4	3	3	2	3	2	3	3	3	3	3	3	4	1	3	3	3	3	4	4
28-Feb	3	3	4	4	4	3	4	4	3	4	4	6	5	5	4	4	4	4	3	4	4	4	3	3	6
																	Diurnal Maximum								



Direction of Maximum Speed: 224 deg on Feb 22 19:00	Hours in Service: 672
Direction of Maximum Daily Speed Average: 214.0 deg on Feb 22	Hours of Data: 672
Direction of Minimum Speed: 31 deg on Feb 8 21:00	Hours of Missing Data: 0
Direction of Minimum Daily Speed Average: 3.4 deg on Feb 17	Percent Operational Time: 100.0
Monthly Average Direction: 302.7 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-Feb	216	211	219	216	218	189	182	213	227	258	281	311	329	330	331	333	334	299	278	278	274	279	272	267	279.0
2-Feb	269	260	265	260	260	249	256	254	259	260	265	271	268	273	277	278	295	261	250	259	273	278	276	272	266.0
3-Feb	264	264	260	258	263	262	266	308	326	328	324	329	325	324	330	312	272	237	208	194	191	210	216	187	280.9
4-Feb	209	216	195	190	204	205	216	207	201	217	250	270	270	269	269	279	284	282	308	324	327	320	318	321	251.1
5-Feb	324	326	299	292	317	324	326	327	334	332	333	341	359	359	353	353	353	356	358	356	6	356	2	7	338.0
6-Feb	23	18	26	43	56	61	61	64	61	74	73	79	82	82	72	77	76	76	80	86	85	85	88	90	69.8
7-Feb	98	101	106	111	117	117	117	117	121	128	123	124	118	123	126	115	113	120	123	127	114	114	131	201	117.4
8-Feb	360	337	332	333	332	340	338	346	337	339	342	352	17	65	19	22	10	351	21	35	31	71	84	90	352.0
9-Feb	103	106	96	38	37	77	67	59	99	82	54	48	27	72	43	27	45	52	75	96	37	6	1	2	56.3
10-Feb	348	327	336	336	324	327	319	325	322	323	325	324	337	339	341	340	334	331	339	322	326	332	329	326	329.5
11-Feb	314	317	325	321	228	213	196	150	173	171	155	144	136	136	130	142	133	138	143	146	151	154	161	170	153.5
12-Feb	184	195	212	226	234	235	261	266	267	259	276	280	276	35	10	8	357	356	357	352	344	345	341	340	278.2
13-Feb	351	347	354	345	337	359	18	8	26	38	60	59	64	74	79	86	95	109	116	119	114	119	122	125	73.9
14-Feb	126	128	125	130	133	141	138	144	145	156	159	163	169	183	183	207	219	224	231	237	243	272	317	329	175.7
15-Feb	334	334	330	333	335	342	337	340	325	335	328	333	320	336	324	333	333	330	330	325	326	325	326	326	329.7
16-Feb	329	320	324	325	324	322	322	321	324	325	320	329	334	341	347	286	275	277	275	281	279	283	301	286	311.5
17-Feb	288	285	283	284	285	279	281	277	283	269	106	105	83	84	103	111	116	139	149	167	162	170	171	160	235.8
18-Feb	168	150	143	151	151	166	152	136	139	146	150	131	142	125	124	111	121	118	122	130	146	141	149	153	141.1
19-Feb	138	164	127	134	152	99	132	220	251	245	233	40	59	20	15	26	9	331	333	329	326	325	325	323	325.9
20-Feb	323	323	322	322	322	323	322	323	323	325	326	327	333	334	336	329	321	310	320	323	322	321	322	321	323.8
21-Feb	323	324	308	310	317	314	309	320	324	326	330	335	347	351	1	34	53	223	191	182	196	215	215	213	309.2
22-Feb	207	221	214	208	203	192	199	195	196	200	207	205	193	182	178	198	203	202	224	222	225	234	247	268	214.0
23-Feb	287	289	289	274	280	295	297	304	307	305	305	296	305	301	302	320	327	326	333	350	352	4	30	30	309.4
24-Feb	58	77	89	87	96	92	90	95	90	80	72	64	66	54	47	27	14	12	357	347	343	338	334	325	43.6
25-Feb	319	325	322	327	326	311	305	308	324	322	349	350	356	350	360	357	29	51	142	157	181	202	209	200	318.5
26-Feb	199	197	196	195	198	198	197	200	202	196	196	200	193	196	199	202	205	197	203	240	234	248	284	316	207.2
27-Feb	328	333	335	328	325	325	328	329	336	336	314	295	269	269	271	268	273	262	242	249	248	247	248	245	291.5
28-Feb	246	255	269	273	270	259	267	275	280	283	290	309	318	315	306	311	305	280	270	274	307	318	306	315	285.9
	291.1	287.8	290.5	284.4	276.7	274.4	281.3	285.8	293.4	286.3	295.0	309.0	318.2	324.2	328.2	318.3	314.1	284.9	264.9	275.5	282.3	283.0	293.2	295.5	
	Diurnal Average																								

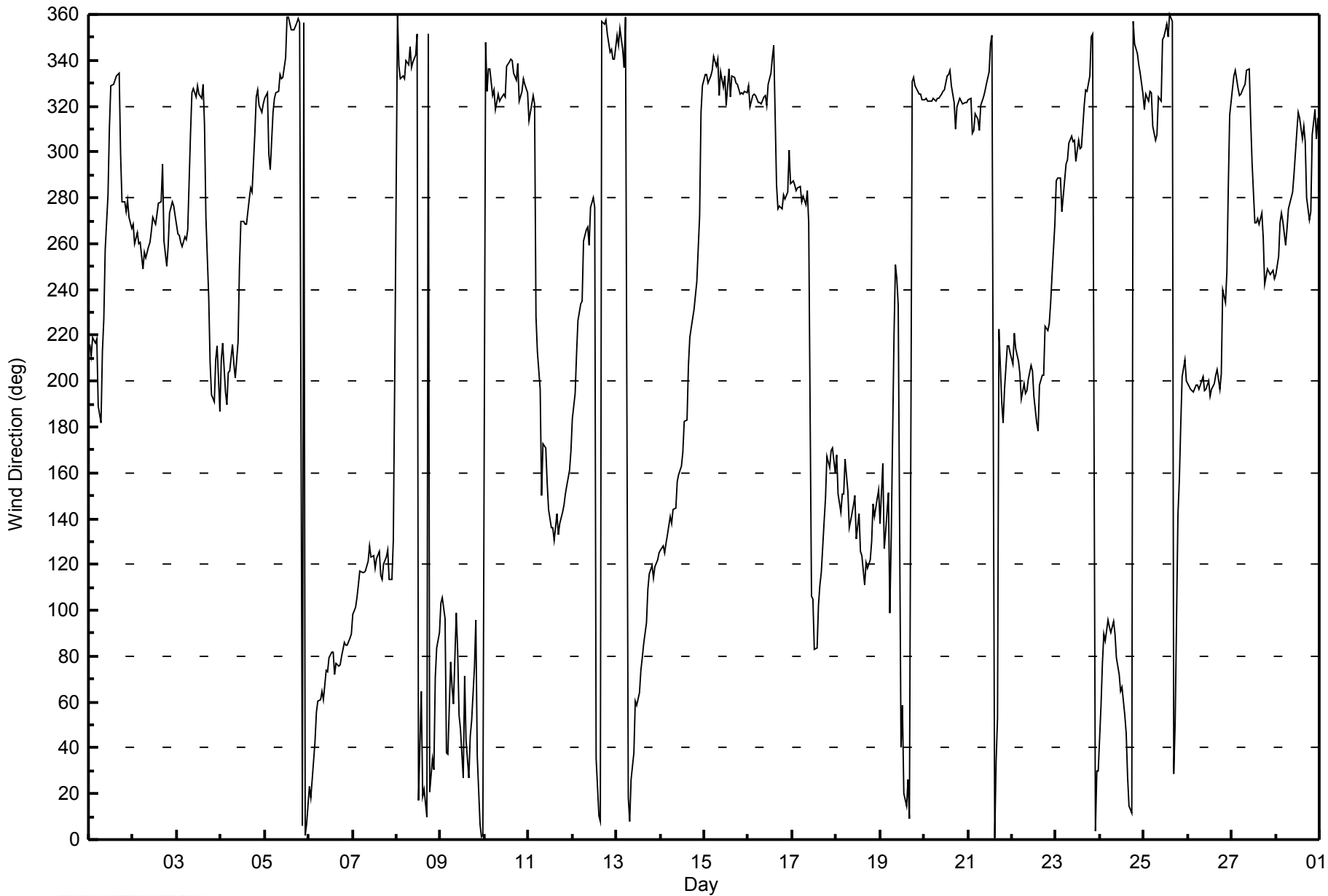
All monthly, daily, and diurnal averages have been calculated using vector methods





**WBEA**  
**Hourly Averages**

**Wind Direction (WD) - deg**  
**ConocoPhillips - Surmont - February 2015**





Number of Exceedences (AAAQO): 1-hr: 0 24-hr: 0 Maximum Value: 82 deg on Feb 8 00:00																	Hours in Service: 672 Hours of Data: 672 Hours of Missing Data: 0 Hours of Calibration: 0 Percent Operational Time: 100.0								
Minimum Value: 7 deg on Feb 17 05:00																									
Percentiles: P <sub>1</sub> = 8 P <sub>10</sub> = 9 Q <sub>1</sub> = 11 Median = 13 Q <sub>3</sub> = 16 P <sub>90</sub> = 21 P <sub>99</sub> = 60																									
Day	Hourly Period Ending At (MST)																							Daily Maximum	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		24
1-Feb	16	15	18	13	11	32	27	20	18	15	17	19	10	10	11	10	11	27	9	10	11	9	8	7	32
2-Feb	9	9	11	8	9	10	10	11	10	11	12	12	10	15	12	11	26	17	7	10	10	10	9	8	26
3-Feb	9	10	8	8	8	9	10	33	10	11	12	12	12	14	10	27	14	12	11	11	12	14	14	19	33
4-Feb	16	13	16	17	15	15	13	14	15	14	26	12	12	11	12	11	11	9	22	10	10	16	14	12	26
5-Feb	10	9	22	16	15	11	9	9	14	11	15	19	16	20	15	16	13	12	14	15	14	12	13	16	22
6-Feb	13	13	14	14	15	13	14	12	13	12	13	12	14	12	15	13	13	13	13	12	12	12	12	11	15
7-Feb	10	12	12	13	12	14	13	12	12	11	13	13	14	14	13	14	13	12	12	21	15	30	61	82	82
8-Feb	37	15	9	12	13	13	13	12	9	13	16	21	23	34	24	29	15	10	26	21	39	24	19	22	39
9-Feb	17	15	18	32	20	24	20	23	19	20	26	25	18	25	16	18	15	17	23	16	26	18	16	14	32
10-Feb	22	28	17	12	14	10	15	11	12	12	11	13	13	13	13	15	17	13	19	25	10	10	10	8	28
11-Feb	13	16	23	60	37	9	9	16	12	15	14	14	13	13	12	13	13	12	13	13	13	15	16	16	60
12-Feb	22	17	19	17	10	10	11	11	15	29	15	14	22	30	24	10	12	12	15	13	14	13	16	15	30
13-Feb	13	16	14	18	15	18	14	14	14	17	15	15	16	16	15	13	12	12	11	11	12	11	11	11	18
14-Feb	11	10	10	10	11	13	13	12	13	14	13	15	15	21	17	15	13	10	9	8	9	21	21	11	21
15-Feb	13	11	17	17	16	45	30	15	34	13	10	13	33	12	24	16	11	9	9	9	9	9	9	9	45
16-Feb	9	14	9	8	9	11	11	13	11	11	14	11	14	14	15	33	11	10	9	9	8	9	16	11	33
17-Feb	11	10	7	8	7	10	8	10	10	27	15	27	66	20	11	10	13	12	12	15	13	14	14	11	66
18-Feb	15	19	21	14	20	15	15	15	14	11	15	14	15	10	16	12	10	11	10	13	15	16	18	12	21
19-Feb	17	14	20	19	20	44	42	46	19	16	12	62	19	25	17	14	19	10	10	8	8	9	9	10	62
20-Feb	9	9	10	10	11	10	9	10	10	10	12	12	16	14	13	10	15	16	13	9	10	9	9	9	16
21-Feb	9	8	12	13	13	13	12	12	9	10	11	13	15	19	18	25	36	70	12	16	15	11	11	12	70
22-Feb	12	11	13	16	16	17	25	22	20	18	17	19	18	18	20	16	16	15	10	10	9	9	13	12	25
23-Feb	10	11	12	10	11	13	13	14	14	14	15	17	15	21	15	13	10	11	14	16	15	19	16	17	21
24-Feb	17	11	12	12	12	13	11	10	11	11	15	13	14	15	19	15	20	14	13	12	13	12	11	8	20
25-Feb	12	9	10	8	8	14	12	14	12	16	14	15	15	27	16	16	22	25	60	20	14	11	10	11	60
26-Feb	8	9	12	13	11	11	12	13	13	14	13	13	16	14	15	15	15	13	20	12	9	8	14	21	21
27-Feb	10	12	12	11	11	10	10	11	11	17	26	30	17	12	13	14	13	12	9	12	8	8	8	8	30
28-Feb	8	11	10	11	11	9	10	9	9	10	15	16	14	17	21	19	18	10	11	10	24	14	16	15	24
	37 28 23 60 37 45 42 46 34 29 26 62 66 34 24 33 36 70 60 25 39 30 61 82																								
	Diurnal Maximum																								



# Wood Buffalo Environmental Association

## SO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 20, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:30	End Time (MST)	14:55
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial Number	622
Cal Gas Concentration	51.1 ppm	Cal Gas Expiry Date	5/29/2014
Gas Cert Reference	LL110503		
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	n/a	DACS channel #	TCP/IP

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	1000	1000	PMT voltage	16	11
Analyzer Range (mv)	1000	1000	Lamp voltage	2797	2729
Calculated slope	0.994880	0.996597	Chamber temp.	50.0	50.0
Calculated intercept	0.579563	0.812971	Pressure (mmHg)	22.3	22.0
Analyzer Background	16.9	16.9	Flow (lpm)	564.000	554.000
Analyzer Coefficient	1.011	1.011	Intensity	69	67

Analyzer make	API T100	Analyzer serial #	598
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### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.3	NA
as found span	5000	76.7	783.9	786.5	0.997
calibrator zero	5000	0.0	0.0	0.3	NA
high point	5000	76.7	783.9	786.5	0.997
second point	5000	38.4	392.4	391.9	1.001
third point	5000	19.2	196.2	195.4	1.004
calibrator zero					
as left zero	5000	0.0	0.0	0.1	NA
as left span	6000	92.0	783.5	784.1	0.999
Average Correction Factor					1.001

Corrected As found	786.2	Previous response	787.3	% change	0.1%
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#### Notes:

Filter changed after as founds. No adjustments made.

Calibration Performed By: Devin Russell



## Wood Buffalo Environmental Association

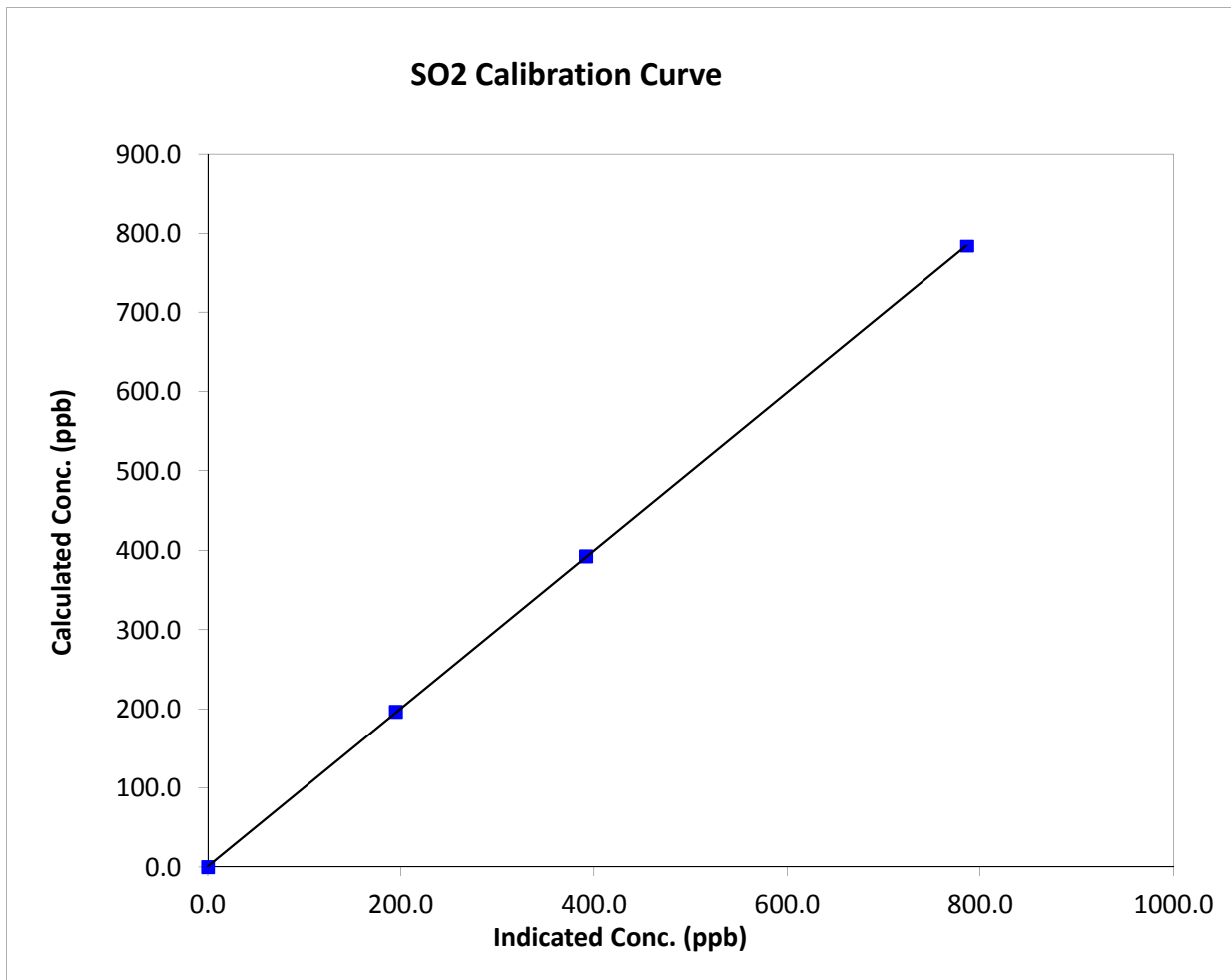
### SO<sub>2</sub> Calibration Summary

#### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 20, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	API T100	Analyzer serial #	598

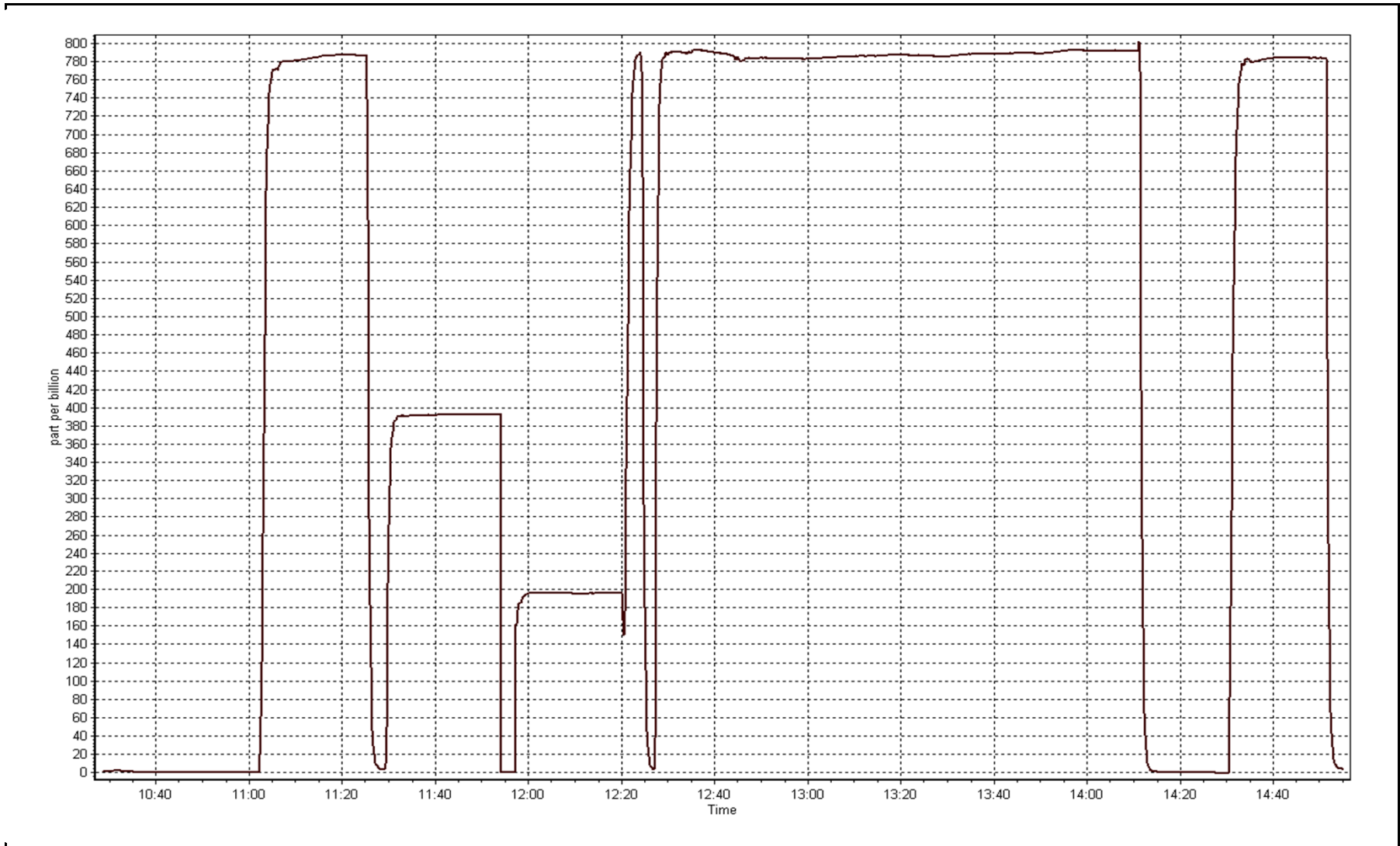
#### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999990
783.9	786.5	0.9967		
392.4	391.9	1.0014	Slope	0.996597
196.2	195.4	1.0044		
			Intercept	0.812971



SO2 Calibration Plot

Date: February 12, 2015



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# Wood Buffalo Environmental Association

## H2S Calibration Report

### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Reason:	Routine		
Start Time (MST)	10:00	End Time (MST)	12:45
Barometric Pressure	n/a mmHg	Station temp.	22 Deg C
Calibrator Make/Model	API T700	Serial number	622
Cal Gas Concentration	10.4 ppm H2S	Cal Gas Expiry Date	30 May, 2016
Gas Cert Reference	LL34303	SO2 gas conc.	51.1 ppm SO2
DACS make/model	Campbell Scientific CR3000	DACS serial No.	7882
DACS voltage range	n/a	DACS channel #	TC/IP

### Analyzer Information

	Before	After		Before	After
Analyzer Range (ppb)	100	100	PMT voltage	22	11
Analyzer Range (mv)	100	100	Lamp voltage	2937	2868
Calculated slope	1.009366	1.004548	Chamber temp.	50	50
Calculated intercept	-0.336426	-0.370001	Pressure	22.6	23.6
Analyzer Background	18	18	Flow	555	591
Analyzer Coefficient	0.998	0.998	Intensity	65	64
			Converter temp.	314	315

Analyzer make/model	API T101	Analyzer serial #	197
Converter make/model	n/a	Converter serial #	n/a

### Calibration Data

Set Point	Total flow rate (cc/min)	Source gas flow rate (cc/min)	Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)
as found zero	5000	0.0	0.0	0.1	NA
as found span	5000	38.5	80.1	79.9	1.002
SO2 scrubber check					
calibrator zero	5000	0.0	0.0	0.1	NA
high point	5000	38.5	80.1	79.9	1.002
second point	5000	19.3	40.1	40.6	0.990
third point	5000	12.0	25.0	25.5	0.981
calibrator zero					
as left zero	5000	0.0	0.0	0.6	NA
as left span	5000	38.5	80.1	79.8	1.004
Average Correction Factor					0.991

Corrected As found	79.8	Previous response	79.7	% change	-0.2%
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#### Notes:

Spiking before as found span due to high calibrator MFC pressure warning. Lowered pressure on the H2S cylinder regulator to 32 PSI. No adjustments made.

Calibration Performed By:

Devin Russell



# Wood Buffalo Environmental Association

## H2S Calibration Summary

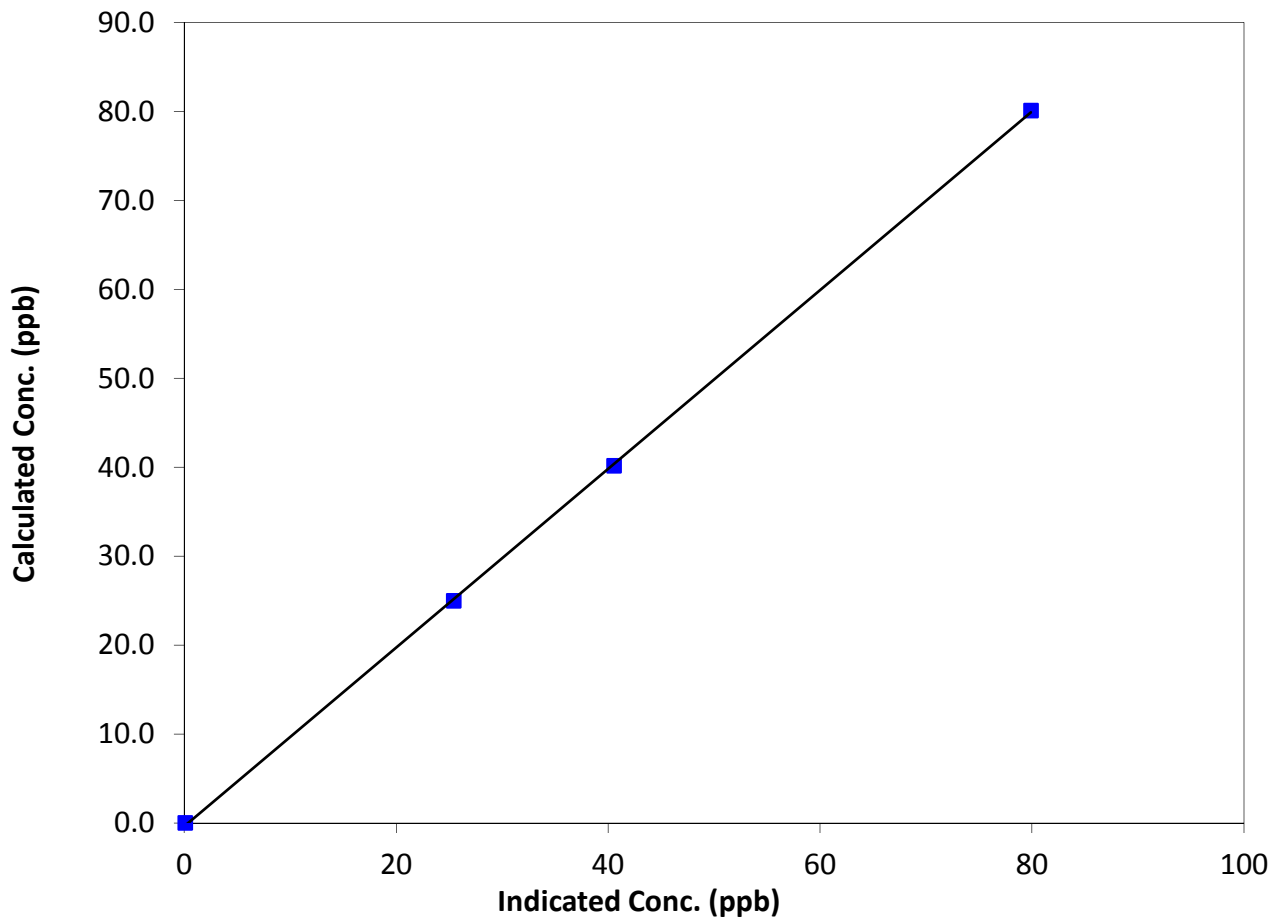
### Station Information

Calibration Date	February 11, 2015	Previous Calibration	January 22, 2015
Station Name	ConocoPhillips - Surmont	Station Number	AMS 502
Start Time (MST)	10:00	End Time (MST)	12:45
Analyzer make	API T101	Analyzer serial #	197

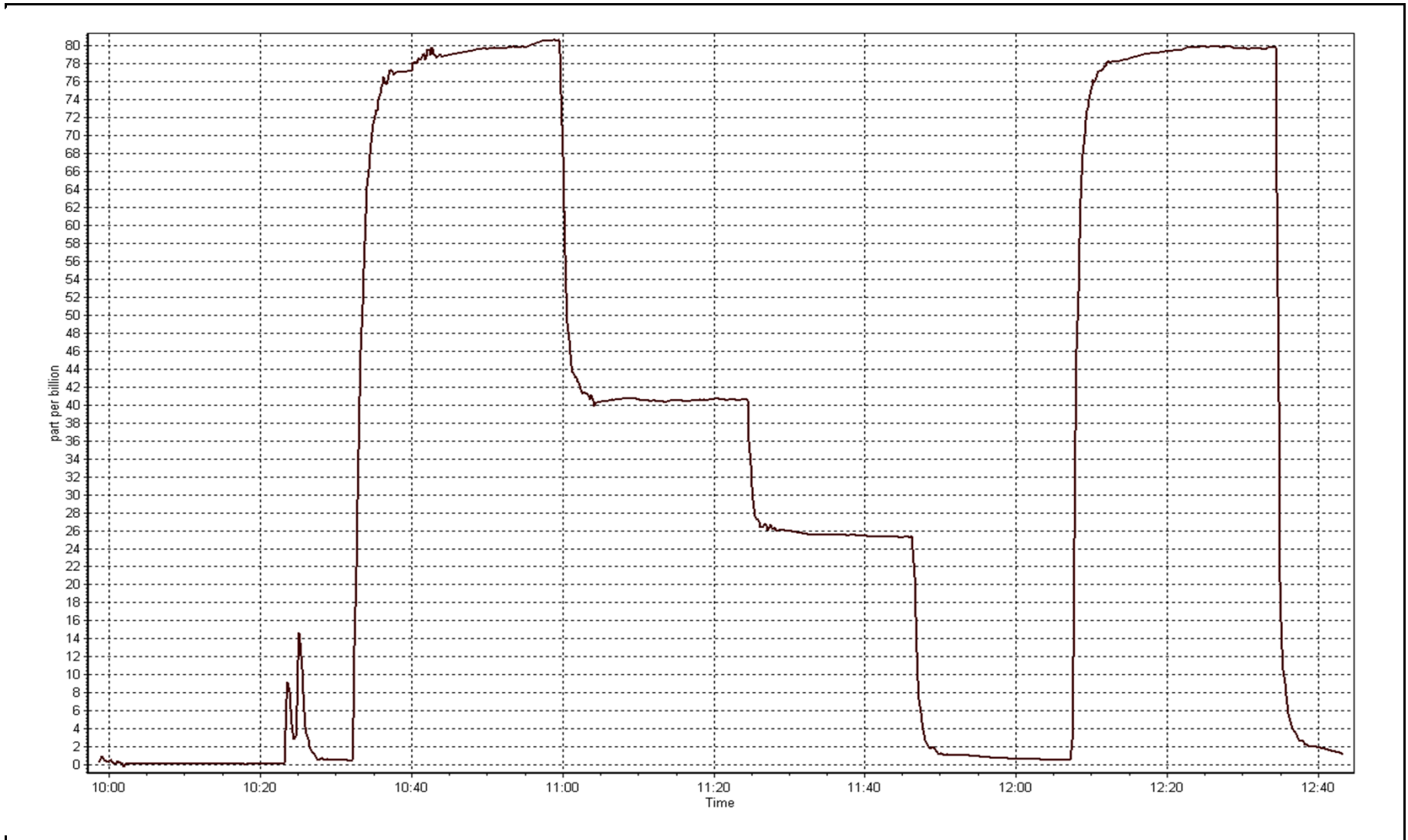
### Calibration Data

Calculated concentration (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.1	N/A	Correlation Coefficient	0.999937
80.1	79.9	1.0023		
40.1	40.6	0.9900	Slope	1.004548
25.0	25.5	0.9807		
			Intercept	-0.370001

### H2S Calibration Curve









# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Reason:	<input type="text" value="Routine"/>		
Start Time (MST)	10:30	End Time (MST)	14:55
Barometric Pressure	n/a mmHg	Station Temperature	22.0 Deg C
Calibrator	API T700	Serial Number	622
NO Cal Gas Conc	52.2 ppm	Cal Gas Expiry Date	May 29, 2014
NOx Cal Gas Conc	52.2 ppm	Cal Gas Serial #	LL110503

### DACS Information

DACS make & model	Campbell Scientific CR3000	DACS serial No.	7882
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Parameter		NOx	NO	NO2
MV conversion	Analyzer Range (ppb)	1000	1000	1000
	Analyzer Range (mv)	1000	1000	1000
Before	Data Slope	0.998423	0.998649	1.000458
	Data Offset	0.343486	0.531437	0.211318
After	Data Slope	1.003715	1.002104	1.001722
	Data Offset	0.289059	0.686062	-0.399630
Channel #		TCP/IP	TCP/IP	TCP/IP
Voltage Range				

### Analyzer Information

Analyzer make/model	Thermo 42i	Analyzer serial #	1218153356
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Test Point	before		after	
Concentration range	1000	ppb	1000	ppb
NO coefficient	0.721	ppb	0.721	ppb
NOX coefficient	0.997	ppb	0.997	ppb
NO2 coefficient	1.000	ppb	1.000	ppb
NO bkgrnd	4.8		4.8	
NOX bkgrnd	4.8		4.8	
PMT	-941		-940.5	
Chamber Temp	50.5	Deg C	50.5	Deg C
Moly Temp	327.4	Deg C	322.4	Deg C
Cooler Temp	-3.1	Deg C	-2.9	Deg C
O3 flow	ok	ccm	ok	ccm
Chamber Press	203.2	mmHg	206.7	mmHg
Sample Flow	0.491	ccm	0.477	ccm

**Notes:**

Filter changed after as founds. No adjustments made.



# Wood Buffalo Environmental Association

## NO<sub>x</sub>-NO-NO<sub>2</sub> Calibration Report

### Station Information

Calibration Date: February 12, 2015 Station Number: AMS 502

### 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 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
as found zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.3	N/A	N/A
as found span	5000	76.7	800.7	800.7	0.0	797.6	798.7	-1.1	1.0039	1.0025
calibrator zero	5000	0.0	0.0	0.0	0.0	-0.2	-0.3	0.3	N/A	N/A
high point	5000	76.7	800.7	800.7	0.0	797.6	798.7	-1.1	1.0039	1.0026
second point	5000	38.4	400.9	400.9	0.0	398.9	398.8	0.1	1.0050	1.0053
third point	5000	19.2	200.4	200.4	0.0	199.5	199.2	0.2	1.0050	1.0062
calibrator zero										
as left zero	5000	0.0	0.0	0.0	0.0	0.0	-0.1	0.2	N/A	N/A
as left span	6000	92.0	800.4	520.1	280.3	808.4	528.8	279.7	0.9901	0.9836
Average Correction Factor									1.0047	1.0047

Corrected As found NO<sub>x</sub>= 797.8 NO= 799.0 Percent Change NO<sub>x</sub>= 0.5% NO= 0.3%  
 Previous Response NO<sub>x</sub>= 801.7 NO= 801.3

### 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 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			0.3			N/A	
1st NO <sub>2</sub> (300)	N/A	520.1	278.9	798.6	520.1	278.5	0.9875	1.0000	1.0016	99.8%
2nd NO <sub>2</sub> (200)	N/A	606.2	192.8	799.7	606.2	193.5	0.9862	1.0000	0.9965	100.3%
3rd NO <sub>2</sub> (100)	N/A	697.3	101.7	799.1	697.3	101.8	0.9869	1.0000	0.9991	100.1%
4th NO <sub>2</sub> (0)	799.0	N/A	0.1	799.2	799.0	0.2	0.9868	1.0000	N/A	N/A
Average Correction Factor							0.9869	1.0000	0.9991	100.1%

Calibration Performed By: Devin Russell



# Wood Buffalo Environmental Association

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

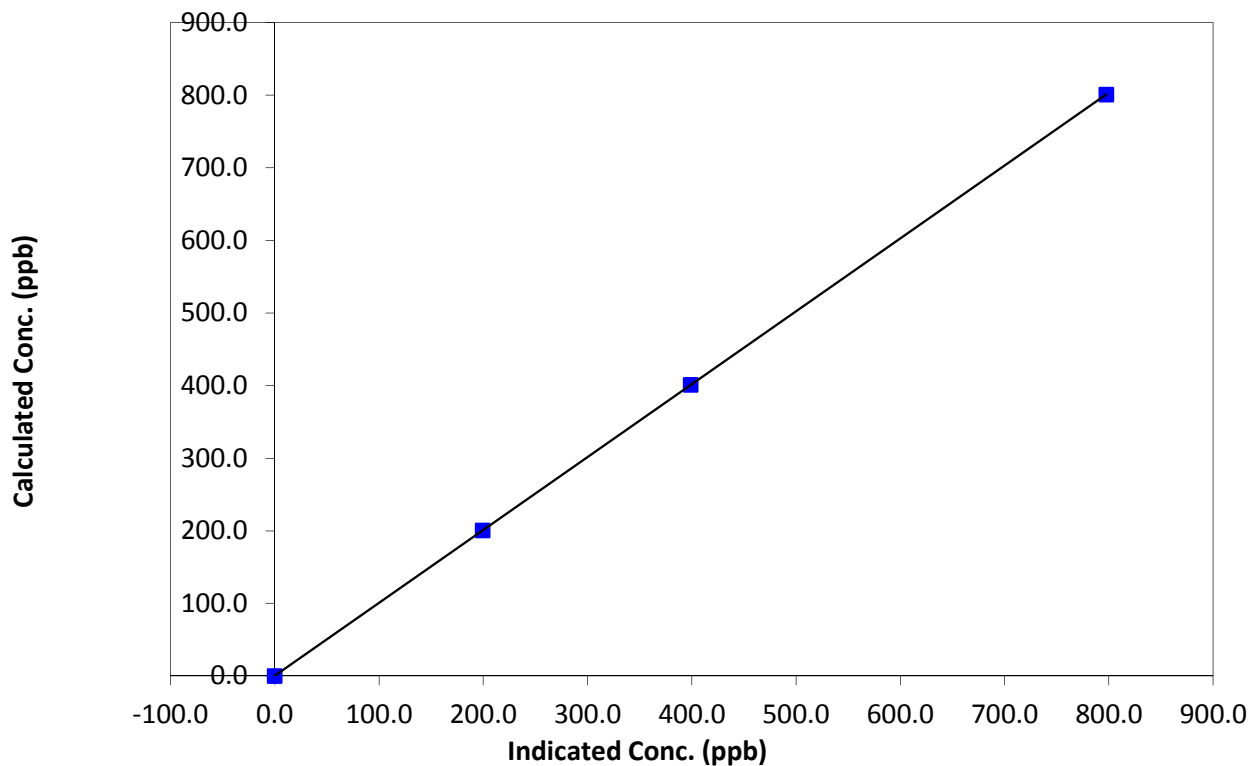
### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	-0.2	N/A	Correlation Coefficient	1.000000
800.7	797.6	1.0039		
400.9	398.9	1.0050	Slope	1.003715
200.4	199.5	1.0050		
			Intercept	0.289059

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





# Wood Buffalo Environmental Association

## NO Calibration Summary

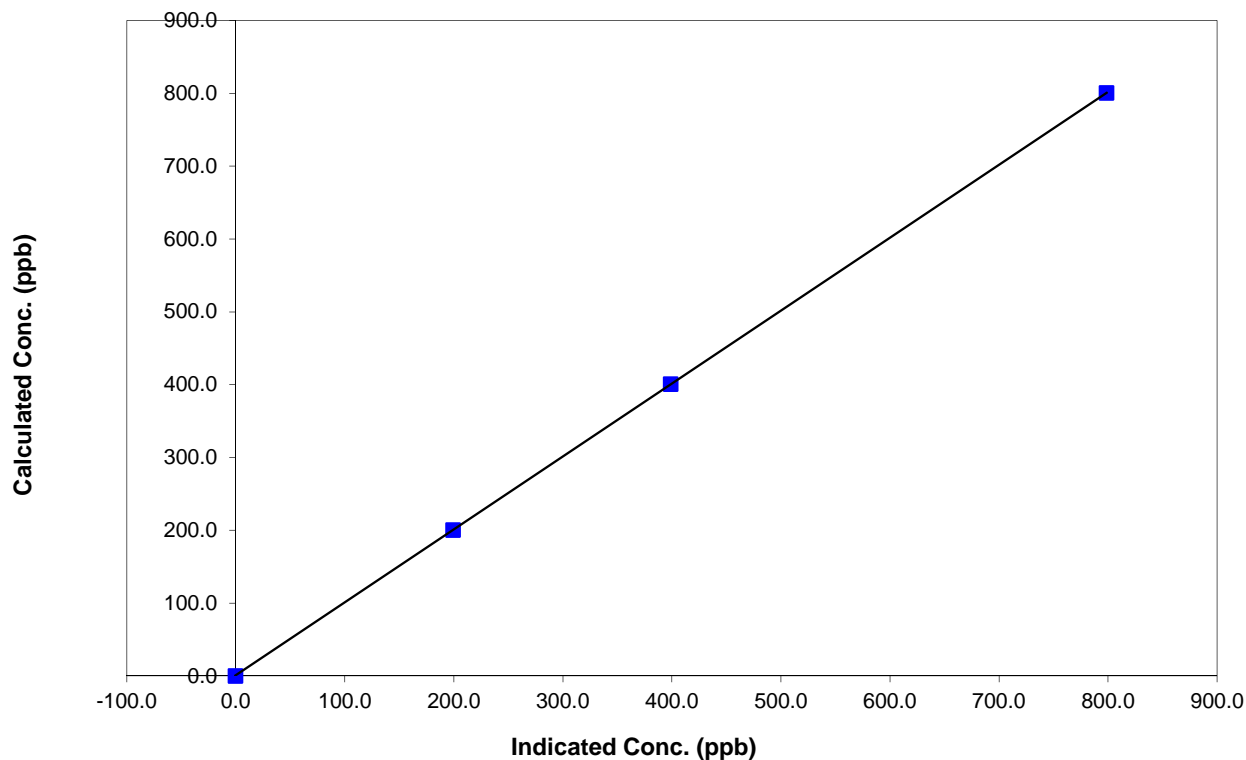
### Station Information

Calibration Date	February 12, 2015	Previous Calibration	January 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:30	End Time (MST)	14:55
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	-0.3	N/A	Correlation Coefficient	0.999998
800.7	798.7	1.0026		
400.9	398.8	1.0053	Slope	1.002104
200.4	199.2	1.0062		
			Intercept	0.686062

### NO Calibration Curve





# Wood Buffalo Environmental Association

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

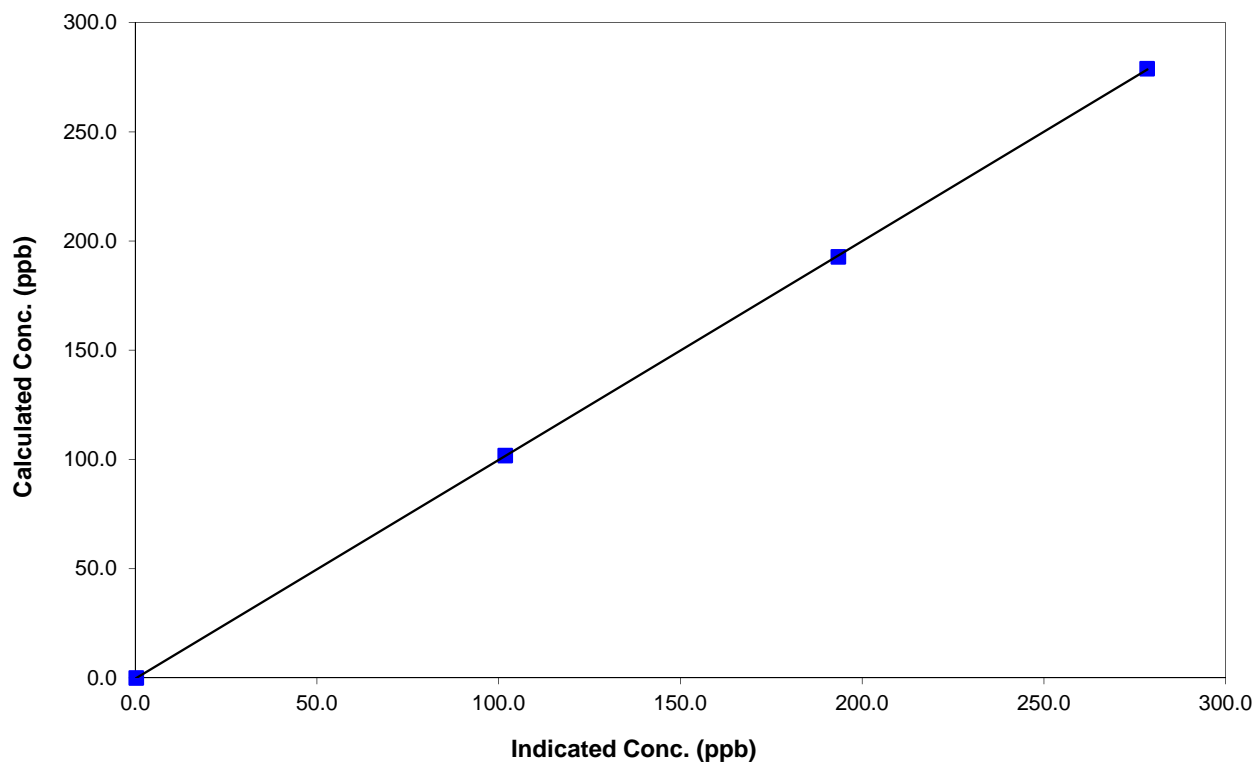
### Station Information

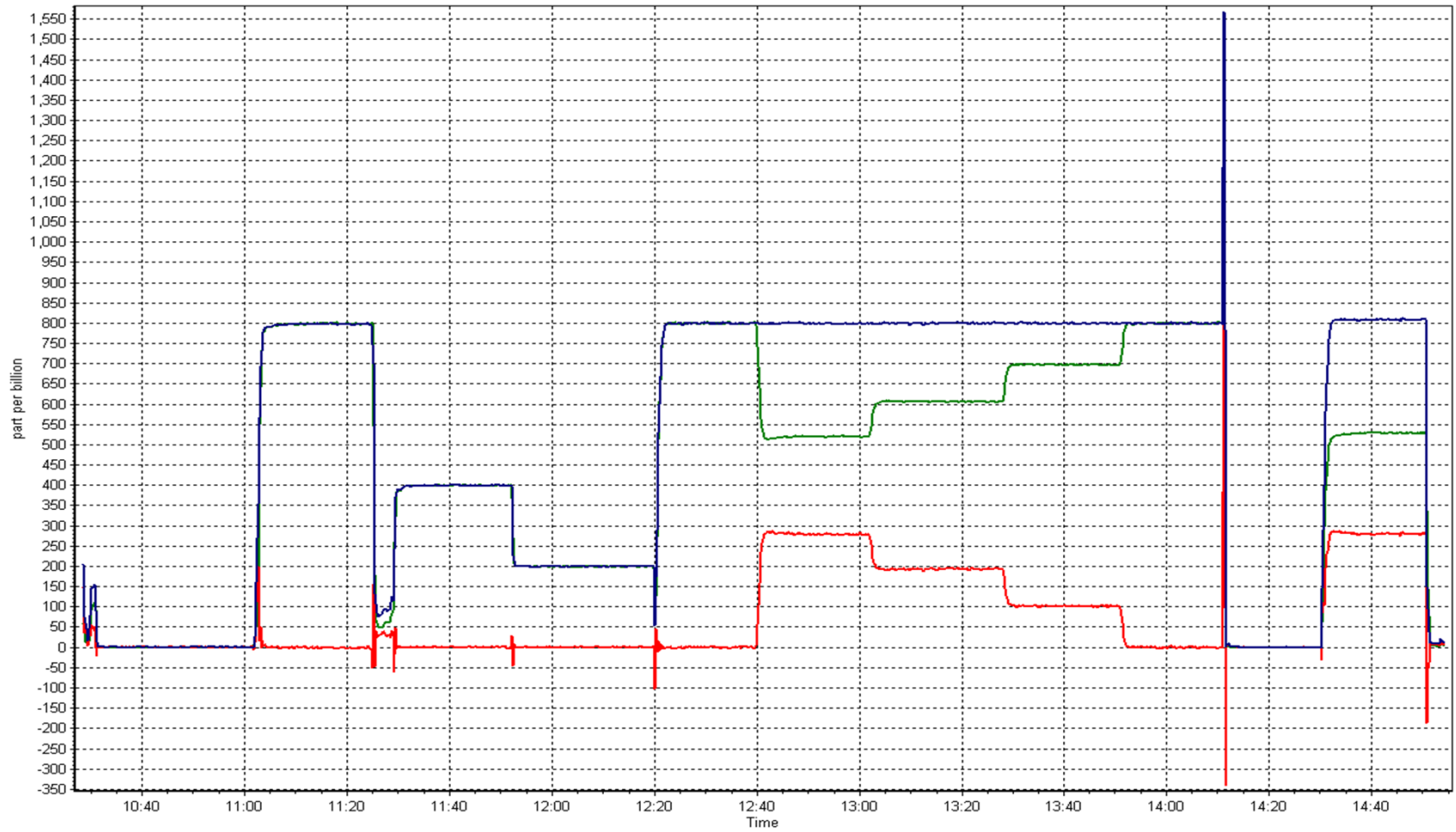
Calibration Date	February 12, 2015	Previous Calibration	January 21, 2015
Station Name	ConocoPhillips	Station Number	AMS 502
Start Time (MST)	10:30	End Time (MST)	14:55
Analyzer make	Thermo 42i	Analyzer serial #	1218153356

### Calibration Information

Calculated conc (ppb) (Cc)	Indicated concentration (ppb) (Ic)	Correction factor (Cc/Ic)	Statistical Evaluation	
0.0	0.3	N/A	Correlation Coefficient	0.999988
278.9	278.5	1.0016		
192.8	193.5	0.9965	Slope	1.001722
101.7	101.8	0.9991		
			Intercept	-0.399630

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





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*WOOD BUFFALO  
ENVIRONMENTAL  
ASSOCIATION*

**SEPTEMBER 2014  
MONTHLY REPORT**



CONTINUOUS MONITORING  
INTEGRATED MONITORING  
Original - October 30, 2014  
Revision 1 – March 31, 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

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March 30, 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 September 2014**  
**Wood Buffalo Environmental Association**  
**Revision 1**

---

Enclosed is a revision to the Wood Buffalo Environmental Association regional air quality monitoring network monthly report for September, 2014. There is 1 update in the Revision 1.

The ammonia (NH<sub>3</sub>) analyzer at AMS 6, Patricia McInnes, operated less than 90% of the time in September 2014. During the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) audit of the station on September 20, the NH<sub>3</sub> analyzer failed to meet the operational performance specifications as identified in the Air Monitoring Directive (AMD). Data from the AEMERA audit conducted on September 22, 2013 to and including analyzer repairs and recalibration on November 4, 2014 was reviewed and re-processed as per the findings of the audit, records of the analyzer operations and a data assessment.

The analyzer operations at the station for the review period were within the AMD criteria. A comparison of the NO<sub>x</sub> data collected simultaneously from the onsite Thermo Model 17C and 42i indicates a strong correlation between the two analyzers except for a short period of time when the data from the two analyzers did not match. Based on this strong correlation, it was inferred that the calculation of NH<sub>3</sub> data is accurately represented. With respect to the single episode of data from September 22 12:55h to September 23 20:10h, 2014 MST, where the NO<sub>x</sub> values from the two analyzers show differences, the Model 17C NH<sub>3</sub> data was invalidated and removed from the final data set. Conservatively, the NH<sub>3</sub> data from Thermo Model 17C, following the AEMERA Audit on September 20, 2014 and extending to September 24 daily span check at 08:00h MST, was invalidated and removed from the final data set.

Operational changes to calibration procedures within WBEA have been implemented to prevent these incidences from reoccurring in the future. The current Air Monitoring Directive indicates the performances of analyzers are to be within operational limits, if the as-found state of the analyzer response is within 15% of the calculated concentration when cross-referenced by a calibrator. WBEA has implemented a requirement for its personnel to replace the analyzer or repair it with a high degree of certainty that performance issues have been resolved in all incidences when the analyzer response is greater than 10% of the calculated concentration.

For September 2014 monthly reporting period, data from the NH<sub>3</sub> analyzer was operational for only 84% of the time. An operational time of less than 90% was

reported to Environmental Response Centre on March 5, 2015 (ESRD reference number 295573). Revised summary tables and data will be resubmitted to Alberta Environment and Sustainable Resource Development and Clean Air Strategic Alliance Data Warehouse by March 31, 2015.

If additional information is required, please call 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

R00\_1409\_L01\_V2.DOC

**WOOD BUFFALO ENVIRONMENTAL ASSOCIATION  
MONTHLY AMBIENT AIR QUALITY MONITORING REPORT  
September 2014  
REPORT HISTORY**

Original report release date: October 30, 2014

**Revision 1 – report release date: March 31, 2015**

**Update – AMS 6, Patricia McInnes, Ammonia hourly data revised**

During the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) audit of the station on September 20, the NH<sub>3</sub> analyzer failed to meet the operational performance specifications as identified in the Air Monitoring Directive (AMD).

After data review, the NH<sub>3</sub> data from Thermo Model 17C, following the AEMERA Audit on September 20, 2014 and extending to September 24 daily span check at 08:00h MST, was invalidated and removed from the final data set.

Report modifications include:

- Revision of the network summary.
- Revision of the monthly site summary tables.
- Replacement of the Ammonia hourly data tables.

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

SEPTEMBER 2014

page 1 of 2

prepared 04Mar15:17:45

APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	9	2014					
254465-00-00	rev.1						
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	99.86	0.047	0	0.005	0
189942-00-02	SO2(ppm)	2	97.78	0.082	0	0.010	0
206355-00-00	SO2(ppm)	4	50.00	0.043	0	0.005	0
46586-00-00	SO2(ppm)	5	99.86	0.084	0	0.011	0
216466-00-04	SO2(ppm)	6	99.86	0.015	0	0.004	0
137467-00-00	SO2(ppm)	7	100.00	0.013	0	0.002	0
20809-01-00	SO2(ppm)	8	100.00	0.006	0	0.001	0
241311-00-00	SO2(ppm)	11	100.00	0.030	0	0.006	0
094-02-00	SO2(ppm)	12	100.00	0.107	0	0.012	0
305529-00-00	SO2(ppm)	13	100.00	0.036	0	0.007	0
026-02-00	SO2(ppm)	14	100.00	0.009	0	0.001	0
228044-00-00	SO2(ppm)	15	98.47	0.053	0	0.007	0
73203-01-00	SO2(ppm)	16	100.00	0.031	0	0.004	0
	SO2(ppm)	17	100.00	0.015	0	0.004	0
	SO2(ppm)	19	100.00	0.021	0	0.003	0
	SO2(ppm)	501	96.67	0.005	0	0.001	0
	SO2(ppm)	502	50.42	0.004	0	0.001	0
	H2S(ppm)	2	97.78	0.012	2	0.003	0
	H2S(ppm)	4	50.42	0.003	0	0.001	0
	H2S(ppm)	5	100.00	0.017	3	0.003	0
	H2S(ppm)	11	100.00	0.007	0	0.002	0
	H2S(ppm)	17	100.00	0.002	0	0.001	0
	H2S(ppm)	19	99.17	0.003	0	0.001	0
	H2S(ppm)	501	99.17	0.001	0	0.000	0
	H2S(ppm)	502	51.81	0.002	0	0.001	0
	TRS(ppm)	1	99.86	0.009	0	0.002	0
	TRS(ppm)	6	100.00	0.002	0	0.001	0
	TRS(ppm)	7	100.00	0.002	0	0.001	0
	TRS(ppm)	9	100.00	0.003	0	0.001	0
	TRS(ppm)	12	100.00	0.003	0	0.001	0
	TRS(ppm)	13	100.00	0.016	2	0.002	0
	TRS(ppm)	14	99.86	0.002	0	0.001	0
	TRS(ppm)	15	100.00	0.001	0	0.001	0
	THC(ppm)	1	99.72	2.7	-	2.0	-
	THC(ppm)	2	96.67	6.1	-	2.8	-
	THC(ppm)	4	50.00	3.6	-	2.6	-
	THC(ppm)	5	99.58	5.1	-	2.8	-
	THC(ppm)	6	99.86	2.4	-	2.1	-
	THC(ppm)	7	100.00	2.3	-	2.1	-
	THC(ppm)	9	100.00	3.3	-	2.5	-
	THC(ppm)	11	100.00	4.1	-	2.7	-
	THC(ppm)	12	100.00	5.0	-	2.9	-
	THC(ppm)	13	96.67	4.2	-	2.5	-
	THC(ppm)	14	99.72	8.6	-	2.9	-
	THC(ppm)	15	100.00	6.1	-	2.7	-
	THC(ppm)	16	99.58	6.0	-	2.8	-
	THC(ppm)	17	99.58	2.8	-	2.3	-
	THC(ppm)	19	99.72	3.1	-	2.4	-
	O3(ppm)	1	99.17	0.049	0	0.026	-
	O3(ppm)	6	99.86	0.041	0	0.028	-

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

SEPTEMBER 2014

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APPROVAL NUMBERS	REPORT DATE						
	MONTH	YEAR					
289664-00-00	9	2014	CONTINUOUS AMBIENT MONITORING				
254465-00-00	rev.1						
149968-00-01							
48522-01-00							
240008-00-03							
48263-00-00							
224816-00-03							
189942-00-02							
206355-00-00							
46586-00-00							
216466-00-04							
137467-00-00							
20809-01-00							
241311-00-02							
094-02-00							
305529-00-00							
026-02-00							
228044-00-00							
73203-01-00							
			ONE-HOUR AVERAGE	24-HOUR AVERAGE			
	PARAMETER	STN. NO.	% TIME OPERATIONAL	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION	MAXIMUM CONCENTRATION	NO. READINGS > REGULATION
	O3(ppm)	7	99.86	0.040	0	0.022	-
	O3(ppm)	8	100.00	0.038	0	0.032	-
	O3(ppm)	13	100.00	0.044	0	0.023	-
	O3(ppm)	14	99.86	0.048	0	0.028	-
	O3(ppm)	17	100.00	0.042	0	0.029	-
	NO2(ppm)	1	99.72	0.023	0	0.011	-
	NO2(ppm)	6	100.00	0.017	0	0.007	-
	NO2(ppm)	7	100.00	0.033	0	0.012	-
	NO2(ppm)	8	100.00	0.011	0	0.003	-
	NO2(ppm)	12	99.86	0.035	0	0.016	-
	NO2(ppm)	13	100.00	0.026	0	0.010	-
	NO2(ppm)	14	99.31	0.013	0	0.004	-
	NO2(ppm)	15	100.00	0.027	0	0.011	-
	NO2(ppm)	16	100.00	0.029	0	0.016	-
	NO2(ppm)	17	100.00	0.016	0	0.006	-
	NO2(ppm)	19	100.00	0.027	0	0.008	-
	NO2(ppm)	501	100.00	0.014	0	0.003	-
	NO2(ppm)	502	52.50	0.019	0	0.007	-
	CO(ppm)	7	100.00	0.4	0	0.2	-
	NH3(ppm)	1	95.56	0	0	0	-
	NH3(ppm)	6	83.75	0	0	0	-
	PM2.5(ug/m <sup>3</sup> )	1	98.33	31.2	-	11.5	0
	PM2.5(ug/m <sup>3</sup> )	6	98.06	33.8	-	10.3	0
	PM2.5(ug/m <sup>3</sup> )	7	99.72	42.8	-	12.4	0
	PM2.5(ug/m <sup>3</sup> )	8	99.72	15.8	-	9.7	0
	PM2.5(ug/m <sup>3</sup> )	12	99.86	31.6	-	10.4	0
	PM2.5(ug/m <sup>3</sup> )	13	99.58	22.6	-	10.2	0
	PM2.5(ug/m <sup>3</sup> )	14	99.86	36	-	9.4	0
	PM2.5(ug/m <sup>3</sup> )	15	99.86	26.9	-	10.2	0
	PM2.5(ug/m <sup>3</sup> )	16	99.72	40.1	-	14.3	0
	PM2.5(ug/m <sup>3</sup> )	17	97.92	41.6	-	9.5	0
	WIND	1	99.44	-	-	-	-
	WIND	2	97.78	-	-	-	-
	WIND	4	100.00	-	-	-	-
	WIND	5	100.00	-	-	-	-
	WIND	6	96.67	-	-	-	-
	WIND	7	100.00	-	-	-	-
	WIND	8	99.86	-	-	-	-
	WIND	9	99.17	-	-	-	-
	WIND	11	99.58	-	-	-	-
	WIND	12	99.72	-	-	-	-
	WIND	13	99.17	-	-	-	-
	WIND	14	99.58	-	-	-	-
	WIND	15	99.72	-	-	-	-
	WIND	16	100.00	-	-	-	-
	WIND	17	99.44	-	-	-	-
	WIND	19	100.00	-	-	-	-
	WIND	501	97.64	-	-	-	-
	WIND	502	52.50	-	-	-	-
SIGNATURE OF ASSOCIATION REPRESENTATIVE				FOR ALBERTA ENVIRONMENT USE ONLY			



# **WOOD BUFFALO ENVIRONMENTAL ASSOCIATION**

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

### **AMS 6 PATRICIA MCINNES SEPTEMBER 2014**

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

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

Original: October 30, 2014  
Revision 1: March 31, 2015

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WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
 SEPTEMBER 2014 (revised March 4, 2015)

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

Parameter	Hours of Data	Hours of Calibration	Hours without Data	Operational Time	Maximum 1-Hour Value	1-Hour Exceedances	Maximum 24-Hour Value	24-Hour Exceedances
SO2 (ppb) Average	683	36	37	99.86	15	0	4	0
TRS (ppb) Average	680	40	40	100.00	2	0	1	0
THC (ppm) Average	681	38	39	99.86	2.4	-	2.1	-
NMHC(ppm) Average	681	38	39	99.86	0.051	-	0.003	-
CH4(ppm) Average	681	38	39	99.86	2.4	-	2.1	-
O3 (ppb) Average	682	37	38	99.86	41	0	28	-
NO2 (ppb) Average	680	40	40	100.00	17	0	7	-
NO (ppb) Average	680	40	40	100.00	17	-	4	-
NOX (ppb) Average	680	40	40	100.00	25	-	10	-
NH3 (ppb) Average	562	41	158	83.75	0	0	0	-
PM2.5 (ug/m3) Average	706	0	14	98.06	33.8	-	10.3	0
Temperature 2 m (C) Average	720	0	0	100.00	29.5	-	18.2	-
Relative Humidity (%) Average	720	0	0	100.00	98	-	-	-
Wind Speed 10 m (km/h) Average	696	0	24	96.67	32	-	-	-
Wind Direction 10 m (deg) Average	696	0	24	96.67	-	-	-	-

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

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
 SEPTEMBER 2014 (revised March 4, 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	0.9	2	-	0	0	0	0	1	2	15
TRS (ppb) Average	680	0.5	0	-	0	0	0	0	1	1	2
THC (ppm) Average	681	1.98	0.1	-	1.9	1.9	1.9	2	2	2.1	2.4
NMHC(ppm) Average	681	0	0.002	-	0	0	0	0	0	0	0.051
CH4(ppm) Average	681	1.98	0.1	-	1.9	1.9	1.9	2	2	2	2.4
O3 (ppb) Average	682	17.6	8	-	2	7	11	17	23	28	41
NO2 (ppb) Average	680	3.3	3	-	0	1	1	3	5	7	17
NO (ppb) Average	680	1.4	2	-	0	0	0	1	2	3	17
NOX (ppb) Average	680	4.6	4	-	0	1	2	3	6	10	25
NH3 (ppb) Average	562	0	0	-	0	0	0	0	0	0	0
PM2.5 (ug/m3) Average	706	4.8	4.1	-	0.1	1.2	2.1	3.7	6.4	9.5	33.8
Temperature 2 m (C) Average	720	9.48	5.8	-	-1.5	2.4	5.4	8.9	12.6	18	29.5
Relative Humidity (%) Average	720	74	19	-	24	44	62	78	90	94	98
Wind Speed 10 m (km/h) Average	696	9.4	6	-	0	3	5	8	13	18	32
Wind Direction 10 m (deg) Average	696	-	-	-	-	-	-	-	-	-	-

WOOD BUFFALO ENVIRONMENTAL ASSOCIATION - PATRICIA McINNES (AMS 6)  
 SEPTEMBER 2014 (revised March 4, 2015)

OPERATIONAL NOTES

Parameter	Period Start	Period End	Duration (Hours)	Notes
SO2	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
NMHC, CH4, THC	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
O3	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
NH3	01 Sep 2014 10:00	30 Sep 2014 09:00	29	Stabilization after daily span
NH3	06 Sep 2014 12:00	06 Sep 2014 12:00	1	Maintenance - sample manifold cleaned
NH3	20 Sep 2014 14:00	24 Sep 2014 07:00	90	Analyzer failure - AMD Audit failure and Data Assessment
PM2.5	08 Sep 2014 12:00	08 Sep 2014 12:00	1	Maintenance - Flow and zero check, sample head cleaning
PM2.5	15 Sep 2014 04:00	15 Sep 2014 13:00	11	Analyzer failure - analyzer removed for off site repair
PM2.5	25 Sep 2014 12:00	25 Sep 2014 12:00	1	Intermittent unstable operation - excessive baseline drift
PM2.5	26 Sep 2014 23:00	26 Sep 2014 23:00	1	Intermittent unstable operation - excessive baseline drift
Wind Speed, Wind Direction	03 Sep 2014 16:00	03 Sep 2014 16:00	1	Flatline in sensor output signal
Wind Speed, Wind Direction	03 Sep 2014 17:00	04 Sep 2014 14:00	22	DAS collection error - invalid program uploaded
Wind Speed, Wind Direction	24 Sep 2014 00:00	24 Sep 2014 00:00	1	Flatline in sensor output signal

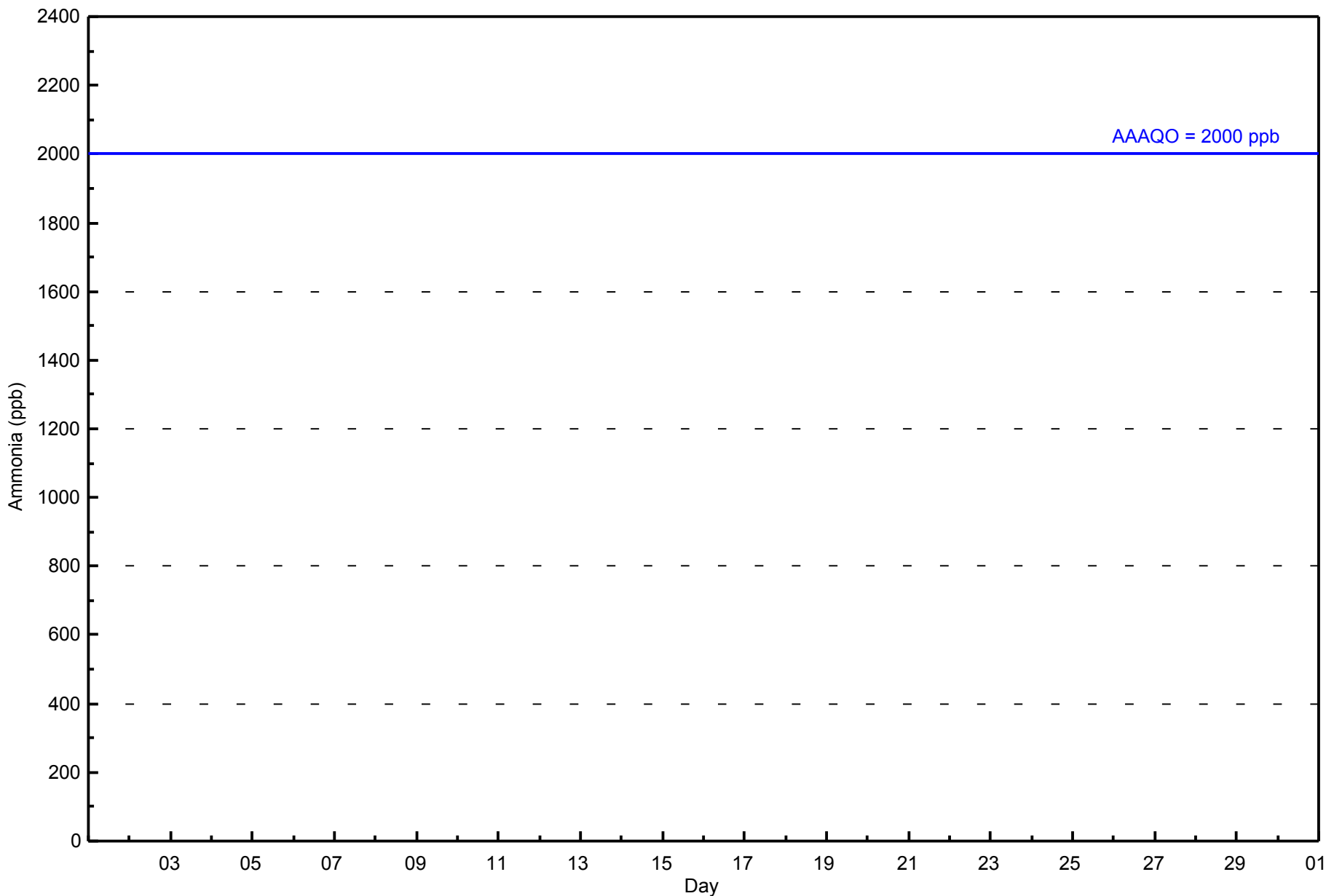
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**WBEA NETWORK**  
**Hourly Averages**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - September 2014**







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

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - September 2014**

<b>Concentration Ranges (ppb)</b>	<b>Number of Hours</b>	<b>%</b>	<b>Cumulative %</b>
0 - 5	562	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: 562

Total Number of Hours: 720



**WBEA NETWORK**  
**Frequency Distribution**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - September 2014**

Concentration Ranges (ppb)	Wind Direction																Totals
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 - 5	42	30	16	7	15	47	38	32	42	47	43	30	25	33	34	60	541
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>	42	30	16	7	15	47	38	32	42	47	43	30	25	33	34	60	541

Total Number of Valid Hours: 541

Total Number of Hours: 720

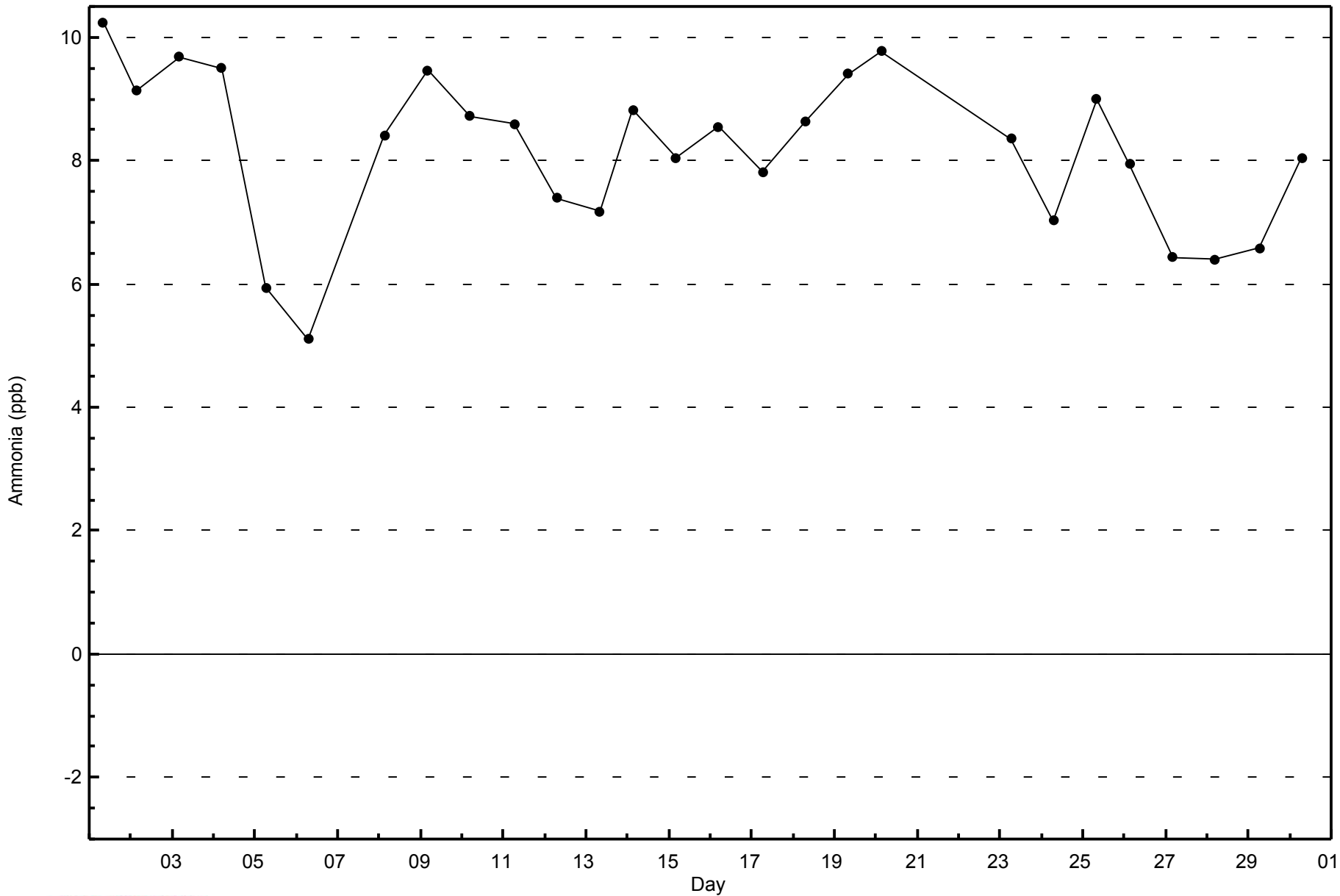


WBEA NETWORK

Zero Responses

Ammonia (NH<sub>3</sub>) - ppb

Patricia McInnes - September 2014





**WBEA NETWORK**  
**Span Responses**

**Ammonia (NH<sub>3</sub>) - ppb**  
**Patricia McInnes - September 2014**

